Appendix A

Servicing Guidelines Checklist & Concept Plan

DEVELOPMENT SERVICING STUDY CHECKLIST

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☐	Date and revision number of the report.	Title Page
☐	Location map and plan showing municipal address, boundary, and layout of proposed development.	Figure 1
☐	Plan showing the site and location of all existing services.	Figures 2/3/4
☐	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0 & Section 2.0
☐	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.4
☐	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	All sections
☐	Statement of objectives and servicing criteria.	Section 1.0 & Section 3.2, Section 4.2, and Section 5.2
☐	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, Section 4.1, and Section 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Sections 1.1 & 1.2
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Drawing 1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	*MSS*
☐	Proposed phasing of the development, if applicable.	N/A. Depends on landowner preferred timing
☐	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.1 & Section 2.1
☐	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	All Figures

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	Section 3.2
☐	Availability of public infrastructure to service proposed development	MSS & Section 3.2
☐	Identification of system constraints	MSS & Section 3.2
☐	Identify boundary conditions	Detailed hydraulic assessment N/A for FSR

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Confirmation of adequate domestic supply and pressure	MSS. Detailed hydraulic assessment N/A for FSR.
☐	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	MSS. Detailed hydraulic assessment N/A for FSR.
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Detailed hydraulic assessment N/A for FSR.
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	Detailed hydraulic assessment N/A for FSR.
☐	Address reliability requirements such as appropriate location of shut-off valves	Detailed hydraulic assessment N/A for FSR.
☐	Check on the necessity of a pressure zone boundary modification	MSS.
☐	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	MSS. Detailed hydraulic assessment N/A for FSR.
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	MSS, Section 3.2 & Figure 5. Detailed hydraulic assessment N/A for FSR.
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	MSS.
☐	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2, Appendix C
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Detailed hydraulic assessment N/A for FSR.

4.3 Development Servicing Report: Wastewater		
☐	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	MSS
☐	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1 & 4.2
☐	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	MSS, Section 4.2, Appendix D
☐	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Appendix D
☐	Description of proposed sewer network including sewers, pumping stations, and forcemains.	MSS, Section 4.2, Appendix C & Figure 3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	MSS
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☐	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 1.1 & Section 5.1
☐	Analysis of available capacity in existing public infrastructure.	MSS & Section 5.3
☐	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Figure 5, Appendix B
☐	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	MSS, Section 5.2
☐	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	MSS & Section 5.2
☐	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	MSS, Section 5.3, & Figure 5
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	MSS, Section 5.3
☐	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	MSS, Section 5.2, Section 5.3 & Section 5.4
☐	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	*MSS,* Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	MSS, Section 5.3
☐	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	*MSS*
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	Section 5.3
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.3, Appendix E & Figure 2

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	MSS
☐	Identification of municipal drains and related approval requirements.	N/A
☐	Descriptions of how the conveyance and storage capacity will be achieved for the development.	*MSS,* Section 5.5
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	MSS, Section 5.3 & Drawing 1
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	*MSS & EUC Pond 1 North Main Cell and North Forebay Modifications (DSEL, August 31, 2020)*
☐	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	MSS
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	Section 1.1 & 5.6

4.5 Approval and Permit Requirements: Checklist		
☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	Section 1.2
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 1.2

4.6 Conclusion Checklist		
☐	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A first submission
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	Section 8.0

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

SKETCH TO ILLUSTRATE UNIT LAYOUT ON

PHASE 1, 2, 3 and 4
TRAILS EDGE NORTH
CITY OF OTTAWA

Prepared by Annis , O'Sullivan , Vollebekk Ltd.
August 13, 2020

Scale 1 : 1250
50 37.5 25 12.5 0 25 50 Metres

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

LEGEND

31 Foot Product (9.45) =	109 Units	(32%)
35 Foot Product (10.67) =	190 Units	(56%)
44 Foot Product (13.41) =	35 Units	(10%)
50 Foot Product (15.24) =	6 Units	(2%)
TOTAL SINGLE UNITS = 340		
Townhomes =	529 Units	
Back to Back Towns =	114 Units	

TABLE TO ILLUSTRATE PROPOSED LAND USE

PROPOSED USE	NUMBER OF UNITS	UNITS	AREA (Ha/Ac)
SINGLE 9.45 (31 FOOT)	109	32%	12.37 / 30.57
SINGLE 10.67 (35 FOOT)	190	56%	
SINGLE 13.41 (44 FOOT)	35	10%	
SINGLE 15.24 (50 FOOT)	6	2%	
SUB TOTAL SINGLES	340	100%	
TOWNS (3X5)	15		12.05 / 29.78
TOWNS (4X41)	164		
TOWNS (5X28)	140		
TOWNS (6X35)	210		
SUB TOTAL TOWNS	529		
BACK TO BACK	114		1.45 / 3.59
HIGH DENSITY	BLOCKS 36, 80 AND 81		11.11 / 27.45
STREETS			15.49 / 38.28
PARKS			6.41 / 15.84
WALKWAYS			0.12 / 0.28
EMPLOYMENT LANDS	BLOCKS 76, 77 AND 78		19.34 / 47.79
OTHER	BLOCKS 52		3.65 / 9.03
SITE TOTAL	...		81.99 / 202.6

REVISION SCHEDULE

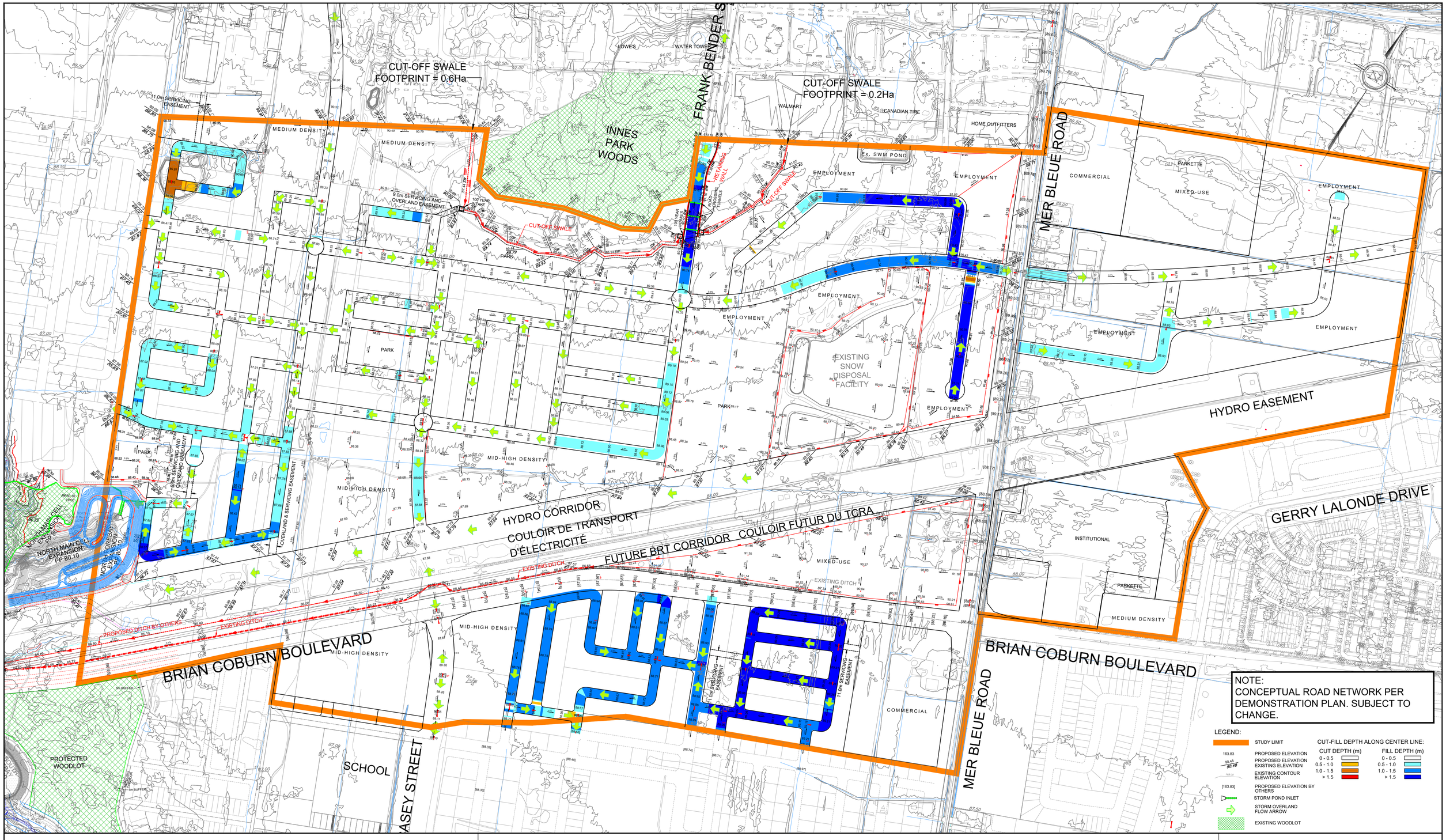
NO.	REVISION	DATE	BY
4	REVISIONS	AUG. 13, 2020	N
3	REVISIONS	AUG. 7, 2020	AR/N
2	REVISIONS	JULY 16, 2020	N
1	PLAN PREPARED	JAN 6, 2020	N

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 18818-19 Richcraft Pt Lts 1-4 C3 OF GL DPS D2 | N

Appendix B

Excerpts from Supporting EUC Phase 3 Area CDP MSS (DSEL, Dec 2020)



DSEL
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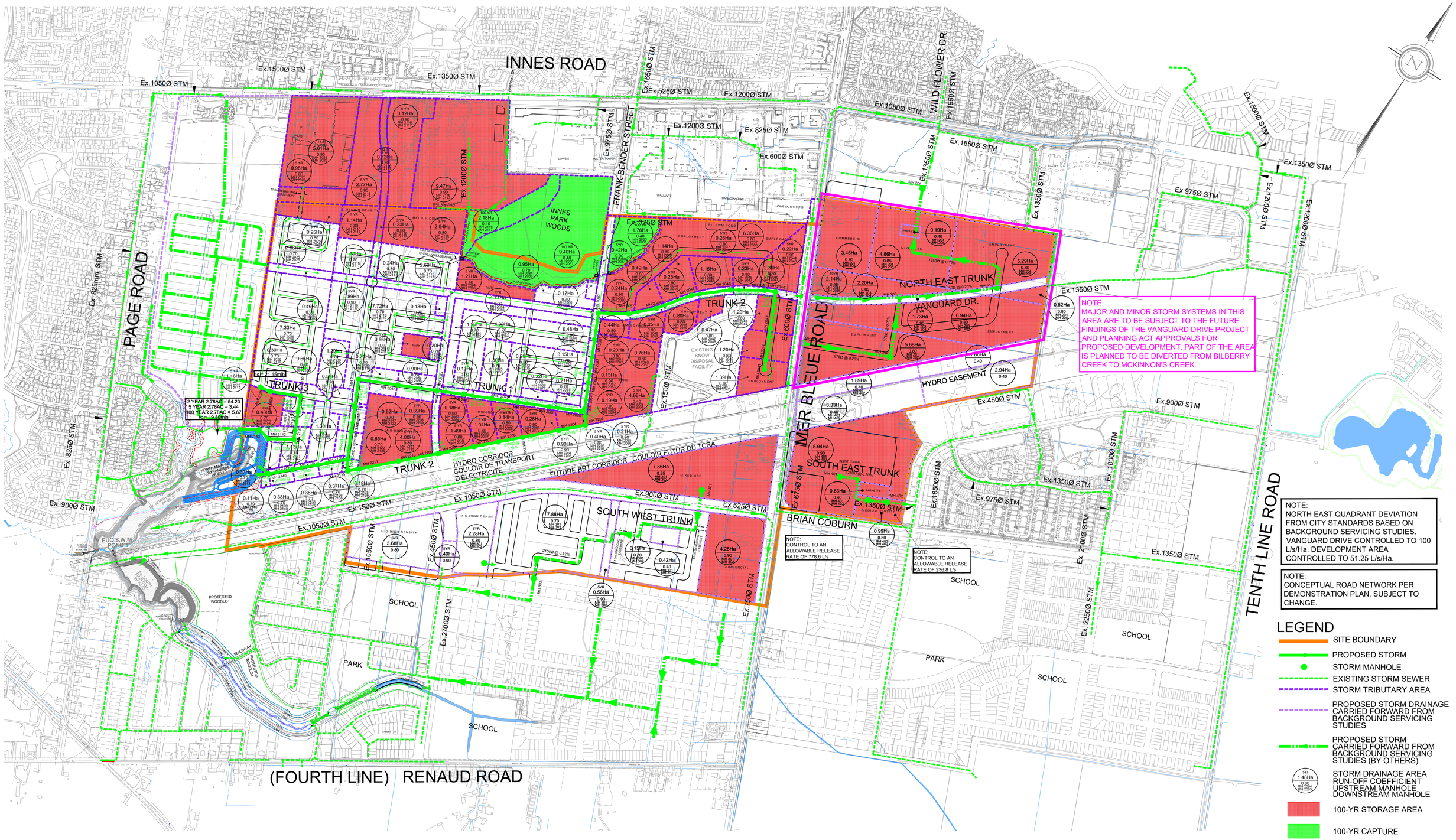
EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
GRADING PLAN

