

Memorandum

Date: Thursday, December 17, 2020
 Project: Ontario Line TA
 To: Liana Bresler, SvN
 From: Walter Burke and Anish Deshpande, Mott MacDonald
 Subject: Revised Summary Hydrological Scope Discussion for Corktown – Sites B1, B2 and F

Purpose

The purpose of this memorandum is to present a revised recommended preliminary geotechnical and hydrological investigation scope (i.e., wells and borings) to be performed to provide initial information to prospective TOC developers (DevCo). This memo is based on ongoing discussions and recent information provided to Mott MacDonald by SvN from November through December 2020 including a revised drawing we received on November 23, 2020. It is our intent that the data derived from this recommended preliminary investigation will be reviewed in conjunction with data presented in a geotechnical data report previously prepared by another consultant and a design memorandum prepared by Thurber Engineering Ltd. (Thurber). This preliminary investigation is limited in extent and scope and is not intended to represent all the geotechnical and hydrological studies required for the project. At present Metrolinx is performing preliminary investigations to support the request for proposals (RFPs) for the stations and tunnel and the preliminary investigations will be followed by final investigations to be performed by the Project Co. However, it appears that a limited number of the Metrolinx investigations for the Corktown Station are located within the footprint of the Corktown TOC Station which includes boring OL-05013 at Sites B1 and B2, and boring OL-05014 located within the basement footprint of Site F (West Block). We assume that the preliminary investigations for the TOC development will be followed by final investigations to be performed by the DevCo.

The DevCo will be responsible to interpret the data presented and, perform the detailed geotechnical and hydrological investigations, testing, analysis and reporting necessary to develop final designs and comply with applicable codes and requirements, including but not limited to the City of Toronto Application Support Material: Terms of Reference (TOR). The DevCo is responsible for all applicable regulatory submissions, including but not limited to the City of Toronto Hydrological Review Form, August 2018 (Hydrological Form).

