

Functional Servicing Report – Eastern Avenue Transit Oriented Communities

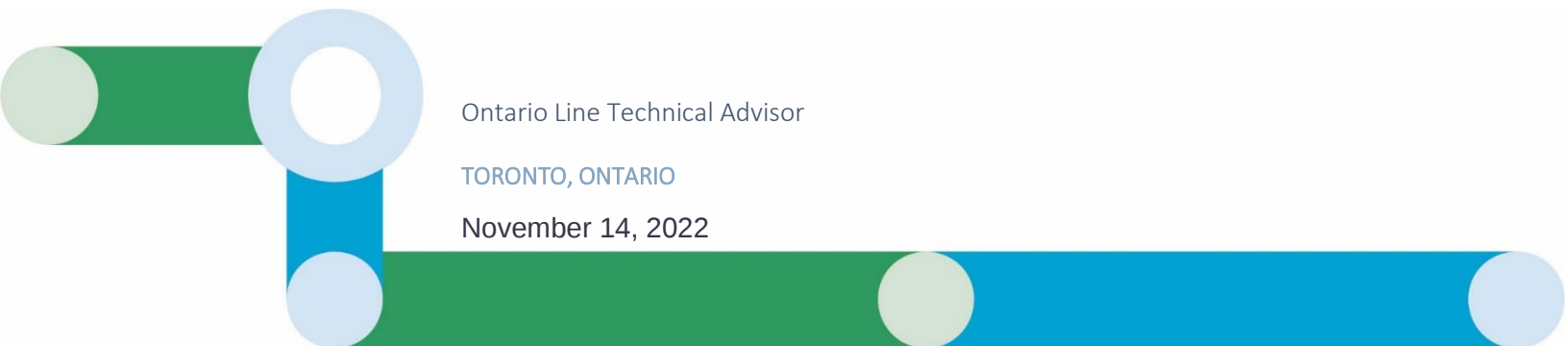
356 Eastern Avenue
Toronto Ontario M4M 1B8

Issued for Rezoning

Contract RFS-2019-NAFC-110

PO 214244

HDR Project 10206938



Ontario Line Technical Advisor

TORONTO, ONTARIO

November 14, 2022

Doug Jackson, PE: Project Manager
Matt DeMarco, PMP: Deputy Project Manager
Tyrone Gan, P. Eng. Principal-In-Charge

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Abbreviations

BMP	Best Management Practice
DRM	Design Requirement Manual
GFA	Gross Floor Area
HGL	Hydraulic Grade Lines
HGRA	High Volume Groundwater Recharge Areas
IBC	Initial Business Case
IDF	Intensity-Duration-Frequency
IO	Infrastructure Ontario
MECP	Ministry of the Environment, Conservation, and Parks
OGS	Oil and Grit Separator
OL	Ontario Line
RCD	Reference Concept Design
SUE	Subsurface Utility Engineering
TGS	Toronto Green Standard
TCM681	Toronto Municipal Code Chapter 681
TOC	Transit Oriented Communities
TSS	Total Suspended Solids
TRCA	Toronto and Region Conservation Authority
WWFMG	Wet Weather Flow Management Guidelines

1 Introduction

The Province of Ontario is planning to build a new 15.5 km rapid transit line serving the City of Toronto. The development of this line is being managed jointly by Metrolinx, the Provincial Transit Agency responsible for the Greater Toronto and Hamilton Area, and IO. TOC are proposed at the OL Stations to integrate high density, mixed-use developments with the transit infrastructure.

HDR Inc. has been retained by Metrolinx to prepare a Functional Servicing Report to assess servicing requirements for the proposed Eastern Avenue TOC near the future OL East Harbour station in the Riverside neighbourhood. This Functional Servicing Report provides a conceptual study for water distribution, sanitary sewer, and storm drainage for the proposed development.

A Stormwater Management Report outlining the proposed stormwater management strategy for this site has been prepared by OneTeam under a separate cover. In preparation of this report, OneTeam staff reviewed the available information for existing utilities and the associated OL RCD plans.

1.1 Site Description

The proposed TOC development is located at 356 Eastern Avenue in the Riverside neighborhood northwest of the Lakeshore East GO Line corridor. It is bounded by Lewis Street to the west, Eastern Avenue to the south, residential homes to the north and Saulter Street to the east. The existing site is an L-shape 5-storey self-storage commercial building with parking spaces on the west side of the site. Refer to **Figure 1-1** for an aerial map of the site.



Figure 1-1 Aerial Map of Proposed Site

1.2 Proposed Development

The proposed development at the site is a 11-storey building which comprises of mostly residential and some non-residential space. The building has an underground parking at the basement level, non-residential space at the ground level, and a green roof for storm water management. The building also has a rail safety crash wall at the southeast side of the building. The proposed parking has space for 35 vehicles and 162 bicycles.

2 Site Condition

2.1 Existing Topography

The site is situated on a generally flat surface consisting of an L-shape five-storey building and a parking lot with an approximate total area of 0.35 Ha. North side of the building slopes gently to the east towards Saulter Street, and the parking lot in the west portion of the site slopes to the west towards Lewis Street.

2.2 Existing Utility Information

The existing utility information surrounding the sites is provided on the Site Servicing Plan attached in Appendix A. Note that all existing utility information is based on the available Quality Levels B, C, and D SUE investigation results. Prior to detailed design and construction, the Development Co shall confirm information on the existing underground and aerial utilities.

2.3 Proposed Site Grading

The proposed grading development is provided in Appendix A.

The site's proposed grading follows the existing topography of the site in general, with elimination of flat terrain in the inner north and west face of the new building to improve drainage. The proposed grading around the TOC allows positive drainage away from the building, with 1 – 3% slopes across the sidewalks, as per the City standard.

