

GARDINER EXPRESSWAY AND LAKE SHORE BOULEVARD EAST RECONFIGURATION ENVIRONMENTAL ASSESSMENT

Geo-Environmental Baseline Conditions Report - 2014



WATERFRONToronto



EXECUTIVE SUMMARY

This Report has been prepared to provide background and supplementary information on the baseline soils and groundwater conditions (existing/future) in the study area for the proposed reconfiguration of the Gardiner Expressway and Lake Shore Boulevard from Lower Yonge Street to Logan Avenue in the east. This Report will form part of the supporting documentation for the Environmental Assessment (EA) Study.

Although no geotechnical field work (soils and foundations boreholes) was undertaken specifically for this Environmental Assessment, for most of the study area or lands that will be directly affected by any new facilities, existing, detailed information was available due to the significant number of active/recent local projects. This includes numerous sub-surface investigations for the East Bayfront, the Keating Channel Precinct and the lands associated with the Don Mouth Naturalization and Port Lands Flood Protection project. These studies plus available soils information from the original design work on the Gardiner Expressway completed in the 1960s and on adjacent projects north (up-gradient) of the rail yards provided a thorough database to describe the soils and groundwater conditions in the study area.

Locally, the overburden soils consist of depths of fill up to 8 m to 10 m placed through historical lake filling during the late 19th and early 20th centuries. In 1912, the Toronto Harbour Commissioners initiated the conversion of approximately 1000 acres of marsh and shoreline into a waterfront industrial area, including channeling the Don River, constructing concrete dockwalls, and dredging millions of tons of sand to create the Port Lands. The shoreline was filled with dredged sediment from the Inner Harbour but the fill also reportedly included construction debris, excavated soil, sewage sludge, incinerator refuse, timber, concrete, and municipal garbage. Native soils consisting of former lake bottom sediments have been observed underlying the fill materials, and overlying bedrock.

A layer of fill material of varying thickness covers the entire study area. These fill materials are expected to be comprised of soft soils from dredging and excavation spoils from other areas of Toronto. Additionally, the fill materials are anticipated to contain rubble and previous shoreline structures. These fill materials are expected to present challenges to construction based on their limited geotechnical engineering suitability. The presence of rubble and subsurface structures could present difficulties for caisson or soldier pile installation and/or excavations. Not all excavated soils resulting from construction would be reusable from a geotechnical perspective and would need special handling, management, and potentially off-site disposal at licensed landfills. It has been noted that in some cases the fill layer is oil-impregnated likely from pipeline leakage in the area.

Lands within the study area have been historically used for fuel oil bulk storage and for oil refining uses. The aerial photograph on the following page is from 1964 and shows the Keating Channel Precinct area industrial land uses during the construction of the east end of the Gardiner Expressway.

The contaminants detected in the soil include metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) (including chlorinated solvents), and general chemistry parameters. These contaminants have been detected at concentrations above

the MOECC Guidelines for Background and Generic Site Condition Standards (2011). The contaminated soil depths north of the Keating Channel have been reported to extend to depths of 3 metres below ground surface east of Cherry Street.



The presence of contaminated soils and the need for specific remediation strategies have been noted as a requirement with any development strategy in the Keating Channel Precinct area. A detailed 2009 Subsurface Investigation was carried out for the area south of the Keating Channel for the Toronto Region Conservation Authority as part of the Don Mouth Naturalization and Port Lands Flood Protection Project. This assessment reports contaminants of concern within the soil and groundwater in the area including light and heavier fraction petroleum hydrocarbons (PHCs), chlorinated and non-chlorinated organic compounds, heavy metals, polychlorinated biphenyls (PCBs), and general chemistry parameters.

Soils in the Gardiner - Lake Shore Boulevard corridor are further compromised given the potential for migration of impacted groundwater into the study area from up-gradient sources. In general, groundwater is expected to migrate regionally from up-gradient inland areas down-gradient towards water bodies within and adjacent to the study area, that being the Don River, the Keating Channel, and Lake Ontario.

Groundwater levels within the Keating Channel Precinct area were noted as shallow, approximately 0.7 to 3.9 m below ground surface, and generally observed within the fill materials. Groundwater readily infiltrated into test pit excavations. In addition, shallow water table conditions as well as proximity of some sections of the study area to water bodies will create conditions where significant water inflow to

any excavations will be likely to occur. Shallow water table conditions will require groundwater control measures to be implemented. Dewatering for many construction activities will be required.

Previous investigations indicate that bedrock is encountered at a depth of approximately 10 m and 12 m in the portion of the study area west of Cherry Street and at greater depths in the area between Cherry Street and the Don River. A deep bedrock valley has been identified some 300 m west of the Don Valley Parkway with a sudden drop of up to 25 m noted in the bedrock surface elevations along the Gardiner Expressway corridor. Having a width of about 200 m, this valley crosses the Gardiner and continues southward.

