

**WEST LORNE  
STORM SEWER STUDY 2023**

**MUNICIPALITY OF WEST ELGIN**



MUNICIPALITY OF  
**West Elgin**





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Mr. Lee Gosnell, CRS  
Manager of Operations & Community Services  
Corporation of the Municipality of West Elgin  
22413 Hoskins Line  
Rodney, Ontario  
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Mr. Gosnell: Re: West Lorne Storm Sewer Study 2023  
Our Job No. 223197

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This study has been prepared in accordance with instructions provided by the Municipality of West Elgin as well as our engineering proposal dated August 8, 2023. We completed a field investigation of the existing storm sewer system including topographical survey along all road centrelines, all catchbasins and maintenance holes including within specific low-lying properties, and review of reported drainage problems noted in 2023 within the Town of West Lorne. On July 29, 2023, West Lorne experienced approximately 150mm (6") of rainfall during a 2-hour period which is greater than the historical 250-year storm event. On August 23, 2023, West Lorne experienced approximately 175mm (7") of rainfall during a 5-hour period, and on June 28, 2021 West Lorne experienced approximately 125mm (5") of rainfall during a 1-hour period, both which are of a similar storm return event. An analysis of the capacity of the existing storm sewer system was then completed and compared to the sewer surcharge and surface ponding problems reported. The following summarizes our findings, provides recommendations toward reducing the drainage problems within West Lorne and provides a future storm sewer design including related 2024 sewer construction cost estimates.

## **SUMMARY OF REPORT**

### **A. GENERAL**

The main purpose of this study is to analyse the existing conditions of the storm sewer network in West Lorne to determine the optimum locations where upgrades and/or replacement of existing storm sewers would best improve the functionality and efficiency of the storm sewer system as well as alleviate existing surface flooding.

The storm sewer study revealed that approximately 141.41 hectares of land is tributary to this storm sewer system. The majority of flows within West Lorne are tributary to the Graham Drain. The existing storm sewers located within this study area are of various ages and therefore were constructed to different design standards. Some roadways, or portions thereof, within the study area do not currently have any storm sewers in place.

**A. GENERAL (cont'd)**

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 storm sewers range from being adequate to meet today's municipal design standard of a 5-year storm event to as low as 27% of a 5-year storm event (see Watershed Plans and Design Sheets in Appendices 'A' and 'B').

Existing infrastructure documentation was provided by Municipality of West Elgin and Elgin County to assist with this project. Supplied information included design drawings and Municipal drawings reflecting existing roadways and underground infrastructure within West Lorne. This information was compared with field results obtained during our site investigations.

Refer to FIGURES No. 1 - 4 which depict road allowances owned by Elgin County and the Municipality of West Elgin within West Lorne.

**B. DESIGN CRITERIA**

Determination of the watershed limits, tributary flows and sewer capacities for both existing and future conditions were completed using information gathered from drawings (both as-constructed and design drawings) provided by the Municipality, County or located within Spriet records, partially verified in the field by Spriet Associates personnel or through comparison with contour mapping. Refer to the Watershed Plans and Design Sheets included as FIGURES No. 5 - 8 in Appendices 'A' and 'B'.

It is noted that the Municipality of West Elgin does not have design standards specific to the Municipality and the design standards of the Municipality of Dutton-Dunwich were referenced for design purposes. As such, this study has been prepared in accordance with the Municipality of Dutton-Dunwich design standards.

The flows for the tributary areas were calculated based upon the Rational Formula using computerised software spread sheets. Several factors including the watershed area, location of existing and proposed catch basins and manholes, existing and future storm sewer slopes, applicable surface runoff coefficients, and design storm intensities are required as input. We calculated runoff coefficients for each applicable individual watershed area. These runoff coefficients are shown on FIGURES No. 5 - 8. The 5-year design storm was used as the performance level for both the existing and future conditions. The rainfall intensities for this storm event were generated using a synthetic rainfall distribution intensity curve used by many Municipalities in the area. This curve can be calculated mathematically using the coefficients  $a = 477.211$ , constant  $b = 2.475$ , and exponent  $c = 0.617$ . The design review was performed in accordance with Ministry of Environment, Conservation and Parks (MECP) standards as well as the Municipality of Dutton-Dunwich design standards.

The predominant land use within the storm sewer area under investigation in this study is residential. However, numerous commercial and industrial properties also exist within the study area, primarily along Graham Street, Main Street, Finney Street and Argyle Street. Similarly, a few of the large upstream properties are strictly agricultural and thus the runoff coefficients (C) have been adjusted accordingly. As noted on Proposed Conditions Storm Watershed Plan, there are several proposed developments within West Lorne.

**B. DESIGN CRITERIA (cont'd)**

The use of the "Rational Method" was determined to be appropriate for this study. Although the Rational Method has certain shortcomings, such as the methods of determination of the values of 'C' and 'i', it is still a highly recognized and practical empirical method to analyse and design storm sewer systems.

The Rational Method formula is:

$$Q = 2.78 * (C)(i)(A) \text{ in which:}$$

Q = the storm runoff rate (L/s)

C = runoff coefficient

i = average rainfall intensity (mm/hr)

A = size of tributary drainage area (ha)

The Manning Formula has been used to calculate capacity of existing and proposed storm sewer pipes, and a Manning coefficient of friction value of  $n = 0.013$  is generally accepted as standard practice for sewer design.

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

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

The peak rate of runoff from an area can generally be calculated using the Rational Formula  
$$Q = 2.78 * (C)(i)(A).$$

This formula is useful for sizing storm sewers to remove water as fast as possible from street surfaces for the given design storm.

The drainage area to be used in the design of a storm sewer should include all those areas which will naturally drain or could reasonably be drained to the system.

The area term in the Rational Formula represents the total area tributary to the point on the storm sewer system under consideration.

The rainfall intensity for a particular storm frequency and time of concentration should be determined from applicable intensity-duration-frequency curves for which the system is to be constructed.

Although the level of convenience provided by the minor system is basically a decision of the municipality, it is suggested that at least a 2-year storm should be used for design purposes.

The time of concentration is the time required for flow to reach a particular point in the sewer system from the most remote part of the drainage area. It includes not only the travel time in the sewers, but also the inlet time, or time required to flow overland into the sewer system.

It is recommended that storm sewer capabilities be calculated using the Manning formula with a roughness coefficient ( $n$ ) of 0.013 for all smooth-walled pipe materials.

Allowable flow velocities - 0.8m/s (minimum) to 6.0 m/s (maximum).

Minimum storm sewer pipe size - 250mm (10 inch).



**SPRIET ASSOCIATES**  
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## **D. LOWER THAMES VALLEY CONSERVATION AUTHORITY (LTVCA)**

All proposed storm sewers outlet into existing ravines or open water courses which require a LTVCA permit based on submission of detailed design drawings for the proposed works.

## **E. LIST OF ATTACHMENTS**

FIGURES 1 – 4      Municipal and County Road Allowances within West Lorne

### **APPENDIX 'A'**

FIGURE No. 5      Existing Watershed Area Plans

FIGURE No. 6      Existing Storm Sewer Design Sheets

### **APPENDIX 'B'**

FIGURE No. 7      Future Watershed Area Plans

FIGURE No. 8      Future Storm Sewer Design Sheets

### **APPENDIX 'C'**

FIGURES 9 – 12      Summary of Existing Undersized Storm Sewers

FIGURES 13 – 16      Summary of Existing Storm System Deficiencies

FIGURES 17 – 20      Summary of Existing Municipal Drains

FIGURE 21      Municipal Drain Capacity Map

### **APPENDIX 'D'**

Typical Photos

## **F. SUMMARY, RECOMMENDATIONS AND SEWER REPLACEMENT COSTING**

When comparing APPENDIX 'A' (existing conditions) and APPENDIX 'B' (future conditions) Area Plans and Design Sheets, it was noted that the majority of existing storm sewer runs are undersized and do not provide outlet for the 5-year design storm event. Similarly, numerous runs of sewer do not meet the MECP recommended minimum 250mm (10 inch) diameter or the minimum 300mm (12 inch) Dutton-Dunwich Municipal standard. We also note that numerous areas currently do not have storm sewers in place and as such installation of new storm sewers will greatly improve the drainage within these areas. We recommend the installation of storm sewers including sewer pipes, maintenance holes and catch basins which allows the surface flows to be collected and discharged underground, thus alleviating numerous surface flow and flooding concerns. These include the installation of the storm sewers listed below as replacement of existing undersized pipe or installation as new sewers:

Location	Municipal Drain (Y/N)	Length (m)	Diameter (mm)	Proposed Work	Estimated 2024 Design & Construction Costs
Allowance – MH N68 to MH N69	Y	81.2	375	Replacement	\$ 145,300
Allowance – MH N69 to MH N70	Y	28.2	600	Replacement	\$ 60,300
Angelo Street – MH T9 to MH T11	N	3.3	450	Replacement	\$ 6,000
Angelo Street – MH T11 to MH T5	N	75.9	450	Replacement	\$ 138,900



<b>Location</b>	Municipal Drain (Y/N)	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	Estimated 2024 Design & Construction Costs
Anne Street – MH N29 to MH N34	N	33.7	450	Replacement	\$ 61,700
Anne Street – MH N34 to MH N35	N	61.4	525	Replacement	\$ 114,800
Anne Street – MH N35 to MH N36	N	21.7	450	Replacement	\$ 39,700
Anne Street – MH N36 to MH N27	N	47.1	600	Replacement	\$ 100,800
Argyle Street – MN N94 to MN 95	N	25.7	450	Replacement	\$ 47,000
Bainard Street – MH N22 to MH N26	N	97.3	600	Replacement	\$ 208,200
Bainard Street – MH N26 to MH N11	N	18.8	675	Replacement	\$ 49,400
Catherine Road – MH C2 to MH C3	Y	50.7	375	Replacement	\$ 90,800
Catherine Road – MH C3 to MH C4	Y	101.2	525	Replacement	\$ 189,200
Catherine Road – MH C4 to MH C5	Y	44.5	525	Replacement	\$ 83,200
Catherine Road – MH C5 to MH C6	Y	116.5	675	Replacement	\$ 306,400
Catherine Road – MH C6 to MH C7	Y	122.6	750	Replacement	\$ 353,100
Catherine Road – MH C7 to MH C8	Y	58.7	750	Replacement	\$ 169,100
Catherine Road – MH C8 to Outlet	Y	7.1	750	Replacement	\$ 20,500
Chestnut Street – MH N107 to MH N104	N	188.6	450	Replacement	\$ 345,100
Chestnut Street – MH N101 to MH N102	N	34.3	375	Replacement	\$ 61,400
Division Street – MH W10 to MH W7	Y	85.1	375	Replacement	\$ 152,300
Easement – MH N8 to MH N9	Y	62.1	600	Replacement	\$ 132,900
Elm Street – MH A35 to MH A36	N	58.1	375	Replacement	\$ 104,000
Elm Street – MH A36 to MH A37	N	61.7	450	Replacement	\$ 112,900
Elm Street – MH A37 to MH A38	N	125.1	525	Replacement	\$ 233,900
Elm Street – MH A38 to MH A34	N	13.5	450	Replacement	\$ 24,700
Elm Street – MH N106 to MH N97	N	192.6	450	Replacement	\$ 352,500
Elm Street – Stub to MH N127	N	42.0	450	Replacement	\$ 76,900
Elm Street – MH N127 to MH N117	N	25.2	525	Replacement	\$ 47,100



<b>Location</b>	<b>Municipal Drain (Y/N)</b>	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	<b>Estimated 2024 Design &amp; Construction Costs</b>
Elm Street – MH N117 to MH N97	Y*	46.4	450	Replacement	\$ 84,900
Evandale Street – MH W16 to MH W14	N	82.8	375	Replacement	\$ 148,200
Finney Street – MH N6 to MH N5	Y	44.0	450	Replacement	\$ 80,500
Finney Street – MH N32 to MH N33	N	38.0	300	Replacement	\$ 66,900
Finney Street – MH N33 to MH N31	N	38.0	450	Replacement	\$ 69,500
Finney Street – MH N14 to MH N28	N	63.1	375	Replacement	\$ 112,900
Finney Street – MH N28 to MH N29	N	38.6	450	Replacement	\$ 70,600
Frederic Street – MH N51 to MH N52	N	107.4	975	Replacement	\$ 417,800
Frederic Street – MH N52 to MH 53	N	34.4	900	Replacement	\$ 114,200
Frederic Street – MH N53 to MH N48	N	27.0	600	Replacement	\$ 57,800
Future Subdivision – MH N5 to MH N7	Y	89.4	675	Replacement	\$ 235,100
Future Subdivision – MH N7 to MH N8	Y	17.5	675	Replacement	\$ 46,000
Gilbert Street – MH N12 to MH N13	N	61.3	525	Replacement	\$ 114,600
Gilbert Street – MH N13 to MH N14	N	61.2	525	Replacement	\$ 114,400
Gilbert Street – MH N14 to MH N130	N	42.6	600	Replacement	\$ 91,200
Gilbert Street – MH N130 to MH N17	N	55.3	675	Replacement	\$ 145,400
Gilbert Street – MH N17 to MH N11	N	67.5	525	Replacement	\$ 126,200
Graham Road * – MH N1 to MH N2	Y	101.3	750	Replacement	\$ 291,700
Graham Road * – MH N2 to MH N10	Y	8.3	675	Replacement	\$ 21,800
Graham Road * – MH N10 to MH N11	Y	114.7	900	Replacement	\$ 380,800
Graham Road * – MH N11 to MH N27	Y	96.3	1,050	Replacement	\$ 403,500
Graham Road * – MH N27 to MH N48	Y	93.4	1,200	Replacement	\$ 439,900
Graham Road * – MH N48 to MH N54	Y	96.7	1,350	New	\$ 506,700
Graham Road * – MH N54 to MH N64	Y	48.7	1,800	New	\$ 378,900
Graham Road * – MH N64 to MH N65	Y	58.5	1,350	New	\$ 306,500



<b>Location</b>	Municipal Drain (Y/N)	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	Estimated 2024 Design & Construction Costs
Graham Road * – MH N65 to MH N71	Y	93.5	1,650	New	\$ 633,000
Graham Road * – MH N71 to MH N124	Y	35.7	975	New	\$ 138,900
Graham Road * – MH N123 to MH N124	Y	6.7	1,200	New	\$ 31,600
Graham Road * – MH N124 to MH N84	Y	83.4	1,650	New	\$ 564,600
Graham Road * – MH N84 to MH N97	Y	101.2	1,650	New	\$ 685,100
Graham Road * – MH N97 to MH N99	Y	106.5	1,800	New	\$ 828,600
Hughes Street – MH N50 to MH N51	N	34.2	750	Replacement	\$ 98,500
Jane Street – MH N56 to MH N57	N	55.8	375	Replacement	\$ 99,900
Jane Street – MH N59 to MH 60	N	55.5	375	Replacement	\$ 99,300
Jane Street – MH N60 to MH N61	N	24.5	525	Replacement	\$ 45,800
Jane Street – MH N61 to MH N62	N	50.6	525	Replacement	\$ 94,600
Jane Street – MH N62 to MH N63	N	67.0	450	Replacement	\$ 122,600
Jane Street – MH N56 to MH N57	N	55.8	375	Replacement	\$ 99,900
Jessie Street – MH N129 to MH N109	N	11.2	450	Replacement	\$ 20,500
Jessie Street – MH N109 to MH N110	N	40.3	750	Replacement	\$ 116,100
Jessie Street – MH N110 to MH N111	N	33.9	750	Replacement	\$ 97,600
Jessie Street – MH N111 to MH N105	N	36.4	675	Replacement	\$ 95,700
John Street – MH N37 to MH N38	Y	39.8	375	Replacement	\$ 71,200
John Street – MH N38 to MH N39	Y	39.0	525	Replacement	\$ 72,900
John Street – MH N39 to MH N40	Y	18.5	525	Replacement	\$ 34,600
John Street – MH N40 to MH N41	Y	49.9	525	Replacement	\$ 93,300
John Street – MH N41 to MH N47	Y	42.8	525	Replacement	\$ 80,000
John Street – MH N47 to MH N27	Y	19.4	900	Replacement	\$ 64,400
Main Street * – MH X1 to MH X2	N	99.8	375	Replacement	\$ 178,600
Main Street * – MH X2 to MH X3	Y	24.3	675	Replacement	\$ 63,900



<b>Location</b>	Municipal Drain (Y/N)	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	Estimated 2024 Design & Construction Costs
Main Street * – MH A4 to MH A5	N	129.0	525	Replacement	\$ 241,200
Main Street * – MH A5 to MH A12	N	170.1	675	Replacement	\$ 447,400
Main Street * – to MH A28	Y	200.0	300	Replacement	\$ 352,000
Main Street * – MH A39 to MH A40	Y	44.7	300	Replacement	\$ 78,700
Main Street * – MH A40 to MH A41	Y	71.7	450	Replacement	\$ 131,200
Main Street * – MH A41 to MH A42	Y	24.5	375	Replacement	\$ 43,900
Main Street * – MH A42 to MH A43	Y	208.7	675	Replacement	\$ 548,900
Main Street * – MH A43 to MH A12	Y	207.0	675	Replacement	\$ 544,400
Main Street * – MH N150 to MH 151	N	73.3	450	Replacement	\$ 134,100
Main Street * – MH 151 to MH N152	N	71.9	450	Replacement	\$ 131,600
Main Street * – MH 152 to MH N124	N	38.0	375	Replacement	\$ 68,000
Main Street * – MH N82 to MH N83	N	147.6	375	Replacement	\$ 264,200
Main Street * – MH N121 to ex. 375mm dia. pipe	N	69.6	300	Replacement	\$ 122,500
Main Street * – MH N108 to MH N125	N*	111.3	375	Replacement	\$ 199,200
Main Street * – MH N122 to MH N125	Y	96.2	300	Replacement	\$ 169,300
Main Street * – MH N125 to MH N73	Y	58.8	600	Replacement	\$ 125,800
Main Street * – MH N73 to MH N74	Y	92.9	675	Replacement	\$ 244,300
Main Street * – MH N74 to MH N75	Y	65.7	675	Replacement	\$ 172,800
Main Street * – MH N75 to MH N76	Y	141.4	825	Replacement	\$ 441,200
Main Street * – MH N76 to MH N70	Y	57.6	825	Replacement	\$ 179,700
Maple Street – MH A30 to MH A31	N	70.1	450	Replacement	\$ 128,300
Maple Street – MH A31 to ex. 900mm dia. pipe	N	44.3	375	Replacement	\$ 79,300
Maple Street – MH A32 to MH A33	N	27.9	300	Replacement	\$ 49,100
Maple Street – MH N85 to MH N86	N	55.5	300	Replacement	\$ 97,700
Maple Street – MH N86 to MH N87	N	56.2	375	Replacement	\$ 100,600



<b>Location</b>	Municipal Drain (Y/N)	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	Estimated 2024 Design & Construction Costs
Maple Street – MH N88 to MH N89	N	55.5	375	Replacement	\$ 99,300
Maple Street – MH N89 to MH N90	N	26.9	375	Replacement	\$ 48,100
Maple Street – MH N92 to MH N84	Y	19.3	450	Replacement	\$ 35,300
Maple Street – MH N95 to MH N96	N	36.9	525	Replacement	\$ 69,000
Maple Street – MH N96 to MH N84	N	64.6	450	Replacement	\$ 118,200
Mary Street – MH N24 to MH N22	N	40.1	300	Replacement	\$ 70,600
McGregor Street – MH W19 to MH W9	N	103.2	375	Replacement	\$ 184,700
McGregor Street – MH W9 to MH W10	Y	26.6	450	Replacement	\$ 48,700
McGregor Street – MH W12 to MH W10	N	18.1	300	Replacement	\$ 31,900
Mehring Street – MH N113 to MH N114	N	53.0	375	Replacement	\$ 94,900
Miller Drain – MH X3 to Outlet	Y	92.0	675	Replacement	\$ 242,000
Miller Drain – MH X3 to Outlet	Y	120.0	675	Replacement	\$ 315,600
Morden Street – MH A7 to MH A9	N	37.5	375	Replacement	\$ 67,100
Morden Street – MH A9 to MH A11	N	48.3	300	Replacement	\$ 85,000
Morden Street – MHA11 to MH A5	N	14.2	375	Replacement	\$ 25,400
Munroe Street – MH A6 to MH A7	N	53.2	375	Replacement	\$ 95,200
Munroe Street – MH A8 to MH A7	N	32.2	300	Replacement	\$ 56,700
Munroe Street – MH A13 to MH A14	N	72.3	300	Replacement	\$ 127,200
Munroe Street – MH A16 to MH A17	N	35.9	300	Replacement	\$ 63,200
Munroe Street – MH A17 to MH A18	N	18.9	300	Replacement	\$ 33,300
Munroe Street – MH A19 to MH A20	N	38.6	300	Replacement	\$ 67,900
Munroe Street – MH A21 to MH A22	N	16.9	300	Replacement	\$ 29,700
Munroe Street – MH A22 to MH A23	N	17.6	300	Replacement	\$ 31,000
Munroe Street – MH A27 to MH A20	N	8.2	450	Replacement	\$ 15,000
Munroe Street – MH A20 to MH A15	N	78.0	600	Replacement	\$ 166,900



