Functional Servicing Report

VED Homes Subdivision

Township of Wellington North

November 2, 2022

Project Reference Number 22-087

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Introduction

This report will review the functional servicing for the proposed development on VED Homes in Township of Wellington North, Ontario.

Background Information

The subject property comprised of townhouse blocks including 35 units in Township of Wellington North, County of Wellington. The 0.985 ha property is bounded by Catchet Development residential lots to the west, residentials and property lands to the south, and residentials to the north and east. The site location is shown below.

Figure 1- Site Location

Sanitary Servicing

The proposed development includes residential blocks. All residential units will be serviced by 100 mm diameter sanitary sewers teed of 200mm diameter sanitary sewers. The total sanitary flow will be directed to manhole MH1A. A sanitary sewer collector of 200 mm diameter connects manhole MH1A to the existing manhole MH6A at Catchet Development. The wastewater flows from the proposed development are calculated using the Municipal Servicing Standards of Township of Wellington North.

The residential peak sanitary flow including infiltration was calculated using density estimate of 2.76 persons per unit, an average flow of 0.0052 L/c/s, a peak factor according to Harmon formula, and an inflow and infiltration allowance of 0.15 L/ha/s.

The total peak flow from the proposed development is calculated to be 2.31 L/s. The Catchet Development sanitary sewer has been sized for external lands including VED Homes lands.

The sanitary sewer design sheet for the proposed development and Catchet Development is included in Appendix A. The sanitary sewer design sheet of Catchet Development is included in Appendix B. The total capacity of 200 mm sanitary sewer from MH6A to MH5A at Catchet Development is 23 L/s and it can convey the total wastewater of VED Homes and Catchet developments collected at MH6A. The proposed sanitary catchment areas are included in Appendix C.

Water Servicing

The150 mm diameter water main along Adelaide Street is proposed to be extended to service the VED Homes Development. The water service will provide for fire suppression and domestic water supply to the building. The domestic water supply main will be a 150 mm watermain teed off of the 150mm watermain at Adelaide Street. Each unit will have a 25 mm diameter water service off of the 150 mm watermain.

The domestic water demand was calculated based on the Municipal Servicing standards - Township of Wellington North, and Water and Design Guidelines for Drinking-Water Systems 2008 - Ministry of the Environment. The average water demand per unit is based on 2.76 persons per unit with an average daily demand of 450 L/cap/day. Townhouse blocks 1, 2, and 3 have five units, while 4 Townhouse rows of the Condo Block have from 3 to 6 units. The max day peaking factor is 1.9. The water demand for each block is summarized in the table below.

Table 1: Condo Blocks Water Demand

Townhouse Block	Average Water Demand L/S	Max Day Demand L/S
Block 1 with 5 units	0.0719	0.1366
Block 2 with 5 units	0.0719	0.1366
Block 3 with 5 units	0.0719	0.1366
Condo blocks with 6 units	0.0863	0.1639
Condo blocks with 6 units	0.0863	0.1639
Condo block with 5 units	0.0719	0.1366
Condo block with 3 units	0.0431	0.0819

The fire flow requirement for the townhouse units is calculated based on the Fire Underwriter's Survey Water Supply for Public Fire Protection, 1999. As per Part II of the document, Note J addresses dwellings, and states that if the buildings are contiguous, the fire flow requires is 8,000 L/min (133 L/s).

Stormwater Servicing

The proposed development consists of townhouse blocks including 35 new residential units. The post development runoff from the entire site will be directed to Catchet Development located west of the VED Homes Development. The storm sewer system of Catchet Development has been sized for external lands including VED Homes lands. The backyard of blocks 1 and 2 will

drain overland towards the catchment areas of Catchet Development. The roofs and front areas of blocks 1, 2, and 3 as well as Adelaide Street will drain to proposed catchbasin CB1 and catchbasin manhole CBMH1 at Adelaide Street. The runoffs in excess of the capacity of the 375 mm storm sewer outlet at CBMH1 will be diverted over the Adelaide Street and drain into catchbasin DCB1 at the proposed driveway. The grading of roofs, front areas of the Condo blocks, and driveway will direct the stormwater to catchbasin DCB1. The backyards of the east Condo block and block 3 will also drain to the catchbasin DCB1.The catchbasin DCB1 will discharge into the proposed underground chamber located east of the driveway. The underground chambers comprise of 60 chambers and are equipped with a 200 mm control pipe for quantity control of the outflow to the manhole MH2. The southwest, south, and southeast landscapes as well as proposed parking area will finally drain to the existing manhole MH7B.

