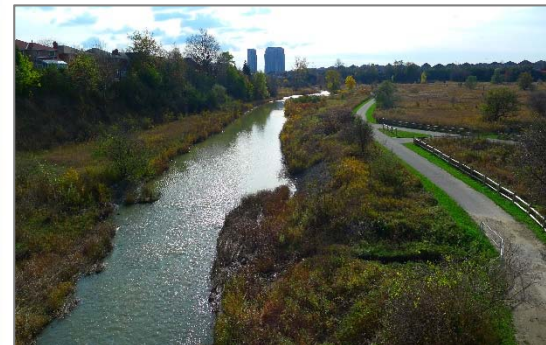
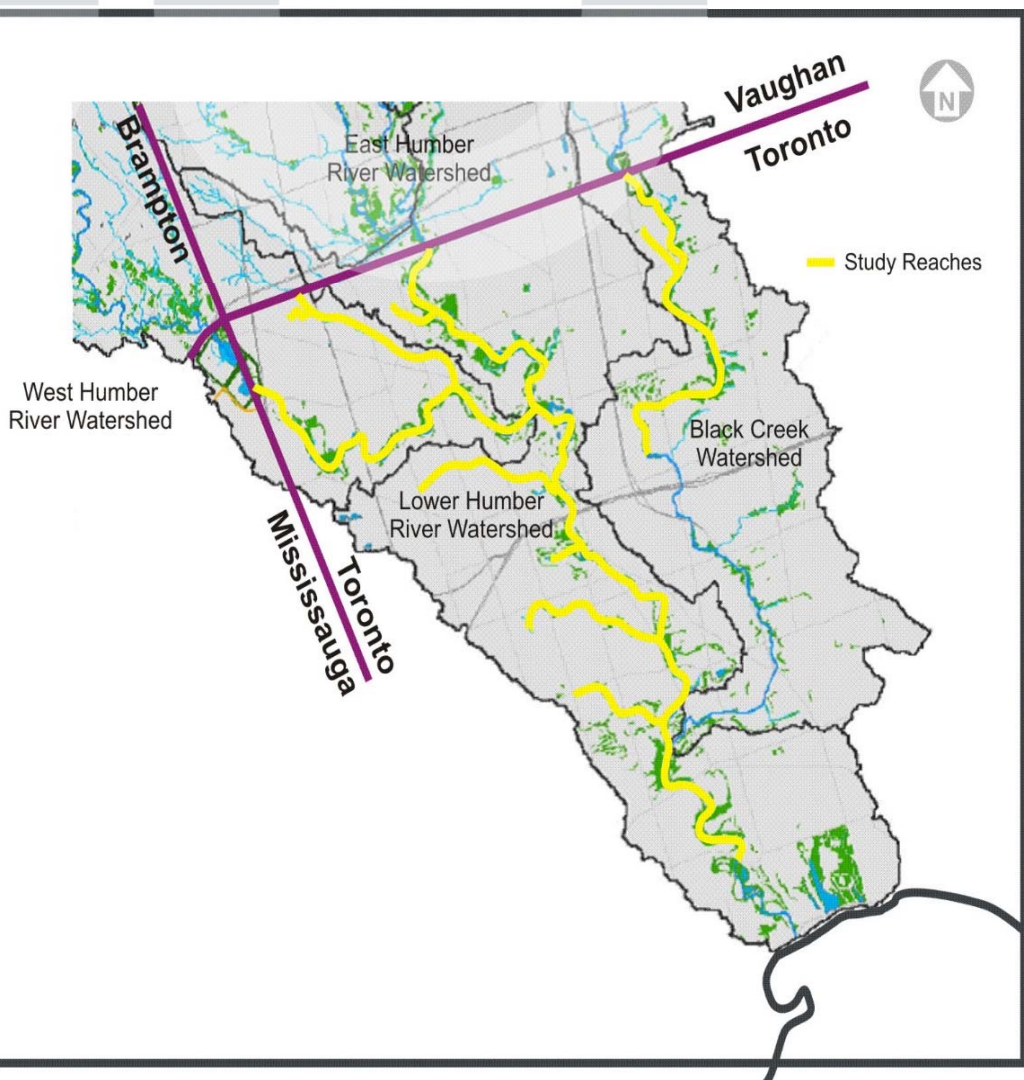


Technical Report

Humber River Watershed within the City of Toronto Floodplain Mapping Update

Toronto and Region Conservation Authority
101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

September 14, 2018



IMPORTANT NOTICE

This Document was prepared exclusively for Toronto and Region Conservation Authority, (the "Proponent") by Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood). The quality of information contained herein is consistent with the level of effort involved in Wood services and based on:

- i. information available at the time of preparation,*
- ii. data supplied by the Proponent and outside sources, and*
- iii. the assumptions, conditions and qualifications set forth in this document.*

This document is intended to be used by the Proponent only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance upon this document by any third party for any other purpose will be at that party's sole risk.



September 14, 2018

Wood Project TPB178137

Toronto and Region Conservation Authority
101 Exchange Avenue,
Vaughan, Ontario, L4K 5R6

Attn: Ms. Qiao Ying M.Sc., P.Eng.
Capital Projects, Restoration & Infrastructure

Dear Ms. Ying:

**RE: Technical Report
Humber River Watershed - Floodplain Mapping Update within the City of Toronto**

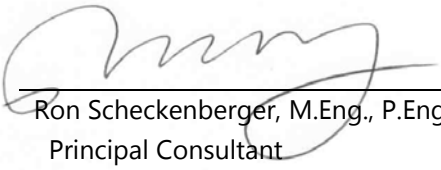
Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood), is pleased to provide the Toronto and Region Conservation Authority (TRCA) with this final report for the above noted project.

We appreciate the opportunity of providing TRCA with our services and trust this submission is fully satisfactory. If you have any questions with regard to this information, please do not hesitate to contact the undersigned.

Yours truly,

**Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited**

Per:

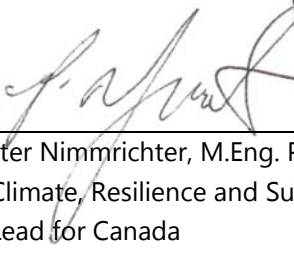


Ron Scheckenberger, M.Eng., P.Eng.
Principal Consultant
Water Resources

(905) 335-2353 x3109

ron.scheckenberger@woodplc.com

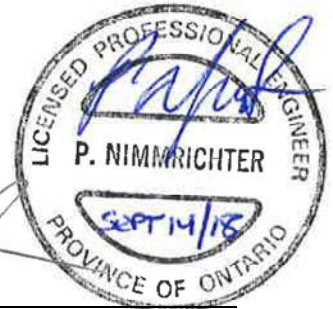
Per:



Peter Nimmrichter, M.Eng. P.Eng., IRP
Climate, Resilience and Sustainability
Lead for Canada
Associate Water Resources Engineer

(905) 335-2353 x3100

peter.nimmrichter@woodplc.com



PN/RS/cc

This page left intentionally blank

Table of Contents

1.0	INTRODUCTION	1
1.1	OVERVIEW OF THE HUMBER RIVER WATERSHED	1
1.2	WORK SCOPE AND REPORT STRUCTURE.....	4
2.0	BACKGROUND REVIEW AND SITE RECONNAISSANCE (TASK 1)	5
2.1	TASK 1A: BACKGROUND DATA REVIEW	5
2.2	TASK 1B: COLLECTION OF WATER CROSSING AS-BUILT INFORMATION	6
2.3	TASK 1C: PREPARATION OF A DIGITAL ELEVATION MODEL (DEM).....	7
2.4	TASK 1D: DEVELOPMENT OF A HEC-RAS STEADY-STATE FLOW TABLE	7
2.5	TASK 1E: SITE RECONNAISSANCE	8
3.0	HYDRAULIC MODEL DEVELOPMENT (TASK 2).....	15
3.1	HEC-RAS SOFTWARE	15
3.2	TASK 2A.1 – HEC-RAS MODEL DEVELOPMENT	16
3.2.1	Cross-Sections	16
3.2.2	Hydraulic Structures.....	17
3.2.3	Lateral Structures	20
3.2.4	Energy Loss Coefficients.....	20
3.2.5	Starting Water Surface Elevations	21
3.2.6	Ineffective Flow Areas.....	21
3.2.7	Blocked Obstructions	21
3.2.8	Hydraulic Model Calibration/Validation	21
3.3	TASK 2A.2 – PCSWMM2D PROFESSIONAL MODEL DEVELOPMENT	22
3.3.1	PCSWMM2D Professional.....	22
3.3.2	Albion Centre PCSWMM2D Model.....	23
3.3.3	Carrier Drive PCSWMM2D Model.....	24
3.3.4	Lanyard Road PCSWMM2D Model.....	24
3.3.5	Weston Golf Club PCSWMM2D Model.....	27
3.4	MODEL SENSITIVITY AND UNCERTAINTY ANALYSIS.....	30
3.4.1	Manning's Roughness.....	30
3.4.2	Peak Discharge	32
3.4.3	Starting Water Surface Elevation	32
3.4.4	Summary of Hydraulic Model Sensitivity.....	34
4.0	FLOOD CHARACTERIZATION AND SCREENING (TASK 3)	37
4.1	TASK 3A - HEC-RAS MODEL FINALIZATION AND FLOOD MAP PREPARATION	37
4.1.1	Structure Overtopping.....	37
4.2	TASK 3B – IDENTIFICATION OF SPILLS AND SPILL PATHS	43
4.2.1	Spill Area #1 – Finch Avenue West and Islington Avenue.....	43
4.2.2	Spill Area #2 – Humberwood Boulevard.....	45
4.2.3	Spill Area #3 – Lawrence Avenue West / Hickory Tree Road	46
4.2.4	Spill Area #4 – Scarlett Road / Chapman Road.....	47
4.3	TASK 3C - DEVELOPMENT OF GRAPHICAL REPRESENTATIONS OF MODEL DATA	49
5.0	RECOMMENDATIONS	51
6.0	REFERENCES	53

List of Appendices

APPENDIX A	Watercourse Crossing Data Sheets
APPENDIX B	TRCA's Standard Manning's Roughness Coefficients for Watershed Hydraulic Modelling
APPENDIX C	TRCA Albion Creek 2D Modelling
APPENDIX D	HEC-RAS Output
APPENDIX E	Flow Nodes Used for Development of the HEC-RAS Steady Flow Data Table