<b>Location</b>	Municipal Drain (Y/N)	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	Estimated 2024 Design & Construction Costs
Munroe Street – MH N77 to MH N78	N	33.1	300	Replacement	\$ 58,300
Munroe Street – MH N78 to MH N79	N	36.3	300	Replacement	\$ 63,900
Munroe Street – MH N79 to MH N80	N	35.6	300	Replacement	\$ 62,700
Munroe Street – MH N66 to MH N67	N	71.6	375	Replacement	\$ 128,200
Munroe Street – MH N67 to MH N68	N	60.1	375	Replacement	\$ 107,600
Sexton Street – MH P3 to Outlet	Y	109.0	600	Replacement	\$ 233,300
Todd Place – MH T2 to MH T3	N	21.6	300	Replacement	\$ 38,000
Todd Place – MH T3 to MH T4	N	51.2	450	Replacement	\$ 93,700
Todd Place – MH T4 to MH T5	N	69.8	450	Replacement	\$ 127,700
Todd Place – MH T7 to MH T8	N	77.6	375	Replacement	\$ 138,900
Todd Place – MH T8 to MH T9	N	68.8	450	Replacement	\$ 125,900
Todd Place – MH T5 to Outlet	N	205.2	675	Replacement	\$ 539,700
Walker Street – MH N2 to MH N10	Y	8.3	675	Replacement	\$ 21,800
Wellington Street – MH A15 to MH A28	Y	89.0	600	Replacement	\$ 190,500
Wellington Street – MH A28 to MH A12	Y	11.2	900	Replacement	\$ 37,200
Wellington Street – MH A12 to MH A33	Y	99.1	975	Replacement	\$ 385,500
Wellington Street – MH A33 to MH A34	Y	86.1	1,200	Replacement	\$ 405,500
William Street – MH W1 to MH W2	N	56.5	450	Replacement	\$ 103,400
William Street – MH W3 to MH W4	N	46.4	450	Replacement	\$ 84,900
William Street – MH W4 to MH W5	N	36.2	525	Replacement	\$ 67,700
William Street – MH W5 to MH W6	N	42.8	450	Replacement	\$ 78,300
William Street – MH W6 to MH W7	N	11.9	675	Replacement	\$ 31,300
William Street – MH W8 to MH W7	N	18.3	300	Replacement	\$ 32,200
William Street – MH W7 to MH W13	Y	22.9	750	Replacement	\$ 65,900
William Street – MH W13 to MHW14	Y	105.6	825	Replacement	\$ 329,500



<b>Location</b>	Municipal Drain (Y/N)	<b>Length (m)</b>	<b>Diameter (mm)</b>	<b>Proposed Work</b>	Estimated 2024 Design & Construction Costs
William Street – MH W14 to MH W17	Y	81.6	900	Replacement	\$ 270,900
William Street – MH W17 to MH W18	Y	32.1	600	Replacement	\$ 68,700
William Street – MH W18 to Outlet	Y	78.2	900	Replacement	\$ 259,600
Wood Street – MH W2 to MH W3	N	17.1	450	Replacement	\$ 31,300
Wood Street – MH P2 to MH P3	Y	100.0	675	Replacement	\$ 263,000
Wood Street – MH N116 to MH N125	N	88.3	300	Replacement	\$ 155,400
Wilton Drain Replacement	Y	519.3	1800	Replacement	\$ 1,921,400
* Elgin County Roadway					

We have calculated estimated costs required to design and construct the proposed storm sewers within this report, solely within the Municipality of West Elgin roadway network, including related Engineering Design, Contract Administration costs and construction costs. Our overall estimate of costs required to design and construct all storm sewers proposed for replacement within this report is \$ 27,024,500, including the proposed Wilton Drain replacement, based on estimated 2024 construction costs. The design and construction of these storm sewers is expected to be performed in several phases depending on available Municipal Funding, Government Grants, and Asset Management Plan requirements. We note that many of the existing storm sewers located within West Lorne and proposed for replacement within this report are currently Municipal Drains under The Drainage Act. Refer to FIGURES 17-20 which denote the location of Municipal Drains within West Lorne.

The above listed Estimated 2024 Design and Construction costs do not take into account existing road conditions as detailed assessment of current road conditions was not included within the scope of this report. Based on the existing right-of-ways, some cost estimates include installing the proposed storm sewer within the grassed boulevard and costs to replace approximately half of the roadway asphalt, as applicable. The estimated costs listed above are meant as "ballpark" prices for budgeting purposes based on typical costs of similar works. Detailed design is required to determine the full extent of works and related detailed cost estimate.

It should be noted that the majority of West Lorne storm sewer flows are directed through the Graham Street storm sewer in which numerous runs are undersized. As such, this report recommends that several new storm sewer runs along Graham Street be constructed to ultimately twin the Graham Street storm sewer system and significantly increase the available capacity.

Based upon past experience, we would suggest that construction of these proposed storm sewers be performed in conjunction with any required watermain, sanitary sewer or roadway reconstruction projects required in this study area. Construction of the noted storm sewer upgrades will most likely be installed in several different construction projects based upon Municipal budget and potential government funding.

New storm sewer or replacements are not proposed for all roadways within the study area.



## F. SUMMARY, RECOMMENDATIONS AND SEWER REPLACEMENT COSTING (cont'd)

Using the Spriet topographic survey, existing road grades including high and low points, were analysed to determine where proposed sewers were required. Specifically, certain roadways within the study area slope in opposite directions within a single block from high points while others drain in a consistent direction.

Similarly, several storm sewer runs flow in reverse direction to their outlet. Some roadways which have a significant road grade (i.e. extremely steep) and have no reported problems. In such cases, we have not proposed the installation or replacement of storm sewers as road runoff is collected at the bottom of the slope. Similarly, consistent with typical practices, storm sewers are not proposed at the upstream end for the full roadway length as existing roadway grading will carry runoff downstream to the proposed sewer network.

Based upon the results of this study and discussions of previous flooding history with Municipality personnel, we recommend the following two (2) projects be the first replacement projects to be constructed within the overall proposed storm sewer upgrades listing:

1. Main Street fronting St. Mary's Roman Catholic Church  
(Main Street Drain)
  - From MHN74 to MHN70
  - Total Length: 264.7
  - Proposed Diameter: 675mm-825mm
  - Estimated 2024 Design and Construction Cost: \$793,700.00
  - Rationale: The existing storm sewers within this area are extremely undersized to accept flows from the 5-year storm event. In certain areas, the existing storm sewer is 300mm diameter, while our study has determined a minimum 675mm diameter sewer is required for the 5-year storm event. Replacing the storm sewers within this immediate area will improve the overall drainage fronting the Church and level of service along a main roadway.
2. Wilton Drain
  - From MH N99 to Wilton Municipal Drain (open portion)
  - Total Length: 520m
  - Proposed Diameter: 1800mm
  - Estimated 2024 Design and Construction Cost: \$1,921,400.00
  - Rationale: This portion of the existing Wilton Drain (600mm diameter) is extremely undersized to accept flows from the 5-year storm event. This section of the Wilton Drain is 600mm diameter, while our study has determined 1800mm diameter sewers are required. Considering the Wilton Drain serves as the outlet for a significant portion of West Lorne, performing this replacement will provide benefit to a large upstream area within West Lorne.



## F. SUMMARY, RECOMMENDATIONS AND SEWER REPLACEMENT COSTING (cont'd)

We note that both of the above-noted sewer replacement sections (Main Street Drain and Wilton Drain) are currently Municipal Drains and any replacement or upgrades must be performed under The Drainage Act.

We must clarify that the storm sewers (or Municipal Drains) proposed to be replaced within this Report, for an estimated value of \$ 27,024,500 are sized to meet the 5-year return storm event. In the future, if these sewers were constructed and in place, the large rainfall events experienced within West Lorne on June 28, 2021, July 29, 2023, and August 23, 2023 would still reveal similar surface ponding and flooding as noted during these 3 previous storm events. However, with the larger storm sewers in place, the volume of surface ponding and duration of evident surface ponding would be reduced.

## G. MUNICIPALITY AND COUNTY SEWERS

We note that this storm sewer study has included all existing storm sewers within West Lorne, along both Municipality of West Elgin and Elgin County roadways.

## H. FURTHER INVESTIGATION

As this study was limited to the analysis of the piped storm sewer system, we recommend that the outlet ditches downstream be analysed for capacity prior to installation of any pipe improvements to ensure it can adequately handle the design flows. It may be determined that channel improvements are also required.

We recommend the Municipality consider performing existing storm sewer flushing and video inspection to allow existing sewer conditions to be determined.

It was noted during discussions and liaison with Municipality personnel that many properties (homes) within West Lorne currently have storm sewer connections from their home tied directly into the existing storm sewer network. As such, when the storm sewers are surcharged and full of water, the water within the sewers has the ability to back up into the homes causing internal damages. We recommend that further investigation take place in this regard to determine the extent and location of properties that have property storm services tied directly into the storm sewer network. A backflow prevention program should be evaluated to determine which properties could benefit from installation of backflow prevention measures to prevent storm sewer flows from backing up into the homes.

We recommend that this Report be reviewed and revised every 3 – 5 years based on changes related to sewer infrastructure construction, development, construction industry input and inflation, funding, government grants, and any reported problem areas.

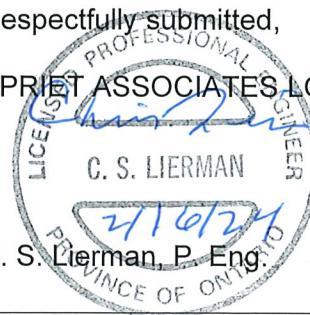
Respectfully submitted,

SPRIET ASSOCIATES LONDON LIMITED

C. S. LIERMAN

21/6/24

C. S. Lierman, P. Eng.



**SPRIET ASSOCIATES**  
engineers & architects



**FIGURE 1**  
**WEST LORNE – NORTH EASTERLY QUADRANT**



**FIGURE 2**  
**WEST LORNE – SOUTH EASTERLY QUADRANT**



**FIGURE 3**  
**WEST LORNE – SOUTH WESTERLY QUADRANT**



**FIGURE 4**  
**WEST LORNE – NORTH WESTERLY QUADRANT**

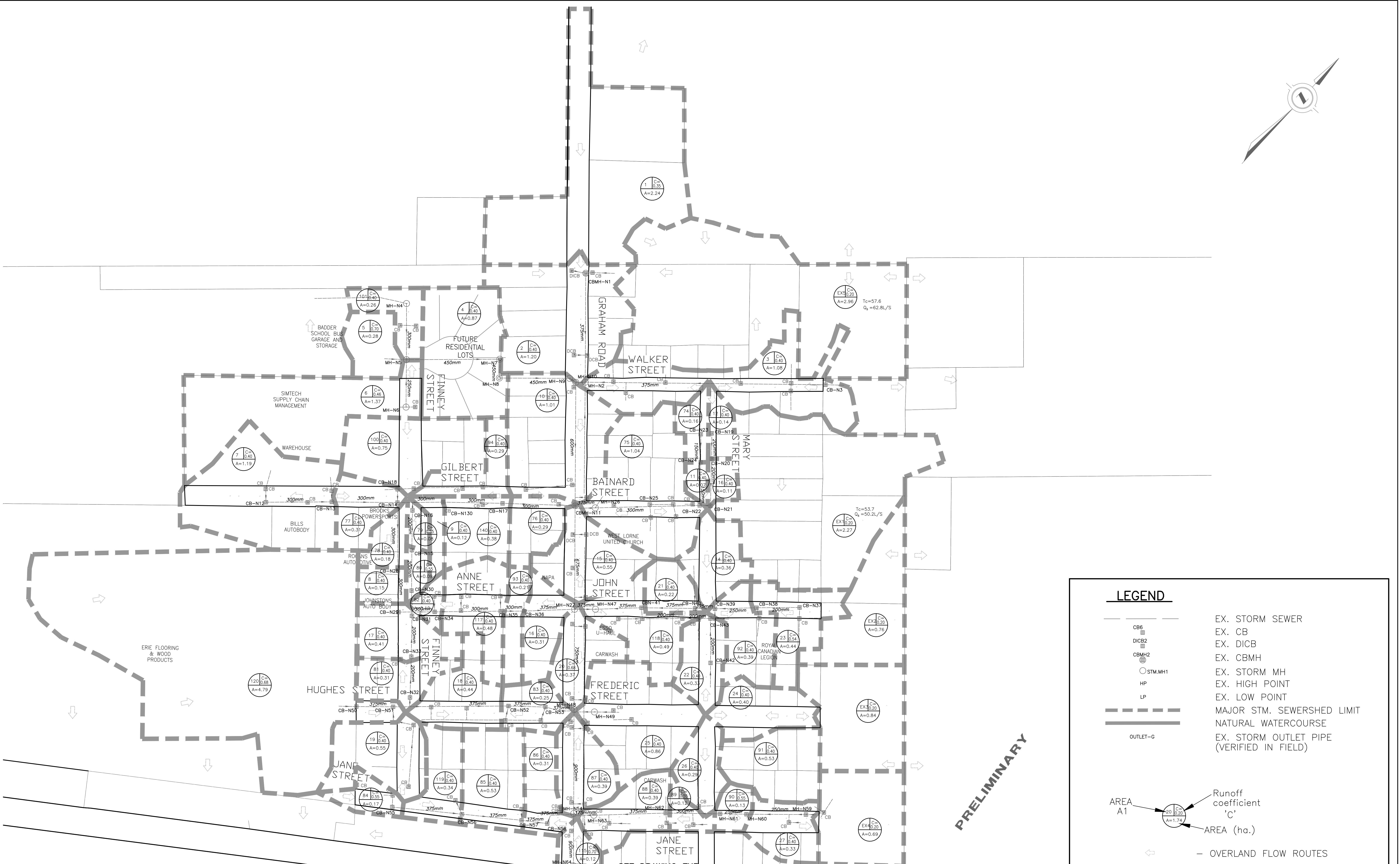
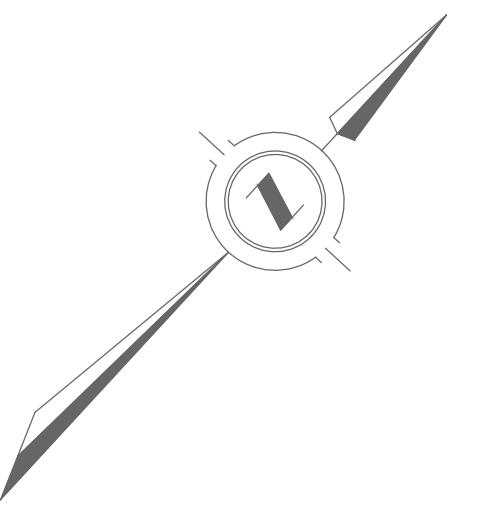
**APPENDIX 'A'**  
**EXISTING CONDITIONS**

**FIGURE NO. 5**  
**WATERSHED AREA PLANS**

**FIGURE NO. 6**  
**STORM DESIGN SHEETS**



**SPRIET ASSOCIATES**  
engineers & architects



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN	JACSL			
					DRAWN BY	PM			
					CHECKED	CSL			
					APPROVED	CSL			
					DATE	NOV. 2023			

**SPIRIET ASSOCIATES**  
LONDON CONSULTING ENGINEERS  
155 YORK STREET -- LONDON (519) 672-4100 -- N6A 1A8

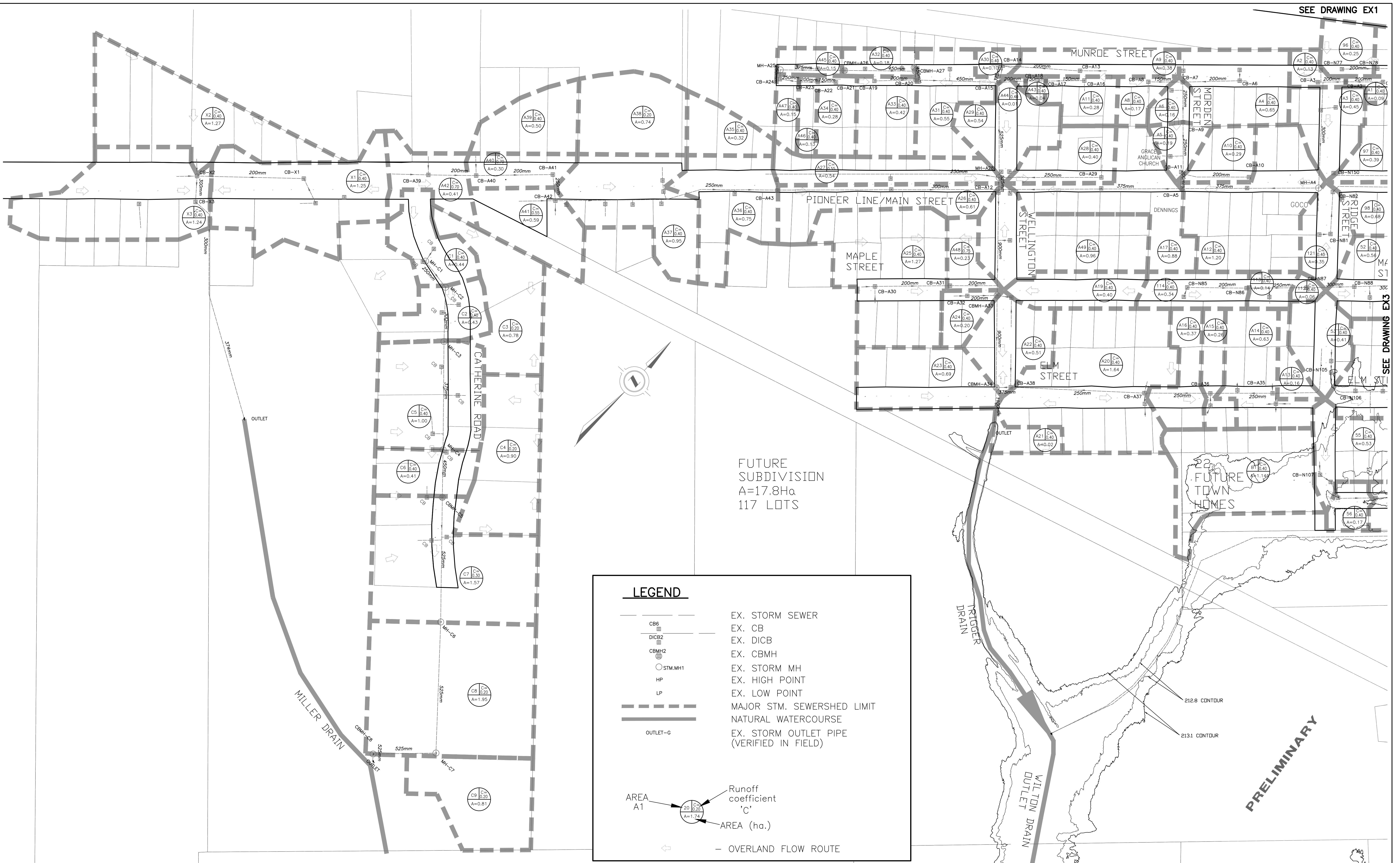


MUNICIPALITY OF  
**West Elgin**  
1998

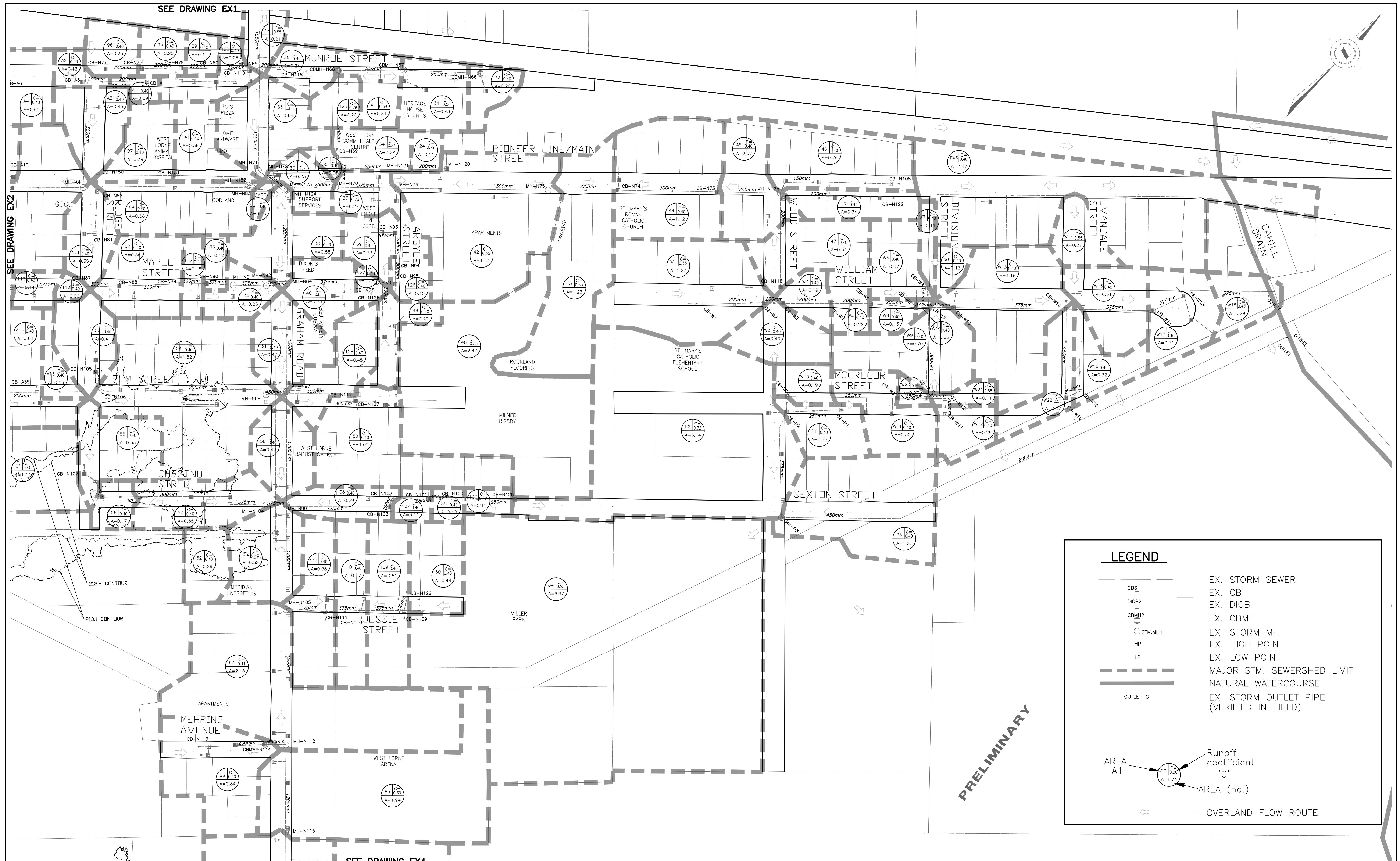
ENGINEER'S STAMP

SCALE HORZ.	1:1500	TITLE	PROJECT No.
15.0m	0	WEST LORNE STORM SEWER STUDY 2023	223197
EXISTING WATERSHED PLAN			SHEET No.
EX1			PLAN FILE No.