The overall site peak flows in post development condition have been attenuated to less than peak flows in predevelopment condition considered in Cachet Development stormwater management design.

One central quality and quantity SWM pond for the Catchet Development area and the external drainage areas, including VED Homes Development, is proposed. No additional quality control is required for VED Homes Development.

Table 2: Peak Discharge Rates from Subject Property

Design Storm	Total inflow to Catchet Development based on Catchet stormwater management report (m^3/sec)	Proposed Condition *Outflow from VED Development to Catchet Development at MH7* (m^3/sec)
5 year	0.108	0.089
100 year	0.212	0.209

Conclusions

1. Each unit of the proposed development will be serviced with a 100 mm diameter sewer to the proposed 200mm diameter sanitary sewers, which finally direct the sewer flow to the Existing manhole at Catchet Development.
2. Each unit of the proposed development will be serviced with a 25 mm diameter water service off of the 150 mm watermain. The150 mm watermain will be teed off of the 150mm watermain at Adelaide Street. The water service will provide for fire suppression and domestic water supply.
3. The proposed development will include stormwater management on site to provide quantity control of runoff. Quality control will be carried out on Catchet Development Site located next to VED Homes Development site. The overall site peak flows in post development condition have been attenuated to less than peak flows in predevelopment condition.

Hossein Moarefi, P.Eng.
K. Smart Associates Limited

APPENDIX A

Sanitary Sewer Design Sheet of the Proposed Development

VED Homes Subdividion, Township of Wellington North

SANITARY SEWER DESIGN SHEET

Project Name:	VED Homes Subdivision
Project Number:	22-087
Date:	02-Nov-22
Designed by:	Hossein Moarefi, P. Eng.
Checked by:	Sandra Swanton, P. Eng.

Residential Sewage Flow[2]	0.0052 L/c/s (450 L/c/day)
Density- Appartments[1]	2.76 c/unit
Units	35
Residential Peaking Factor[2]	$1+(14/4+P^{0.5})$, P = Pop/1000
Infiltration[2]	0.15 L/ha/s

LOCATION						SEWAGE FLOWS					SEWER DESIGN					
Block	From	To	Blocks Area (ha)	Total area (m^2)	Total Pop.	Res. Peaking Factor	Average Res. Flow (L/s)	Peak Res. Flow (L/s)	Infiltration (L/s)	Total Peak Flow (L/s)	Mannings 'n'	Pipe Size (mm)	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)
Condo Block- South west units (A1)	MH4A	MH3A	0.120	0.120	17	4.39	0.088	0.388	0.018	0.406	0.013	200	1.00	23.5	32.80	1.044
Condo Block - Sout East units (A2)	MH5A	MH3A	0.253	0.253	22	4.37	0.114	0.500	0.038	0.538	0.013	200	1.00	38.1	32.80	1.044
CondoBlock west units (A3)		MH1A	0.140	0.140	17	4.39	0.088	0.388	0.021	0.409						
Condo Block South west units (A1) + Condo Block South East units (A2) + CondoBlock west units (A3)	MH3A	MH1A	0.513	0.513	56	4.30	0.291	1.253	0.077	1.330	0.013	200	0.50	64.7	23.19	0.738
Blocks 2, 3 (A4)	MH2A	MH1A	0.313	0.313	28	4.36	0.146	0.635	0.047	0.682	0.013	200	1.00	35.8	32.80	1.044
Block 1 (A5)		MH1A	0.160	0.160	14	4.40	0.073	0.320	0.024	0.344						
(A1, A2, A3, A4, A5) Blocks 1, 2, 3 and all Condo Blocks	MH1A	EX. MH6A	0.986	0.986	98	4.25	0.510	2.164	0.148	2.312	0.013	200	0.50	35.3	23.19	0.738

Notes:

1- Appendix B -Projected Futuer Service Population and Average Day Wastewater Flows