3 Water Supply

3.1 Existing Condition

There is a 300 mm watermain along Eastern Avenue and 150 mm watermain along Lewis Street in the vicinity of the site. The site is currently serviced by two water services of unknown pipe size connected to Eastern Avenue watermain and a fire hydrant on Lewis Street side.

3.2 Water Supply

Under the Ontario Building Code (OBC), every dwelling unit shall be supplied with a water distribution system where drinking water is available (Section 9.31.3.1). The OBC also states that every water distribution system shall be connected to a watermain that is part of the municipal drinking water system unless otherwise stated in OBC Article 7.1.5.3.

The OBC also requires that both office space and residential space be built from non-combustible construction, and sprinklered, unless otherwise stated in Subsection 3.2.6 and 3.2.2.7 of the Code. In addition, the OBC does not require fire hydrants within a building but mandates that a hydrant is located within 90 m horizontally of any portion of a building perimeter which is required to face a street.

The watermain network shall be designed and constructed to the latest version of the City of Toronto's *Design Criteria for Sewers and Watermains*. A Site Servicing Plan in **Appendix A** has been prepared to show the potential locations of the watermain service connections to the developments. The water demand for the proposed sites was calculated per City of Toronto's *Design Criteria for Sewers and Watermains (2021)* and using site statistics provided by the architect. Water demand calculation summary is provided in **Table 3-1**.

Table 3-1 Water Demand Calculation Summary

Parameter/ Items	Residential	Commercial
Average Day Water Consumption Rate	190 L/capita/day	190 L/capita/day
Total Site Area	3,514 m ²	
Total GFA	11,348 m ²	907 m ²
Residential units	142	n/a
Residential/Commercial Population	454	21
Peaking Factor – Peak Hour	2.5	1.2
Average Water Demand from Site	0.8 L/s	0.0 L/s
Maximum Day Flow Rate	1.1 L/s	0.0 L/s
Peak Water Demand from Site	2.1 L/s	0.0 L/s

The estimated fire flow requirements for each site were calculated based on recommendations by the *Fire Underwriters Survey Water Supply for Public Fire Protection (1999)* as per City's Guideline. These were determined to be 19,505.10 L/min for the proposed site. Detailed calculations can be found in **Appendix B**.

Water supply to this site is proposed to be serviced from the 300 mm watermain on Eastern Avenue. This connection line will split into a 200 mm fire service and a 150 mm domestic service before entering the building.

The water meters will be in the sprinkler or mechanical rooms inside the building.

Further coordination with the City of Toronto is required to confirm the existing watermain network capacity to support the water demand of the site.

3.3 Hydrant Flow Test

At the time of writing this report, no watermain pressure information was available. It is recommended to conduct a hydrant flow test during the detailed design stage to confirm the adequacy of the watermain pressure to support the proposed development.

4 Sanitary Sewer

4.1 Existing Condition

Available SUE information shows a 150 mm sanitary sewer servicing the existing site connecting to a 300 mm vitrified clay pipe on Lewis Street. Additional existing sewer mains in the vicinity of the site include a 300 mm vitrified clay sanitary sewer and a 1650 mm reinforced concrete sewer on Eastern Avenue, and a 450 mm combined sewer along Saulter Street, and a 450 mm diameter vitrified clay combined sewer on the southeast along Go Line.

The existing 450 mm combined is proposed to be relocated east as part of the “Lakeshore East Joint Corridor – Early Works” contract by others.

4.2 Proposed Sanitary Sewer Flow

Sanitary flows for the proposed developments were calculated based on design parameters from the *City of Toronto Design Criteria for Sewers and Watermains (2021)* and site statistics provided by the architect. **Table 4-1** summarizes the sanitary flow calculation for the proposed development. Detailed sanitary flow calculations are included in **Appendix C**.

Table 4-1 Sanitary Demand Calculation Summary

Parameter/ Items	Residential	Commercial
Sanitary Discharge Rate	450 L/capita/day	n/a
Commercial Average Flow	n/a	180, 000 L/floor ha/day
Total GFA	11,348 m ²	907 m ²
Peaking Factor	4	n/a
Peak Sanitary Flow	2.01 L/s	0.19
Groundwater Discharge to Sanitary Sewer	0.09 L/s	
Maximum Cumulative Flow with Peaking Factor	8.33 L/s	

4.3 Sanitary Sewer Service Connection

Two sanitary sewer connections are proposed for the new building: a 200 mm sanitary service connection to the 300 mm sanitary sewer on Lewis Street on the west side of the building and a 200 mm sanitary service connection to the existing 450 mm combined sewer on Saulter Street on the east side of the new development.

A Site Servicing Plan in **Appendix A** has been prepared to show the potential locations of the sanitary service connections to support the developments. Future coordination with the City of Toronto is required to confirm the existing sanitary and combined sewer network capacity to accommodate the proposed development.

5 Storm Drainage and Stormwater Management

5.1 Existing Condition

The existing site is relatively flat terrain occupied by a five-story commercial building and parking lot, and vegetated areas. Refer to **Figure 1-1** for the existing conditions of the proposed development. East Harbour Station is located in the Don River Watershed. East Harbour Station is within Basement Flooding Study Area 32. The study of which was started in 2006, and completed in 2012, according to the City of Toronto.

The existing parking lot component of the commercial site located at 356 Eastern Avenue is graded to contain runoff on site and direct it to catch basins located at low points. It is assumed that roof drains discharge to the on-site storm sewer system as downspouts discharging to grade are evident. The presence of on-site controls could not be established based on the information received at the time of the preparation of this report. Runoff in excess of the capacity of the on-site storm sewer system ponds in the parking lots and then spills to the adjacent municipal roadways.