PROJECT No. :	14-733
SCALE	1:4000
DATE:	OCTOBER 2019
DRAWING No.	2



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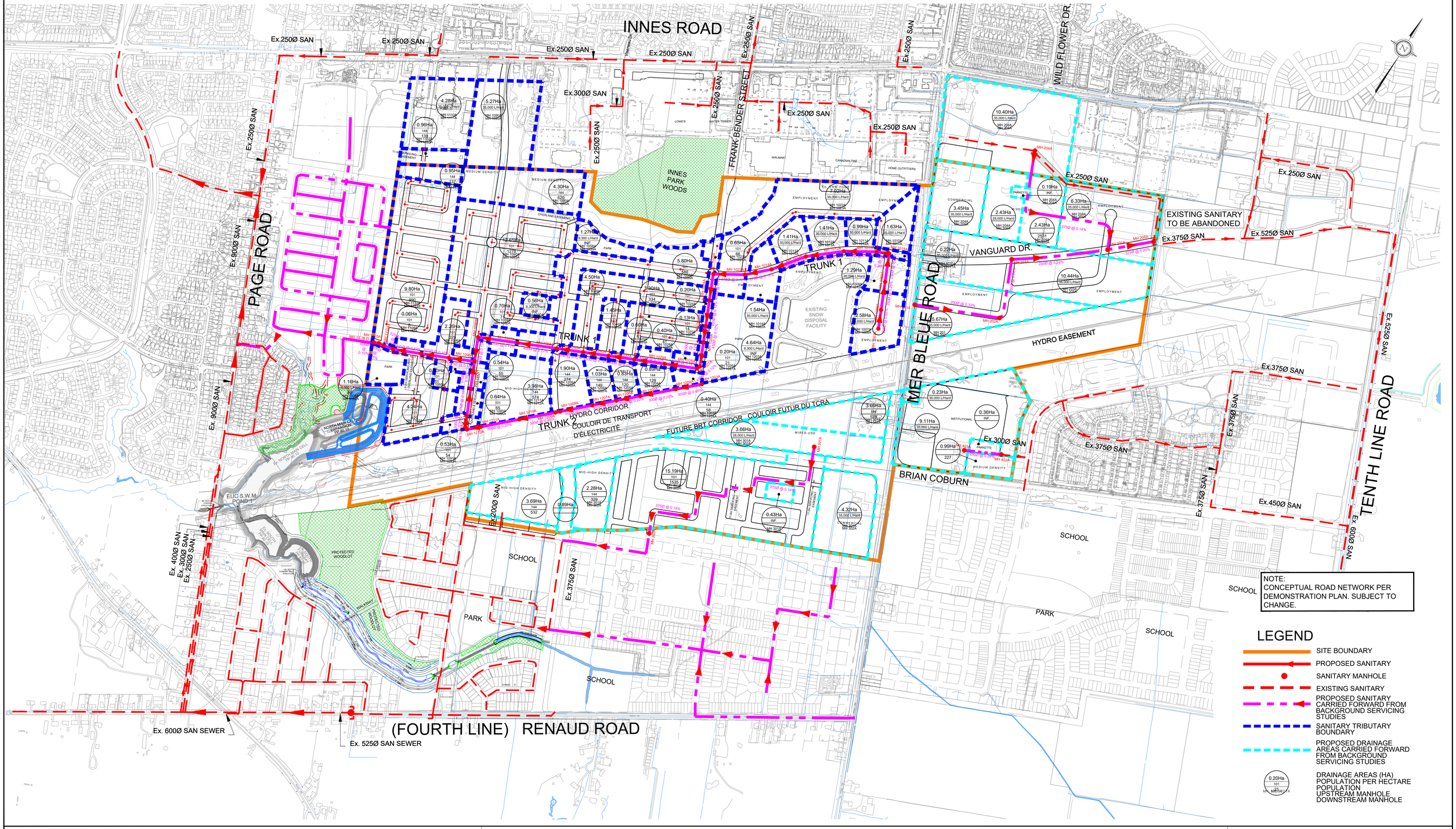
EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
CONCEPTUAL STORM SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	OCTOBER 2019
DRAWING No.	4



NOTE:
CONCEPTUAL ROAD NETWORK PER DEMONSTRATION PLAN. SUBJECT TO CHANGE.

LEGEND

- SITE BOUNDARY
- PROPOSED SANITARY
- SANITARY MANHOLE
- EXISTING SANITARY
- PROPOSED SANITARY CARRIED FORWARD FROM BACKGROUND SERVICING STUDIES
- SANITARY TRIBUTARY BOUNDARY
- PROPOSED DRAINAGE AREAS CARRIED FORWARD FROM BACKGROUND SERVICING STUDIES
- DRAINAGE AREAS (HA) POPULATION PER HECTARE POPULATION UPSTREAM MANHOLE DOWNSTREAM MANHOLE

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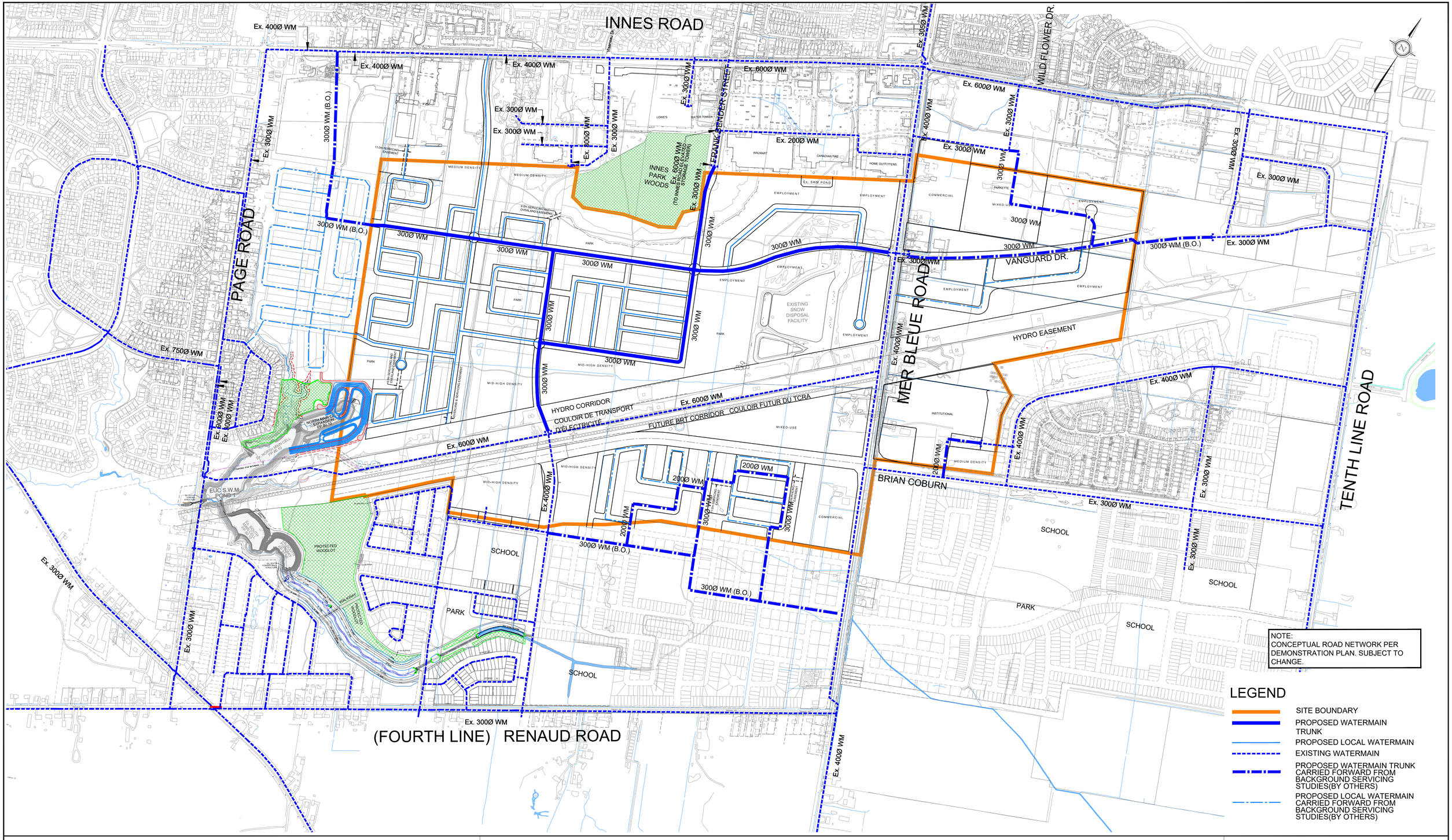
EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
CONCEPTUAL SANITARY SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	OCTOBER 2019
DRAWING No.	5



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EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
WATERMAIN SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	OCTOBER 2019
DRAWING No.	6

Appendix C

Water Demand Calculations

Richcraft Homes
Trails Edge North
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	340	1156
Townhouse	2.7	529	1429
B2B	2.7	114	308
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	-	0
3 Bedroom	3.1	-	0
Average	1.8	1,059	1907

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4800	1344.0	933.3	2688.0	1866.7	4032.0	2800.0

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Empoyment	35,000.0 L/ha/d	19.34	676.90	470.1	1015.4	705.1	1827.6	1269.2
Parks	9,300 L/ha/d	6.41	59.61	41.4	89.4	62.1	161.0	111.8
Total I/CI Demand			736.5	511.5	1104.8	767.2	1988.6	1381.0
Total Demand			**2080.5**	**1444.8**	**3792.8**	**2633.9**	**6020.6**	**4181.0**

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	319	1085
Townhouse	2.7	746	2015
B2B	2.7	-	0
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	252	530
3 Bedroom	3.1	-	0
Average	1.8	688	1239

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4869	1363.3	946.8	2726.6	1893.5	4090.0	2840.3

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Empoyment	35,000.0 L/ha/d	19.42	679.70	472.0	1019.6	708.0	1835.2	1274.4
Parks	9,300 L/ha/d	6.26	58.22	40.4	87.3	60.6	157.2	109.2
Total I/CI Demand			737.9	512.4	1106.9	768.7	1992.4	1383.6
Total Demand			**2101.2**	**1459.2**	**3833.5**	**2662.2**	**6082.3**	**4223.8**

