

# Draft Functional Servicing Report – King/Bathurst

## Integrated Transit Oriented Communities

662-668 King Street West  
663-647 King Street West, 69-73 Bathurst Street, 58 Steward Street  
Toronto Ontario M5V 1M7

Issued for Rezoning

Contract RFS-2019-NAFC-110

PO 214244

HDRProject 10206938



Ontario Line Technical Advisor

TORONTO, ONTARIO

May 31, 2021

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

1	Introduction .....	5
1.1	Site Description .....	5
1.2	Proposed Development .....	6
2	Site Condition .....	7
2.1	Existing Topography .....	7
2.2	Existing Utility Information .....	7
2.3	Proposed Site Grading .....	7
3	Water Supply and Appurtenances .....	8
3.1	Existing Condition .....	8
3.2	Water Supply .....	8
3.3	Hydrant Flow Test .....	9
4	Sanitary Servicing .....	10
4.1	Existing Condition .....	10
4.2	Proposed Sanitary Flow .....	10
4.3	Sanitary Service Connection .....	11
5	Storm Drainage and Stormwater Management .....	12
5.1	Existing Condition .....	12
5.2	Stormwater Management Criteria .....	12
5.2.1	Quality Control .....	12
5.2.2	Quantity/Flood Control .....	12
5.2.3	Water Balance .....	13
5.2.4	Erosion Control .....	13
5.3	Stormwater Management Plan .....	13
6	Site Utilities .....	15
6.1	Electrical Service .....	15
6.2	Gas Service .....	15
6.3	Communication .....	15
7	Conclusions and Summary .....	16

## Figures

Figure 1-1.	Aerial Map of Subject Site Locations .....	6
-------------	--	---

## Tables

Table 3-1.	North Site Development Water Demand Calculation Summary .....	8
Table 3-2.	South Site Development Water Demand Calculation Summary .....	9
Table 4-1.	North Site Development Sanitary Demand Calculation Summary .....	10
Table 4-2.	South Site Development Sanitary Demand Calculation Summary .....	10
Table 5-1.	Summary of the Required Storage .....	14

## Appendices

Appendix A. Site Servicing Plan and Grading Plan..... A-1  
Appendix B. Water Demand Calculation..... B-1  
Appendix C. Sanitary Flow Demand Calculation ..... C-1  
Appendix D. Drainage Plans..... D-1

## Abbreviations

BMP	Best Management Practice
DRM	Design Requirements Manual
HGL	Hydraulic Grade Line
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
SWM	Stormwater Management
SUE	Subsurface Utility Engineering
TGS	Toronto Green Standard
TMC681	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 managed jointly by Metrolinx and Infrastructure Ontario (IO). Transit-Oriented Communities are proposed at the Ontario Line 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 Ontario Line Transit-Oriented Communities (TOC) at the intersection of King Street West and Bathurst Street in the City of Toronto. This Functional Servicing Report provides a preliminary study for water distribution, electrical service, sanitary sewage, and storm drainage for the developments of the proposed site.

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 Ontario Line Reference Concept Design (RCD) plans.

## 1.1 Site Description

There are two proposed developments at the intersection of King Street and Bathurst Street. The subject site includes the North Site (Site B, 662-668 King Street/ 91 Bathurst Street) located in the northeast corner and the South Site (Site D, 647-655 King Street West/ 69-76 Bathurst Street/ 58-60 Stewart Street), located at the southeast corner of the intersection of King Street West and Bathurst Street, where the Ontario Line transit station is proposed.

The North Site consists of a two and three-storey mixed-use buildings on the northeast corner, and a four-storey mixed-use building on the southeast corner. **Figure 1** shows an aerial map of the subject site locations.

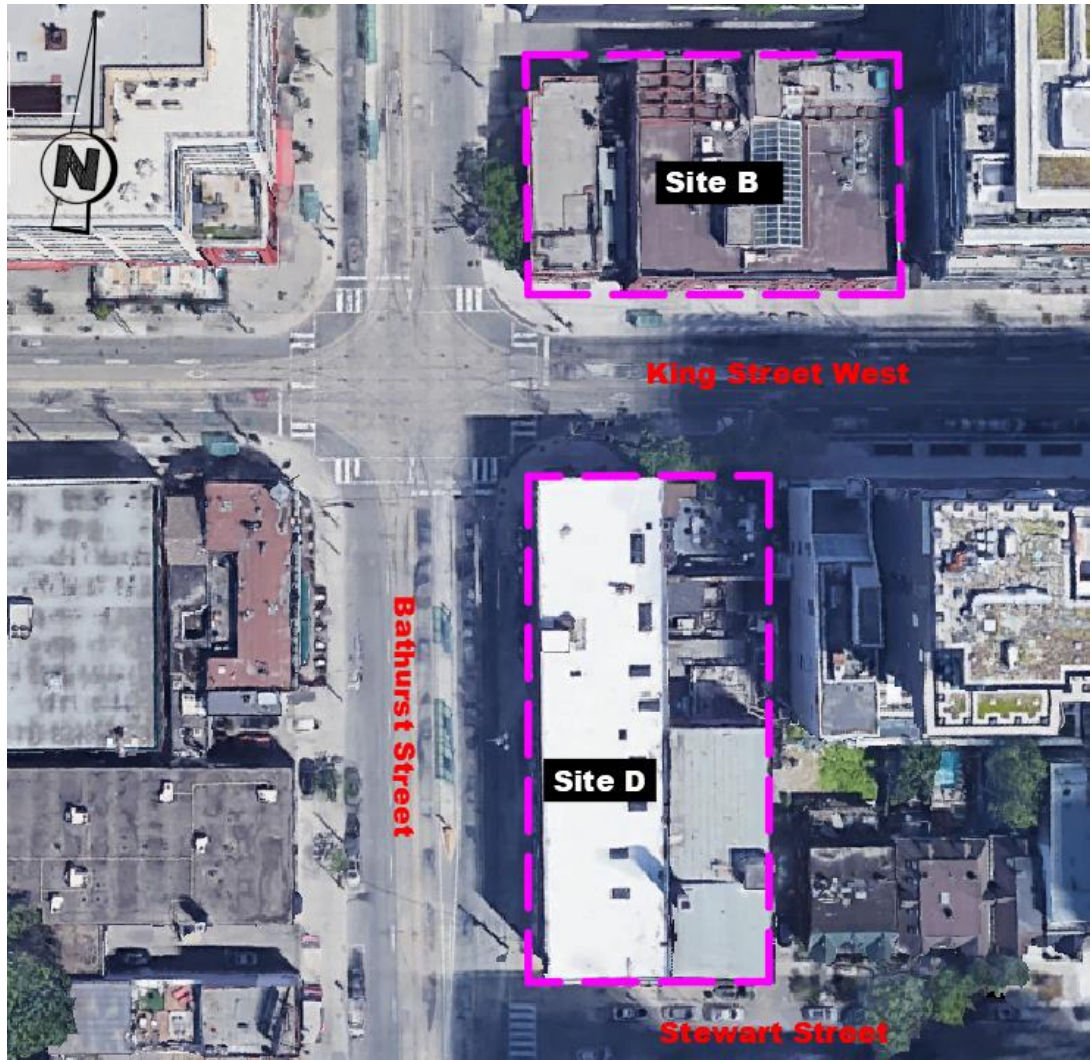


Figure 1-1. Aerial Map of Subject Site Locations

## 1.2 Proposed Development

Based on the preliminary reference concept designs, the proposed development at this location consists of a twenty-five-storey building at North Site and another twenty-five-storey building at the South Site.

The development of the North Site will be residential with transit infrastructure and will conserve the two existing commercial buildings on site as-is. The development will provide 187 residential units in the levels above the heritage buildings, contain two underground levels that will house transit infrastructure and 299 bicycle parking spaces with no vehicle parking provided.