SEE DRAWING EX1



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN J.A.CSL				
					DRAWN BY PM				
					CHECKED CSL				
					APPROVED CSL				
					DATE NOV. 2023				



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION
DETAILS	No.	REVISIONS	DATE	CONSULTANT
DESIGN J.A.CSL				
DRAWN BY PM				
CHECKED CSL				
APPROVED CSL				
DATE NOV. 2023				

**SPRIET ASSOCIATES**  
LONDON CONSULTING ENGINEERS  
155 YORK STREET --- LONDON, ON N6A 1A8

ENGINEER'S STAMP

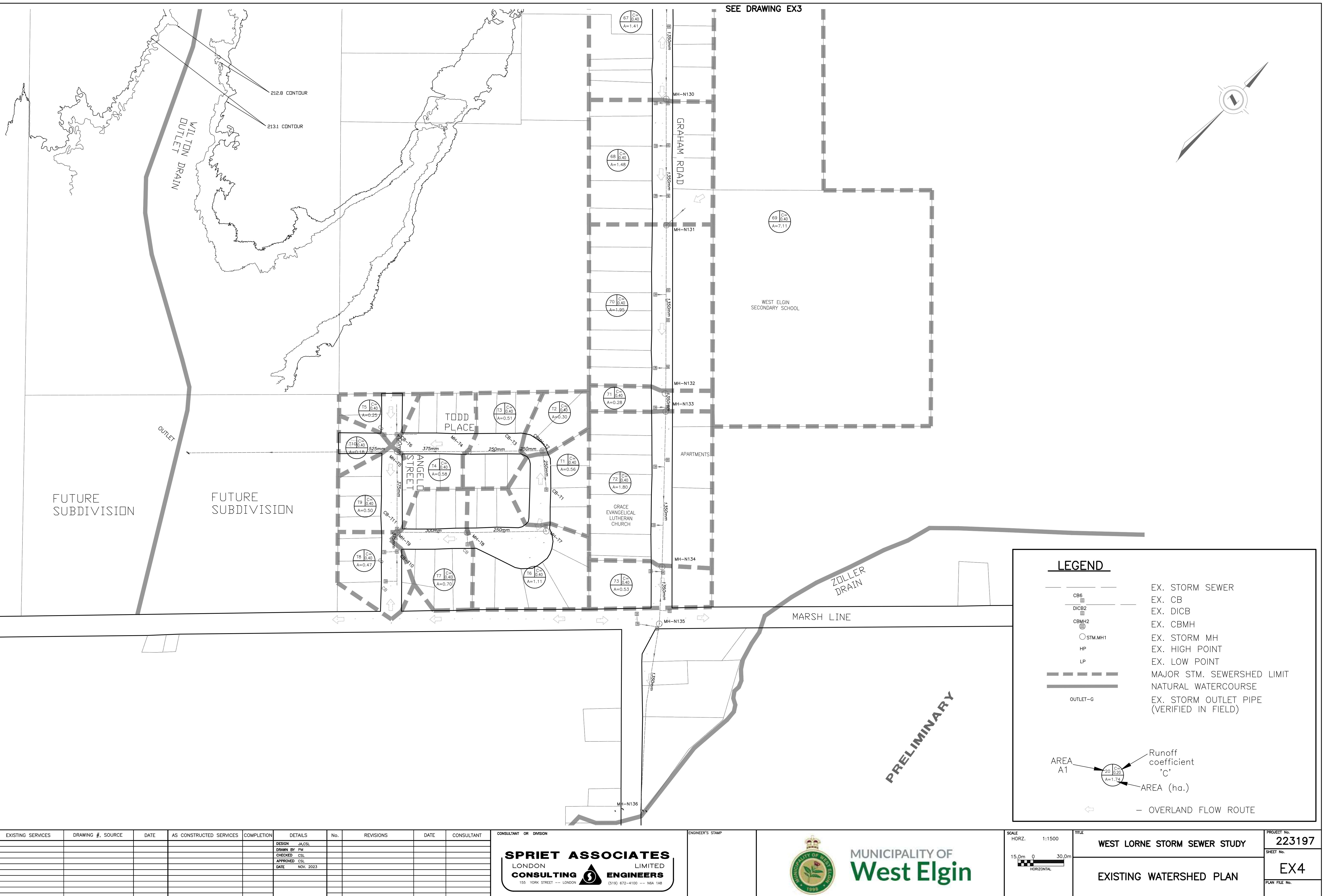


MUNICIPALITY OF  
**West Elgin**

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15.0m 0 30.0m  
HORIZONTAL

PROJECT No. 223197  
SHEET No.  
**EX3**  
PLAN FILE No.

TITLE  
**WEST ELGIN STORM SEWER STUDY 2023**  
EXISTING WATERSHED PLAN



## FIGURE NO. 6

STORM SEWER DESIGN SHEET (EXISTING SEWERS)																									
RUNOFF COEFFICIENT 'C'				PROJECT NAME WEST LORNE STORM SEWERS - GRAHAM ROAD										DATE: 30-Nov-23											
PARKS AND PLAYGROUNDS	-0.20	RESIDENTIAL SINGLE FAMILY	-0.40											DESIGNED BY: J.A.	C.S.L.										
- MULTI-FAMILY	-0.65	COMMERCIAL & INDUSTRIAL	-0.75											JOB No.: 223197	1 OF 4										
LOCATION	AREA (A)		TOTAL 2.78(AxC)			RAINFALL INTENSITY			SEWER DESIGN						PROFILE										
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.	
EX5	Agri			2.96	2.96	0.20	1.65		1.65	57.6	38.13	62.8												cal size	
1,2	GRAHAM RD	N1	N2	3.44	3.44	0.37	3.54	A	3.54	15.00	81.68	351.8	0.013	375	0.14	66	0.59	101.3	2.842					705.613	
3	WALKER ST	N3	N2	1.08	1.08	0.40	1.20		1.20	15.00	81.68	98.1	0.013	375	0.39	109	0.99	223.6	3.759					360.715	
	WALKER ST	N2	N10		4.52	0.40			4.74	2.842	17.84	74.43	415.5	0.013	450	0.40	180	1.13	8.3	0.122					616.870
101	FINNEY ST	N4	N5	0.26	0.26	0.40	0.29		0.29	15.00	81.68	23.6	0.013	300	0.19	42	0.60	52.0	1.453					241.993	
6	FINNEY ST	N6	N5	1.37	1.37	0.46	1.75		1.75	15.00	81.68	143.1	0.013	250	0.32	34	0.69	44.0	1.070					431.291	
4,5	FUTURE SUB'D	N5	N7	1.15	2.78	0.47	1.50	B	3.54	1.453	16.45	77.76	275.5	0.013	450	0.20	128	0.80	89.4	1.859					602.198
	FUTURE SUB'D	N7	N8		2.78	0.40			3.54	1.859	18.31	73.39	260.1	0.013	450	0.18	121	0.76	17.5	0.383					601.045
	EASEMENT	N8	N9		2.78	0.40			3.54	0.383	18.70	72.57	257.2	0.013	450	0.19	124	0.78	62.1	1.325					592.472
	GRAHAM RD	N9	N10		2.78	0.40			3.54	1.325	20.02	69.90	247.7	0.013	450	0.91	272	1.71	6.9	0.067					435.528
10	GRAHAM RD	N10	N11	1.01	11.27	0.40	1.12		9.41	0.122	17.96	74.16	760.3	0.013	600	0.20	275	0.97	114.7	1.968					881.121
7	GILBERT ST	N12	N13	1.19	1.19	0.40	1.32		1.32	15.00	81.68	108.1	0.013	300	0.11	32	0.45	61.3	2.252					474.268	
77	GILBERT ST	N13	N14	0.31	1.50	0.40	0.34		1.67	2.252	17.25	75.80	126.4	0.013	300	0.12	33	0.47	61.2	2.152					494.839
79	FINNEY ST	N15	N16	0.08	0.08	0.55	0.12		0.12	15.00	81.68	10.0	0.013	200	0.24	16	0.51	36.9	1.202					167.760	
100,9	GILBERT ST	N14	N130	0.87	2.45	0.40	0.97		2.76	2.152	19.40	71.11	196.1	0.013	300	0.12	33	0.47	42.6	1.498					583.369
140	GILBERT ST	N130	N17	0.38	2.83	0.40	0.42		3.18	1.498	20.90	68.26	217.1	0.013	300	0.12	33	0.47	55.3	1.945					606.046
76	GILBERT ST	N17	N11	0.29	3.12	0.40	0.32		3.50	1.945	22.85	64.98	227.6	0.013	300	0.33	56	0.79	67.5	1.431					510.305
12	MARY ST	N19	N20	0.14	0.14	0.40	0.16		0.16	15.00	81.68	12.7	0.013	200	0.17	14	0.43	23.7	0.918					195.904	
116	MARY ST	N20	N21	0.11	0.25	0.40	0.12		0.28	0.918	15.92	79.15	22.0	0.013	200	0.83	30	0.95	43.9	0.769					178.736
EX1	MARY ST				2.27	2.52	0.20	1.26		1.26	53.70	39.74	50.2											249.009	
	MARY ST	N21	N22						0.28	0.769	16.69	77.17	71.6	0.013	250	1.50	73	1.48	10.0	0.112					
74	MARY ST	N23	N24	0.16	0.16	0.40	0.18		0.18	15.00	81.68	14.5	0.013	150	1.44	18	1.03	26.8	0.432					137.977	
11	MARY ST	N24	N22	0.07	0.23	0.40	0.08		0.26	0.432	15.43	80.46	20.6	0.013	150	0.32	9	0.49	40.1	1.371					208.417
75	BAINARD ST	N22	N26	1.04	3.79	0.40	1.16		1.69	0.769	16.69	77.17	180.6	0.013	300	0.16	39	0.55	97.3	2.963					535.925
	BAINARD ST	N26	N11		3.79	0.40			1.69	2.963	19.65	70.62	169.5	0.013	375	0.06	43	0.39	18.8	0.806					629.024
15	GRAHAM RD	N11	N27	0.55	18.73	0.40	0.61		15.21	1.968	19.93	70.07	1178.7	0.013	675	0.26	429	1.20	96.3	1.340					988.735
81	FINNEY ST	N32	N33	0.31	0.31	0.40	0.34		0.34	15.00	81.68	28.2	0.013	200	0.29	18	0.56	38.0	1.126					238.790	
17	FINNEY ST	N33	N31	0.41	0.72	0.40	0.46		0.80	1.126	16.13	78.60	62.9	0.013	200	0.11	11	0.35	38.0	1.829					387.183
94.78	FINNEY ST	N14	N28	0.47	0.47	0.40	0.52		0.52	15.00	81.68	42.7	0.013	300	0.15	37	0.53	63.1	1.985					315.845	
8	FINNEY ST	N28	N29	0.15	0.62	0.40	0.17		0.69	1.985	16.98	76.44	52.7	0.013	300	0.07	26	0.36	38.6	1.777					394.308
80	FINNEY ST	N15	N30	0.09	0.09	0.55	0.14		0.14	15.00	81.68	11.2	0.013	200	0.02	5	0.15	37.7	4.256					279.393	
	FINNEY ST	N30	300					</td																	

STORM SEWER DESIGN SHEET (EXISTING SEWERS)																									
RUNOFF COEFFICIENT 'C'					PROJECT NAME WEST LORNE STORM SEWERS - GRAHAM ROAD											DATE: 30-Nov-23									
PARKS AND PLAYGROUNDS		-0.20	RESIDENTIAL SINGLE FAMILY		-0.40												DESIGNED BY: J.A.								
- MULTI-FAMILY		-0.65	COMMERCIAL & INDUSTRIAL		-0.75												CHECKED BY: C.S.L.								
														JOB No.: 223197		SHEET 2 OF 4									
LOCATION			AREA (A)		TOTAL 2.78(AxC)			RAINFALL INTENSITY			SEWER DESIGN						PROFILE								
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.	
EX3,24,25	FREDRIC ST	N49	N48	2.10	2.10	0.32	1.87		D	1.87		15.00	81.68	152.6	0.013	375	1.20	192	1.74	18.9	0.181			cal size	344.825
120	HUGHES ST	N50	N51	4.79	4.79	0.68	9.06			9.06		15.00	81.68	739.7	0.013	375	0.58	134	1.21	34.2	0.471				714.259
18,19	FREDERIC ST	N51	N52	0.99	5.78	0.40	1.10			10.16	0.471	15.47	80.35	816.1	0.013	375	0.19	76	0.69	107.4	2.587				913.573
83	FREDERIC ST	N52	N53	0.25	6.03	0.40	0.28			10.43	2.587	18.06	73.95	771.6	0.013	375	0.25	88	0.79	34.4	0.722				849.695
	FREDERIC ST	N53	N48		6.03	0.40				10.43	0.722	18.78	72.39	755.3	0.013	375	1.71	229	2.08	27.0	0.217				587.782
87	GRAHAM RD	N48	N54	0.39	33.14	0.40	0.43			34.55	1.381	22.65	65.28	2368.8	0.013	900	0.17	746	1.17	96.7	1.374				1391.073
EX4,27	JANE ST	N59	N60	1.02	1.02	0.27	0.77	E	0.77			15.00	81.68	62.5	0.013	250	0.34	35	0.71	55.5	1.309				312.620
90,91	JANE ST	N60	N61	0.66	1.68	0.43	0.79	F	1.55	1.309	16.31	78.12	121.4	0.013	250	0.16	24	0.48	24.5	0.843				461.835	
26,89	JANE ST	N61	N62	0.41	2.09	0.44	0.50	G	2.06	0.843	17.15	76.04	156.3	0.013	300	0.14	36	0.51	50.6	1.648				520.579	
88	JANE ST	N62	N63	0.39	2.48	0.40	0.43			2.49	1.648	18.80	72.35	180.1	0.013	375	0.87	164	1.48	67.0	0.754				389.758
	JANE ST	N63	N54		2.48	0.40				2.49	0.754	19.55	70.81	176.3	0.013	375	1.59	221	2.00	18.8	0.157				345.297
84,119	JANE ST	N55	N56	0.51	0.51	0.45	0.64	H	0.64			15.00	81.68	52.1	0.013	375	0.17	72	0.65	65.2	1.660				332.481
85	JANE ST	N56	N57	0.53	1.04	0.40	0.59			1.23	1.660	16.66	77.24	94.8	0.013	375	0.17	72	0.65	55.8	1.421				416.104
86	JANE ST	N57	N58	0.31	1.35	0.40	0.34			1.57	1.421	18.08	73.90	116.2	0.013	375	0.50	124	1.12	24.0	0.356				366.835
	JANE ST	N58	N54		1.35	0.40				1.57	0.356	18.44	73.12	114.9	0.013	375	1.44	210	1.91	29.8	0.261				299.645
115	GRAHAM RD	N54	N64	0.12	37.09	0.70	0.23			38.85	1.374	24.03	63.17	2567.3	0.013	1050	0.04	546	0.63	48.7	1.287				1880.519
30	MUNROE	N118	N65	0.24	0.24	0.40	0.27			0.27		15.00	81.68	21.8	0.013	200	12.10	114	3.63	18.1	0.083				107.773
96	MUNROE	N77	N78	0.25	0.25	0.40	0.28			0.28		15.00	81.68	22.7	0.013	200	0.19	14	0.46	33.1	1.212				238.460
95	MUNROE	N78	N79	0.20	0.45	0.40	0.22			0.50	1.212	16.21	78.37	39.2	0.013	200	1.13	35	1.11	36.3	0.545				209.516
29	MUNROE	N79	N80	0.12	0.57	0.40	0.13			0.63	0.545	16.76	76.99	48.8	0.013	200	1.13	35	1.11	35.6	0.535				227.419
122	MUNROE	N80	N119	0.28	0.85	0.40	0.31			0.95	0.535	17.29	75.70	71.6	0.013	300	1.13	103	1.45	29.0	0.332				262.513
	MUNROE	N119	N65		0.85	0.40				0.95	0.332	17.62	74.93	70.8	0.013	300	9.92	305	4.31	9.5	0.037				174.013
28	GRAHAM RD	N64	N65	0.21	38.39	0.55	0.32			40.38	1.287	25.31	61.35	2590.6	0.013	1050	0.15	1058	1.22	58.5	0.798				1472.714
33	GRAHAM RD	N65	N71	0.64	39.03	0.80	1.42			41.81	0.798	26.11	60.29	2633.5	0.013	1050	0.06	669	0.77	93.5	2.017				1759.572
	GRAHAM RD	N71	N124		39.03	0.40				41.81	2.017	28.13	57.81	2529.6	0.013	1050	0.35	1616	1.87	35.7	0.319				1245.219
31,32	MUNROE	N66	N67	0.63	0.63	0.47	0.82	I	0.82			15.00	81.68	67.2	0.013	250	0.29	32	0.65	71.6	1.829				330.957
41	MUNROE	N67	N68	0.31	0.94	0.59	0.51			1.33	1.829	16.83	76.82	102.3	0.013	250	0.51	42	0.87	60.1	1.158				348.446
123	ALLOWANCE	N68	N69	0.20	1.14	0.76	0.42			1.75	1.158	17.99	74.11	130.0	0.013	250	0.80	53	1.08	81.2	1.249				35