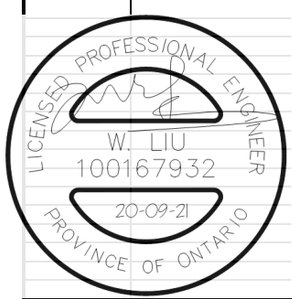
Appendix D

Sanitary Servicing Design

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION			TOTAL	PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
TRUNK 2																											
	1203A	1204A	0.36		52	0.36	52	3.6	0.61		0.00		0.00	4.59	4.59	0.74	4.95	4.95	1.63	2.99	81.0	300	0.65	77.96	0.04	1.10	0.52
	1204A	1205A	0.75		108	1.11	160	3.5	1.84		0.00		0.00		4.59	0.74	0.75	5.70	1.88	4.46	111.0	300	0.20	43.25	0.10	0.61	0.39
	1205A	1206A	0.77		111	1.88	271	3.5	3.05		0.00		0.00		4.59	0.74	0.77	6.47	2.14	5.93	74.0	300	0.20	43.25	0.14	0.61	0.43
	1206A	1207A	0.97		140	2.85	411	3.4	4.55		0.00		0.00		4.59	0.74	0.97	7.44	2.46	7.74	75.0	300	0.20	43.25	0.18	0.61	0.46
	1207A	1208A				2.85	411	3.4	4.55		0.00		0.00		4.59	0.74	0.00	7.44	2.46	7.74	100.5	300	0.20	43.25	0.18	0.61	0.46
	1208A	1209A	1.77		255	4.62	666	3.3	7.18		0.00		0.00		4.59	0.74	1.77	9.21	3.04	10.96	14.5	300	0.20	43.25	0.25	0.61	0.51
	1209A	1210A	1.64		237	6.26	903	3.3	9.55		0.00		0.00		4.59	0.74	1.64	10.85	3.58	13.87	112.5	300	0.20	43.25	0.32	0.61	0.54
	1210A	1211A	2.83		408	9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	2.83	13.68	4.51	18.75	120.0	300	0.20	43.25	0.43	0.61	0.59
	1211A	1212A				9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	0.00	13.68	4.51	18.75	43.5	300	0.20	43.25	0.43	0.61	0.59
	1212A	1091A				9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	0.00	13.68	4.51	18.75	10.0	300	0.20	43.25	0.43	0.61	0.59
	1091A	1093A				9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	0.00	13.68	4.51	18.75	33.5	300	0.20	43.25	0.43	0.61	0.59
	1093A	1094A	1.16		118	10.25	1429	3.2	14.61		0.00		0.00		4.59	0.74	1.16	14.84	4.90	20.25	84.0	450	0.12	98.76	0.21	0.62	0.49
	1094A	1095A	0.52		53	10.77	1482	3.1	15.11		0.00		0.00		4.59	0.74	0.52	15.36	5.07	20.92	81.0	450	0.12	98.76	0.21	0.62	0.49
To TRUNK 1, Pipe 1095A - 1096A						10.77	1482				0.00		0.00		4.59			15.36									
TRUNK 1																											
	1007A	1008A				0.00				1.87	1.87		0.00		0.00	1.14	1.87	1.87	0.62	1.75	58.0	300	0.65	77.96	0.02	1.10	0.44
	1008A	1009A				0.00	0			1.19	3.06		0.00		0.00	1.86	1.19	3.06	1.01	2.87	86.5	300	0.25	48.35	0.06	0.68	0.37
	1009A	1010A				0.00	0			0.90	3.96		0.00		0.00	2.41	0.90	3.96	1.31	3.71	86.5	300	0.25	48.35	0.08	0.68	0.40
	1010A	1011A				0.00	0			2.04	6.00		0.00		0.00	3.65	2.04	6.00	1.98	5.63	46.0	300	0.25	48.35	0.12	0.68	0.46
	1011A	1012A				0.00	0			1.02	7.02		0.00		0.00	4.27	1.02	7.02	2.32	6.58	97.5	375	0.15	67.91	0.10	0.61	0.39
	1012A	1013A				0.00	0			2.12	9.14		0.00		0.00	5.55	2.12	9.14	3.02	8.57	125.5	375	0.15	67.91	0.13	0.61	0.42
	1013A	1014A				0.00	0			2.12	11.26		0.00		0.00	6.84	2.12	11.26	3.72	10.56	88.0	375	0.15	67.91	0.16	0.61	0.45
	1014A	1022A				0.00	0			1.18	12.44		0.00		0.00	7.56	1.18	12.44	4.11	11.66	93.0	375	0.15	67.91	0.17	0.61	0.46
	1022A	1023A				0.00	0			6.81	19.25		0.00		0.00	11.70	6.81	19.25	6.35	18.05	100.5	375	0.15	67.91	0.27	0.61	0.52
	1023A	1024A	0.72		73	0.72	73	3.6	0.86		19.25		0.00		0.00	11.70	0.72	19.97	6.59	19.14	82.0	450	0.12	98.76	0.19	0.62	0.48
	1024A	1025A	0.19		20	0.91	93	3.6	1.09		19.25		0.00		0.00	11.70	0.19	20.16	6.65	19.44	79.0	450	0.12	98.76	0.20	0.62	0.48
	1025A	1026A	0.14		15	1.05	108	3.6	1.26		19.25		0.00		0.00	11.70	0.14	20.30	6.70	19.65	58.0	450	0.12	98.76	0.20	0.62	0.48
	1026A	1027A	0.24		25	1.29	133	3.6	1.54		19.25		0.00		0.00	11.70	0.24	20.54	6.78	20.01	63.5	450	0.12	98.76	0.20	0.62	0.49
	1027A	1028A				1.29	133	3.6	1.54		19.25		0.00		0.00	11.70	0.00	20.54	6.78	20.01	25.0	450	0.12	98.76	0.20	0.62	0.49
	1028A	1029A	0.52		53	1.81	186	3.5	2.13		19.25		0.00		0.00	11.70	0.52	21.06	6.95	20.77	93.0	450	0.12	98.76	0.21	0.62	0.49
	1029A	1037A	0.48		49	2.29	235	3.5	2.66		19.25		0.00		0.00	11.70	0.48	21.54	7.11	21.47	93.0	450	0.12	98.76	0.22	0.62	0.49
	1037A	1040A	3.56		360	5.85	595	3.3	6.45		19.25		0.00		0.00	11.70	3.56	25.10	8.28	26.43	79.0	450	0.12	98.76	0.27	0.62	0.52
	1040A	1049A	1.54		156	7.39	751	3.3	8.03		19.25		0.00		0.00	11.70	1.54	26.64	8.79	28.52	79.0	450	0.12	98.76	0.29	0.62	0.53
	1049A	1058A	4.52		457	11.91	1208	3.2	12.51		19.25		0.00		0.00	11.70	4.52	31.16	10.28	34.49	81.0	450	0.12	98.76	0.35	0.62	0.56
	1058A	1059A	5.68		574	17.59	1782	3.1	17.90		19.25		0.00	1.37	1.37	11.92	7.05	38.21	12.61	42.43	121.5	450	0.12	98.76	0.43	0.62	0.60
	1059A	1090A	0.46		47	18.05	1829	3.1	18.33		19.25		0.00		1.37	11.92	0.46	38.67	12.76	43.01	121.5	450	0.12	98.76	0.44	0.62	0.60
			2.41		348	20.46	2177			5.07	24.32		0.00	0.59	1.96		8.07	46.74									
	1090A	1095A	14.50		1465	34.96	3642	2.9	34.18		24.32		0.00		1.96	15.09	14.50	61.24	20.21	69.48	68.5	450	0.15	110.42	0.63	0.69	0.73
Contribution From TRUNK 1, Pipe 1094A - 1095A						10.77	1482				0.00		0.00		4.59		15.36	76.60									
	1095A	1096A	0.50		51	46.23	5175	2.8	46.71		24.32		0.00		6.55	15.84	0.50	77.10	25.44	87.98	79.5	525	0.12	148.98	0.59	0.69	0.72
	1096A	1107A	1.98		200	48.21	5375	2.8	48.30		24.32		0.00		6.55	15.84	1.98	79.08	26.10	90.23	76.0	525	0.10	136.00	0.66	0.63	0.67
			1.91		276	50.12	5651				24.32		0.00		6.55		1.91	80.99									
			4.43		448	54.55	6099				24.32		0.00		6.55		4.43	85.42									
	1107A	1108A	9.77		987	64.32	7086	2.7	61.57	4.28	28.60		0.00		6.55	18.44	14.05	99.47	32.83	112.83	97.5	525	0.22	201.72	0.56	0.93	0.95
	1108A	1133A	0.31		32	64.63	7118	2.7	61.81		28.60		0.00	1.16	7.71	18.62	1.47	100.94	33.31	113.75	47.5	600	0.22	288.00	0.39	1.02	0.96
	1133A	1A (B.O.)				64.63	7118	2.7	61.81		28.60		0.00		7.71	18.62	0.00	100.94	33.31	113.75	15.5	600	0.10	194.17	0.59	0.69	0.71



DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	35000	L/ha/da	0.4051	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013 (Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.41	l/s/Ha			Single house coeff=	3.4	

Designed:	V.W.	PROJECT:	**Trailsedge North**
Checked:	W.L.	LOCATION:	**City of Ottawa**
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No.		File Ref: 20-1195	Date: **21 Sep 2020**
			Sheet No. 1 of 1

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL (FULL) (m/s)	VEL (ACT.) (m/s)
North West Sanitary Trunk																									
Trunk 1	1007A	1008A			0.00	0			2.58	2.58					1.57	2.58	2.58	0.85	2.42	58.00	200.00	0.65	26.44	0.09	0.84	0.52
COMMERCIAL	1008A	1009A			0.00	0				2.58					1.57	0.00	2.58	0.85	2.42	86.50	250.00	0.25	29.73	0.08	0.61	0.37
COMMERCIAL	1009A	1010A			0.00	0			1.29	3.87					2.35	1.29	3.87	1.28	3.63	86.50	250.00	0.25	29.73	0.12	0.61	0.41
COMMERCIAL					0.00	0			0.22	4.09						0.22	4.09								
COMMERCIAL	1010A	1011A			0.00	0			1.63	5.72					3.48	1.63	5.72	1.89	5.37	39.50	300.00	0.20	43.25	0.12	0.61	0.00
COMMERCIAL	1011A	1012A			0.00	0			0.99	6.71					4.08	0.99	6.71	2.21	6.29	99.50	375.00	0.15	67.91	0.09	0.61	0.38
COMMERCIAL	1012A	1013A			0.00	0			1.41	8.12					4.93	1.41	8.12	2.68	7.61	117.00	375.00	0.15	67.91	0.11	0.61	0.40
COMMERCIAL	1013A	1014A			0.00	0			1.41	9.53					5.79	1.41	9.53	3.14	8.93	112.00	375.00	0.15	67.91	0.13	0.61	0.41
COMMERCIAL	1014A	1022A			0.00	0			1.54	11.07					6.73	1.54	11.07	3.65	10.38	83.50	375.00	0.15	67.91	0.15	0.61	0.44
COMMERCIAL	1022A	1023A			0.00	0			7.02	18.09					10.99	7.02	18.09	5.97	16.96	96.50	375.00	0.15	67.91	0.25	0.61	0.51
	1023A	1024A	0.65	66	0.65	66	3.63	0.78		18.09					10.99	0.65	18.74	6.18	17.95	81.00	450.00	0.12	98.76	0.18	0.62	0.47
	1024A	1025A	0.20	21	0.85	87	3.61	1.02		18.09					10.99	0.20	18.94	6.25	18.26	79.00	450.00	0.12	98.76	0.18	0.62	0.47
	1025A	1026A	0.13	14	0.98	101	3.59	1.18		18.09					10.99	0.13	19.07	6.29	18.46	51.00	450.00	0.12	98.76	0.19	0.62	0.48
	1026A	1027A	0.20	21	1.18	122	3.58	1.42		18.09					10.99	0.20	19.27	6.36	18.77	74.00	450.00	0.12	98.76	0.19	0.62	0.48
	1027A	1028A			1.18	122				18.09					10.99	0.00	19.27	6.36	17.35	11.00	450.00	0.12	98.76	0.18	0.62	0.47
	1028A	1029A	0.40	41	1.58	163	3.54	1.87		18.09					10.99	0.40	19.67	6.49	19.35	100.00	450.00	0.12	98.76	0.20	0.62	0.48
	1029A	1037A	0.60	61	2.18	224	3.50	2.54		18.09					10.99	0.60	20.27	6.69	20.22	94.00	450.00	0.12	98.76	0.20	0.62	0.48
	1037A	1040A	3.30	334	5.48	558	3.36	6.08		18.09					10.99	3.30	23.57	7.78	24.85	79.00	450.00	0.12	98.76	0.25	0.62	0.51
	1040A	1049A	1.45	147	6.93	705	3.31	7.56		18.09					10.99	1.45	25.02	8.26	26.81	79.00	450.00	0.12	98.76	0.27	0.62	0.52
	1049A	1058A	4.50	455	11.43	1160	3.21	12.07		18.09					10.99	4.50	29.52	9.74	32.80	81.50	450.00	0.12	98.76	0.33	0.62	0.56
PARK	1058A	1059A	5.80	586	17.23	1746	3.10	17.54		18.09			1.27	1.27	11.20	7.07	36.59	12.07	40.81	120.50	450.00	0.12	98.76	0.41	0.62	0.59
	1059A	1090A	0.70	71	17.93	1817	3.09	18.20		18.09				1.27	11.20	0.70	37.29	12.31	41.71	123.00	450.00	0.12	98.76	0.42	0.62	0.59
PARK, EXT FUT			4.30	620	22.23	2437			5.27	23.36			0.56	1.83		10.13	47.42									
	1090A	1095A	12.65	1278	34.88	3715	2.89	34.79		23.36				1.83	14.49	12.65	60.07	19.82	69.10	75.00	450.00	0.15	110.42	0.63	0.69	0.73
Contribution from Trunk 2, MH 1094A-1095A					10.74	1478				0.00				4.64			15.38									
	1095A	1096A	0.50	51	46.12	5244	2.78	47.24		23.36				6.47	15.24	0.50	75.95	25.06	87.54	79.00	525.00	0.12	148.98	0.59	0.69	0.72
	1096A	1107A	2.26	229	48.38	5473	2.77	49.13		23.36				6.47	15.24	2.26	78.21	25.81	90.18	86.50	525.00	0.10	136.00	0.66	0.63	0.67
	1107A	1108A	4.24	429	52.62	5902	2.74	52.41		23.36				6.47	15.24	4.24	82.45	27.21	94.86	87.00	525.00	0.42	278.71	0.34	1.29	1.16
PARK	1108A	1132A	0.06	8	52.68	5910	2.74	52.48		23.36			1.16	7.63	15.43	1.22	83.67	27.61	95.52	31.50	525.00	0.10	136.00	0.70	0.63	0.68
CONTRIBUTION FROM EXTERNAL			0.96	144	53.64	6054	2.73	53.56	4.42	27.78				7.63		5.38	89.05									
			0.95	137	54.59	6191				27.78				7.63		0.95	90.00									
	1132A	1133A	9.80	990	64.39	7181	2.68	62.37		27.78				7.63	18.11	9.80	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72
	1133A	1A (B.O.)			64.39	7181	2.68	62.37		27.78				7.63	18.11	0.00	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72
To MH 1A By Others																										
Trunk 2																										
PARK	1203A	1204A	0.40	58	0.40	58				0.00			4.64	4.64	0.75	5.04	5.04	1.66	2.41	81.00	300.00	0.65	77.96	0.03	1.10	0.48
	1204A	1205A	0.89	129	1.29	187	3.53	2.14		0.00				4.64	0.75	0.89	5.93	1.96	4.85	111.00	300.00	0.20	43.25	0.11	0.61	0.40
	1205A	1206A	0.83	120	2.12	307	3.46	3.44		0.00				4.64	0.75	0.83	6.76	2.23	6.42	74.00	300.00	0.20	43.25	0.15	0.61	0.44
	1206A	1207A	1.03	149	3.15	456	3.40	5.02		0.00				4.64	0.75	1.03	7.79	2.57	8.34	75.00	300.00	0.20	43.25	0.19	0.61	0.47
	1207A	1208A			3.15	456				0.00				4.64	0.75	0.00	7.79	2.57	3.32	100.50	300.00	0.20	43.25	0.08	0.61	0.37