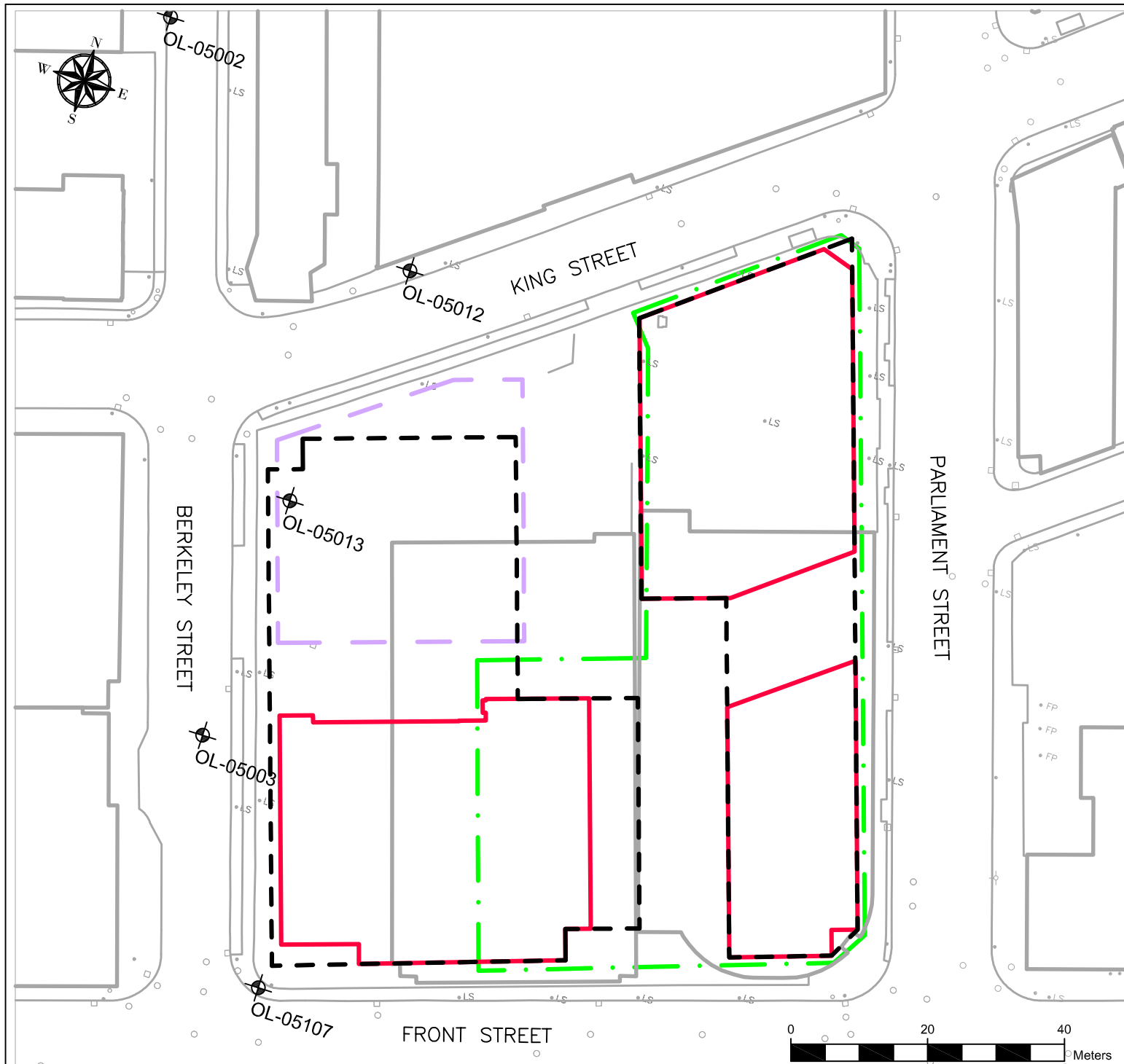
TOC Development ⁽¹⁾	
Name	Corktown
Sites B1 and B2 (Combined)	
TOC Maximum Built Over Footprint in square meters (sqm)	5,821
Number of basements (and levels)	1 (4 levels)
Size of basement (sqm)	4,317
TOC Max. Built Over Footprint not underlain by basement or station (sqm)	1,474
Maximum depth of basement, meters (m)	11.1
Maximum depth of preliminary drilled pier foundation ⁽²⁾ (m)	23

<p><u>Site F (West Block)</u> TOC Maximum Built Over Footprint in square meters (sqm) 3,924 Number of basements (and levels) 1 (2 levels) Size of basement (sqm) 4,585 TOC Max. Built Over Footprint not underlain by basement (sqm) 0 Maximum depth of basement, meters (m) 5.7 Maximum depth of preliminary drilled pier foundation ⁽²⁾ (m) 23</p> <p><u>Site F (East Block)</u> TOC Maximum Built Over Footprint in square meters (sqm) 3,819 Number of basements (and levels) 1 (1 level) Size of basement (sqm) 4,786 TOC Max. Built Over Footprint not underlain by basement (sqm) 0 Maximum depth of basement, meters (m) 3.0 Maximum depth of preliminary drilled pier foundation ⁽²⁾ (m) 23</p>	
<p>Estimated Final Investigation Requirements</p>	
<p><u>Sites B1 and B2 (Combined)</u> Minimum number of wells in basement required per TOR ^{(3), (4), (5)} 12 Estimated number of borings required in non-basement areas ⁽⁶⁾ 3 Estimated total number of borings/wells required for this site 15</p> <p><u>Site F (West Block)</u> Minimum number of wells in basement required per TOR ^{(3), (4), (5)} 13 Estimated number of borings required in non-basement areas ⁽⁶⁾ 0 Estimated total number of borings/wells required for this site 13</p> <p><u>Site F (East Block)</u> Minimum number of wells in basement required per TOR ^{(3), (4), (5)} 13 Estimated number of borings required in non-basement areas ⁽⁶⁾ 0 Estimated total number of borings/wells required for this site 13</p> <p><u>Existing Investigation – Sites B1 and B2</u> Current number of borings/wells in the vicinity of TOC development: 4 Depth(s) of borings/wells within TOC footprint (m) 55.3 Current number of borings/wells located within any TOC basement 0</p> <p><u>Existing Investigation – Site F</u> Current number of borings/wells in the vicinity of TOC development: 1 Depth(s) of borings/wells within TOC footprint (m) 55.0 Current number of borings/wells located within any TOC basement 1</p> <p>Thickness of soil overburden (m) 9.3 to 12.4 Depth of groundwater in soil (m) 2.3 to 8.8 Depth of groundwater in rock (m) 10.3 to 13.1</p>	
<p>Recommended Preliminary Investigation ^{(7) (8)}</p>	
<p><u>Sites B1 and B2 (Combined)</u> Total number of preliminary borings converted to wells in TOC basements 3 Depth of borings/wells in TOC basement (m) 30 (boring)/15 (well) Number of downhole hydrological tests 3 Number of preliminary borings in non-basement TOC footprint 2 Depth of borings in non-basement TOC footprint (m) 1 @35 and 1 @50 Total number of recommended preliminary borings/wells 5</p>	