The building on the South Site will be a mixed-use residential development with transit infrastructure and commercial uses. The proposed design indicates that this development will provide 235 residences ranging from studios to 3-bedroom and commercial spaces on the ground level. This building will also contain two underground levels that will house transit infrastructure and 256 bicycle parking spaces with no vehicle parking provided.

## 2 Site Condition

### 2.1 Existing Topography

The existing sites are situated on relatively flat terrain with a two- and three-storey commercial buildings on the North Site, and a four-storey mixed-use building on the South Site.

The North Site has an approximate area of 0.20 Ha with asphalt pavement to the north of the proposed development, concrete sidewalk and trees to the west, concrete sidewalk only to the south, and interlocking brick to the east. This location slopes generally to the south.

The South Site has an approximate area of 0.16 Ha with concrete sidewalk to the north, west and south, and asphalt pavement to the east. This location also continuously slopes from north to south.

### 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 that was carried out in 2020. Prior to detailed design and construction, it is recommended that the OneTeam and Development Co. confirm the existing underground and aerial utilities and the vertical elevation information. At the time when this report is prepared, the sewer capacity information was not available.

### 2.3 Proposed Site Grading

The existing two and three-storey commercial buildings will remain as is and thus the proposed grading at the North Site will maintain the existing gentle slope to the south. The proposed grading at the South Site will also be a relatively gentle slope upon completion, with the proposed grade anticipated to be the minimum sufficient to drain stormwater from the development site to meet City of Toronto Toronto-East York design guidelines. A preliminary Grading Plan is attached in **Appendix A**.



## 3 Water Supply and Appurtenances

### 3.1 Existing Condition

Available SUE surveys of the area do not appear to show any water service connections to the existing North Site. However, the surveys show an existing network of 150mm watermain lines along King Street West and Bathurst Street. Further investigation on-site may be required to determine the existing flow pressure

### 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 City of Toronto's *Design Criteria for Sewers and Watermains (2019)*. A Site Servicing Plan in **Appendix A** has been prepared to show the potential locations of the watermain servicing connections to the developments. The water demand for the proposed sites was calculated per the *City of Toronto Design Criteria for Sewers and Watermains (2019)* and using site statistics provided by the architect. Calculation summaries for North Site and South Site are provided in **Table 3-1** and

**Table 3-2**, respectively, and detailed water demand calculations for each can be found in **Appendix B**.

**Table 3-1. North Site Development Water Demand Calculation Summary**

Parameter/ Items	Residential	Commercial
Average Day Water Consumption Rate	191 L/capita/day	191 L/capita/day
Total Site Area	1 643 m <sup>2</sup>	
Total GFA	14 851 m <sup>2</sup>	1 236 m <sup>2</sup>
Residential units	187	n/a
Residential/ commercial population	325	14
Peaking factor	2.5	1.2
Average Water Demand from Site	0.7 L/s	0.03 L/s
Peak Water Demand from Site	1.8 L/s	0.04 L/s

**Table 3-2. South Site Development Water Demand Calculation Summary**

Parameter/ Items	Residential	Commercial
Average Day Water Consumption Rate	191 L/capita/day	n/a
Total Site Area	1 957 m <sup>2</sup>	
Total GFA	23 171 m <sup>2</sup>	0 m <sup>2</sup>
Residential units	235	n/a
Residential/ commercial population	409	n/a
Peaking factor – peak hour	2.5	n/a
Average Water Demand from Site	0.9 L/s	n/a
Peak Water Demand from Site	2.3 L/s	n/a

The estimated fire flow requirements were calculated based on recommendations by the *Fire Underwriters Survey Water Supply for Public Fire Protection (1999)* and the City of Toronto’s fire flow requirement. These were determined to be 28 450 L/min for the North Site development and 33 488.5 L/min for the South Site development. Detailed calculations can be found in **Appendix B**.

The proposed North Site development will be serviced by a 200 mm domestic watermain service and a 250 mm fire watermain service that branches from a proposed 300mm watermain connection adjacent to the development. The 300mm watermain connection will connect to the existing 150mm watermain line along King Street West just south of the building. Further coordination with the City to confirm water supply capacity and water pressure of the existing watermain network is ongoing.

The proposed South Site development will be serviced by a 200 mm domestic watermain service and a 250 mm fire watermain service that branch from a proposed 300 mm watermain connection adjacent to the development. The 300 mm watermain connection will connect to the existing 150 mm watermain trunk along Bathurst Street west of the building.

The water meters will be located in sprinkler or mechanical rooms inside the buildings. 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 preparation of this report, no watermain pressure information was available. Consequently, 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 Servicing

### 4.1 Existing Condition

Based on presently available information, the four-storey building on subject North Site is currently serviced by a single sanitary sewer connection west of the building that outlets to the existing 750mm x 1125mm egg-shaped Brick combined sewer along Bathurst Street.

Available SUE surveys of the area do not appear to show any sanitary service connections to the existing South Site. However, the surveys do show an existing network of combined storm/sanitary sewers along King Street West and Bathurst Street and a sanitary sewer along Browns Lane. Further investigation on site is required to confirm the existing servicing laterals.

### 4.2 Proposed Sanitary Flow

Sanitary flows for the proposed developments are per the 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 development on North Site and South Site respectively. Detailed sanitary flow calculations are included in **Appendix C**.

**Table 4-1. North Site Development Sanitary Demand Calculation Summary**

Parameter/ Items	Residential	Commercial
Sanitary Demand Rate	450 L/capita/day	0 L/capita/day
Commercial Average Flow	n/a	180 000 L/floor ha/day
Total GFA	14 851 m <sup>2</sup>	1 236 m <sup>2</sup>
Peaking Factor	4.1	n/a
Peak Sanitary Flow	1.69 L/s	0.26 L/s
Groundwater Discharge to Sanitary Sewer	0.04 L/s	
Maximum Cumulative Flow with Peaking Factor	7.24 L/s	

**Table 4-2. South 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	23 171 m <sup>2</sup>	0 m <sup>2</sup>
Peaking Factor	4	n/a
Peak Sanitary Flow	2.13 L/s	n/a
Groundwater Discharge to Sanitary Sewer	0.05 L/s	
Maximum Cumulative Flow with Peaking Factor	8.57 L/s	

## 4.3 Sanitary Service Connection

The proposed North Site development will be serviced by a 250 mm sanitary sewer connection to the existing 725 mm x 1125 mm egg shaped brick combined sewer south of the building on King Street West.

The proposed South Site development will be serviced by a 250 mm sanitary sewer connection to the existing 600 mm combined sewer just west of the building on Bathurst 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

The subject North Site has a drainage area of 0.16 Ha and subject South Site of 0.20 Ha. The minor drainage flow in the vicinity of the sites is captured by several catch basins and conveyed into existing storm sewers, which include a 600 mm storm sewer along Bathurst Street discharging to a 1350 mm storm sewer along King Street that ultimately discharges into a 3810 mm storm sewer running north to south along Portland Street. There are also 750 mm x 1125 mm and 450 mm combined sewers along Bathurst Street. Refer to the **Existing Drainage Plan** in **Appendix D**.

Bathurst Street slopes continuously from north to south for more than 5 km, creating a large drainage area for the major flow at the intersection of Bathurst Street and King Street. The major overland flow along Bathurst runs from north to south and along King Street runs towards the west.

The City is working on the InfoWorks model for this area and will not be available before the end of 2021. With limited information that is currently available, it's not possible to further comment on where the existing buildings are draining.

### 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 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 total suspended solids (TSS) on an annual loading basis from all the storm runoff leaving the site (WWFMG, TGS).
  - OGS devices are credited with a maximum of 50% TSS removal (WWFMG, TRCA).