Existing storm sewers adjacent to the site include a 450 mm combined sewer flowing from north to south along Saulter Street, which connects into the 900 mm x 600 mm combined sewer on Eastern Avenue. A 450 mm storm sewer flows north to south along Lewis Street, which connects to the 900 mm x 600 mm combined sewer on Eastern Avenue. The 900 mm x 600 mm combined sewer on Eastern Avenue flows east to west, discharging into the Don River. A 1,650 mm combined sewer overflow runs west to east along Eastern Avenue. With the limited information that is currently available, it was assumed that a portion of the existing roof is serviced by the Lewis Street storm sewer and a portion is serviced by the Saulter Street combined sewer. Refer to the attached existing conditions drainage plan in **Appendix D**.

A portion of major flows on Eastern Avenue collect at a low point at the rail corridor underpass immediately east of the proposed development. Major flows on Eastern Avenue, west of the proposed development flow east to west. Major flows on Saulter Street and Lewis Street travel from north to south. A portion of the major flows from the GO tracks flow west onto Saulter Street and into the 356 Eastern Avenue property.

5.2 Stormwater Management Criteria

Stormwater management requirements are specified by the authorities having jurisdiction over the Project. These requirements apply to all locations where the proposed design will influence or be influenced by surface water runoff. The key criteria applicable to this Project are summarized in the following sections.

5.2.1 Quality Control

- Provide a long-term average removal of 80% of TSS from the storm runoff of additional impervious areas (TRCA Guidelines).
- Provide a long-term average removal of 80% of TSS on an annual loading basis from all the storm runoff leaving the site (WWFMG, TGS).
 - OGS are credited with a maximum of 50% TSS removal (WWFMG, TRCA).

5.2.2 Quality/Flood Control

- Provide protection against surface flooding from ponding on streets during the 100-year event. Consult *Toronto Water – Sewer Asset Planning Section* for developments within the City's chronic basement flooding areas (WWFMG).
- Drainage discharged to the municipal storm sewer must be controlled to the peak release rate from the lower of:
 - The existing conditions peak flow from design event with a 2-year return period assuming a runoff coefficient of 0.5, if the existing imperviousness is greater than 50%; and,
 - The existing capacity of the storm sewer (WWFMG).
- In absence of an approved or adequate overland flow route, all flows from the 2-year up to the 100-year return storm events shall be stored on site and released at the allowable release rate as defined above (WWFMG).
- Peak flows should be calculated using the IDF information in the WWFMG.

5.2.3 Water Balance

- Retain all runoff from the 5 mm rainfall event on-site through infiltration, evaporation, and/or rainwater reuse (TGS Version 4 - Tier 1).
- For sites located in HGRA, pre-development groundwater recharge rates should be maintained (TRCA).

5.2.4 Erosion Control

- For infill/redevelopment sites (<2 ha), where the site does not drain to a sensitive watercourse, erosion control should be provided through the retention of a small design rainfall event (typically 5 mm). This is often achieved by satisfying the water balance retention requirement (WWFMG, TRCA).
- For new large development sites (> 5 ha) discharge directly and/or in proximity (within 100 m) of natural watercourses, it is required to complete an Erosion Analysis Report to determine the erosion control criteria for the sites (WWFMG).
- For sites where it is not feasible (this condition must be reviewed and agreed by City staff) to complete an erosion analysis study report, it is typically required that runoff from a 25 mm design storm shall be detained on-site and released over a minimum of 24 hours (WWFMG).

5.3 Stormwater Management Plan

As per the applicable SWM criteria summarized in **Section 5.2**, it is required to provide water balance, as well as quantity, quality, and erosion control for the proposed 356 Eastern Avenue TOC site. The stormwater BMP considered for the site include a green roof, an underground detention/retention tank, catch basin sedimentation separation units, and an OGS unit. The Proposed Conditions Drainage Plan is presented in **Appendix D**.

All building openings shall be protected from flooding. During detail design, depth of overland flow at these locations should be calculated using dual drainage models to

confirm that all openings to the buildings will have sufficient freeboard above the maximum water elevation during the 100-year storm event.

The summary of required storage is presented below in **Table 5-1**.

Quality Control

Storage tanks with orifice controls can be installed in the first underground level to provide the required storage volumes for both catchments 201B and 202B. Controlled runoff from catchment 201B will discharge to the Lewis Street storm sewer and controlled runoff from catchment 202B will discharge to the Saulter Street combined sewer with ultimate discharge to the 900 mm x 600 mm combined sewer on Eastern Avenue.

Water Balance and Erosion Control

The proposed green roof will achieve a retention of 2.7 m³/event, the landscaping will achieve a retention of 2.2 m³/event, and the impervious surface will achieve a retention of 2.7 m³/event through initial abstraction.

Quality Control

A combination of a green roof, landscaping, catch basin shields, water reuse, and an OGS unit will provide the required quality control to the runoff leaving the site.

Table 5-1 Summary of Required Storage

ID	Site Area (ha)		Proposed Green Roof Area (ha)	Required Storage Volume for Quantity Control (m ³)	Required Storage Volume for Quality Control (m ³)	Required Storage Volume for Water Balance Reuse (m ³)
	Exist.	Prop.				
201	0.22	0.10	0.021	35	10	10.2
202	0.31	0.16	0.033	48	12.5	

For details of the stormwater management requirement and design, refer to the Stormwater Management Report under a separate cover.

6 Site Utilities

This site will be serviced by utilities provided by Enbridge Gas, Toronto Hydro, and relevant telecommunications providers. Future utility coordination is required with each utility company to determine the feasibility, requirements, and connection locations for their respective service.