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT. 18, 2019
PROVINCE OF ONTARIO

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =	0.800		
Average Daily Flow =	280	l/p/day		Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.405	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00			Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%			
Mixed Use	35000.00	L/ha/da					
Institutional =	0.405	l/s/Ha					

Designed: R.B	PROJECT: Orleans EUC MUC		
Checked: K.M	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October, 2019	Sheet No. 1 of 2

Copy of 733_SAN_Oct1819_Opt1_final.xlsx

D1

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
	1208A	1209A	1.90	274	5.05	730	3.31	7.83		0.00				4.64	0.75	1.90	9.69	3.20	11.78	14.50	300.00	0.20	43.25	0.27	0.61	0.51
	1209A	1210A			5.05	730				0.00				4.64	0.75	0.00	9.69	3.20	3.95	112.50	300.00	0.20	43.25	0.09	0.61	0.38
	1210A	1211A			5.05	730				0.00				4.64	0.75	0.00	9.69	3.20	3.95	120.00	300.00	0.20	43.25	0.09	0.61	0.38
	1211A	1212A	3.98	574	9.03	1304	3.18	13.44		0.00				4.64	0.75	3.98	13.67	4.51	18.70	43.50	300.00	0.20	43.25	0.43	0.61	0.59
	1212A	1091A			9.03	1304				0.00				4.64	0.75	0.00	13.67	4.51	5.26	10.00	300.00	0.20	43.25	0.12	0.61	0.41
	1091A	1093A	0.53	54	9.56	1358	3.17	13.95		0.00				4.64	0.75	0.53	14.20	4.69	19.39	33.00	300.00	0.20	43.25	0.45	0.61	0.59
	1093A	1094A	0.64	65	10.20	1423	3.16	14.57		0.00				4.64	0.75	0.64	14.84	4.90	20.22	84.00	375.00	0.15	67.91	0.30	0.61	0.53
	1094A	1095A	0.54	55	10.74	1478	3.15	15.09		0.00				4.64	0.75	0.54	15.38	5.08	20.92	84.50	375.00	0.15	67.91	0.31	0.61	0.54
To Trunk 1, Pipe 1095A-1096A					10.74	1478				0.00				4.64			15.38									
North East Sanitary Trunk																										
External Commercial					0.00	0			10.40	10.40						10.40	10.40									
Mixed Use Block*			2.43	2531	2.43	2531	3.00	24.61	2.43	12.83						4.86	15.26									
					2.43	2531			3.45	16.28						3.45	18.71									
	204A	205A			2.43	2531			6.33	22.61			0.19	0.19	13.77	6.52	25.23	8.33	22.10	525.00	375.00	0.14	65.60	0.34	0.59	0.53
To Pipe 205A - 206A					2.43	2531				22.61				0.19			25.23		22.10							
	201A	202A			0.00	0			5.67	5.67					3.45	5.67	5.67	1.87	5.32	266.00	200.00	0.32	18.55	0.29	0.59	0.51
	202A	203A			0.00	0			0.00	5.67					3.45	0.00	5.67	1.87	5.32	176.00	250.00	0.24	29.13	0.18	0.59	0.44
	203A	205A			0.00	0			10.44	16.11					9.79	10.44	16.11	5.32	15.11	292.50	250.00	0.24	29.13	0.52	0.59	0.60
Contribution from Pipe 204A - 205A					2.43	2531				22.61				0.19			25.23									
	205A	206A			2.43	2531				38.72				0.19	23.56	0.00	41.34	13.64	37.20	150.50	375.00	0.20	78.41	0.47	0.71	0.70
To Existing Vanguard Drive Sanitary					2.43	2531				38.72				0.19			41.34		37.20							
South West Sanitary Trunk																										
Mixed Use Block			3.66	528	3.66	528			3.66	3.66					2.22	7.32	7.32									
Mid-High Density Residential			15.19	1535	18.85	2063	3.06	20.46	4.32	7.98					4.85	19.51	26.83									
	301A	302A	2.28	329	21.13	2392	3.02	23.41		7.98			0.43	0.43	4.92	2.71	29.54	9.75	38.08	791.00	375.00	0.14	65.60	0.58	0.59	0.61
To Sanitary By Others					21.13	2392				7.98				0.43			29.54		38.08							
Road			0.89	0	0.89	0									0.00	0.89	0.89	0.29	0.29	49.00	200.00	0.32	18.55	0.02	0.59	0.23
To Existing Sanitary, Fern Casey Street					0.89	0				0.00				0.00			0.89		0.29							
Mid-High Density Residential			3.69	532	3.69	532	3.37	5.81		0.00				0.00	0.00	3.69	3.69	1.22	7.03	49.00	200.00	0.32	18.55	0.38	0.59	0.55
To Existing Sanitary, Axis Way					3.69	532				0.00				0.00			3.69		7.03							
South East Sanitary Trunk											9.11	9.11	0.36	0.36		9.47	9.47									
Existing Medium Density**	401A	402A	0.99	227	0.99	227	3.50	2.57		0.00	0.23	9.34		0.36	5.73	1.22	10.69	3.53	11.83	114.00	250.00	0.24	29.13	0.41	0.59	0.56
To Existing Sanitary to Gerry Lalonde Drive					0.99	227				0.00		9.34		0.36			10.69		11.83							

*Note: Proposed population 2531 per background servicing study

**Note: Existing population 227 per background servicing study

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =	0.800		
Average Daily Flow =	280	l/p/day		Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.405	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00			Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%			
Mixed Use	35000.00	L/ha/da					
Institutional =	0.405	l/s/Ha					

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT. 18/2019
PROVINCE OF ONTARIO

Designed: R.B	PROJECT: Orleans EUC MUC		
Checked: K.M	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October, 2019	Sheet No. 2 of 2

Copy of 733_SAN_Oct1819_Opt1_final.xlsx

D2

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
NW Quadrant to Nature Trail Crescent	1133A	1A (B.O.)			64.33	7168	2.68	62.26		35.83				7.63	23.00	0.00	107.79	35.57	120.83							
Per Sanitary Sewer Calculation Sheet - prepared by DSEL, October 2018					64.33	7168	2.68			35.83				7.63					120.83							
3490 Innes Rd. Future Dev. Blocks					4.33	1402	3.16	14.36	5.40	5.40				0.00	3.28	9.73	9.73	3.21	20.85							
Future Dev. Blocks taken at EUC Phase 3 CDP Mid-High Residential Density (144 pop/ha)																										
3490 Innes Road					19.75	1516	3.14	15.43	0.00	0.00			1.42	1.42	0.23	21.17	21.17	6.99	22.65							
Per Sanitary Sewer Calculation Sheet - Caivan Communities Orleans Village - prepared by DSEL, May 2018																										
Total to Existing Nature Trail Crescent sewer					88.41	10086	2.56	83.68	41.23	41.23			9.05	9.05	26.51	138.69	138.69	45.77	155.96							

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =		0.800		
Average Daily Flow =	280	l/p/day		Industrial Peak Factor = as per MOE Graph				
Comm/Inst Flow =	35000	L/ha/da	0.405	Extraneous Flow =		0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.405	Minimum Velocity =		0.600	m/s	
Max Res. Peak Factor =	4.00			Manning's n =	(Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%				
Mixed Use	28000.00	L/ha/da						
Institutional =	0.405	l/s/Ha						

Designed: BK

Checked:

Dwg. Reference:

