DRAFT Functional Servicing Report – Gerrard-Carlaw South TOC

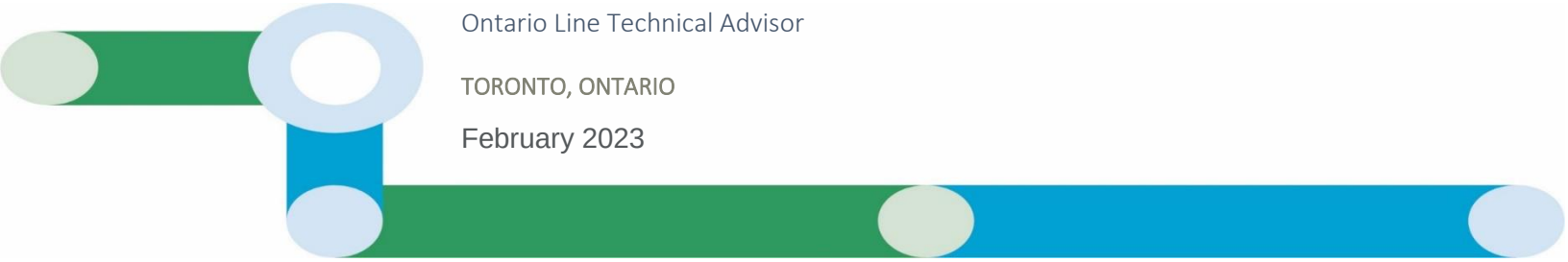
Thackeray block, Carlaw block, Badgerow block, Dickens block

Issued for Rezoning Draft Report

Contract RFS-2019-NAFC-110

PO 214244

HDR Project 10206938



Ontario Line Technical Advisor

TORONTO, ONTARIO

February 2023

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

Disclaimer

The material in this report reflects HDR's professional judgment considering the scope, schedule and other limitations stated in the document and in the contract between HDR and the client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, HDR did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that HDR shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party resulting from decisions made or actions taken based on this document.

In preparing this report, HDR relied, in whole or in part, on data and information provided by the Client and third parties that was current at the time of such usage, which information has not been independently verified by HDR and which HDR has assumed to be accurate, complete, reliable, and current. Therefore, while HDR has utilized its best efforts in preparing this report, HDR does not warrant or guarantee the conclusions set forth in this report which are dependent or based upon data, information or statements supplied by third parties or the client, or that the data and information have not changed since being provided in the report. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that HDR shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party resulting from decisions made or actions taken based on this document.

Contents

Figures

Tables

Appendices

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 Infrastructure Ontario (IO). Trainsit Oriented Comunities (TOC) are proposed at the Ontario Line (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 the servicing requirements related to the proposed Gerrard Carlaw South TOC at two separate sites in the Leslieville neighborhood south of the proposed Gerrard Station. This Functional Servicing Report provides a conceptual study for water distribution, sanitary sewer, and storm drainage for the proposed developments.

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 Refence Concept Design (RCD) plans.

1.1 Site Description

The proposed development is located at the intersection of Carlaw Avenue and Dickens Street and includes two sites: 388 Carlaw Avenue and 10 Dickens Street.

The 388 Carlaw Site, which includes Thackeray block, Carlaw block and Badgerow block, is located east of Thackeray Street, bounded by Carlaw Avenue on the east, Dickens Street on the south and GO Line corridor on the north. The existing site consists of multiple two- and three-storey commercial buildings.

The 10 Dickens Site, which includes Dickens block, is situated west of Thackeray Street and bounded by Logan Avenue on the west, Dickens Street on the south and GO Line corridor on the north. The existing site is used as a parking lot.

An aerial map of the proposed development is shown on **Figure 1-1**.