#### 5.2.2 Quantity/Flood Control

- Protect 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 flow 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 - Tier 1).
- Retain all runoff from the 10 mm rainfall event on site through infiltration, evaporation, and/or rainwater reuse (TGS - Tier 2).
- 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 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 King/Bathurst development sites. The stormwater best management practices (BMP) considered for the site include green roofs, underground detention/retention tanks, and oil/grit separator (OGS) units. The **Proposed Conditions Drainage Plan** is presented in **Appendix D**.

All building openings should be protected from flooding. During detailed design, the 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 a 100-year storm event. The Reference Concept Design (RCD) satisfies stormwater management (SWM) and drainage requirements for the proposed sites as follows:

- **Quantity Control:**

Storage tank units with orifice control are proposed in the first underground level to provide quantity control.

- **Quality Control:**

Quality control for each site will be provided via the proposed green roof and an Oil Grit Separator unit.

- **Water Balance:**

Green roof and water reuse are proposed to satisfy the 10 mm retention requirement.

Summary of the required storage is presented in Table 5-1 below:

**Table 5-1. Summary of the Required Storage**

ID	Site Area (ha)		Proposed Green Roof (ha)	Required Storage Volume for Quantity Control (m <sup>3</sup> )	Required Storage Volume for Water Balance Reuse (m <sup>3</sup> )
	Exist.	Prop.			
North Site	0.16	0.16	0.071	53.0	14.1
South Site	0.19	0.19	0.099	63.0	16.6

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

## 6 Site Utilities

North Site and South Site will both be serviced by utilities provided by Enbridge Gas, Toronto Hydro, and 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 service will be provided by Toronto Hydro and the utility survey currently shows that there are existing Toronto Hydro conduits in the approximate location of the North Site and the South Site. The developer is to initiate discussions with Toronto Hydro to determine the connection requirements and locations of electrical service to the proposed North Site and South Site developments.

### 6.2 Gas Service

Gas service will be provided by Enbridge Gas. Available SUE surveys of the area indicate that the existing buildings at the North Site are currently serviced by a gas line just south of the building on King Street West, and the existing building at the South Site by a gas line west of the building on Bathurst Street. It is recommended to maintain the existing gas servicing laterals for future developments. The developer is to initiate discussions with Enbridge Gas to determine the connection requirements and to confirm the locations of gas service to the proposed North and South Site developments.

### 6.3 Communication

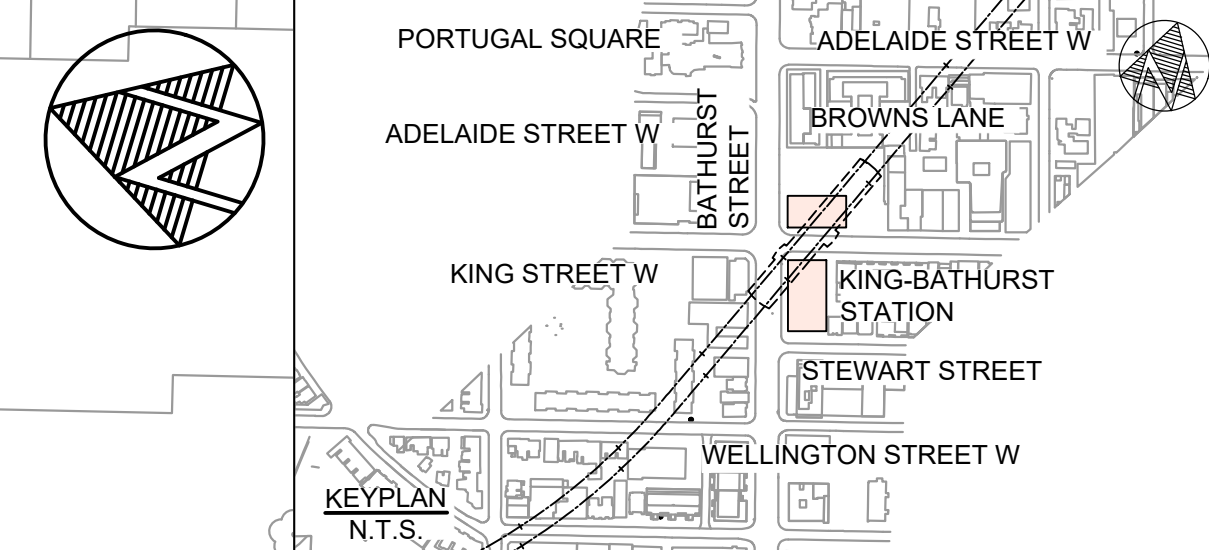
Surveys currently show cables from Rogers, Beanfield, and Bell traversing the extent of both subject sites. The developer is to coordinate with the relevant communication systems provider to determine connection requirements.



## 7 Conclusions and Summary

A Site Servicing plan has been prepared to support the rezoning submission for the proposed developments at the intersection of King Street West and Bathurst Street in the City of Toronto as part of the Ontario Line Transit Oriented Communities initiative. Due to limitations in the available existing utility information, this report focuses on the proposed developments water demand, sanitary demand, and stormwater management design requirements. Coordination and data collection with City of Toronto is on-going throughout this project to review the existing sewage capacity to accommodate the proposed developments. A flow monitoring program to be completed in 2021 will support the review of existing sewage capacity and water pressure in the proximity of the proposed developments.

