

**WEST LORNE
SANITARY SEWER STUDY 2021**

MUNICIPALITY OF WEST ELGIN



MUNICIPALITY OF
West Elgin



March 21, 2022

Lee Gosnell
Manager of Operations & Community Services
Municipality of West Elgin
22413 Hoskins Line
Rodney, Ontario
N0L 2C0

Mr. Gosnell:

Re: West Lorne Sanitary Sewer Study 2021
Our Job No. 221081

This study has been prepared in accordance with instructions provided by the Municipality of West Elgin. An analysis of the capacity of the existing sanitary sewer system under existing conditions (population and water usage) as well as long term growth for proposed and anticipated developments was then completed including several potential developments. The following summarizes our findings, provides comments regarding sanitary sewer capacity to accommodate urban growth and provides a future sanitary sewer design.

SUMMARY OF REPORT

A. GENERAL

The main purpose of this study was to analyse the existing conditions of the sanitary sewer network in West Lorne and determine if the existing sanitary system has excess capacity to accommodate future urban growth.

We note that this sanitary sewer study included analysis of all existing sanitary sewers within the Town of West Lorne, along both Municipality of West Elgin and Elgin County roadways.

It should be noted that additional sewage contributions from urban growth would not only have an impact on the sanitary sewers, but also on the existing pumping station, treatment plant and sewage lagoon.

Based on our records of the existing sanitary sewer system, we have prepared a plan of the entire sewer system and completed theoretical calculations for each sewer run to compare existing sewage flows to actual sewer capacity. Similarly, we performed calculations to determine required sewer sizing for anticipated sewage flows based on proposed developments and anticipated future residential growth.



A. GENERAL (cont'd)

This sanitary sewer study revealed that approximately 84.34 hectares of land is tributary to the existing sanitary sewer system. The existing sanitary sewers located within this study area are of various ages and therefore were constructed to different design standards.

An analysis of the calculated tributary flows and capacities for both existing and future conditions for the above-noted areas was completed as detailed below. The existing sanitary sewers were all deemed to have adequate capacity to meet existing and proposed flows (see Area Plans and Design Sheets in APPENDICES 'A' and 'B').

A desktop study of existing sanitary sewer infrastructure was performed, including review of as-built drawings provided by the Municipality, and reference to Spriet Associates design drawings and records. Information regarding the extent of proposed and future developments was provided by Municipality personnel. Similarly, Municipality personnel provided water usage data for the highest users within the Town of West Lorne for our review and inclusion within the design sheets to ensure accurate existing sanitary sewer flows are reflected within our capacity analysis.

Refer to APPENDIX 'A' – Drawings EX1 and EX2, which depicts the existing sanitary sewer system within the Town of West Lorne.

As noted, areas of proposed or future growth within West Lorne were determined in liaison with Municipality personnel and are plotted within the Future Conditions Sanitary Area Plan included in APPENDIX 'B' – Drawings FUT1 and FUT2.

B. DESIGN CRITERIA

Determination of the tributary populations and sewer capacities for both existing and future conditions were completed using information gathered from drawings (as-constructed) as well as liaison with Municipality personnel. Refer to the Area Plans and Design Sheets included within APPENDICES 'A' and 'B'.

Flows for the tributary populations were calculated based upon current local standards using computerised software spread sheets. Several factors including tributary population densities and land use (i.e. residential, commercial or industrial) and measured water usage values were considered to accurately calculate sanitary flows within the spread sheets. Tributary populations are outlined on the design sheets. The design review was performed in accordance with current Ministry of Environment, Conservation and Parks (MECP) and local standards.

The predominant land use within the sanitary sewer area under investigation in this study is residential. However, numerous commercial and industrial properties also exist within the study area. Future growth was modelled to incorporate proposed or future residential developments.



B. DESIGN CRITERIA (cont'd)

Sanitary sewage flows outlined within the study are calculated using the following criteria consistent with local design standards:

1. Tributary Population Densities:

Tributary population densities taken in accordance with Official Plan and Zoning Bylaw recommendations.

Residential and Commercial: Population density of 60 persons per gross hectare or 80 persons per net hectare.

Industrial: Population density not less than 115 persons per net hectare.

2. Daily per Capita Sewage Flow:

Daily per capita sewage flows of 350 L, excluding infiltration allowances, for residential areas.

3. Land Use:

The Municipality's Official Land Use plan for ultimate probable land use. The net area shall be taken as the gross hectares less the area occupied by roads, parks, right-of-ways, etc. The net area for residential and commercial lands is taken as 73% of the gross hectares. The net industrial area is taken as 80% of the gross industrial hectares.

4. Capacity Factor:

Residential and Commercial: Ranging from 1.55 for 4.0 hectares of net residential or commercial land to 1.00 for 3,000 net hectares.

Industrial: Ranging from 1.55 for 4.0 hectares of net industrial land to 1.00 for 1,600 hectares of net industrial land.

5. Sewage Flow Allowances:

Industrial and Commercial: Sewage flow allowances for industrial and commercial developments shall not be less than 22,500 litres per gross hectare per day.

6. Peak Sewage Flows:

Residential: Residential peak sewage flows calculated based on the Harmon Formula as noted below:

$$M = 1 + \frac{14}{4 + P^{0.5}}$$

Where, P is the Tributary Population in thousands

M is the Peaking Factor (maximum of 4 where applicable)

Industrial and Commercial: Industrial and Commercial peak sewage flows calculated based on the "Harmon" x 0.8



B. DESIGN CRITERIA (cont'd)7. Infiltration Allowance:

The infiltration allowance for all types of developments shall be taken as 8640 litres per hectare per day or 0.100 litres per hectare per second.

8. Minimum Pipe Diameter:

The minimum size of sanitary sewer is 200mm diameter.

The Manning Formula was used to calculate capacity of existing and proposed sanitary sewer pipes, and a Manning coefficient of friction value of $n = 0.013$ is generally accepted as standard practice for sewer design. However, based on the age and material of the existing sanitary sewers within the study area, a Manning coefficient of friction of 0.015 is more applicable in this situation when analysing the existing sanitary sewers.

C. MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS (MECP) GUIDELINES

The MECP Guidelines for the Design of Sanitary Sewer Systems includes the following text:

Wherever possible, the design of sanitary sewers should be based on the ultimate sewage flows expected from the tributary area. Tributary areas need not necessarily be restricted to current municipal limits.

For the estimation of future sewage flow rates for municipal sewage collection systems, the designer should make reference to the Official Plan (or Draft Official Plan) of the municipality. Such official plans will contain future population densities and land uses.

Sanitary sewer capacities should be designed for the estimated ultimate tributary population, except where parts of the systems can be readily increased in capacity.

The sewage flows from commercial and institutional establishments vary greatly with the type of water-using facilities present in the development, the population at the facilities, the presence of water metering and the extent of extraneous flows entering the sewers.

Peak sewage flow rates from industrial areas vary greatly with the extent of area development, the types of industries present, the provision of in-plant effluent treatment and recycle/re-use or rate of flow controls, the presence of cooling waters in the discharge and other factors.

All sewers should be designed and constructed to give mean velocities, when flowing full, of not less than 0.6 m/s (2.0 ft/s), based on the Chézy-Manning formula using an 'n' value of 0.013.

Sewers 1200 mm in diameter (NPS-48) or larger should be designed and constructed to give mean velocities, when flowing full, of not less than 0.9 m/s (3.0 ft/s), based on the Chezy-Manning formula using an 'n' value of 0.013.

The velocities in sanitary sewer systems should not be more than 3 m/s (10 ft/s), especially where high grit loads are expected. Higher velocities should be avoided unless special precautions are taken. Where velocities greater than 4.6 m/s (15 ft/s) are attained, special provision should be made to protect against pipe displacement by impact and erosion.



D. **EXISTING CONDITIONS**

This sanitary sewer study revealed that approximately 84.34 hectares of land is tributary to the existing sanitary sewer system. The existing sanitary sewers located within this study area are of various ages and therefore were constructed to different design standards.

The existing sanitary sewer system within West Lorne consists of approximately 12,500m of sanitary sewers, ranging in size from 200mm to 450mm diameter. The bulk of these sanitary sewers were constructed in the early 1970's based on the as-constructed drawings prepared for Ontario Water Resources Commission. The existing sanitary sewers are split into (2) distinctive and separate sewer networks, essentially splitting the Town of West Lorne sanitary flows into a northerly and southerly sewer system. Each of these sewer systems outlets their respective flows at the existing underground pump station, located along Marsh Line approximately 220m westerly of the intersection of Marsh Line and Angelo Street. A 450mm diameter trunk sanitary sewer provides outlet from pump station flows southerly with outlet into the existing downstream sewage lagoon treatment system.

The West Lorne Wastewater Treatment Plant and Collection System is operated under the MECP Certificate of Approval ECA # 3-0442-90-938. A brief overview of the West Lorne Wastewater Treatment Plant and Collection System is as follows:

- The West Lorne Wastewater Treatment Plant is comprised of extended aeration, clarification, filtration, disinfection and sludge disposal.
- Collection system including one (1) pumping station and a sanitary sewer system.

Based on the 2020 West Lorne Wastewater Treatment Plant Quarterly Report, the plant is currently at 56% of its rated capacity of 900 m³/day (10.42 L/s) based on the 2020 average daily raw flow of 501.44 m³/day.

OCWA ANNUAL REPORT FLOWS

Annual OCWA Report	Average Day Flows		Max Day Flows	
	m ³ /d	L/s	m ³ /day	L/s
2016	466.35	5.40	1452	16.81
2017	496.10	5.74	1512	17.50
2018	634.80	7.35	2427	28.09
2019	509.30	5.89	1998	23.13
2020	473.3	5.48	1414	16.37



E. PROPOSED CONDITIONS

In order to review the existing sanitary sewer system under proposed or future conditions, we included currently proposed or anticipated subdivisions within the “Future” analysis. Currently proposed subdivisions, as noted on Drawings FUT1 and FUT2, are summarized as follows:

1. Finney Street Subdivision (A125) – located in the north-westerly portion of West Lorne along the east side of Finney Street with sanitary flows proposed to enter the sanitary system within existing maintenance hole MH SN131 located along Finney Street. The subdivision includes 10 proposed single-family homes with an estimated population of 30.
2. Creeks Edge Subdivision (FUT ‘A’ and FUT ‘B’) – located in the south-westerly portion of West Lorne along the north side of Marsh Line with sanitary flows proposed to enter the sanitary system within existing maintenance holes SA53 and SA10 located along Marsh Line. The subdivision includes 67 proposed single-family homes with an estimated population of 201.
3. Future Town Homes (FUT ‘C’) – located at the west side of the intersection of Ridge Street and Chestnut Street with sanitary flows proposed to enter the sanitary system within existing maintenance hole MH 102. The development was included with 33 town homes proposed with an estimated population of 66.
4. Future Residential Development – located south of Elm Street and west of Chestnut Street and Mehring Avenue with sanitary flows proposed to enter the sanitary system within existing maintenance hole MH 21. The development was included with 117 single family units with an estimated population of 351.

F. LIST OF ATTACHMENTS

APPENDIX ‘A’

DRAWINGS EX1 – EX2	-	Existing Sanitary Sewers Under Existing Demand
FIGURE NO. 1	-	Existing Sanitary Sewer Design Sheet

APPENDIX ‘B’

DRAWINGS FUT1 – FUT2	-	Existing Sanitary Sewers Under Proposed Demand
FIGURE NO. 2	-	Future Sanitary Sewer Design Sheet

APPENDIX ‘C’

Typical Photos

APPENDIX ‘D’

FIGURE NO. 3 -	Official Plan – Schedule ‘D’ – Land Use and Transportation Plan
FIGURE NO. 4 -	Zoning By-Law – Schedule ‘C’ - West Lorne and Area (Maps 1 – 6)



G. **SUMMARY AND RECOMMENDATIONS**

When comparing APPENDIX 'A' (existing conditions) and APPENDIX 'B' (future conditions) Area Plans and Design Sheets, it was noted that all existing sanitary sewer runs are adequate to convey existing and future flows including the noted future development conditions.

The following chart provides a comparison of existing and future sanitary sewer modelling results:

	Existing Conditions	Future Conditions
Area (ha)	84.34	108.94
Population	1879	2524
Maximum Estimated Flow (L/s)	41.37	55.22
Used Sewer Capacity in Runs MH25 – MH10 (%)	43	54
Used Sewer Capacity in Runs MHSA9 – MHSA1 (%)	49	65

Of specific note are the following:

- In both existing and future scenarios, all existing sanitary sewer runs have adequate capacity to convey estimated flows.
- The downstream sewer runs within the northerly sanitary sewer area (MH25 – MH 10) are able to convey approximately 43% and 54% of the estimated existing and future flows, respectively.
- The downstream sewer runs within the combined northerly and southerly sanitary sewer area (MHSA9 – MHSA1 at the lagoon) are able to convey approximately 49% and 65% of the estimated existing and future flows, respectively.

We note that analysis of the existing pump station and Wastewater treatment plant including sewage lagoon treatment system were not included within this Report. As such, monitoring of the condition and capacity of the pump station and sewage lagoon treatment system should continue to be reviewed at designated intervals including the rate of development and proposed development growth in West Lorne.

We acknowledge that this analysis was based on theoretical volumes and measured high water user water records within West Lorne, with ultimate (overall) flow value comparison with flows documented within the OCWA yearly reports. Specific parameters within the modelling were revised to ensure the existing overall flows compared favourably with measured OCWA flows.

We note that modelling results suggests that numerous runs may not experience flow velocities meeting the MECP recommended minimum 0.6 m/s. As such, a sewer flushing program may be warranted within the sewer system at known or documented concern areas.

It may be beneficial to perform video inspection of specific runs of sanitary sewer to confirm existing condition, particularly in areas with known capacity or surcharge concerns.



H. FURTHER INVESTIGATION

We recommend that this Report be reviewed and revised every 5-10 years based on changes related to sewer infrastructure construction, proposed development, funding, and any reported problem areas.