List of Tables

TABLE 2-1: LIST OF FLOW NODES WITH FLOW CHANGE EXCEEDING 10% AND OUTCOMES	8
TABLE 2-2: SUMMARY OF WATERCOURSE CROSSINGS INCLUDED IN HYDRAULIC MODEL.....	11
TABLE 2-3: SUMMARY OF WATERCOURSE CROSSINGS NOT INCLUDED IN HYDRAULIC MODEL	13
TABLE 3-1: STARTING WATER SURFACE ELEVATIONS.....	21
TABLE 3-2: LANYARD ROAD CULVERT/SEWER ALIGNMENT – COMPUTED WATER SURFACE ELEVATIONS.....	27
TABLE 3-3: WESTON GOLF CLUB CULVERT – COMPUTED WATER SURFACE ELEVATIONS.....	30
TABLE 3-4: SENSITIVITY ANALYSIS - MANNING'S ROUGHNESS – CHANGE IN COMPUTED WATER SURFACE ELEVATIONS....	31
TABLE 3-5: SENSITIVITY ANALYSIS - MANNING'S ROUGHNESS – CHANGE IN CRITICAL DEPTH OCCURRENCE	32
TABLE 3-6: SENSITIVITY ANALYSIS – STEADY FLOW – CHANGE IN COMPUTED WATER SURFACE ELEVATIONS.....	33
TABLE 3-7: SENSITIVITY ANALYSIS - STEADY FLOW – CHANGE IN CRITICAL DEPTH OCCURRENCE.....	33
TABLE 3-8: SENSITIVITY ANALYSIS – STARTING WATER LEVEL – SUMMARY OF CHANGES IN COMPUTED WATER SURFACE ELEVATIONS	34
TABLE 3-9: SENSITIVITY ANALYSIS – STARTING WATER LEVEL – DETAILED VIEW OF CHANGES IN COMPUTED WATER SURFACE ELEVATIONS	36
TABLE 4-1: MODELLED BRIDGES – COMPUTATIONAL SUMMARY	39

List of Figures

FIGURE 1-1: STUDY AREA.....	2
FIGURE 3-1: ALBION CENTRE CULVERT/SEWER ALIGNMENT.....	23
FIGURE 3-2: CARRIER DRIVE CULVERT/SEWER ALIGNMENT	24
FIGURE 3-3: LANYARD ROAD CULVERT/SEWER APPROXIMATE ALIGNMENT.....	25
FIGURE 3-4: WESTON GOLF CLUB CULVERT ALIGNMENT	28
FIGURE 4-1: SPILL AREA #1 – FINCH AVENUE WEST / ISLINGTON AVENUE	44
FIGURE 4-2: SPILL AREA #2 – HUMBERWOOD BOULEVARD.....	45
FIGURE 4-3: SPILL AREA #3 – LAWRENCE AVENUE WEST / HICKORY TREE ROAD.....	46
FIGURE 4-4: SPILL AREA #4 – SCARLETT ROAD / CHAPMAN ROAD.....	48
FIGURE 4-5: SPILL AREA #4 – POSSIBLE SPILL FLOW PATHS	48

EXECUTIVE SUMMARY

Wood Environment & Infrastructure, a Division of Wood Canada Limited (Wood) was retained by the Toronto and Region Conservation Authority (TRCA) in September 2017 to update floodplain maps for the areas of Humber River and its associated tributaries, over a linear distance of about 65 km, within the City of Toronto.

The previous update of floodplain maps for the Humber River within the City of Toronto was completed in about 2006 and many of the maps, today, may no longer reasonably reflect current conditions. As well, considerable urban development (both residential and transportation related) has occurred in recent years which has, in some cases, also led to channel and valley corridor realignments.

Recognizing this, TRCA updated the Humber River Watershed hydrology and prepared new topographic information. Hydrology and base mapping are the two fundamental necessities for floodplain mapping.

The update of floodplain maps for the Humber River within the City of Toronto, specifically within the West, East and Lower Humber Rivers and Black Creek subwatersheds, focused on the following key tasks:

- Background Review and Site Reconnaissance

Various datasets and other information were provided by TRCA through the course of the project. This information was reviewed and used in the development of the floodline mapping as deemed relevant. This information included basemap/planimetric data, existing hydraulic modelling for the subject watercourses, topographic surveys, as-built drawings, existing reports, aerial imagery and flow data.

Site reconnaissance of the one-hundred and seventy-nine (179) watercourse crossings (road, rail and pedestrian) initially identified from a review using Google Earth Pro™ as being located along the Humber River and tributaries within the study area was completed. From this reconnaissance, seventy-nine (79) crossings were identified for inclusion in the hydraulic model as they were deemed to be of hydraulic significance.

- HEC-RAS Model Development

The objective of the hydraulic analysis was the computation of water surface elevations resulting from the 2 year through 100 year, 350 year design events and Regional Storm (Hurricane Hazel) flow estimates. The computed water surface elevations are then used in conjunction with the LiDAR data to delineate the limits of the floodplain on topographic mapping sheets. The US Army Corps of Engineers (USACE) HEC-RAS one-dimensional backwater model was utilized for this analysis.

The collection and processing of data, computational procedures and analysis of computed profiles completed for this study are compliant with the following Environment Canada, MNRF and TRCA guidelines, software use guidance provided by the US Army Corps of Engineers and other industry standard hydraulic modelling practices.

It was also determined through the course of model development that a number of long or complex culverts (see list below) located within the study area would be better modelled using a 2 dimensional approach.

- The Albion Centre culvert/sewer (#107) which conveys from the inlet at Stevenson Road to the outlet downstream of Kipling Avenue; a distance of about 700 m.
- The Carrier Drive culvert (#117), located near 247 Carrier Drive, has complex below ground connectivity with multiple inflows to a single manhole.
- The Lanyard Road culvert (#120) which conveys flow from north of Finch Avenue West to Lanyard Road; approximate length of 717 m.
- The Weston Golf Club (#160) culvert is approximately 140 m long, and overflow from the culvert has the potential to cascade over the valley slope flowing along a separate path from the culvert alignment.

In discussion with TRCA, it was decided that HEC-RAS was not the appropriate software to model these culverts. It was decided to use PCSWMM2D Professional to estimate water surface elevations at the inlet of these culverts and to assign the computed water surface elevations in the HEC-RAS model as Known Water Surface Elevations, at the cross-sections adjacent to the inlet of the culverts.

TRCA developed its own 2D model of the Albion Centre area, using DHI software, in parallel with the development of the PCSWMM2D model. TRCA's effort was to be used as a means of comparison and validation of the results of the PCSWMM2D model. However, over the course of the development of this 2D model it became clear that the complexities of the circumstance required a much larger model area in order to properly represent overland flow paths. It was, therefore, decided by TRCA that the modelling requirements for this location were significantly beyond the original intent of the project. As such, TRCA took on the modelling effort for the entire Albion Creek watercourse from its confluence with the Humber River West Branch.

The Black Creek Retardation Dam, located about 350 m upstream from Jane Street, does not have any operational components and has been coded into the new hydraulic model as a bridge.

TRCA owns eight (8) weirs along the Lower Humber River between Catherine Street/Old Mill Road and Highway 401. These weirs were installed in response to Hurricane Hazel beginning in the late 1950's. These weirs were not coded into the hydraulic model at the direction of TRCA based on outcomes of hydraulic modelling completed for the Lower Humber Weirs

Assessment. However, the below waterline surveys completed for the Lower Humber Weirs Assessment were used to supplement cross-section data where survey data was available.

TRCA provided the starting water surface elevations for the newly developed hydraulic model based on hydraulic modelling results from the Lower Humber River 2D study and Jane-Wilson 2D Study.

A sensitivity analysis of parameters (Manning's Roughness, Peak Discharge, Starting Water Surface Elevation) included in the new hydraulic model was completed. It was concluded from this analysis that there was no need to alter the parameterization of the hydraulic model for the present study.

- Flood Risk Characterization and Screening

Upon receipt of TRCA approval for the new hydraulic model, preparation of the floodplain delineations for the required suite of flow scenarios required for this assignment was completed in collaboration with TRCA. The flow scenarios were the Regional Storm and, the 2, 5, 10, 25, 50, 100, and 350 year design storms.

The delineation of the Regulatory floodline was completed in compliance with MNRF procedures, whereby the greater of the 100 year, or Hurricane Hazel inundation limits has been used to establish the Regulatory floodline. The 100 year and Hurricane Hazel inundation limits were subjected to a greater level of scrutiny for accuracy commensurate with an engineering flood delineation approach.

Flood inundation limits for the 2, 5, 10, 25, 50, 100, 350 year design storm flow scenarios were not subjected to the same "clean-up" effort as the engineered flood delineations as these flood zones are to be used for flood risk screening and characterization only.

A structure overtopping assessment was completed with regard to the sixty-six (66) crossings included in the new hydraulic model (note thirteen [13] crossings were part of the Albion Creek reach modelled separately by TRCA). The following conveyance capacity limitations were identified from the hydraulic model results:

Flow Scenario	# of crossings that <u>do not have</u> the conveyance capacity to accommodate the flow scenario without overtopping
2 year	8
5 year	13
10 year	19
25 year	20
50 year	23
100 year	26
350 year	35
Regional Flood	38

The results indicated that twenty-eight (28) of the modelled crossings have sufficient capacity to accommodate all flow scenarios without overtopping.

An assessment of spill locations and paths was completed following the MNR's Technical Guide River & Stream Systems: Flooding Hazard Limit (2002) (ref. Section 4.13 of the guidelines) which defines a spill as occurring when flood levels overtop the banks of a watercourse and spill overland away from the watercourse channel. In this context, four (4) spill areas have been identified within the study area for this project, namely:

- Spill Area #1 - is located near the intersection of Islington Avenue and Finch Avenue West. The spill originates downstream from the Albion Centre with contributors to spill from two adjacent locations.
- Spill Area #2 - is located on the upstream side of the Humberwood Blvd Bridge with spill waters flowing to the south.
- Spill Area #3 - is located on the upstream and east side of the Lawrence Avenue West Bridge with spill waters flowing to the south-east.
- Spill Area #4 - is located on the upstream side of the Scarlett Road Bridge, near the intersection with Chapman Road (just south of the bridge), with spill waters flowing to the south and east.

All graphical representations of the new hydraulic model computations have been prepared and submitted to TRCA in accordance with the requirements for this study. The finalization of the study geomatic deliverables was completed in collaboration with TRCA.

Two recommendations have been advanced as outcomes of the spills assessment, namely that 2D modelling be used to better delineate floodplains and to better understand flood risk associated with those properties in the spill zones associated with:

- Spill #3 on the east side of the Lawrence Avenue West Bridge
- Spill #4 along the section of Scarlett Road potentially impacted by the spill

1.0 Introduction

Wood Environment & Infrastructure, a Division of Wood Canada Limited (Wood) was retained by the Toronto and Region Conservation Authority (TRCA) in September 2017 to update floodplain maps for the areas of Humber River and its associated tributaries within the City of Toronto.