STORM SEWER DESIGN SHEET (EXISTING SEWERS)																			DATE: 30-Nov-23						
RUNOFF COEFFICIENT 'C'				PROJECT NAME WEST LORNE STORM SEWERS - GRAHAM ROAD											DESIGNED BY: J.A.										
PARKS AND PLAYGROUNDS -0.20				RESIDENTIAL SINGLE FAMILY -0.40				- MULTI-FAMILY -0.65				COMMERCIAL & INDUSTRIAL -0.75				RETURN PERIOD 5 years		TIME ENTRY 15.00 min.		STORM SOURCE MDD		CHECKED BY: C.S.L.			
LOCATION				AREA (A)		TOTAL 2.78(AxC)				RAINFALL INTENSITY				SEWER DESIGN						PROFILE					
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.	
																							cal size		
46	MAIN	N108	N125	0.76	0.76	0.40	0.85		0.85		15.00	81.68	69.0	0.013	150	0.50	11	0.61	111.3	3.044				301.789	
125	MAIN	N122	N125	0.34	0.34	0.40	0.38		0.38		15.00	81.68	30.9	0.013	200	0.41	21	0.67	96.2	2.398				231.666	
47	WOOD	N116	N125	0.54	0.54	0.40	0.60		0.60		15.00	81.68	49.0	0.013	200	0.75	28	0.90	88.3	1.628				246.053	
45	MAIN	N125	N73	0.57	2.21	0.40	0.63		2.46	3.044	18.04	73.98	181.8	0.013	250	0.16	24	0.48	58.8	2.022				537.271	
44	MAIN	N73	N74	1.12	3.33	0.40	1.25		3.70	2.022	20.07	69.81	258.5	0.013	300	0.16	39	0.55	92.9	2.829				613.081	
43	MAIN	N74	N75	1.23	4.56	0.65	2.22		5.93	2.829	22.90	64.90	384.6	0.013	300	0.42	63	0.89	65.7	1.235				593.768	
42	MAIN	N75	N76	1.63	6.19	0.55	2.49		8.42	1.235	24.13	63.02	530.5	0.013	300	0.25	48	0.68	141.4	3.445				738.350	
37	MAIN	N76	N70	0.27	6.46	0.73	0.55		8.97	3.445	27.58	58.46	524.2	0.013	375	0.25	88	0.79	57.6	1.209				735.016	
36	MAIN	N70	N123	0.23	8.28	0.40	0.26		11.94	1.209	28.79	57.06	681.1	0.013	750	0.85	1026	2.32	45.3	0.325				644.624	
	GRAHAM	N123	N124		8.28	0.40			11.94	0.325	29.11	56.69	676.8	0.013	750	0.05	249	0.56	6.7	0.198				1093.898	
38	GRAHAM	N124	M84	0.55	47.86	0.40	0.61		54.36	0.319	28.45	57.44	3235.0	0.013	1200	0.10	1233	1.09	83.4	1.275				1727.099	
114	MAPLE	N85	N86	0.34	0.34	0.40	0.38		0.38		15.00	81.68	30.9	0.013	200	0.25	16	0.52	55.5	1.772				254.182	
113	MAPLE	N86	N87	0.14	0.48	0.40	0.16		0.53	1.772	16.77	76.96	41.1	0.013	250	0.18	25	0.51	56.2	1.822				300.851	
112	MAPLE	N87	N88	0.06	0.54	0.40	0.07		0.60	1.822	18.59	72.78	43.7	0.013	300	0.34	56	0.80	44.5	0.930				273.309	
52	MAPLE	N88	N89	0.56	1.10	0.40	0.62		1.22	0.930	19.52	70.87	86.7	0.013	300	0.75	84	1.18	55.5	0.781				304.627	
102	MAPLE	N89	N90	0.15	1.25	0.40	0.17		1.39	0.781	20.30	69.36	96.4	0.013	300	0.96	95	1.34	26.9	0.334				302.678	
103	MAPLE	N90	N91	0.12	1.37	0.40	0.13		1.52	0.334	20.64	68.74	104.7	0.013	375	0.65	141	1.28	25.0	0.326				335.892	
104	MAPLE	N91	N92	0.25	1.62	0.40	0.28		1.80	0.326	20.96	68.15	122.8	0.013	375	1.21	193	1.75	31.1	0.297				317.316	
	MAPLE	N92	N84		1.62	0.40			1.80	0.297	21.26	67.62	121.8	0.013	375	0.24	86	0.78	19.3	0.414				428.509	
39	ARGYLE	N93	N94	0.33	0.33	0.40	0.37		0.37		15.00	81.68	30.0	0.013	250	1.42	71	1.44	22.7	0.262				181.486	
126	ARGYLE	N94	N95	0.15	0.48	0.40	0.17		0.53	0.262	15.26	80.94	43.2	0.013	300	0.05	22	0.31	25.7	1.400				389.823	
49	ARGYLE	N126	375	0.27	0.27	0.40	0.30		0.30		15.00	81.68	24.5	0.013	300	1.75	128	1.81	12.2	0.112				161.863	
127	MAPLE	N95	N96	0.08	0.83	0.40	0.09		0.92	1.400	1.40	206.89	190.9	0.013	375	0.24	86	0.78	36.9	0.791				507.186	
40	MAPLE	N96	N84	0.35	1.18	0.80	0.78		1.70	0.791	2.19	184.49	313.9	0.013	375	1.94	244	2.21	64.6	0.487				412.989	
51	GRAHAM	N84	N97	0.47	51.13	0.40	0.52		58.38	1.275	29.72	56.02	3383.7	0.013	1200	0.09	1170	1.03	101.2	1.631				1791.485	
53,54	ELM	N106	N97	2.23	2.23	0.40	2.48		2.48		15.00	81.68	202.6	0.013	250	1.18	65	1.32	192.6	2.439				384.672	
48	ELM	stub	N127	2.47	2.47	0.53	3.64		3.64		15.00	81.68	297.3	0.013	300	1.39	114	1.61	42.0	0.434				430.756	
50	ELM	N127	N117	1.02	3.49	0.40	1.13		4.77	0.434	15.43	80.46	384.1	0.013	300	1.39	114	1.61	25.2	0.260				474.187	
128	ELM	N117	N97	0.45	3.94	0.40	0.50		5.27	0.434	15.87	79.28	418.1	0.013	300	3.14</									









STORM SEWER DESIGN SHEET (EXISTING SEWERS)																			DATE: 30-Nov-23					
RUNOFF COEFFICIENT 'C'					PROJECT NAME WEST LORNE STORM SEWERS - TRIGGER DRAIN											DESIGNED BY: P.M.								
PARKS AND PLAYGROUNDS RESIDENTIAL SINGLE FAMILY					RETURN PERIOD TIME ENTRY STORM SOURCE											CHECKED BY: C.S.L.								
- MULTI-FAMILY COMMERCIAL & INDUSTRIAL					5 years 15.00 min. MDD											JOB No.: 223197								
LOCATION	AREA (A)		TOTAL 2.78(AxC)				RAINFALL INTENSITY				SEWER DESIGN				PROFILE									
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.
																							cal size	
A1	MUNROE	A1	A2	0.09	0.09	0.40	0.10		0.10		15.00	81.68	8.2	0.013	200	0.30	18.0	0.57	34.9	1.017				149.223
A2	MUNROE	A2	A3	0.13	0.22	0.40	0.14		0.24	1.017	16.02	78.88	19.3	0.013	200	0.68	27.0	0.86	25.9	0.501				176.637
A3	RIDGE	A3	A4	0.45	0.67	0.40	0.50		0.75	0.501	16.52	77.59	57.8	0.013	300	1.28	109.4	1.55	99.1	1.067				236.732
A12	MAIN	A4	A5	1.20	1.87	0.40	1.33		2.08	1.067	17.59	75.02	156.0	0.013	375	0.23	84.1	0.76	129.0	2.824				473.920
A4	MUNROE	A6	A7	0.65	0.65	0.40	0.72		0.72		15.00	81.68	59.0	0.013	200	0.32	18.6	0.59	53.2	1.501				309.444
A8	MUNROE	A8	A7	0.17	0.17	0.40	0.19		0.19		15.00	81.68	15.4	0.013	150	0.04	3.0	0.17	32.2	3.114				276.367
A6	MORDEN	A7	A9	0.16	0.98	0.40	0.18		1.09	1.501	16.50	77.63	84.6	0.013	250	0.59	45.7	0.93	37.5	0.672				315.753
A5	MORDEN	A9	A11	0.19	1.17	0.40	0.21		1.30	0.672	17.17	75.99	98.9	0.013	250	1.16	64.0	1.30	48.3	0.617				294.891
A10	MAIN	A10	A11	0.29	0.29	0.40	0.32		0.32		15.00	81.68	26.3	0.013	200	1.26	36.8	1.17	71.7	1.020				176.821
	MORDEN	A11	A5	1.46	0.40				1.62	0.617	15.62	79.95	129.8	0.013	200	1.16	35.3	1.12	14.2	0.210				326.599
A17	MAIN	A5	A12	0.88	4.21	0.40	0.98		4.68	2.824	20.41	69.16	323.8	0.013	375	0.23	84.1	0.76	170.1	3.724				623.212
A9	MUNROE	A13	A14	0.38	0.38	0.40	0.42		0.42		15.00	81.68	34.5	0.013	200	0.77	28.8	0.92	72.3	1.315				214.613
A30	MUNROE	A14	A15	0.10	0.48	0.40	0.11		0.53	1.315	16.32	78.11	41.7	0.013	375	3.13	310.2	2.81	16.0	0.095				177.098
A11	MUNROE	A16	A17	0.28	0.28	0.40	0.31		0.31		15.00	81.68	25.4	0.013	150	0.36	9.1	0.52	35.9	1.157				220.715
A43	MUNROE	A17	A18	0.04	0.32	0.40	0.04		0.36	1.157	16.16	78.52	27.9	0.013	150	0.00	1.1	0.06	18.9	5.221				511.719
A44	MUNROE	A18	A15	0.01	0.33	0.40	0.01		0.37	5.221	21.38	67.42	24.7	0.013	200	1.33	37.8	1.20	24.9	0.345				170.965
A33	MUNROE	A19	A20	0.42	0.42	0.40	0.47		0.47		15.00	81.68	38.1	0.013	200	0.29	17.7	0.56	38.6	1.144				267.592
A34	MUNROE	A21	A22	0.28	0.28	0.40	0.31		0.31		15.00	81.68	25.4	0.013	150	0.32	8.6	0.49	16.9	0.578				225.644
A46	MUNROE	A22	A23	0.13	0.41	0.40	0.14		0.46	0.578	15.58	80.06	36.5	0.013	200	0.35	19.4	0.62	17.6	0.475				254.078
A47	MUNROE	A23	A24	0.15	0.56	0.40	0.17		0.62	0.475	16.05	78.79	49.1	0.013	250	1.21	65.4	1.33	18.0	0.225				224.970
	MUNROE	A24	A25		0.56	0.40			0.62	0.225	16.28	78.20	48.7	0.013	250	3.42	110.0	2.24	8.6	0.064				184.631
A45	MUNROE	A25	A26	0.15	0.71	0.40	0.17		0.79	0.064	16.34	78.04	61.6	0.013	375	0.34	102.2	0.93	60.1	1.082				310.878
A32	MUNROE	A26	A27	0.18	0.89	0.40	0.20		0.99	1.082	17.42	75.39	74.6	0.013	450	0.33	163.8	1.03	65.9	1.067				335.894
	MUNROE	A27	A20		0.89	0.40			0.99	1.067	18.49	73.00	72.2	0.013	450	0.00	20.0	0.13	8.2	1.089				730.745
A31	MUNROE	A20	A15	0.55	1.86	0.40	0.61		2.07	1.089	19.58	70.76	146.3	0.013	450	0.09	85.5	0.54	78.0	2.417				551.714
A29	WELLINGTON	A15	A28	0.54	3.21	0.40	0.60		3.57	2.417	22.00	66.36	236.9	0.013	525	0.19	187.5	0.87	89.0	1.713				574.500
A28	MAIN	A29	A28	0.40	0.40	0.40	0.44		0.44		15.00	81.68	36.3	0.013	250	1.33	68.6	1.40	95.6	1.140				197.472
A27	MAIN	A28	A28	0.54	0.54	0.55	0.83		0.83		15.00	81.68	67.4	0.013	250	0.50	42.1	0.86	200.0	3.891				299.164
	WELLINGTON	A28	A12		4.15				4.84	1.713	23.71	63.65	308.0	0.013	525	0.04	86.0	0.40</td						

STORM SEWER DESIGN SHEET (EXISTING SEWERS)																					
RUNOFF COEFFICIENT 'C'				PROJECT NAME WEST LORNE STORM SEWERS - WILLIAM STREET											DATE: 30-Nov-23						
PARKS AND PLAYGROUNDS -0.2 RESIDENTIAL SINGLE FAMILY 0.40				- MULTI-FAMILY -0.65 COMMERCIAL & INDUSTRIAL -0.7				RETURN PERIOD TIME ENTRY STORM SOURCE			5 years 15.00 min. MDD			DESIGNED BY: P.M. CHECKED BY: C.S.L. JOB No.: 223197 SHEET 1 OF 1							
LOCATION				AREA (A)				TOTAL 2.78(AxC)				RAINFALL INTENSITY				SEWER DESIGN					
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	n	SIZE mm	SLOPE %	CAP. l/sec.	VEL. m/s	LEN. meters	TIME min.	
																			cal size		
W1	WILLIAM STREET	W1	W2	1.27	1.27	0.55	1.94		1.94	15.00	81.68	158.6	0.013	200	0.68	27.0	0.86	56.5	1.094	389.179	
W2	WOOD STREET	W2	W3	0.40	1.67	0.40	0.44		2.39	1.094	16.09	78.68	187.8	0.013	200	1.05	33.6	1.07	17.1	0.266	382.174
W3	WILLIAM STREET	W3	W4	0.19	1.86	0.40	0.21		2.60	0.266	16.36	77.99	202.6	0.013	200	0.77	28.8	0.92	46.4	0.844	416.774
W4	WILLIAM STREET	W4	W5	0.22	2.08	0.40	0.24		2.84	0.844	17.20	75.91	215.8	0.013	200	0.52	23.7	0.75	36.2	0.801	459.323
W6	WILLIAM STREET	W5	W6	0.13	2.21	0.40	0.14		2.99	0.801	18.01	74.06	221.2	0.013	200	0.91	31.3	1.00	42.8	0.716	417.461
W19	WILLIAM STREET	W6	W7	0.02	2.23	0.40	0.02		3.01	0.716	18.72	72.51	218.2	0.013	375	0.12	60.7	0.55	11.9	0.361	607.217
W5/7	WILLIAM STREET	W8	W7	0.48	0.48	0.40	0.53		0.53	15.00	81.68	43.6	0.013	150	0.84	14.0	0.79	18.3	0.386	230.472	
W10/11	McGREGOR	W19	W9	0.69	0.69	0.40	0.77		0.77	15.00	81.68	62.7	0.013	250	0.38	36.7	0.75	103.2	2.303	306.417	
W20	McGREGOR	W9	W10	0.07	0.76	0.55	0.11		0.87	2.303	17.30	75.68	66.2	0.013	250	0.11	19.7	0.40	26.6	1.103	394.537
W12	McGREGOR	W11	W12	0.25	0.25	0.40	0.28		0.28	15.00	81.68	22.7	0.013	200	0.97	32.3	1.03	14.7	0.238	175.656	
W21	McGREGOR	W12	W10	0.11	0.36	0.55	0.17		0.45	0.238	15.24	81.00	36.1	0.013	200	0.79	29.2	0.93	18.1	0.325	217.305
W9	DIVISION	W10	W7	0.70	1.82	0.40	0.78		2.10	1.103	18.41	73.18	153.6	0.013	300	0.99	96.2	1.36	85.1	1.042	358.373
																				1392.384	
W8/13	WILLIAM	W13		4.53	0.40		*	5.64		19.23	71.46	403.2	0.013	375	0.00	12.3	0.11	22.9	3.435	737.967	
W16	EVANDALE	W15	W16	0.32	0.32	0.40	0.36		0.36	15.00	81.68	29.1	0.013	250	3.77	115.5	2.35	14.7	0.104	149.390	
W22	EVANDALE	W16	W14	0.37	0.69	0.55	0.57		0.92	0.104	15.10	81.39	75.0	0.013	250	0.00	4.2	0.08	82.8	16.273	741.062
W14/15	WILLIAM	W14	W17	0.78	7.29	0.45	0.98	**	8.97	2.543	25.21	61.50	551.9	0.013	375	0.12	60.7	0.55	81.6	2.473	859.920
W17	WILLIAM	W17	W18	0.51	7.80	0.40	0.57		9.54	2.473	27.68	58.34	556.6	0.013	375	1.18	190.5	1.72	32.1	0.310	561.964
W18	WILLIAM	W18	OUTLET	0.29	8.09	0.40	0.32		9.86	0.310	27.99	57.97	571.8	0.013	375	0.01	17.5	0.16	78.2	8.210	1388.582
*	$T_c = (218.2(18.72+0.361)+153.6(18.41+1.042))/(218.2+153.6) = 19.23$																				

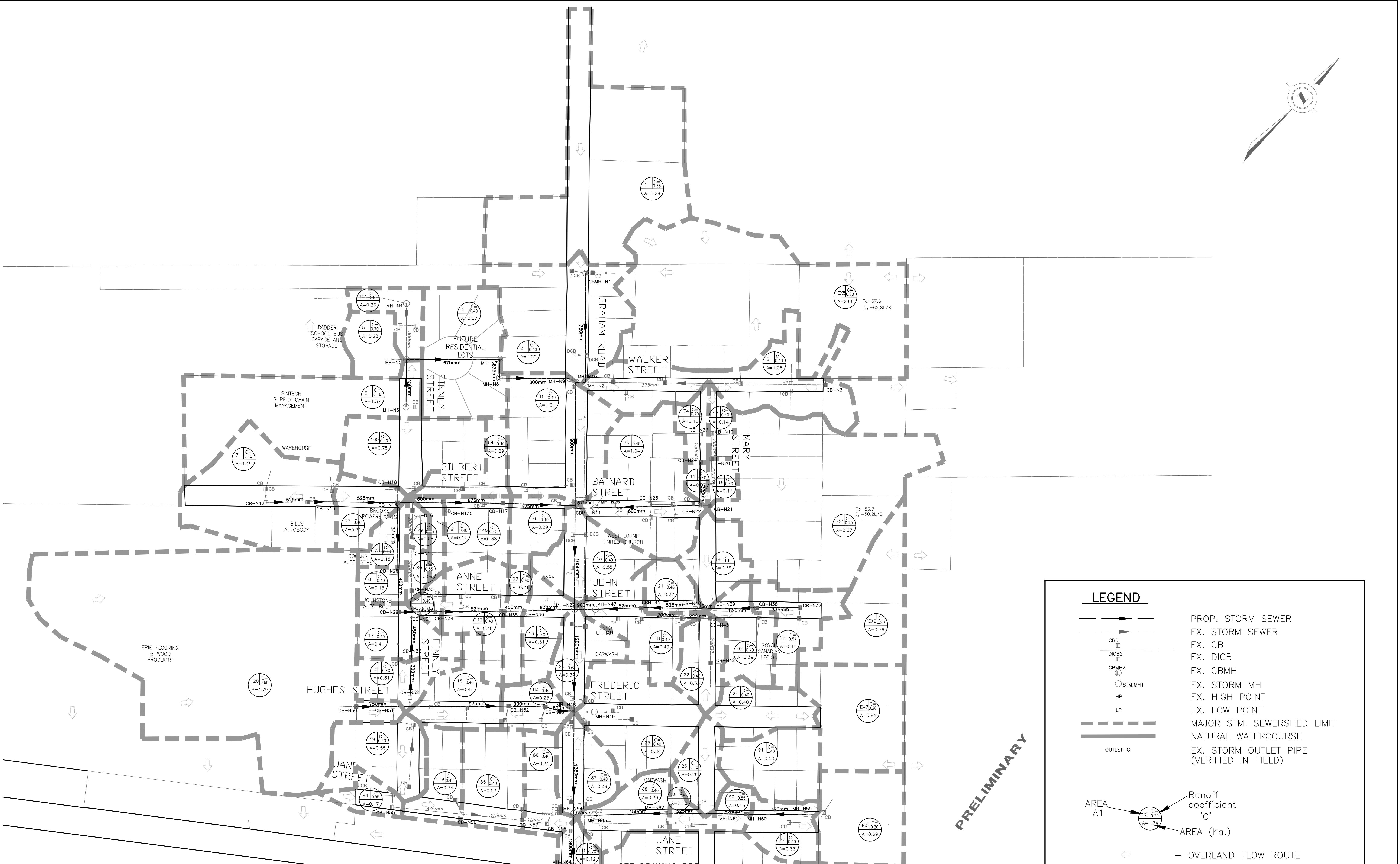
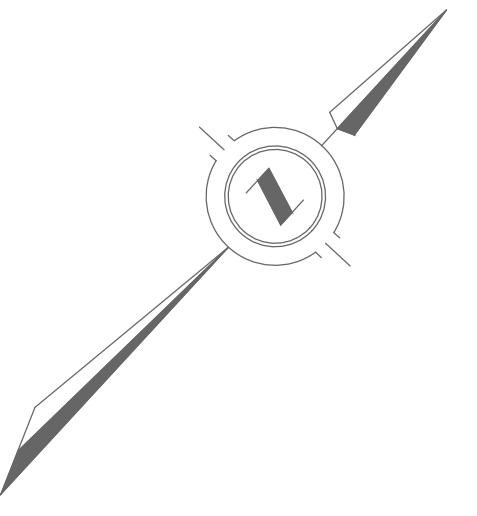
**APPENDIX 'B'**  
**FUTURE CONDITIONS**

**FIGURE NO. 7  
WATERSHED AREA PLANS**

**FIGURE NO. 8  
STORM DESIGN SHEETS**



**SPRIET ASSOCIATES**  
engineers & architects



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN J.A.CSL				
					DRAWN BY PM				
					CHECKED CSL				
					APPROVED CSL				
					DATE NOV. 2023				

CONSULTANT OR DIVISION									
<b>SPIRIET ASSOCIATES</b> LONDON CONSULTING ENGINEERS 155 YORK STREET -- LONDON, ON N6A 1A8 519 672-4100 -- N6A 1A8									

SEE DRAWING PR3

ENGINEER'S STAMP

(Stamp Placeholder)



MUNICIPALITY OF  
**West Elgin**  
1998



SCALE HORIZ.  
1:1500  
15.0m 0 30.0m  
HORIZONTAL

TITLE  
**WEST LORNE STORM SEWER STUDY 2023**  
PR1

PROJECT No.  
**223197**  
SHEET No.  
PLAN FILE No.