Respectfully submitted,

SPRIET ASSOCIATES LONDON LIMITED



C. S. Lierman, P.Eng.



APPENDIX 'A'

EXISTING CONDITIONS

DRAWINGS EX1 – EX2 – EXISTING SANITARY SEWERS

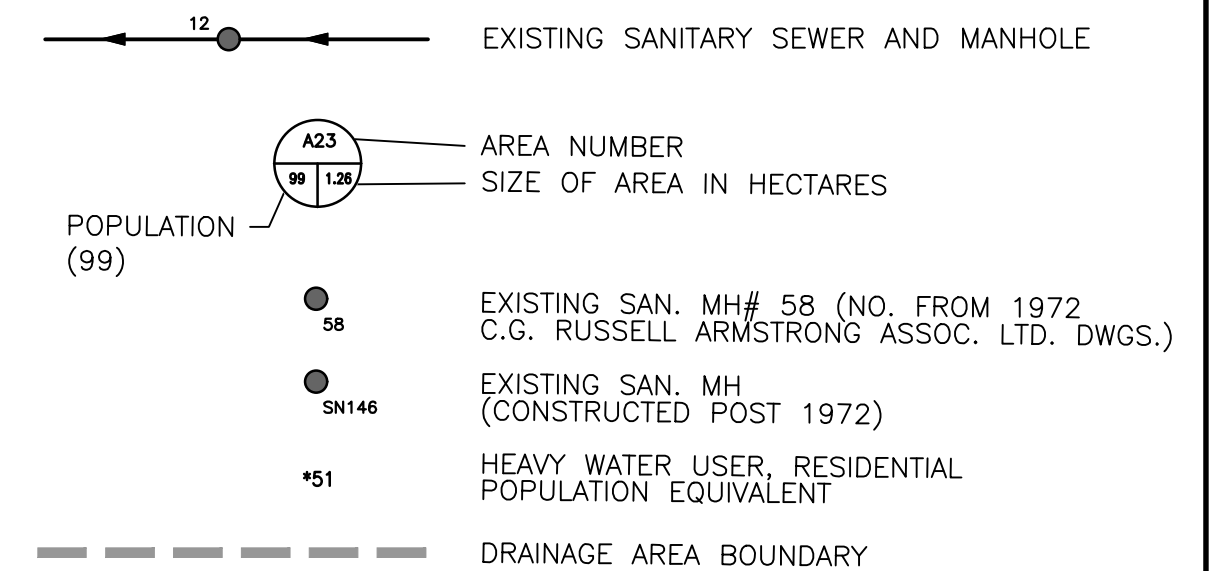
FIGURE NO. 1 – EXISTING SANITARY DESIGN SHEET



SPRIET ASSOCIATES
engineers & architects



LEGEND

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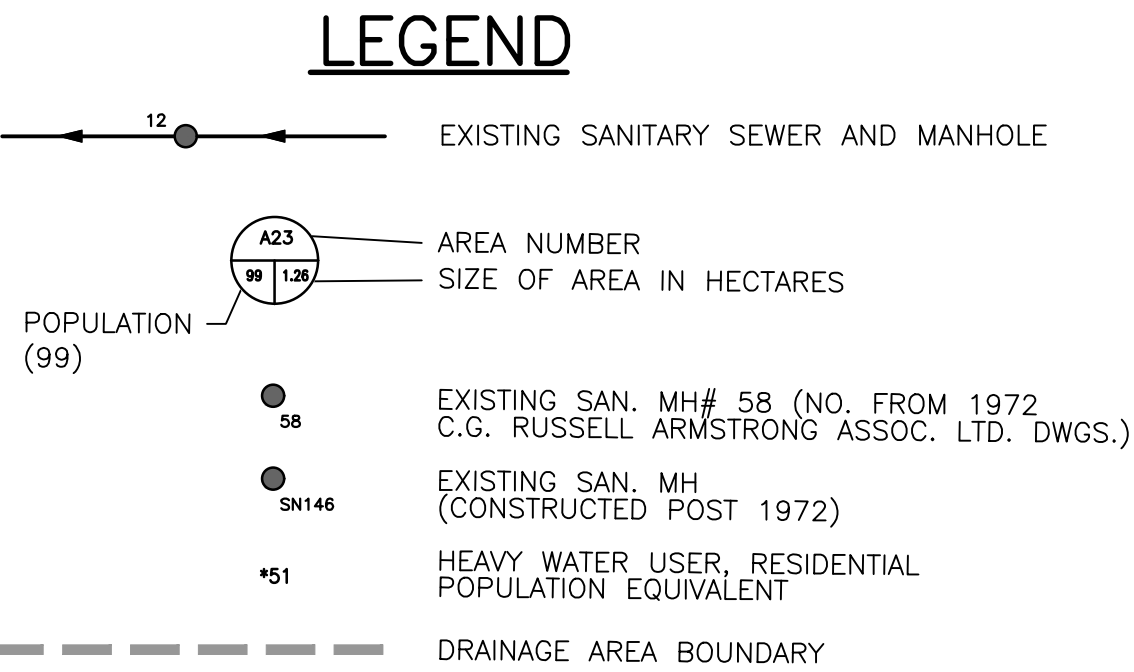
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FIGURE 1

SANITARY SEWER DESIGN SHEET - EXISTING CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing										DATE: March 10, 2022						
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day						LOT BASIS SINGLE FAMILY 3 PEOPLE COMMERCIAL / INSTUTIONAL: 8 to 10 PEOPLE MULTI FAMILY BACHELOR: 1.5 PEOPLE 1- BEDROOM: 2.5 PEOPLE 2- BEDROOM: 3 PEOPLE						COMMERCIAL / INSTUTIONAL: 300 litres/person/day RESIDENTIAL SEWAGE FLOW: 380 litres/person/day						DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081									
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN							PROFILE						
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE
A1	Graham Road	SA110	SA109	1.07	1.07	*	3	6	21.0	21	0.11	0.37	0.48	0.015	200	0.35	16.7	0.532	88.4	2.77		0.309			4.000	2.85%	52.7
A2	Walker Street	SA111	SA109	0.80	0.80		3	8	24.0	24	0.08	0.42	0.50	0.015	200	0.34	16.5	0.524	114.0	3.62		0.388			4.000	3.05%	54.0
A3	Graham Road	SA109	SA108	0.92	2.79		3	8	24.0	69	0.09	0.42	1.49	0.015	200	0.35	16.7	0.532	98.5	3.09		0.345			4.000	8.93%	80.8
A4	Graham Road	SA108	SA107	0.75	3.54	*	3	4	16.0	85	0.08	0.28	1.85	0.015	250	0.35	30.3	0.617	111.3	3.01		0.390			4.000	6.10%	87.6
A5	Graham Road	SA107	SA106	0.65	4.19	*	3	4	17.0	102	0.07	0.30	2.21	0.015	250	0.35	30.3	0.617	99.0	2.67		0.347			4.000	7.31%	93.7
A6	Graham Road	SA106	SA34	0.73	4.92		3	6	18.0	120	0.07	0.32	2.60	0.015	250	0.35	30.3	0.617	94.8	2.56		0.332			4.000	8.59%	99.6
A7	Mary Street	SA111	SA112	1.20	1.20		3	6	18.0	18	0.12	0.32	0.44	0.015	200	0.65	22.8	0.725	117.3	2.70		0.762			4.000	1.92%	45.4
A8	Bainard Street	SA122	SA112	0.70	0.70	*	3	4	22.0	22	0.07	0.39	0.46	0.015	200	0.37	17.2	0.547	68.3	2.08		0.253			4.000	2.66%	51.3
A9	Mary Street	SA112	SA113	0.69	2.59	*	3	2	9.0	49	0.07	0.16	1.12	0.015	200	0.35	16.7	0.532	91.4	2.87		0.320			4.000	6.71%	72.6
A10	John Street	SA121	SA113	0.50	0.50		3	5	15.0	15	0.05	0.26	0.31	0.015	200	0.35	16.7	0.532	64.9	2.03		0.227			4.000	1.88%	45.1
A11	John Street	SA119	SA113	1.56	1.56	*	3	6	28.0	28	0.16	0.49	0.65	0.015	200	0.35	16.7	0.532	126.8	3.97		0.444			4.000	3.88%	59.1
A12	Mary Street	SA113	SA114	0.57	5.22		3	5	15.0	107	0.06	0.26	2.40	0.015	250	0.25	25.6	0.522	95.1	3.04		0.238			4.000	9.39%	103.0
A13	Frederic Street	SA118	SA114	0.71	0.71		3	5	15.0	15	0.07	0.26	0.33	0.015	200	0.40	17.9	0.569	75.6	2.22		0.302			4.000	1.87%	45.0
A14	Frederic Street	SA117	SA114	0.68	0.68	*	3	5	18.0	18	0.07	0.32	0.38	0.015	200	0.40	17.9	0.569	103.3	3.03		0.413			4.000	2.15%	47.4
A15	Mary Street	SA114	SA115	0.46	7.07		3	4	12.0	152	0.05	0.21	3.38	0.015	250	0.25	25.6	0.522	97.5	3.12		0.244			4.000	13.20%	117.0
A16	Jane Street	SA116	SA115	1.05	1.05		3	9	27.0	27	0.11	0.48	0.58	0.015	200	0.50	20.0	0.636	99.4	2.61		0.497			4.000	2.90%	53.0
A17	Jane Street	SA115	SA34	0.93	9.05	*	3	6	23.0	202	0.09	0.40	4.46	0.015	250	0.25	25.6	0.522	113.7	3.63		0.284			4.000	17.41%	129.8
A18	Jane Street	SA34	SA33	0.08	14.05		3			322	0.01		7.07	0.015	450	0.12	85.1	0.535	66.1	2.06		0.079			4.000	8.31%	177.1
A19	Jane Street	SA33	SA32	0.47	14.52		3	3	9.0	331	0.05	0.16	7.28	0.015	450	0.12	85.1	0.535	99.1	3.09		0.119			4.000	8.55%	179.0
A124	Finney Street	SN132	SN131	0.16	0.16		3	1	3.0	3	0.02	0.05	0.07	0.015	200	0.29	15.2	0.484	19.0	0.65		0.055			4.000	0.45%	26.4
A125	Finney Street	SN131	SN130	0.13	0.29		3			3	0.01		0.08	0.015	200	0.47	19.4	0.616	51.6	1.40		0.243			4.000	0.42%	25.7
	Finney Street	SN130	SN129		0.29		3			3			0.08	0.015	200	0.35	16.7	0.532	10.0	0.31		0.035			4.000	0.49%	27.2
A117	Finney Street	SN129	SN128	0.21	0.50		3	1	3.0	6	0.02	0.05	0.16	0.015	200	0.5	20.0	0.636	61.8	1.62		0.309			4.000	0.78%	32.4
A118	Gilbert Street	SN135	SN128	2.73	2.73		3	5	15.0	15	0.27	0.26	0.54	0.015	200	0.30	15.5	0.492	105.1	3.56		0.315			4.000	3.47%	56.7
A119	Gilbert Street	SN134	SN128	1.18	1.18		3	8	27.0	27	0.12	0.48	0.59	0.015	200	0.30	15.5	0.492	96.0	3.25		0.288			4.000	3.83%	58.9
A120	Finney Street	SN128	SN127	0.43	4.84		3	2	6.0	54	0.04	0.11	1.43	0.015	200	0.30	15.5	0.492	102.1	3.46		0.306			4.000	9.27%	82.0
A121	Anne Street	SN133	SN127	1.09	1.09		3	10	30.0	30	0.11	0.53	0.64	0.015	200	0.30	15.5	0.492	96.0	3.25		0.288			4.000	4.12%	60.5
A122	Finney Street	SN127	SA124	0.41	6.34		3	2	6.0	90	0.04	0.11	2.22	0.015	200	0.30	15.5	0.492	106.1	3.59		0.318			4.000	14.33%	96.5
A20	Hughes Street	SA125	SA124	1.07	1.07		3	11	33.0	33	0.11	0.58	0.69	0.015	200	0.35	16.7	0.532	127.1	3.98		0.445			4.000	4.11%	60.4
A21	Hughes Street	SA123	SA124	0.23	0.23		3	2	6.0	6	0.02	0.11	0.13	0.015	200	0.50	20.0	0.636	38.1	1.00		0.191			4.000	0.64%	30.1
A22	Finney Street	SA124	SA32	0.50	8.14		3	3	9.0	139	0.05	0.16	3.24	0.015	250	0.30	28.1	0.571	86.9	2.53		0.261			4.000	11.56%	111.3
A123	Jane Street	SA126	SA32	0.07	0.07	*	3		19.0	19	0.01	0.33	0.34	0.015	250	0.40	32.4	0.660	56.6	1.43		0.226			4.000	1.05%	45.3
	Easement	SA32	SA31		22.73		3			489			10.86	0.015	450	0.12	85.1	0.535	115.2	3.59		0.138			3.979	12.77%	208.0

SANITARY SEWER DESIGN SHEET - EXISTING CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing											DATE: March 10, 2022										
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day					LOT BASIS SINGLE FAMILY 3 PEOPLE COMMERCIAL / INSTUTIONAL: 8 to 10 PEOPLE MULTI FAMILY BACHELOR: 1.5 PEOPLE 1- BEDROOM: 2.5 PEOPLE 2- BEDROOM: 3 PEOPLE					COMMERCIAL / INSTUTIONAL: 300 litres/person/day RESIDENTIAL SEWAGE FLOW: 380 litres/person/day					DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No.: 221081																	
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN							PROFILE											
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infiltr. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE					
A23	Easement	end	SA85	0.17	0.17		3	3	9.0	9	0.02	0.16	0.18	0.015	200	0.50	20.0	0.636	21.2	0.56		0.11			4.000	0.88%	33.9					
A24	Easement	SA85	SA86	0.16	0.33		3	3	9.0	18	0.02	0.16	0.35	0.015	200	0.50	20.0	0.636	58.5	1.53		0.29			4.000	1.75%	43.9					
A25	Munroe Street	SA86	SA31	0.47	0.80		3	4	12.0	30	0.05	0.21	0.61	0.015	200	0.47	19.4	0.616	109.1	2.95		0.51			4.000	3.14%	54.6					
A26	Munroe Street	SA87	SA31	0.49	0.49		3	4	12.0	12	0.05	0.21	0.26	0.015	200	0.53	20.6	0.655	97.2	2.47		0.52			4.000	1.26%	38.8					
A27	Ridge Street	SA31	SA30	0.49	24.51		3	4	12.0	543	0.05	0.21	11.98	0.015	450	0.12	85.1	0.535	105.5	3.29		0.13			3.956	14.09%	215.8					
A28	Main Street	SA71	SA30	0.61	0.61		3	6	18.0	18	0.06	0.32	0.38	0.015	200	0.40	17.9	0.569	99.7	2.92		0.40			4.000	2.11%	47.1					
A29	Main Street	SA69	SA70	0.25	0.25		3	2	6.0	6	0.03	0.11	0.13	0.015	200	0.40	17.9	0.569	43.6	1.28		0.17			4.000	0.73%	31.6					
A30	Main Street	SA70	SA30	0.60	0.85		3	5	15.0	21	0.06	0.26	0.45	0.015	200	0.40	17.9	0.569	87	2.55		0.35			4.000	2.54%	50.5					
A31	Ridge Street	SA30	SA29	0.56	26.53		3	5	15.0	597	0.06	0.26	13.13	0.015	450	0.12	85.1	0.535	95.4	2.97		0.11			3.933	15.44%	223.3					
A32	Easement	SA84	SA83	0.24	0.24	*	3	5	21.0	21	0.02	0.37	0.39	0.015	200	0.43	18.5	0.590	45.7	1.29		0.20			4.000	2.12%	47.2					
	Easement	SA83	SA82		0.24		3		0.0	21	0.00	0.00	0.39	0.015	200	1.06	29.1	0.926	49.4	0.89		0.52			4.000	1.35%	39.8					
A33	Maple Street	SA82	SA29	1.20	1.44		3	10	30.0	51	0.12	0.53	1.04	0.015	200	0.40	17.9	0.569	110.6	3.24		0.44			4.000	5.83%	68.9					
A34	Maple Street	SA80	SA81	1.05	1.05		3	7	21.0	21	0.11	0.37	0.47	0.015	200	0.40	17.9	0.569	96.6	2.83		0.39			4.000	2.66%	51.3					
A35	Maple Street	SA81	SA29	0.81	1.86		3	6	18.0	39	0.08	0.32	0.87	0.015	200	0.40	17.9	0.569	99.4	2.91		0.40			4.000	4.88%	64.5					
A36	Ridge Street	SA29	SA28	0.36	30.19		3	3	9.0	696	0.04	0.15	15.23	0.015	450	0.12	85.1	0.535	106.1	3.31		0.13			3.896	17.91%	236.1					
A37	Chestnut Street	SA100	SA101	0.61	0.61		3	6	18.0	18	0.06	0.32	0.38	0.015	200	0.35	16.7	0.532	58.8	1.84		0.21			4.000	2.26%	48.3					
A38	Chestnut Street	SA101	SA102	0.73	1.34		3	7	21.0	39	0.07	0.37	0.82	0.015	200	0.35	16.7	0.532	81.8	2.56		0.29			4.000	4.91%	64.6					
A39	Ridge Street	SA102	SA28	1.02	2.36		3	3	9.0	48	0.10	0.16	1.08	0.015	200	0.35	16.7	0.532	99.1	3.11		0.35			4.000	6.47%	71.6					