The soil and groundwater conditions are of importance when considering the costs and complexity of infrastructure construction in the study area.

TABLE OF CONTENTS

EXECUTIVE SUMMARY..... ii

GLOSSARY AND ABBREVIATIONS vi

1. INTRODUCTION 1

 1.1 Study Area 1

2. STUDY METHODOLOGY..... 3

 2.1 Data Gaps 3

3. DESCRIPTION OF BASELINE CONDITIONS..... 5

 3.1 Existing Subsurface Conditions 5

 3.1.1 Overview of Existing Conditions 5

 3.1.2 West Don Lands Precinct 8

 3.1.3 Lower Don Lands and Keating Channel Precinct 9

 3.1.4 Distillery District and St. Lawrence Neighbourhood..... 10

 3.1.5 East Bayfront Precinct..... 10

 3.2 Future Baseline (“Do Nothing”) – Subsurface Conditions 11

 3.2.1 Port Lands and South Riverdale 13

 3.2.2 West Don Lands Precinct 13

 3.2.3 Lower Don Lands and Keating Channel Precinct 13

 3.2.4 Distillery District and St. Lawrence Neighbourhood..... 13

 3.2.5 East Bayfront Precinct..... 13

 3.2.6 Lower Yonge Precinct 13

 3.3 Constraints and Opportunities..... 14

4. REFERENCES 15

List of Figures

Figure 1: Study Area..... 2

Figure 2: Example of Original Borehole Data for 1960s Gardiner Design Work 3

Figure 3: Historic Shorelines of Toronto Harbour 6

Figure 4: Future 2031 Conditions 12

GLOSSARY AND ABBREVIATIONS

BGS – Below Ground Surface

CEAA 2012 – Canadian Environmental Assessment Act, 2012

EA – Environmental Assessment

EAA – Environmental Assessment Act (Ontario)

ESA – Environmental Site Assessment

LNAPL - Light Non-Aqueous Phase Liquid

MOECC – Ontario Ministry of the Environment and Climate Change

PAHs – Polycyclic Aromatic Hydrocarbons

PCBs - Polychlorinated Biphenyls

PHCs – Petroleum Hydrocarbons

ToR – Terms of Reference

VOCs – Volatile Organic Compounds

1. INTRODUCTION

Waterfront Toronto and the City of Toronto (City) have jointly undertaken an Individual Environmental Assessment (EA) to determine the future of the eastern portion of the elevated Gardiner Expressway and Lake Shore Boulevard from approximately Lower Jarvis Street to approximately Leslie Street (referred to as the Gardiner East EA). The EA is being completed pursuant to the Ontario *Environmental Assessment Act* (EAA).

As part of the Gardiner East EA, this report documents the soils and groundwater baseline conditions in the Gardiner East EA study area.

1.1 Study Area

In 2009 the study area for the EA was defined in the Terms of Reference (ToR) as the section of the Gardiner Expressway and Lake Shore Boulevard East that extends 2.4 km from approximately Lower Jarvis Street to Logan Avenue. Since 2009 this study area has been revised to a slightly greater area in order to capture transition areas to the east and west and the Richmond/Adelaide interchange with the Don Valley Parkway (DVP). The study area now extends from just west of Lower Jarvis Street to approximately Leslie Street. This study area is referred to as the Environmental and Urban Design Study Area. It includes the lands in the vicinity of the section of the Gardiner Expressway and Lake Shore Boulevard East that are being considered for reconfiguration. These are the areas that could potentially experience disruption effects and be transformed through redevelopment opportunities. Figure 1 illustrates the study area.

For the purposes of describing the existing soils and groundwater environment, particular focus was given to information for:

- Areas immediately north of the existing Gardiner Expressway right-of-way;
- Areas hydrogeologically up-gradient (up-gradient in terms of groundwater flow direction) of the existing Gardiner Expressway right-of-way;
- Areas lying within the existing Gardiner Expressway right-of-way;
- Areas immediately adjacent south of the existing Gardiner Expressway right-of-way; and
- Areas considered immediately hydrogeologically down-gradient (immediately down-gradient in terms of interpreted groundwater flow direction) of the existing Gardiner Expressway right-of-way.