PROPOSED WATERSHED PLAN

SEE DRAWING PR1

SEE DRAWING PR3

PRELIMINARY

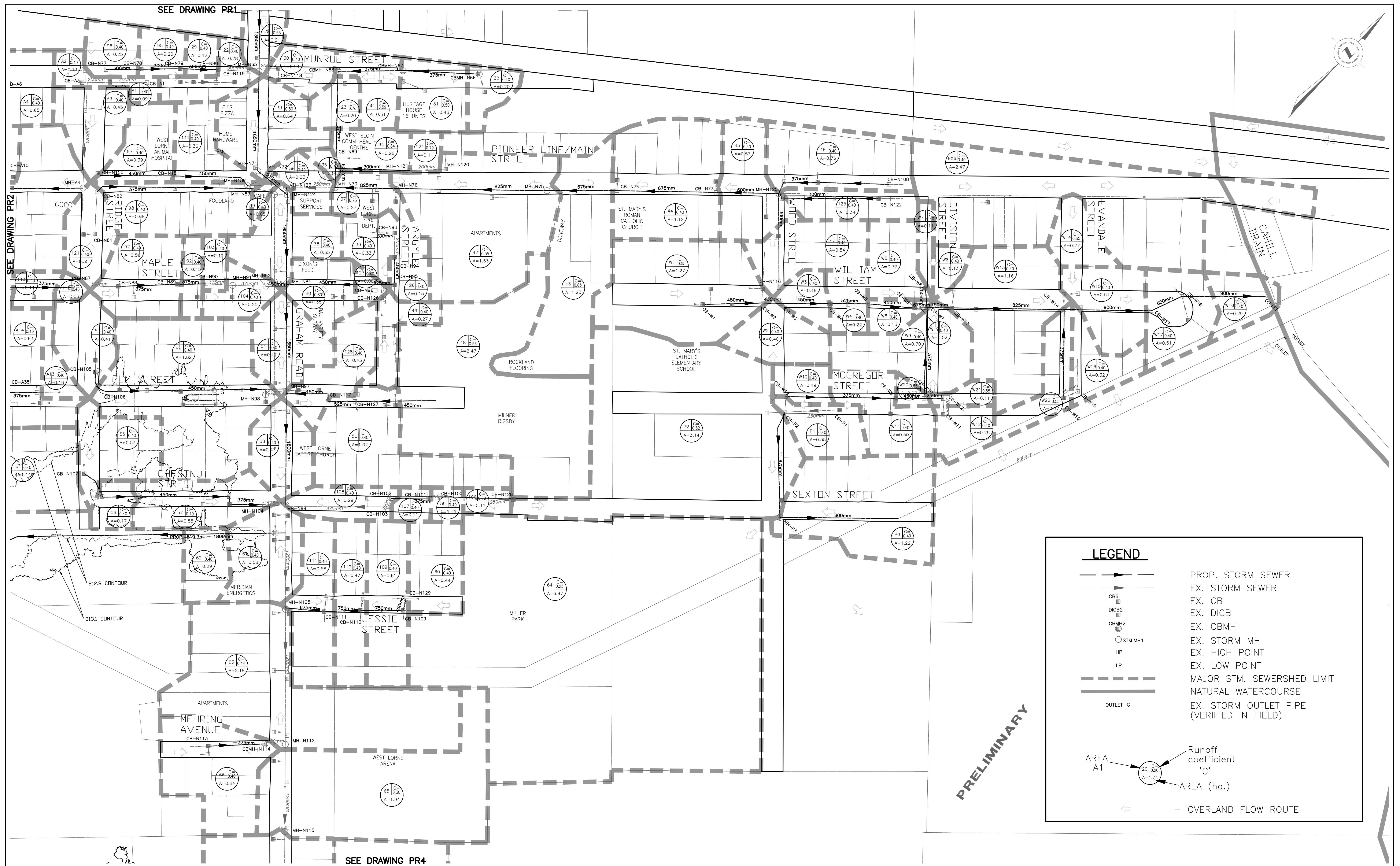
FUTURE  
SUBDIVISION  
 $A=17.8\text{ha}$   
117 LOTS

## LEGEND

- PROP. STORM SEWER
- EX. STORM SEWER
- CB6 EX. CB
- DICB2 EX. DICB
- CBMH2 EX. CBMH
- STM.MH1 EX. STORM MH
- HP EX. HIGH POINT
- LP EX. LOW POINT
- MAJOR STM. SEWERSHED LIMIT
- NATURAL WATERCOURSE
- EX. STORM OUTLET PIPE (VERIFIED IN FIELD)
- OUTLET-G
- AREA A1
  - Runoff coefficient 'C'
  - AREA (ha.)
- OVERLAND FLOW ROUTE



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT	CONSULTANT OR DIVISION	ENGINEER'S STAMP	SCALE HORZ. 1:1500	TITLE	PROJECT No. 223197
					DESIGN J.A.CSL					LONDON CONSULTING ENGINEERS		15.0m 0 30.0m	WEST LORNE STORM SEWER STUDY 2023	SHEET No.
					DRAWN BY PM					LIMITED		HORIZONTAL		PR2
					CHECKED CSL					155 YORK STREET -- LONDON				PLAN FILE No.
					APPROVED CSL					(519) 672-4100 -- N6A 1A8				
					DATE NOV. 2023								PROPOSED WATERSHED PLAN	



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN J.A.CSL				

**SPRIET ASSOCIATES**  
LONDON CONSULTING ENGINEERS  
155 YORK STREET --- LONDON, ON N6A 1A8



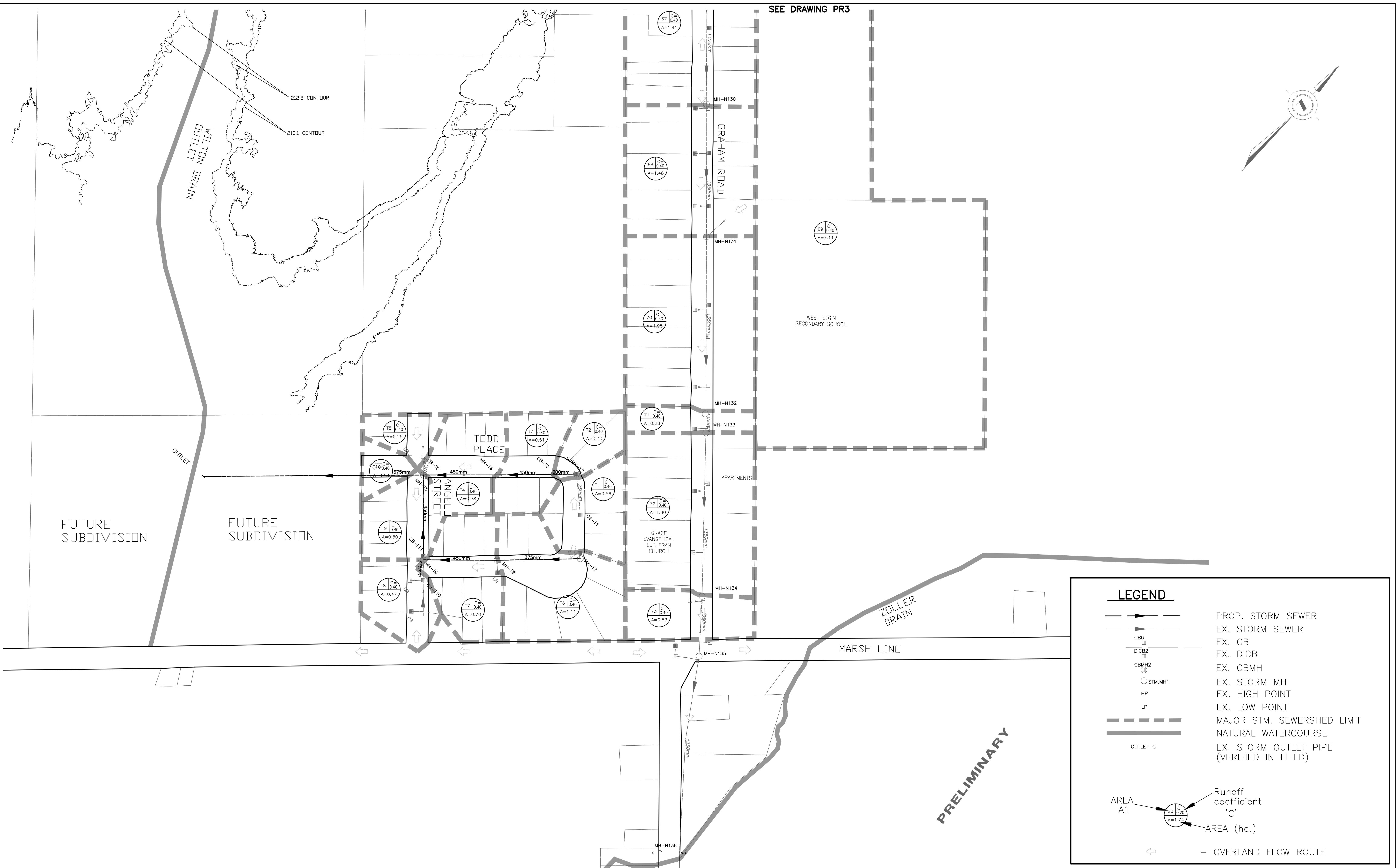
MUNICIPALITY OF  
**West Elgin**  
1998

PROJECT No.	223197
SHEET No.	
PR3	
PLAN FILE No.	

SCALE HORZ. 1:1500  
15.0m 0 30.0m HORIZONTAL

TITLE: WEST LORNE STORM SEWER STUDY 2023

PROPOSED WATERSHED PLAN



**SPRIET ASSOCIATES**

LONDON CONSULTING ENGINEERS

155 YORK STREET -- LONDON

LIMITED





# MUNICIPALITY OF **West Elgin**

SCALE HORZ. 1:1500	TITLE <b>WEST LORNE STORM SEWER STUDY</b>	PROJECT No. <b>223197</b>
15.0m 0 30.0m  HORIZONTAL	<b>PROPOSED WATERSHED PLAN</b>	

## FIGURE NO. 8

STORM SEWER DESIGN SHEET (PROPOSED SEWERS)																	DATE: 30-Nov-23										
RUNOFF COEFFICIENT 'C'				PROJECT NAME WEST LORNE STORM SEWERS - GRAHAM ROAD											DESIGNED BY: J.A.												
PARKS AND PLAYGROUNDS -0.20 RESIDENTIAL SINGLE FAMILY -0.40				RETURN PERIOD 5 years TIME ENTRY 15.00 min. STORM SOURCE MDD											CHECKED BY: C.S.L.												
- MULTI-FAMILY -0.65 COMMERCIAL & INDUSTRIAL -0.75				JOB No.: 223197 SHEET 1 OF 4																							
LOCATION	AREA (A)		TOTAL 2.78(AxC)				RAINFALL INTENSITY			SEWER DESIGN						PROFILE											
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.			
EX5	Agri			2.96	2.96	0.20	1.65		1.65	57.60	38.13	62.8												cal size			
1,2	GRAHAM RD	N1	N2	3.44	3.44	0.37	3.54	A	3.54	15.00	81.68	351.8	0.013	750	0.14	417	0.94	101.3	1.791					705.613			
3	WALKER ST	N3	N2	1.08	1.08	0.40	1.20		1.20	15.00	81.68	98.1	0.013	375	0.39	109	0.99	223.6	3.759					360.715			
	WALKER ST	N2	N10		4.52	0.40			4.74	1.791	16.79	76.91	427.3	0.013	675	0.40	532	1.49	8.3	0.093					623.361		
101	FINNEY ST	N4	N5	0.26	0.26	0.40	0.29		0.29	15.00	81.68	23.6	0.013	300	0.19	42	0.60	52.0	1.453					241.993			
6	FINNEY ST	N6	N5	1.37	1.37	0.46	1.75		1.75	15.00	81.68	143.1	0.013	450	0.32	161	1.01	44.0	0.723					431.291			
4,5	FUTURE SUB'D	N5	N7	1.15	2.78	0.47	1.50	B	3.54	1.453	16.45	77.76	275.5	0.013	675	0.20	376	1.05	89.4	1.418					602.198		
	FUTURE SUB'D	N7	N8		2.78	0.40			3.54	1.418	17.87	74.37	263.5	0.013	675	0.18	357	1.00	17.5	0.293					604.029		
	EASEMENT	N8	N9		2.78	0.40			3.54	0.293	18.16	73.71	261.2	0.013	600	0.19	268	0.95	62.1	1.093					595.965		
	GRAHAM RD	N9	N10		2.78	0.40			3.54	1.093	19.26	71.40	253.0	0.013	450	0.91	272	1.71	6.9	0.067					439.015		
10	GRAHAM RD	N10	N11	1.01	11.27	0.40	1.12		9.41	0.093	16.88	76.68	784.1	0.013	900	0.20	810	1.27	114.7	1.502					891.354		
7	GILBERT ST	N12	N13	1.19	1.19	0.40	1.32		1.32	15.00	81.68	108.1	0.013	525	0.11	143	0.66	61.3	1.551						474.268		
77	GILBERT ST	N13	N14	0.31	1.50	0.40	0.34		1.67	1.551	16.55	77.51	129.3	0.013	525	0.12	149	0.69	61.2	1.482						498.999	
79	FINNEY ST	N15	N16	0.08	0.08	0.55	0.12		0.12	15.00	81.68	10.0	0.013	200	0.24	16	0.51	36.9	1.202						167.760		
100,9	GILBERT ST	N14	N130	0.87	2.45	0.40	0.97		2.76	1.482	18.03	74.00	204.1	0.013	600	0.12	213	0.75	42.6	0.944						592.171	
140	GILBERT ST	N130	N17	0.38	2.83	0.40	0.42		3.18	0.944	18.98	71.98	228.9	0.013	675	0.12	291	0.81	55.3	1.133						618.221	
76	GILBERT ST	N17	N11	0.29	3.12	0.40	0.32		3.50	1.133	20.11	69.73	244.2	0.013	525	0.33	247	1.14	67.5	0.986						523.996	
12	MARY ST	N19	N20	0.14	0.14	0.40	0.16		0.16	15.00	81.68	12.7	0.013	200	0.17	14	0.43	23.7	0.918						195.904		
116	MARY ST	N20	N21	0.11	0.25	0.40	0.12		0.28	0.918	15.92	79.15	22.0	0.013	200	0.83	30	0.95	43.9	0.769						178.736	
EX1	MARY ST				2.27	2.52	0.20	1.26		1.26	53.70	39.74	50.2												249.009		
	MARY ST	N21	N22						0.28	0.769	16.69	77.17	71.6	0.013	250	1.50	73	1.48	10.0	0.112							
74	MARY ST	N23	N24	0.16	0.16	0.40	0.18		0.18	15.00	81.68	14.5	0.013	150	1.44	18	1.03	26.8	0.432						137.977		
11	MARY ST	N24	N22	0.07	0.23	0.40	0.08		0.26	0.432	15.43	80.46	20.6	0.013	300	0.32	55	0.77	40.1	0.864						208.417	
75	BAINARD ST	N22	N26	1.04	3.79	0.40	1.16		1.69	0.769	16.69	77.17	180.6	0.013	600	0.16	246	0.87	97.3	1.867						535.925	
	BAINARD ST	N26	N11		3.79	0.40			1.69	1.867	18.55	72.87	173.3	0.013	675	0.06	206	0.58	18.8	0.545						634.279	
15	GRAHAM RD	N11	N27	0.55	18.73	0.40	0.61		15.21	1.502	18.39	73.23	1226.8	0.013	1050	0.26	1392	1.61	96.3	0.998						1003.675	
81	FINNEY ST	N32	N33	0.31	0.31	0.40	0.34		0.34	15.00	81.68	28.2	0.013	300	0.29	52	0.74	38.0	0.860							238.790	
17	FINNEY ST	N33	N31	0.41	0.72	0.40	0.46		0.80	0.860	15.86	79.30	63.5	0.013	450	0.11	95	0.59	38.0	1.065							388.479
94.78	FINNEY ST	N14	N28	0.47	0.47	0.40	0.52		0.52	15.00	81.68	42.7	0.013	375	0.15	68	0.61	63.1	1.710							315.845	
8	FINNEY ST	N28	N29	0.15	0.62	0.40	0.17		0.69	1.710	16.71	77.11	53.2	0.013	450	0.07	75	0.47	38.6	1.3							

STORM SEWER DESIGN SHEET (PROPOSED SEWERS)																								
RUNOFF COEFFICIENT 'C'					PROJECT NAME WEST LORNE STORM SEWERS - GRAHAM ROAD											DATE: 30-Nov-23								
PARKS AND PLAYGROUNDS		-0.20	RESIDENTIAL SINGLE FAMILY		-0.40												DESIGNED BY: J.A.							
- MULTI-FAMILY		-0.65	COMMERCIAL & INDUSTRIAL		-0.75												CHECKED BY: C.S.L.							
																	JOB No.: 223197							
																	SHEET 2 OF 4							
LOCATION			AREA (A)		TOTAL 2.78(AxC)			RAINFALL INTENSITY			SEWER DESIGN						PROFILE							
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.
EX3,24,25	FREDRIC ST	N49	N48	2.10	2.10	0.32	1.87	D	1.87		15.00	81.68	152.6	0.013	375	1.20	192	1.74	18.9	0.181				cal size 344.825
120	HUGHES ST	N50	N51	4.79	4.79	0.68	9.06		9.06		15.00	81.68	739.7	0.013	750	0.58	848	1.92	34.2	0.297				714.259
18,19	FREDERIC ST	N51	N52	0.99	5.78	0.40	1.10		10.16	0.297	15.30	80.84	821.0	0.013	975	0.19	977	1.31	107.4	1.368				915.640
83	FREDERIC ST	N52	N53	0.25	6.03	0.40	0.28		10.43	1.368	16.67	77.22	805.7	0.013	900	0.25	905	1.42	34.4	0.403				863.622
	FREDERIC ST	N53	N48		6.03	0.40			10.43	0.403	17.07	76.24	795.5	0.013	600	1.71	803	2.84	27.0	0.158				599.317
87	GRAHAM RD	N48	N54	0.39	33.14	0.40	0.43	*	34.55	1.010	20.39	69.19	1757.8	0.013	1350	0.17	2201	1.54	96.7	1.048				1243.861
EX4,27	JANE ST	N59	N60	1.02	1.02	0.27	0.77	E	0.77		15.00	81.68	62.5	0.013	375	0.34	102	0.93	55.5	0.999				312.620
90,91	JANE ST	N60	N61	0.66	1.68	0.43	0.79	F	1.55	0.999	16.00	78.93	122.7	0.013	525	0.16	172	0.79	24.5	0.514				463.617
26,89	JANE ST	N61	N62	0.41	2.09	0.44	0.50	G	2.06	0.514	16.51	77.60	159.6	0.013	525	0.14	161	0.74	50.6	1.134				524.581
88	JANE ST	N62	N63	0.39	2.48	0.40	0.43		2.49	1.134	17.65	74.88	186.4	0.013	450	0.87	266	1.67	67.0	0.668				394.811
	JANE ST	N63	N54		2.48	0.40			2.49	0.668	18.32	73.38	182.7	0.013	375	1.59	221	2.00	18.8	0.157				349.950
84,119	JANE ST	N55	N56	0.51	0.51	0.45	0.64	H	0.64		15.00	81.68	52.1	0.013	375	0.17	72	0.65	65.2	1.660				332.481
85	JANE ST	N56	N57	0.53	1.04	0.40	0.59		1.23	1.660	16.66	77.24	94.8	0.013	375	0.32	99	0.90	55.8	1.036				369.569
86	JANE ST	N57	N58	0.31	1.35	0.40	0.34		1.57	1.036	17.70	74.76	117.5	0.013	375	0.50	124	1.12	24.0	0.356				368.444
	JANE ST	N58	N54		1.35	0.40			1.57	0.356	18.05	73.96	116.3	0.013	375	1.44	210	1.91	29.8	0.261				300.937
115	GRAHAM RD	N54	N64	0.12	37.09	0.70	0.23	*	38.85	1.048	21.44	67.31	2181.7	0.013	1800	0.04	2299	0.90	48.7	0.898				1769.204
30	MUNROE	N118	N65	0.24	0.24	0.40	0.27		0.27		15.00	81.68	21.8	0.013	200	12.10	114	3.63	18.1	0.083				107.773
96	MUNROE	N77	N78	0.25	0.25	0.40	0.28		0.28		15.00	81.68	22.7	0.013	300	0.19	42	0.60	33.1	0.925				238.460
95	MUNROE	N78	N79	0.20	0.45	0.40	0.22		0.50	0.925	15.93	79.13	39.6	0.013	300	1.13	103	1.45	36.3	0.416				210.268
29	MUNROE	N79	N80	0.12	0.57	0.40	0.13		0.63	0.416	16.34	78.04	49.5	0.013	300	1.13	103	1.45	35.6	0.408				228.573
122	MUNROE	N80	N119	0.28	0.85	0.40	0.31		0.95	0.408	16.75	77.02	72.8	0.013	300	1.13	103	1.45	29.0	0.332				264.210
	MUNROE	N119	N65		0.85	0.40			0.95	0.332	17.08	76.21	72.0	0.013	300	9.92	305	4.31	9.5	0.037				175.119
28	GRAHAM RD	N64	N65	0.21	38.39	0.55	0.32	*	40.38	0.898	22.34	65.79	1711.8	0.013	1350	0.15	2067	1.44	58.5	0.675				1260.781
33	GRAHAM RD	N65	N71	0.64	39.03	0.80	1.42	*	41.81	0.675	23.02	64.71	2149.3	0.013	1650	0.06	2233	1.04	93.5	1.492				1630.488
	GRAHAM RD	N71	N124		39.03	0.40		*	41.81	1.492	24.51	62.48	1108.9	0.013	975	0.35	1326	1.78	35.7	0.335				913.984
97	MAIN	N150	N151	0.39	0.39	0.40	0.43		0.43		15.00	81.68	35.4	0.013	450	0.03	49	0.31	73.3	3.935				398.239
141	MAIN	N151	N152	0.36	0.75	0.40	0.40		0.83	3.935	18.93	72.07	60.1	0.013	450	0.11	95	0.59	71.9	2.015				380.572
	MAIN	N152	N124		0.75	0.40			0.83	2.015	20.95	68.17	56.9	0.013	375	0.11	58</td							