6.1 Electrical Service

Electrical services will be provided by Toronto Hydro. Surveys currently show existing Toronto Hydro conduits within the vicinity of all proposed developments, including an existing electrical service connection to the existing building. The developer is to initiate discussions with Toronto Hydro to determine the requirements and connection locations for electrical service.

6.2 Gas Service

Gas service will be provided by Enbridge Gas. There is a 750 mm gas main and an abandoned gas main on the Eastern Avenue. There are a 600 mm and 300 mm abandoned gas main and an active 150 mm gas main on Lewis St. The developer is to initiate discussions with Enbridge Gas to determine the connection requirements and locations of gas service to the proposed site.

6.3 Communication

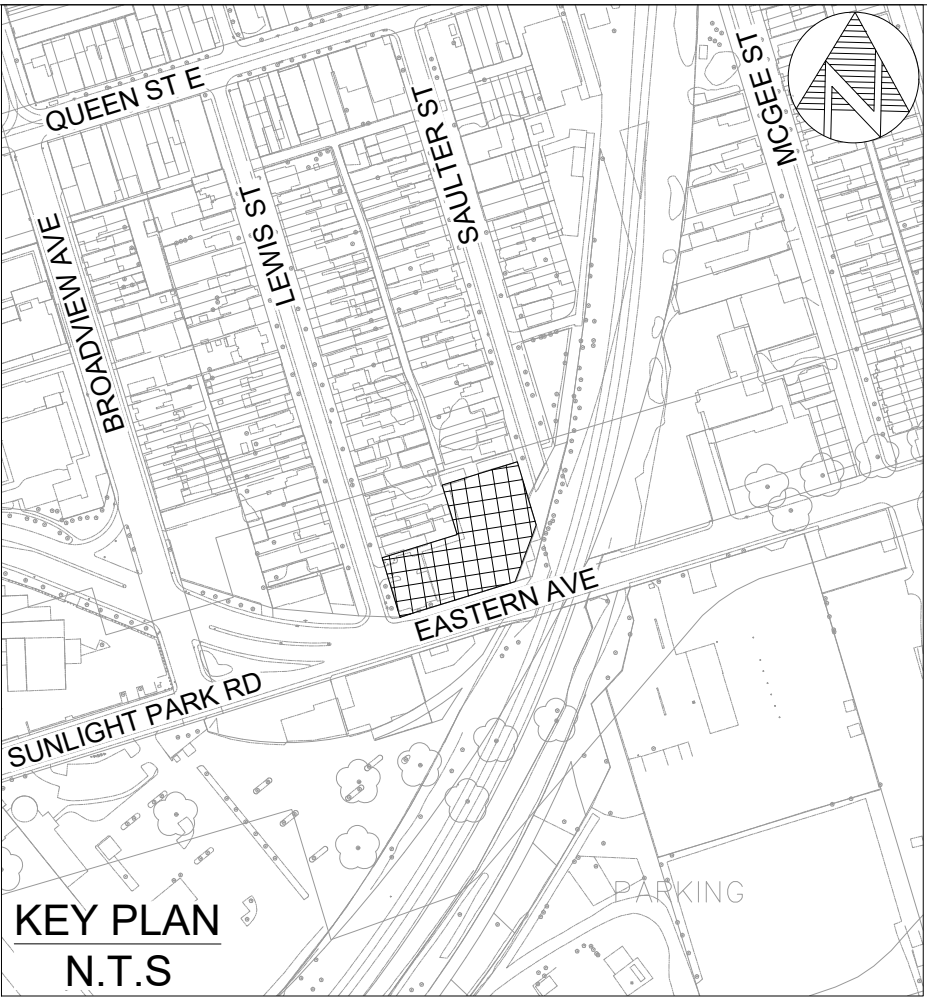
Surveys currently show cables from Rogers, Beanfield, Telus and Bell traversing the extent of all sites. The developer is to coordinate with the relevant communication systems provider to determine connection requirements.

7 Conclusions and Summary

A Functional Servicing Report has been prepared to support a preliminary rezoning submission for the proposed TOC development at 356 Eastern Avenue in the City of Toronto. Due to limitations in the available existing utility information, this report focuses on the proposed development water demand, sanitary demand, and stormwater management requirements.

To confirm the capacity of the existing water and sewer infrastructure to accommodate the proposed TOC, further studies and coordination with the City of Toronto are needed during the detailed design phase.

Appendix A. Site Servicing Plan and Grading Plan



 PROPOSED STORM CONNECTION
 PROPOSED SANITARY CONNECTION
 PROPOSED WATER CONNECTION

1. EXISTING UTILITY INFORMATION SHOWN IS BASED ON SUBSURFACE UTILITY ENGINEERING (SUE) QL-B, QL-C AND QL-D. ALL LOCATIONS AND DEPTH ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR CONSTRUCTION.
2. FOR PROPOSED PUBLIC UTILITY RELOCATION WITHIN ROW, REFER TO CIVIL RELOCATION PLANS. DRY UTILITY RELOCATIONS TO BE CONFIRMED WITH PRIVATE UTILITY COMPANIES.
3. NOT ALL AERIAL UTILITIES HAVE BEEN IDENTIFIED OR SHOWN ON THIS PLAN.
4. FINAL SITE SERVICING WILL BE AS PER TOC DESIGN DEVELOPMENT

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3		6	

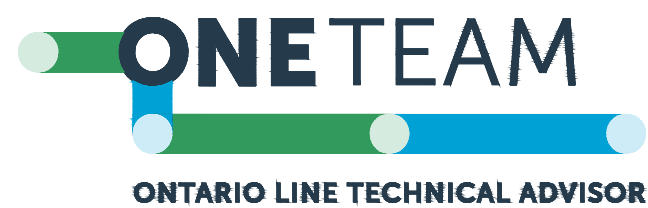
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DD MONTH YYYY