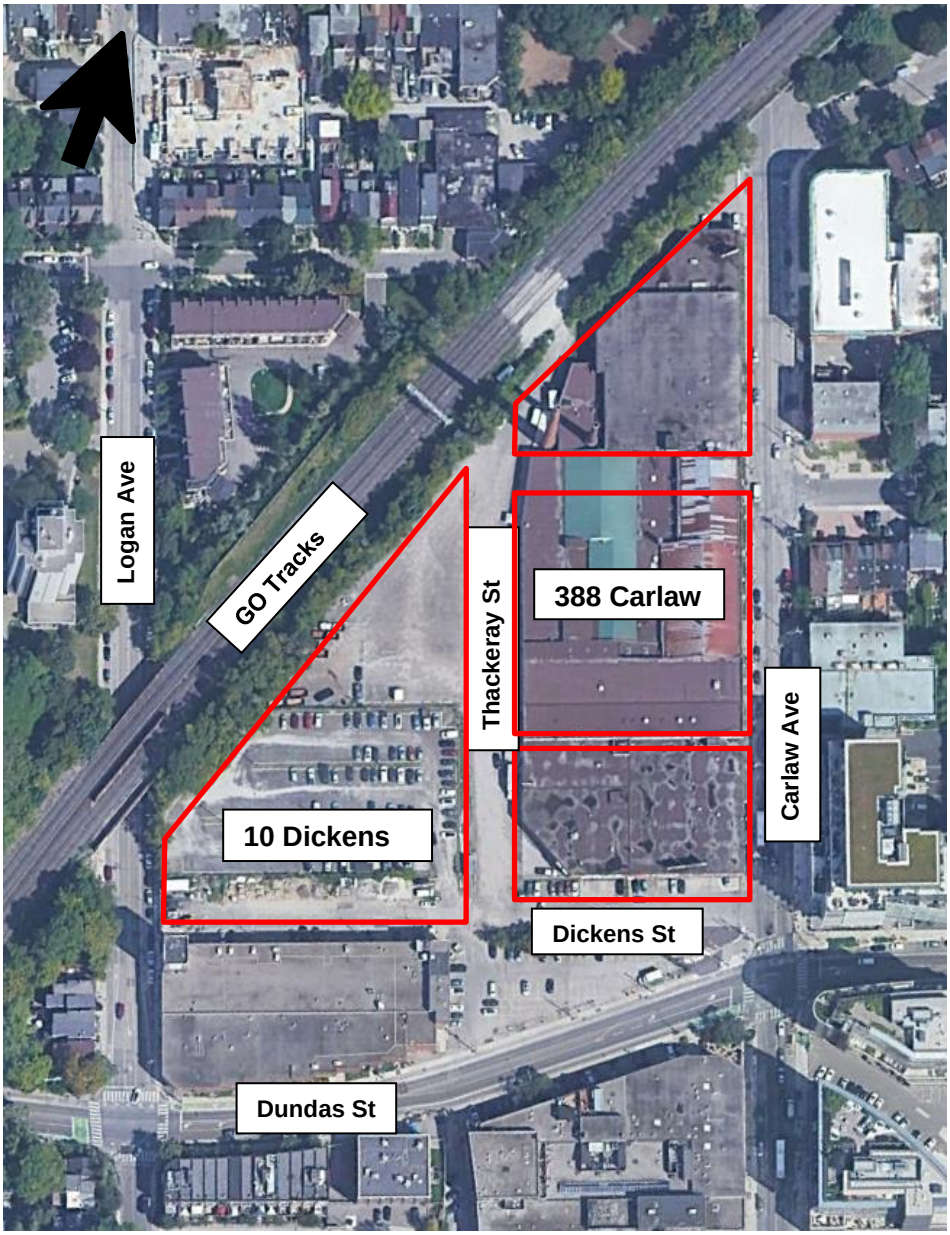


Figure 1-1 Proposed Site Aerial Map

1.2 Proposed Development

Based on the RCDs, the proposed development consists of mixed-use buidlings at both Sites.

At 388 Carlaw Site there are three proposed blocks: Thackeray block, Carlaw block, and Badgerow block.

Thackeray block is located at the north-west corner of Dickens Street and Carlaw Avenue intersection and includes a 12-story building. Carlaw block is located between Thackeray Street and Carlaw Avenue and consists of a 23-storey building with retail and general commercial space on the first floor. Thackeray block and Carlaw block share underground and parking space.

Badgerow block is located at the north-west corner of Carlaw Avenue and future Thackeray Street extension intersection and includes a 8-storey office building.

At 10 Dickens Site there is a proposed Dickens block.

Dickens block is located at the west corner of Dickens Street and Thackeray Street intersection. The proposed mixed use building has two towers, a 30-storey tower and a 39-storey tower, connected with a 6-story building.

2 Site Condition

2.1 Existing Topography

388 Carlaw Site has approximate area of the is 1.14 Ha. An existing two-storey building is currently situated on the northeast corner of the site, and a single-storey attached auto services building is located directly southeast of the site. The slope on Carlaw Avenue is generally flat where the flow is going from north to south towards Dundas St. The site also features a gentle, less-pronounced slope from north to south, with a concrete sidewalk and landscape features on Carlaw Avenue.

10 Dickens Site has an approximate area of 0.75 Ha. The existing ground condition of the parking lot at 10 Dickens Site is generally a gentle sloped terrain sloping towards Dickens Street. The slope on Logan Avenue is going from south to north and the parking lot in the 10 Dickens Site are also sloping inwards towards Dickens Street and Thackeray Street. The joint corridor rail is draining towards Dickens Street and Thackeray 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 Quality Levels B, C, and, D Subsurface Utility Engineering (SUE) investigation. Prior to detailed design and construction the Development Co shall confirm information on the existing underground and aerial utilities.

Based on the available information there are multiple abandoned existing pipelines filled with nitrogen along Thackeray Street. The Development Co shall confirm with the pipeline companies if the pipelines are still in place and consider their requirements during a detailed design phase, as needed.

2.3 Proposed Site Grading

The proposed grading at the 388 Carlaw Site provides relatively gentle slope to the east towards Carlaw Ave and to the south towards Dickens Street, and allows positive drainage from the site.

The proposed grading at the 10 Dickens Site provides a slope to the east towards Thackeray Street and to the south towards Dickens Street.

The proposed grading around the future TOC blocks allows positive drainage away from the buildings, with 1 – 3% slopes across the sidewalks, as per the City standard.

The proposed grading plan is provided in **Appendix A**.

3 Water Supply

3.1 Existing Condition

The existing watermain infrastructure in the vicinity of the proposed TOC includes a 300 mm watermain on Dickens Street, as well as a 150 mm and 300 mm watermains on Carlaw Avenue.

Based on presently available information, there are multiple water service connections to the existing watermains along Dickens Street and Carlaw Avenue.

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 will 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 in accordance with City of Toronto's *Design Criteria for Sewers and Watermains (2021)* and using site statistics provided by the architect. Calculation summaries for the 388 Carlaw Site and the 10 Dickens Site are provided in **Table 3-1** and **Table 3-2**, respectively, and detailed water demand calculations can be found in **Appendix B**.

Table 3-1 388 Carlaw Water Demand Calculation Summary

Parameter/ Items	Residential	Commercial
Average Day Water Consumption Rate	190 L/capita/day	190 L/capita/day
Total Site Area	13,002 m^2	
Total GFA	43,986 m^2	13,000 m^2
Residential units	569	N/a
Residential / commercial population	1,537	143
Peaking factor	2.5	1.2
Average Water Demand from Site	3.4 L/s	0.3 L/s
Peak Water Demand from Site	8.4 L/s	0.4 L/s

Table 3-2 10 Dickens Water Demand Calculation Summary

Parameter/ Items	Residential	Commercial
Average Day Water Consumption Rate	190 L/capita/day	190 L/capita/day
Total Site Area	7,690 m^2	
Total GFA	55,628 m^2	416 m^2
Residential units	744	n/a
Residential / commercial population	2,009	5
Peaking factor	2.5	1.2
Average Water Demand from Site	4.4 L/s	0.0 L/s
Peak Water Demand from Site	11.0 L/s	0.0 L/s

The estimated fire flow requirements were calculated based on recommendations by the City of Toronto's Fire flow requirement. These were determined to be 41,665.6 L/min for the 10 Dickens Site, and 42,014.3 L/min for the 388 Carlaw Site. It must be noted that these values were calculated without factoring in the adjustment factors based on building occupancy, construction, and sprinkler coverage. The fire flow requirements is expected to be further reduced at the detailed design stage, once building construction and usage information has been determined. Detailed calculations can be found in **Appendix B**.