Recommended testing:	
<ul style="list-style-type: none"> rock unconfined compression tests ⁽⁹⁾ groundwater analytical test suites in compliance with the testing protocols presented in the TOR. Analytical soil testing, as applicable ⁽¹⁰⁾ 	10 3 Assume by Stantec
Site F (West Block)	
Total number of preliminary borings converted to wells in TOC basements	3
Depth of borings/wells in TOC basement (m)	30 (boring)/15 (well)
Number of downhole hydrological tests	3
Number of preliminary borings in non-basement TOC footprint	Not applicable
Depth of borings in remaining TOC footprint (m)	Not applicable
Total number of recommended preliminary borings/wells	3
Recommended testing:	
<ul style="list-style-type: none"> rock unconfined compression tests ⁽⁹⁾ groundwater analytical test suites in compliance with the testing protocols presented in the TOR. Analytical soil testing, as applicable ⁽¹⁰⁾ 	6 3 Assume by Stantec
Site F (East Block)	
Total number of preliminary borings converted to wells in TOC basements	4
Depth of borings/wells in TOC basement (m)	30 (boring)/15 (well)
Number of downhole hydrological tests	4
Number of preliminary borings in non-basement TOC footprint	Not applicable
Depth of borings in remaining TOC footprint (m)	Not applicable
Total number of recommended preliminary borings/wells	4
Recommended testing:	
<ul style="list-style-type: none"> rock unconfined compression tests ⁽⁹⁾ groundwater analytical test suites in compliance with the testing protocols presented in the TOR. Analytical soil testing, as applicable ⁽¹⁰⁾ 	8 4 Assume by Stantec

Notes:

- Refer to attached Drawings C1 and C2 based on SvN CAD files received by Mott MacDonald on November 23, 2020. Note the "TOC Maximum Built Over Footprint" represents the maximum lateral extent of the above-ground TOC development regardless of height or elevation.
- Depths are estimated based on preliminary foundation design.
- The TOR requires a minimum of 5 wells for a 30m x 30m basement. This results in a base exploration coverage of 180 square meters per well. The TOR states: "...additional groundwater wells shall be installed and the qualified professional will use professional judgement to determine the number of additional wells required." This document assumes that the coverage cited above is applicable and that less stringent project-specific criteria will not be adopted.
- For the purpose of this document, Mott MacDonald has assumed a coverage of 500 square meters per well for required additional wells. This assumption to be confirmed by the professional who will prepare and submit the Hydrological Form.
- Assumes borings to be performed for the station will be adequate for design for portion of TOC that overlays the station.
- Based on an assumed exploration coverage of 500 square meters per boring to be confirmed by the geotechnical P. Eng. of record.
- Advance and sample investigations through soil overburden in accordance with ASTM D1586. Advance investigations through rock in accordance with ASTM D2113.
- Coordinate performance of recommended preliminary investigations with demolition, site remediation and access agreement constraints.
- Perform tests in accordance with ASTM D7012.
- Testing to be performed by Stantec as an extension of the OLTA Environmental Investigations.