STORM SEWER DESIGN SHEET (PROPOSED SEWERS)																		DATE: 30-Nov-23						
RUNOFF COEFFICIENT 'C'				PROJECT NAME WEST LORNE STORM SEWERS - GRAHAM ROAD												DESIGNED BY: J.A.								
PARKS AND PLAYGROUNDS -0.20				RESIDENTIAL SINGLE FAMILY -0.40				- MULTI-FAMILY -0.65				COMMERCIAL & INDUSTRIAL -0.75				RETURN PERIOD 5 years								
STORM SOURCE						TIME ENTRY 15.00 min.				MDD				JOB No.: 223197										
LOCATION				AREA (A)		TOTAL 2.78(AxC)			RAINFALL INTENSITY			SEWER DESIGN						PROFILE						
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.
																							cal size	
46	MAIN	N108	N125	0.76	0.76	0.40	0.85		0.85		15.00	81.68	69.0	0.013	375	0.50	124	1.12	111.3	1.653				301.789
125	MAIN	N122	N125	0.34	0.34	0.40	0.38		0.38		15.00	81.68	30.9	0.013	300	0.41	62	0.88	96.2	1.830				231.666
47	WOOD	N116	N125	0.54	0.54	0.40	0.60		0.60		15.00	81.68	49.0	0.013	300	0.75	84	1.18	88.3	1.242				246.053
45	MAIN	N125	N73	0.57	2.21	0.40	0.63		2.46	1.653	16.65	77.26	189.9	0.013	600	0.16	246	0.87	58.8	1.128				546.072
44	MAIN	N73	N74	1.12	3.33	0.40	1.25		3.70	1.128	17.78	74.57	276.1	0.013	675	0.16	336	0.94	92.9	1.648				628.435
43	MAIN	N74	N75	1.23	4.56	0.65	2.22		5.93	1.648	19.43	71.06	421.1	0.013	675	0.42	545	1.52	65.7	0.719				614.303
42	MAIN	N75	N76	1.63	6.19	0.55	2.49		8.42	0.719	20.15	69.66	586.3	0.013	825	0.25	718	1.34	141.4	1.755				766.581
37	MAIN	N76	N70	0.27	6.46	0.73	0.55		8.97	1.755	21.90	66.52	596.4	0.013	825	0.25	718	1.34	57.6	0.715				771.471
36	MAIN	N70	N123	0.23	8.28	0.40	0.26		11.94	0.715	22.62	65.34	780.0	0.013	750	0.85	1026	2.32	45.3	0.325				678.250
	GRAHAM	N123	N124		8.28	0.40			11.94	0.325	22.94	64.82	773.9	0.013	1200	0.05	872	0.77	6.7	0.145				1150.286
38	GRAHAM	N124	N84	0.55	49.34	0.40	0.61	*	56.00	0.335	24.84	62.00	2352.3	0.013	1650	0.10	2882	1.35	83.4	1.031				1532.574
114	MAPLE	N85	N86	0.34	0.34	0.40	0.38		0.38		15.00	81.68	30.9	0.013	300	0.25	48	0.68	55.5	1.352				254.182
113	MAPLE	N86	N87	0.14	0.48	0.40	0.16		0.53	1.352	16.35	78.01	41.6	0.013	375	0.18	74	0.67	56.2	1.391				302.390
112	MAPLE	N87	N88	0.06	0.54	0.40	0.07		0.60	1.391	17.74	74.66	44.8	0.013	300	0.34	56	0.80	44.5	0.930				275.930
52	MAPLE	N88	N89	0.56	1.10	0.40	0.62		1.22	0.930	18.67	72.61	88.8	0.013	375	0.75	152	1.37	55.5	0.673				307.422
102	MAPLE	N89	N90	0.15	1.25	0.40	0.17		1.39	0.673	19.35	71.22	99.0	0.013	375	0.96	172	1.56	26.9	0.288				305.706
103	MAPLE	N90	N91	0.12	1.37	0.40	0.13		1.52	0.288	19.63	70.65	107.6	0.013	375	0.65	141	1.28	25.0	0.326				339.367
104	MAPLE	N91	N92	0.25	1.62	0.40	0.28		1.80	0.326	19.96	70.02	126.1	0.013	375	1.21	193	1.75	31.1	0.297				320.551
	MAPLE	N92	N84		1.62	0.40			1.80	0.297	20.26	69.45	125.1	0.013	450	0.24	140	0.88	19.3	0.366				432.822
39	ARGYLE	N93	N94	0.33	0.33	0.40	0.37		0.37		15.00	81.68	30.0	0.013	250	1.42	71	1.44	22.7	0.262				181.486
126	ARGYLE	N94	N95	0.15	0.48	0.40	0.17		0.53	0.262	15.26	80.94	43.2	0.013	450	0.05	64	0.40	25.7	1.069				389.823
49	ARGYLE	N126	375	0.27	0.27	0.40	0.30		0.30		15.00	81.68	24.5	0.013	300	1.75	128	1.81	12.2	0.112				161.863
127	MAPLE	N95	N96	0.08	0.83	0.40	0.09		0.92	1.069	1.07	218.63	201.8	0.013	525	0.24	211	0.97	36.9	0.632				517.794
40	MAPLE	N96	N84	0.35	1.18	0.80	0.78		1.70	0.632	1.70	197.58	336.2	0.013	450	1.94	397	2.50	64.6	0.431				423.741
51	GRAHAM	N84	N97	0.47	52.61	0.40	0.52	*	60.03	1.031	25.87	60.60	2580.7	0.013	1650	0.09	2734	1.28	101.2	1.319				1618.443
53,54	ELM	N106	N97	2.23	2.23	0.40	2.48		2.48		15.00	81.68	202.6	0.013	450	1.18	310	1.95	192.6	1.648				384.672
48	ELM	stub	N127	2.47	2.47	0.53	3.64		3.64		15.00	81.68	297.3	0.013	450	1.39	336	2.11	42.0	0.331				430.756
50	ELM	N127	N117	1.02	3.49	0.40	1.13		4.77	0.331	15.33	80.74	385.4	0.013	525	1.39	507	2.34	25.2	0.179				474.819
128	ELM	N117	N97	0.45	3.94	0.40	0.50		5.27	0.331	15.66	79												

## STORM SEWER DESIGN SHEET (PROPOSED SEWERS)

RUNOFF COEFFICIENT 'C'

PARKS AND PLAYGROUNDS  
RESIDENTIAL SINGLE FAMILY

- MULTI-FAMILY  
COMMERCIAL & INDUSTRIAL

**PROJECT NAME**    **WEST LORNE STORM SEWERS - GRAHAM ROAD**

30-Nov-23

DESIGNED BY: J.A

CHECKED BY: C.S.L.

JOB No. : 223197

SHEET 4 OF

[View Details](#) | [Edit](#) | [Delete](#)

RETURN PERIOD 5 years  
TIME ENTRY 15.00 min.  
STORM SOURCE MDD





## STORM SEWER DESIGN SHEET (PROPOSED SEWERS)

RUNOFF COEFFICIENT 'C'

PARKS AND PLAYGROUNDS  
RESIDENTIAL SINGLE FAMILY

- MULTI-FAMILY  
COMMERCIAL & INDUSTRIAL

PROJECT NAME    WEST LORNE STORM SEWERS - TODD PLACE

DATE: 30-Nov-23  
D BY: P.M.  
D BY: C.S.L.  
B No.: 223197  
SHEET 1 OF 1

RETURN PERIOD 5 years  
TIME ENTRY 15.00 min.  
STORM SOURCE MDD

STORM SEWER DESIGN SHEET (PROPOSED SEWERS)																								
RUNOFF COEFFICIENT 'C'					PROJECT NAME WEST LORNE STORM SEWERS - TRIGGER DRAIN										DATE: 30-Nov-23									
PARKS AND PLAYGROUNDS RESIDENTIAL SINGLE FAMILY					-0.2 0.40					RETURN PERIOD TIME ENTRY STORM SOURCE					DESIGNED BY: P.M. CHECKED BY: C.S.L. JOB No.: 223197 SHEET 1 OF 1									
- MULTI-FAMILY COMMERCIAL & INDUSTRIAL			-0.65							5 years	15.00	min.	MDD											
LOCATION	AREA (A)		TOTAL 2.78(AxC)			RAINFALL INTENSITY			SEWER DESIGN			PROFILE												
AREA No.	STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.
A1	MUNROE	A1	A2	0.09	0.09	0.40	0.10		0.10		15.00	81.68	8.2	0.013	200	0.30	18.0	0.57	34.9	1.017				149.223
A2	MUNROE	A2	A3	0.13	0.22	0.40	0.14		0.24	1.017	16.02	78.88	19.3	0.013	200	0.68	27.0	0.86	25.9	0.501				176.637
A3	RIDGE	A3	A4	0.45	0.67	0.40	0.50		0.75	0.501	16.52	77.59	57.8	0.013	300	1.28	109.4	1.55	99.1	1.067				236.732
A12	MAIN	A4	A5	1.20	1.87	0.40	1.33		2.08	1.067	17.59	75.02	156.0	0.013	525	0.23	206.3	0.95	129.0	2.257				473.920
A4	MUNROE	A6	A7	0.65	0.65	0.40	0.72		0.72		15.00	81.68	59.0	0.013	375	0.32	99.2	0.90	53.2	0.987				309.444
A8	MUNROE	A8	A7	0.17	0.17	0.40	0.19		0.19		15.00	81.68	15.4	0.013	300	0.30	53.0	0.75	32.2	0.716				189.414
A6	MORDEN	A7	A9	0.16	0.98	0.40	0.18		1.09	0.987	15.99	78.96	86.0	0.013	375	0.59	134.7	1.22	37.5	0.513				317.765
A5	MORDEN	A9	A11	0.19	1.17	0.40	0.21		1.30	0.513	16.50	77.64	101.0	0.013	300	1.16	104.2	1.47	48.3	0.546				297.279
A10	MAIN	A10	A11	0.29	0.29	0.40	0.32		0.32		15.00	81.68	26.3	0.013	200	1.26	36.8	1.17	71.7	1.020				176.821
	MORDEN	A11	A5	1.46	0.40				1.62	0.546	15.55	80.15	130.1	0.013	375	1.16	188.8	1.71	14.2	0.138				326.894
A17	MAIN	A5	A12	0.88	4.21	0.40	0.98		4.68	2.257	19.84	70.24	328.8	0.013	675	0.23	403.1	1.13	170.1	2.516				626.843
A9	MUNROE	A13	A14	0.38	0.38	0.40	0.42		0.42		15.00	81.68	34.5	0.013	300	0.77	84.9	1.20	72.3	1.004				214.613
A30	MUNROE	A14	A15	0.10	0.48	0.40	0.11		0.53	1.004	16.00	78.92	42.1	0.013	375	3.13	310.2	2.81	16.0	0.095				177.784
A11	MUNROE	A16	A17	0.28	0.28	0.40	0.31		0.31		15.00	81.68	25.4	0.013	300	0.36	58.0	0.82	35.9	0.729				220.715
A43	MUNROE	A17	A18	0.04	0.32	0.40	0.04		0.36	0.729	15.73	79.65	28.3	0.013	300	0.25	48.4	0.68	18.9	0.461				246.131
A44	MUNROE	A18	A15	0.01	0.33	0.40	0.01		0.37	0.461	16.19	78.43	28.8	0.013	200	1.33	37.8	1.20	24.9	0.345				180.950
A33	MUNROE	A19	A20	0.42	0.42	0.40	0.47		0.47		15.00	81.68	38.1	0.013	300	0.29	52.1	0.74	38.6	0.873				267.592
A34	MUNROE	A21	A22	0.28	0.28	0.40	0.31		0.31		15.00	81.68	25.4	0.013	300	0.32	54.7	0.77	16.9	0.364				225.644
A46	MUNROE	A22	A23	0.13	0.41	0.40	0.14		0.46	0.364	15.36	80.65	36.8	0.013	300	0.35	57.2	0.81	17.6	0.362				254.779
A47	MUNROE	A23	A24	0.15	0.56	0.40	0.17		0.62	0.362	15.73	79.66	49.6	0.013	250	1.21	65.4	1.33	18.0	0.225				225.897
	MUNROE	A24	A25		0.56	0.40			0.62	0.225	15.95	79.06	49.2	0.013	250	3.42	110.0	2.24	8.6	0.064				185.382
A45	MUNROE	A25	A26	0.15	0.71	0.40	0.17		0.79	0.064	16.02	78.89	62.3	0.013	375	0.34	102.2	0.93	60.1	1.082				312.139
A32	MUNROE	A26	A27	0.18	0.89	0.40	0.20		0.99	1.082	17.10	76.17	75.4	0.013	450	0.33	163.8	1.03	65.9	1.067				337.181
	MUNROE	A27	A20		0.89	0.40			0.99	1.067	18.16	73.71	73.0	0.013	450	0.20	127.5	0.80	8.2	0.170				365.856
A31	MUNROE	A20	A15	0.55	1.86	0.40	0.61		2.07	0.170	18.33	73.34	151.7	0.013	600	0.09	184.2	0.65	78.0	1.995				559.181
A29	WELLINGTON	A15	A28	0.54	3.21	0.40	0.60		3.57	1.995	20.33	69.31	247.4	0.013	600	0.19	267.6	0.95	89.0	1.567				583.953
A28	MAIN	A29	A28	0.40	0.40	0.40	0.44		0.44		15.00	81.68	36.3	0.013	250	1.33	68.6	1.40	95.6	1.140				197.472
A27	MAIN	A28	A28	0.54	0.54	0.55	0.83		0.83		15.00	81.68	67.4	0.013	300	0.50	68.4	0.97	200.0	3.446				299.164
	WELLINGTON	A28	A12		4.15				4.84	1.567	21.90	66.53	322.0	0.013	900	0.04	362.1	0.57	11.2	0.328				863.312
A25	MAPLE	A30	A31	1.27	1.27	0.40	1.41		1.41		15.00	81.68	115.4	0.013	450	0.32	161.3	1.01	70.1	1.152				397.801
A48	MAPLE	A31	900	0.23	1.50	0.75	0.48																	

STORM SEWER DESIGN SHEET (PROPOSED SEWERS)																								
RUNOFF COEFFICIENT 'C'				PROJECT NAME WEST LORNE STORM SEWERS - WILLIAM STREET													DATE: 30-Nov-23							
PARKS AND PLAYGROUNDS -0.2				RESIDENTIAL SINGLE FAMILY 0.40				- MULTI-FAMILY -0.65				COMMERCIAL & INDUSTRIAL -0.7				RETURN PERIOD 5 years			TIME ENTRY 15.00 min.		STORM SOURCE MDD			
AREA No.	LOCATION STREET	FROM M.H.	TO M.H.	AREA hectares	TOTAL hectares	'C'	SECT.	LAT.	SEWER	SECT. min.	ACCUM. min.	INTEN. mm/hr.	Q l/sec.	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.
																							cal size	
W1	WILLIAM STREET	W1	W2	1.27	1.27	0.55	1.94		1.94		15.00	81.68	158.6	0.013	<b>450</b>	0.68	235.1	1.48	56.5	0.637			389.179	
W2	WOOD STREET	W2	W3	0.40	1.67	0.40	0.44		2.39	0.637	15.64	79.90	190.7	0.013	<b>450</b>	1.05	292.2	1.84	17.1	0.155			384.383	
W3	WILLIAM STREET	W3	W4	0.19	1.86	0.40	0.21		2.60	0.155	15.79	79.48	206.5	0.013	<b>450</b>	0.77	250.2	1.57	46.4	0.492			419.737	
W4	WILLIAM STREET	W4	W5	0.22	2.08	0.40	0.24		2.84	0.492	16.28	78.19	222.3	0.013	<b>525</b>	0.52	310.1	1.43	36.2	0.421			464.442	
W6	WILLIAM STREET	W5	W6	0.13	2.21	0.40	0.14		2.99	0.421	16.70	77.12	230.4	0.013	<b>450</b>	0.91	272.0	1.71	42.8	0.417			423.848	
W19	WILLIAM STREET	W6	W7	0.02	2.23	0.40	0.02		3.01	0.417	17.12	76.11	229.0	0.013	<b>675</b>	0.12	291.2	0.81	11.9	0.244			618.344	
W5/7	WILLIAM STREET	W8	W7	0.48	0.48	0.40	0.53		0.53		15.00	81.68	43.6	0.013	<b>250</b>	0.84	54.5	1.11	18.3	0.275			230.472	
W10/11	McGREGOR	W19	W9	0.69	0.69	0.40	0.77		0.77		15.00	81.68	62.7	0.013	<b>375</b>	0.38	108.1	0.98	103.2	1.758			306.417	
W20	McGREGOR	W9	W10	0.07	0.76	0.55	0.11		0.87	1.758	16.76	76.99	67.3	0.013	<b>450</b>	0.11	94.6	0.59	26.6	0.746			397.099	
W12	McGREGOR	W11	W12	0.25	0.25	0.40	0.28		0.28		15.00	81.68	22.7	0.013	<b>200</b>	0.97	32.3	1.03	14.7	0.238			175.656	
W21	McGREGOR	W12	W10	0.11	0.36	0.55	0.17		0.45	0.238	15.24	81.00	36.1	0.013	<b>250</b>	0.79	52.9	1.08	18.1	0.280			217.305	
W9	DIVISION	W10	W7	0.70	1.82	0.40	0.78		2.10	0.746	17.50	75.21	157.9	0.013	<b>375</b>	0.99	174.5	1.58	85.1	0.898			362.058	
	WILLIAM	W7	W13		4.53	0.40		*	5.64		19.23	71.46	403.2	0.013	<b>750</b>	0.20	497.9	1.13	22.9	0.339			694.589	
W8/13	WILLIAM	W13	W14	1.29	5.82	0.40	1.43		7.08	0.339	19.57	70.78	500.9	0.013	<b>825</b>	0.19	625.7	1.17	105.6	1.504			760.751	
W16	EVANDALE	W15	W16	0.32	0.32	0.40	0.36		0.36		15.00	81.68	29.1	0.013	<b>250</b>	3.77	115.5	2.35	14.7	0.104			149.390	
W22	EVANDALE	W16	W14	0.37	0.69	0.55	0.57		0.92	0.104	15.10	81.39	75.0	0.013	<b>375</b>	0.20	78.4	0.71	82.8	1.944			369.678	
W14/15	WILLIAM	W14	W17	0.78	7.29	0.45	0.98	**	8.97	1.504	21.07	67.96	609.8	0.013	<b>900</b>	0.12	627.1	0.99	81.6	1.380			892.724	
W17	WILLIAM	W17	W18	0.51	7.80	0.40	0.57		9.54	1.380	22.45	65.61	626.0	0.013	<b>600</b>	1.18	667.0	2.36	32.1	0.227			587.279	
W18	WILLIAM	W18	OUTLET	0.29	8.09	0.40	0.32		9.86	0.227	22.68	65.24	643.5	0.013	<b>900</b>	0.20	809.6	1.27	78.2	1.024			827.719	
*	$T_c = (218.2(18.72+0.361)+153.6(18.41+1.042))/(218.2+153.6) = 19.23$																							