For the 10 Dickens Site there are four proposed water service connections. On the north-east side of the building there are two proposed 200 mm water services connected to the existing 300 mm watermain on Dickens Street via a 300 mm proposed watermain along Thackeray Street. Both 200 mm water services will split into a 200 mm fire service and a 150 mm domestic service before entering the building. On the south side of the building there are two proposed 250 mm water services connected to the same 300 mm watermain on Dickens Street. Both 250 mm water services split into a 250 mm fire service and a 200 mm domestic service before entering the building.

For the 388 Carlaw Site, there are four proposed water service connections to the existing 300 mm watermain on Carlaw Avenue. The water service connections will be 200 mm sized and will split into a 150 mm domestic watermain service and a 200 mm fire watermain service before entering the building. Water service for the Carlaw block will be connected to the existing watermain on Carlaw Avenue via the proposed 300 mm watermain along the future Thackeray Street Extension.

According to the City of Toronto standards, the proposed TOC buildings 84 m and higher are serviced by two water connections.

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

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. The locations and number of hydrants shall be confirmed during the detailed design stage.

4 Sanitary Servicing

4.1 Existing Condition

The existing sanitary sewer infrastructure in the vicinity of the proposed TOC includes the following:

Along Carlaw Avenue there is a 1,800 mm sanitary sewer, and two combimed sewer lines: a 600 mm x 900 mm combined sewer and a 300 mm combined sewer.

Along Dickens Street there are a 2,700 mm and a 1,825 mm sanitary sewer lines, and a 525 mm and a 375 mm combined sewer lines.

Available SUE surveys of the area do not show any existing sanitary service connections to the 388 Carlaw and 10 Dickens Site. Further investigation on site will be needed prior the detailed design stage.

4.2 Proposed Sanitary Flow

Sanitary flows for the proposed developments were calculated based on design parameters from the City of Toronto Design Criteria for Sewers and Watermains (2019) and site statistics provided by the architect. **Table 4-1** and **Table 4-2** summarise the sanitary flow calculations for the proposed developments and detailed sanitary flow calculations are included in **Appendix C**.

Table 4-1 10 Dickens Site Development Sanitary Demand Calculation Summary

Parameter/ Items	Residential	Commercial
Sanitary Demand Rate	450 L/capita/day	N/a
Commercial Average Flow	n/a	180,000 L/floor ha/day
Total GFA	55,628 m^2	416 m^2
Peaking Factor	3.6	n/a
Peak Sanitary Flow	10.46 L/s	0.09 L/s
Groundwater Discharge to Sanitary Sewer	0.20 L/s	
Maximum Cumulative Flow with Peaking Factor	37.96 L/s	

Table 4-2 388 Carlaw Site Development Sanitary Demand Calculation Summary

Parameter/ Items	Residential	Commercial
Sanitary Demand Rate	450 L/capita/day	N/a
Commercial Average Flow	n/a	180,000 L/floor ha/day
Total GFA	43,986 m^2	13,000 m^2
Peaking Factor	3.7	n/a
Peak Sanitary Flow	8.01 L/s	2.71 L/s
Groundwater Discharge to Sanitary Sewer	0.34 L/s	
Maximum Cumulative Flow with Peaking Factor	32.67 L/s	

4.3 Sanitary Service Connection

At 388 Carlaw Site the three development blocks will each have a separate sanitary connection.

Thackerary block will have a 250 mm sanitary servicing connection to the 1,800 mm sanitary sewer on Carlaw Avenue.

Carlaw block will have two sanitary connections: a 200 mm sanitary connection at the north side of the building is connected to the 1,800 mm sanitary sewer on Carlaw Avenue and a 250 mm sanitary connection at the west side of the building is connected to the 2,700 mm sanitary sewer on Dickens Street via the proposed 300 mm sanitary sewer line along Thackeray Street.

Badgerow block will have a proposed 150 mm sanitary servicing connection connecting to the 1,800 mm sanitary sewer on Carlaw Avenue.

At 10 Dickens Site there are two proposed sanitary sewer comnnections for the Dickens block: a 300 mm sanitary sewer connection at the south side of the building is connected to the 2,700 mm sanitary on Dickens Street, and a 300 mm sanitary sewer connection at the east side of the building is connected to the same 2,700 mm sanitary sewer on Dickens Street via the proposed 300 mm sanitary sewer line along Thackeray Street.

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

5 Storm Drainage and Stormwater Management

5.1 Existing Condition

There are two site developments proposed on the northwest and northeast sides of the intersection of Dickens Street and Thackeray Street. There is a parking lot on the west side of Thackeray Street and two to three-story interconnected commercial buildings on the east side. The Gerrard block is not within a Toronto Region Conservation Authority (TRCA) riverine watershed but are part of the Lake Ontario Waterfront area and is within the Basement Flooding Study Area 3. **Figure 1-1** shows an aerial image of the subject sites' location.

The existing parking lot component at 10 Dickens Street is graded to convey runoff from the site to the catch basins located on Dickens Street. It is also assumed that the downspout drainage discharge from the building roofs at 388 Carlaw Avenue to the storm sewer systems on Carlaw Avenue. Based on the existing grading surfaces, there are offsite flows from the GO Lines in the Joint Rail Corridor that are currently incoming to the proposed TOC site locations. There is a retaining wall at the northwest corner of the site, adjacent to the joint corridor that directs the runoff from the rail to Logan Avenue. There are gabion baskets between the rail and the northeast corner of the building at 388 Carlaw where water infiltrates in the vegetated area and there is no off-site drainage. The parking lot at the northeast corner of the building at 388 Carlaw drains towards Carlaw Avenue. Please refer to the attached existing drainage plan in **Appendix D**.

Existing storm drainage adjacent to the 10 Dickens site include a 450 mm Combined sewer and a 675 mm storm sewer on Logan Avenue. There is a 375 mm combined sewer that runs from west to east on Dickens Street and increases in size to a 525 mm combined sewer. Furthermore, there is also a 1,050 mm x 1,475 mm storm sewer, 600 mm x 900 mm combined sewer, and a 300 mm combined sewer flowing southward on Carlaw Avenue.

Major flows on Thackeray Street flow from north to south into Dickens Street. Major flows on Dickens Street travel from west to east. Major flows on Carlaw Avenue from north of Badgerow Avenue flow north towards Gerrard Street East. Major flows on Carlaw Avenue starting from south of Badgerow Avenue flow from north to south towards Dickens Street.

With the limited information that is currently available, it is not possible to further comment on the existing drainage.