Figure 1: Study Area



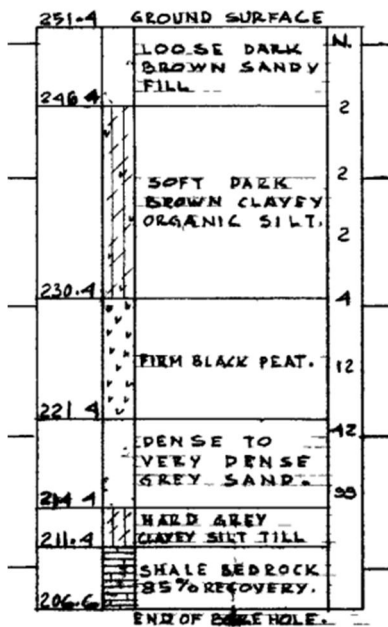
2. STUDY METHODOLOGY

To describe the existing geologic and hydrogeologic conditions in the study area, a review of available historical records and relevant environmental assessments and investigation reports was carried out. The reports that were reviewed are noted in the reference section of this appendix report (Section 4). As noted previously, for most of the study area or lands that will be directly affected by any new facilities, existing, detailed information was available due to the significant number of active/recent local projects.

2.1 Data Gaps

To date, documented soil and groundwater analysis data pertains to specific study sites within the EA study area including the waterfront precincts adjacent to the Gardiner/Lake Shore Boulevard corridor (West Don Lands, East Bayfront, Lower Don Lands, Keating Channel Precinct (also known as North Keating) lands). This information covers the majority of the lands under assessment. Notwithstanding, there is limited soils and groundwater information for the immediate Gardiner Expressway and Lake Shore Boulevard corridor. Soils and detailed borehole information is available from the original design records and plans for the construction of the Gardiner Expressway in the 1960s (see Figure 2 below) and Golder Associates provided a report (Subsurface Data Compilation – Lakefront Corridor, December 21, 2000) on their review of available subsurface information from previous historical geotechnical investigations along the Gardiner - Lake Shore Boulevard corridor between Jameson Avenue and the Don Valley Parkway.

Figure 2: Example of Original Borehole Data for 1960s Gardiner Design Work



Included in the information are investigations of the lands known as 480 Lake Shore Boulevard East that were also completed by Golder (Draft Report on Phase II Environmental Site Assessment, 480 Lakeshore

Boulevard East, August 2006). This covers the lands east of Cherry Street bounded by the existing Gardiner Expressway to the south, the rail yards to the north and Don River to the east. These lands represent the majority of the study area where new, "off-corridor" facilities will require assessment. However, this information is restricted to the examination of the chemical and groundwater characteristics of the soils and not its structural characteristics.

For subsequent preliminary and detailed design work, in order to assess the subsurface soil and groundwater conditions directly along the new Gardiner/Lake Shore Boulevard corridor, a data collection program will need to be undertaken. This would involve the drilling of both geotechnical/foundations and environmental boreholes in and adjacent to the alignment, from which soil samples at varying depth intervals can be collected. Monitoring wells should be installed in the boreholes, in order to collect groundwater levels and samples for analysis. The environmental soil and groundwater data would need to be assessed in accordance with Ontario Regulation 153/04, as amended by O. Reg. 511/09. It is anticipated that this work would be completed during the preliminary design stage in order to feed into the detailed design.

The methane monitoring conducted for the precinct redevelopments in the waterfront area for East Bayfront and West Don Lands has identified significant levels of combustible gases (methane), likely generated from deeper fill or native lake bottom materials. There is a concern for the migration of methane to outdoor air or through passive uses of the property. This would need to be considered in the design of subsurface structures, such as utility vaults. In order to assess the levels of combustible gas, a monitoring program should be undertaken within the study area (exact location(s) to be determined at detailed design stage). Soil vapour monitoring should be carried out through field measurements for volatile organic compounds (VOCs), total combustible gases, and for levels of methane, carbon dioxide, and oxygen. This work should also be completed during the preliminary design stage.

3. DESCRIPTION OF BASELINE CONDITIONS

3.1 Existing Subsurface Conditions

Property-specific soil and groundwater investigations have been carried out within the EA study area in the precincts of West Don Lands, East Bayfront, the Lower Don Lands and Keating Channel Precinct. Subsurface conditions from these investigations provide an indication of general baseline conditions for these precincts. The following presents an overview of existing conditions.