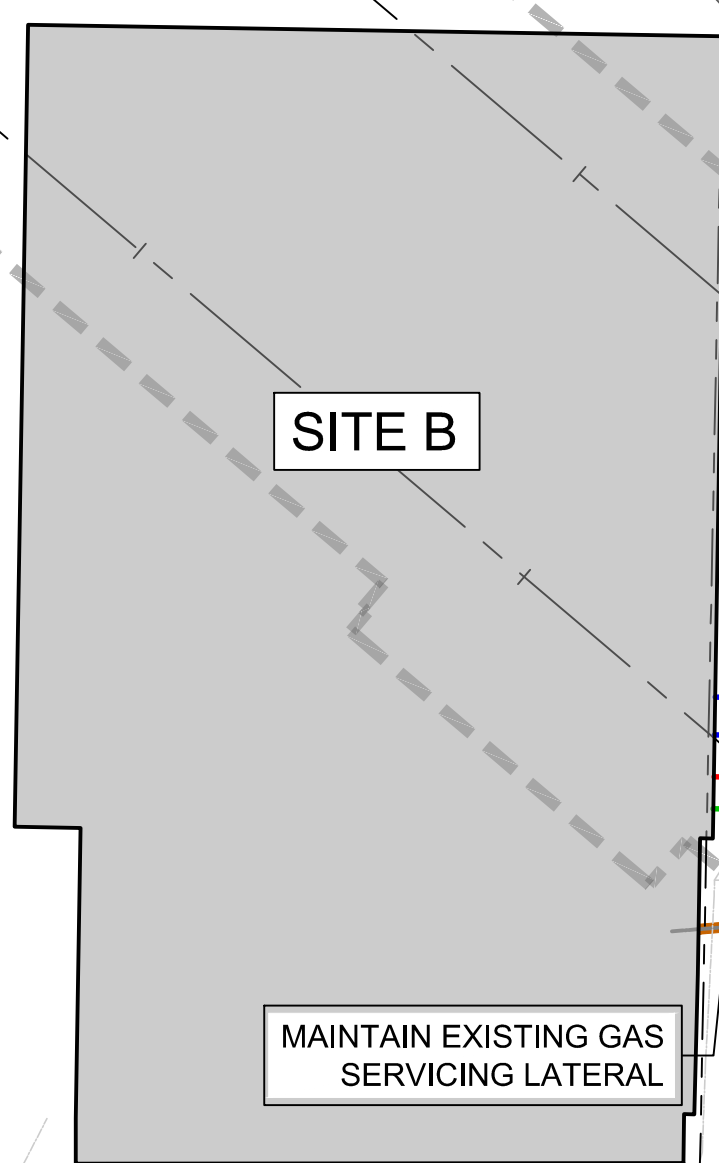
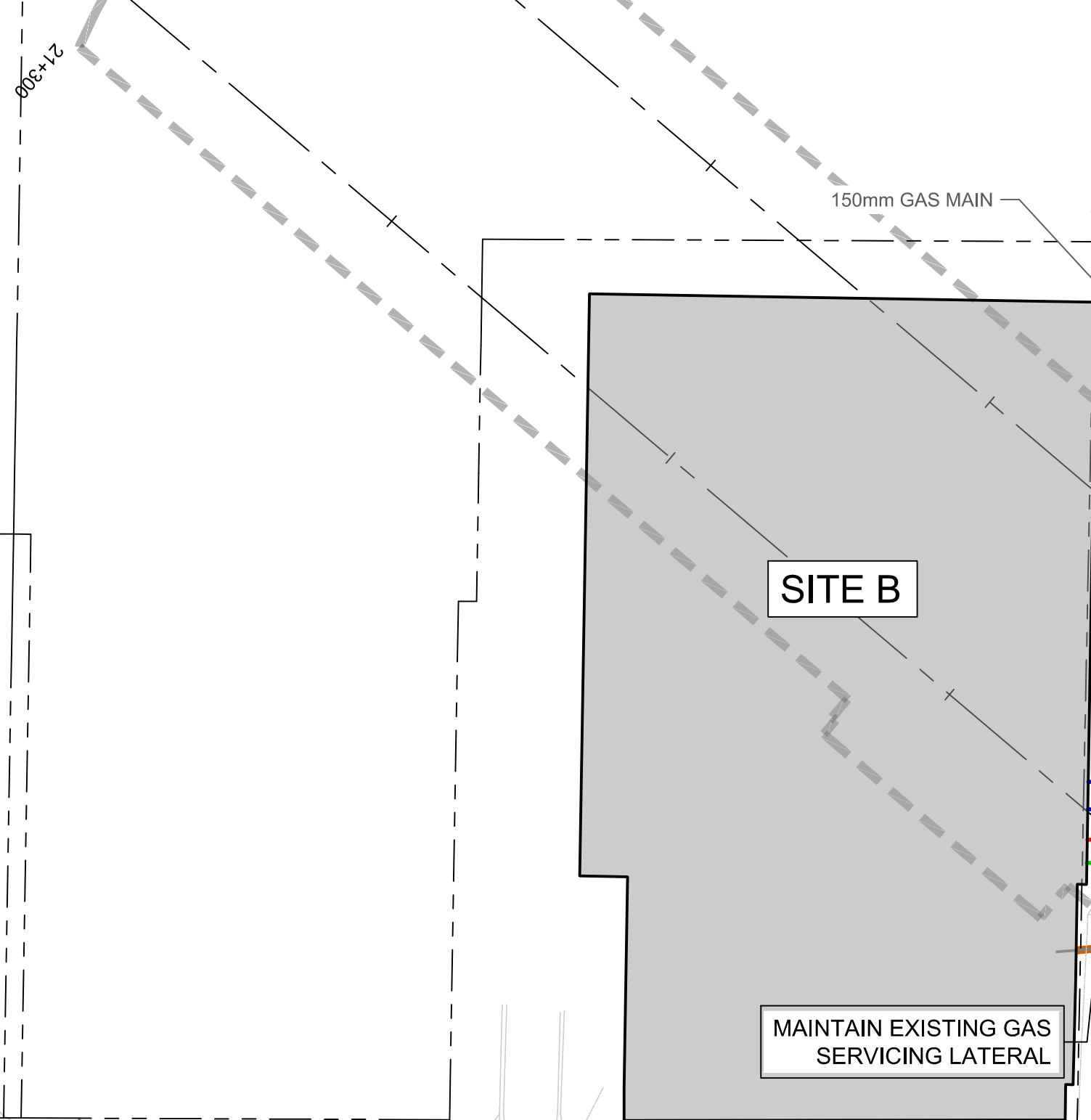
# Appendix A. Site Servicing Plan and Grading Plan



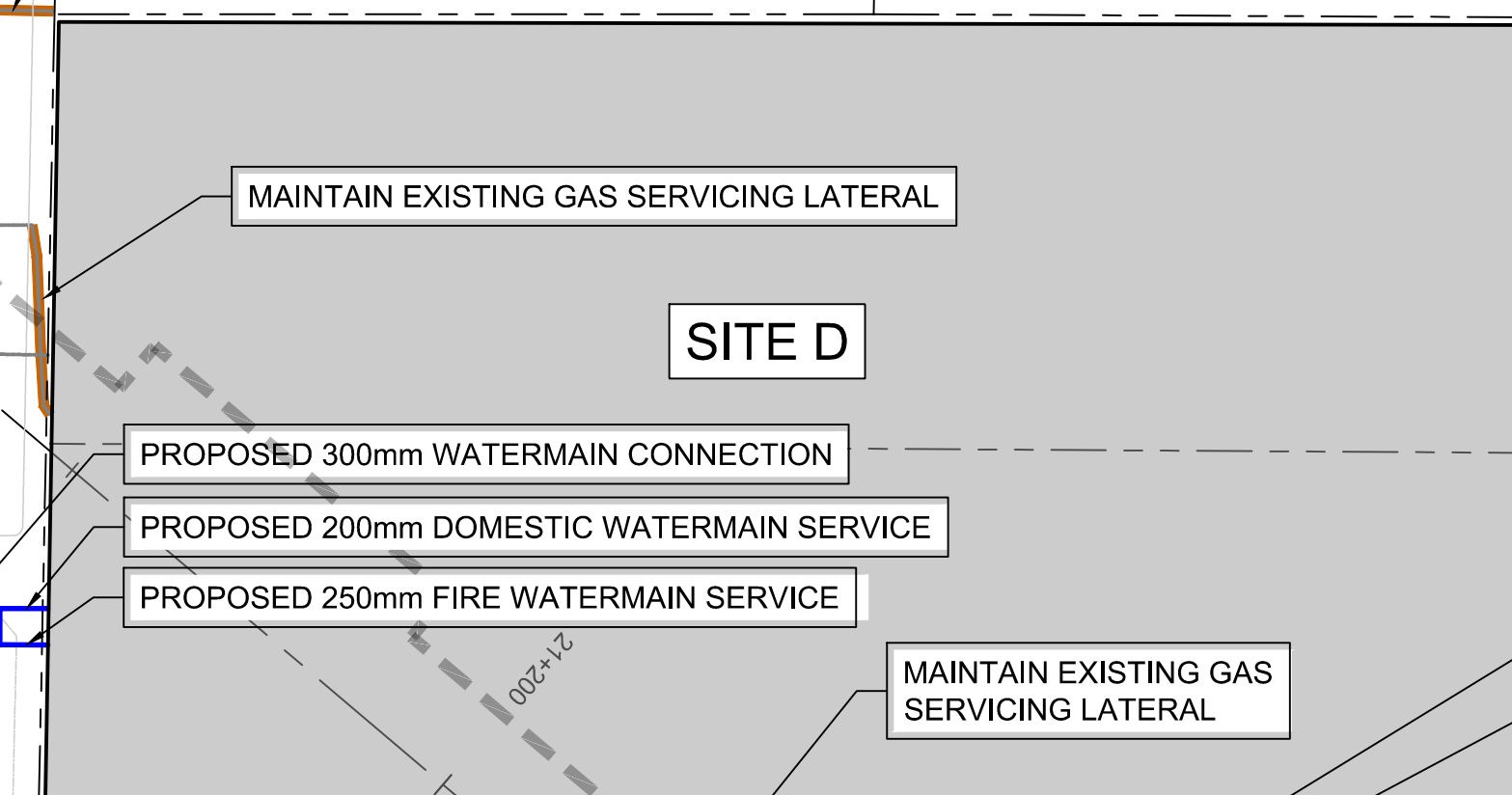
PROPOSED WESTBOUND TRACK CENTRELINE  
 PROPOSED EASTBOUND TRACK CENTRELINE

KING ST W

STEWART ST



- PROPOSED 200mm DOMESTIC WATERMAIN SERVICE
- PROPOSED 250mm FIRE WATERMAIN SERVICE
- PROPOSED 300mm WATERMAIN CONNECTION
- PROPOSED 300mm STORM SEWER CONNECTION
- PROPOSED 250mm SANITARY SEWER CONNECTION
- MAINTAIN EXISTING GAS SERVICING LATERAL, ABANDON AS NEEDED



- PROPOSED 300mm WATERMAIN CONNECTION
- PROPOSED 200mm DOMESTIC WATERMAIN SERVICE
- PROPOSED 250mm FIRE WATERMAIN SERVICE
- MAINTAIN EXISTING GAS SERVICING LATERAL

- PROPOSED 250mm SANITARY SEWER CONNECTION
- PROPOSED 300mm STORM SEWER 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 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.