5.2 Stormwater Management Criteria

Stormwater management requirements are specified by the authorities having jurisdiction over the Project. These requirements are applicable to all locations where the proposed design will influence or be influenced by surface water runoff. The stormwater management design criteria are described below and supplemented by the Project Specific Output Specifications (PSOS). 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 total suspended solids (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 (Wet Weather Flow Management Guidelines (WWFMG), Toronto Green Standard (TGS)).
    - Oil and Grit Seperator (OGS) devices are credited with a maximum of 50% TSS removal (WWFMG, TRCA).

5.2.2 Quantity/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 the 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 Intensity-Duration-Frequency (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 (WWFMG, TGS Version 4 - Tier 1).
- For sites located in High Volume Groundwater Recharge Areas (HGRA), pre-development groundwater recharge rates should be maintained (TRCA).

5.2.4 Erosion Control

- For residential infill development (between 0.1 ha and 5 ha) where storm/combined sewer infrastructure exists, erosion control is not required unless the site is located in close proximity to natural watercourse (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 Gerarrd TOC site. The stormwater best management practices (BMP) considered for the site include a green roof, underground detention/retention tanks, and OGS units. The Proposed Conditions Drainage Plan is presented in **Appendix D**.

All building openings should 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 RCD satisfies SWM and drainage requirements for the Proposed Gerrard Sites as follows:

- **Quantity Control:**

  Storage tank units with orifice controls are proposed in the first underground level to provide quantity control. The required storage volumes are 234 m^3, 110 m^3, and 254 m^3 for Dickens block, Badgerow block, and Carlaw blocks respectively, released over 24 hours.

- **Quality Control:**

  Quality control for each site will be provided via the proposed green roof along with inline treatments, the water retained in the storage tanks for reuse, and OGS units. The required storage volumes are 28 m^3, 11 m^3, and 55 m^3 for Dickens block, Badgerow block, and Carlaw blocks respectively to meet quality requirements.

- **Water Balance:**

  Green roof and water reuse are proposed to satisfy the 5 mm retention requirement. Reuse volume for quality control will satisfy the water balance requirements.

- **Minor Drainage System:**

  Water captured from the roofs of the building will be discharged into the existing storm/combined sewer systems after receiving quality and quantity treatment.

- **Major Drainage System:**

  Major system drainage patterns will be generally maintained under proposed conditions. For the proposed aboveground structures, major system flows will be captured and controlled using underground storage.

Table 5-1 Summary of the Required Storage

ID	Area (ha)		Proposed Green Roof (ha)	Required Storage Volume (m^3)	Required Storage Volume for Water Balance Reuse (m^3)
	Exist.	Prop.			
Dickens block	1.44	1.09	0.14	234	28
Badgerow block	0.37	0.46	0.04	110	11
Carlaw blocks	0.92	0.93	0.22	254	55

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

6 Site Utilities

The 10 Dickens Site and 388 Carlaw Site will both be serviced by utilities provided by Toronto Hydro, Enbridge Gas, and pertinent 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 and currently, the existing buildings on East Site are serviced by hydro lines on Carlaw Avenue. Available surveys show existing Toronto Hydro conduits along Carlaw Avenue, Dickens Street, and Logan Avenue. The developer should initiate discussions with Toronto Hydro to determine the connection requirements and locations of electrical service to the proposed developments.

6.2 Gas Service

Gas service will be provided by Enbridge Gas. Available SUE surveys of the area indicate that there area 150 mm and a 500 mm abandoned gas mains, and a 150 mm gas main along Carlaw Streett on Carlaw Avenue. In addition, there is a 300 mm gas main and an abandoned 150 mm gas main on Dickens Street. The developer should initiate discussions with Enbridge Gas to determine the connection requirements and locations of gas service to the proposed developments.

6.3 Communication

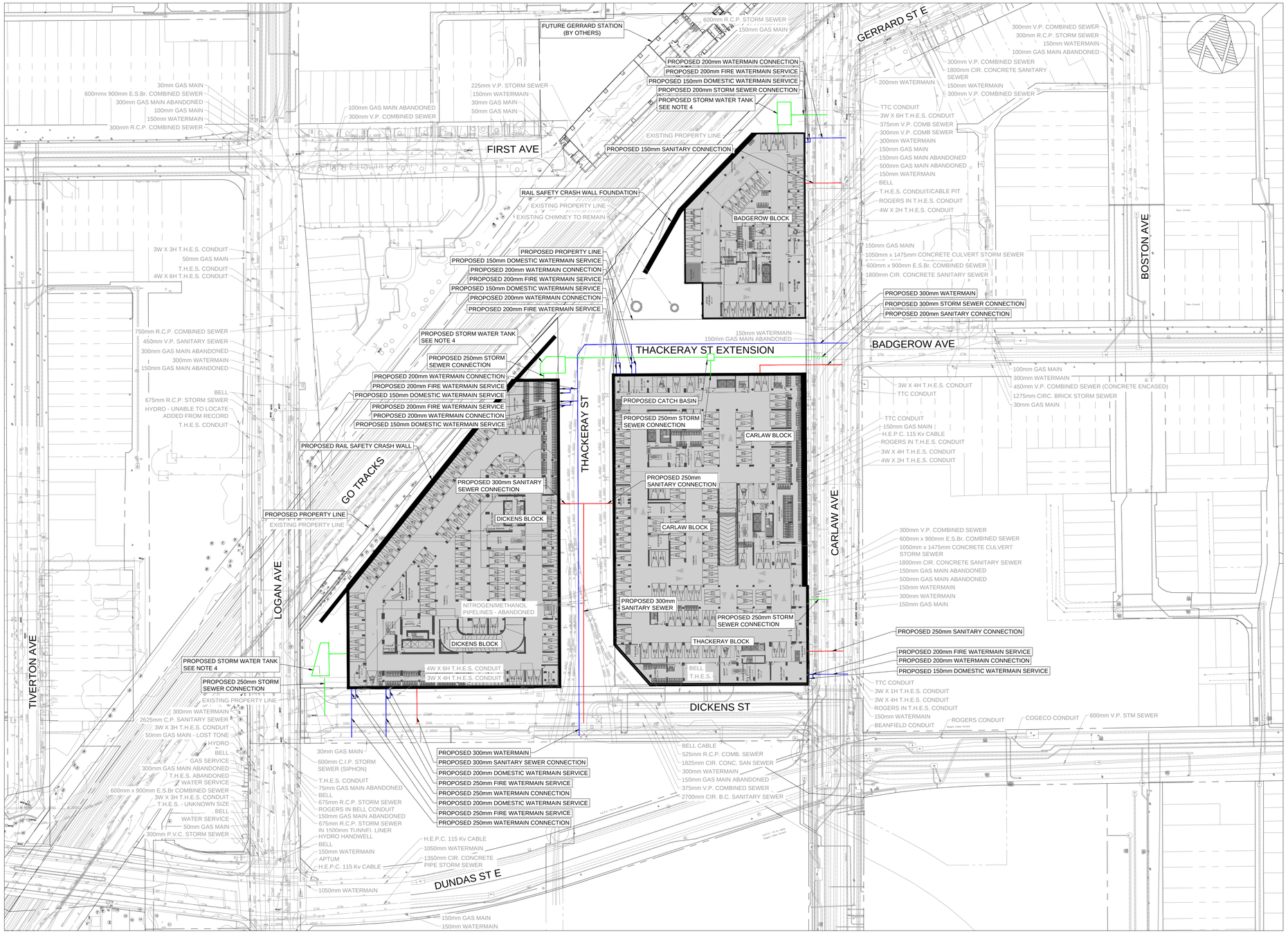
Surveys currently show cables from Telus, Beanfield, 360 Networks, Metrolinx Fibre, Rogers, and Bell in the vicinity of the existing sites. The developer is to coordinate with the relevant communication systems provider to determine connection requirements.