The previous update of floodplain maps for the Humber River within the City of Toronto was completed in about 2006 and were based on a variety of techniques and methodologies, and which have been revised and augmented over the years. Many of the maps are also of a vintage that may no longer reasonably reflect current conditions along the river and founded upon modelling science that may not be reflective of conditions in the broader watershed area. Further, considerable urban development (both residential and transportation related) has occurred in recent years which has, in some cases, also led to channel and valley corridor realignments. The Toronto and Region Conservation Authority (TRCA) has also indicated that the base mapping upon which the current floodplain maps are developed, may no longer be fully representative of the real world circumstance.

The foregoing led to the decision by the TRCA to update the Humber River Watershed hydrology, which was finalized in 2015, and subsequently revised in 2018 (*Humber River Hydrology Update, April 2018, Civica Infrastructure Inc.*). As well, new topographic information from LiDAR was acquired. Hydrology and base mapping are the two fundamental necessities for floodplain mapping. With these updated datasets now available, TRCA is advancing the update of floodplain mapping for the Humber River within the City of Toronto.

This report summarizes the development of a new hydraulic (HEC-RAS) model and flood plain mapping defining various annual exceedance probability (AEP) flood risk for watercourse reaches within the study area as illustrated in Figure 1-1.

1.1 Overview of the Humber River Watershed

The Humber River Watershed lies within the jurisdiction of the TRCA. The watershed covers about 900 km² (TRCA, 2018), from its headwaters on the Niagara Escarpment and Oak Ridges Moraine through to flat clay and till plains to the marshes and river mouth at Lake Ontario. As of 2010, about 30% of the watershed was developed with urban land uses.

The headwaters of the watershed are situated within the Horseshoe Moraine, the Guelph Drumlin Field, the Niagara Escarpment and the Oak Ridges Moraine, which generally contain permeable soils. Soils in the Guelph Drumlin Field and the Horseshoe Moraine are located atop the Niagara Escarpment, and are generally characterized by sands and sandy loam, with mixtures of loam and clay loam within the remainder of the headwater areas on the Oak Ridges Moraine. (TRCA, 2008)

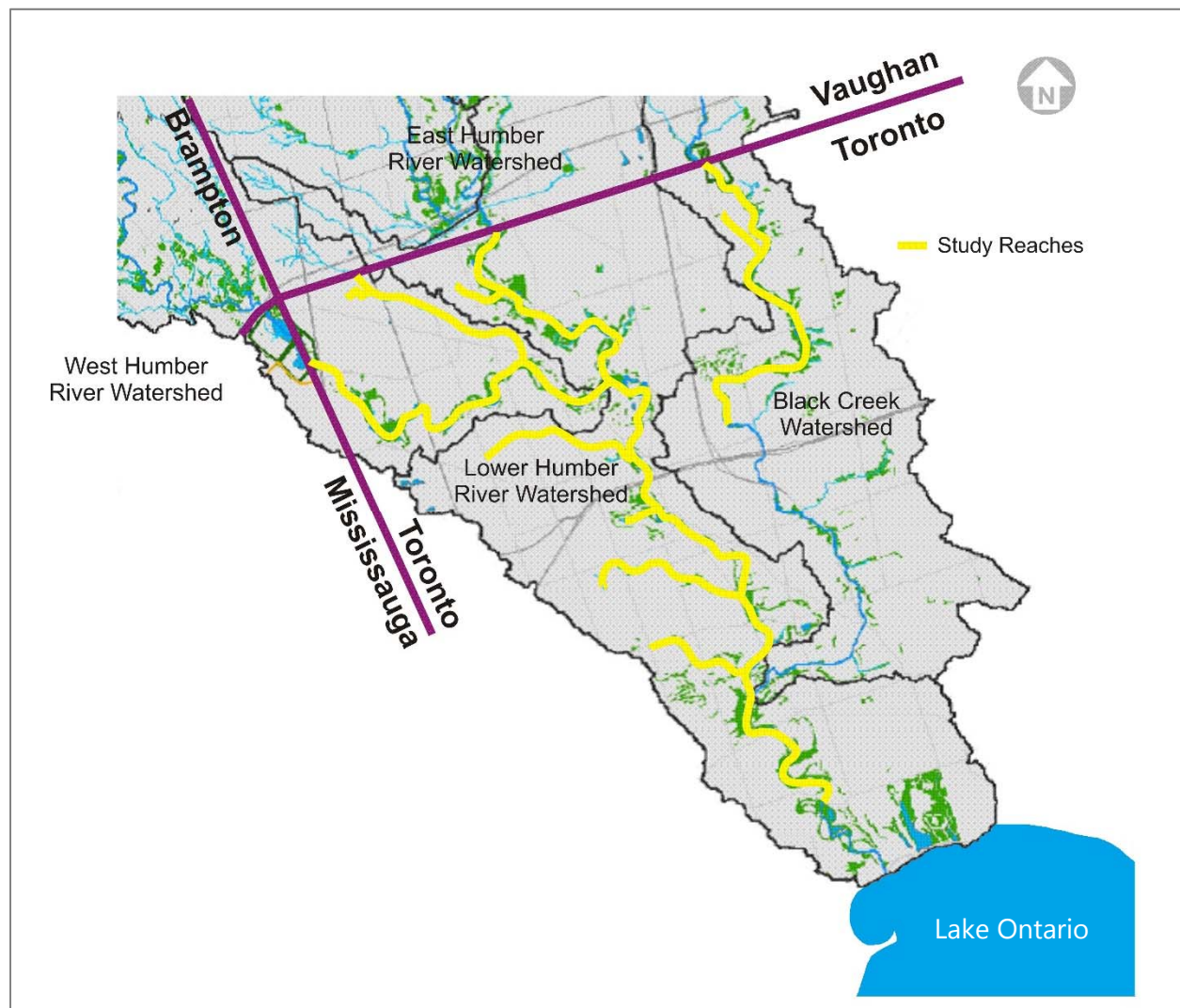


Figure 1-1: Study Area

Hydrologically, the Humber River watershed has traditionally been divided into the following five subwatersheds:

- Main Humber
- West Humber
- Black Creek
- East Humber
- Lower Humber
-

The study area for the current floodplain mapping assignment encompasses areas within the West, East and Lower Humber Rivers and Black Creek subwatersheds. The descriptions for each of these subwatersheds, see below, have been abstracted from (TRCA, 2008).

The Black Creek subwatershed encompasses an area of approximately 65 km², the majority of which has been developed. The majority of the older residential and industrial development in the City of Toronto occurred prior to the adoption of stormwater quantity and quality control measures. Flooding has been a hazard through the Black Creek Watershed and, as a result, large

reaches of Black Creek were transformed to concrete channels to increase the conveyance capacity of the system.

The West Humber subwatershed has its headwaters in the South Slope, while the majority of the 204 km² subwatershed is within the Peel Plain. The upper half of the watershed within the Town of Caledon remains primarily agricultural, while the majority of the lower half of the subwatershed in Brampton has been or soon will be developed. The downstream portion of the subwatershed in Rexdale in the City of Toronto was developed some time ago for residential and industrial uses. The Claireville Flood Control Dam and Reservoir is located where the main channel of the West Humber crosses from Brampton into Toronto, and is operated by TRCA as part of the Flood Warning Program.

The Lower Humber River drains an area of approximately 78 km², and carries the Humber River flows off the Peel Plain through the Iroquois Sand Plain to Lake Ontario. Stream slopes are quite mild on the Peel Plain, and are nearly flat through the lower reaches and the Humber Marshes near the outlet to Lake Ontario. The subwatershed is entirely developed, with several large pockets of older industrial lands. Similar to the Black Creek, the majority of the subwatershed was developed with little to no modern stormwater management controls, although some major stormwater management retrofit projects are being implemented.

Specific reaches of the Humber River and associated tributaries included in the scope for this flood plain mapping assignment are summarized below and illustrated on Figure 1-1.

- **Lower Humber River**

This reach extends from approximately 900 m downstream of Bloor Street W. to the Steeles Avenue W. Bridge. Six (6) tributaries are included in this reach, including Silver Creek, Berry Creek, and Emery Creek.

- **Black Creek**

This reach extends from approximately 1.3 km south of Jane Street to the Steeles Avenue W. and Jane Street Bridge. One (1) tributary is included in this reach.

- **West Humber River**

This reach extends from the confluence with the Lower Humber River and East Humber River Watersheds, approximately 645 m downstream of Albion Road, to the downstream side of the Claireville Dam. Albion Creek is included in the study area, from the confluence with the West Humber River upstream to Carrier Drive.

- **East Humber River**

This reach extends from the confluence with the Lower Humber River and West Humber River Watersheds, approximately 645 m downstream of Albion Road. This study reach extends to the City of Toronto boundary with York Region, near Steeles Avenue W. Two (2) tributaries are included in this reach.

1.2 Work Scope and Report Structure

This study has been focused on the development of new floodplain mapping for select reaches of the Humber River and tributaries within the City of Toronto. The key tasks comprising this study are outlined below:

- **Task 1 - Background Review and Site Reconnaissance**
 - Task 1A Background data review
 - Task 1B Collection of water crossing as-built information from external stakeholders
 - Task 1C Preparation of a Digital Elevation Model (DEM) using TRCA LiDAR data
 - Task 1D Development of a HEC-RAS steady-state flow table
 - Task 1E Site reconnaissance of all of the structures within scope of the assignment
- **Task 2 – HEC-RAS Model Development**
 - Task 2A Development of the new HEC-RAS hydraulic model
 - Task 2B Determination of watercourse crossings model coding data source(s)
 - Task 2C Field survey of watercourse crossings
- **Task 3 - Flood Risk Characterization and Screening**
 - Task 3A Finalization of the HEC-RAS model with regard to spill locations
 - Task 3B Identification of spill paths
 - Task 3C Development of a suite of graphical representations of information computed with the HEC-RAS model
- **Task 4 - Preparation of a Technical Report Summarizing All Technical Work**
- **Task 5 - Preparation of Digital Drawings and Figures**

The following report sections have also been structured to follow the key tasks.