BATHURST ST

BATHURST ST

- BELL CANADA CONDUIT
- 1350mm CONC. STM SEWER
- 150mm WATER MAIN
- 750mm X 1125mm E.S.Br. COMB SEWER ABANDONED
- 300mm WATER MAIN
- 300mm GAS MAIN ABANDONED
- ROGERS CONDUIT
- 600mm COMB SEWER
- BELL CANADA CONDUIT
- ROGERS CONDUIT
- TRAFFIC CONTROL CONDUIT
- 500mm GAS MAIN ABANDONED
- 300mm GAS MAIN ABANDONED
- T.T.C. CONDUIT
- 750mm WATER MAIN ABANDONED
- 750mm X 1125mm E.S.Br. COMB SEWER

- 100mm GAS MAIN
- ZAYO CABLE IN ABANDONED WATER PIPE
- 150mm WATER MAIN
- BELL CANADA CONDUIT
- 600mm COMB SEWER
- 500mm GAS MAIN ABANDONED
- ROGERS CONDUIT
- 300mm GAS MAIN ABANDONED
- 750mm WATER MAIN ABANDONED
- 750mm X 1125mm E.S.Br. COMB SEWER ABANDONED

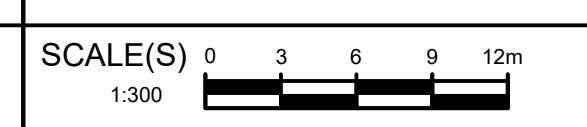
**LEGEND**

- PROPOSED STORM CONNECTION
- PROPOSED SANITARY CONNECTION
- PROPOSED WATER CONNECTION
- PROPOSED GAS CONNECTION
- - - PROPOSED UNDERGROUND CONCOURSE LEVEL

FILE: 10206938-ss0300-02-sf130.dwg PLOTTED BY: USER

REVISIONS	REVISIONS
1	4
2	5
3	6

**RCD**  
NOT FOR CONSTRUCTION

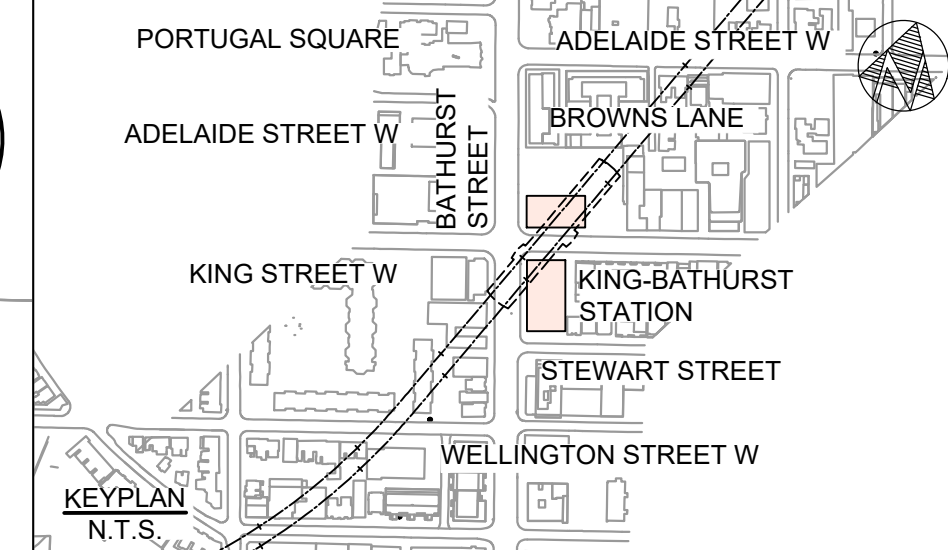


STATUS



DESIGNED	M.LI	2020/12/08
DRAWN	H.WANG	2020/09/09
CHECKED	M.LI	2020/09/09
APPROVED	APPROVED	2020/08/28

ONTARIO LINE SUBWAY  
 TITLE: TOC KING-BATHURST STATION SERVICING PLAN  
 Plot Date: 7 December 2020  
  
 Dwg. No. SS0300-02-SF130 Sheet No.