7 Conclusions and Summary

A Functional Servicing Report has been prepared to support a preliminary rezoning submission for the proposed Gerrard-Carlaw South TOC 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



LEGEND

- PROPOSED STORM CONNECTION
- PROPOSED SANITARY CONNECTION
- PROPOSED WATER CONNECTION

NOTES:

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 DURING DETAILED DESIGN STAGE.
2. NOT ALL AERIAL UTILITIES HAVE BEEN IDENTIFIED OR SHOWN ON THIS PLAN.
3. FINAL SITE SERVICING WILL BE AS PER TOC DESIGN DEVELOPMENT
4. LOCATION AND CONFIGURATION OF THE PROPOSED STORMWATER TANKS TO BE CONFIRMED DURING DETAILED DESIGN STAGE.

REVISIONS		REVISIONS	
1	RCD 2022-10-31	4	
2		5	
3		6	

RCD
NOT FOR CONSTRUCTION
DD MONTH YYYY

SCALE(S) 1:750 (0 15 30m)

STATUS

ONE TEAM
ONTARIO LINE TECHNICAL ADVISOR

DESIGNED H. ALKADHALLY
DRAWN H. ALKHADHALLY
CHECKED
APPROVED

ONTARIO LINE SUBWAY

TITLE
TOC
GERRARD CARLAW STATION
SERVICING PLAN

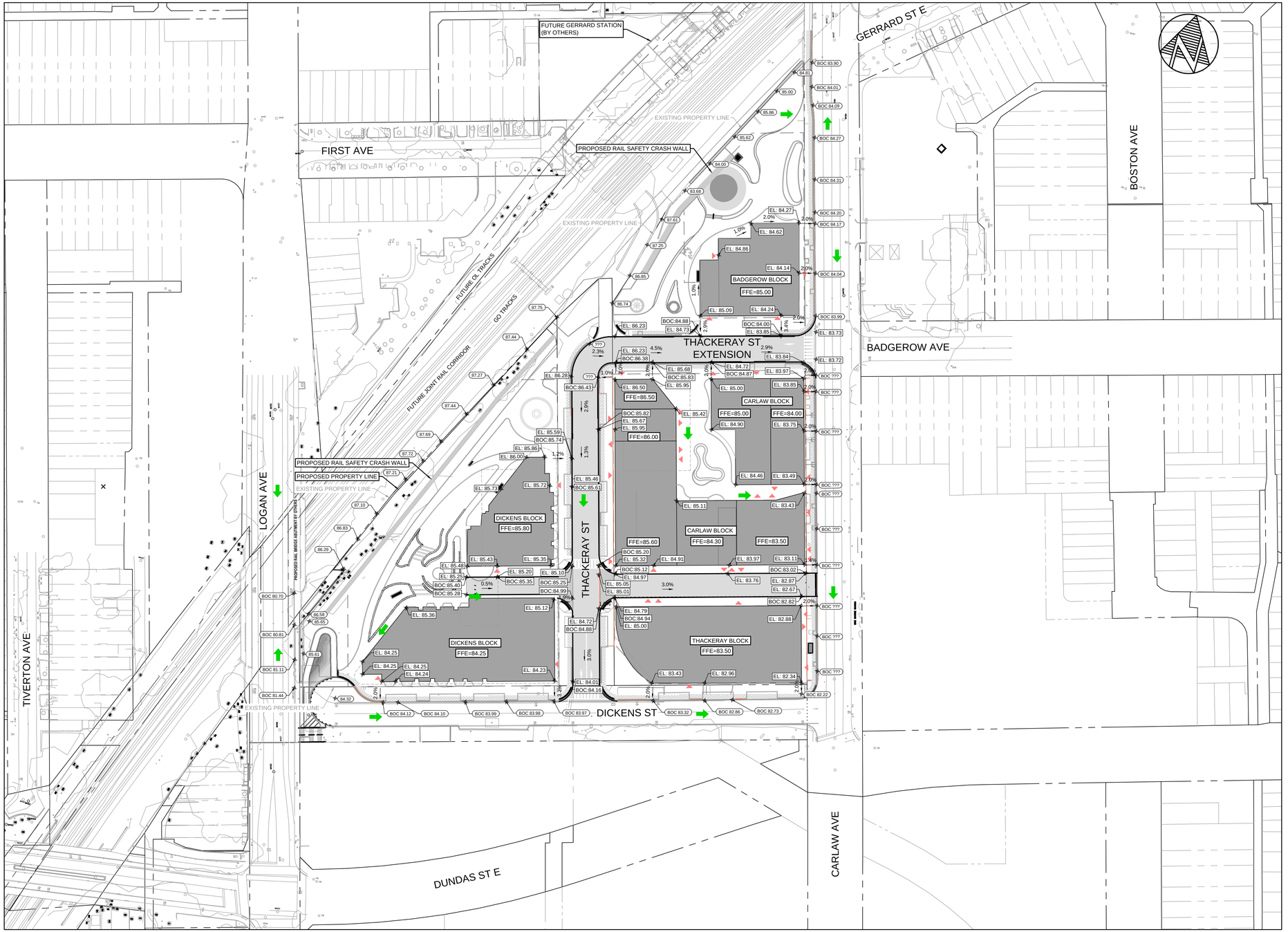
Plot Date: 9 February 2023

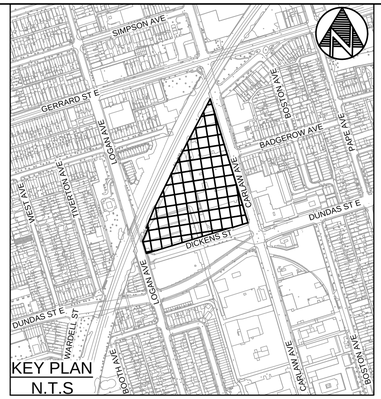
METROLINX
Infrastructure Ontario

Dwg. No. SS0500-03-SF001

Sheet No.

FILE: 10206938-ss0500-03-sf001_recover.dwg
PLOTTED BY: ALKADHALLY, HANEN





LEGEND

90.33	EXISTING ELEVATION
BOC 89.62	EXISTING BACK OF CURB ELEVATION
EL:89.66	PROPOSED ELEVATION
BOC:89.66	PROPOSED BACK OF CURB ELEVATION
2.0%	GRADING SLOPE
	OVERLAND FLOW DIRECTION
	BUILDING ENTRANCE

NOTE

1. ALL GRADES WITHIN THE REGULATORY FLOOD PLAIN WILL BE MAINTAINED OR MATCHED.

2. THE EXISTING DRAINAGE PATTERN IN THE AREA OF THE SITE SHOULD BE MAINTAINED.

3. ALL DRAINAGE TO BE COLLECTED AND APPROPRIATELY CONTROLLED, TREATED, AND DISTRIBUTED AS PER CITY OF TORONTO STANDARDS.

4. CURRENTLY GRADING IS BASED ON LIDAR SURVEY. GRADES TO BE CONFIRMED WITH DETAIL SURVEY. GRADING TO FOLLOW CITY OF TORONTO STANDARDS.

5. FINAL SITE GRADING WILL BE AS PER TOC DESIGN DEVELOPMENT.

6. FIRST FLOOR ELEVATIONS (FFE) ARE SHOWN BASED ON CURRENT INFORMATION IN THE ARCHITECTURAL DRAWINGS. FFE SHOULD BE CONFIRMED DURING DETAILED DESIGN.

REVISIONS		REVISIONS	
1		4	
2		5	
3		6	

RCD
NOT FOR CONSTRUCTION
DD MONTH YYYY

SCALE(S) 1:750 (0, 15, 30m)

STATUS

ONE TEAM
ONTARIO LINE TECHNICAL ADVISOR

DESIGNED O. GARGAT
DRAWN O. GARGAT
CHECKED H. ALKHADHALLY
APPROVED

ONTARIO LINE SUBWAY

TITLE
TOC
GERRARD CARLAW STATION
GRADING PLAN

Plot Date: 9 February 2023

METROLINX
Infrastructure Ontario

Dwg. No. GR0500-03-SF001

Sheet No.

FILE: 10206938-gr0500-03-sf001.dwg
PLOTTED BY: ALKADHALLY, HANEN

Appendix B. Water Demand Calculation

Computed by: H.Alkadhally
Date: 11/15/2022

DESIGN CALCULATION
Water Demand and Fire Flow Demand