STATUS



DESIGNED L. KIM
DRAWN O. GARGAT
CHECKED
APPROVED

EASTERN AVENUE TOC

SERVICING PLAN

Plot Date: 11 November 2022



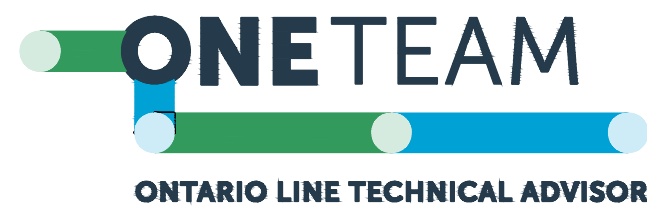
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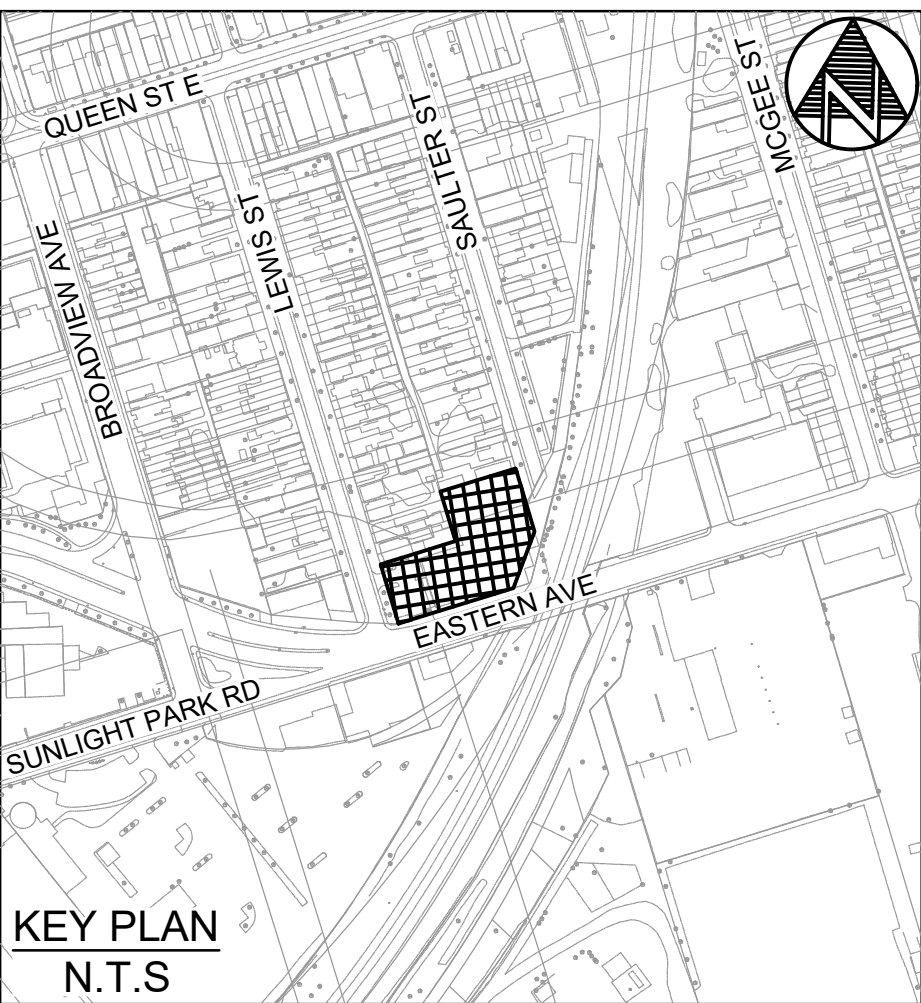
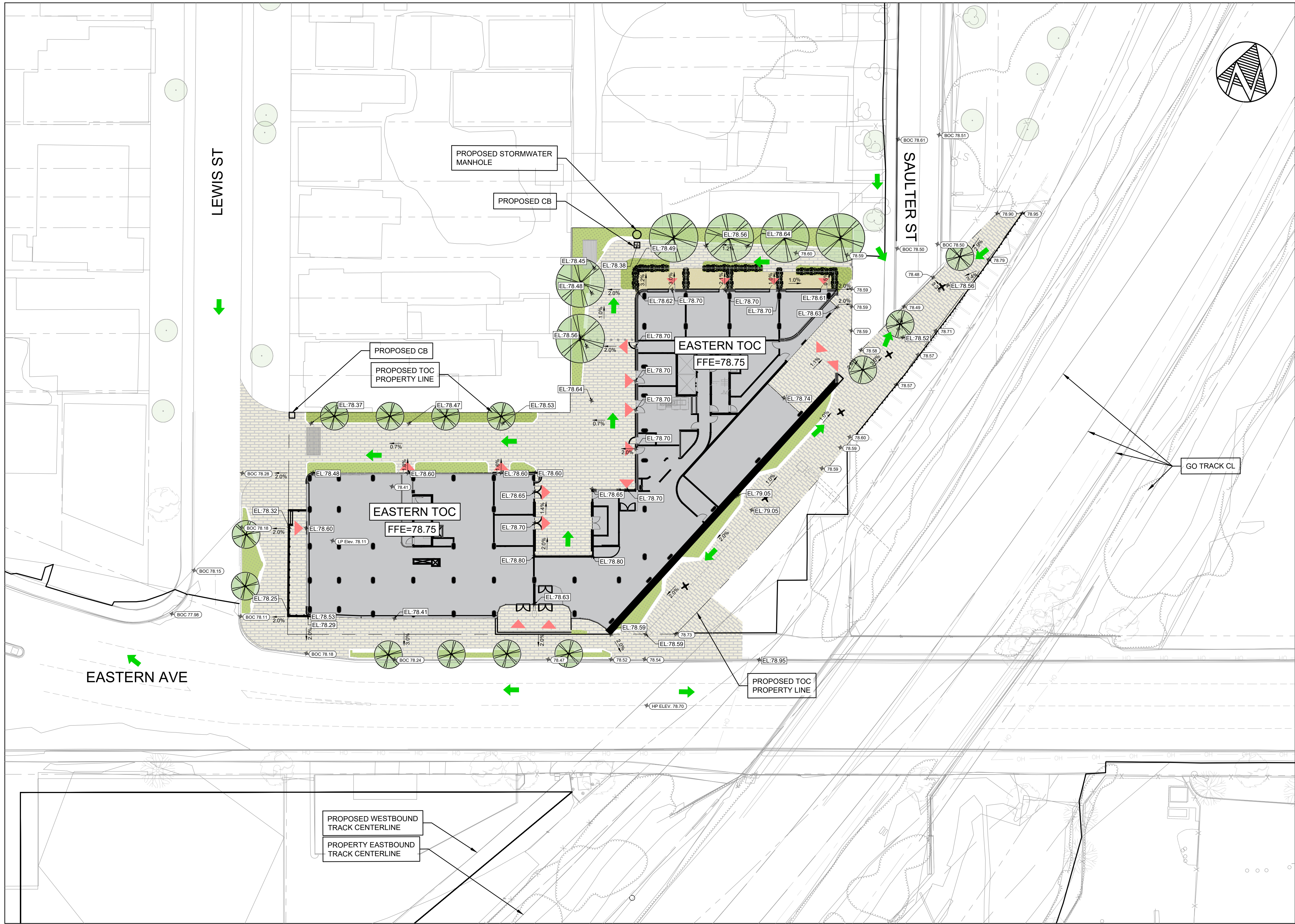
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DESIGNED: L. KIM
DRAWN: O. GARGAT
CHECKED: _____
APPROVED: _____