PROJECT: **Orleans EUC MUC**

LOCATION: **City of Ottawa**

File Ref: 14-733

Date: October, 2018

Sheet No. 1 of 1

LICENSED PROFESSIONAL ENGINEER
A. J. TEMELINI
100213887
2020-07-15
PROVINCE OF ONTARIO

Appendix E

Stormwater Servicing Design

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)																FLOW						SEWER DATA							
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Trunk 1																																
					0.00	0.00	0.27	0.90	0.68	0.68			0.00	0.00			0.00	0.00														
	2065	2066	0.28	0.70	0.54	0.54			0.00	0.68			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	112	450	450	PVC	0.25	80.0	142.5531	0.8963	1.4876	0.787
					0.00	0.54	0.23	0.90	0.58	1.25			0.00	0.00			0.00	0.00														
	2066	2072	0.28	0.70	0.54	1.09			0.00	1.25			0.00	0.00			0.00	0.00	11.49	71.53	96.94	113.60	166.02	199	600	600	PVC	0.17	95.5	253.1634	0.8954	1.7776	0.787
					0.00	1.09	0.17	0.90	0.43	1.68			0.00	0.00			0.00	0.00														
	2072	2075	3.35	0.70	6.52	7.61			0.00	1.68			0.00	0.00			0.00	0.00	13.27	66.19	89.62	104.98	153.36	654	825	825	CONC	0.33	79.0	824.5950	1.5426	0.8536	0.793
					0.00	7.61	0.18	0.90	0.45	2.13			0.00	0.00			0.00	0.00														
	2075	2083	1.34	0.70	2.61	10.22			0.00	2.13			0.00	0.00			0.00	0.00	14.12	63.93	86.52	101.33	148.00	837	975	975	CONC	0.22	88.5	1051.1471	1.4079	1.0477	0.796
					0.00	10.22	0.17	0.90	0.43	2.55			0.00	0.00			0.00	0.00														
	2083	2084	4.46	0.70	8.68	18.90			0.00	2.55			0.00	0.00			0.00	0.00	15.17	61.38	83.02	97.22	141.97	1372	1050	1050	CONC	0.40	81.5	1727.0623	1.9945	0.6810	0.794
			0.18	0.70	0.35	19.25			0.00	2.55			0.00	0.00			0.00	0.00														
			0.22	0.70	0.43	19.67			0.00	2.55			0.00	0.00			0.00	0.00														
			0.79	0.70	1.54	21.21			0.00	2.55			0.00	0.00			0.00	0.00														
			0.91	0.70	1.77	22.98			0.00	2.55			0.00	0.00			0.00	0.00														
					0.00	22.98	1.37	0.40	1.52	4.08			0.00	0.00			0.00	0.00														
					0.00	22.98	1.75	0.90	4.38	8.45			0.00	0.00			0.00	0.00														
	2084	2085	2.04	0.70	3.97	26.95			0.00	8.45			0.00	0.00			0.00	0.00	15.85	59.84	80.92	94.75	138.34	2297	1350	1350	CONC	0.29	122.0	2874.2790	2.0080	1.0126	0.799
	2085	2116	0.58	0.70	1.13	28.08			0.00	8.45			0.00	0.00			0.00	0.00	16.86	57.70	77.99	91.31	133.29	2280	1650	1650	CONC	0.10	112.5	2882.2416	1.3479	1.3910	0.791
			9.46	0.90	0.00	28.08			0.00	8.45			0.00	0.00			0.00	0.00					85L/s/Ha	805								
			0.35	0.90	0.88	28.96			0.00	8.45			0.00	0.00			0.00	0.00														
					0.00	28.96	0.59	0.40	0.66	9.11			0.00	0.00			0.00	0.00														
					0.00	28.96	0.85	0.90	2.13	11.24			0.00	0.00			0.00	0.00														
					0.00	28.96			0.00	11.24			0.00	0.00	2.25	0.40	2.50	2.50														
					0.00	28.96	2.51	0.80	5.58	16.82			0.00	0.00			0.00	2.50														
			5.61	0.70	10.92	39.87			0.00	16.82			0.00	0.00			0.00	2.50														
					0.00	39.87	6.43	0.90	16.09	32.91			0.00	0.00			0.00	2.50														
	2116	2117	7.77	0.70	15.12	54.99			0.00	32.91			0.00	0.00			0.00	2.50	18.25	55.03	74.34	87.01	127.00	6595	2250	2250	CONC	0.19	68.5	9084.5492	2.2848	0.4997	0.726
	2117	2122	0.52	0.70	1.01	56.01			0.00	32.91			0.00	0.00			0.00	2.50	18.75	54.13	73.12	85.58	124.89	6555	2400	2400	CONC	0.13	80.5	8925.6843	1.9730	0.6800	0.734
	2122	2136	0.75	0.70	1.46	57.47			0.00	32.91			0.00	0.00			0.00	2.50	19.43	52.97	71.53	83.71	122.15	6508	2550	2550	CONC	0.10	84.0	9201.9602	1.8018	0.7770	0.707
To Trunk 2, Pipe 2136 - 2138						57.47				32.91				0.00				2.50	20.21					805									
Trunk 2																																
	2041	2042	1.38	0.80	3.07	3.07			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	236	525	525	PVC	0.65	29.5	346.7273	1.6017	0.3070	0.680
	2042	2043	1.34	0.80	2.98	6.05			0.00	0.00			0.00	0.00			0.00	0.00	10.31	75.65	102.60	120.26	175.80	458	750	750	CONC	0.27	95.5	578.4757	1.3094	1.2156	0.791
	2043	2044	1.14	0.80	2.54	8.58			0.00	0.00			0.00	0.00			0.00	0.00	11.52	71.41	96.78	113.42	165.74	613	825	825	CONC	0.29	110.0	773.0058	1.4461	1.2678	0.793
					0.00	8.58	0.22	0.90	0.55	0.55			0.00	0.00			0.00	0.00														
					0.00	8.58			0.00	0.55	2.14	0.90	5.35	5.35			0.00	0.00														
	2044	2046	1.76	0.80	3.91	12.50			0.00	0.55			0.00	5.35			0.00	0.00	12.79	67.53	91.45	107.14	156.52	1468	900	900	CONC	0.91	36.5	1726.9268	2.7146	0.2241	0.850
					0.00	12.50	0.23	0.90	0.58	1.13			0.00	5.35			0.00	0.00														
	2046	2047	0.84	0.80	1.87	14.37			0.00	1.13			0.00	5.35			0.00	0.00	13.01	66.89	90.57	106.11	155.01	1631	1200	1200	CONC	0.25	100.5	1949.3651	1.7236	0.9718	0.837
					0.00	14.37	0.30	0.90	0.75	1.88			0.00	5.35			0.00	0.00														
			0.42	0.80	0.93	15.30			0.00	1.88			0.00	5.35			0.00	0.00														
	2047	2048	1.52	0.80	3.38	18.68			0.00	1.88			0.00	5.35			0.00	0.00	13.99	64.27	86.98	101.88	148.81	1909	1500	1500	CONC	0.11	123.5	2344.4784	1.3267	1.5515	0.814
					0.00	18.68	0.21	0.90	0.53	2.40			0.00	5.35			0.00	0.00														
			0.59	0.80	1.31	19.99			0.00	2.40			0.00	5.35			0.00	0.00														
	2048	2049	0.89	0.80	1.98	21.97			0.00	2.40			0.00	5.35			0.00	0.00	15.54	60.53	81.86	95.86	139.96	2040	1500	1500	CONC	0.12	88.0	2448.7278	1.3857	1.0584	0.833
					0.00	21.97	0.25	0.90	0.63	3.03			0.00	5.35			0.00	0.00														
			0.59	0.80	1.31	23.29			0.00	3.03			0.00	5.35			0.00	0.00														
	2049	2057	0.63	0.80	1.40	24.69			0.00	3.03			0.00	5.35			0.00	0.00	16.60	58.24	78.73	92.18	134.57	2170	1500	1500	CONC	0.13	104.0	2548.7167	1.4423	1.2018	0.851
					0.00	24.69	0.20	0.90	0.50	3.53			0.00	5.35			0.00	0.00														
			0.39	0.80	0.87	25.55			0.00	3.53			0.00	5.35			0.00	0.00														
	2057	2060	6.44	0.80	14.32	39.88			0.00	3.53			0.00	5.35			0.00	0.00	17.80	55.87	75.49	88.36	128.97	2967	1800	1800	CONC	0.10	92.0	3634.9621	1.4284	1.0734	0.816

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

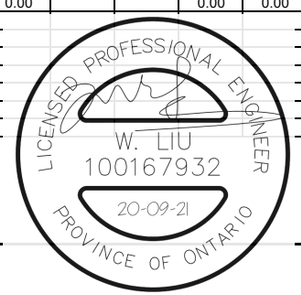
LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
20-09-21
PROVINCE OF ONTARIO

Designed: A.K.	PROJECT: Trailsedge North Community	
Checked: W.L.	LOCATION: City of Ottawa	
Dwg. Reference: DWG No. 2	File Ref: 20-1195	Date: 16 Sep 2020
		Sheet No. SHEET 1 OF 2

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
			0.25	0.70	0.49	40.36			0.00	3.53			0.00	5.35			0.00	0.00														
					0.00	40.36	0.42	0.90	1.05	4.58			0.00	5.35			0.00	0.00														
					0.00	40.36	0.46	0.90	1.15	5.73			0.00	5.35			0.00	0.00														
					0.00	40.36			0.00	5.73			0.00	5.35	1.78	0.40	1.98	1.98														
	2060	2061			0.00	40.36			0.00	5.73			0.00	5.35	9.40	0.40	10.45	12.43	18.87	53.92	72.83	85.24	124.39	4597	1800	1800	CONC	0.23	81.5	5512.6929	2.1664	0.6270	0.834
	2061	2062			0.00	40.36	0.17	0.90	0.43	6.15			0.00	5.35			0.00	12.43	19.50	52.85	71.37	83.53	121.88	4535	1800	1800	CONC	0.22	79.0	5391.5200	2.1187	0.6214	0.841
	2062	2063			0.00	40.36	0.11	0.90	0.28	6.43			0.00	5.35			0.00	12.43	20.12	51.84	69.99	81.90	119.50	4467	1800	1800	CONC	0.21	51.0	5267.5605	2.0700	0.4106	0.848
	2063	2064			0.00	40.36	0.20	0.90	0.50	6.93			0.00	5.35			0.00	12.43	20.53	51.19	69.11	80.87	117.98	4445	1950	1950	CONC	0.14	79.0	5324.3041	1.7828	0.7385	0.835
	2064	2203			0.00	40.36			0.00	6.93			0.00	5.35			0.00	12.43	21.27	50.08	67.58	79.08	115.36	4347	2100	2100	CONC	0.10	49.5	5483.0809	1.5831	0.5211	0.793
					0.00	40.36	0.33	0.80	0.73	7.66			0.00	5.35			0.00	12.43														
	2203	2204			0.00	40.36	4.55	0.40	5.06	12.72			0.00	5.35			0.00	12.43	21.79	49.32	66.55	77.87	113.58	4666	2100	2100	CONC	0.11	81.5	5750.7038	1.6603	0.8181	0.811
	2204	2205			0.00	40.36	0.71	0.90	1.78	14.50			0.00	5.35			0.00	12.43	22.61	48.18	65.00	76.04	110.91	4673	2100	2100	CONC	0.11	111.0	5750.7038	1.6603	1.1142	0.813
	2205	2206			0.00	40.36	0.74	0.80	1.65	16.15			0.00	5.35			0.00	12.43	23.72	46.72	63.01	73.71	107.49	4634	2100	2100	CONC	0.11	73.5	5750.7038	1.6603	0.7378	0.806
	2206	2207			0.00	40.36	1.00	0.80	2.22	18.37			0.00	5.35			0.00	12.43	24.46	45.81	61.77	72.25	105.35	4680	2100	2100	CONC	0.11	75.0	5750.7038	1.6603	0.7529	0.814
	2207	2208			0.00	40.36	1.26	0.80	2.80	21.17			0.00	5.35			0.00	12.43	25.21	44.92	60.56	70.83	103.27	4758	2100	2100	CONC	0.11	103.5	5750.7038	1.6603	1.0390	0.827
	2208	2209			0.00	40.36	0.41	0.90	1.03	22.20			0.00	5.35			0.00	12.43	26.25	43.75	58.97	68.96	100.53	4694	2100	2100	CONC	0.11	7.5	5750.7038	1.6603	0.0753	0.816
	2209	2210			0.00	40.36			0.00	22.20			0.00	5.35			0.00	12.43	26.33	43.67	58.86	68.83	100.34	4685	2100	2100	CONC	0.11	120.5	5750.7038	1.6603	1.2096	0.815
	2210	2211			0.00	40.36			0.00	22.20			0.00	5.35			0.00	12.43	27.54	42.40	57.13	66.80	97.36	4547	2250	2250	CONC	0.10	119.0	6590.6247	1.6576	1.1965	0.690
	2211	2135			0.00	40.36	4.03	0.80	8.96	31.16			0.00	5.35			0.00	12.43	28.73	41.22	55.52	64.91	94.60	4917	2550	2550	CONC	0.10	35.5	9201.9602	1.8018	0.3284	0.534
	2135	2136	0.40	0.70	0.78	41.14			0.00	31.16			0.00	5.35			0.00	12.43	29.06	40.90	55.10	64.42	93.88	4912	2700	2700	CONC	0.10	35.0	10717.0825	1.8718	0.3116	0.458
Contribution From Trunk 1, Pipe 2122 - 2136						57.47				32.91				0.00				2.50	20.21					805									
	2136	2138			0.00	98.61			0.00	64.07			0.00	5.35			0.00	14.93	29.37	40.61	54.70	63.95	93.20	10049	2700	2700	CONC	0.15	90.5	13125.6918	2.2925	0.6579	0.766
			0.06	0.70	0.12	98.72			0.00	64.07			0.00	5.35			0.00	14.93														
			0.36	0.70	0.70	99.42			0.00	64.07			0.00	5.35			0.00	14.93														
			0.51	0.70	0.99	100.42			0.00	64.07			0.00	5.35			0.00	14.93														
			0.63	0.70	1.23	101.64			0.00	64.07			0.00	5.35			0.00	14.93														
			0.68	0.70	1.32	102.97			0.00	64.07			0.00	5.35			0.00	14.93														
	2138	2139	1.26	0.70	2.45	105.42			0.00	64.07			0.00	5.35			0.00	14.93	30.03	40.02	53.89	63.00	91.80	10184	2700	2700	CONC	0.16	77.0	13556.1562	2.3677	0.5420	0.751
	2139	2140	0.32	0.70	0.62	106.04			0.00	64.07			0.00	5.35			0.00	14.93	30.57	39.54	53.24	62.24	90.69	10096	2700	2700	CONC	0.14	67.0	12680.6230	2.2147	0.5042	0.796
	2140	2150	0.14	0.70	0.27	106.31			0.00	64.07			0.00	5.35			0.00	14.93	31.08	39.10	52.65	61.55	89.67	10004	2700	2700	CONC	0.15	50.5	13125.6918	2.2925	0.3671	0.762
	2150	HW			0.00	106.31			0.00	64.07			0.00	5.35			0.00	14.93	31.44	38.79	52.23	61.05	88.95	9931	2700	2700	CONC	0.15	19.5	13125.6918	2.2925	0.1418	0.757
Trunk 3																																
			0.31	0.70	0.60	0.60			0.00	0.00			0.00	0.00			0.00	0.00														
	2025	2026			0.00	0.60	1.01	0.40	1.12	1.12			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	163	675	675	CONC	0.15	35.5	325.5584	0.9098	0.6503	0.502
	2026	2119	0.41	0.70	0.80	1.40			0.00	1.12			0.00	0.00			0.00	0.00	10.65	74.39	100.88	118.24	172.82	218	750	750	CONC	0.10	96.5	352.0491	0.7969	2.0183	0.618
			0.06	0.70	0.12	1.52			0.00	1.12			0.00	0.00			0.00	0.00	21.15													
					0.00	1.52	0.47	0.90	1.18	2.30			0.00	0.00			0.00	0.00														
					0.00	1.52	0.95	0.80	2.11	4.41			0.00	0.00			0.00	0.00														
					0.00	1.52	0.96	0.80	2.14	6.55			0.00	0.00			0.00	0.00														
			2.89	0.70	5.62	7.14			0.00	6.55			0.00	0.00			0.00	0.00														
					0.00	7.14	5.63	0.90	14.09	20.63			0.00	0.00			0.00	0.00														
	2119	21200	6.40	0.70	12.45	19.60			0.00	20.63			0.00	0.00			0.00	0.00	21.15	50.25	67.82	79.36	115.77	2384	1650	1650	CONC	0.18	32.5	3866.9329	1.8085	0.2995	0.617
	21200	2120	0.50	0.70	0.97	20.57			0.00	20.63			0.00	0.00			0.00	0.00	21.45	49.81	67.22	78.65	114.73	2412	1650	1650	CONC	0.18	21.5	3866.9329	1.8085	0.1981	0.624
	2120	21210	0.42	0.70	0.82	21.39			0.00	20.63			0.00	0.00			0.00	0.00	21.65	49.52	66.83	78.19	114.06	2438	1650	1650	CONC	0.18	40.5	3866.9329	1.8085	0.3732	0.630
	21210	2121			0.00	21.39			0.00	20.63			0.00	0.00			0.00	0.00	22.02	48.99	66.11	77.34	112.81	2412	1650	1650	CONC	0.18	37.0	3866.9329	1.8085	0.3410	0.624
			0.37	0.70	0.72	22.11			0.00	20.63			0.00	0.00			0.00	0.00														
	2121	2142	1.15	0.70	2.24	24.34			0.00	20.63			0.00	0.00			0.00	0.00	22.36	48.52	65.46	76.58	111.70	2532	1650	1650	CONC	0.19	76.0	3972.8959	1.8580	0.6817	0.637
	2142	2143			0.00	24.34			0.00	20.63			0.00	0.00			0.00	0.00	23.04	47.60	64.21	75.11	109.55	2484	1650	1650	CONC	0.18	23.5	3866.9329	1.8085	0.2166	0.642
	2143	2144			0.00	24.34			0.00	20.63			0.00	0.00			0.00	0.00	23.26	47.32	63.82	74.66	108.88	2469	1650	1650	CONC	0.18	20.0	3866.9329	1.8085	0.1843	0.638
	2144	HW			0.00	24.34			0.00	20.63			0.00	0.00			0.00	0.00	23.44	47.08	63.50	74.28	108.32	2456	1650	1650	CONC	0.18	17.5	3866.9329	1.8085	0.1613	0.635



Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

Designed: A.K.	PROJECT: Trailsedge North Community	
Checked: W.L.	LOCATION: City of Ottawa	
Dwg. Reference: DWG No. 2	File Ref: 20-1195	Date: 16 Sep 2020
		Sheet No. SHEET 2 OF 2

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

Manning 0.013

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
North West																																	
TRUNK 1																																	
	2065	2066	0.21	0.70	0.41	0.41	0.21	0.90	0.53	0.53			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	86	450	450	PVC	0.20	96.5	128	0.80	2.01	0.68
	2066	2072	0.32	0.70	0.62	1.03	0.28	0.90	0.70	1.23			0.00	0.00			0.00	0.00	12.01	69.87	94.67	110.93	162.09	188	600	600	PVC	0.14	96.0	230	0.81	1.97	0.82
	2072	2075	3.15	0.70	6.13	7.16	0.20	0.90	0.50	1.73			0.00	0.00			0.00	0.00	13.98	64.30	87.02	101.93	148.87	611	825	825	CONC	0.25	79.0	718	1.34	0.98	0.85
	2075	2083	1.30	0.70	2.53	9.69	0.19	0.90	0.48	2.20			0.00	0.00			0.00	0.00	14.96	61.87	83.70	98.02	143.14	784	975	975	CONC	0.17	85.0	924	1.24	1.14	0.85
	2083	2084	4.30	0.70	8.37	18.06	0.18	0.90	0.45	2.65			0.00	0.00			0.00	0.00	16.10	59.29	80.16	93.86	137.04	1283	1050	1050	CONC	0.28	81.5	1445	1.67	0.81	0.89
			0.18	0.70	0.35	18.41			0.00	2.65			0.00	0.00			0.00	0.00															
			0.20	0.70	0.39	18.80			0.00	2.65			0.00	0.00			0.00	0.00															
			0.90	0.70	1.75	20.55			0.00	2.65			0.00	0.00			0.00	0.00															
			0.95	0.70	1.85	22.40			0.00	2.65			0.00	0.00			0.00	0.00															
					0.00	22.40	1.27	0.40	1.41	4.06			0.00	0.00			0.00	0.00															
	2084	2085	1.90	0.70	3.70	26.10	1.71	0.90	4.28	8.34			0.00	0.00			0.00	0.00	16.91	57.59	77.84	91.13	133.03	2152	1350	1350	CONC	0.18	118.0	2264	1.58	1.24	0.95
	2085	2116	0.71	0.70	1.38	27.48			0.00	8.34			0.00	0.00			0.00	0.00	18.16	55.20	74.57	87.29	127.40	2139	1650	1650	CONC	0.10	119.5	2882	1.35	1.48	0.74
					0.00	27.48	0.56	0.40	0.62	8.97			0.00	0.00			0.00	0.00															
FUTURE EXT. COMM.					0.00	27.48	3.12	0.90	7.81	16.77			0.00	0.00			0.00	0.00															
FUTURE EXT. COMM.					0.00	27.48	0.72	0.90	1.80	18.57			0.00	0.00	2.18	0.40	2.42	2.42															
FUTURE EXT. COMM.			9.47	0.90	0.00	27.48	1.14	0.80	2.54	21.11			0.00	0.00			0.00	2.42					85L/s/Ha	805									
					0.00	27.48	0.89	0.90	2.23	23.34			0.00	0.00			0.00	2.42															
			1.16	0.70	2.26	29.73	2.94	0.80	6.54	29.87			0.00	0.00			0.00	2.42															
			0.24	0.80	0.53	30.27	2.77	0.90	6.93	36.80			0.00	0.00			0.00	2.42															
			2.62	0.70	5.10	35.37	0.23	0.80	0.51	37.32			0.00	0.00			0.00	2.42															
	2116	2117	7.72	0.70	15.02	50.39			0.00	37.32			0.00	0.00			0.00	2.42	19.64	52.63	71.06	83.16	121.35	5598	2250	2250	CONC	0.15	75.0	8072	2.03	0.62	0.69
	2117	2122	0.52	0.70	1.01	51.40			0.00	37.32			0.00	0.00			0.00	2.42	20.25	51.63	69.70	81.57	119.01	5544	2400	2400	CONC	0.11	84.0	8210	1.81	0.77	0.68
	2122	2136	0.65	0.70	1.26	52.67			0.00	37.32			0.00	0.00			0.00	2.42	20.25	51.63	69.70	81.57	119.01	5609	2550	2550	CONC	0.10	84.0	9202	1.80	0.78	0.61
TO TRUNK 2						52.67				37.32				0.00				2.42	21.02														
TRUNK 2																																	
	2041	2042	1.39	0.80	3.09	3.09			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	237	525	525	PVC	0.65	29.5	347	1.60	0.31	0.68
	2042	2043	1.20	0.80	2.67	5.76			0.00	0.00			0.00	0.00			0.00	0.00	10.31	75.65	102.60	120.26	175.80	436	750	750	CONC	0.25	95.5	557	1.26	1.26	0.78
	2043	2044	1.29	0.80	2.87	8.63			0.00	0.00			0.00	0.00			0.00	0.00	11.57	71.26	96.57	113.17	165.38	615	825	825	CONC	0.32	110.0	812	1.52	1.21	0.76
	2044	2046			0.00	8.63	0.22	0.90	0.55	0.55	2.14	0.90	5.35	5.35			0.00	0.00	12.78	67.57	91.50	107.20	156.61	1207	900	900	CONC	0.62	33.5	1425	2.24	0.25	0.85
	2046	2047	2.39	0.80	5.32	13.94	0.23	0.90	0.58	1.13			0.00	5.35			0.00	0.00	13.03	66.86	90.53	106.05	154.93	1602	1200	1200	CONC	0.24	103.5	1910	1.69	1.02	0.84
			0.47	0.80	1.05	14.99	0.26	0.90	0.65	1.78			0.00	5.35			0.00	0.00															
	2047	2048	1.15	0.80	2.56	17.55			0.00	1.78			0.00	5.35			0.00	0.00	14.05	64.11	86.77	101.63	148.43	1823	1500	1500	CONC	0.10	117.0	2235	1.26	1.54	0.82
			0.80	0.80	1.78	19.33	0.25	0.90	0.63	2.40			0.00	5.35			0.00	0.00															
	2048	2049	1.14	0.80	2.54	21.86			0.00	2.40			0.00	5.35			0.00	0.00	15.59	60.41	81.70	95.67	139.69	2029	1500	1500	CONC	0.12	112.5	2449	1.39	1.35	0.83
			0.49	0.80	1.09	22.95			0.00	2.40			0.00	5.35			0.00	0.00															
	2049	2057	0.76	0.80	1.69	24.64	0.25	0.90	0.63	3.03			0.00	5.35			0.00	0.00	16.94	57.53	77.77	91.04	132.90	2141	1500	1500	CONC	0.13	85.5	2549	1.44	0.99	0.84
			0.44	0.80	0.98	25.62			0.00	3.03			0.00	5.35			0.00	0.00															
	2057	2060	6.36	0.80	14.14	39.77	0.24	0.90	0.60	3.63			0.00	5.35			0.00	0.00	17.93	55.62	75.15	87.96	128.39	2955	1800	1800	CONC	0.13	90.5	4144	1.63	0.93	0.71
					0.00	39.77	0.42	0.90	1.05	4.68			0.00	5.35	1.78	0.40	1.98	1.98															
	2060	2061	0.17	0.70	0.33	40.10	0.48	0.90	1.20	5.88			0.00	5.35	9.40	0.40	10.45	12.43	18.86	53.95	72.87	85.28	124.45	4595	1800	1800	CONC	0.23	81.5	5513	2.17	0.63	0.83
	2061	2062			0.00	40.10	0.20	0.90	0.50	6.38			0.00	5.35			0.00	12.43	19.48	52.88	71.41	83.57	121.94	4539	1800	1800	CONC	0.22	79.0	5392	2.12	0.62	0.84
	2062	2063			0.00	40.10	0.13	0.90	0.33	6.71			0.00	5.35			0.00	12.43	20.11	51.86	70.02	81.94	119.55	4474	1800	1800	CONC	0.21	51.0	5268	2.07	0.41	0.85
	2063	2064			0.00	40.10	0.19	0.90	0.48	7.18			0.00	5.35			0.00	12.43	20.52	51.22	69.14	80.90	118.04	4451	1950	1950	CONC	0.14	78.5	5324	1.78	0.73	0.84
	2064	2203			0.00	40.10			0.00	7.18			0.00	5.35			0.00	12.43	21.25	50.10	67.62	79.12	115.42	4353	2100	1950	CONC	0.10	50.0	5483	1.58	0.53	0.79
					0.00	40.10	0.40	0.80	0.89	8.07			0.00	5.35			0.00	12.43															
	2203	2204			0.00	40.10	4.66	0.40	5.18	13.25			0.00	5.35			0.00	12.43	21.78	49.34	66.58	77.90	113.63	4690	2100	2100	CONC	0.11	81.5	5751	1.66	0.82	0.82
	2204	2205			0.00	40.10	0.90	0.80	2.00	15.25			0.00	5.35			0.00	12.43	22.59	48.20	65.03	76.08	110.96	4711	2100	2100	CONC	0.11	111.0	5751	1.66	1.11	0.82
	2205	2206			0.00	40.10	0.84	0.80	1.87	17.12			0.00	5.35			0.00	12.43	23.71	46.74	63.04	73.74	107.53	4685	2100	2100	CONC	0.11	74.0	5751	1.66	0.74	0.81
	2206	2207			0.00	40.10	1.04	0.80	2.31	19.43			0.00	5.35			0.00	12.43	24.45	45.82	61.79	72.27	105.38	4735	2100	2100	CONC	0.11	74.5	5751	1.66	0.75	0.82
	2207	2208			0.00	40.10	1.49	0.80	3.31	22.75			0.00	5.35			0.00	12.43	25.20	44.94	60.58	70.85	103.30	4843	2100	2100	CONC	0.11	103.5	5751	1.66	1.04	0.84
	2208	2209			0.00	40.10	0.39	0.90	0.98	23.72			0.00	5.35			0.00	12.43	26.24	43.77	58.99	68.99	100.57	4774	2100	2100	CONC	0.11	8.0	5751	1.66	0.08	0.83
	2209	2210			0.00	40.10			0.00	23.72			0.00	5.35			0.00	12.43	26.32	43.68	58.87	68.85	100.36	4764	2100	2100	CONC	0.11	120.0	5751	1.66	1.20	0.83
	2210	2211			0.00	40.10			0.00	23.72			0.00	5.35			0.00	12.43	27.52	42.41	57.14	66.82	97.40	4625	2250	2250	CONC	0.10	119.0	6591	1.66	1.20	0.70
	2211	2135			0.00	40.10	4.00	0.80	8.90	32.62			0.00	5.35			0.00	12.43	28.72	41.23	55.54	64.94	94.64	4989	2550	2550	CONC	0.10	36.5	9202	1.80	0.34	0.54
	2135	2136	0.18	0.70	0.35	40.45			0.00	32.62			0.00	5.35			0.00	12.43	29.06	40.91	55.10	64.43	93.89	4964	2700	2700	CONC	0.10	35.0	10717	1.87	0.31	0.46
Contribution From TRUNK 1, PipE 2122 - 2136						52.67				37.32				0.00				2.42	21.02														