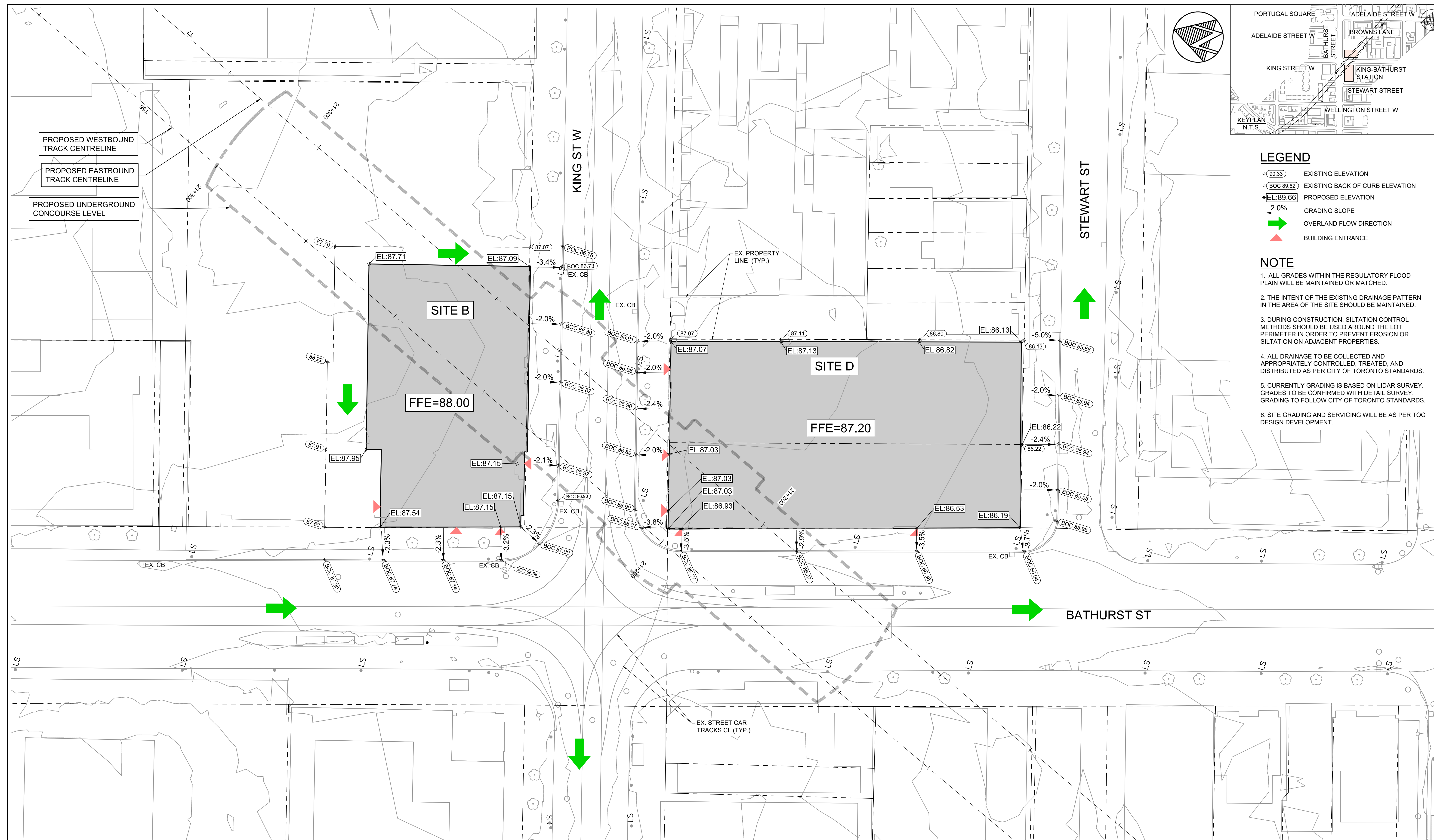


**LEGEND**

- ⊕ 90.33 EXISTING ELEVATION
- ⊕ BOC 89.62 EXISTING BACK OF CURB ELEVATION
- ⊕ EL:89.66 PROPOSED 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 INTENT OF THE EXISTING DRAINAGE PATTERN IN THE AREA OF THE SITE SHOULD BE MAINTAINED.
3. DURING CONSTRUCTION, SILTATION CONTROL METHODS SHOULD BE USED AROUND THE LOT PERIMETER IN ORDER TO PREVENT EROSION OR SILTATION ON ADJACENT PROPERTIES.
4. ALL DRAINAGE TO BE COLLECTED AND APPROPRIATELY CONTROLLED, TREATED, AND DISTRIBUTED AS PER CITY OF TORONTO STANDARDS.
5. CURRENTLY GRADING IS BASED ON LIDAR SURVEY. GRADES TO BE CONFIRMED WITH DETAIL SURVEY. GRADING TO FOLLOW CITY OF TORONTO STANDARDS.
6. SITE GRADING AND SERVICING WILL BE AS PER TOC DESIGN DEVELOPMENT.



FILE: 10206938-gr0300-02-sf130.dwg  
PLOTTED BY: USER

REVISIONS		REVISIONS	
1		4	
2		5	
3		6	

**RCD**  
NOT FOR CONSTRUCTION

SCALE(S)

1:300

STATUS



DESIGNED	M. LI	2020/12/08
DRAWN	H. WANG	2020/12/08
CHECKED	M. LI	2020/12/08
APPROVED	APPROVED	2020/12/08

**ONTARIO LINE SUBWAY**

**TOC KING-BATHURST STATION**

**GRADING PLAN**

Plot Date:

Infrastructure Ontario

Dwg. No. GR0300-02-SF130

Sheet No.

## Appendix B. Water Demand Calculation

**DESIGN CALCULATION**  
**Water Demand and Fire Flow Demand**

Location: King Bathurst TOC  
 Site B

Items	Water Demand Calculation		Remark
<b>Site Parameters</b>			
Average Day Water Consumption Rate	191 l/capita/day		Multi-unit high-rise = 191 litres / capita /day (City of Toronto Design Criteria for Sewers and Watermain)
Total Site Area	1643 Sq.m		
Total GFA	Residential	Commercial	
	14851	1236	Sq.m
Residential Units	187	n/a	
Residential/Commercial Population	325	14	Residential: 1.74 people /unit , Commercial: 1.1 people /100sq. m
Peaking Factor	Residential	Commercial	
Minimum hour	0.84	0.84	
Peak Hour	2.5	1.2	
Maximum Day Factor	1.3	1.1	
<b>Friction Factors</b>			
300mm to 600mm	120.0 'C' Factor		
	Residential	Commercial	
Average Consumption Rate	0.7L/s	0.03L/s	Population x Average consumption
Maximum Day Flow Rate	0.9L/s	0.03L/s	Population x Average consumption x Maximum Day Factor
Peak Hour Flow Rate	1.8L/s	0.04L/s	Population x Average consumption x Peak Hour Factor
Items	Fire Flow Demand Calculation		Remark
<b>Fire Flow Requirement (City of Toronto)</b>	28450.0 L/min		[number of hydrants] x [5,690 l/min]
High-rise residential & Commercial over two stories	19000.0 L/min		
Duration	5.0 hours		
Minimum number of hydrants	4.0 hydrants		(City of Toronto Design Criteria for Sewers and Watermain)
Average Spacing between hydrants	90.0m		
Maximum distance from access point of a building or lot to a hydrant	55.0m		
<b>Fire Flow Requirement (Fire Underwriter's Survey Guideline)</b>	27903.6 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 (All floors excluding Basement, under 2-Storeys) Coefficient related to Construction=1.0
	minus: 15%	4185.5 L/min	<u>Occupancy hazard reduction of surcharge</u> Non-combustible Limited combustible Combustible Free burning Rapid burning
	minus: 50%	11859.0 L/min	Apply Reduction for Automatic sprinklers designed to NFPA 13 (30%), systems with water supply (10%) and system with electronic supervision (10%)
<b>Fire Flow (F)</b>	28450.0 L/min		Takes the largest flow between City's requirement and Fire Underwriter's Survey Guideline

**DESIGN CALCULATION**  
**Water Demand and Fire Flow Demand**

Location: King Bathurst TOC  
 Site D

Items	Water Demand Calculation		Remark
<b>Site Parameters</b>			
Average Day Water Consumption Rate	191 l/capita/day		Multi-unit high-rise = 191 litres / capita /day (City of Toronto Design Criteria for Sewers and Watermain)
Total Site Area	1957 Sq.m		
Total GFA	Residential	Commercial	
	23171	0	Sq.m
Residential Units	235	n/a	
Residential/Commercial Population	409	0	Residential: 1.74 people /unit , Commercial: 1.1 people /100sq. m
Peaking Factor	Residential	Commercial	
Minimum hour	0.84	0.84	
Peak Hour	2.5	1.2	
Maximum Day Factor	1.3	1.1	
<b>Friction Factors</b>			
300mm to 600mm	120.0 'C' Factor		
	Residential	Commercial	
Average Consumption Rate	0.9L/s	0L/s	Population x Average consumption
Maximum Day Flow Rate	1.2L/s	0L/s	Population x Average consumption x Maximum Day Factor
Peak Hour Flow Rate	2.3L/s	0L/s	Population x Average consumption x Peak Hour Factor
Items	Fire Flow Demand Calculation		Remark
<b>Fire Flow Requirement (City of Toronto)</b>			
High-rise residential & Commercial over two stories	28450.0 L/min		[number of hydrants] x [5,690 l/min]
Duration	19000.0 L/min		
Minimum number of hydrants	5.0 hours		
Average Spacing between hydrants	4.0 hydrants		(City of Toronto Design Criteria for Sewers and Watermain)
Maximum distance from access point of a building or lot to a hydrant	90.0 m		
	55.0 m		
<b>Fire Flow Requirement (Fire Underwriter's Survey Guideline)</b>			
	33488.5 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-Storeys) Coefficient related to Construction=1.0
			<u>Occupancy hazard reduction of surcharge</u>
			Non-combustible Limited combustible Combustible Free burning Rapid burning
minus: 15%	5023.3 L/min		
minus: 50%	14232.6 L/min		Apply Reduction for Automatic sprinklers designed to NFPA 13 (30%), systems with water supply (10%) and system with electronic supervision (10%)
<b>Fire Flow (F)</b>	33488.5 L/min		Takes the largest flow between City's requirement and Fire Underwriter's Survey Guideline