Location: Gerrard Carlaw TOC
388 Carlaw

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	13002	Sq.m	
Total GFA	Residential	Non-Residential	
	43986	13000	Sq.m
Residential Units	569	n/a	
Residential/Non-Residential Population	1537	143	

Peaking Factor	Residential	Non-Residential	
Minimum hour	0.84	0.84	
Peak Hour	2.5	1.2	
Maximum Day Factor	1.3	1.1	

	Residential	Non-Residential	
Average Consumption Rate	3.4L/s	0.3L/s	Population x Average consumption
Maximum Day Flow Rate	4.4L/s	0.3L/s	Population x Average consumption x Maximum Day Factor
Peak Hour Flow Rate	8.4L/s	0.4L/s	Population x Average consumption x Peak Hour Factor

Items	Fire Flow Demand Calculation		Remark
Fire Flow Requirement	42014.3	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 Coefficient related to Construction=0.8 (Type II Non Combustible Construction)
Fire Flow (F)	42014.3	L/min	

Computed by: H.Alkadhally
Date: 11/15/2022

DESIGN CALCULATION
Water Demand and Fire Flow Demand

Location: Gerrard Carlaw TOC
10 Dickens

Items	Water Demand Calculation		Remark
Site Parameters			
Average Day Water Comsumption 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	7690	Sq.m	
Total GFA	Residential	Non-Residential	
	55628	416	Sq.m
Residential Units	744	n/a	
Residential/Non-Residential Population	2009	5	

Peaking Factor	Residential	Non-Residential	
Minimum hour	0.84	0.84	
Peak Hour	2.5	1.2	
Maximum Day Factor	1.3	1.1	

	Residential	Non-Residential	
Average Comsumption Rate	4.42L/s	0.01L/s	Population x Average consumption
Maximum Day Flow Rate	5.74L/s	0.01L/s	Population x Average consumption x Maximum Day Factor
Peak Hour Flow Rate	11.04L/s	0.01L/s	Population x Average consumption x Peak Hour Factor

Items	Fire Flow Demand Calculation		Remark
Fire Flow Requirement	41665.6	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 Coefficient related to Construction=0.8 (Type II Non Combustible Construction)
Fire Flow (F)	41665.6	L/min	

Appendix C. Sanitary Flow Demand Calculation

Computed by: H. Alkadhally
Date: 11/15/2022

DESIGN CALCULATION
Sanitary Flow Demand

Location: Gerrard Carlaw TOC
388 Carlaw

Items	Sanitary Demand Calculation		Remark
Site Parameters			
Average waste water flow	450	l/capita/day	Multi-unit high-rise = 450 litres / capita /day *(City of Toronto Design Criteria for Sewers and Watermain)*
Non-Residential average flow	180000	l/floor hectare/day	Commercial = 180000 litres/ floor hectare / day *(City of Toronto Design Criteria for Sewers and Watermain)*
Total Site Area	13002	Sq.m	
Total GFA	Residential	Non-Residential	
	43986	13000	Sq.m
Residential Units	569	n/a	
Residential/Non-Residential Population	1537	n/a	