2.0 Background Review and Site Reconnaissance (Task 1)

2.1 Task 1A: Background Data Review

Various datasets and other information were provided by TRCA at the on-set, and through the course, of the project. This information was reviewed and used in the development of the floodline mapping as deemed relevant. The various datasets and other information included:

- Various basemap data in shapefile format, including: municipal boundaries, contours, building footprints, right-of-way limits, crossing locations, land uses, watercourse centerlines, current floodplain limits, Humber River Hydrology catchment boundaries, Humber River Hydrology flow nodes, and study area boundaries.
- Existing HEC-RAS models for various study sections of the Humber River, including Lower Humber, East Humber, West Humber, Albion Creek, and Silver Creek.
- Various topographic surveys in AutoCAD™ drawing (dwg) format, including:
 - F1288 - 2191 Kipling Avenue - As-built-NAD83
 - F620 EXISTING CONDITIONS-NAD 83
 - F-1059 Jason Road Bank As-Built 2016-NAD83
 - F733-Atwood AsBuilt-NAD83
 - F1369-1-2-3 Denison Road FINAL As-Built-NAD83
 - F-1032 Pine Point Park-NAD83
 - F1146-Grovetree Road Sanitary sewer Existing-NAD83
- Various as-built drawings, including
 - Various Black Creek Dam Design Drawings, prepared by James F. MacLaren Associates consulting engineers Toronto, dated December 1959
 - Weston Gold Club Irrigation Ponds, Layout and Grading Plans, prepared by Schollen & Company Inc., dated December 1, 2006
- Various documentation, including:
 - Final Report, Humber River Hydrology Update, prepared by Civica Infrastructure Inc., dated June 2015, including the associated VO4 models
 - Lower Humber Weirs Assessment, Phase 1 Report, prepared by Stantec, dated January 12, 2016, including associated HEC-RAS model
 - Standard Manning's Roughness Coefficients for TRCA Watershed Hydraulic Modelling document
 - Hydraulic Structure Inventory Sheet template document
- Various other digital data, including:
 - LiDAR data in 1-m ESRI Grid format
 - 15 cm Orthographic Aerial Imagery (2015)

- Humber River Toronto ArcMap file
- Peak Flows in MicrosoftTM Excel file format
- Water level boundaries extracted from 2D model in MicrosoftTM Excel file format

2.2 Task 1B: Collection of Water Crossing As-Built Information

As-built crossing information was obtained from the various structure owners, including the City of Toronto, the Ontario Ministry of Transportation (MTO) and the Toronto Transit Commission (TTC) for use in the study. The following as-built drawings were reviewed and used in the development of the floodline mapping:

City of Toronto

- Details of Norfield Cres. Culvert and Wingwalls, Drawing S-3210-4, dated August 1964,
- Culvert on Islington Avenue, North of Torbolton Drive, Drawing S637-1, dated July 1956,
- Reinforced Concrete Retaining Wall at Redwater Drive, Along South Bank of Berry Creek, Drawing S-3211-1, dated December 1957,
- Drumheller Road, From Elmhurst Drive to Clearbrooke Circle Road, Drawing PRB-1113-1-2, dated January 1984,
- Plan and Profile of Road and Storm Sewer on Kipling Avenue, from Mount Olive Drive to Steeles Avenue, Drawing PRB-950-2-1, dated December 1975,
- Plan & Profile of Berry Creek, From Kipling Avenue to Brydon Drive, Drawing S-3403-1, date unknown,
- Plan, Profile & Cross Sections of Martin Grove Rd. Culvert at Berry Creek, Drawing S-3214-1, dated August 1966,
- Details of Martin Grove Rd. Culvert at Berry Creek, Drawing S-3214-2, dated June 1966,
- Plan and Profile of Carrier Drive, Drawing PSB-3257-1, prepared by Urban Engineering Consultants, dated September 1975,
- Finch Avenue West Culvert Repair, Structure No. 399, Drawing 399-S-4774-1, prepared by TSH, dated February 2006,
- Finch Avenue West Culvert Repair, Structure No. 399, Drawing 399-S-4774-2, prepared by TSH, dated February 2006,
- Plan & Profile of Sanitary Sewer and Storm Sewer on Postdam Road, From Finch Avenue to Driftwood Avenue, Drawing P-114-01, prepared by F. Schaeffer & Associates Ltd., dated April 1963,
- Plan & Profile of Sanitary Sewer and Storm Sewer on Postdam Road, From North Side of Hydro Property to the North Limit of Subdivision, Drawing D-204-06, prepared by F. Schaeffer & Associates Ltd., dated April 1963,
- Grubbes Bridge, Bridge Repairs and Expansion Joints, Existing Conditions, Drawing S-249-29, dated June 1991,
- Humberwood Blvd. Bridge, General Arrangement, Drawing S-3030-2, prepared by Marshal Macklin Monaghan Limited, dated August 1989,
- Islington Avenue at West Branch of Humber River, Bridge Rehabilitation, Deck Layout, Drawing S-494-19, prepared by Giffels Associates Limited, dated February 1990

Ontario Ministry of Transportation

- Contract Drawings drawing set, Contract No 82-51, prepared by Proctor & Redfern Limited, dated August 1980,
- Humber River Bridge (SBL) Hwy. 427 Widening various drawings, prepared by Totten Sims Hubicki Associates, dated November 1994,
- Humber River Crossing, Highway #401 various drawings, prepared by T.O. Lazarides, Lount and Partners, dated December 1954,
- General Arrangement, Humber River Bridge No. 4, E.- To N. & South Bound-Ramp 'A', dated September 1964,
- General Layout, Humber River Bridges No. 2, 3 & 5, dated October 1964,
- General Arrangement, Hwy 401 EB Core, Humber River Bridge, Rehabilitation of Structure, prepared by SNC Lavalin, dated March 2001,
- General Arrangement, Humber River Bridge #5, WB Express, Structure Rehabilitation, prepared by Morrison Hershfield, dated December 2004,
- General Arrangement, Hwy 401 E. B. Collectors, Humber River Bridge #3, prepared by McCormick Rankin Corporation, dated March 2005,
- General Arrangement, Hwy 401 W.B. Collectors, Humber River Bridge #1, Rehabilitation, prepared by McCormick Rankin Corporation, dated December 2009,
- Hwy 427, Humber River Bridge – NB, Rehabilitation & Widening various drawings, prepared by SNC Lavalin, dated March 2014,
- Hwy 401, Humber River Bridge No. 4, Replacement various drawings, prepared by SNC Lavalin, dated February 2016

Toronto Transit Commission

- Bloor Danforth Subway, West Extension, Contract – W3, Drawing W3-S-19, prepared by Proctor & Redfern Consulting Engineers, dated August 1964

2.3 Task 1C: Preparation of a Digital Elevation Model (DEM)

The 1-m ESRI Grid format LiDAR data provided by the TRCA was used to develop a Digital Elevation Model (DEM) for use in the study. The DEM defined the base topography for the HEC-RAS model, was used to generate cross-section geometry data (i.e. station/elevation pairings) and supported flood plain delineation.

2.4 Task 1D: Development of a HEC-RAS Steady-State Flow Table

A HEC-RAS steady flow data table was developed and refined during the study. The flow data, provided by the TRCA, was obtained from the Humber River Hydrology Update (Civica, 2018). The 2 year – 100 year storm event peak flow data assigned in the steady flow table were based on an Existing Conditions model scenario, which includes existing SWM facilities within the Humber River Watershed. The 350 year and Regional Storm event peak flow data assigned in the steady flow table were based on a Future Conditions model scenario, excluding existing SWM facilities.

A review of the percent change between consecutive flow nodes/change locations was completed for the Regional Storm event. Where the percent change exceeded 10%, additional flow

node/change locations were identified. These locations were provided to TRCA for review. A number of outcomes stemmed from this review (ref. Table 2-1), namely:

- TRCA provided a new adjusted flow for a location
- TRCA advised that the flow change was close to 10% and the addition of another flow change location would not significantly alter hydraulic computations
- TRCA advised that a flow change location could not be reasonably identified within the context of the hydraulic model, and as such no flow change location was defined.

An illustration of the locations of the final flow nodes used for development of the HEC-RAS steady flow data table has been provided in Appendix E.

Table 2-1: List of flow nodes with flow change exceeding 10% and outcomes

Upstream Flow Node ID and Associated Flow (m ³ /s)	Downstream Flow Node ID and Associated Flow (m ³ /s)	Difference (%)	Number of Additional Flow Nodes Required	Notes
0.157 / 1426.9	50.2 / 1808.207	27%	2	There is an intermediate flow node (49.1); since, node 50.2 is the confluence of 49.1 and 48.1 (534.986 m ³ /s), the flow change is reasonable. No additional nodes deemed necessary.
0.2 / 90.2	49.4 / 103.5	15%	1	No change deemed necessary.
0.3 / 62.0	49.8 / 77.4	24%	2	Added nodes 0.162 and 0.163
0.9 / 86.8	45.2 / 135.0	55%	5	Flows generated by urbanized, linear catchment 45.07; ortho-photographs show a possible outfall channel joining the Humber River, which would the appropriate reach to apply flow changes. Without representing this outfall channel (e.g. hydrologic routing) to stagger the peak, there is no reasonably logical location to place new node(s) / flow changes between nodes 0.9 and 45.2
0.11 / 54.8	0.9 / 86.8	58%	5	Nodes 0.164, 0.165, 0.166, 0.167, and 0.168 added.
0.5 / 311.31	0.159 / 359.0	15%	1	No change deemed necessary.
0.12 / 193.0	47.1 / 281.9	46%	4	There is an intermediate flow node 0.4 (219.815 m ³ /s), which is the confluence of nodes 0.12 and 0.7 (32.877 m ³ /s). Nodes 0.169 and 0.17 added between nodes 0.4 and 47.1

2.5 Task 1E: Site Reconnaissance

A total of one-hundred and seventy-nine (179) watercourse crossings (road, rail and pedestrian) were initially identified, from a review using Google Earth Pro™, as being located along the Humber River and tributaries within the study area.

Of this total, seven-nine (79) crossings were identified for inclusion in the hydraulic model as they were deemed to be of hydraulic significance. An information summary for these structures is provided in Table 2-2, which includes an identification of the data type used to complete the structure coding in the hydraulic model.

The remaining one hundred (100) crossings (ref. Table 2-3) were either not deemed to be of hydraulic significance, were identified as being out of scope of the study, or a structure could not be identified in the field, and were therefore not included.

Summary information for all watercourse crossings within the study area is provided in Appendix A.