**APPENDIX 'C'**

**SUMMARY FIGURES**

**FIGURE NOS. 9 – 12  
SUMMARY OF EXISTING UNDERSIZED SEWERS**

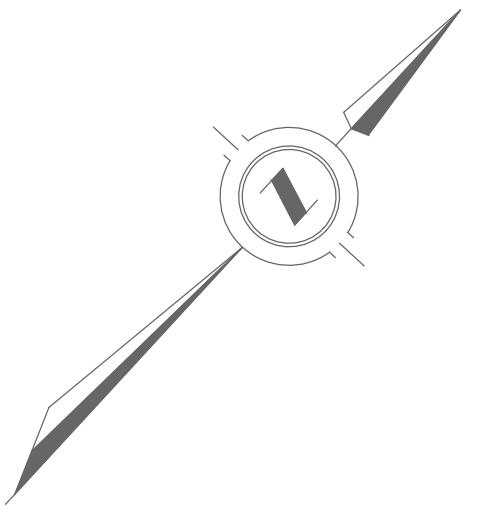
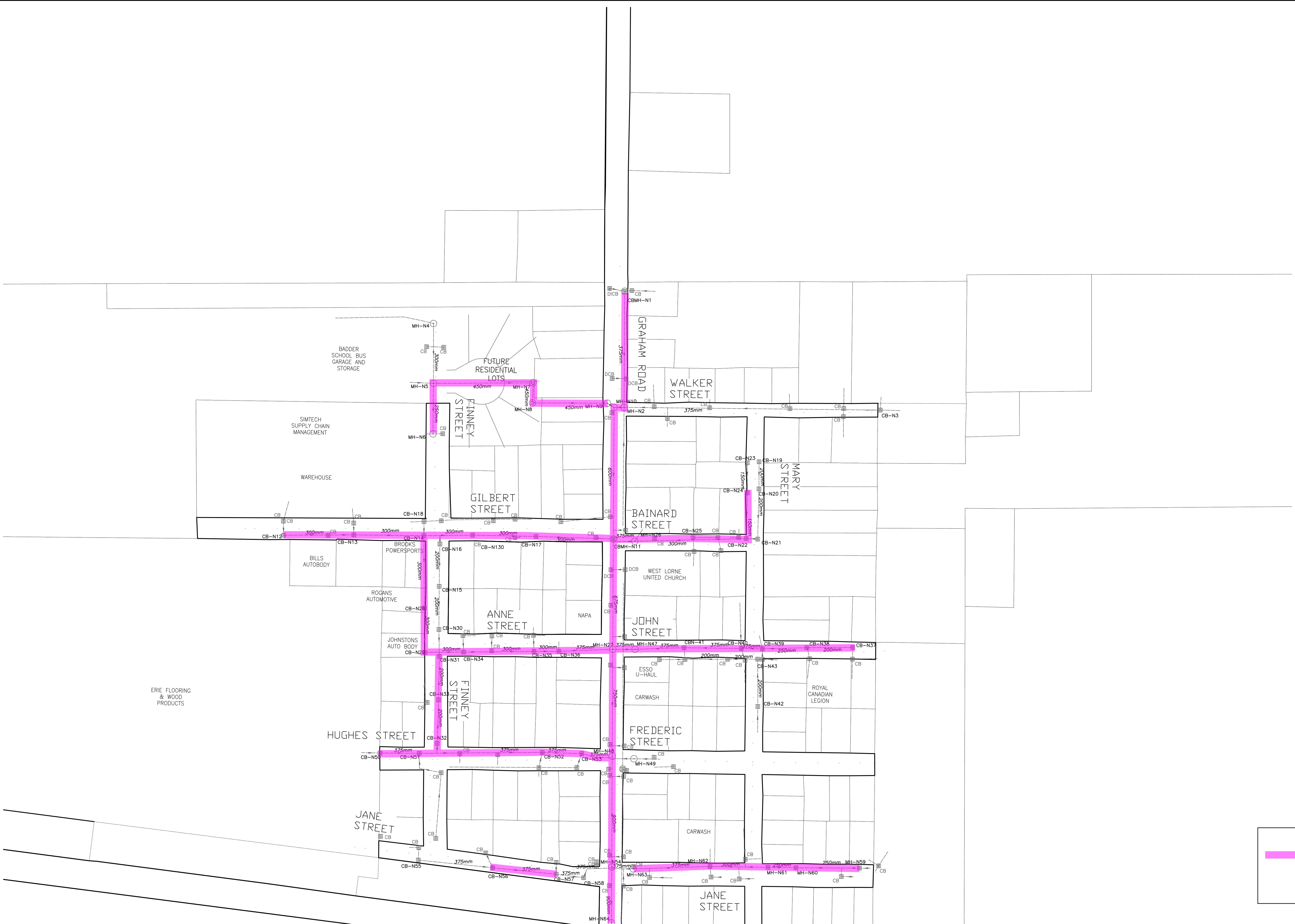
**FIGURE NOS. 13 – 16  
SUMMARY OF EXISTING STORM SYSTEM DEFICIENCIES**

**FIGURE NOS. 17 – 20  
SUMMARY OF EXISTING MUNICIPAL DRAINS**

**FIGURE NO. 21  
MUNICIPAL DRAIN CAPACITY MAP**



**SPRIET ASSOCIATES**  
engineers & architects



# LEGEND

## UNDERSIZED EXISTING STORM SEWER BASED ON 5 - YEAR STORM EVENT MODELLING

# **SPIRET ASSOCIATES**

LONDON CONSULTING ENGINEERS

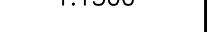
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155 YORK STREET -- LONDON (519) 672-4100 -- N6A 1A8





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15.0m      0      30.0m  HORIZONTAL	<b>SUMMARY OF EXISTING UNDERSIZED STORM SEWERS</b>	FIGURE NO. 9 PLAN FILE No.



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN JACSL				
					DRAWN BY PM				
					CHECKED CSL				
					APPROVED CSL				
					DATE NOV. 2023				

223197-EXISTING

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LONDON CONSULTING ENGINEERS  
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519 672-4100 --- N6A 1A8



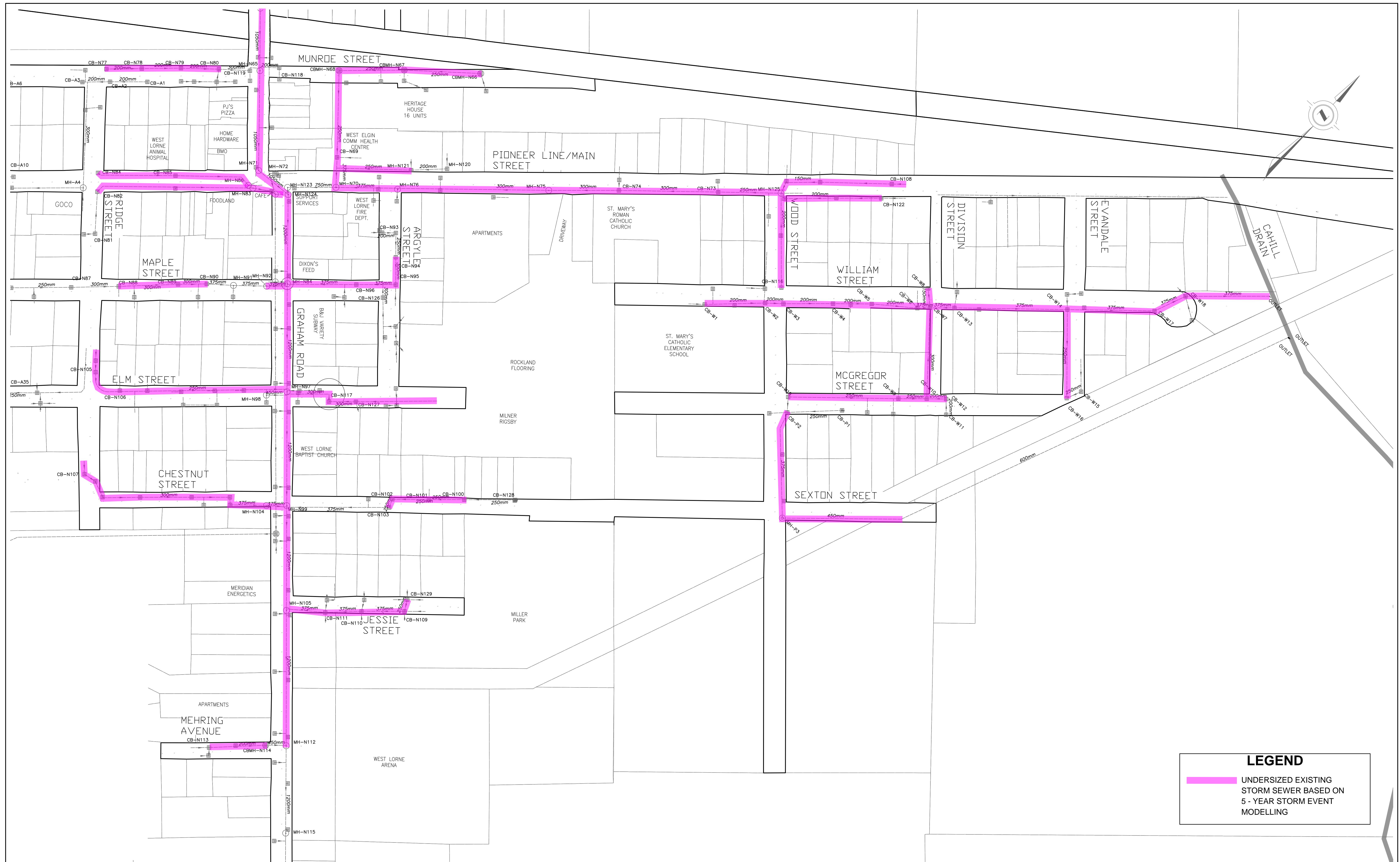
MUNICIPALITY OF  
**West Elgin**  
1998

PROJECT No.	FIGURE No.	PLAN FILE No.
223197		

**TITLE**  
**WEST LORNE STORM SEWER STUDY**

**SUMMARY OF EXISTING UNDERSIZED STORM SEWERS**

SCALE HORIZ. 1:2500  
25.0m 0 50.0m  
HORIZONTAL



# MUNICIPALITY OF **West Elgin**

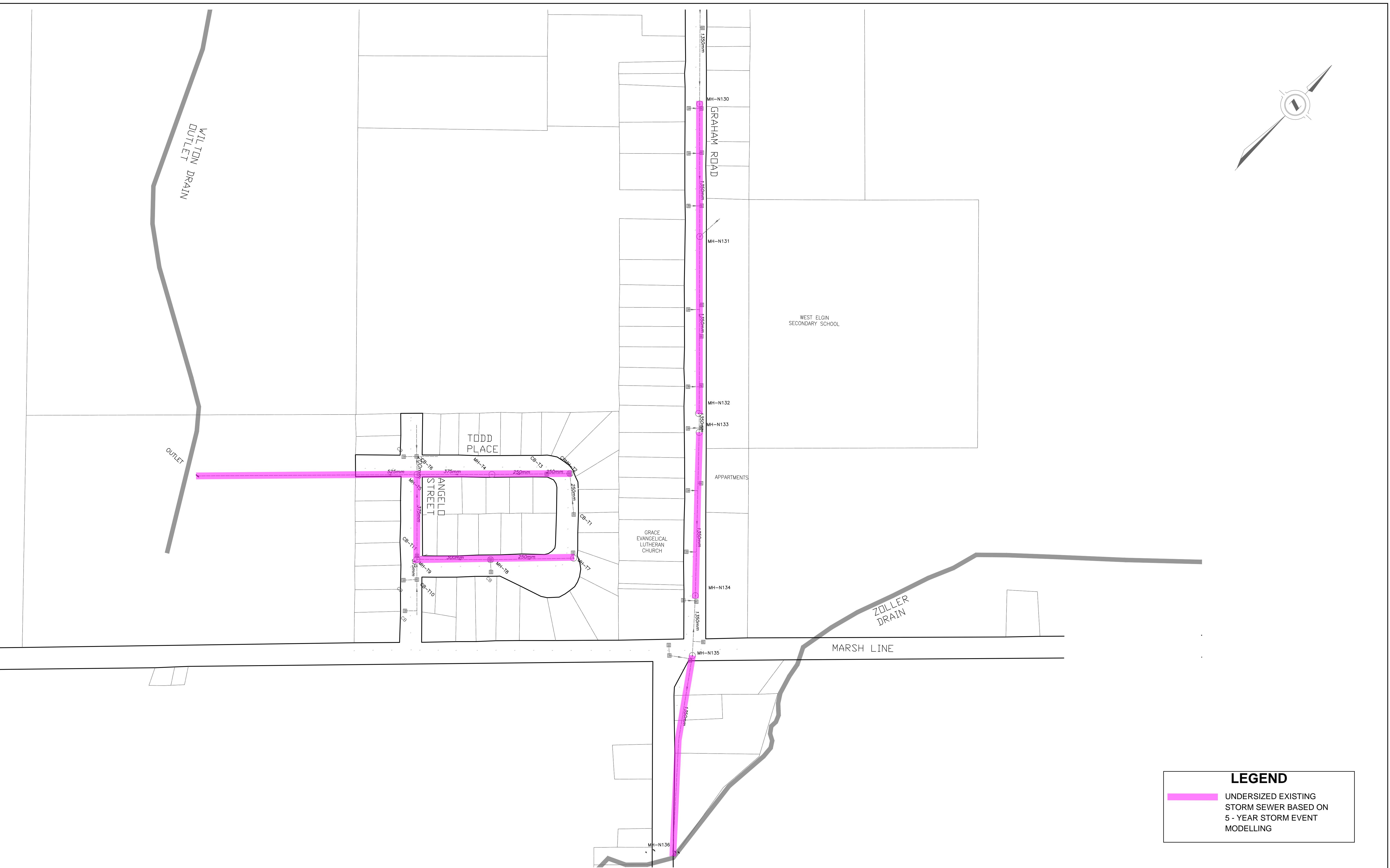
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# **SUMMARY OF EXISTING UNDERSIZED STORM SEWERS**

**PROJECT No.**

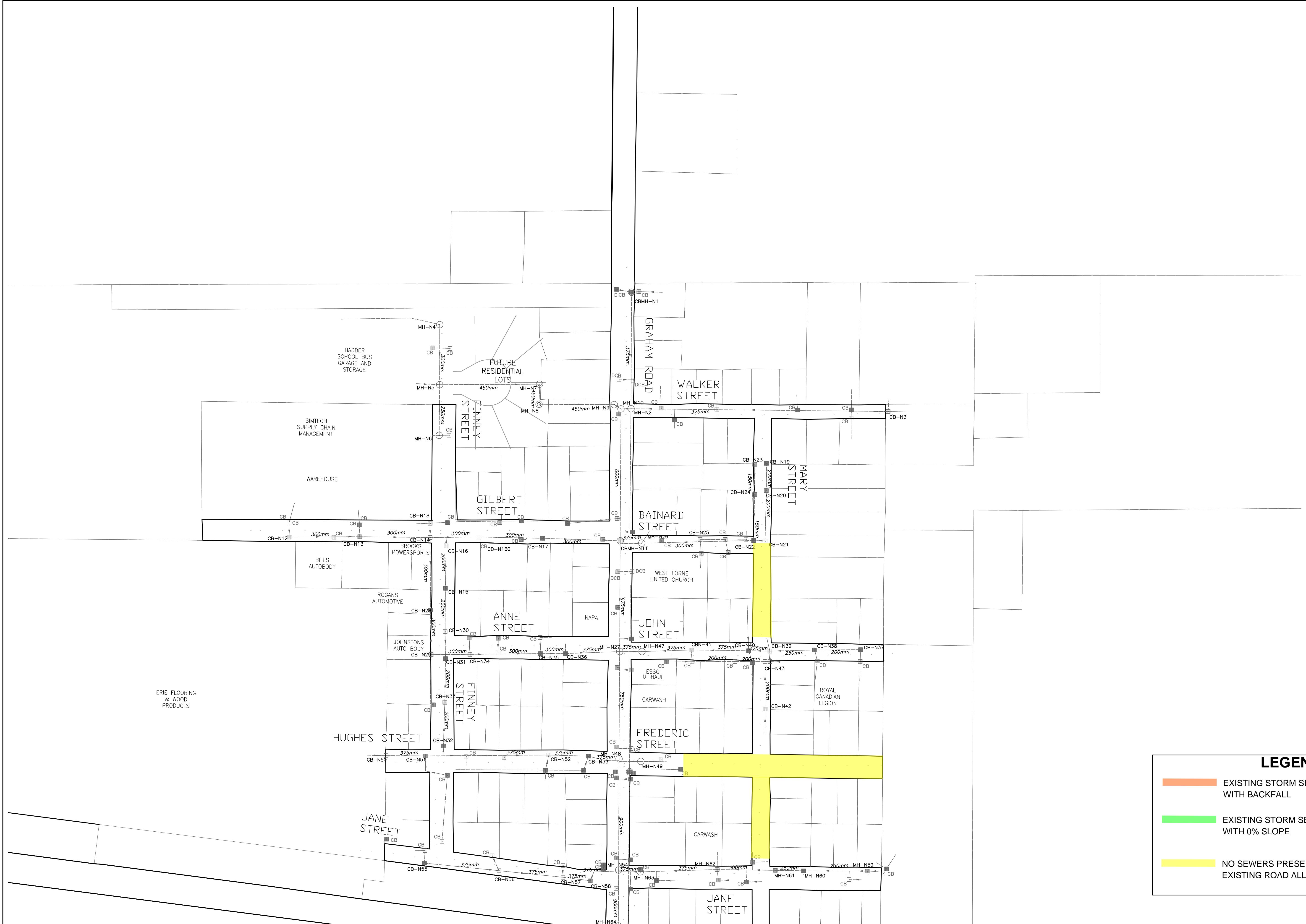
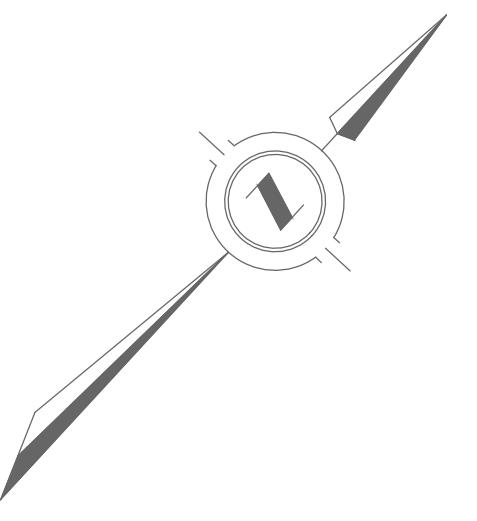
**223197**  
**FIGURE**  
**NO. 11**

**NO. 11**



# MUNICIPALITY OF **West Elgin**

SCALE HORZ. 1:2500	TITLE <b>WEST LORNE STORM SEWER STUDY</b>	PROJECT No. <b>223197</b>
25.0m 0 50.0m  HORIZONTAL	SUMMARY OF EXISTING UNDERSIZED STORM SEWERS	FIGURE NO. 12 PLAN FILE No.



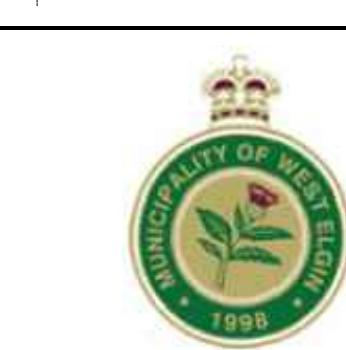
**LEGEND**

- EXISTING STORM SEWERS WITH BACKFALL
- EXISTING STORM SEWERS WITH 0% SLOPE
- NO SEWERS PRESENT WITHIN EXISTING ROAD ALLOWANCE

EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN JACSL				
					DRAWN BY PM				
					CHECKED CSL				
					APPROVED CSL				
					DATE NOV. 2023				

**SPRIET ASSOCIATES**  
LONDON CONSULTING ENGINEERS  
155 YORK STREET -- LONDON (519) 672-4100 -- N6A 1A8

ENGINEER'S STAMP



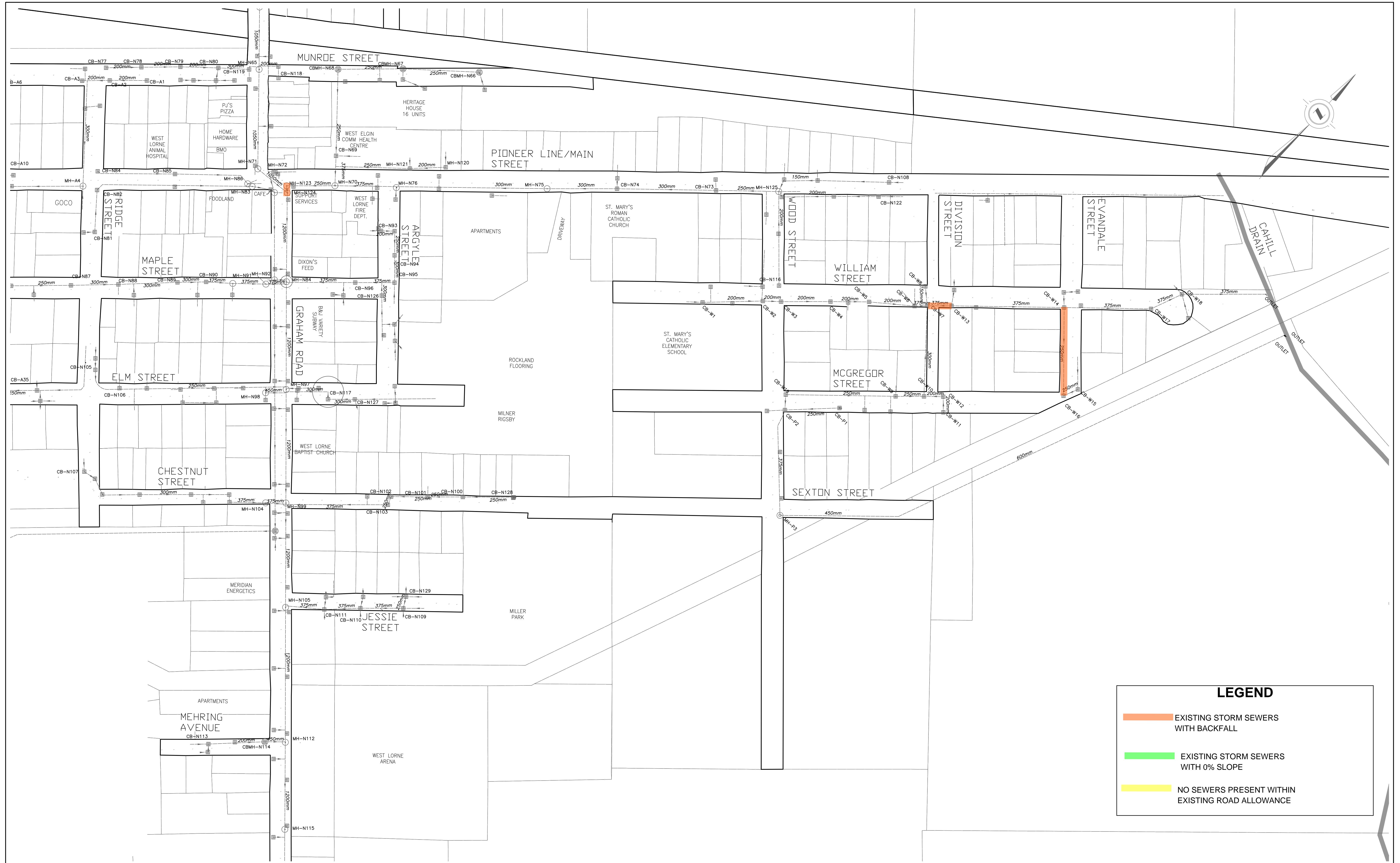
MUNICIPALITY OF  
**West Elgin**  
1998

SCALE  
HORZ. 1:1500  
15.0m 0 30.0m  
HORIZONTAL

PROJECT No.  
**223197**  
FIGURE  
No. 13  
PLAN FILE No.