Peaking Factor	Residential	Non-Residential	
Residential peak factor (PF=)	3.7	n/a	*Commercial peak factor is included in average flow*
Extraneour Flow			
Infiltration allowance (< 10 ha)	0.26	l/s/ha	
Residential Flow	8.01	l/s	peak sanitary flow
Non-Residential Flow	2.71	l/s	peak sanitary flow
Infiltration Flow	0.34	l/s	groundwater discharge to sanitary sewer
Maximum Cumulative Flow with peaking factor	**32.67**	**l/s**	

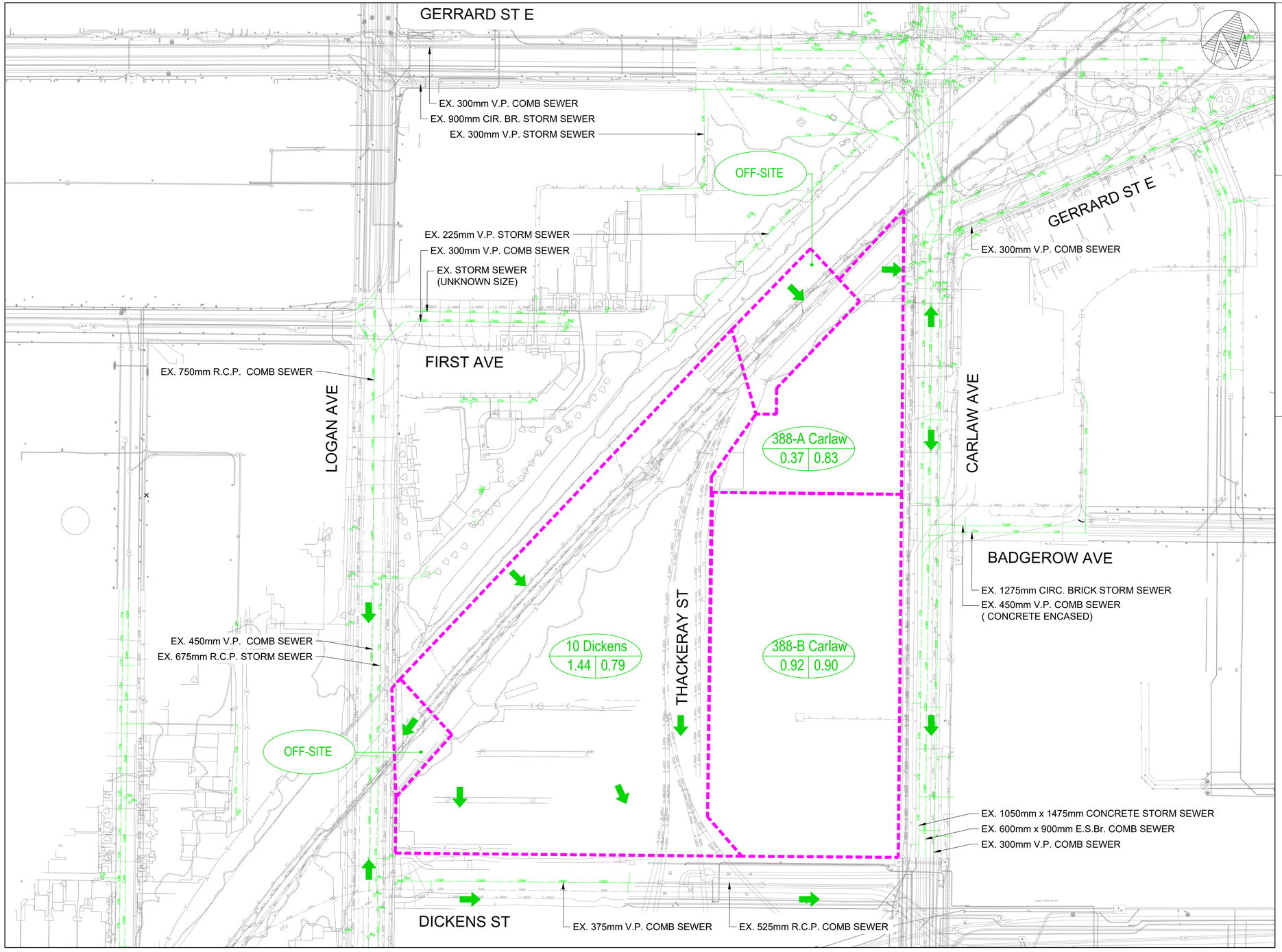
Computed by: H. Alkadhally
Date: 11/15/2022

DESIGN CALCULATION
Sanitary Flow Demand

Location: Gerrard Carlaw TOC
10 Dickens

Items	Sanitary Demand Calculation		Remark
Site Parameters			
Average waste water flow	450	l/capita/day	Multi-unit high-rise = 450 litres / capita /day *(City of Toronto Design Criteria for Sewers and Watermain)*
Non-Residential average flow	180000	l/floor hectare/day	Commercial = 180000 litres/ floor hectare / day *(City of Toronto Design Criteria for Sewers and Watermain)*
Total Site Area	7690	Sq.m	
Total GFA	Residential	Non-Residential	
	55628	416	Sq.m
Residential Units	744	n/a	
Residential/Non-Residential Population	2009	n/a	
Peaking Factor	Residential	Non-Residential	
Residential peak factor (PF=)	3.6	n/a	*Commercial peak factor is included in average flow*
Extraneour Flow			
Infiltration allowance (< 10 ha)	0.26	l/s/ha	
Residential Flow	10.46	l/s	peak sanitary flow
Non-Residential Flow	0.09	l/s	peak sanitary flow
Infiltration Flow	0.20	l/s	groundwater discharge to sanitary sewer
Maximum Cumulative Flow with peaking factor	**37.96**	**l/s**	

Appendix D. Drainage Plans



NOTES:

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. EXHIBIT TO BE UPDATED AS NEW INFORMATION IS MADE AVAILABLE.