This page left intentionally blank

Table 2-2: Summary of Watercourse Crossings Included in Hydraulic Model

Crossing #	Crossing Location/Designation	Included in Previous TRCA HEC-RAS Model?	Structure Type	New HEC-RAS Model				
				HEC-RAS Watercourse Designation	HEC-RAS Section	How Coded? ¹		
						Previous Dataset	Field Measurements	As-Built Drawings
1	Bloor Street	Y	Bridge	Lower Humber	1200	■		■
2	Bloor Subway Bridge	Y	Bridge	Lower Humber	1247.204			■
3	Old Mill Road	Y	Bridge	Lower Humber	1566.188	■		
10	Dundas Street West	Y	Bridge	Lower Humber	3972.244	■		
11	Pedestrian Bridge - Lambton Woods - Bridge (4)	Y	Pedestrian Bridge	Lower Humber	4535.243	■	■	
12	Railway (CP)	Y	Bridge	Lower Humber	4571.18	■		
15	Scarlett Road	Y	Bridge	Lower Humber	734.8901	■		
16	Eglinton Avenue West	Y	Bridge	Lower Humber	1679.951	■		
20	Lawrence Avenue	Y	Bridge	Lower Humber	1567.575	■		
22	St Philips Road	Y	Bridge	Lower Humber	2734.193	■		
23	Railway (CN)	Y	Bridge	Lower Humber	3279.97	■		■
25	Hwy 401 HUMBER R. BR#4 E-N & SB RAMP A	Y	Bridge	Lower Humber	4098.95	■		■
26 & 27	Hwy 401 HUMBER R. BR#3 EB 401 COLLECTOR & Hwy 401 HUMBER R. BR#2 WB 401 COLLECTOR	Y	Bridge	Lower Humber	4201.13	■		■
28	Hwy 401 HUMBER R.BR 1	Y	Bridge	Lower Humber	4264.165	■		■
29	Albion Road (north structure)	Y	Bridge	Lower Humber	75.84924	■		■
30	Recreational Trail Bridge	Y	Pedestrian Bridge	Lower Humber	148.4585	■	■	■
48	Edenbridge Drive		Bridge	Silver Creek	209.441		■	■
49	Royal York Road		Culvert	Silver Creek	1180.649		■	■
57	Scarlett Road	Y	Bridge	Lower Humber Trib A	167.7546	■	■	■
58	Westmount Park	Y	Pedestrian Bridge	Lower Humber Trib A	1402.237	■	■	■
59	Brittany Court	Y	Bridge	Lower Humber Trib A	1725.08	■	■	■
60	Royal York Road	Y	Bridge	Lower Humber Trib A	1801.486	■	■	■
61	The Westway	Y	Bridge	Lower Humber Trib A	2113.388	■	■	■
62	Alex Marchetti Park - Bridge (1)	Y	Pedestrian Bridge	Lower Humber Trib A	2375.916	■	■	■
63	Alex Marchetti Park - Bridge (2)	Y	Pedestrian Bridge	Lower Humber Trib A	2585.436	■	■	■
64	Alex Marchetti Park - Bridge (3)	Y	Pedestrian Bridge	Lower Humber Trib A	2761.94	■	■	■
65	Islington Avenue	Y	Bridge	Lower Humber Trib A	3182.91	■	■	■
66	Parallel with Dixon Rd, Private Driveway	Y	Driveway Culvert	Lower Humber Trib A	3490.4	■	■	■
67	Wincott Drive	Y	Culvert	Lower Humber Trib A	3919.765	■	■	■
69	Norfield Crescent		Culvert	Berry Creek	709.2499		■	■
70	Trail bridge - The Elms Park		Pedestrian Bridge	Berry Creek	1077.975		■	■
71	Islington Avenue		Bridge	Berry Creek	1336.632		■	■
72	Redwater Drive		Culvert	Berry Creek	1579		■	■
73	Drumheller Road		Culvert	Berry Creek	1980.414		■	■
74	Berry Creek Drive		Culvert	Berry Creek	2425.411		■	■
75	Kipling Avenue		Culvert	Berry Creek	2666.036		■	■
76	Trail bridge – Brydon Road		Pedestrian Bridge	Berry Creek	2883.22		■	■
77	Martin Grove Road		Sewer Outfall	Berry Creek	3768.831		■	■
79	Albion Road (Grubbes Bridge)	Y	Bridge	West Humber Creek	679.4845	■	■	■





Crossing #	Crossing Location/Designation	Included in Previous TRCA HEC-RAS Model?	Structure Type	New HEC-RAS Model				
				HEC-RAS Watercourse Designation	HEC-RAS Section	How Coded? ¹		
						Previous Dataset	Field Measurements	As-Built Drawings
80	Islington Avenue	Y	Bridge	West Humber Creek	1541.738	■	■	
81	Kipling Avenue	Y	Bridge	West Humber	631.1946	■	■	
82	Martin Grove Road	Y	Bridge	West Humber	2103.113	■	■	
84	Highway 27	Y	Bridge	West Humber	3746.331	■	■	
88	Humberwood Boulevard	Y	Bridge	West Humber	6288.086	■	■	
89	Finch Avenue West	Y	Bridge	West Humber	6858.708	■	■	
90	Highway 427 - Humber River SBL/NBL		Bridge	West Humber	7281.613			■
91	Highway 427 - RAMP 427N - Finch Ave E/W		Bridge	West Humber	7327.588			■
98	Finch Avenue West / Islington Avenue intersection	Y	Bridge	Lower Humber	2910.686	■		
100	Trail bridge - Rowntree Mills Park - Bridge (2)	Y	Pedestrian Bridge	Lower Humber	285.1792	■	■	
102	Steeles Avenue West	Y	Bridge	Lower Humber	2353.223	■		
103	Albion Road	Y	Culvert	Albion Creek	311.1711	■	■	■
105	Amaron Avenue	Y	Culvert	Albion Creek	991.5994	■	■	■
106	Taysham Crescent	Y	Culvert	Albion Creek	1363.969	■	■	■
107	Albion Centre (modelled using PCSWMM2D)	Y	Culvert/Sewer	Albion Creek	1415.901	■		■
108	Garfella Drive	Y	Culvert	Albion Creek	2393.418	■		
109	Martin Grove Road	Y	Culvert	Albion Creek	2814.604	■		
110	Silverstone Drive	Y	Culvert	Albion Creek	3115.149	■		
111	Baywood Road	Y	Culvert	Albion Creek	3834.634	■	■	
112	Royalcrest Road	Y	Culvert	Albion Creek	4109.203	■	■	
113	Highway 27	Y	Culvert	Albion Creek	4262.798	■		
115	Driveway Access		Driveway Culvert	Albion Creek	4504.875		■	
116	Driveway Access		Driveway Culvert	Albion Creek	4626.943		■	
117	Carrier Drive (modelled using PCSWMM2D)		Culvert/Sewer	Albion Creek	4662.43		■	■
119	Trail/Construction Bridge		Pedestrian Bridge	Emery Creek	835.6872		■	■
120	Lanyard Road (modelled using PCSWMM2D)		Culvert/Sewer	Emery Creek	985.2028		■	■
137	Jane Street	Y	Culvert	Black Creek	1578.899	■	■	
138	Black Creek Retardation Dam	Y	Dam	Black Creek	1934.072	■	■	
140	Vehicular Bridge - Downsview Dells Park - #2		Pedestrian Bridge	Black Creek	3556.971		■	■
143	Sheppard Avenue West		Culvert	Black Creek	4406.016		■	■
145	Grandravine Drive	Y	Culvert	Black Creek	5570.445	■	■	
148	Trail bridge	Y	Pedestrian Bridge	Black Creek	103.2365	■	■	
149	Finch Avenue West	Y	Culvert	Black Creek	599.0427	■	■	
152	Shoreham Drive	Y	Bridge	Black Creek	3036.412	■	■	
153	Intersection of Steeles Avenue and Jane Street	Y	Bridge	Black Creek	3988.09	■	■	
156	Finch Avenue West		Culvert	Black Creek Trib A	383.1797		■	■
157	Potsdam Road		Culvert	Black Creek Trib A	557.766		■	■
159	Driftwood Avenue		Culvert	Black Creek Trib A	1079.834		■	■
160	Weston Golf Course (modelled using PCSWMM2D)		Culvert	Lower Humber Trib B	349.1465		■	■
168	Kipling Avenue		Culvert	Lower Humber Trib C	781.6691		■	■

Notes: (1) Within the “How Coded” column, three black squares appearing for one crossing indicates that the geometry was coded in the HEC-RAS model as a combination of the three sources of information.





Table 2-3: Summary of Watercourse Crossings Not Included in Hydraulic Model

Culvert #	Road Name / Watercourse Crossing Name	HEC-RAS Watercourse Designation	Why not included in new HEC-RAS model?
4, 5, 6, 7, 8, 9	Weirs #1 to #6	Lower Humber	at the direction of TRCA
13, 14	in water structures identified	Lower Humber	not hydraulic structures
17, 21	Weir #9 and #10	Lower Humber	at the direction of TRCA
18	Construction Bridge	Lower Humber	temporary structure
19	Pedestrian Bridge - Raymore Park	Lower Humber	not hydraulically significant
24	Trail bridge	Lower Humber	not hydraulically significant
31	West Humber Parkland – Trail Bridge (2)	Lower Humber	not hydraulically significant
32 to 37	Golf Course Crossings	Black Creek	not hydraulically significant
38	Scarlett Road	Black Creek	not in scope
39, 40	Smythe Park - Bridges 2, 3	Black Creek	not hydraulically significant
41	Jane Street	Black Creek	not in scope
42	Rockcliffe Boulevard	Black Creek	not in scope
43	Alliance Avenue	Black Creek	not in scope
44	Hilldale Road / Humber Blvd	Black Creek	not in scope
45	Pedestrian Bridge	Black Creek	not in scope
46	Weston Road	Black Creek	not in scope
47, 50 to 54	Trail bridge and Golf Course Crossings	Silver Creek	not hydraulically significant
55	Eden Valley Drive	Silver Creek	removed from scope
56	Trail bridge	Lower Humber Trib A	not hydraulically significant
68	Trail bridge - Pine Point Park	Berry Creek	not hydraulically significant
78	Trail bridge - Summerlea Park	West Humber Crk	not hydraulically significant
83	West Humber Parkland – Trail Bridge (1)	West Humber	not hydraulically significant
85, 86, 87	Humber Arboretum Trail – Bridges 2,3,4	West Humber	not hydraulically significant
92	Claireville Dam	West Humber	not in scope
93, 94, 95, 96	North Humber Park Trail – Bridges 1,2,3,4	Lower Humber	not hydraulically significant
97, 99	Trail Bridges	Lower Humber	not hydraulically significant
101	Rowntree Mills Park – Trail Bridge (3)	Lower Humber Trib C	not hydraulically significant
104	Trail bridge - Beaumonde Heights Park	Albion Creek	not hydraulically significant
114	Carrier Drive	Albion Creek	removed from scope
118	Trail Bridge	Emery Creek	not hydraulically significant
121	Pedestrian Bridge	Emery Creek	no crossing identified in field
122	Finch Avenue West	Emery Creek	upstream side of culvert starting a structure 120 (Lanyard Road)
123, 124	Chalkfarm Park – Trail Bridges 1, 2	Black Creek	not hydraulically significant
125 to 136	Golf Course Bridges	Black Creek	not hydraulically significant
139	Trail Bridge - Downsview Dells Park - Bridge (1)	Black Creek	not hydraulically significant
141, 142	in water structures identified	Black Creek	no crossings identified in field
144	Trail Bridge - Northwood Park	Black Creek	not hydraulically significant
146, 147	Derrydowns Park – Trail Bridges 1, 3	Black Creek	not hydraulically significant
150, 151	Black Creek Parkland – Trail Bridges 1, 2	Black Creek	not hydraulically significant
154, 155, 158	Private Access and Trail Bridges	Black Creek	not in scope
161 to 166, 166A & B, 167	Trail and Golf Course Bridges	Lower Humber Trib B	not hydraulically significant





This page left intentionally blank

3.0 Hydraulic Model Development (Task 2)

The collection and processing of data, computational procedures and analysis of computed profiles completed for this study are compliant with the following criteria and guidelines:

- Hydrologic Engineering Center User's Manual and Training Documents (USACE, 2010),
- *Hydrologic and Hydraulic Procedures for Flood Plain Delineation* (Environment Canada, 1976),
- MNR Technical Guide Flooding Hazard Limit (MNR, 2002) and,
- Standard Manning's Roughness Coefficients for TRCA Watershed Hydraulic Modelling

The objective of the hydraulic analysis was the computation of water surface elevations resulting from the 2 year through 100 year, 350 year design events and Regional Storm (Hurricane Hazel) flow estimates. The computed water surface elevations are then used in conjunction with the LiDAR data (ref. Section 2.3) to delineate the limits of the floodplain on topographic mapping sheets. To determine the water surface profile for a given flood condition, a backwater analysis is generally necessary. The US Army Corps of Engineers (USACE) HEC-RAS one-dimensional backwater model was utilized for this analysis.