3.1.1 Overview of Existing Conditions

Geology Overview

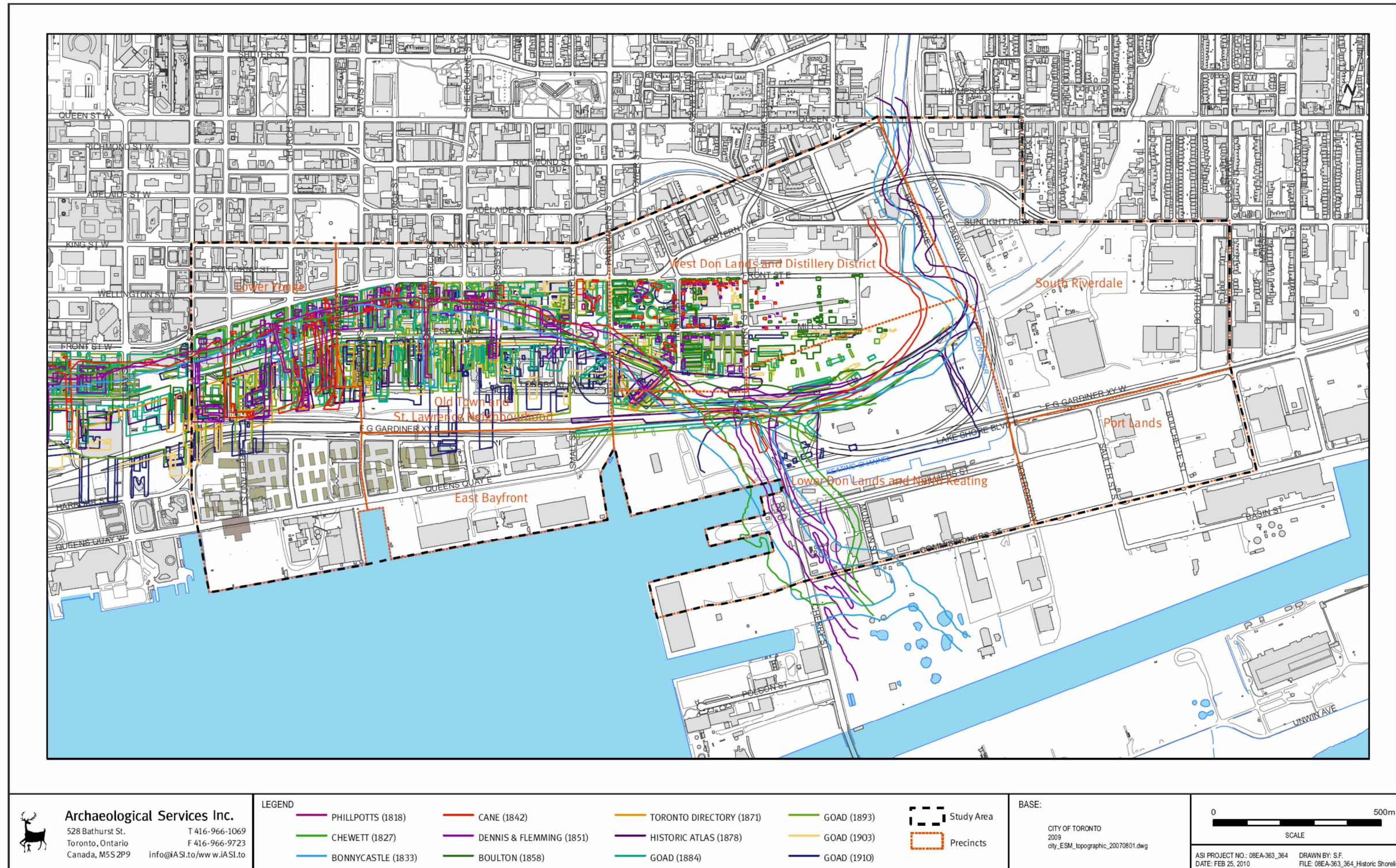
The study area is within the Iroquois Plain physiographic region. Native overburden deposits consist of clay till and sand from glacial Lake Iroquois.¹ The underlying bedrock is pale grey to cream shale, fossiliferous limestone, dolostone and siltstone from the Upper Ordovician age Georgian Bay formation.¹ The upper 2 metres (m) of the shale is generally heavily weathered.

Locally, the overburden soils consist of depths of fill up to 8 to 10 m placed through historical lake filling during the late 19th and early 20th centuries. Figure 3, prepared by Archaeological Services Inc., provides a mapping summary of the various historic shorelines. With reference to Figure 3, the section occupied by the Gardiner Expressway lying between Small and Sumach Streets may have received fill early to mid-19th century. In 1912, the Toronto Harbour Commissioners initiated the conversion of approximately 1000 acres of marsh and shoreline into a waterfront industrial area, including channelling the Don, constructing concrete dockwalls, and dredging millions of tons of sand to create the Port Lands. The shoreline was filled with dredged sediment from the Inner Harbour but the fill also reportedly included construction debris, excavated soil, sewage sludge, incinerator refuse, timber, concrete, and municipal garbage.

Native soils consisting of former lake bottom sediments have been observed underlying the fill materials, and overlying bedrock.