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
Oct 18, 2019
PROVINCE OF ONTARIO

Designed: R.B.
Checked: K.M.
Dwg. Reference:

PROJECT: Orleans EUC MUC
LOCATION: City of Ottawa
File Ref: 14-733
Date: October 2019
Sheet No: 1

733_STM_Oct1819_Opt1.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

Manning 0.013

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of Conc.	Intensity 2 Year	Intensity 5 Year	Intensity 10 Year	Intensity 100 Year	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
	2136	2138	0.37	0.70	0.72	93.83			0.00	69.94			0.00	5.35			0.00	14.86	27.52	42.41	57.14	66.82	97.40	9781	2700	2700	CONC	0.15	90.5	13126	2.29	0.66	0.75
			1.29	0.70	2.51	96.34			0.00	69.94			0.00	5.35			0.00	14.86															
			1.30	0.70	2.53	98.87			0.00	69.94			0.00	5.35			0.00	14.86															
			0.50	0.70	0.97	99.85			0.00	69.94			0.00	5.35			0.00	14.86															
	2138	2139	0.38	0.70	0.74	100.59			0.00	69.94			0.00	5.35			0.00	14.86	21.02	50.44	68.08	79.66	116.22	11988	2700	2700	CONC	0.16	77.0	13556	2.37	0.54	0.88
	2139	2140	0.38	0.70	0.74	101.33			0.00	69.94			0.00	5.35			0.00	14.86	21.56	49.64	66.99	78.38	114.34	11834	2700	2700	CONC	0.15	73.5	13126	2.29	0.53	0.90
	2140	HW	0.11	0.70	0.21	101.54			0.00	69.94			0.00	5.35			0.00	14.86	21.56	49.64	66.99	78.38	114.34	11844	2700	2700	CONC	0.15	47.0	13126	2.29	0.34	0.90
TO POND 1																																	
TRUNK 3																																	
					0.00	0.00	0.98	0.80	2.18	2.18			0.00	0.00			0.00	0.00	21.15														
			2.86	0.70	5.57	5.57	5.61	0.90	14.04	16.22			0.00	0.00			0.00	0.00															
					0.00	5.57	0.95	0.80	2.11	18.33			0.00	0.00			0.00	0.00															
	2025	2026	7.33	0.70	14.26	19.83	0.49	0.90	1.23	19.55			0.00	0.00			0.00	0.00	21.15	50.25	67.82	79.36	115.77	148	1650	1650	CONC	0.14	32.0	3410	1.59	0.33	0.04
	2026	2119	0.39	0.70	0.76	20.59	1.16	0.40	1.29	20.84			0.00	0.00			0.00	0.00	21.48	49.76	67.15	78.57	114.61	1366	1650	1650	CONC	0.16	92.5	3646	1.71	0.90	0.37
	2119	2120	0.66	0.70	1.28	21.87			0.00	20.84			0.00	0.00			0.00	0.00	22.39	48.48	65.41	76.52	111.61	1469	1650	1650	CONC	0.10	47.0	2882	1.35	0.58	0.51
	2120	2121	0.43	0.70	0.84	22.71			0.00	20.84			0.00	0.00			0.00	0.00	22.97	47.70	64.34	75.27	109.78	2204	1650	1650	CONC	0.10	84.5	2882	1.35	1.04	0.76
	2121	2142	1.13	0.70	2.20	24.91			0.00	20.84			0.00	0.00			0.00	0.00	24.01	46.36	62.52	73.13	106.63	2258	1650	1650	CONC	0.10	76.0	2882	1.35	0.94	0.78
	2142	2143	0.37	0.70	0.72	25.63			0.00	20.84			0.00	0.00			0.00	0.00	22.97	47.70	64.34	75.27	109.78	2204	1650	1650	CONC	0.10	43.0	2882	1.35	0.53	0.76
	2143	2144			0.00	25.63			0.00	20.84			0.00	0.00			0.00	0.00	24.01	46.36	62.52	73.13	106.63	2258	1800	1800	CONC	0.10	51.1	3635	1.43	0.60	0.62
	2144	HW			0.00	25.63			0.00	20.84			0.00	0.00			0.00	0.00	24.95	45.22	60.97	71.31	103.97	2260	1800	1800	CONC	0.10	22.5	3635	1.43	0.26	0.62
TO POND 1																																	

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT 18, 2019
PROVINCE OF ONTARIO

Designed: R.B.	PROJECT: Orleans EUC MUC		
Checked: K.M.	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October 2019	Sheet No. 2

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

Manning 0.013

Location	From Node	To Node	AREA (Ha) 2 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	5 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	10 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	100 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	FLOW Time of Conc. (min)	Intensity 2 Year (mm/h)	Intensity 5 Year (mm/h)	Intensity 10 Year (mm/h)	Intensity 100 Year (mm/h)	Peak Flow Q (l/s)	SEWER DATA DIA. (mm) (actual)	DIA (mm) (nominal)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF LOW (min	RATIO Q/Q full
NORTH EAST TRUNK*																																	
	201	202	5.68	0.80	12.63	12.63			0.00	0.00			0.00	0.00			0.00	0.00						291	675	675	CONC	0.20	262.0	376	1.05	4.16	0.77
	202	203	0.00	0.90	0.00	12.63			0.00	0.00			0.00	0.00			0.00	0.00						291	675	675	CONC	0.20	193.0	376	1.05	3.06	0.77
			2.20	0.80	4.89	17.53			0.00	0.00			0.00	0.00			0.00	0.00															
	203	204	6.94	0.80	15.43	32.96	1.73	0.90	4.33	4.33			0.00	0.00			0.00	0.00						933	1050	1050	CONC	0.20	294.0	1221	1.41	3.47	0.76
			0.52	0.80	1.16	34.12			0.00	4.33			0.00	0.00			0.00	0.00															
			5.29	0.80	11.76	45.88			0.00	4.33			0.00	0.00			0.00	0.00															
			4.86	0.85	11.48	57.37			0.00	4.33			0.00	0.00			0.00	0.00															
			0.19	0.40	0.21	57.58			0.00	4.33			0.00	0.00			0.00	0.00															
	204	205	3.45	0.90	8.63	66.21			0.00	4.33			0.00	0.00			0.00	0.00						1666	1350	1350	CONC	0.15	513.5	2067	1.44	5.93	0.81
To Existing Storm to Wildflower Drive						66.21				4.33				0.00				0.00	0.00														
SOUTH WEST TRUNK																																	
			7.35	0.85	17.37	17.37			0.00	0.00			0.00	0.00			0.00	0.00															
Commercial			4.28	0.90	10.71	28.08			0.00	0.00			0.00	0.00			0.00	0.00															
Mid-High Density					0.00	28.08	2.28	0.80	5.07	5.07			0.00	0.00			0.00	0.00															
			6.15	0.70	11.97	40.04			0.00	5.07			0.00	0.00			0.00	0.00															
			7.88	0.70	15.33	55.38			0.00	5.07			0.00	0.00			0.00	0.00															
Park	301	302	0.42	0.40	0.47	55.85	0.56	0.90	1.40	6.47			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	4964	2100	2100	CONC	0.12	790.5	6006	1.73	7.60	0.83
To Storm By Others						55.85				6.47				0.00				0.00	10.00														
Mid-High Density Residential			0.00	0.80	0.00	0.00	0.49	0.90	1.23	1.23			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	128	525	525	CONC	0.20	57.0	192	0.89	1.07	0.66
To Existing Fern Casey Street						0.00				1.23				0.00				0.00	10.00														
Mid-High Density Residential					0.00	0.00	3.68	0.80	8.18	8.18			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	853	1050	1050	CONC	0.15	61.5	1058	1.22	0.84	0.81
To Existing Storm, to Axis Way						0.00				8.18				0.00				0.00	10.00														
SOUTH EAST TRUNK																																	
Hydro Easement			1.89	0.40	2.10	2.10			0.00	0.00			0.00	0.00			0.00	0.00															
Hydro Easement			3.33	0.40	3.70	5.80			0.00	0.00			0.00	0.00			0.00	0.00															
			8.94	0.90	22.37	28.17			0.00	0.00			0.00	0.00			0.00	0.00															
Parkette			0.63	0.40	0.70	28.87			0.00	0.00			0.00	0.00			0.00	0.00															
	401	402	0.99	0.80	2.20	31.07			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	2387	1350	1350	CONC	0.30	211.0	2923	2.04	1.72	0.82
To Existing Storm to Gerry Lalonde Drive						31.07				0.00				0.00				0.00	10.00														
Hydro Easement			1.86	0.40	2.07	2.07			0.00	0.00			0.00	0.00			0.00	0.00															
Hydro Easement			2.94	0.40	3.27	5.34			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	410	450	450	CONC	3.00	269.5	494	3.10	1.45	0.83
To Existing Storm, Trigoria Crescent						5.34				0.00				0.00				0.00	10.00														

***NOTE: NORTH EAST TRUNK DEVIATION FROM CITY STANDARDS BASED ON BACKGROUND SERVICING STUDIES. VANGUARD DRIVE CONTROLLED TO 100L/s/Ha. DEVELOPMENT AREA CONTROLLED TO 51.25 L/s/Ha.**

Definitions:
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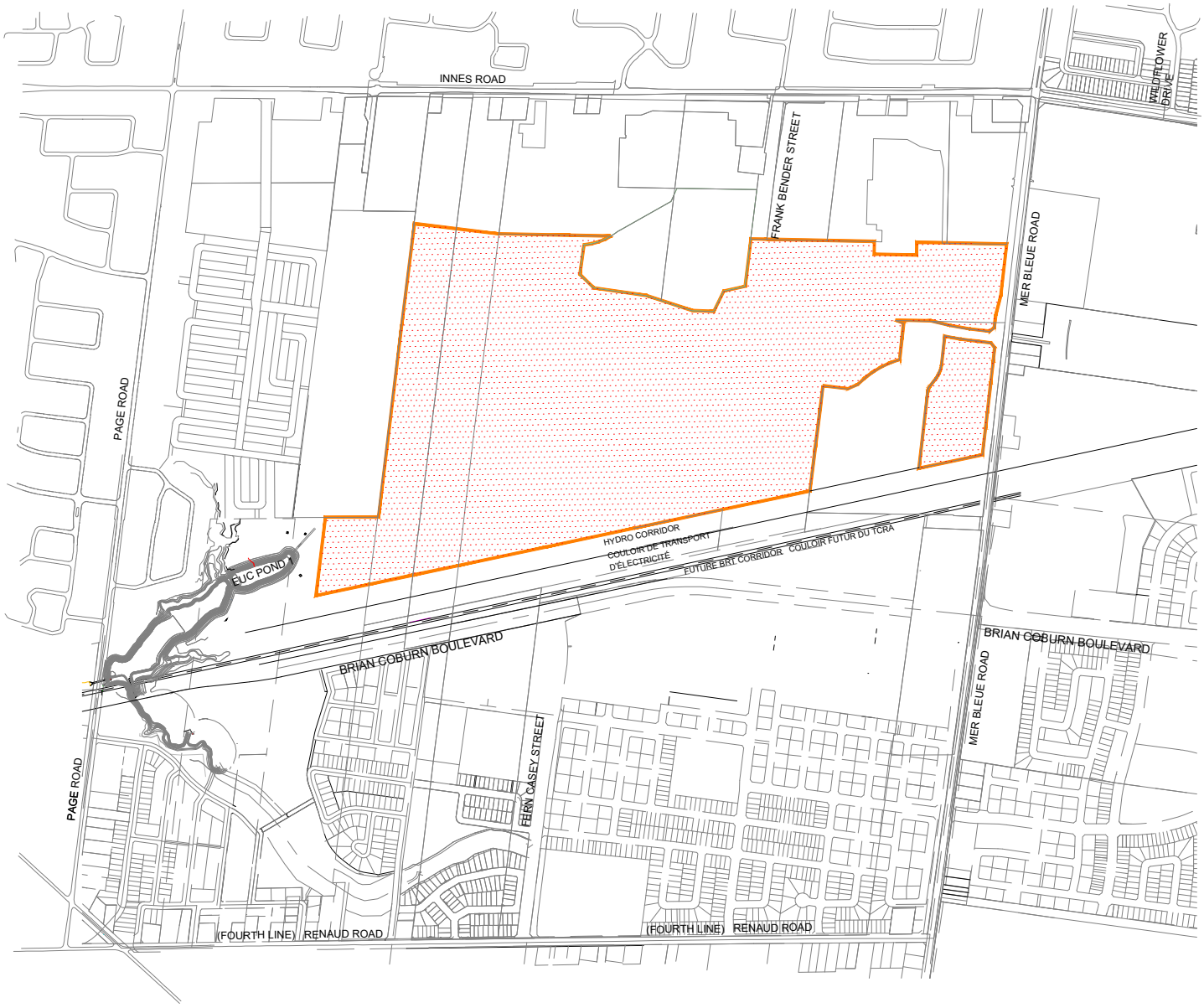
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT 18, 2019
PROVINCE OF ONTARIO