The following sections describe the development of the HEC-RAS hydraulic model, as well as the details associated with the results of the hydraulic simulation of various flood events.

3.1 HEC-RAS Software

HEC-RAS (USACE, 2002), the successor to HEC-2, is a hydraulic modelling computer program developed by the USACE to simulate water surface profiles for steady and gradually varied flow in open channel watercourses. The computational procedures used by HEC-2 and HEC-RAS to model steady state flow are generally similar and are based on solving the one-dimensional energy equation. The HEC-RAS computational software estimates water surface elevation and related output along a channel reach under sub-critical, supercritical or mixed flow regimes. The program is capable of modelling complicated networks with multiple reaches and tributaries. Flow through culverts, bridges, weirs and gated spillways can also be accommodated. Levees, blocked obstructions and ineffective flow areas can also be modelled, as can ice jam and debris flow conditions.

In simple terms, the model uses surface water flow rates to predict water surface elevations. These elevations can then be transferred to a DEM or topographic map to identify the limits of flood-prone areas.

HEC-RAS requires a terrain model with three-dimensional attributes (x, y, and z) for the area of interest. The terrain model commonly used in hydrologic modelling is a DEM. HEC-GeoRAS is a pre- and post-processing program developed co-operatively by the Hydrologic Engineering Center (HEC) of the USACE and Environmental Systems Research Institute Inc. (ESRI) to:

- extract geometric data from a DEM for input into HEC-RAS, and;
- use output from the hydraulic model and generate a water surface elevation DEM that can be superimposed on the terrain DEM to identify flood-prone areas.

The HEC-GeoRAS 10.4.0.1 for ArcGIS 10.4 and HEC-RAS 5.0.3 were used to complete the one dimensional hydraulic modelling component of this project. HEC-RAS 5.0.3 represents the most up-to-date version of the software at the time the project was initiated.

The software package GeoHEC-RAS, produced by CivilGEO Inc., is another pre- and post-processing interface that can be used to support development of HEC-RAS models and visualization of HEC-RAS computations and results.

HEC-RAS is an approved model for flood plain calculations in Ontario and was identified as the preferred modelling platform in the Terms of Reference for this project.

3.2 Task 2A.1 – HEC-RAS Model Development

3.2.1 Cross-Sections

Hydraulic sections were located in accordance with HEC-RAS modelling guidelines (USACE, 2010). Cross-section data was abstracted from the DEM developed for this project supplemented with low-flow channel cross-section data obtained from the TRCA provided field survey, as outlined in Section 2 of this report, and below.

The locations of the sections are illustrated on the flood risk maps. The first cross-section of the hydraulic model is located approximately 900 m downstream of the Bloor Street West crossing of the Humber River. This location was selected by the TRCA, and defines the downstream limit of the study area.

The LiDAR DEM developed for this project provides topographic information in a 1 m x 1 m grid to a vertical positional accuracy of 0.1 m ±. Since the entire study area was captured in the LiDAR survey, cross-sections extending out past the floodplain extents were cut directly from the LiDAR without the need for supplementary field survey.

Detailed topographic field survey was provided by TRCA for local areas within the study area. A total of twelve (12) surveys were provided, of which seven (7) were used to extract the below waterline survey data for integration into the cross-sections located within each respective surveyed area. In addition, the Lower Humber Weirs Assessment, Phase 1 Report (ref. Stantec, 2016) contained below waterline survey data adjacent to the aforementioned weir structures located within the Lower Humber River watershed. The Lower Humber Weirs Assessment Report and associated HEC-RAS model were reviewed, and where survey data was noted to be lower than the LiDAR data, survey data was extracted and integrated into cross-sections as appropriate.

An overview of the hydraulic model for of the study area is as follows:

- Overall study reach length of approximately 65 km
- 970 hydraulic sections across 11 reaches
- Minimum channel elevation of 74.65 m at the start of the model – Lower Humber River
- Maximum channel elevation of about 132.45 m at the end of the model – Lower Humber
- Maximum channel elevation of about 144 m at the end of the model – Emery Creek
- Maximum channel elevation of about 170.32 m at the end of the model – Albion Creek
- Maximum channel elevation of about 158.31 m at the end of the model – West Humber at Claireville Dam
- Minimum channel elevation of 127.72 m at the start of the model – Black Creek
- Maximum channel elevation of about 180.47 m at the end of the model – Black Creek
- Average inter-section reach length of about 67 m
- About 785 (or about 81%) of sections having inter-section reach length less than 100 m
- About 448 (or about 46%) of sections having inter-section reach length less than 50 m
- About 171 (or about 18%) of sections having inter-section reach length less than 25 m

3.2.2 Hydraulic Structures

Watercourse Crossings / Bridges

As noted previously (ref. Section 2.5), a total of one-hundred and seventy-nine (179) watercourse crossings were initially identified along the Humber River and tributaries within the study area. Of these, seventy-nine (79) crossings were included in the new Humber River hydraulic model and one hundred (100) crossings were not.

Summary information for all watercourse crossings within the study area is provided in Appendix A as structured Watercourse Crossing Data Sheets formatted to TRCA's standard template.

It was also determined through the course of model development that a number of long or complex culverts were located within the study area. The subject culverts are:

- The Albion Centre culvert/sewer (#107) which conveys from the inlet at Stevenson Road to the outlet downstream of Kipling Avenue; a distance of about 700 m.
- The Carrier Drive culvert (#117), located near 247 Carrier Drive, has complex below ground connectivity with multiple inflows to a single manhole.
- The Lanyard Road culvert (#120) which conveys flow from north of Finch Avenue West to Lanyard Road; approximate length of 717 m.

- The Weston Golf Club (#160) culvert is approximately 140 m long, and overflow from the culvert has the potential to cascade over the valley slope flowing along a separate path from the culvert alignment.

In discussion with TRCA, it was decided that HEC-RAS was not the appropriate software to model these culverts. It was decided to use PCSWMM2D Professional to estimate water surface elevations at the inlet of long culverts #120 and #160, and to assign the computed water surface elevations in the HEC-RAS model as Known Water Surface Elevations, at the cross-sections adjacent to the inlet of the long culverts.

Dams and Weirs

One dam is located within the study area, namely the Black Creek Retardation Dam located about 350 m upstream from Jane Street (ref. Photo 3-1). This dam does not have any operational components and has been coded into the hydraulic model as a bridge.

As well, the upper bound of the hydraulic model along the West Humber River is the Claireville Dam. The model extends to the downstream face of the dam.



Photo 3-1 Black Creek Retardation Dam

TRCA owns eight (8) weirs along the Lower Humber River between Catherine Street/Old Mill Road and Highway 401. These weirs, referred to as Weirs #1 through #6, Weir #9 and Weir #10, were installed in response to Hurricane Hazel beginning in the late 1950's. These weirs (ref. Photo 3-2) were not coded into the hydraulic model at the direction of TRCA based on outcomes of hydraulic modelling completed for the *Lower Humber Weirs Assessment* completed by Stantec (2016). However, the below waterline surveys completed as a component of the 2016 Stantec assignment were used to supplement cross-section data where survey data was available.



Photo 3-2 Lower Humber River Weirs - Example

The potential for field topographic survey (Task 2C) was contemplated at the outset of the project if information gaps were identified that would preclude coding of watercourse crossings in the new hydraulic model. Following completion of the preceding Tasks 1A, 1B, and 1E (ref. Sections 2.1, 2.2 and 2.5 respectively), the available existing information sources, namely:

- the previous (2006) HEC-RAS model;
- the available as-built drawings/data; and/or;
- information measured as a component of the field reconnaissance visits;

were deemed to be sufficient to code the required watercourse crossings in HEC-RAS. As such, field topographic survey of watercourse crossings was determined not to be necessary.

3.2.3 Lateral Structures

No lateral structures (i.e., side weirs and similar) are located along the study reaches for this project.

3.2.4 Energy Loss Coefficients

Energy loss coefficients are used in the HEC-RAS program to calculate changes in the water surface elevation between sections. The coefficients include Manning roughness coefficients, expansion and contraction coefficients, and weir and pressure coefficients for road / rail crossings. These coefficients were estimated based on published information, field reconnaissance and engineering judgment.

Expansion and Contraction Coefficients

Expansion and contraction coefficients for normal channel cross-sections were set at 0.1 and 0.3, respectively, and 0.3 and 0.5 for cross-sections at hydraulic structures respectively. These ratios are used by HEC-RAS in the computation of energy losses due to flow contraction and expansion between adjacent cross-sections. The noted values are consistent with those recommended in the HEC-RAS Technical Reference Manual.

Roughness Coefficients

Initial estimation of Manning roughness coefficients was based on field observations, review of aerial imagery (available via Google Maps™ and TRCA), engineering judgment, previous modelling experience, and comparison of reach characteristics with the "Roughness Characteristics of Natural Channels" (Barnes, 1967). Images available via Google Streetview™ were also helpful in this regard.

Final Manning's 'n' values were aligned with TRCA's "Standard Manning's Roughness Coefficients for TRCA Watershed Hydraulic Modelling" guide (ref. Appendix C).

Roughness coefficients used for the hydraulic model were in the range 0.025 to 0.080¹ for channels and 0.025 to 0.080 for overbank areas. Channels through the study area range from clean, gravel bottom to large boulders with debris (represented by the low and high range of roughness coefficient). For the overbank areas the lower range represented grassed areas clear of significant vegetation and the upper range represented forested overbank areas. Some urban areas (i.e., asphalt or concrete) are also included in the overbank areas in select locations.