# Appendix C. Sanitary Flow Demand Calculation



**DESIGN CALCULATION  
Sanitary Flow Demand**

 Location: King Bathurst TOC  
 Site B

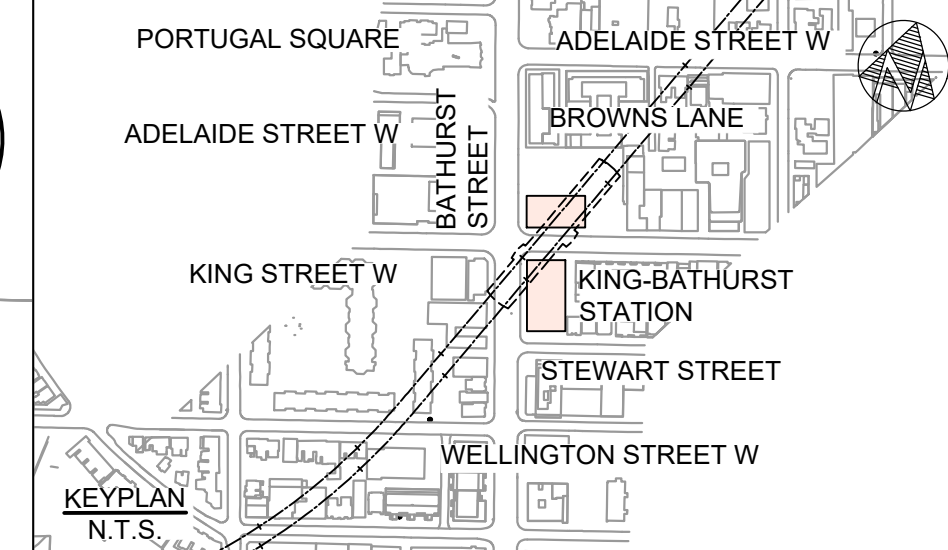
Items	Water Demand Calculation		Remark
<b>Site Parameters</b>			
Average waste water flow	450	l/capita/day	Multi-unit high-rise = 450 litres / capita /day <i>(City of Toronto Design Criteria for Sewers and Watermain)</i>
Commercial average flow	180000	l/floor hectare/day	Commercial = 180000 litres/ floor hectare / day <i>(City of Toronto Design Criteria for Sewers and Watermain)</i>
Total Site Area	1643	Sq.m	
Total GFA	Residential 14851	Commercial 1236	Sq.m
Residential Units	187	n/a	
Residential/Commercial Population	325	14	Residential: 1.74 people /unit , Commercial: 1.1 people /100sq. m
Peaking Factor	Residential 4.1	Commercial n/a	<i>Commercial peak factor is included in average flow</i>
Extraneous Flow			
Infiltration allowance (< 10 ha)	0.26	l/s/ha	
Residential Flow	1.69	l/s	
Commercial Flow	0.26	l/s	
Infiltration Flow	0.04	l/s	
<b>Maximum Cumulative Flow with peaking factor</b>	<b>7.24</b>	<b>l/s</b>	

**DESIGN CALCULATION  
Sanitary Flow Demand**

 Location: King Bathurst TOC  
 Site D

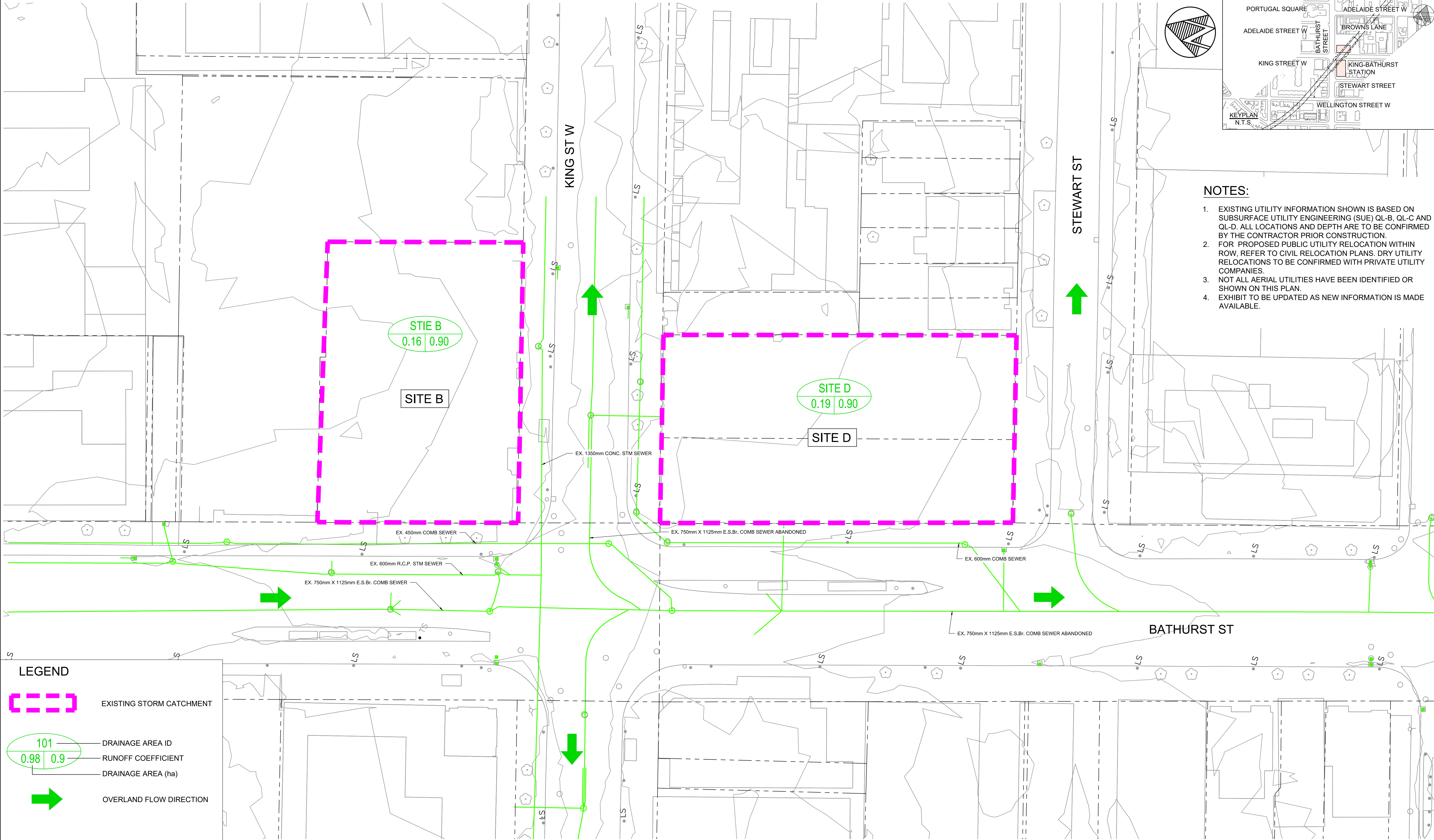
Items	Water Demand Calculation		Remark
<b>Site Parameters</b>			
Average waste water flow	450	l/capita/day	Multi-unit high-rise = 450 litres / capita /day <i>(City of Toronto Design Criteria for Sewers and Watermain)</i>
Commercial average flow	180000	l/floor hectare/day	Commercial = 180000 litres/ floor hectare / day <i>(City of Toronto Design Criteria for Sewers and Watermain)</i>
Total Site Area	1957	Sq.m	
Total GFA	Residential 23171	Commercial 0	Sq.m
Residential Units	235	n/a	
Residential/Commercial Population	409	0	Residential: 1.74 people /unit , Commercial: 1.1 people /100sq. m
Peaking Factor	Residential	Commercial	
Residential peak factor (PF=)	4	n/a	<i>Commercial peak factor is included in average flow</i>
Extraneous Flow			
Infiltration allowance (< 10 ha)	0.26	l/s/ha	
Residential Flow	2.13	l/s	
Commercial Flow	0.00	l/s	
Infiltration Flow	0.05	l/s	
<b>Maximum Cumulative Flow with peaking factor</b>	<b>8.57</b>	<b>l/s</b>	