PROJECT ONTARIO LINE SUBWAY		Plot Date: 14 November 2022	
TITLE EASTERN AVE TOC GRADING PLAN		 Infrastructure Ontario	
Dwg. No. SS0500-04-SF003		Sheet No.	



- LEGEND**
- EXISTING ELEVATION
 - EXISTING BACK OF CURB ELEVATION
 - PROPOSED ELEVATION
 - GRADING SLOPE
 - OVERLAND FLOW DIRECTION
 - BUILDING ENTRANCE
- NOTE**
- ALL GRADES WITHIN THE REGULATORY FLOOD PLAIN WILL BE MAINTAINED OR MATCHED.
 - THE EXISTING DRAINAGE PATTERN IN THE AREA OF THE SITE SHOULD BE MAINTAINED.
 - ALL DRAINAGE TO BE COLLECTED AND APPROPRIATELY CONTROLLED, TREATED, AND DISTRIBUTED AS PER CITY OF TORONTO STANDARDS.
 - CURRENTLY GRADING IS BASED ON LIDAR SURVEY. GRADES TO BE CONFIRMED WITH DETAIL SURVEY. GRADING TO FOLLOW CITY OF TORONTO STANDARDS.
 - FINAL SITE GRADING WILL BE AS PER TOC DESIGN DEVELOPMENT.
 - FIRST FLOOR ELEVATIONS (FFE) ARE SHOWN BASED ON CURRENT INFORMATION IN THE ARCHITECTURAL DRAWINGS. FFE SHOULD BE CONFIRMED DURING DETAILED DESIGN.

Appendix B. Water Demand Calculation

DESIGN CALCULATION
Water Demand and Fire Flow Demand

Location: Eastern Avenue TOC

Items	Water Demand Calculation		Remark
Site Parameters			
Average Day Water Consumption Rate	190 l/capita/day		Multi-unit high-rise = 190 litres / capita /day (City of Toronto Design Criteria for Sewers and Watermain)
Total Site Area	3514	Sq.m	
Total GFA	Residential	Non-Residential	
	11348	907	Sq.m
Residential Units	142	n/a	
Residential/Non-Residential Population	454	21	Occupant load from Arch Stats
Peaking Factor			
	Residential	Non-Residential	
Minimum hour	0.84	0.84	
Peak Hour	2.5	1.2	
Maximum Day Factor	1.3	1.1	
Friction Factors			
300mm to 600mm	120.0 'C' Factor		
	Residential	Non-Residential	
Average Consumption Rate - L/s	0.8	0.00	Population x Average consumption
Maximum Day Flow Rate - L/s	1.1	0.00	Population x Average consumption x Maximum Day Factor
Peak Hour Flow Rate - L/s	2.1	0.00	Population x Average consumption x Peak Hour Factor
Items			
Fire Flow Demand Calculation		Remark	
Fire Flow Requirement (Fire Underwriter's Survey Guideline)			
19505.1 L/min		$F=220 C * A^{0.5}$ (Fire Underwriter's Survey Guidelines)	
F= the required fire flow in L/min C= the coefficient related to the type of construction A= the total floor area in square metres (All floors excluding Basement, under 2-Stores) Coefficient related to Construction=0.8 (Type II Non Combustible Construction)			
Fire Flow (F)		19505.1 L/min	