¹ The Physiography of Southern Ontario, Chapman and Putnam, 1984

Figure 3: Historic Shorelines of Toronto Harbour



Historic Shorelines

Soil Conditions – General Overview

Fill Material

A layer of fill material of varying thickness covers the entire study area. Investigations have revealed that the fill material generally consist of sand and gravel and/or sandy silt containing varying amounts of cinders, coal tar and other industrial by-products.² Therefore, the quality of fill materials is suspect and may need special handling/disposal/remediation.

Native Soil

Previous investigations indicate that native soils generally consist of dark grey native organic silts and dark brown to grey sand to silty sands of variable thickness.³ The native overburden generally consists of lakebed sediments including gravel materials interbedded with peat deposits and marshlands. The quality of the native soils is suspect as some were exposed as former lake bottom sediments to potential impacts during the late 1800s and early 1900s, and also given the potential for migration of impacted groundwater from up-gradient sources and also due to the potential migration of impacts vertically from the overlying fill materials. In general, groundwater is expected to migrate regionally from up-gradient inland areas down-gradient towards water bodies within and adjacent to the study area, that being the Don River, the Keating Channel, and Lake Ontario.

Bedrock

Previous investigations indicate that bedrock is encountered at a depth of approximately 10m and 12 m in the portion of the study area near West Don Lands and East Bayfront, and greater depths in the area of the Lower Don and Keating Channel Precinct.

Soil Contaminants

Some sections of the study area have been the subject of extensive subsurface investigations that were initiated during the late 1980s, and have been continued through the 1990s to the present. The contaminants of concern potentially present in the study area are those associated with the composition of lakefill materials, industrial operations including underground and aboveground storage tanks, as well as with historical harbour operations. Soil and groundwater investigations detected surface or near-surface soil and groundwater impacted at levels exceeding the MOECC industrial/commercial/community Standards (refer to O. Reg. 153/04 as amended by O. Reg. 511/09). Exceeded parameters include petroleum hydrocarbons (PHCs), polyaromatic hydrocarbons (PAHs),

² East Bayfront Class Environmental Assessment Master Plan, Toronto Waterfront Revitalization Corporation, City of Toronto, January 2006

³ Phase II Environmental Site Assessment, TEDCO Lands East Bayfront, Dillon Consulting Limited, May 2007 and Preliminary Geotechnical Investigation East Bayfront West Precinct Risk Assessment/Risk Management Queens Quay, Toronto, Peto MacCallum Ltd., November 28, 2007

volatile organic compounds (VOCs) and metals. Specific soil conditions for precincts that have been investigated for redevelopment plans are detailed in the following sections.

Groundwater Overview

Groundwater is generally found within 1 to 2 m of the ground surface within the fill materials and generally fluctuates with Lake Ontario and Don River water levels as well as with seasonal rainfall patterns. Regional and local groundwater generally flows south towards Lake Ontario.

Geotechnical Overview

Based on the available subsurface information, it is anticipated that extensive thicknesses of variable fill materials are present in portions of the Gardiner/Lake Shore Boulevard corridor. These fill materials are expected to be comprised of soft soils from dredging and excavation spoils from other areas of Toronto. Additionally, the fill materials are anticipated to contain rubble and previous shoreline structures. These fill materials are expected to present challenges to construction based on their limited geotechnical engineering unsuitability. The presence of rubble and subsurface structures could present difficulties for caisson or soldier pile installation and/or excavations. The excavated soils are not all expected to be reusable from a geotechnical perspective and would need handling, management, and potentially off-site disposal at licensed landfills. In addition, shallow water table conditions as well as proximity of some sections of the study area to water bodies will create conditions where significant water inflow to any excavations are likely to occur. Shallow water table conditions will require groundwater control measures to be implemented. Dewatering for many construction activities is anticipated.

3.1.2 West Don Lands Precinct

The West Don Lands Precinct is a large area consisting of approximately seven existing municipal blocks of land historically known as a portion of the "Ataratiri Lands". Historical use of these lands included railway-related uses, a leather tannery, food packing plant, cartage and freight companies, scrap yards, coal and oil companies, a varnish manufacturing facility, a concrete readi-mix company, a foundry, and some residential land uses. Extensive subsurface investigations have been completed for most of this Precinct, although some property specific information is limited.

Heterogeneous fill has been encountered during past investigations of this Precinct up to depths of 10 m below ground surface with layers of sand, gravel, silt, silty sand and clayey silt with traces of rubber, brick, coal, ash, glass, peat, slag, cinders and wood debris.

The West Don Lands investigations encountered bedrock at a depth of approximately 10m and 12 m. Impacted soil is found throughout the area, and attributed to fill placement to raise land elevations to allow development, including former industrial operations such as a coal gasification plant, former scrap yards and an extensive tank farm that occupied lands southwest of the West Don Lands. Contaminants of concern at the West Don Lands include PHCs, PAHs, VOCs, various metals, and polychlorinated

biphenyls (PCBs).⁴ There is also evidence of petroleum hydrocarbon impact evidenced by odour during borehole drilling.