SANITARY SEWER DESIGN SHEET - EXISTING CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing																DATE: March 10, 2022					
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day						LOT BASIS SINGLE FAMILY 3 PEOPLE COMMERCIAL / INSTUTIONAL: 8 to 10 PEOPLE MULTI FAMILY BACHELOR: 1.5 PEOPLE 1- BEDROOM: 2.5 PEOPLE 2- BEDROOM: 3 PEOPLE						COMMERCIAL / INSTUTIONAL: 300 litres/person/day RESIDENTIAL SEWAGE FLOW: 380 litres/person/day						DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No.: 221081														
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN							PROFILE											
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE					
A40	Wood Street	SA66	SA65	1.63	1.63	*	3	3	13.0	13	0.16	0.23	0.39	0.015	200	0.50	20.0	0.636	69.8	1.83		0.35			4.000	1.96%	45.78					
A41	William Street	SA68	SA67	0.55	0.55		3	3	9.0	9	0.06	0.16	0.21	0.015	200	0.55	20.9	0.667	57	1.42		0.31			4.000	1.02%	35.81					
A42	William Street	SA67	SA65	0.32	0.87		3	2	6.0	15	0.03	0.11	0.35	0.015	200	0.55	20.9	0.667	83.2	2.08		0.46			4.000	1.68%	43.16					
								4																								
A43	William Street	SN139	SN138	0.95	0.95		3	9	27.0	27	0.10	0.48	0.57	0.015	200	0.35	16.7	0.532	91.4	2.86		0.32			4.000	3.41%	56.35					
A44	William Street	SN138	SA65	0.09	1.04		3	0	0.0	27	0.01	0.00	0.58	0.015	200	0.35	16.7	0.532	47.2	1.48		0.17			4.000	3.46%	56.68					
A45	Wood Street	SA65	SA62	0.44	3.98		3	3	9.0	64	0.04	0.16	1.52	0.015	200	0.50	20.0	0.636	109.1	2.86		0.55			4.000	7.63%	76.20					
A46	Main Street	SA64	SA63	0.92	0.92		3	9	27.0	27	0.09	0.48	0.57	0.015	200	0.35	16.7	0.532	91.4	2.86		0.32			4.000	3.39%	56.23					
A47	Main Street	SA63	SA62	0.53	1.45		3	5	15.0	42	0.05	0.26	0.88	0.015	200	0.35	16.7	0.532	67.1	2.10		0.23			4.000	5.29%	66.42					
A48	Main Street	SA62	SA61	1.00	6.43		3	9	27.0	133	0.10	0.48	2.98	0.015	300	0.20	37.2	0.527	91.4	2.89		0.18			4.000	8.01%	116.40					
A49	Main Street	SA61	SA60	0.66	7.09	*	3	2	16.0	149	0.07	0.28	3.33	0.015	300	0.20	37.2	0.527	79.4	2.51		0.16			4.000	8.94%	121.31					
A50	Main Street	SA60	SA59	1.82	8.91	*	3	6	29.0	178	0.18	0.51	4.02	0.015	300	0.20	37.2	0.527	91.4	2.89		0.18			4.000	10.80%	130.21					
A51	Main Street	SA59	SA58	0.50	9.41	*	3	3	12.0	190	0.05	0.21	4.28	0.015	300	0.20	37.2	0.527	92	2.91		0.18			4.000	11.50%	133.32					
A52	Munroe Street	SN137	SN136	0.62	0.62	*	3	0	7.0	7	0.06	0.12	0.19	0.015	200	0.44	18.7	0.596	83	2.32		0.37			4.000	0.99%	35.41					
A116	Easement	SN136	SA56	0.04	0.66		3	0	0.0	7	0.00	0.00	0.19	0.015	200	0.44	18.7	0.596	17	0.48		0.07			4.000	1.01%	35.69					
A53	Easement	SA56	SA56A	0.31	0.97	*	3	5	18.0	25	0.03	0.32	0.54	0.015	200	0.40	17.9	0.569	45.7	1.34		0.18			4.000	3.00%	53.73					
A54	Easement	SA56A	SA56B	0.02	0.99		3	0	0.0	25	0.00	0.00	0.54	0.015	200	0.40	17.9	0.569	14.3	0.42		0.06			4.000	3.02%	53.80					
A55	Easement	SA56B	SA57	0.13	1.12		3	4	12.0	37	0.01	0.21	0.76	0.015	200	0.40	17.9	0.569	32.9	0.96		0.13			4.000	4.27%	61.30					
A56	Main Street	SA57	SA58	0.70	1.82	*	3	3	19.0	56	0.07	0.33	1.17	0.015	200	0.40	17.9	0.569	78.9	2.31		0.32			4.000	6.53%	71.90					
A57	Argyle Street	SA58	SA92	0.51	11.74		3	4	12.0	258	0.05	0.21	5.71	0.015	300	0.20	37.2	0.527	101.5	3.21		0.20			4.000	15.34%	148.52					
A58	Maple Street	SA91	SA92	0.26	0.26		3	2	6.0	6	0.03	0.11	0.13	0.015	200	0.60	21.9	0.696	68.3	1.63		0.41			4.000	0.60%	29.39					
A59	Argyle Street	SA92	SA93	0.88	12.88		3	7	21.0	285	0.09	0.37	6.30	0.015	300	0.20	37.2	0.527	103	3.26		0.21			4.000	16.92%	154.09					
A60	Elm Street	SA94	SA93	0.25	0.25	*	3	2	21.0	21	0.03	0.37	0.39	0.015	200	0.83	25.7	0.819	69	1.40		0.57			4.000	1.53%	41.74					
A61	Elm Street	SA93	SA36	0.36	13.49		3	3	9.0	315	0.04	0.16	6.89	0.015	300	0.57	62.9	0.889	98.5	1.85		0.56			4.000	10.96%	130.93					
A62	Graham Road	SA55	SA54	0.72	0.72	*	3	4	20.0	20	0.07	0.35	0.42	0.015	200	0.35	16.7	0.532	80.5	2.52		0.28			4.000	2.54%	50.42					
A63	Graham Road	SA54	SA36	0.69	1.41		3	5	15.0	35	0.07	0.26	0.76	0.015	200	0.35	16.7	0.532	97.5	3.05		0.34			4.000	4.53%	62.66					
A64	Graham Road	SA42	SA41	2.01	2.01		3	9	27.0	27	0.20	0.48	0.68	0.015	200	0.35	16.7	0.532	98.8	3.10		0.35			4.000	4.05%	60.07					
A65	Graham Road	SA41	SA40	1.12	3.13	*	3	4	16.0	43	0.11	0.28	1.07	0.015	200	0.35	16.7	0.532	88.4	2.77		0.31			4.000	6.40%	71.34					
A66	Merhing Avenue	SA105	SA40	0.62	0.62		3	4	12.0	12	0.06	0.21	0.27	0.015	200	0.35	16.7	0.532	91.1	2.85		0.32			4.000	1.63%	42.76					
A67	Graham Road	SA40	SA39	0.86	4.61	*	3	2	21.0	76	0.09	0.37	1.80	0.015	200	0.35	16.7	0.532	66.4	2.08		0.23			4.000	10.76%	86.69					
A68	Graham Road	SA39	SA38	0.78	5.39		3	4	12.0	88	0.08	0.21	2.09	0.015	200	0.35	16.7	0.532	71	2.22		0.25			4.000	12.49%	91.67					
A69	Jessie Street	SA104	SA103	0.44	0.44		3	3	9.0	9	0.04	0.16	0.20	0.015	200	0.35	16.7	0.532	69.5	2.18		0.24			4.000	1.21%	38.21					
A70	Jessie Street	SA103	SA38	0.36	0.80		3	3	9.0	18	0.04	0.16	0.40	0.015	200	0.35	16.7	0.532	91.6	2.87		0.32			4.000	2.37%	49.18					
A71	Graham Road	SA38	SA37	0.99	7.18		3	5	15.0	121	0.10	0.26	2.85	0.015	250	0.25	25.6	0.522	93.6	2.99		0.23			4.000	11.12%	109.69					
A72	Chestnut Street	SA97	SA98	0.81	0.81	*	3	5	19.0	19	0.08	0.33	0.42	0.015	200	0.40	17.9	0.569	89.5	2.62		0.36			4.000	2.32%	48.80					
A73	Chestnut Street	SA98	SA99	0.76	1.57		3	8	24.0	43	0.08	0.42	0.91	0.015	200	0.40	17.9	0.569	92.2	2.70		0.37			4.000	5.11%	65.58					
A74	Chestnut Street	SA99	SA37	0.14	1.71		3	1	3.0	46	0.01	0.05	0.98	0.015	200	0.40	17.9	0.569	41.1	1.20		0.16			4.000	5.49%	67.34					
A75	Graham Road	SA37	SA36	0.57	9.46	*	3	3	19.0	186	0.06	0.33	4.22	0.015	250	0.25	25.6	0.522	97.8	3.12		0.24			4.000	16.47%	127.12					
A76	Elm Street	SA																														

SANITARY SEWER DESIGN SHEET - EXISTING CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing											DATE: March 10, 2022						
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day					LOT BASIS SINGLE FAMILY 3 PEOPLE COMMERCIAL / INSTUTIONAL: 8 to 10 PEOPLE MULTI FAMILY BACHELOR: 1.5 PEOPLE 1- BEDROOM: 2.5 PEOPLE 2- BEDROOM: 3 PEOPLE					COMMERCIAL / INSTUTIONAL: 300 litres/person/day RESIDENTIAL SEWAGE FLOW: 380 litres/person/day					DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081													
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN							PROFILE							
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE	
A78	Elm Street	SA28	SA27	0.93	59.17		3	8	24.0	1343	0.09	0.39	29.48	0.015	450	0.12	85.1	0.535	103.9	3.24		0.12			3.714	34.65%	302.43	
A79	Elm Street	SA27	SA26	0.88	60.05		3	7	21.0	1364	0.09	0.34	29.91	0.015	450	0.12	85.1	0.535	97.5	3.04		0.12			3.709	35.16%	304.08	
A80	Elm Street	SA26	SA25	0.85	60.90		3	6	18.0	1382	0.09	0.29	30.28	0.015	450	0.12	85.1	0.535	100.6	3.14		0.12			3.705	35.61%	305.51	
A81	Munroe Street	SA87	SA88	0.34	0.34		3	2	6.0	6	0.03	0.11	0.14	0.015	200	0.35	16.7	0.532	96	3.01		0.34			4.000	0.84%	33.24	
A82	Munroe Street	SA88	SA89	0.57	0.91		3	5	15.0	21	0.06	0.26	0.46	0.015	200	0.35	16.7	0.532	105.8	3.32		0.37			4.000	2.76%	52.01	
A83	Munroe Street	SA90	SA89	0.40	0.40		3	5	15.0	15	0.04	0.26	0.30	0.015	200	0.35	16.7	0.532	69.5	2.18		0.24			4.000	1.82%	44.51	
A84	Wellington Street	SA89	SA73	0.43	1.74		3	2	6.0	42	0.04	0.11	0.91	0.015	300	0.20	37.2	0.527	107.6	3.40		0.22			4.000	2.45%	74.67	
A85	Main Street	SA71	SA72	1.08	1.08	*	3	6	31.0	31	0.11	0.55	0.65	0.015	200	0.40	17.9	0.569	101.8	2.98		0.41			4.000	3.66%	57.84	
A86	Main Street	SA72	SA73	0.99	2.07		3	9	27.0	58	0.10	0.48	1.23	0.015	200	0.40	17.9	0.569	99.4	2.91		0.40			4.000	6.87%	73.27	
A87	Main Street	SA76	SA75	2.56	2.56		3	8	24.0	24	0.26	0.42	0.68	0.015	200	0.40	17.9	0.569	84.1	2.46		0.34			4.000	3.80%	58.65	
A88	Main Street	SA75	SA74	1.22	3.78		3	10	30.0	54	0.12	0.53	1.33	0.015	200	0.40	17.9	0.569	118.6	3.48		0.47			4.000	7.43%	75.46	
A89	Main Street	SA74	SA73	0.73	4.51		3	6	18.0	72	0.07	0.32	1.72	0.015	200	0.40	17.9	0.569	108.8	3.19		0.44			4.000	9.61%	83.11	
A90	Wellington Street	SA73	SA79	0.51	8.83		3	3	9.0	181	0.05	0.16	4.07	0.015	300	0.20	37.2	0.527	89.9	2.84		0.18			4.000	10.92%	130.76	
A91	Maple Street	SA80	SA79	0.85	0.85		3	8	24.0	24	0.09	0.42	0.51	0.015	200	1.16	30.4	0.968	103.3	1.78		1.20			4.000	1.67%	43.08	
A92	Maple Street	SA77	SA78	0.70	0.70		3	7	21.0	21	0.07	0.37	0.44	0.015	200	0.40	17.9	0.569	58.8	1.72		0.24			4.000	2.46%	49.84	
A93	Maple Street	SA78	SA79	0.57	1.27		3	5	15.0	36	0.06	0.26	0.76	0.015	200	0.40	17.9	0.569	74.7	2.19		0.30			4.000	4.26%	61.22	
A94	Wellington Street	SA79	SA25	0.52	11.47		3	3	9.0	250	0.05	0.16	5.55	0.015	300	0.20	37.2	0.527	110	3.48		0.22			4.000	14.89%	146.87	
A95	Elm Street	SA96	SA95	0.40	0.40		3	2	6.0	6	0.04	0.11	0.15	0.015	200	1.00	28.2	0.899	68	1.26		0.68			4.000	0.52%	27.74	
A96	Elm Street	SA95	SA25	0.35	0.75		3	2	6.0	12	0.04	0.11	0.29	0.015	200	0.40	17.9	0.569	63.1	1.85		0.25			4.000	1.60%	42.44	
	Easement	SA25	SA24		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	67.5	2.10		0.08			3.650	42.46%	326.37	
	Easement	SA24	SA23		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	62.8	1.96		0.08			3.650	42.46%	326.37	
	Easement	SA23	SA22		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	80.6	2.51		0.10			3.650	42.46%	326.37	
	Easement	SA22	SA21		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	59	1.84		0.07			3.650	42.46%	326.37	
	Easement	SA21	SA20		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	72.8	2.27		0.09			3.650	42.46%	326.37	
	Easement	SA20	SA19		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	98.5	3.07		0.12			3.650	42.46%	326.37	
	Easement	SA19	SA18		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	66.4	2.07		0.08			3.650	42.46%	326.37	
	Easement	SA18	SA17		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	71	2.21		0.09			3.650	42.46%	326.37	
	Easement	SA17	SA16		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	76.5	2.38		0.09			3.650	42.46%	326.37	
	Easement	SA16	SA15		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	72.5	2.26		0.09			3.650	42.46%	326.37	
	Easement	SA15	SA14		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	64.6	2.01		0.08			3.650	42.46%	326.37	
	Easement	SA14	SA13		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	66.1	2.06		0.08			3.650	42.46%	326.37	
	Easement	SA13	SA12		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	90.2	2.81		0.11			3.650	42.46%	326.37	
	Easement	SA12	SA11		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	91.7	2.86		0.11			3.650	42.46%	326.37	
	Easement	SA11	SA10		73.12		3		0.0	1644	0.00	0.00	36.12	0.015	450	0.12	85.1	0.535	48.2	1.50		0.06			3.650	42.46%	326.37	