¹ Please note that a Manning's 'n' value of 0.08 was assigned in small tributaries that were identified as dry and/or overgrown, and where other TRCA standard Manning's 'n' were not deemed to be an appropriate representation.

Weir Flow Coefficients

The typical HEC-RAS weir coefficient of 1.4 for watercourse crossings (i.e. bridge/culvert) was adopted for the development of the new model where no previous HEC-RAS dataset coding was available for a structure. If a structure was defined in a previous HEC-RAS dataset, the weir coefficient from that previous dataset was adopted for the new hydraulic model.

3.2.5 Starting Water Surface Elevations

TRCA provided the starting water surface elevations summarized in Table 3-1 for the newly developed hydraulic model. It is understood that this information was sourced from the 2D modelling results from the Lower Humber River 2D study (Valdor, 2017) and Jane-Wilson 2D Study (Valdor, 2016).

Table 3-1: Starting Water Surface Elevations

Location of Boundary ▶	Lower Humber	Black Creek
Source / Study ▶	Valdor, 2017	Valdor 2016
Flow Scenario	Starting Water Surface Elevations (m)	
2 year	75.895	129.968
5 year	76.320	130.105
10 year	76.932	130.346
25 year	77.302	130.503
50 year	77.554	130.606
100 year	77.908	130.728
350 year	79.437	131.198
Regional	80.839	131.583

3.2.6 Ineffective Flow Areas

The “Ineffective Flow Area” command has been used to represent watercourse crossing embankments and backwater areas. This dataset coding has been completed following the guidance provided in the HEC-RAS User’s Manual, and the HEC-RAS Hydraulic Reference Manual.

3.2.7 Blocked Obstructions

The “Blocked Obstruction” command has been used to represent buildings within the floodplain. In addition, buildings which are immediately adjacent to cross-sections, but not necessarily bounded by cross-sections have been represented in the adjacent cross sections.

3.2.8 Hydraulic Model Calibration/Validation

Calibration and validation of the newly developed hydraulic model was not a requirement for this study.

3.3 Task 2A.2 – PCSWMM2D Professional Model Development

As noted previously, through review of the watercourse crossings to be included in the new hydraulic model, it was determined that four long or complex culverts required an alternate computational approach. In discussion with TRCA, it was determined that these crossings would be modelled using a two-dimensional approach using the software PCSWMM2D Professional. The subject culverts are:

- Albion Centre culvert/sewer (#107)
- Carrier Drive culvert (#117)
- Lanyard Road culvert (#120)
- Weston Golf Club (#160)

3.3.1 PCSWMM2D Professional

Hydrologic and hydraulic modelling of the subject culverts has been completed using Personal Computer Storm Water Management Model (PCSWMM) 2013 Professional 2D (version 5.1.011). PCSWMM can simulate the runoff response from rainfall inputs and routes the resulting unsteady state flows (i.e. time varying hydrographs) through a specified system of hydraulic conduits (i.e. storm sewers, open channels, culverts, etc.) and accounts for attenuation due to backwater in conduits and surface ponding in right-of-ways. For this assessment, the runoff response simulation capacities of the software were not utilized as flows from the 2015 Humber River hydrology study were used.

The model's analytical engine is SWMM5 (Storm Water Management Model version 5), developed by the U.S. Environmental Protection Agency. The routing component of SWMM5 solves the complete 1-dimensional Saint Venant (shallow water) equations for unsteady flow (continuity and momentum), which allows for full accounting varied flow conditions (backwater, channel storage, flow reversal, pressurized flow, etc.).

The model has a processor for creating and simulating dual-drainage networks which allows for accurate separation of the minor and major drainage systems. The model allows the user to define the interaction between the two systems by defining inlet capacity to reflect actual field conditions. The Professional 2D model also allows for a method of 2-dimensional (2D) surface modelling (rather than the typical 1-dimensional (1D) modelling in which flow is assumed in only one consistent direction), which has been applied for the subject crossings. Under this application, a 2D "mesh" is created, which consists of cells with a central node (with a surface elevation obtained from the project DEM), with rectangular conduits (with dimensions based on the mesh resolution) connecting nodes together to convey flow. Both low and high resolution meshes can be created depending on the project requirements. This allows for detailed modelling of surface flow conveyance and can account for obstructions such as buildings and walls. The 2D modelling

component can also be combined with standard 1D conduits (sewers and open channels) as required, resulting in a highly versatile modelling tool.

The PCSWMM model is considered well-suited to detailed urban drainage investigations and as such has been applied for the current assessment. Four individual models, one per culvert, were developed and are described in greater detail below.

3.3.2 Albion Centre PCSWMM2D Model

The Albion Centre 4 m x 2.6 m (13 ft x 8.5 ft) culvert/sewer conveys flow from the inlet at Stevenson Road to the outlet downstream of Kipling Avenue over a distance of about 700 m (ref. Figure 3-1).

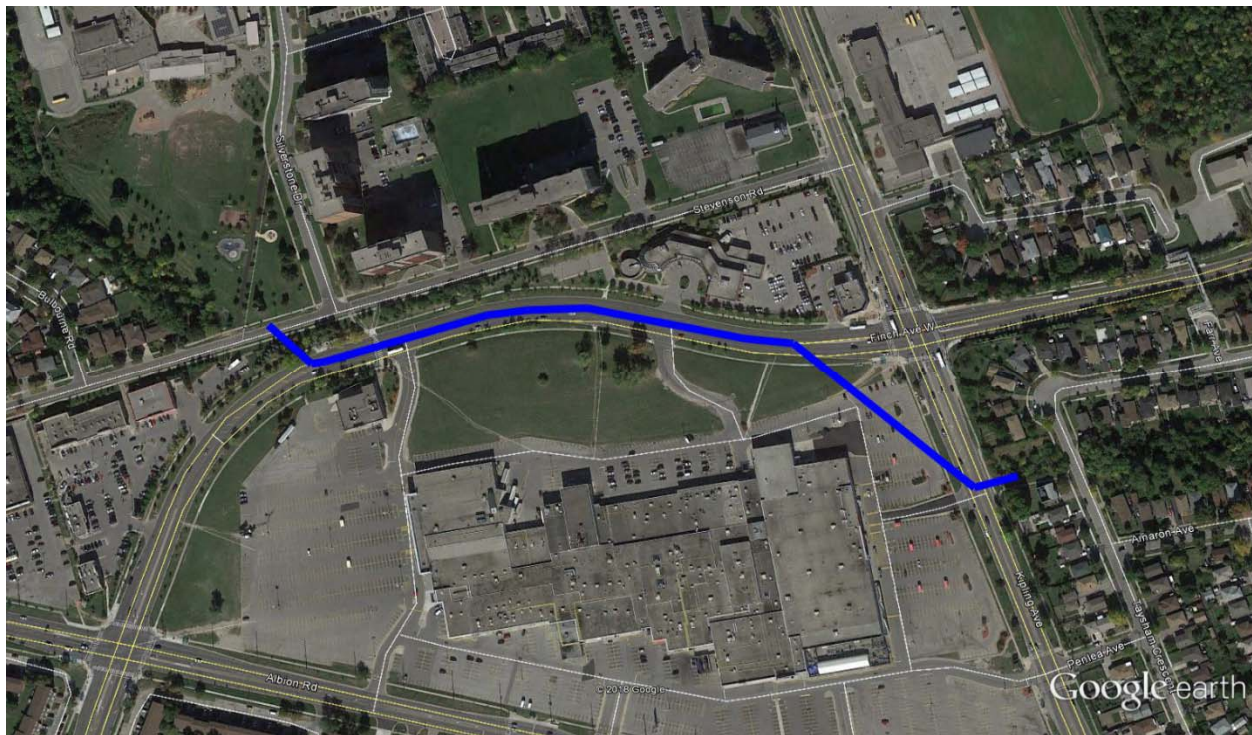


Figure 3-1: Albion Centre Culvert/Sewer Alignment

TRCA was developing its own 2D model of the area, using DHI software, in parallel with the development of the PCSWMM2D model. TRCA's effort was to be used as a means of comparison and validation of the results of the PCSWMM2D model. However, over the course of the development of this 2D model it became clear that the complexities of the circumstance required a much larger model area in order to properly represent overland flow paths. In the midst of model development it was decided by TRCA that the modelling requirements for this location were significantly beyond the original intent of the project. With this decision, TRCA took on the modelling effort for the entire Albion Creek watercourse from its confluence with the Humber

3.3.3 Carrier Drive PCSWMM2D Model

- 1.35 m x 2.1 m (53 inch x 83 inch) horizontal elliptical storm sewer
- 1.5 m (60 inch diameter) corrugated metal pipe (CMP)

As noted previously, TRCA took on the modelling effort for the entire Albion Creek watercourse from its confluence with the Humber River West Branch. The Carrier Drive culvert is also included in the TRCA model. TRCA developed the information provided in Appendix C to describe their efforts in this regard.

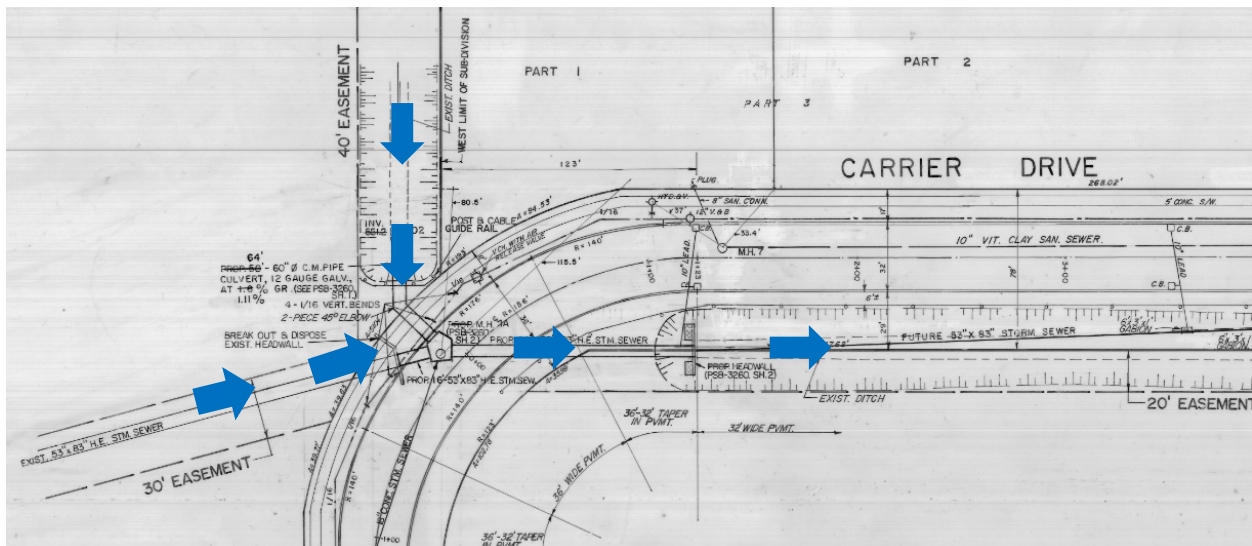


Figure 3-2: Carrier Drive Culvert/Sewer Alignment

The Lanyard Road culvert (#120) conveys flow from Finch Avenue West to Lanyard Road over a distance of about 717 m. This culvert had not been previously included in any other hydraulic models, to the knowledge of the study team, and no as-built data was determined to be available

from the City of Toronto. As such, its configuration for modelling purposes has been based on measurements from field reconnaissance, LiDAR/DEM data and aerial imagery.