In the West Don Lands Precinct, groundwater has been generally encountered between 1 and 3 m within the fill materials and in the underlying silts and tills. Generally, little lateral groundwater flow occurs within the till unit between the bedrock and the fill materials, however, lateral flow occurs within the fill material and is very likely influenced by nearby buried infrastructure. A small portion of the recharge occurring within the West Don Lands reportedly may flow vertically downward to the fractured shale bedrock then laterally through the bedrock fractures towards Lake Ontario.⁵

3.1.3 Lower Don Lands and Keating Channel Precinct

A portion of this area, Keating Channel Precinct, includes the lands referenced as municipal address 480 Lake Shore Boulevard East. As noted, this address contains the lands east of Cherry Street bounded by the existing Gardiner Expressway to the south, the rail yards to the north and Don River to the east, which represent the majority of the study area where new, "off-corridor", facilities will require assessment. This property had been the subject of a subsurface investigation (Golder, 2006). They reported observation of a fill layer ranging from ground surface to approximately 7.9 m below current ground surface which consisted of silt with varying quantities of sand, gravel, clay and debris (e.g. wood chips, brick fragments and metal scrap) and was noted to be visually impacted with petroleum hydrocarbons with variable faint to strong petroleum hydrocarbon odours. Soils analyses revealed heavy metal, petroleum hydrocarbon, and semi-volatile organic compounds impacts in fill materials. Groundwater levels within the property were noted as shallow, approximately 0.7 to 3.9 m below ground surface, and generally observed within the fill materials. Groundwater readily infiltrated into test pit excavations.

Three directions of groundwater flow was observed (Golder, 2006); in the western portion of the site was inferred to be south-west towards the intersection of Cherry Street and Lake Shore Boulevard; groundwater flow was inferred to be south towards the Keating Channel within the central portion of the site; and in the eastern portion of the site, groundwater flow was inferred to be north-east towards the mouth of the Don River. Petroleum hydrocarbon and semi-volatile organic compound impacts were detected in groundwater, and light non-aqueous phase liquid (LNAPL) impacts were detected at four monitoring well locations at thicknesses varying from 1 to 97 cm. Detections of elevated concentrations of petroleum hydrocarbons and semi-volatile organic compounds (PAHs) in groundwater at the northern boundaries of the site were suggested by Golder as possibly indication of migration of impacts from off-property up-gradient. They also indicated that migration off-property of similar groundwater impacts were suspected at the southern property boundary.

⁴ West Don Lands Class EA Master Plan, Toronto Waterfront Revitalization Corporation, City of Toronto, March 2005

⁵ Don Mouth Naturalization and Port Lands Flood Protection Project, Revised Terms of Reference, June 2006, TRCA and Toronto Waterfront Revitalization Corporation

Based on the Golder 2006 investigation information for 480 Lake Shore Boulevard, it is anticipated that soils impacts, as well as groundwater impacts and presence of Light Non-Aqueous Phase Liquid (LNAPL) may need to be addressed in areas proposed for the Gardiner alignment in this part of the EA study area.

The excavated soils are not all expected to be reusable from environmental perspective and will require testing, potentially some reused at other Waterfront Toronto sites undergoing decommissioning and redevelopment, and potentially some designated for off-site disposal at licensed landfills.

3.1.4 Distillery District and St. Lawrence Neighbourhood

These neighbourhoods are north of the area that will be directly impacted by any new facilities to be assessed as part of this EA.

Due to the historical presence of coal gasification plants up-gradient and within the Distillery District and St. Lawrence Neighbourhood, respectively, it is anticipated that impacted soil and/or groundwater may be present where development activities have not already involved remediation. Between 1841 to 1954, a coal gasification plant operated near Front Street East and Parliament Street, and therefore, could have been impacted with coal tar and liquor as well as related impacts such as other petroleum hydrocarbons, metals, and ammonia. Within the Distillery District there is the potential for soil and/or groundwater impacts due to migration of contaminants from the up-gradient source of historical coal gasification plants located in the West Don Lands. Potential contaminants of concern include VOCs, PHCs and PAHs.

3.1.5 East Bayfront Precinct

The East Bayfront Precinct lands are situated immediately adjacent to Lake Ontario and were formed through lake-filling to provide lands for historic industrial uses including two former marine terminals with associated underground storage tanks and rail sidings, and other historical harbour operations such as flour silos, and cement silos.