SANITARY SEWER DESIGN SHEET - EXISTING CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing										DATE: March 10, 2022									
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day						LOT BASIS SINGLE FAMILY COMMERCIAL / INSTUTIONAL: MULTI FAMILY BACHELOR: 1- BEDROOM: 2- BEDROOM:						3 PEOPLE 8 to 10 PEOPLE 1.5 PEOPLE 2.5 PEOPLE 3 PEOPLE COMMERCIAL / INSTUTIONAL: RESIDENTIAL SEWAGE FLOW:						300 litres/person/day 380 litres/person/day						DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081						
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN								PROFILE								
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE			
A97	Graham Road	SA42	SA43	1.28	1.28		3	7	21.0	21	0.13	0.37	0.50	0.015	200	0.35	16.7	0.532	89.30	2.80		0.31			4.000	2.98%	53.5			
A98	Graham Road	SA43	SA44	1.01	2.29	*	3	3	58.0	79	0.10	1.02	1.62	0.015	200	0.35	16.7	0.532	89.90	2.82		0.31			4.000	9.69%	83.3			
A99	Graham Road	SA44	SA45	0.97	3.26		3	4	12.0	91	0.10	0.21	1.93	0.015	200	0.35	16.7	0.532	91.10	2.85		0.32			4.000	11.53%	89.0			
A100	Graham Road	SA45	SA47	0.97	4.23		3	4	12.0	103	0.10	0.21	2.24	0.015	200	0.35	16.7	0.532	78.00	2.44		0.27			4.000	13.37%	94.1			
A101	Graham Road	SA47	SA48	0.73	4.96	*	3	3	20.0	123	0.07	0.35	2.66	0.015	200	0.35	16.7	0.532	69.50	2.18		0.24			4.000	15.92%	100.4			
A102	Graham Road	SA48	SA49	1.21	6.17	*	3	3	19.0	142	0.12	0.33	3.12	0.015	200	0.35	16.7	0.532	105.80	3.32		0.37			4.000	18.64%	106.5			
A103	Marsh Line	SA49	SA50	0.32	6.49		3	1	3.0	145	0.03	0.05	3.20	0.015	250	0.35	30.3	0.617	96.90	2.62		0.34			4.000	10.56%	107.6			
A104	Marsh Line	SA50	SA51	0.20	6.69		3	0	0.0	145	0.02	0.00	3.22	0.015	250	0.35	30.3	0.617	99.10	2.68		0.35			4.000	10.63%	107.9			
A105	Marsh Line	SA51	SN140	0.13	6.82		3	0	0.0	145	0.01	0.00	3.23	0.015	250	0.67	41.9	0.854	66.30	1.29		0.44			4.000	7.71%	95.6			
A106	Todd Place	SN144	SN143	0.88	0.88		3	9	27.0	27	0.09	0.48	0.56	0.015	200	0.49	19.8	0.629	76.20	2.02		0.37			4.000	2.85%	52.7			
A107	Todd Place	SN143	SN142	0.44	1.32		3	5	15.0	42	0.04	0.26	0.87	0.015	200	1.84	38.3	1.220	70.40	0.96		1.30			4.000	2.27%	48.4			
A108	Angelo Street	end	SN142	0.28	0.28		3	2	6.0	6	0.03	0.11	0.13	0.015	250	0.48	35.5	0.723	27.60	0.64		0.13			4.000	0.38%	30.8			
A109	Angelo Street	SN142	SN141	0.59	0.87		3	4	12.0	18	0.06	0.21	0.40	0.015	250	0.48	35.5	0.723	101.70	2.34		0.49			4.000	1.14%	46.7			
A110	Todd Place	SN144	SN145	0.77	0.77		3	6	18.0	18	0.08	0.32	0.39	0.015	200	0.47	19.4	0.616	102.30	2.77		0.48			4.000	2.03%	46.4			
A111	Todd Place	SN145	SN146	1.11	1.88		3	7	21.0	39	0.11	0.37	0.87	0.015	200	0.48	19.6	0.623	72.70	1.95		0.35			4.000	4.47%	62.3			
A112	Todd Place	SN146	SN141	0.64	2.52		3	7	21.0	60	0.06	0.37	1.31	0.015	200	0.36	16.9	0.539	73.80	2.28		0.27			4.000	7.72%	76.5			
A113	Angelo Street	SN141	SN140	0.53	3.92		3	4	12.0	90	0.05	0.21	1.98	0.015	250	0.49	35.8	0.730	77.50	1.77		0.38			4.000	5.51%	84.3			
A114	Marsh Line	SN140	SA52	0.09	10.83		3	0	0.0	235	0.01	0.00	5.22	0.015	250	0.67	41.9	0.854	30.60	0.60		0.21			4.000	12.45%	114.4			
A115	Marsh Line	SA52	SA53	0.19	11.02		3	0	0.0	235	0.02	0.00	5.24	0.015	250	0.68	42.2	0.860	97.20	1.88		0.66			4.000	12.40%	114.3			
A116	Marsh Line	SN53	SA10	0.20	11.22		3	0	0.0	235	0.02	0.00	5.26	0.015	250	0.51	36.6	0.745	97.20	2.17		0.50			4.000	14.37%	120.8			
	Easement	SA10	P.STA.		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	9.50	0.30		0.01			3.607	48.64%	343.4			
	Easement	P.STA.	SA9		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	3.00	0.09		0.00			3.607	48.64%	343.4			
	Easement	SA9	SA8		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	11.00	0.34		0.01			3.607	48.64%	343.4			
	Easement	SA8	SA7		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	63.40	1.98		0.08			3.607	48.64%	343.4			
	Easement	SA7	SA6		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	70.10	2.18		0.08			3.607	48.64%	343.4			
	Easement	SA6	SA5		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	104.90	3.27		0.13			3.607	48.64%	343.4			
	Easement	SA5	SA4		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.12	85.1	0.535	107.00	3.33		0.13			3.607	48.64%	343.4			
	Easement	SA4	SA3		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.14	91.9	0.578	93.60	2.70		0.13			3.607	45.03%	333.6			
	Easement	SA3	SA2		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.13	88.5	0.557	90.00	2.69		0.12			3.607	46.73%	338.3			
	Easement	SA2	SA1		84.34		3	0	0.0	1879	0.00	0.00	41.37	0.015	450	0.19	107.0	0.673	75.60	1.87		0.14			3.607	38.66%	315.1			

APPENDIX 'B'

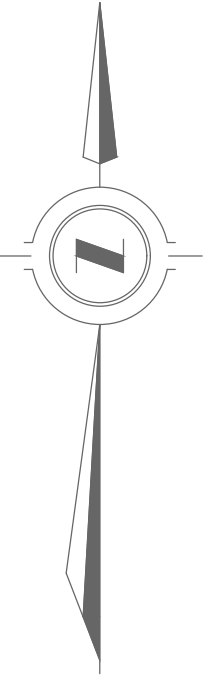
FUTURE CONDITIONS

DRAWINGS FUT1 – FUT2 – PROPOSED SANITARY SEWERS

FIGURE NO. 2 – FUTURE SANITARY DESIGN SHEET



SPRIET ASSOCIATES
engineers & architects



12
 FUT MH
 A23
 99 136
 POPULATION (99)
 *51
 58
 SN146
 FUT MH
 DRAINAGE AREA BOUNDARY
 PROPOSED SUBDIVISION

EXISTING SANITARY SEWER AND MANHOLE
 FUTURE/PROPOSED SANITARY SEWER AND MANHOLE
 AREA NUMBER
 SIZE OF AREA IN HECTARES
 HEAVY WATER USER, RESIDENTIAL POPULATION EQUIVALENT
 EXISTING SAN. MH# 58 (NO. FROM 1972 C.G. RUSSELL ARMSTRONG ASSOC. LTD. DWGS.)
 EXISTING SAN. MH (CONSTRUCTED POST 1972)
 PROPOSED SAN. MH

[illegible]



LEGEND

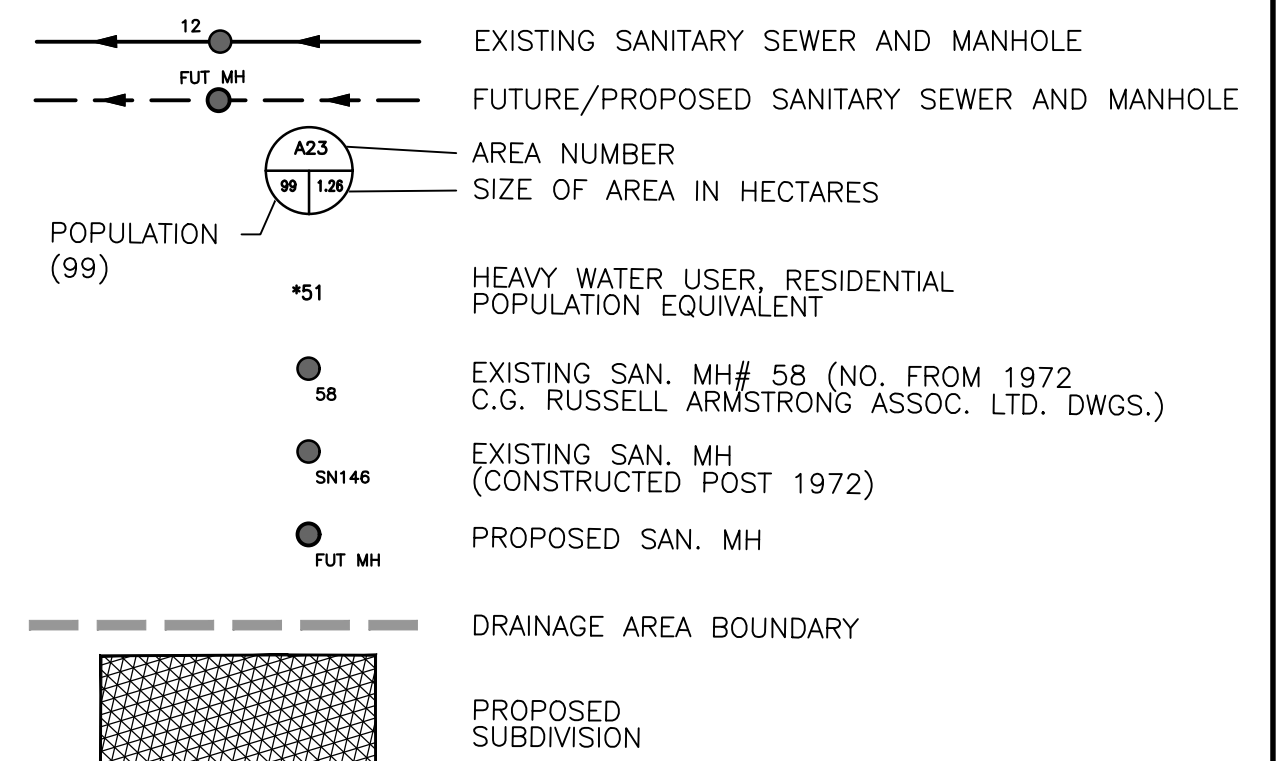
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FIGURE 2