TITLE  
**WEST LORNE STORM SEWER STUDY**  
SUMMARY OF EXISTING  
STORM SYSTEM DEFICIENCIES





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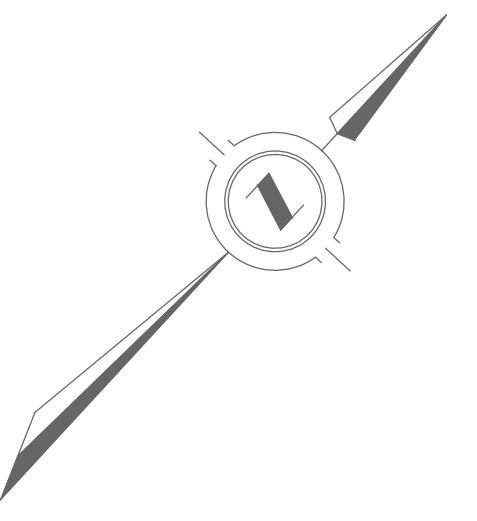
# MUNICIPALITY OF **West Elgin**

SCALE HORZ. 1:2500	TITLE <b>WEST LORNE STORM SEWER STUDY</b>	PROJECT No. <b>223197</b>
25.0m 0 50.0m		FIGURE NO. 15



# MUNICIPALITY OF **West Elgin**

SCALE HORZ. 1:2500	TITLE <b>WEST LORNE STORM SEWER STUDY</b>	PROJECT No. <b>223197</b>
 25.0m 0 50.0m	<b>SUMMARY OF EXISTING STORM SYSTEM DEFICIENCIES</b>	FIGURE NO. 16



PROJECT No. <b>223197</b>	SCALE HORZ. 1:1500	TITLE <b>WEST LORNE STORM SEWER STUDY</b>
FIGURE <b>NO. 17</b>	15.0m 0 30.0m HORIZONTAL	SUMMARY OF EXISTING MUNICIPAL DRAINS

PLAN FILE No.

<b>LEGEND</b>	
WILTON DRAIN	
GRAHAM STREET DRAIN	
FINNEY STREET DRAIN	
FINNEY STREET DRAIN BRANCH 'A'	
MARY STREET DRAIN	
JOHN STREET DRAIN	
TRIGGER DRAIN	
WILLIAM STREET DRAIN	
PAGE STREET DRAIN	
MILLER DRAIN	
CAHILL DRAIN	
DEWSNAP DRAIN	
MAIN STREET DRAIN	
ZOLLER DRAIN	



# MUNICIPALITY OF **West Elgin**

**TITLE**

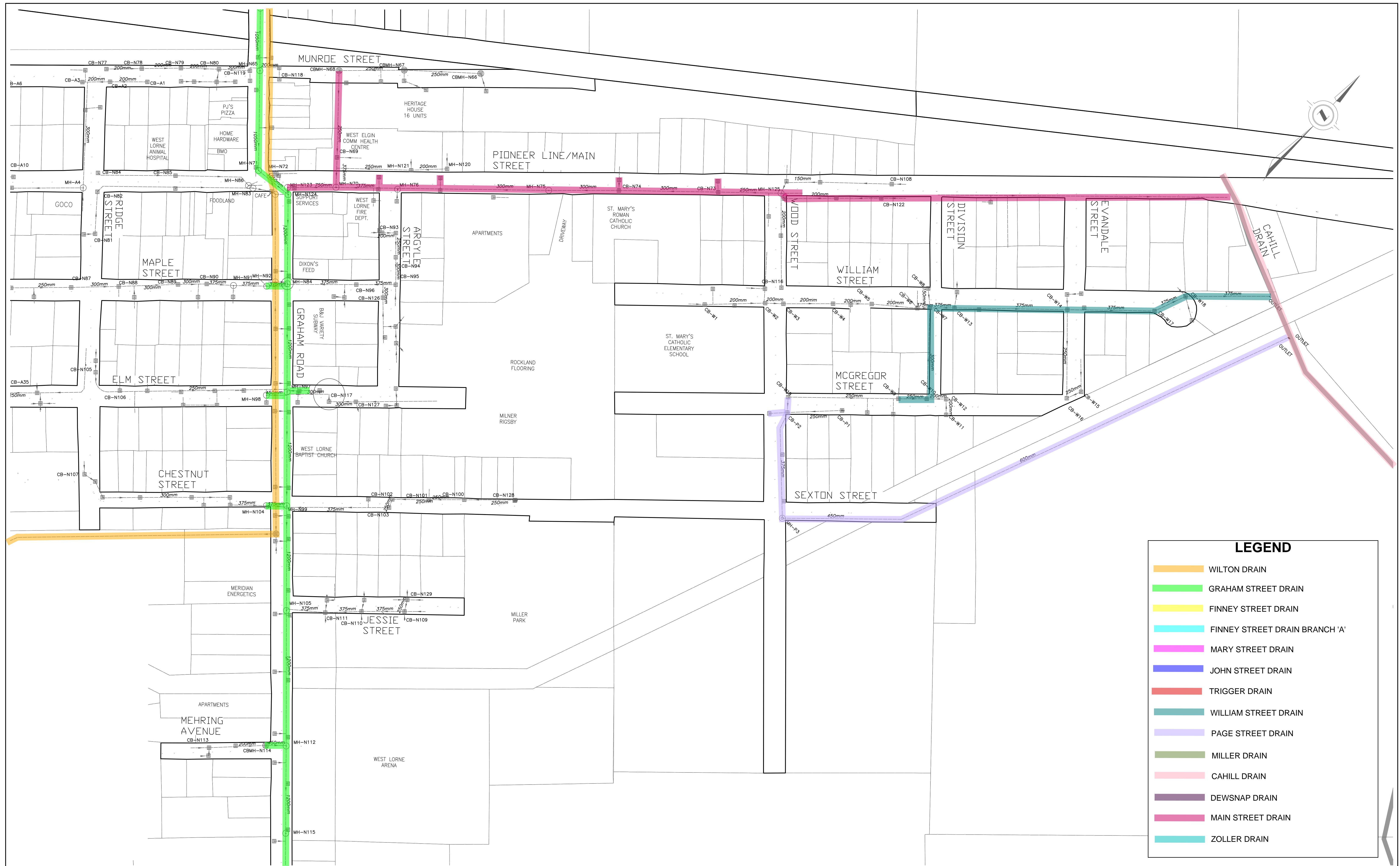
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**WEST LORNE STORM SEWER STUDY**

---

**SUMMARY OF EXISTING  
MUNICIPAL DRAINS**

PROJECT No.	223197
FIGURE NO. 18	
PLAN FILE No.	



# **SPRIET ASSOCIATES**

LONDON

**CONSULTING**

155 YORK STREET -- LONDON



LIMITED

**ENGINEERS**

(519) 672-4100 -- N6A 1A8



# MUNICIPALITY OF **West Elgin**

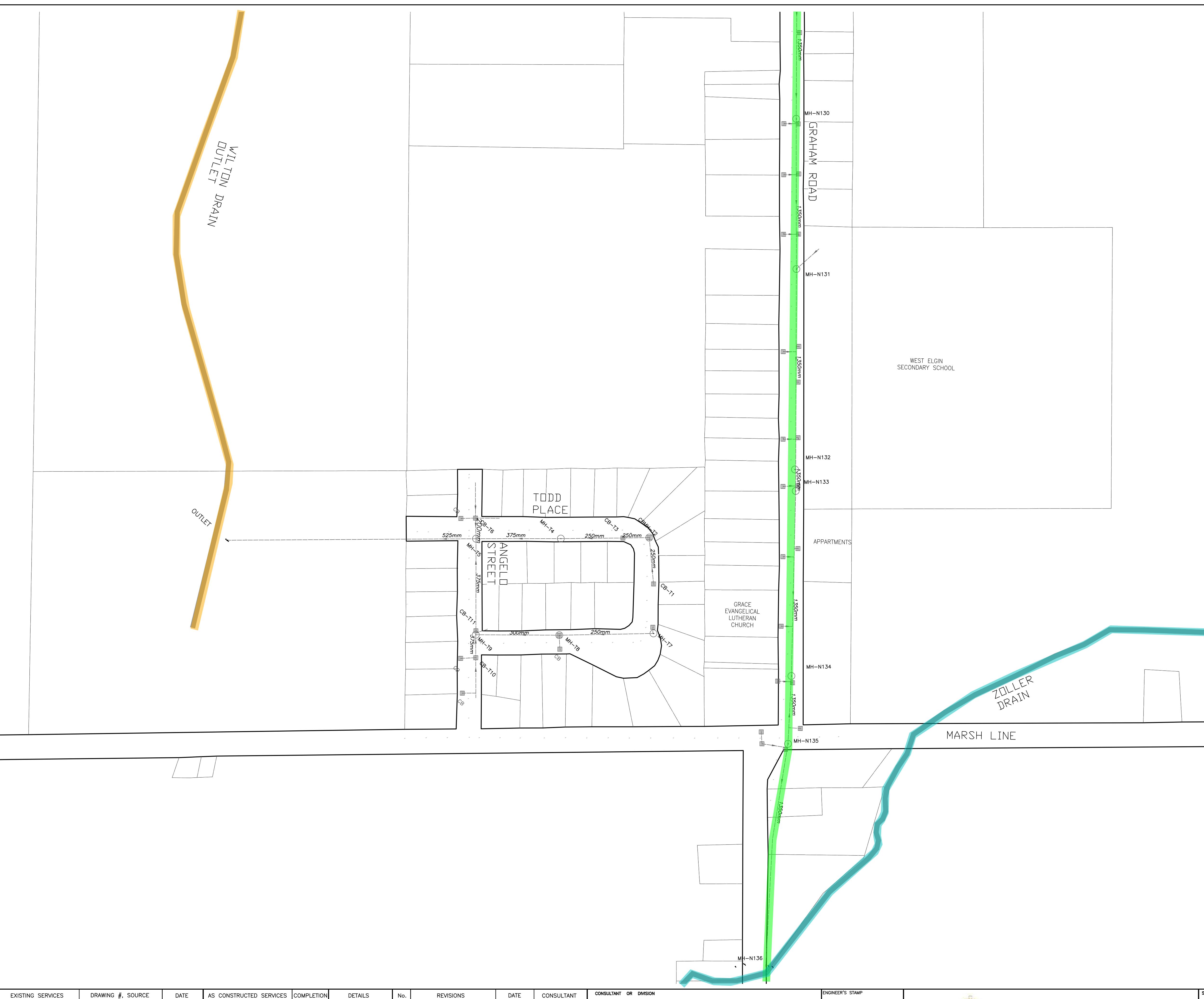
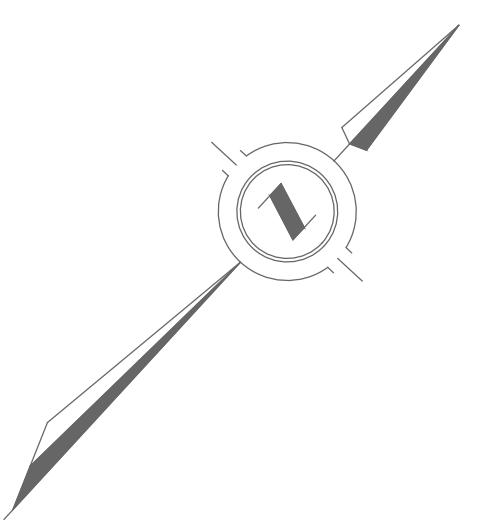
**TITLE**

**WEST LORNE STORM SEWER STUDY**

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**SUMMARY OF EXISTING  
MUNICIPAL DRAINS**

**PROJECT No.**  
**223197**  
**FIGURE**  
**NO. 19**



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN J.A.CSL				
					DRAWN BY PM				
					CHECKED CSL				
					APPROVED CSL				
					DATE NOV. 2023				

EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN J.A.CSL				
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					DATE NOV. 2023				

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155 YORK STREET --- LONDON (519) 672-4100 --- N6A 1A8

ENGINEER'S STAMP



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**West Elgin**

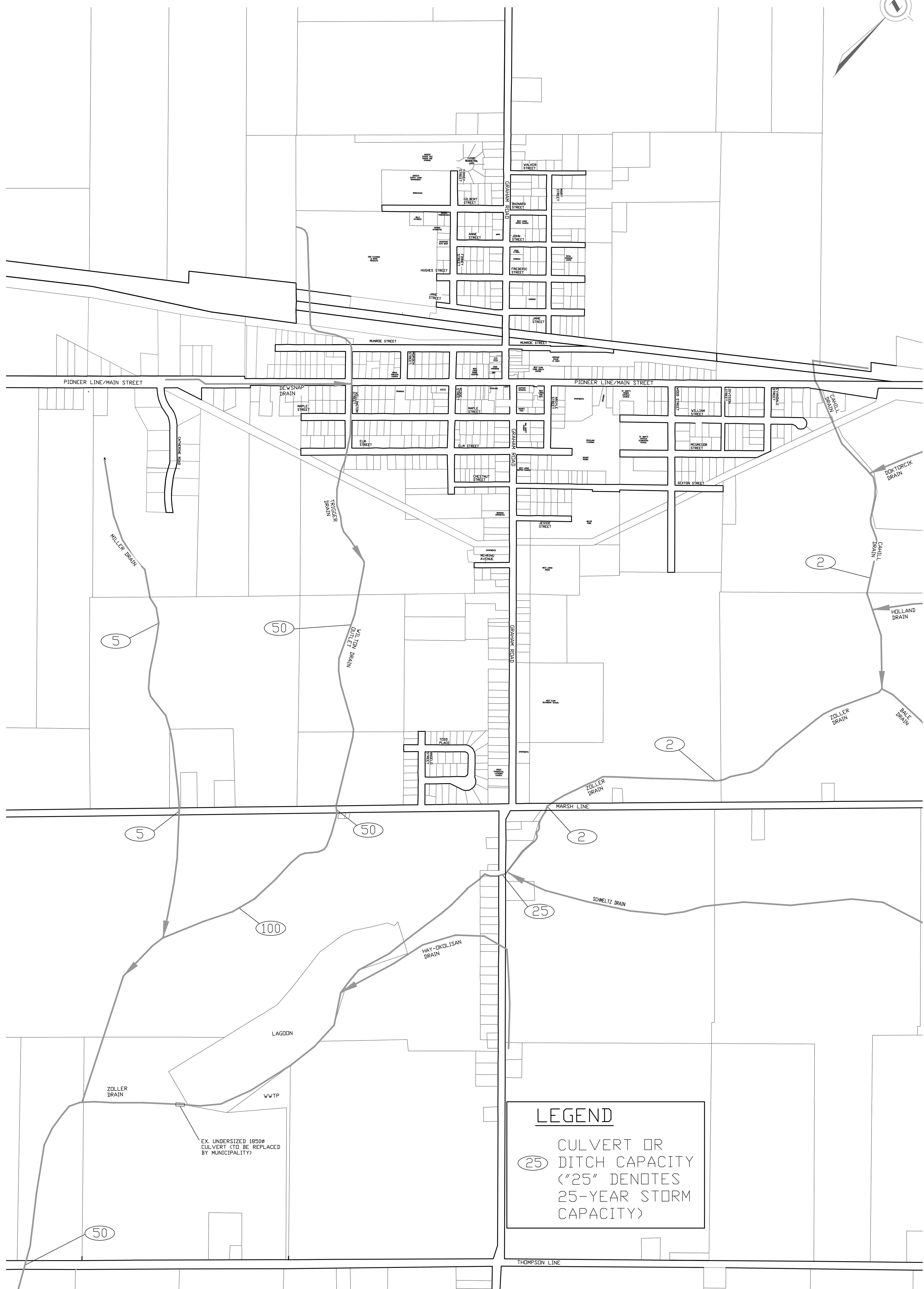
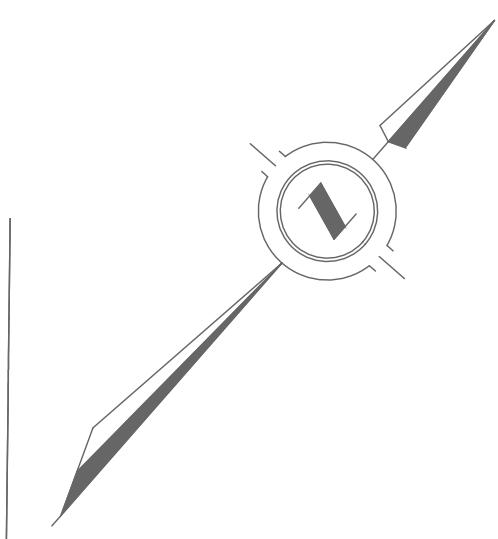
SCALE  
HORZ. 1:2500  
25.0m 0 50.0m  
HORIZONTAL

PROJECT No.  
**223197**  
FIGURE  
No. 20  
PLAN FILE No.

TITLE  
**WEST LORNE STORM SEWER STUDY**  
SUMMARY OF EXISTING  
MUNICIPAL DRAINS

223197-EXISTING

# WEST LORNE



CONSULTANT OR DIVISION

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(519) 672-4100 -- N6A 1A8



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SCALE  
HORZ. 1:5000

50.0m 0 100.0m  
HORIZONTAL

TITLE  
WEST LORNE STORM SEWER STUDY

PROJECT No.  
223197

SHEET No.

FIGURE 21

MUNICIPAL DRAIN CAPACITY MAP

PLAN FILE No.

**APPENDIX 'D'**

**TYPICAL PHOTOS**



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*Image 1: Roadway flooding fronting the West Elgin Community Health Centre on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm  
Proposed Storm Sewer Diameter: 825mm*



*Image 2: Roadway flooding adjacent to St. Mary's Roman Catholic Church on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm  
Proposed Storm Sewer Diameter: 675mm*



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*Image 3: Roadway flooding fronting 128 Pioneer Line on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm  
Proposed Storm Sewer Diameter: 675mm*



*Image 4: Roadway flooding at St. Mary's Roman Catholic Church on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm  
Proposed Storm Sewer Diameter: 675mm*



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*Image 5: Roadway flooding at 134 Pioneer Line on July 29, 2023*  
*Existing Storm Sewer Diameter: 300mm*  
*Proposed Storm Sewer Diameter: 675mm*



*Image 6: Roadway flooding at 167 Pioneer Line on July 29, 2023*  
*Existing Storm Sewer Diameter: 150mm*  
*Proposed Storm Sewer Diameter: 450mm*



*Image 7: Roadway flooding at corner of Finney Street and Gilbert Street on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm*

*Proposed Storm Sewer Diameter: 600mm*



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*Image 8: Roadway flooding at the corner of Finney Street and Gilbert Street on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm*

*Proposed Storm Sewer Diameters: 525mm and 600mm*



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*Image 9: Roadway flooding on Anne Street looking towards Finney Street on July 29, 2023*

*Existing Storm Sewer Diameter: 300mm*

*Proposed Storm Sewer Diameters: 450mm and 525mm*



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*Image 10: Flooding within swale adjacent to 10990 Graham Road on July 29, 2023*



*Image 11: Flooding within swale adjacent to 10990 Graham Road on July 29, 2023*



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