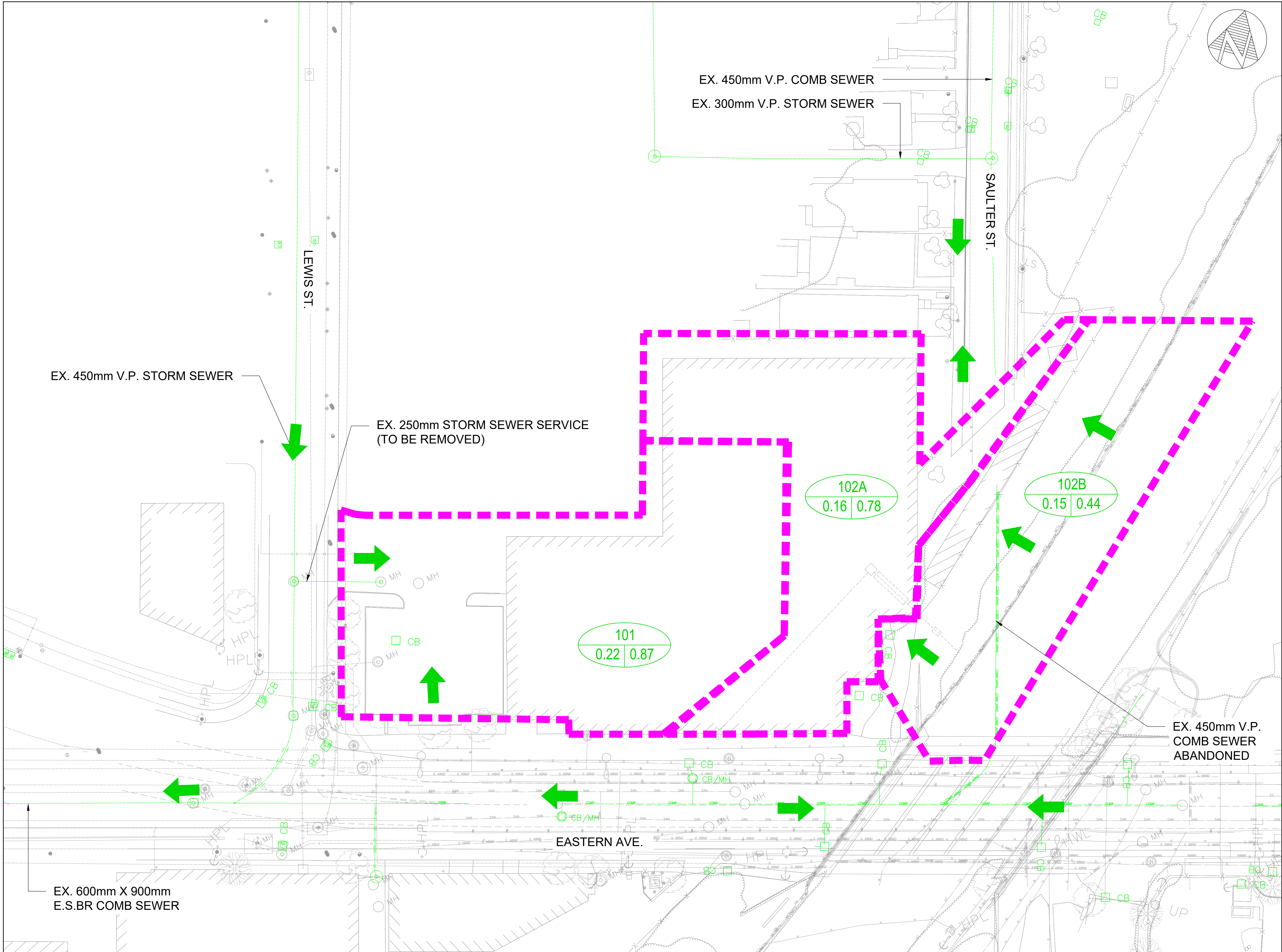
Appendix C. Sanitary Flow Demand Calculation

DESIGN CALCULATION
Sanitary Flow Demand

Location: Eastern Avenue TOC

Items		Water Demand Calculation		Remark
Site Parameters				
Average waste water flow		450	l/capita/day	Multi-unit high-rise = 450 litres / capita /day <i>(City of Toronto Design Criteria for Sewers and Watermain)</i>
Non-Residential average flow		180000	l/floor hectare/day	Commercial = 180000 litres/ floor hectare / day <i>(City of Toronto Design Criteria for Sewers and Watermain)</i>
Total Site Area		3514	Sq.m	
Total GFA		Residential	Non-Residential	
		11348	907	Sq.m
Residential Units		142	n/a	
Residential/Non-Residential Population		454	21	Occupant loads from Arch Stats
Peaking Factor		Residential	Non-Residential	
Residential peak factor (PF=)		4	n/a	<i>Commercial peak factor is included in average flow</i>
Extraneous Flow				
Infiltration allowance (all area)		0.26	l/s/ha	
Residential Flow		2.36	l/s	
Non-Residential Flow		0.19	l/s	
Infiltration Flow		0.09	l/s	
Maximum Cumulative Flow with peaking factor		9.74	l/s	

Appendix D. Drainage Plan



NOTES:

- EXISTING UTILITY INFORMATION SHOWN IS BASED ON SUBSURFACE UTILITY ENGINEERING (SUE) QL-B, QL-C AND QL-D. ALL LOCATIONS AND DEPTH ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR CONSTRUCTION.
- FOR PROPOSED PUBLIC UTILITY RELOCATION WITHIN ROW, REFER TO CIVIL RELOCATION PLANS. DRY UTILITY RELOCATIONS TO BE CONFIRMED WITH PRIVATE UTILITY COMPANIES.
- NOT ALL AERIAL UTILITIES HAVE BEEN IDENTIFIED OR SHOWN ON THIS PLAN.
- EXHIBIT TO BE UPDATED AS NEW INFORMATION IS MADE AVAILABLE.