Impacted soil fill has been encountered through subsurface investigations at East Bayfront (Dillon 2008 and 2009, and CH2MHill 2007 and Peto MacCallum 2007). Overburden fill soils have been observed to depths of approximately 7 m depth and can be generally described as mix of sands, silts, clays and gravel with debris including brick, concrete, cinder, and coal. Contaminants of concern include various VOCs, PHCs, PAHs and metals.

The fill materials are underlain by 4 to 5 m of native former lake bottom sediments consisting of sands and silts primarily with some clayey silt layers. The East Bayfront investigations encountered bedrock at depths between approximately 11m and 12m underlying the native former lake bottom sediments.

Groundwater was generally encountered at shallow depths between 1 to 2 m below ground surface (bgs) within the fill materials, and the levels mimicked the nearby Lake Ontario water levels. Horizontal groundwater flow has been assessed to be towards Lake Ontario. The shallow water table conditions

have required groundwater control measures and dewatering to be implemented for all construction activities completed to date within this Precinct.

3.2 Future Baseline (“Do Nothing”) – Subsurface Conditions

The following sections describe future (2031) conditions as per current approved and proposed precinct plans and development plans. The approved precinct plans that have been consulted include West Don Lands, East Bayfront, and Lower Don Lands and Keating Channel Precinct. The Don Mouth Naturalization, Lower Don River West Remedial Flood Protection Project, and the Port Lands Flood Protection Project, all being completed in cooperation with TRCA, were also considered in this. Also considered are the known developments (residential, commercial and/or industrial) planned in the study area as well as initiatives that are being proposed by transit agencies including the TTC and GO Transit.

The waterfront is an area of transition with new investment occurring rapidly. The future conditions are not static and the following sections reflect what information about development in the study area is known. The nature of this transitioning area is that even planned development may alter by 2031. Therefore, the future conditions represent the best reasonable representation of this area that is known at the time this EA was completed. The quality of soil and groundwater is expected to improve with time as the study area undergoes remediation and re-development.

Figure 4 on the following page provides a 2031 base map of the study area.

Figure 4: Future 2031 Conditions



3.2.1 Port Lands and South Riverdale

Within the study area, the Port Lands and South of Eastern Transportation and Servicing Master Plan (Port Lands TSMP): a Master Plan under the Municipal Class Environmental Assessment (EA) process is being developed in parallel with the Port Lands Planning Framework to identify the street and transit network and municipal servicing required to support future revitalization. The Master Plan applies to most of the Port Lands and to the area referred to as "South of Eastern" (located north of Lake Shore Boulevard East, south of Eastern Avenue, between the Don River and Coxwell Avenue). The Master Plan will provide a coordinated transportation and servicing strategy to connect the two areas. Although timing of any future works in this area is uncertain, long term changes will be significant.

The portion of the study area referred to as South Riverdale is primarily built-out, as such future baseline soil and groundwater conditions are anticipated to be similar to existing conditions.

3.2.2 West Don Lands Precinct

Redevelopment plans have been underway for the West Don Lands Precinct for some time. Soil and groundwater remediation was one of the first tasks to be completed for this redevelopment. This remediation resulted in the improved quality of soil and groundwater conditions throughout the precinct.

3.2.3 Lower Don Lands and Keating Channel Precinct

The implementation of these redevelopment plans for the Lower Don Lands and Keating Channel Precinct will likely result in improvements of soil and groundwater quality. Residential development of the area will require necessary remediation prior to build out and therefore improved conditions by 2031. Remediation and monitoring plans are not currently established for this area, but will be generated by Waterfront Toronto as part of the redevelopment process.

3.2.4 Distillery District and St. Lawrence Neighbourhood

It is anticipated that future baseline soil and groundwater conditions will remain similar to existing conditions. Any future remediation is expected to be minimal as the area is well established and portions have been recently redeveloped.

3.2.5 East Bayfront Precinct

As a result of the redevelopment plans for the East Bayfront Precinct, it is expected that the quality of soil and groundwater conditions will improve with time as the area undergoes remediation and redevelopment. Detailed site remediation and monitoring plans, which have been reviewed by MOECC, exist for this work and can be found through Waterfront Toronto.

3.2.6 Lower Yonge Precinct

The Lower Yonge Precinct Plan has been developed for the area bounded by Yonge Street on the west, Jarvis Street on the east, Lake Shore Boulevard to the north and Queens Quay to the south. This nine hectare area will undergo significant redevelopment with the establishment of a new mixed-use

community including a high density neighbourhood (approximately 28,000 residents and employees), central park area, recreation centre and elementary school. It is expected that the quality of soil and groundwater conditions will improve with time as the area undergoes remediation and redevelopment. The timing of any future works in this area is uncertain.