2- Municipal Servicing Standards - Township of Wellington North

APPENDIX B

Sanitary Sewer Design Sheet of Catchet Development

Urbtech Engineering Inc.
1200 Speers Road, Suite 8, Oakville, Ontario L6L 2X4
Telephone (905) 896 7364 Fax (905) 896 9433

SANITARY DESIGN SHEET
PROPOSED RESIDENTIAL SUBDIVISION
TOWN OF ARTHUR

Sheet No. 1 of 1
Job No. 20-442
Designed by: A.J.
Date: 31-Jan-22

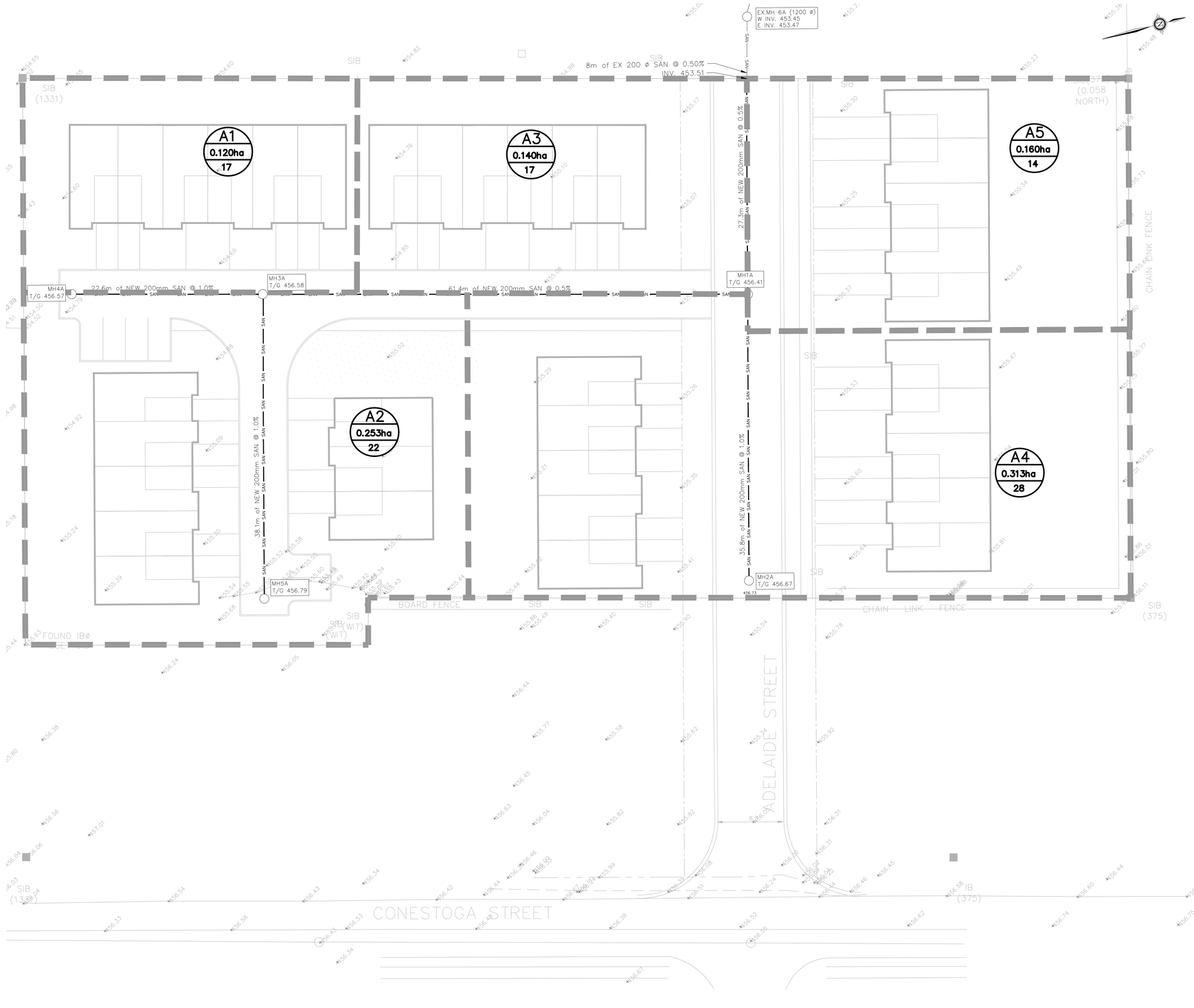
Domestic Flows 350 l/cap/day n = 0.013
Residential pop 4 ppu Infiltration = 0.20 l/s/ha