# 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
- DRAINAGE AREA ID  
RUNOFF COEFFICIENT  
DRAINAGE AREA (ha)
- OVERLAND FLOW DIRECTION

REVISIONS	REVISIONS
1	4
2	5
3	6

**RCD**  
NOT FOR CONSTRUCTION

SCALE(S) 0 3 6 9 12m  
1:300

STATUS



DESIGNED	S. KHORSHID	2020/12/08
DRAWN	H. WANG	2020/09/09
CHECKED	M. LI	2020/12/08
APPROVED	APPROVED	2020/12/08

**ONTARIO LINE SUBWAY**

**TOC**  
**KING-BATHURST STATION**  
EXISTING DRAINAGE PLAN

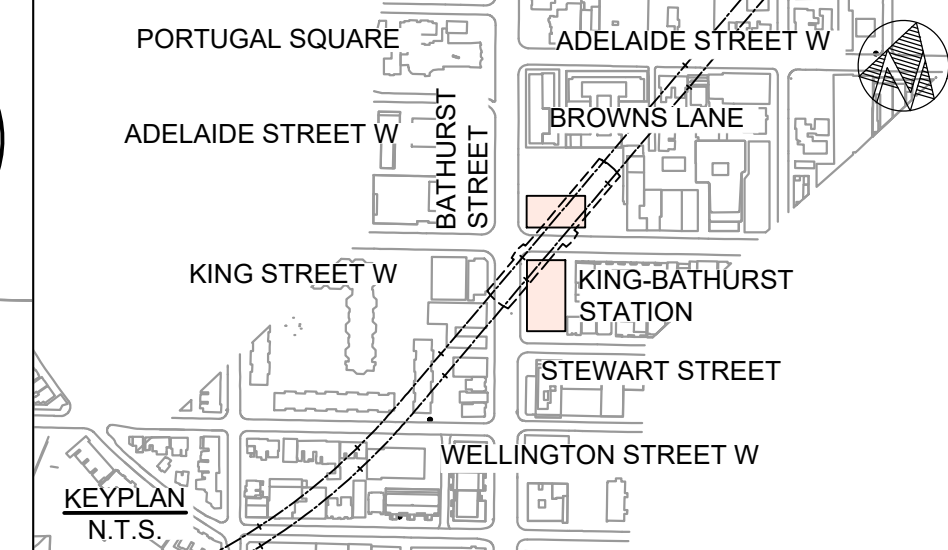
Plot Date:

Infrastructure Ontario

Dwg. No. DR0300-02-SF130

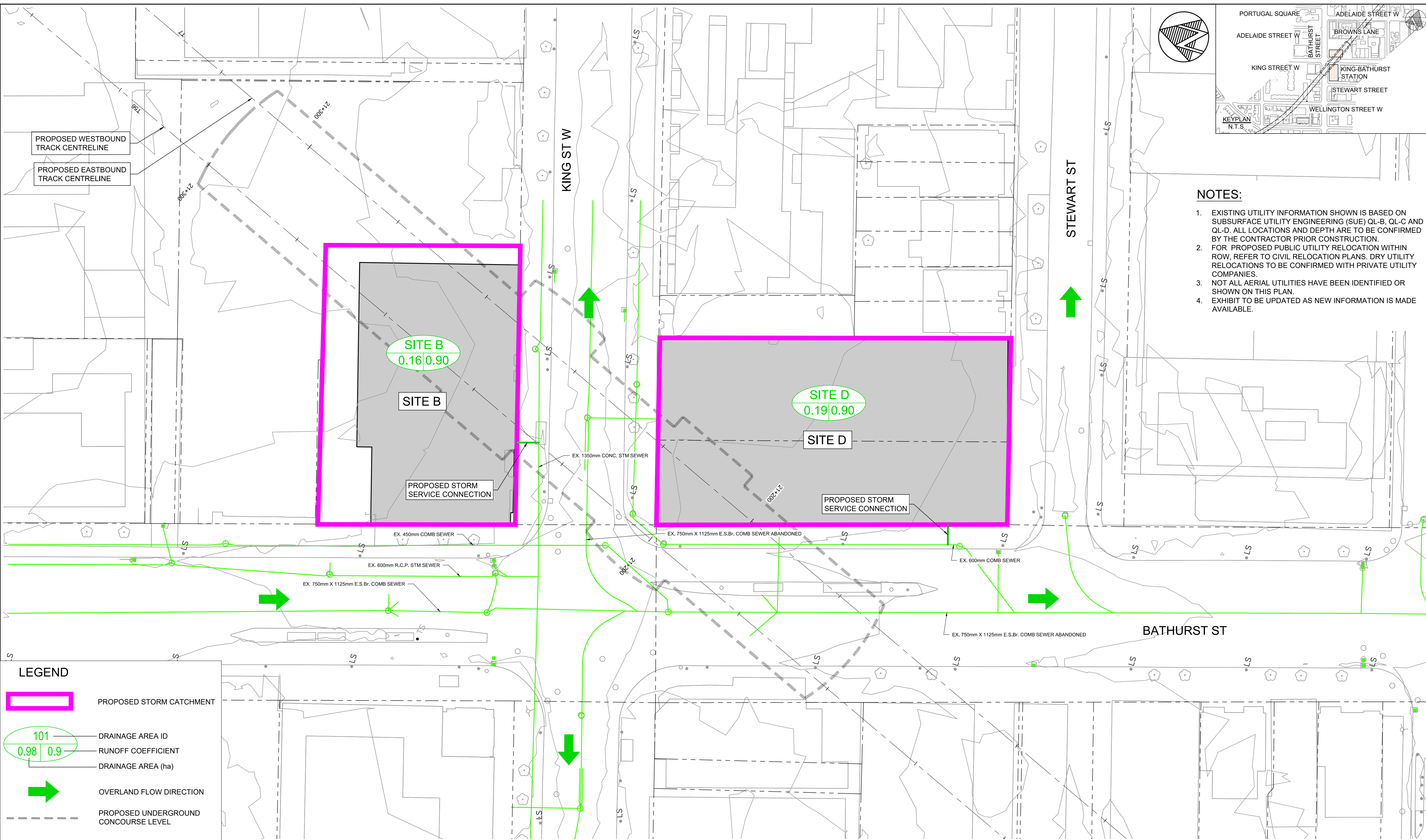
Sheet No.

FILE: 10206938-dr0300-02-sf130.dwg  
PLOTTED BY: USER



**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**

- PROPOSED STORM CATCHMENT
- DRAINAGE AREA ID  
RUNOFF COEFFICIENT  
DRAINAGE AREA (ha)
- OVERLAND FLOW DIRECTION
- PROPOSED UNDERGROUND CONCOURSE LEVEL

REVISIONS	REVISIONS
1	4
2	5
3	6

**RCD**  
NOT FOR CONSTRUCTION

SCALE(S) 0 3 6 9 12m  
1:300

STATUS



DESIGNED	S. KHORSHID	2020/12/08
DRAWN	H. WANG	2020/09/09
CHECKED	M. LI	2020/12/08
APPROVED	APPROVED	2020/12/08

**ONTARIO LINE SUBWAY**

**TOC KING-BATHURST STATION**

**PROPOSED DRAINAGE PLAN**

Plot Date:

Infrastructure Ontario

Dwg. No. DR0300-02-SF131

Sheet No.

FILE: 10206938-drr0300-02-sf130.dwg  
PLOTTED BY: USER