LEGEND	
	STATION FOOTPRINT
	TOC FOOTPRINT AT GROUND LEVEL
	TOC MAXIMUM BUILT OVER FOOTPRINT
	TOC BASEMENT FOOTPRINT
	HISTORIC BORING LOCATION

AREA	m ²
TOC AERIAL FOOTPRINT	5,821
STATION FOOTPRINT INTERLAPPED WITH TOC FOOTPRINT	1,026
TOTAL AREA OF TOC BASEMENT	4,317
TOC ROOFPRIENT NOT UNDERLAIN BY TOC BASEMENT, TOC FOOTPRINT, OR STATION FOOTPRINT	481
TOC ROOFPRIENT NOT UNDERLAIN BY TOC BASEMENT OR STATION FOOTPRINT	1,474

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Reference Files:
 P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Corktown Station\09 Corktown.zip\09 Corktown\10206938-TD009-DT-CORKTOWN - Sheet - 209T101B - LEVEL P1.dwg, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Corktown Station\OLTA - Corktown TOC_Footprints_201019.pdf, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Ontario Line\Station Dwg & Calcs from SvN\10206938-CI0000-00-BP001 Ontario Line Existing Conditions Plan.dwg

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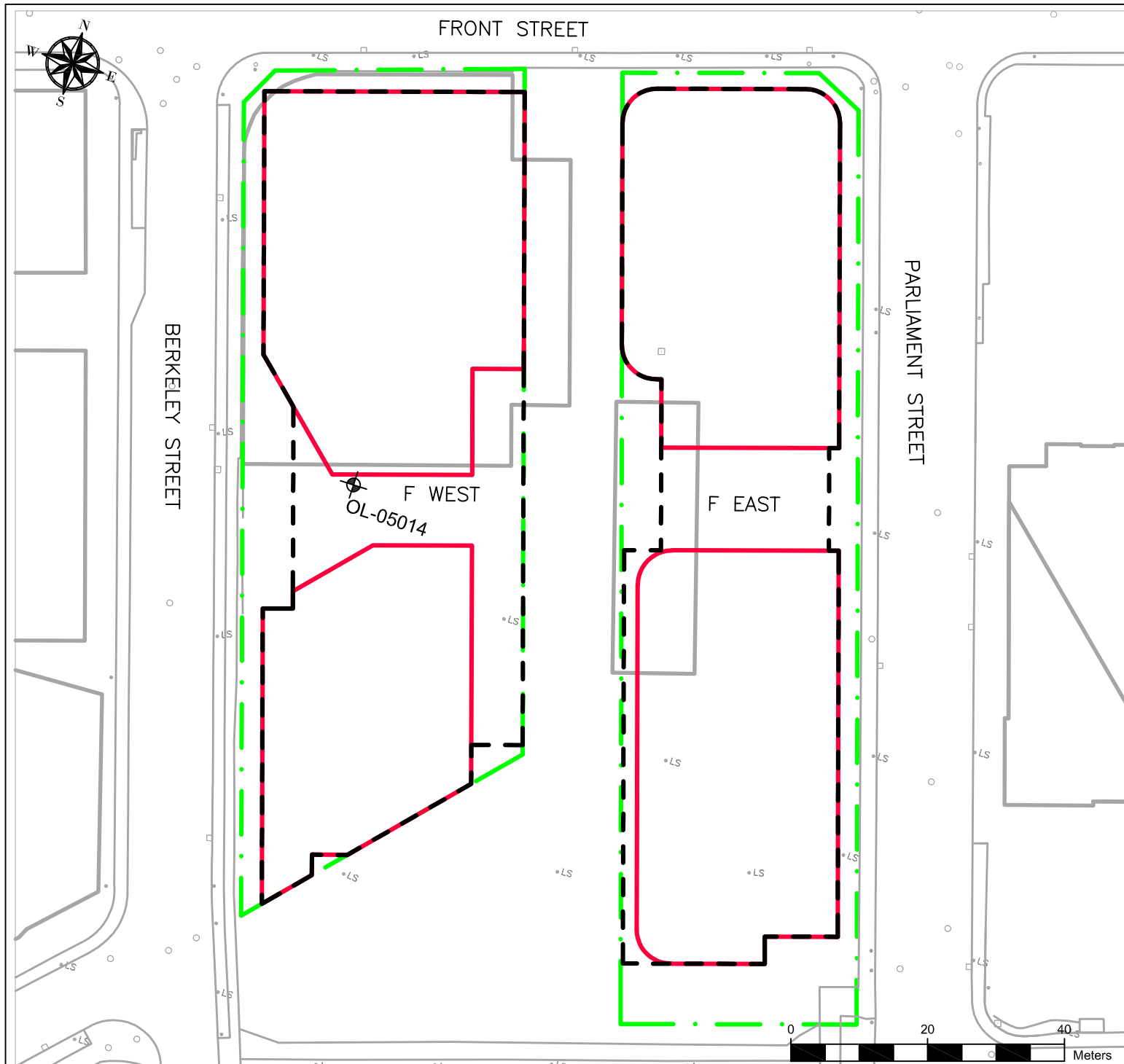
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Client