LEGEND

- EXISTING STORM CATCHMENT
- DRAINAGE AREA ID
RUNOFF COEFFICIENT
DRAINAGE AREA (ha)
- OVERLAND FLOW DIRECTION
- EXISTING STORM SEWER
- EXISTING COMBINED SEWER

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PLOTTED BY: FEHLINGS, NICHOLAS

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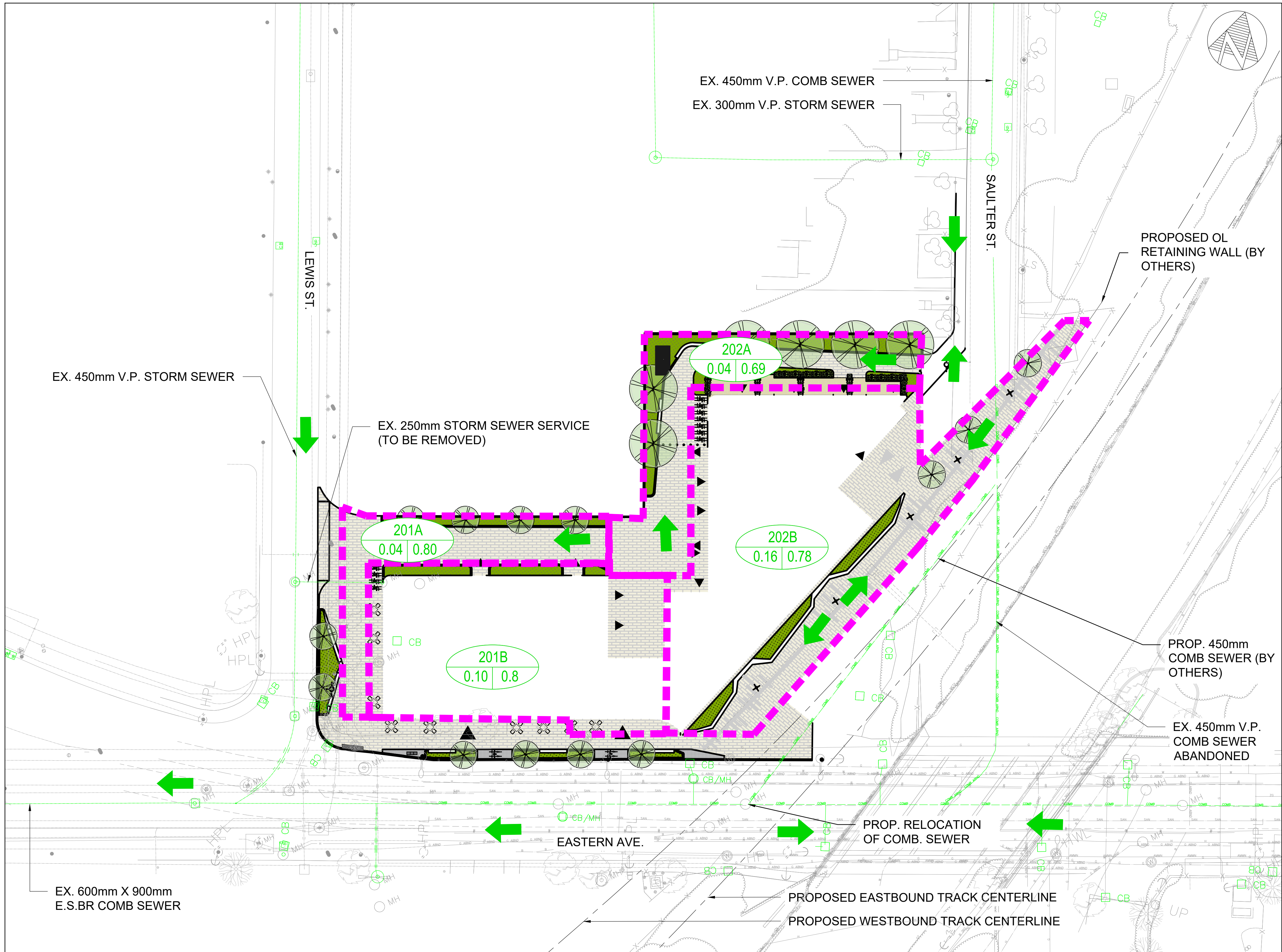


DESIGNED	D. NUTTALL
DRAWN	N. FEHLINGS
CHECKED	D. NUTTALL
APPROVED	D. NUTTALL

ONTARIO LINE SUBWAY EASTERN AVENUE TOC	
TITLE	EXISTING DRAINAGE PLAN

Plot Date: 8 November 2022	
METROLINX	
Infrastructure Ontario	
Dwg. No.	Sheet No.

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PLOTTED BY: FEHLINGS, NICHOLAS



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- NOT ALL AERIAL UTILITIES HAVE BEEN IDENTIFIED OR SHOWN ON THIS PLAN.
- EXHIBIT TO BE UPDATED AS NEW INFORMATION IS MADE AVAILABLE.

LEGEND

- PROPOSED STORM CATCHMENT
- DRAINAGE AREA ID
RUNOFF COEFFICIENT
DRAINAGE AREA (ha)
- OVERLAND FLOW DIRECTION
- EXISTING STORM SEWER
- EXISTING COMBINED SEWER

REVISIONS		REVISIONS	
1		4	
2		5	
3		6	

RCD NOT FOR CONSTRUCTION DD MONTH YYYY	
SCALE(S) 1:300	STATUS



DESIGNED	D. NUTTALL
DRAWN	N. FEHLINGS
CHECKED	D. NUTTALL
APPROVED	D. NUTTALL

ONTARIO LINE SUBWAY EASTERN AVENUE TOC	
PROPOSED DRAINAGE PLAN	

Plot Date: 8 November 2022	
METROLINX Infrastructure Ontario	
Dwg. No.	Sheet No.