LEGEND

- EXISTING STORM CATCHMENT
- 101 / 0.98 | 0.9 — DRAINAGE AREA ID; RUNOFF COEFFICIENT; DRAINAGE AREA (ha)
- OVERLAND FLOW DIRECTION
- STM STM — EXISTING STORM SEWER
- COMB COMB — EXISTING COMBINED SEWER

FILE: 10206938-ss0500-03-sf200.dwg
PLOTTED BY: KHODADADI, MAHSA

REVISIONS		REVISIONS	
1		4	
2		5	
3		6	

RCD
NOT FOR CONSTRUCTION
DD MONTH YYYY

SCALE(S) 1:750

STATUS

HDR

ONE TEAM
ONTARIO LINE TECHNICAL ADVISOR

DESIGNED D. NUTTALL
DRAWN M. KHODADADI
CHECKED XXX
APPROVED XXX

ONTARIO LINE SUBWAY

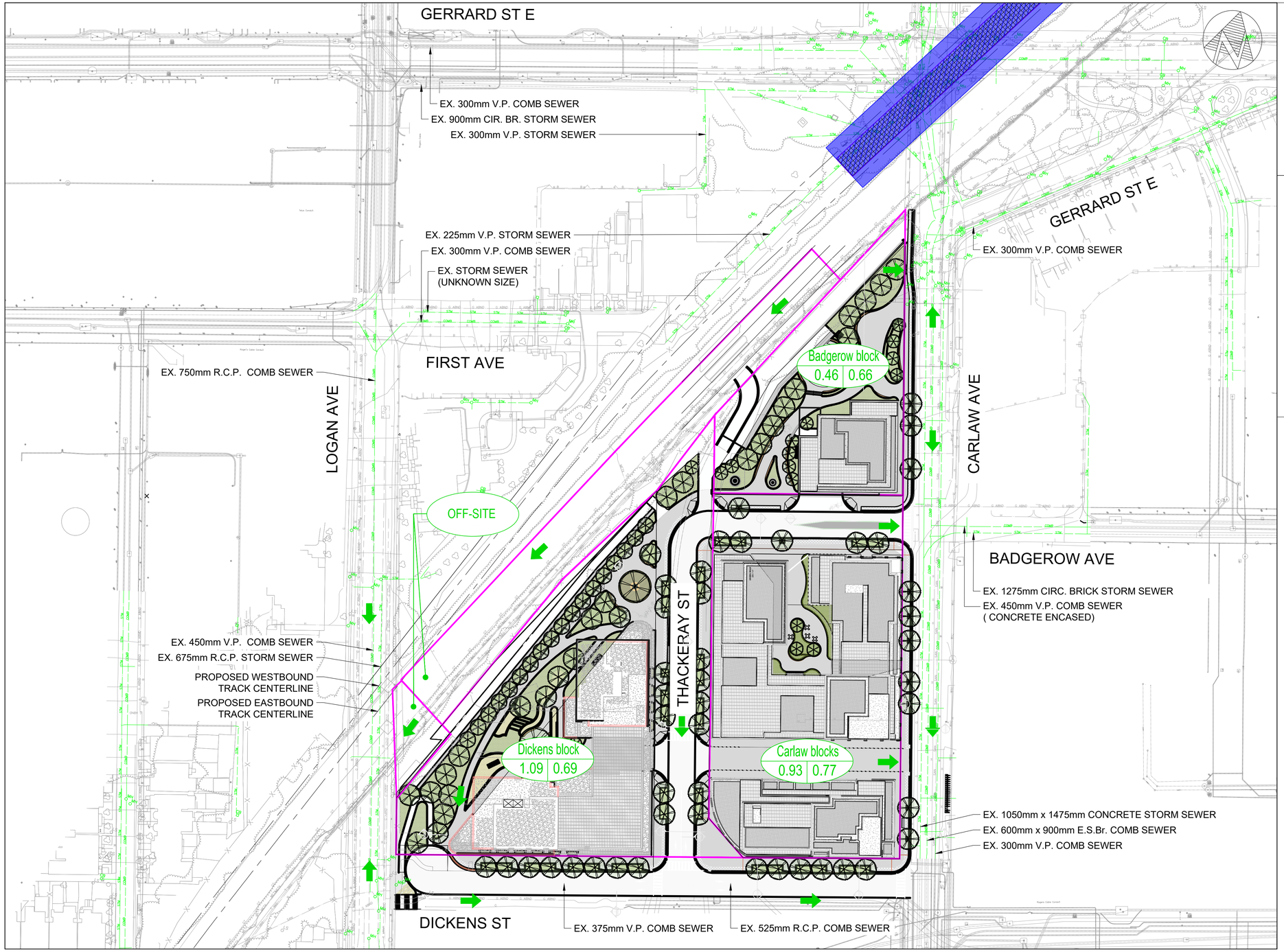
TITLE
GERRARD TOC
EXISTING DRAINAGE PLAN

Plot Date: 11 November 2022

METROLINX
Infrastructure Ontario

Dwg. No.

Sheet No.



NOTES:

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. EXHIBIT TO BE UPDATED AS NEW INFORMATION IS MADE AVAILABLE.
5. REFER TO THE SERVICING PLAN FOR THE PROPOSED STORM SEWERS AND SERVICING CONNECTIONS.

LEGEND

- PROPOSED STORM CATCHMENT
- 101 / 0.98 | 0.9 — DRAINAGE AREA ID; RUNOFF COEFFICIENT; DRAINAGE AREA (ha)
- OVERLAND FLOW DIRECTION
- STM , STM — EXISTING STORM SEWER
- COMB , COMB — EXISTING COMBINED SEWER

FILE: 1020938-ss0500-03-sf200.dwg
PLOTTED BY: KHODADADI, MAHSA

REVISIONS		REVISIONS	
1		4	
2		5	
3		6	

RCD
NOT FOR CONSTRUCTION
DD MONTH YYYY

SCALE(S) 1:750

STATUS

HDR

ONETEAM
ONTARIO LINE TECHNICAL ADVISOR

DESIGNED D. NUTTALL
DRAWN M. KHODADADI
CHECKED XXX
APPROVED XXX

ONTARIO LINE SUBWAY

TITLE
GERRARD TOC
PROPOSED DRAINAGE PLAN

Plot Date: 9 February 2023

METROLINX
Infrastructure Ontario

Dwg. No.

Sheet No.