ONETEAM
 ONTARIO LINE TECHNICAL ADVISOR

Rev	Date	Drawn	Description	Ch'k'd	App'd

Title ONTARIO LINE - CORKTOWN TOC SITE B1 & B2	Drawn	AJ	
	Checked	AD	
	Approved	WB	
Drawing Number C1	Scale at ANSI B 1:20		
	Security STD	Status PRE	Rev 1



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LEGEND	
	TOC FOOTPRINT AT GROUND LEVEL
	TOC MAXIMUM BUILT OVER FOOTPRINT
	TOC BASEMENT FOOTPRINT
	HISTORIC BORING LOCATION

AREA (F WEST)	m ²
TOC AERIAL FOOTPRINT	3,924
STATION FOOTPRINT INTERLAPPED WITH TOC FOOTPRINT	0
TOTAL AREA OF TOC BASEMENT	4,585
TOC ROOFPRINT NOT UNDERLAIN BY TOC BASEMENT OR TOC FOOTPRINT	0

AREA (F EAST)	m ²
TOC AERIAL FOOTPRINT	3,819
STATION FOOTPRINT INTERLAPPED WITH TOC FOOTPRINT	0
TOTAL AREA OF TOC BASEMENT	4,786
TOC ROOFPRINT NOT UNDERLAIN BY TOC BASEMENT OR TOC FOOTPRINT	0

Reference Files:
 P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Corktown Station\09 Corktown.zip\09 Corktown\10206938-TD009-DT-CORKTOWN - Sheet - 209T101F - LEVEL P1.dwg, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Corktown Station\OLTA - Corktown TOC_Footprints_201019.pdf, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Ontario Line\Station Dwgs & Calcs from SvN\10206938-CI0000-00-BP001 Ontario Line Existing Conditions Plan.dwg

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Rev	Date	Drawn	Description	Ch'k'd	App'd

Title ONTARIO LINE - CORKTOWN TOC SITE F	Drawn	AJ	
	Checked	AD	
	Approved	WB	
Drawing Number C2	Scale at ANSI B 1:20		
	Security STD	Status PRE	Rev 1