MH Head Loss h = |(Vd^2- Vu^2)/2g| 180*
h = |(Vd^2- 0.25Vu^2)/2g| 90*
h = |(Vd^2- 0.50Vu^2)/2g| 45*

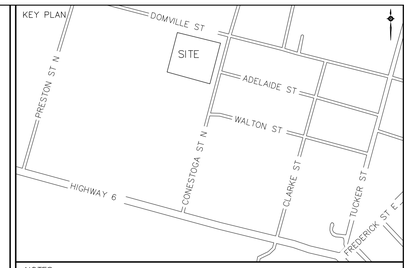
LOCATION			AREA			POPULATION				SEWAGE FLOW						SEWER DESIGN			
STREET	FROM MH	TO MH	AREA No.	AREA (ha)	CUM A. (ha)	PERSONS PER LOT	NO. OF LOTS	POPU-LATION	CUM. POP.	PEAKING FACTOR	Q AVG. (lps)	Q PEAK (lps)	INFILTR. (lps)	TOTAL (lps)	DIA. (m)	GRADE (%)	V (m/s)	Q CAP. (lps)	LENGTH (m)
North Side																			
	12A	10A		0.120	**0.120**	4	2	8	**8**	4.00	0.03	0.13	0.02	**0.15**	200	1.00	1.04	**33**	22.0
	11A	10A		0.490	**0.490**	4	8	32	**32**	4.00	0.13	0.52	0.10	**0.62**	200	1.00	1.04	**33**	55.0
	10A	9A		0.610	**1.220**	4	16	64	**104**	4.00	0.42	1.69	0.24	**1.93**	200	0.50	0.74	**23**	100.0
	9A	8A		0.490	**1.710**	4	13	52	**156**	4.00	0.63	2.53	0.34	**2.87**	200	0.50	0.74	**23**	90.0
	8A	7A		0.400	**2.110**	4	12	48	**204**	4.00	0.83	3.31	0.42	**3.73**	200	0.50	0.74	**23**	91.0
	6A	5A		1.090	**1.090**	4	14	56	**56**	4.00	0.23	0.91	0.22	**1.13**	200	0.50	0.74	**23**	35.0
	5A	4A		0.120	**1.210**	4	2	8	**64**	4.00	0.26	1.04	0.24	**1.28**	200	0.50	0.74	**23**	21.0
	4A	3A		0.450	**1.660**	4	15	60	**124**	4.00	0.50	2.01	0.33	**2.34**	200	0.50	0.74	**23**	80.0
	3A	2A		0.700	**2.360**	4	19	76	**200**	4.00	0.81	3.24	0.47	**3.71**	200	0.50	0.74	**23**	90.0
	2A	1A		0.640	**3.000**	4	18	72	**272**	4.00	1.10	4.41	0.60	**5.01**	200	0.50	0.74	**23**	90.0

APPENDIX C

Proposed Sanitary Catchment Areas



KEY PLAN



NOTES:

A1
0.000ha
00
SANITARY CATCHMENT AREA

PROPOSED TOP OF GRATE ELEVATION

No.	REVISIONS	BY	DATE
	CONSTRUCTION		
	TENDER		
	ISSUE FOR APPROVALS		
	ISSUE BLOCK		

VED HOMES SUBDIVISION

ADELAIDE STREET EXTENSION, ARTHUR

COUNTY OF WELLINGTON TOWNSHIP OF WELLINGTON NORTH

PROPOSED SERVICING CATCHMENT PLAN

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

LICENSED PROFESSIONAL ENGINEER
HOSSEIN MOAREFI
100162491
JULY 22/22
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
KEVIN DEATH
No. 050753

DESIGNED BY: HM	0 5 10	DATE: JULY 2022
CHECKED BY: KD	SCALE: 1:250	SHEET
DRAWN BY: CN		1 OF 1
CHECKED BY: KD	REVISION No.	
FILE No. 22-087		