3.3 Constraints and Opportunities

The remediation and redevelopment planned for West Don Lands, Lower Don Lands and Keating Channel Precinct, East Bayfront and Lower Yonge present an opportunity to improve the current conditions of the study area. In addition, the areas where remediation plans are needed but are currently not planned, such as sites lying directly under the Gardiner Expressway and Lake Shore Boulevard, may benefit from reconfiguration work as it will provide opportunities to remediate soil and groundwater in the area.

Due to the nature of geo-environmental and geo-technical work, constraints are vast as existing structures and redevelopment already underway limit site by site analysis of conditions. This limits the ability to provide an analysis of conditions for the entire study area as development encumbers subsurface investigations. Plans for improvement must be generated within these existing built-up conditions. In addition to built features, where the Gardiner Expressway and Lake Shore Boulevard crosses the Don River mouth particular attention needs to be given to the ecological sensitivity of this area. Finally, soil and groundwater conditions are challenging due to presence of fill materials and the high water table.

4. REFERENCES

- Archaeological Services Inc. (2008). "Waterfront Toronto Archaeological Conservation and Management Strategy." Report for Waterfront Toronto. Dated Final Draft: July 2008.*
- Coffey Geotechnics Inc. (2009). "Environmental Soil and Groundwater Investigation, West Don Lands, Storm Sewer Outfall Project, Toronto, Ontario. Report for R.V. Anderson Associated Limited. Dated May 15, 2009 (Revised June 19, 2009).*
- Decommissioning Consulting Services Limited (2006). "Phase II ESA, West Don Lands, Toronto, Ontario: Volume I." Report for Ontario Realty Corporation. Dated June 2006.*
- Dillon Consulting Limited (2007). "Phase II Environmental Site Assessment, TEDCO Lands – East Bayfront." Report for City of Toronto Economic Development Corporation (TEDCO). Dated October 2007.*
- Environment Ontario (1987). "Inventory of Coal Gasification Plant Waste Sites In Ontario, Volume 1". Dated April 1987 (Reprinted February 1989).*
- Environment Ontario (1987). "Inventory of Coal Gasification Plant Waste Sites In Ontario, Volume II". Dated April 1987 (Reprinted 1989).*
- Golder Associates Ltd. (2006). "Draft Report on Phase II Environmental Site Assessment, 480 Lake Shore Boulevard East, Toronto, Ontario." Report for Toronto Waterfront Revitalization Corporation (now Waterfront Toronto). Dated August 2006.*
- Golder Associated Ltd. "Subsurface Data Compilation – Lakefront Corridor, Letter report for McCormick Rankin Corporation. Dated December 21, 2000.*
- Morrison Hershfield (2004). "Constructability, Structural Engineering, Feasibility and Cost Study for the Gardiner Expressway/Lake Shore Boulevard Options." Report for Toronto Waterfront Revitalization Corporation (now Waterfront Toronto). Dated December 2004.*
- Municipality of Metropolitan Toronto. Soil Test Boring (Cherry Street to Don River). Part of the original design drawings for the Frederick G Gardiner Expressway. Dated November 29, 1961 (with "As Constructed" information November 1964).*
- Municipality of Metropolitan Toronto. Soil Test Data – Sheet No. q (Don River to Leslie Street). Part of the original design drawings for the Frederick G Gardiner Expressway. Dated October 1963 (with "As Constructed" information March 1967). Drawing S-460-1.*
- Peto MacCallum Ltd. (PML)(2007). "Preliminary Geotechnical Investigation, East Bayfront West Precinct, Risk Assessment/Risk Management, Queens Quay, Toronto, Ontario". Report for Dillon Consulting Ltd. Dated November 28, 2007.*
- SLR Consulting (Canada) Ltd. (2009). "Subsurface Investigation: in Support of the Environmental Assessment for the Don Mouth Naturalization and Port Lands Flood Protection Project." Report for Toronto and Region Conservation Authority. Dated October 5, 2009.*

Toronto Waterfront Redevelopment Corporation and City of Toronto (2005). "West Don Lands Class Environmental Assessment Master Plan." Dated March 2005.

Toronto Waterfront Redevelopment Corporation and City of Toronto (2006). "East Bayfront Class Environmental Assessment Master Plan." Dated January 2006.

Toronto Waterfront Redevelopment Corporation and Toronto and Region Conservation Authority (2006). "Don Mouth Naturalization and Flood Protection Project, Revised Terms of Reference." Dated June 2006.

Waterfront Toronto, City of Toronto and Toronto Transit Commission. "Lower Don Lands Infrastructure Master Plan and Keating Channel Precinct Environmental Study Report Appendices". Appendix 13-A1 Geotechnical Report. (Conestoga Rovers 2nd Draft Memorandum – Preliminary Geotechnical Assessment - April 28, 2009)