SANITARY SEWER DESIGN SHEET - FUTURE CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing											DATE: March 18, 2022						
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day					LOT BASIS SINGLE FAMILY 3 PEOPLE COMMERCIAL / INSTUTIONAL: 8 to 10 PEOPLE MULTI FAMILY BACHELOR: 1.5 PEOPLE 1- BEDROOM: 2.5 PEOPLE 2- BEDROOM: 3 PEOPLE					COMMERCIAL / INSTUTIONAL: 300 litres/person/day RESIDENTIAL SEWAGE FLOW: 380 litres/person/day					DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081													
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN							PROFILE							
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE	
A1	Graham Road	SA110	SA109	1.07	1.07	*	3	6	21.0	21	0.11	0.37	0.48	0.015	200	0.35	16.7	0.532	88.4	2.77		0.309			4.000	2.85%	52.7	
A2	Walker Street	SA111	SA109	0.80	0.80		3	8	24.0	24	0.08	0.42	0.50	0.015	200	0.34	16.5	0.524	114.0	3.62		0.388			4.000	3.05%	54.0	
A3	Graham Road	SA109	SA108	0.92	2.79		3	8	24.0	69	0.09	0.42	1.49	0.015	200	0.35	16.7	0.532	98.5	3.09		0.345			4.000	8.93%	80.8	
A4	Graham Road	SA108	SA107	0.75	3.54	*	3	4	16.0	85	0.08	0.28	1.85	0.015	250	0.35	30.3	0.617	111.3	3.01		0.390			4.000	6.10%	87.6	
A5	Graham Road	SA107	SA106	0.65	4.19	*	3	4	17.0	102	0.07	0.30	2.21	0.015	250	0.35	30.3	0.617	99.0	2.67		0.347			4.000	7.31%	93.7	
A6	Graham Road	SA106	SA34	0.73	4.92		3	6	18.0	120	0.07	0.32	2.60	0.015	250	0.35	30.3	0.617	94.8	2.56		0.332			4.000	8.59%	99.6	
A7	Mary Street	SA111	SA112	1.20	1.20		3	6	18.0	18	0.12	0.32	0.44	0.015	200	0.65	22.8	0.725	117.3	2.70		0.762			4.000	1.92%	45.4	
A8	Bainard Street	SA122	SA112	0.70	0.70	*	3	4	22.0	22	0.07	0.39	0.46	0.015	200	0.37	17.2	0.547	68.3	2.08		0.253			4.000	2.66%	51.3	
A9	Mary Street	SA112	SA113	0.69	2.59	*	3	2	9.0	49	0.07	0.16	1.12	0.015	200	0.35	16.7	0.532	91.4	2.87		0.320			4.000	6.71%	72.6	
A10	John Street	SA121	SA113	0.50	0.50		3	5	15.0	15	0.05	0.26	0.31	0.015	200	0.35	16.7	0.532	64.9	2.03		0.227			4.000	1.88%	45.1	
A11	John Street	SA119	SA113	1.56	1.56	*	3	6	28.0	28	0.16	0.49	0.65	0.015	200	0.35	16.7	0.532	126.8	3.97		0.444			4.000	3.88%	59.1	
A12	Mary Street	SA113	SA114	0.57	5.22		3	5	15.0	107	0.06	0.26	2.40	0.015	250	0.25	25.6	0.522	95.1	3.04		0.238			4.000	9.39%	103.0	
A13	Frederic Street	SA118	SA114	0.71	0.71		3	5	15.0	15	0.07	0.26	0.33	0.015	200	0.40	17.9	0.569	75.6	2.22		0.302			4.000	1.87%	45.0	
A14	Frederic Street	SA117	SA114	0.68	0.68	*	3	5	18.0	18	0.07	0.32	0.38	0.015	200	0.40	17.9	0.569	103.3	3.03		0.413			4.000	2.15%	47.4	
A15	Mary Street	SA114	SA115	0.46	7.07		3	4	12.0	152	0.05	0.21	3.38	0.015	250	0.25	25.6	0.522	97.5	3.12		0.244			4.000	13.20%	117.0	
A16	Jane Street	SA116	SA115	1.05	1.05		3	9	27.0	27	0.11	0.48	0.58	0.015	200	0.50	20.0	0.636	99.4	2.61		0.497			4.000	2.90%	53.0	
A17	Jane Street	SA115	SA34	0.93	9.05	*	3	6	23.0	202	0.09	0.40	4.46	0.015	250	0.25	25.6	0.522	113.7	3.63		0.284			4.000	17.41%	129.8	
A18	Jane Street	SA34	SA33	0.08	14.05		3			322	0.01		7.07	0.015	450	0.12	85.1	0.535	66.1	2.06		0.079			4.000	8.31%	177.1	
A19	Jane Street	SA33	SA32	0.47	14.52		3	3	9.0	331	0.05	0.16	7.28	0.015	450	0.12	85.1	0.535	99.1	3.09		0.119			4.000	8.55%	179.0	
A124	Finney Street	SN132	SN131	0.16	0.16		3	1	3.0	3	0.02	0.05	0.07	0.015	200	0.29	15.2	0.484	19.0	0.65		0.055			4.000	0.45%	26.4	
A125	Finney Street	SN131	SN130	1.00	1.16	**	3	10	30.0	33	0.10	0.57	0.74	0.015	200	0.47	19.4	0.616	51.6	1.40		0.243			4.000	3.84%	58.9	
	Finney Street	SN130	SN129		1.16		3			33			0.74	0.015	200	0.35	16.7	0.532	10.0	0.31		0.035			4.000	4.45%	62.2	
A117	Finney Street	SN129	SN128	0.21	1.37		3	1	3.0	36	0.02	0.05	0.82	0.015	200	0.5	20.0	0.636	61.8	1.62		0.309			4.000	4.09%	60.3	
A118	Gilbert Street	SN135	SN128	2.73	2.73		3	5	15.0	15	0.27	0.26	0.54	0.015	200	0.30	15.5	0.492	105.1	3.56		0.315			4.000	3.47%	56.7	
A119	Gilbert Street	SN134	SN128	1.18	1.18		3	8	27.0	27	0.12	0.48	0.59	0.015	200	0.30	15.5	0.492	96.0	3.25		0.288			4.000	3.83%	58.9	
A120	Finney Street	SN128	SN127	0.43	5.71		3	2	6.0	84	0.04	0.11	2.10	0.015	200	0.30	15.5	0.492	102.1	3.46		0.306			4.000	13.55%	94.5	
A121	Anne Street	SN133	SN127	1.09	1.09		3	10	30.0	30	0.11	0.53	0.64	0.015	200	0.30	15.5	0.492	96.0	3.25		0.288			4.000	4.12%	60.5	
A122	Finney Street	SN127	SA124	0.41	7.21		3	2	6.0	120	0.04	0.11	2.88	0.015	200	0.30	15.5	0.492	106.1	3.59		0.318			4.000	18.61%	106.5	
A20	Hughes Street	SA125	SA124	1.07	1.07		3	11	33.0	33	0.11	0.58	0.69	0.015	200	0.35	16.7	0.532	127.1	3.98		0.445			4.000	4.11%	60.4	
A21	Hughes Street	SA123	SA124	0.23	0.23		3	2	6.0	6	0.02	0.11	0.13	0.015	200	0.50	20.0	0.636	38.1	1.00		0.191			4.000	0.64%	30.1	
A22	Finney Street	SA124	SA32	0.50	9.01		3	3	9.0	169	0.05	0.16	3.90	0.015	250	0.30	28.1	0.571	86.9	2.53		0.261			4.000	13.92%	119.3	
A123	Jane Street	SA126	SA32	0.07	0.07	*	3		19.0	19	0.01	0.33	0.34	0.015	250	0.40	32.4	0.660	56.6	1.43		0.226			4.000	1.05%	45.3	
	Easement	SA32	SA31		23.60		3			519			11.52	0.015	450	0.12	85.1	0.535	115.2	3.59		0.138			3.966	13.54%	212.6	

SANITARY SEWER DESIGN SHEET - FUTURE CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing											DATE: March 18, 2022						
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day						LOT BASIS SINGLE FAMILY 3 PEOPLE COMMERCIAL / INSTUTIONAL: 8 to 10 PEOPLE MULTI FAMILY BACHELOR: 1.5 PEOPLE 1- BEDROOM: 2.5 PEOPLE 2- BEDROOM: 3 PEOPLE						COMMERCIAL / INSTUTIONAL: 300 litres/person/day RESIDENTIAL SEWAGE FLOW: 380 litres/person/day						DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081										
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN							PROFILE							
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE	
A40	Wood Street	SA66	SA65	1.63	1.63	*	3	3	13.0	13	0.16	0.23	0.39	0.015	200	0.50	20.0	0.636	69.8	1.83		0.35			4.000	1.96%	45.78	
A41	William Street	SA68	SA67	0.55	0.55		3	3	9.0	9	0.06	0.16	0.21	0.015	200	0.55	20.9	0.667	57	1.42		0.31			4.000	1.02%	35.81	
A42	William Street	SA67	SA65	0.32	0.87		3	2	6.0	15	0.03	0.11	0.35	0.015	200	0.55	20.9	0.667	83.2	2.08		0.46			4.000	1.68%	43.16	
A43	William Street	SN139	SN138	0.95	0.95		3	9	27.0	27	0.10	0.48	0.57	0.015	200	0.35	16.7	0.532	91.4	2.86		0.32			4.000	3.41%	56.35	
A44	William Street	SN138	SA65	0.09	1.04		3	0	0.0	27	0.01	0.00	0.58	0.015	200	0.35	16.7	0.532	47.2	1.48		0.17			4.000	3.46%	56.68	
A45	Wood Street	SA65	SA62	0.44	3.98		3	3	9.0	64	0.04	0.16	1.52	0.015	200	0.50	20.0	0.636	109.1	2.86		0.55			4.000	7.63%	76.20	
A46	Main Street	SA64	SA63	0.92	0.92		3	9	27.0	27	0.09	0.48	0.57	0.015	200	0.35	16.7	0.532	91.4	2.86		0.32			4.000	3.39%	56.23	
A47	Main Street	SA63	SA62	0.53	1.45		3	5	15.0	42	0.05	0.26	0.88	0.015	200	0.35	16.7	0.532	67.1	2.10		0.23			4.000	5.29%	66.42	
A48	Main Street	SA62	SA61	1.00	6.43		3	9	27.0	133	0.10	0.48	2.98	0.015	300	0.20	37.2	0.527	91.4	2.89		0.18			4.000	8.01%	116.40	
A49	Main Street	SA61	SA60	0.66	7.09	*	3	2	16.0	149	0.07	0.28	3.33	0.015	300	0.20	37.2	0.527	79.4	2.51		0.16			4.000	8.94%	121.31	
A50	Main Street	SA60	SA59	1.82	8.91	*	3	6	29.0	178	0.18	0.51	4.02	0.015	300	0.20	37.2	0.527	91.4	2.89		0.18			4.000	10.80%	130.21	
A51	Main Street	SA59	SA58	0.50	9.41	*	3	3	12.0	190	0.05	0.21	4.28	0.015	300	0.20	37.2	0.527	92	2.91		0.18			4.000	11.50%	133.32	
A52	Munroe Street	SN137	SN136	0.62	0.62	*	3	0	7.0	7	0.06	0.12	0.19	0.015	200	0.44	18.7	0.596	83	2.32		0.37			4.000	0.99%	35.41	
A116	Easement	SN136	SA56	0.04	0.66		3	0	0.0	7	0.00	0.00	0.19	0.015	200	0.44	18.7	0.596	17	0.48		0.07			4.000	1.01%	35.69	
A53	Easement	SA56	SA56A	0.31	0.97	*	3	5	18.0	25	0.03	0.32	0.54	0.015	200	0.40	17.9	0.569	45.7	1.34		0.18			4.000	3.00%	53.73	
A54	Easement	SA56A	SA56B	0.02	0.99		3	0	0.0	25	0.00	0.00	0.54	0.015	200	0.40	17.9	0.569	14.3	0.42		0.06			4.000	3.02%	53.80	
A55	Easement	SA56B	SA57	0.13	1.12		3	4	12.0	37	0.01	0.21	0.76	0.015	200	0.40	17.9	0.569	32.9	0.96		0.13			4.000	4.27%	61.30	
A56	Main Street	SA57	SA58	0.70	1.82	*	3	3	19.0	56	0.07	0.33	1.17	0.015	200	0.40	17.9	0.569	78.9	2.31		0.32			4.000	6.53%	71.90	
A57	Argyle Street	SA58	SA92	0.51	11.74		3	4	12.0	258	0.05	0.21	5.71	0.015	300	0.20	37.2	0.527	101.5	3.21		0.20			4.000	15.34%	148.52	
A58	Maple Street	SA91	SA92	0.26	0.26		3	2	6.0	6	0.03	0.11	0.13	0.015	200	0.60	21.9	0.696	68.3	1.63		0.41			4.000	0.60%	29.39	
A59	Argyle Street	SA92	SA93	0.88	12.88		3	7	21.0	285	0.09	0.37	6.30	0.015	300	0.20	37.2	0.527	103	3.26		0.21			4.000	16.92%	154.09	
A60	Elm Street	SA94	SA93	0.25	0.25	*	3	2	21.0	21	0.03	0.37	0.39	0.015	200	0.83	25.7	0.819	69	1.40		0.57			4.000	1.53%	41.74	
A61	Elm Street	SA93	SA36	0.36	13.49		3	3	9.0	315	0.04	0.16	6.89	0.015	300	0.57	62.9	0.889	98.5	1.85		0.56			4.000	10.96%	130.93	
A62	Graham Road	SA55	SA54	0.72	0.72	*	3	4	20.0	20	0.07	0.35	0.42	0.015	200	0.35	16.7	0.532	80.5	2.52		0.28			4.000	2.54%	50.42	
A63	Graham Road	SA54	SA36	0.69	1.41		3	5	15.0	35	0.07	0.26	0.76	0.015	200	0.35	16.7	0.532	97.5	3.05		0.34			4.000	4.53%	62.66	
A64	Graham Road	SA42	SA41	2.01	2.01		3	9	27.0	27	0.20	0.48	0.68	0.015	200	0.35	16.7	0.532	98.8	3.10		0.35			4.000	4.05%	60.07	
A65	Graham Road	SA41	SA40	1.12	3.13	*	3	4	16.0	43	0.11	0.28	1.07	0.015	200	0.35	16.7	0.532	88.4	2.77		0.31			4.000	6.40%	71.34	
A66	Merhing Avenue	SA105	SA40	0.62	0.62		3	4	12.0	12	0.06	0.21	0.27	0.015	200	0.35	16.7	0.532	91.1	2.85		0.32			4.000	1.63%	42.76	
A67	Graham Road	SA40	SA39	0.86	4.61	*	3	2	21.0	76	0.09	0.37	1.80	0.015	200	0.35	16.7	0.532	66.4	2.08		0.23			4.000	10.76%	86.69	
A68	Graham Road	SA39	SA38	0.78	5.39		3	4	12.0	88	0.08	0.21	2.09	0.015	200	0.35	16.7	0.532	71	2.22		0.25			4.000	12.49%	91.67	
A69	Jessie Street	SA104	SA103	0.44	0.44		3	3	9.0	9	0.04	0.16	0.20	0.015	200	0.35	16.7	0.532	69.5	2.18		0.24			4.000	1.21%	38.21	
A70	Jessie Street	SA103	SA38	0.36	0.80		3	3	9.0	18	0.04	0.16	0.40	0.015	200	0.35	16.7	0.532	91.6	2.87		0.32			4.000	2.37%	49.18	
A71	Graham Road	SA38	SA37	0.99	7.18		3	5	15.0	121	0.10	0.26	2.85	0.015	250	0.25	25.6	0.522	93.6	2.99		0.23			4.000	11.12%	109.69	
A72	Chestnut Street	SA97	SA98	0.81	0.81	*	3	5	19.0	19	0.08	0.33	0.42	0.015	200	0.40	17.9	0.569	89.5	2.62		0.36			4.000	2.32%	48.80	
A73	Chestnut Street	SA98	SA99	0.76	1.57		3	8	24.0	43	0.08	0.42	0.91	0.015	200	0.40	17.9	0.569	92.2	2.70		0.37			4.000	5.11%	65.58	
A74	Chestnut Street	SA99	SA37	0.14	1.71		3	1	3.0	46	0.01	0.05	0.98	0.015	200	0.40	17.9	0.569	41.1	1.20		0.16			4.000	5.49%	67.34	
A75	Graham Road	SA37	SA36	0.57	9.46	*	3	3	19.0	186	0.06	0.33	4.22	0.015	250	0.25	25.6	0.522	97.8	3.12		0.24			4.000	16.47%	127.12	
A76	Elm Street	SA36	SA35	0.57	24.93		3	5	15.0	551	0.06	0.26	12.18	0.015	450	0.12	85.1	0.535	88.4	2.75		0.11			3.952	14.32%	217.14	
A77	Elm Street	SA35	SA28	0.76	25.69		3	8	24.0	575	0.08	0.42	12.68	0.015	450	0.12	85.1	0.535	89.6	2.79		0.11			3.942	14.90%	220.39	