Designed: R.B.	PROJECT: Orleans EUC MUC		
Checked: K.M.	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October 2019	Sheet No. 3

DRAWINGS & FIGURES



LEGEND

SITE BOUNDARY

TRAILSEDGE NORTH	SITE LOCATION	DATE: September 2020
		SCALE: 1:15,000
david schaeffer engineering ltd	120 Iber Road, Unit 203 Stittsville, ON K2S 1E9 TEL: (613) 836-0856 FAX: (613) 836-7183 www.DSEL.ca	PROJECT No.: 20-1195
		FIGURE: 1

INNES ROAD

PAGE ROAD

MER BLEUE ROAD

WATER TOWER

FRANK BENDER STREET

COMMERCIAL LANDS - NOT OWNED BY APPLICANT

VACANT LANDS - OWNED BY APPLICANT

COMMERCIAL LAND - NOT OWNED BY APPLICANT

INNES PARK WOODS

6.0m SERVICING EASEMENT

HIGH DENSITY

STREET 1

STREET 2

STREET 3

STREET 4

STREET 5

STREET 6

STREET 7

STREET 8

STREET 9

STREET 10

STREET 11

STREET 12

STREET 13

STREET 14

STREET 15

STREET 16

STREET 17

STREET 18

STREET 19

PARK

CUT-OFF SWALE

(50) YEAR HGL

(100) YEAR HGL

RETAINING WALL

FENCE

OVERLAND & SERVICING EASEMENT

9.0m SERVICING EASEMENT

HYDRO CORRIDOR

COULOIR DE TRANSPORT D'ÉLECTRICITÉ

COULOIR FUTUR DU TCRA

FUTURE BRT CORRIDOR

EXISTING DITCH

PROPOSED DITCH BY OTHERS

MID-HIGH DENSITY

BRIAN COBURN BOULEVARD

EUC S.W.M POND 1

REMOVE EX. NORTH FOREBAY

NORTH MAIN DEPTH FOREBAY ON 79.00 BOTTOM 80.00 100-YR WL 83.00

NORTH MAIN CBMH PP 80-10

EXISTING SNOW DISPOSAL FACILITY

COMMERCIAL

PARKETTE

MIXED-USE

EMPLOYMENT

HYDRO EASEMENT

INSTITUTIONAL

11.0m SERVICING EASEMENT

NOTE:
CONCEPTUAL ROAD NETWORK PER DEMONSTRATION PLAN. SUBJECT TO CHANGE.

LEGEND:

- STUDY LIMIT
- 163.83 PROPOSED ELEVATION
- 90.48 / 90.48 PROPOSED ELEVATION / EXISTING ELEVATION
- 168.00 EXISTING CONTOUR ELEVATION
- [163.83] PROPOSED ELEVATION BY OTHERS
- STORM POND INLET
- STORM OVERLAND FLOW ARROW
- EXISTING WOODLOT

CUT-FILL DEPTH ALONG CENTER LINE:

CUT DEPTH (m)	FILL DEPTH (m)
0 - 0.5	0 - 0.5
0.5 - 1.0	0.5 - 1.0
1.0 - 1.5	1.0 - 1.5
> 1.5	> 1.5

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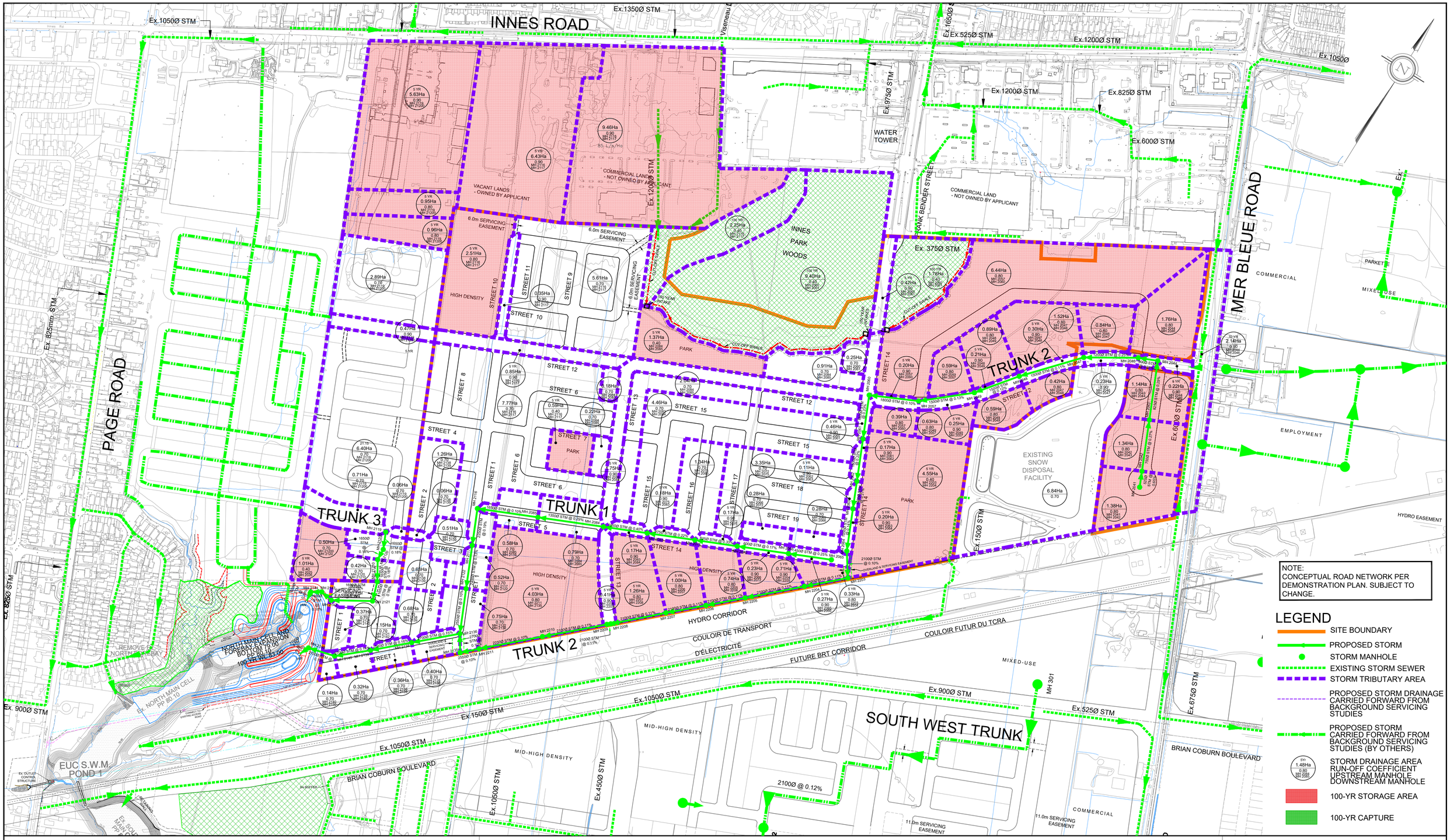
TRAILSEDGE NORTH
GRADING PLAN

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	SEPTEMBER 2020
DRAWING No.	1



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TRAILSEDGE NORTH
CONCEPTUAL STORM SERVICING

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	SEPTEMBER 2020
DRAWING No.	2

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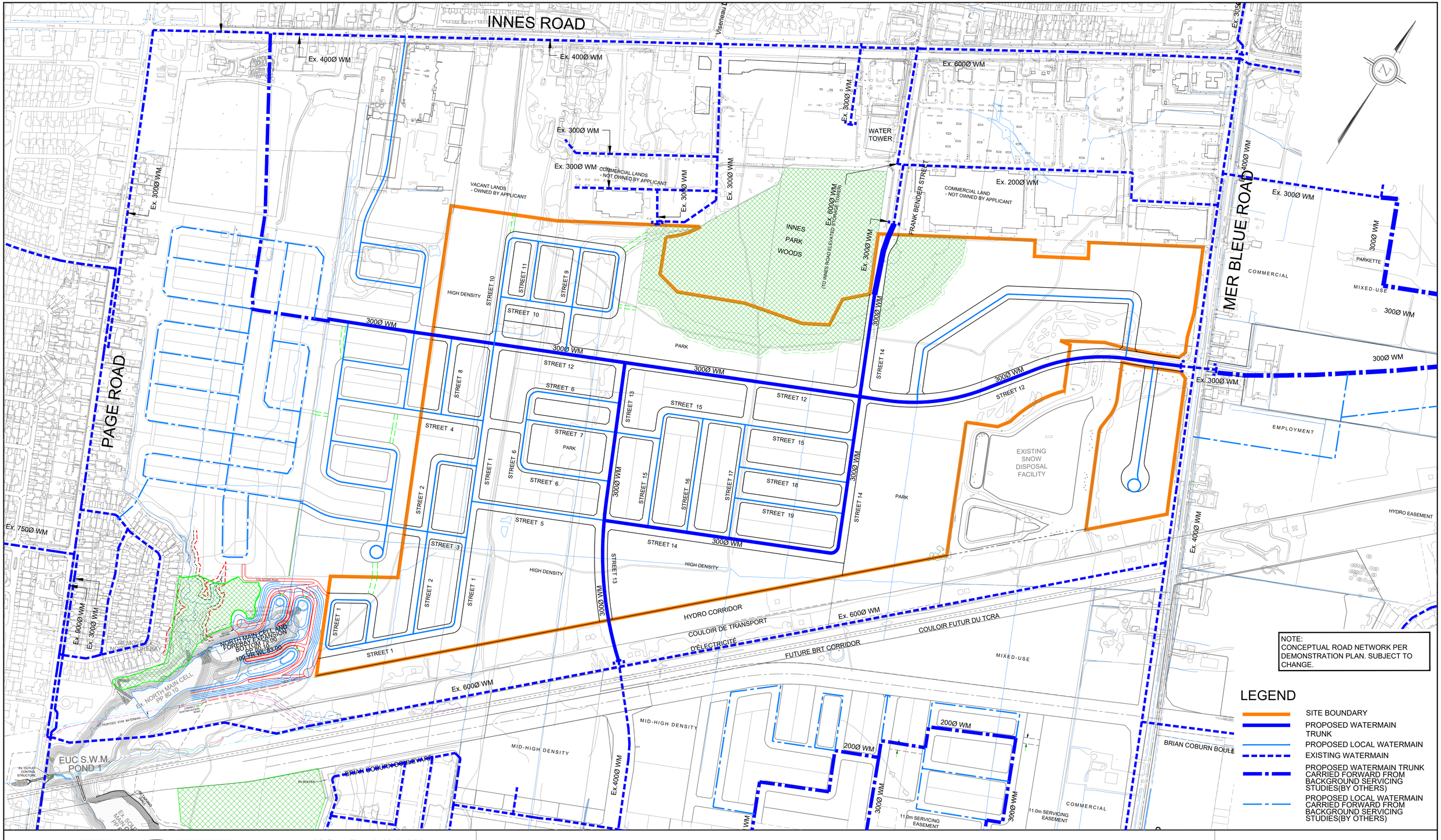
TRAILSEDGE NORTH
CONCEPTUAL SANITARY SERVICING

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	SEPTEMBER 2020
DRAWING No.	3



NOTE:
CONCEPTUAL ROAD NETWORK PER DEMONSTRATION PLAN. SUBJECT TO CHANGE.

LEGEND

- SITE BOUNDARY
- PROPOSED WATERMAIN TRUNK
- PROPOSED LOCAL WATERMAIN
- EXISTING WATERMAIN
- PROPOSED WATERMAIN TRUNK CARRIED FORWARD FROM BACKGROUND SERVICING STUDIES(BY OTHERS)
- PROPOSED LOCAL WATERMAIN CARRIED FORWARD FROM BACKGROUND SERVICING STUDIES(BY OTHERS)

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TRAILSEDGE NORTH
WATERMAIN SERVICING

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	SEPTEMBER 2020
DRAWING No.	4