SANITARY SEWER DESIGN SHEET - FUTURE CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing											DATE: March 18, 2022							
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day				LOT BASIS SINGLE FAMILY COMMERCIAL / INSTUTIONAL: MULTI FAMILY BACHELOR: 1- BEDROOM: 2- BEDROOM:				3 PEOPLE 8 to 10 PEOPLE 1.5 PEOPLE 2.5 PEOPLE 3 PEOPLE				COMMERCIAL / INSTUTIONAL: RESIDENTIAL SEWAGE FLOW:				300 litres/person/day 380 litres/person/day				DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081									
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN								PROFILE							
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE		
A78	Elm Street	SA28	SA27	0.93	60.04		3	8	24.0	1436	0.09	0.39	31.24	0.015	450	0.12	85.1	0.535	103.9	3.24		0.12			3.693	36.73%	309.10		
A79	Elm Street	SA27	SA26	0.88	60.92		3	7	21.0	1457	0.09	0.34	31.67	0.015	450	0.12	85.1	0.535	97.5	3.04		0.12			3.689	37.23%	310.68		
A80	Elm Street	SA26	SA25	0.85	61.77		3	6	18.0	1475	0.09	0.29	32.05	0.015	450	0.12	85.1	0.535	100.6	3.14		0.12			3.685	37.68%	312.06		
A81	Munroe Street	SA87	SA88	0.34	0.34		3	2	6.0	6	0.03	0.11	0.14	0.015	200	0.35	16.7	0.532	96	3.01		0.34			4.000	0.84%	33.24		
A82	Munroe Street	SA88	SA89	0.57	0.91		3	5	15.0	21	0.06	0.26	0.46	0.015	200	0.35	16.7	0.532	105.8	3.32		0.37			4.000	2.76%	52.01		
A83	Munroe Street	SA90	SA89	0.40	0.40		3	5	15.0	15	0.04	0.26	0.30	0.015	200	0.35	16.7	0.532	69.5	2.18		0.24			4.000	1.82%	44.51		
A84	Wellington Street	SA89	SA73	0.43	1.74		3	2	6.0	42	0.04	0.11	0.91	0.015	300	0.20	37.2	0.527	107.6	3.40		0.22			4.000	2.45%	74.67		
A85	Main Street	SA71	SA72	1.08	1.08	*	3	6	31.0	31	0.11	0.55	0.65	0.015	200	0.40	17.9	0.569	101.8	2.98		0.41			4.000	3.66%	57.84		
A86	Main Street	SA72	SA73	0.99	2.07		3	9	27.0	58	0.10	0.48	1.23	0.015	200	0.40	17.9	0.569	99.4	2.91		0.40			4.000	6.87%	73.27		
A87	Main Street	SA76	SA75	2.56	2.56		3	8	24.0	24	0.26	0.42	0.68	0.015	200	0.40	17.9	0.569	84.1	2.46		0.34			4.000	3.80%	58.65		
A88	Main Street	SA75	SA74	1.22	3.78		3	10	30.0	54	0.12	0.53	1.33	0.015	200	0.40	17.9	0.569	118.6	3.48		0.47			4.000	7.43%	75.46		
A89	Main Street	SA74	SA73	0.73	4.51		3	6	18.0	72	0.07	0.32	1.72	0.015	200	0.40	17.9	0.569	108.8	3.19		0.44			4.000	9.61%	83.11		
A90	Wellington Street	SA73	SA79	0.51	8.83		3	3	9.0	181	0.05	0.16	4.07	0.015	300	0.20	37.2	0.527	89.9	2.84		0.18			4.000	10.92%	130.76		
A91	Maple Street	SA80	SA79	0.85	0.85		3	8	24.0	24	0.09	0.42	0.51	0.015	200	1.16	30.4	0.968	103.3	1.78		1.20			4.000	1.67%	43.08		
A92	Maple Street	SA77	SA78	0.70	0.70		3	7	21.0	21	0.07	0.37	0.44	0.015	200	0.40	17.9	0.569	58.8	1.72		0.24			4.000	2.46%	49.84		
A93	Maple Street	SA78	SA79	0.57	1.27		3	5	15.0	36	0.06	0.26	0.76	0.015	200	0.40	17.9	0.569	74.7	2.19		0.30			4.000	4.26%	61.22		
A94	Wellington Street	SA79	SA25	0.52	11.47		3	3	9.0	250	0.05	0.16	5.55	0.015	300	0.20	37.2	0.527	110	3.48		0.22			4.000	14.89%	146.87		
A95	Elm Street	SA96	SA95	0.40	0.40		3	2	6.0	6	0.04	0.11	0.15	0.015	200	1.00	28.2	0.899	68	1.26		0.68			4.000	0.52%	27.74		
A96	Elm Street	SA95	SA25	0.35	0.75		3	2	6.0	12	0.04	0.11	0.29	0.015	200	0.40	17.9	0.569	63.1	1.85		0.25			4.000	1.60%	42.44		
	Easement	SA25	SA24		73.99		3		0.0	1737	0.00	0.00	37.88	0.015	450	0.12	85.1	0.535	67.5	2.10		0.08			3.633	44.53%	332.25		
	Easement	SA24	SA23		73.99		3		0.0	1737	0.00	0.00	37.88	0.015	450	0.12	85.1	0.535	62.8	1.96		0.08			3.633	44.53%	332.25		
	Easement	SA23	SA22		73.99		3		0.0	1737	0.00	0.00	37.88	0.015	450	0.12	85.1	0.535	80.6	2.51		0.10			3.633	44.53%	332.25		
	Easement	SA22	SA21		73.99		3		0.0	1737	0.00	0.00	37.88	0.015	450	0.12	85.1	0.535	59	1.84		0.07			3.633	44.53%	332.25		
FUT D	FUTURE SUB'D.	STUB	SA21	17.80	17.80		3	117	351.0	351	1.78	6.18	7.96	0.013	200	0.40	20.6	0.656	90	2.29		0.36			4.000	38.59%	139.95		
	Easement	SA21	SA20		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	72.8	2.27		0.09			3.571	53.89%	356.87		
	Easement	SA20	SA19		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	98.5	3.07		0.12			3.571	53.89%	356.87		
	Easement	SA19	SA18		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	66.4	2.07		0.08			3.571	53.89%	356.87		
	Easement	SA18	SA17		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	71	2.21		0.09			3.571	53.89%	356.87		
	Easement	SA17	SA16		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	76.5	2.38		0.09			3.571	53.89%	356.87		
	Easement	SA16	SA15		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	72.5	2.26		0.09			3.571	53.89%	356.87		
	Easement	SA15	SA14		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	64.6	2.01		0.08			3.571	53.89%	356.87		
	Easement	SA14	SA13		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	66.1	2.06		0.08			3.571	53.89%	356.87		
	Easement	SA13	SA12		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	90.2	2.81		0.11			3.571	53.89%	356.87		
	Easement	SA12	SA11		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	91.7	2.86		0.11			3.571	53.89%	356.87		
	Easement	SA11	SA10		91.79		3		0.0	2088	0.00	0.00	45.83	0.015	450	0.12	85.1	0.535	48.2	1.50		0.06			3.571	53.89%	356.87		

SANITARY SEWER DESIGN SHEET - FUTURE CONDITIONS 2021											PROJECT NAME: West Lorne Sanitary Servicing																	
Industrial Pop. Density = 60 people/ha Infiltration Rate= 8640 litre/ha/day Sewage Flow = 22500 litre/ha/day				LOT BASIS SINGLE FAMILY COMMERCIAL / INSTUTIONAL: MULTI FAMILY BACHELOR: 1- BEDROOM: 2- BEDROOM:				3 PEOPLE 8 to 10 PEOPLE 1.5 PEOPLE 2.5 PEOPLE 3 PEOPLE				COMMERCIAL / INSTUTIONAL: RESIDENTIAL SEWAGE FLOW:				300 litres/person/day 380 litres/person/day				DESIGNED BY: CSL,JA CHECKED BY: CSL JOB No. : 221081				DATE: March 18, 2022				
LOCATION				AREA (A)		Population					Sewage Flow			SEWER DESIGN								PROFILE						
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	per hectares	per lot	No. of Lots	delta pop	Total Popula.	Infilt. l/s	Sewage l/s	Total l/s	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	DROP IN M.H.	FALL IN SEWER	INVERT U.S.	ELEV. D.S.	PEAKING FACTOR	% CAP.	CALC. PIPE	
A97	Graham Road	SA42	SA43	1.28	1.28		3	7	21.0	21	0.13	0.37	0.50	0.015	200	0.35	16.7	0.532	89.30	2.80		0.31			4.000	2.98%	53.5	
A98	Graham Road	SA43	SA44	1.01	2.29	*	3	3	58.0	79	0.10	1.02	1.62	0.015	200	0.35	16.7	0.532	89.90	2.82		0.31			4.000	9.69%	83.3	
A99	Graham Road	SA44	SA45	0.97	3.26		3	4	12.0	91	0.10	0.21	1.93	0.015	200	0.35	16.7	0.532	91.10	2.85		0.32			4.000	11.53%	89.0	
A100	Graham Road	SA45	SA47	0.97	4.23		3	4	12.0	103	0.10	0.21	2.24	0.015	200	0.35	16.7	0.532	78.00	2.44		0.27			4.000	13.37%	94.1	
A101	Graham Road	SA47	SA48	0.73	4.96	*	3	3	20.0	123	0.07	0.35	2.66	0.015	200	0.35	16.7	0.532	69.50	2.18		0.24			4.000	15.92%	100.4	
A102	Graham Road	SA48	SA49	1.21	6.17	*	3	3	19.0	142	0.12	0.33	3.12	0.015	200	0.35	16.7	0.532	105.80	3.32		0.37			4.000	18.64%	106.5	
A103	Marsh Line	SA49	SA50	0.32	6.49		3	1	3.0	145	0.03	0.05	3.20	0.015	250	0.35	30.3	0.617	96.90	2.62		0.34			4.000	10.56%	107.6	
A104	Marsh Line	SA50	SA51	0.20	6.69		3	0	0.0	145	0.02	0.00	3.22	0.015	250	0.35	30.3	0.617	99.10	2.68		0.35			4.000	10.63%	107.9	
A105	Marsh Line	SA51	SN140	0.13	6.82		3	0	0.0	145	0.01	0.00	3.23	0.015	250	0.67	41.9	0.854	66.30	1.29		0.44			4.000	7.71%	95.6	
A106	Todd Place	SN144	SN143	0.88	0.88		3	9	27.0	27	0.09	0.48	0.56	0.015	200	0.49	19.8	0.629	76.20	2.02		0.37			4.000	2.85%	52.7	
A107	Todd Place	SN143	SN142	0.44	1.32		3	5	15.0	42	0.04	0.26	0.87	0.015	200	1.84	38.3	1.220	70.40	0.96		1.30			4.000	2.27%	48.4	
A108	Angelo Street	end	SN142	0.28	0.28		3	2	6.0	6	0.03	0.11	0.13	0.015	250	0.48	35.5	0.723	27.60	0.64		0.13			4.000	0.38%	30.8	
A109	Angelo Street	SN142	SN141	0.59	0.87		3	4	12.0	18	0.06	0.21	0.40	0.015	250	0.48	35.5	0.723	101.70	2.34		0.49			4.000	1.14%	46.7	
A110	Todd Place	SN144	SN145	0.77	0.77		3	6	18.0	18	0.08	0.32	0.39	0.015	200	0.47	19.4	0.616	102.30	2.77		0.48			4.000	2.03%	46.4	
A111	Todd Place	SN145	SN146	1.11	1.88		3	7	21.0	39	0.11	0.37	0.87	0.015	200	0.48	19.6	0.623	72.70	1.95		0.35			4.000	4.47%	62.3	
A112	Todd Place	SN146	SN141	0.64	2.52		3	7	21.0	60	0.06	0.37	1.31	0.015	200	0.36	16.9	0.539	73.80	2.28		0.27			4.000	7.72%	76.5	
A113	Angelo Street	SN141	SN140	0.53	3.92		3	4	12.0	90	0.05	0.21	1.98	0.015	250	0.49	35.8	0.730	77.50	1.77		0.38			4.000	5.51%	84.3	
A114	Marsh Line	SN140	SA52	0.09	10.83		3	0	0.0	235	0.01	0.00	5.22	0.015	250	0.67	41.9	0.854	30.60	0.60		0.21			4.000	12.45%	114.4	
A115	Marsh Line	SA52	SA53	0.19	11.02		3	0	0.0	235	0.02	0.00	5.24	0.015	250	0.68	42.2	0.860	97.20	1.88		0.66			4.000	12.40%	114.3	
FUT A	CREEK'S EDGE	STUB	SA53	3.19	3.19		3	36	108.0	108	0.32	1.90	2.22	0.013	200	0.40	20.6	0.656	90.00	2.29		0.36			4.000	10.77%	86.7	
A116	Marsh Line	SN53	SA10	0.20	14.41		3	0	0.0	343	0.02	0.00	7.48	0.015	250	0.51	36.6	0.745	97.20	2.17		0.50			4.000	20.44%	137.8	
FUT B	CREEK'S EDGE	STUB	FUTMH	2.55	2.55		3	31	93.0	93	0.26	1.64	1.89	0.013	200	0.40	20.6	0.656	90.00	2.29		0.36			4.000	9.17%	81.7	
A116A	Marsh Line	FUTMH	SA10	0.19	2.74		3	0	0.0	93	0.02	0.00	1.91	0.013	200	0.40	20.6	0.656	82.50	2.10		0.33			4.000	9.27%	82.0	
	Easement	SA10	P.STA.		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	9.50	0.30		0.01			3.505	64.92%	382.7	
	Easement	P.STA.	SA9		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	3.00	0.09		0.00			3.505	64.92%	382.7	
	Easement	SA9	SA8		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	11.00	0.34		0.01			3.505	64.92%	382.7	
	Easement	SA8	SA7		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	63.40	1.98		0.08			3.505	64.92%	382.7	
	Easement	SA7	SA6		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	70.10	2.18		0.08			3.505	64.92%	382.7	
	Easement	SA6	SA5		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	104.90	3.27		0.13			3.505	64.92%	382.7	
	Easement	SA5	SA4		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.12	85.1	0.535	107.00	3.33		0.13			3.505	64.92%	382.7	
	Easement	SA4	SA3		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.14	91.9	0.578	93.60	2.70		0.13			3.505	60.10%	371.8	
	Easement	SA3	SA2		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.13	88.5	0.557	90.00	2.69		0.12			3.505	62.37%	377.0	
	Easement	SA2	SA1		108.94		3	0	0.0	2524	0.00	0.00	55.22	0.015	450	0.19	107.0	0.673	75.60	1.87		0.14			3.505	51.59%	351.1	
											</																	

APPENDIX 'C'
TYPICAL PHOTOS





Figure 1-Munroe @ Ridge - looking South along Ridge



Figure 2-Munroe @ Ridge - looking North along Ridge Ext.



Figure 3-Jane @ Finney - looking South along Finney Ext.



Figure 4-Elm @ Wellington - looking South along Wellington Ext.



Figure 5-Elm @ Wellington - looking North along Wellington



Figure 6-Elm @ Wellington - looking East along Elm

APPENDIX 'D'

MISCELLANEOUS FIGURES

FIGURE NO. 3

**OFFICIAL PLAN
SCHEDULE 'D' LAND USE & TRANSPORTATION PLAN**

FIGURE NO. 4

**ZONING MAP
SCHEDULE 'C' WEST LORNE AND AREA
(MAPS NO. 1 – 6)**



FIGURE 3

Municipality of WEST ELGIN

Village of WEST LORNE

LAND USE & TRANSPORTATION PLAN
Schedule 'D'

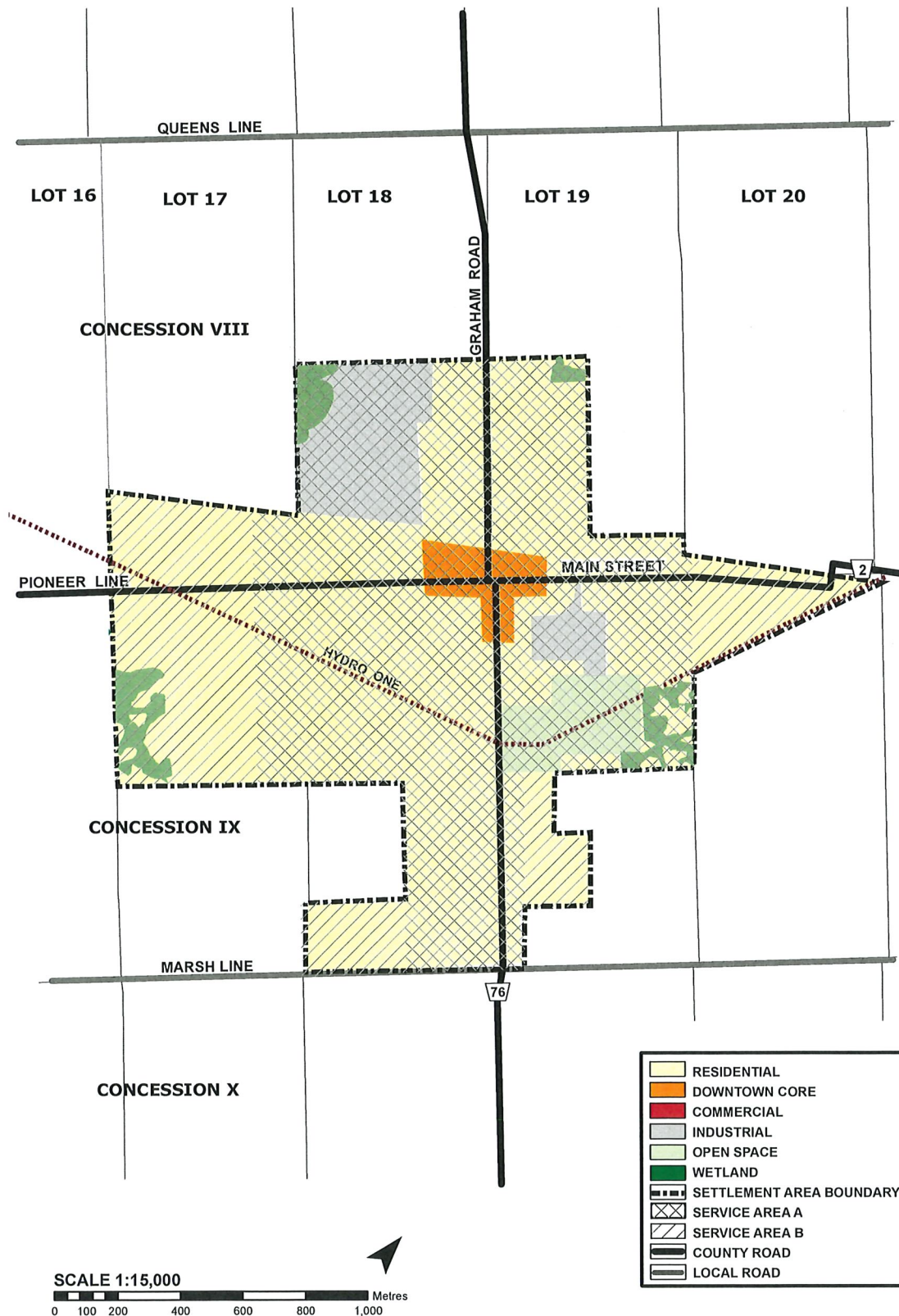
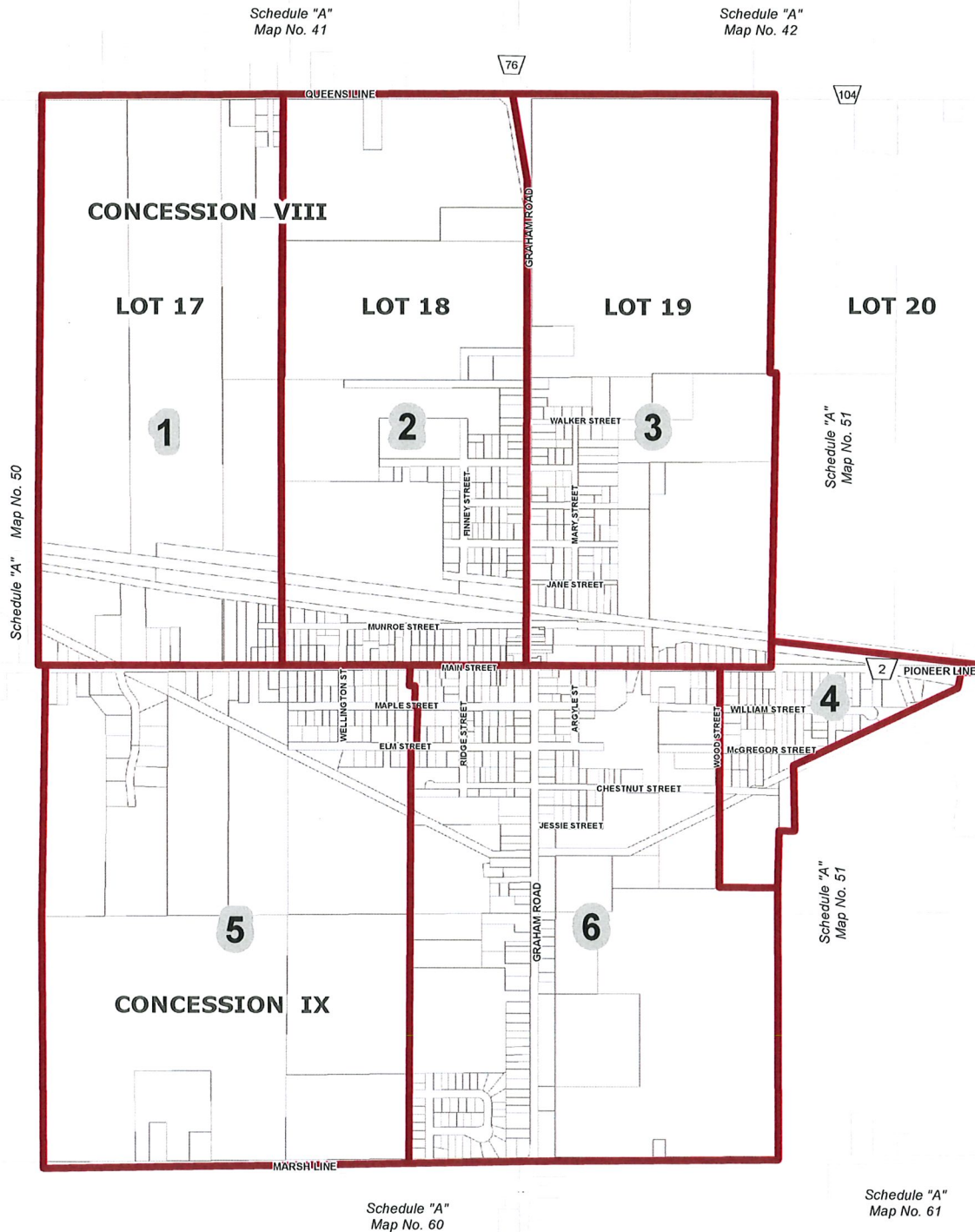
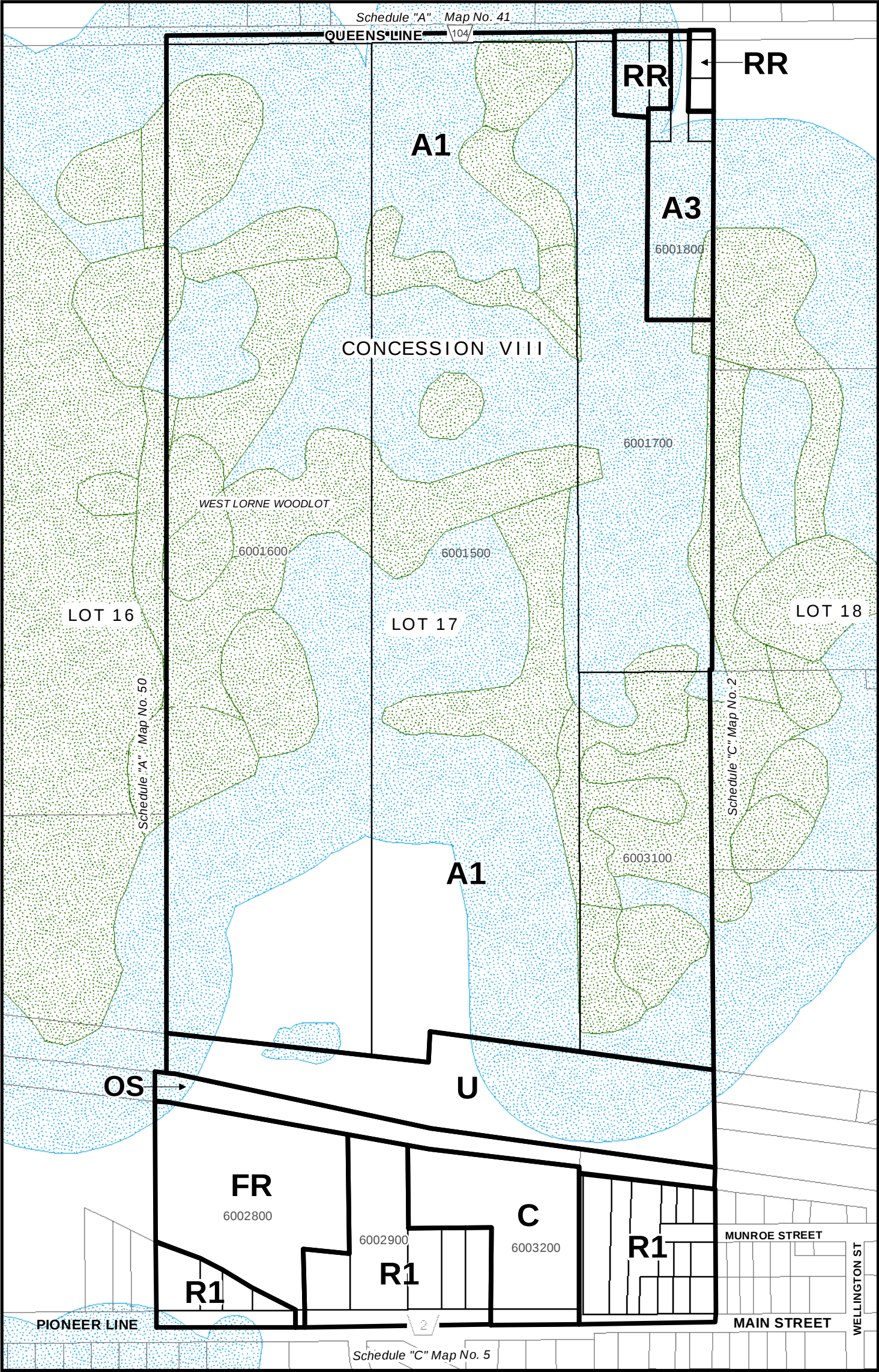


FIGURE 4

Municipality of WEST ELGIN: Schedule "C" WEST LORNE and Area

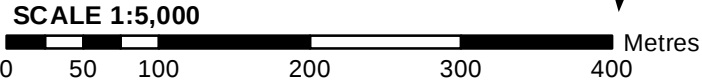


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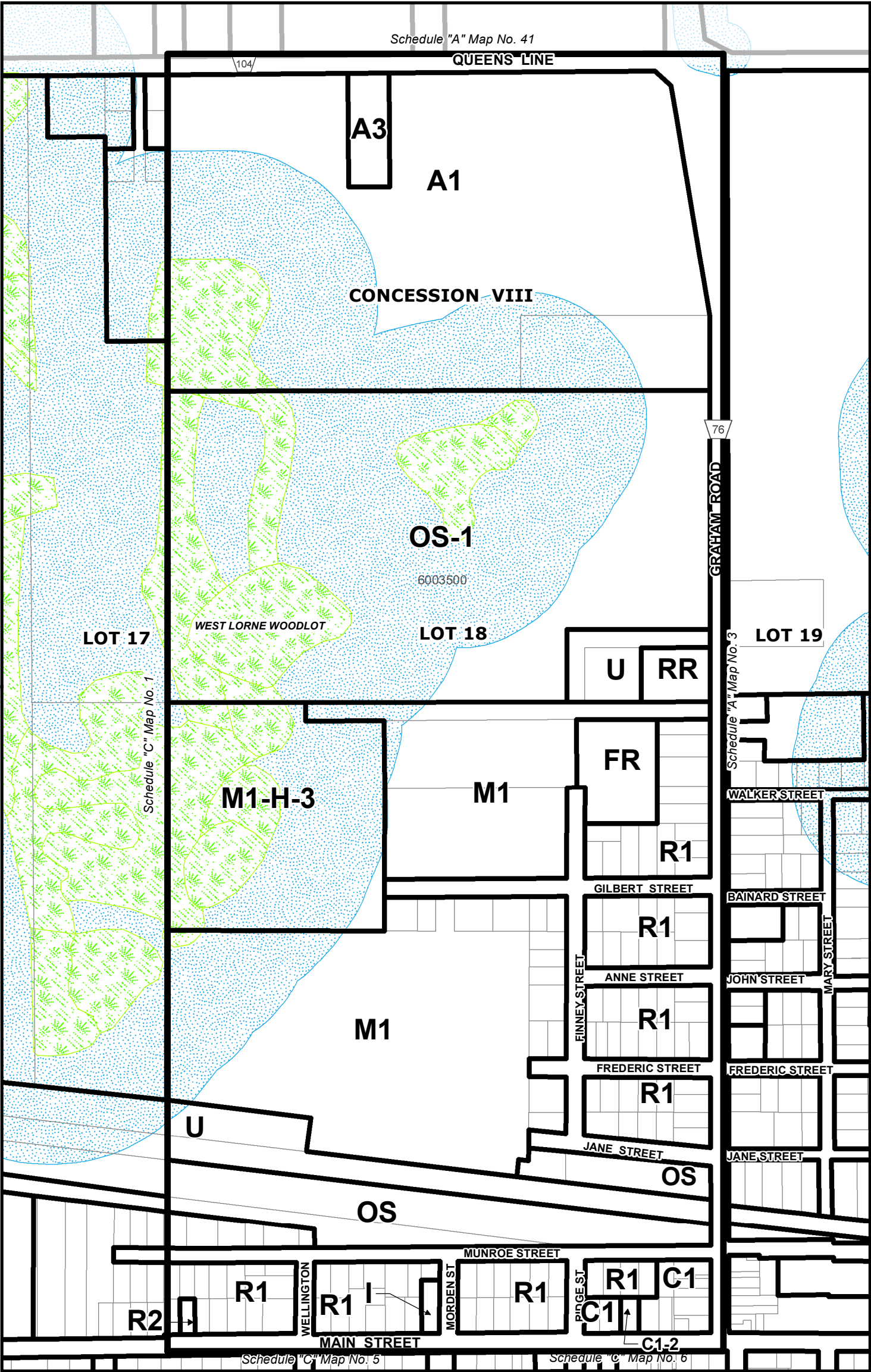


***Municipality of WEST ELGIN:
WEST LORNE and AREA***

Schedule "C"

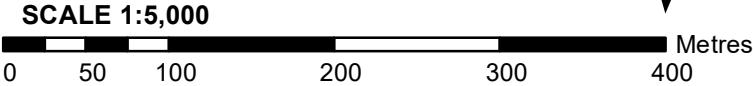


Map No. 1

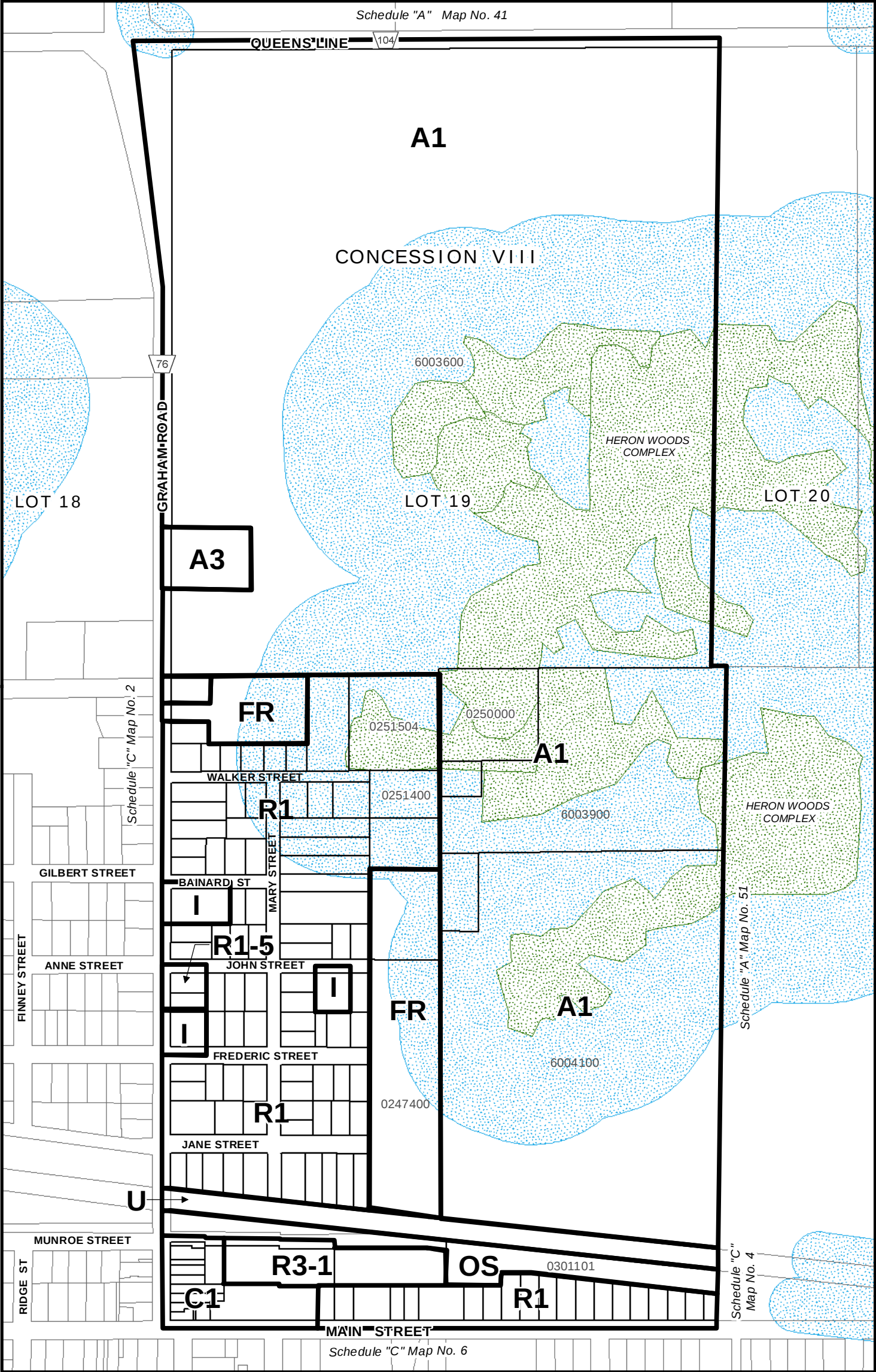


**Municipality of WEST ELGIN:
WEST LORNE and AREA**

Schedule "C"



Map No. 2



***Municipality of WEST ELGIN:
WEST LORNE and AREA***

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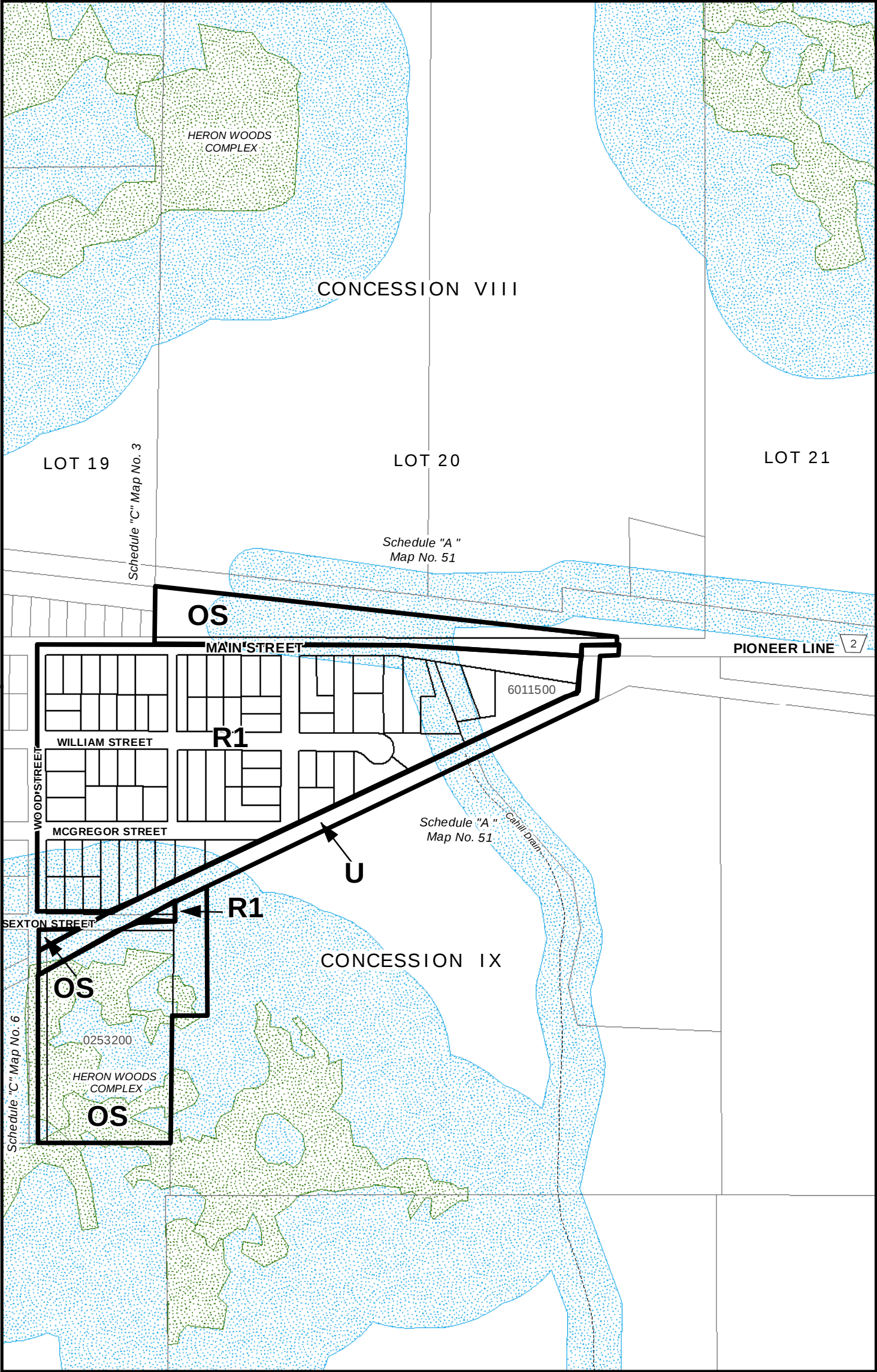
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Municipality of West Elgin Zoning By-Law



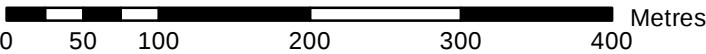
Schedule "C"

Map No. 3



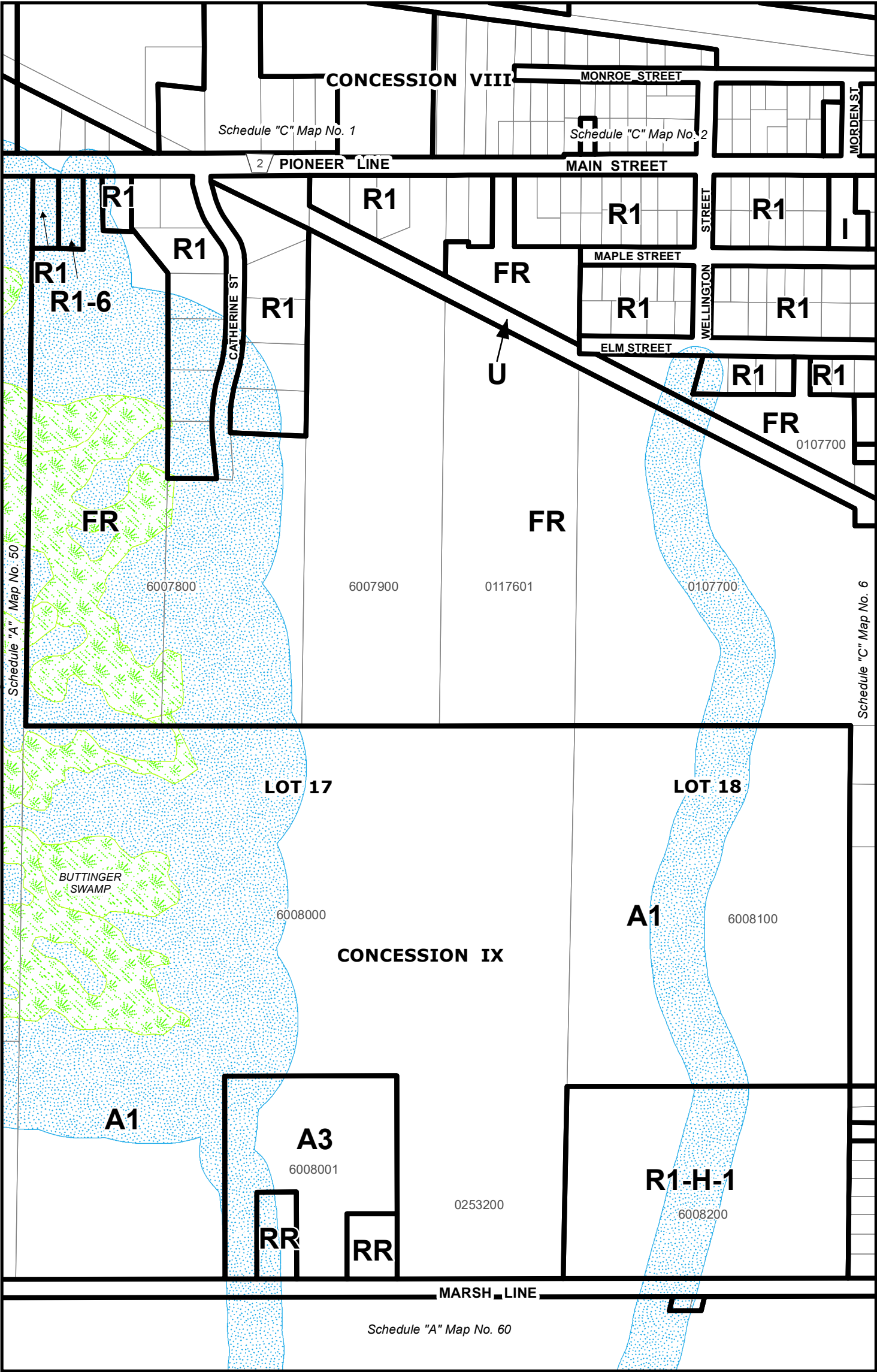
***Municipality of WEST ELGIN:
WEST LORNE and AREA***

SCALE 1:5,000



Schedule "C"

Map No. 4



**Municipality of WEST ELGIN:
WEST LORNE and AREA**

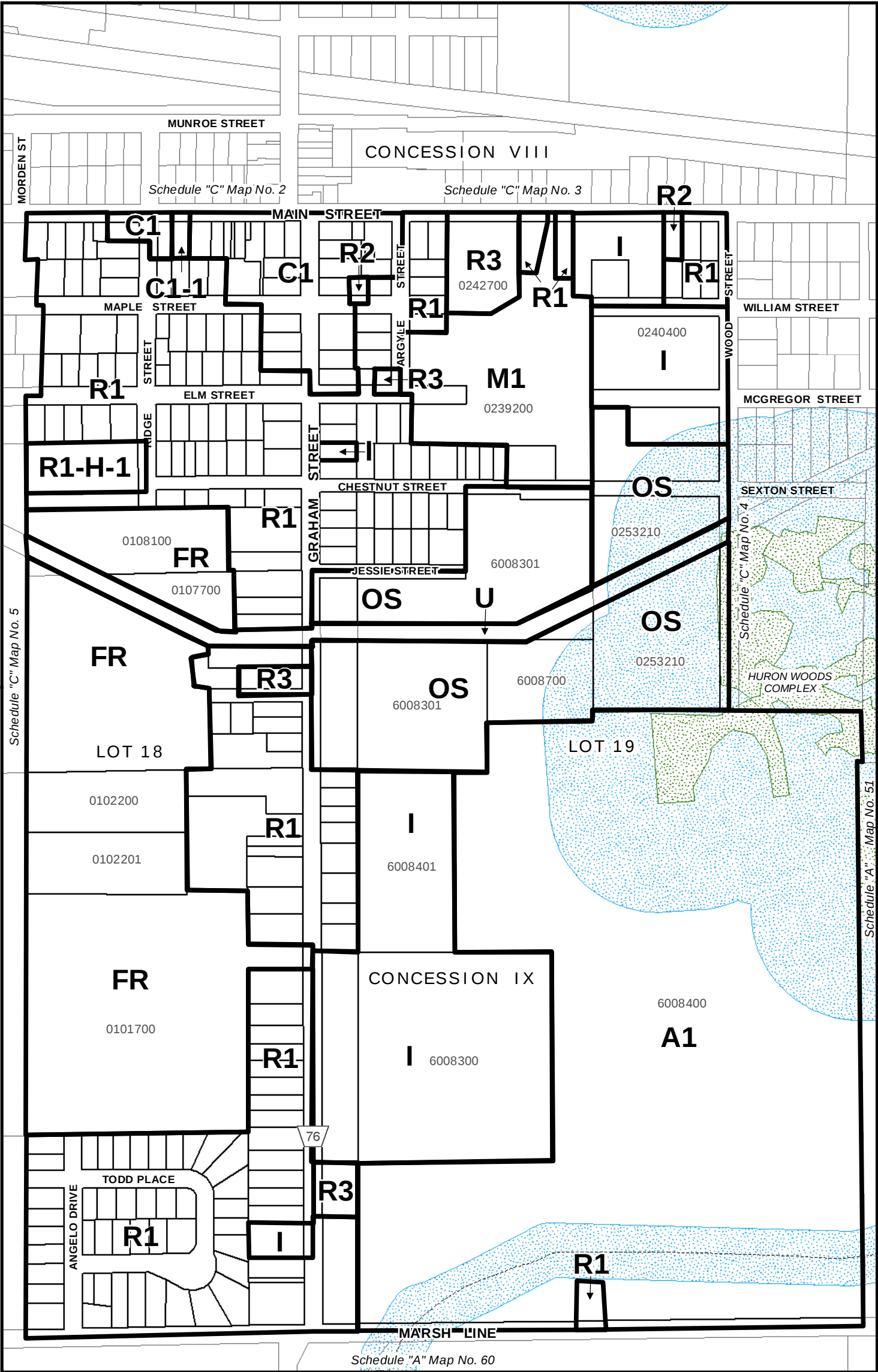
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Municipality of West Elgin Zoning By-Law

Schedule "C"

Map No. 5



**Municipality of WEST ELGIN:
WEST LORNE and AREA**

SCALE 1:5,000

0 50 100 200 300 400 Metres

Municipality of West Elgin Zoning By-Law

Schedule "C"

Map No. 6