This culvert was modelled in PCSWMM2D Professional using a combination of 1D and 2D elements. 1D elements were used to represent the culvert itself, while 2D elements (i.e. 2D cells) were used to represent the channels and overland surfaces surrounding the culvert.

A boundary area was delineated for purposes of creating the 2D cells for the model. The boundary area encompasses the Emery Creek channel (identified as Emery Creek – Reach 1 and Emery Creek – Reach 2 within the HEC-RAS model) and the surrounding overland surfaces. The Emery Creek channel included within the boundary area extends from HEC-RAS cross-section 796.8981 (located on Emery Creek – Reach 1) at the downstream limit to its upstream limit at Toryork Drive. The boundary area also encompasses Structure #119 (trail bridge) located about 175 m downstream from Lanyard Road.

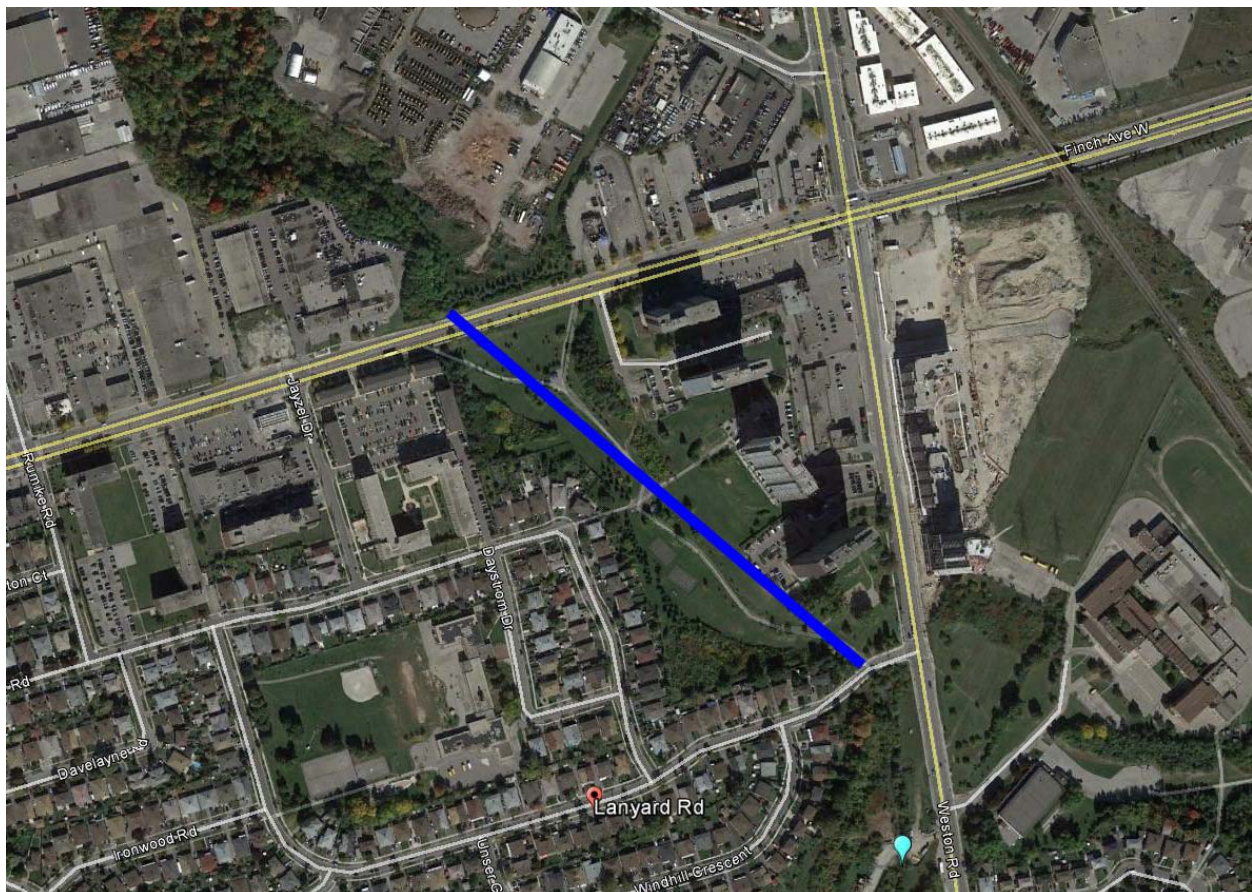


Figure 3-3: Lanyard Road Culvert/Sewer Approximate Alignment

2D cells have been created by generating a “mesh” within the boundary area, using the PCSWMM software. The generation of the mesh makes use of; the LiDAR data provided by TRCA, the land

use shapefile used to assign Manning's 'n' values within the HEC-RAS model, the boundary area shapefile, and a channel centreline shapefile. A directional mesh was selected for the channel areas to ensure the mesh conduits were generated along the direction of flow within the channel. The centerline shapefile was used to define the direction for the channel. A hexagonal mesh was selected for all other areas within the boundary area. A resolution of 5 m was selected all areas of the mesh which was considered sufficient to define all significant features of the boundary area. The average area of the 2D cells is 20.5 m². Buildings were excluded from the 2D mesh generation to properly simulate flood conditions around the walls of the structures.

As noted previously, the generation procedure of the 2D mesh makes use of the land use shapefile to assign Manning's 'n' values to each 2D cell. The land use shapefile was also used to assign Manning's 'n' values within the HEC-RAS model. Roughness parameters defined by the land use shapefile are as follows:

- Roads/Asphalt Areas – 0.025
- Urban Large Pervious Areas – 0.05
- Wet Channels/Ponds – 0.035
- Natural Areas – 0.08

The downstream boundary condition of the PCSWMM2D model is defined by outfalls. Outfalls are connected to the 2D mesh to allow the inflow time series to exit the system. The outfall flow condition assigned in the PCSWMM2D model has been defined as "free", which allows flow within the mesh to exit the system without impedance. An invert elevation was assigned to the outfalls for each storm event, which corresponds to the water surface elevations (WSEL) computed by the HEC-RAS model at cross-section 796.8981.

The Lanyard Road to Finch Avenue West culvert and the trail bridge are represented by 1D conduits within the PCSWMM model. As-built drawings were not available for the Lanyard Road to Finch Avenue West culvert. As such, the culvert size was obtained from field measurements, while the culvert length was estimated using aerial photography. The upstream and downstream inverts assigned in the model were obtained from the LiDAR data surrounding the inlet and outlet locations. The trail bridge culvert is included in the HEC-RAS model. Geometric details of the culvert correspond with the HEC-RAS model.

The 1D elements are connected directly to the nearest mesh junction at the respective inlet and outlet locations.

The inflow time series input location into the 2D mesh has been defined at the upstream end of the Emery Creek channel. The time series data has been entered into the PCSWMM2D model such that peak flows for any given storm event are ramped up over 1 hour and held steady for 6 hours. Peak flows assigned in the PCSWMM2D model correspond to those assigned to the Emery Creek – Reach 2 channel within the HEC-RAS model.

The model has been executed for a duration of 72 hours with a routing time step of 0.3 seconds. The resultant computed water surface elevations at the upstream end of the culvert are summarized in Table 3-2. The computed water surface elevations have been transposed into the

HEC-RAS model at cross-section 1773.913, located on Emery Creek – Reach2 as a known water surface elevation.

Table 3-2: Lanyard Road Culvert/Sewer Alignment – Computed Water Surface Elevations

Event	Computed Water Surface Elevations (m)
2 Year	141.98
5 Year	144.73
10 Year	145.39
25 Year	145.52
50 Year	145.60
100 Year	145.67
350 Year	145.87
Regional Storm	145.56

3.3.5 Weston Golf Club PCSWMM2D Model

The Weston Golf Club (#160) 1050 mm diameter concrete pipe culvert is about 140 m long with a slope of 1%. It conveys flow from the top of the valley to the bottom of the valley slope just downstream of the CN Rail Bridge (#23). Overflow from the culvert has the potential to cascade over the valley slope flowing along a separate path from the culvert/pipe alignment.

This culvert was modelled in PCSWMM2D Professional using a combination of 1D and 2D elements. 1D elements were used to represent the culvert itself, while 2D elements (i.e. 2D cells) were used to represent the channels and overland surfaces surrounding the culvert.

A boundary area was delineated for purposes of creating the 2D cells for the PCSWMM2D model. The boundary area encompasses the tributary channel within the Weston Golf Course area (identified as Lower Humb TribB – Reach 1 and Lower Humb TribB – Reach 2 within the HEC-RAS model), a segment of the main Humber River channel, and the surrounding overland surfaces. The entire tributary channel is included within the boundary area, extending from its confluence with the main channel to its upstream limit at Lemsford Road. The segment of the main channel included in the boundary area is bound by HEC-RAS cross-section 3047.155 (located on Lower Humber – Reach 3) at the downstream limit to the CN Rail Bridge at the upstream limit.

2D cells have been created by generating a “mesh” within the boundary area, using the PCSWMM2D software. The generation of the mesh makes use of; the LiDAR data provided by TRCA, the land use shapefile used to assign Manning’s ‘n’ values within the HEC-RAS model, the boundary area shapefile, and a channel centreline shapefile. A directional mesh was selected for the channel areas to ensure the mesh conduits were generated along the direction of flow within the channel. The centerline shapefile was used to define the direction for the channel. A hexagonal

mesh was selected for all other areas within the boundary area. A resolution of 4 m was selected for the tributary channel, while a resolution of 5 m was selected for all other areas. A higher resolution was required for the tributary channel as the definition of the channel geometry is of significance for the purposes of this task. The average area of the 2D cells is 21 m². Buildings do not exist within the 2D mesh boundary area, therefore buildings were not excluded from the 2D mesh generation.

As noted previously, the generation procedure of the 2D mesh makes use of the land use shapefile to assign Manning's 'n' values to each 2D cell. The land use shapefile was also used to assign Manning's 'n' values within the HEC-RAS model. Roughness parameters defined by the land use shapefile are as follows:

- Roads/Asphalt Areas – 0.025
- Wet Channels/Ponds – 0.035
- Urban Large Pervious Areas – 0.05
- Natural Areas – 0.08

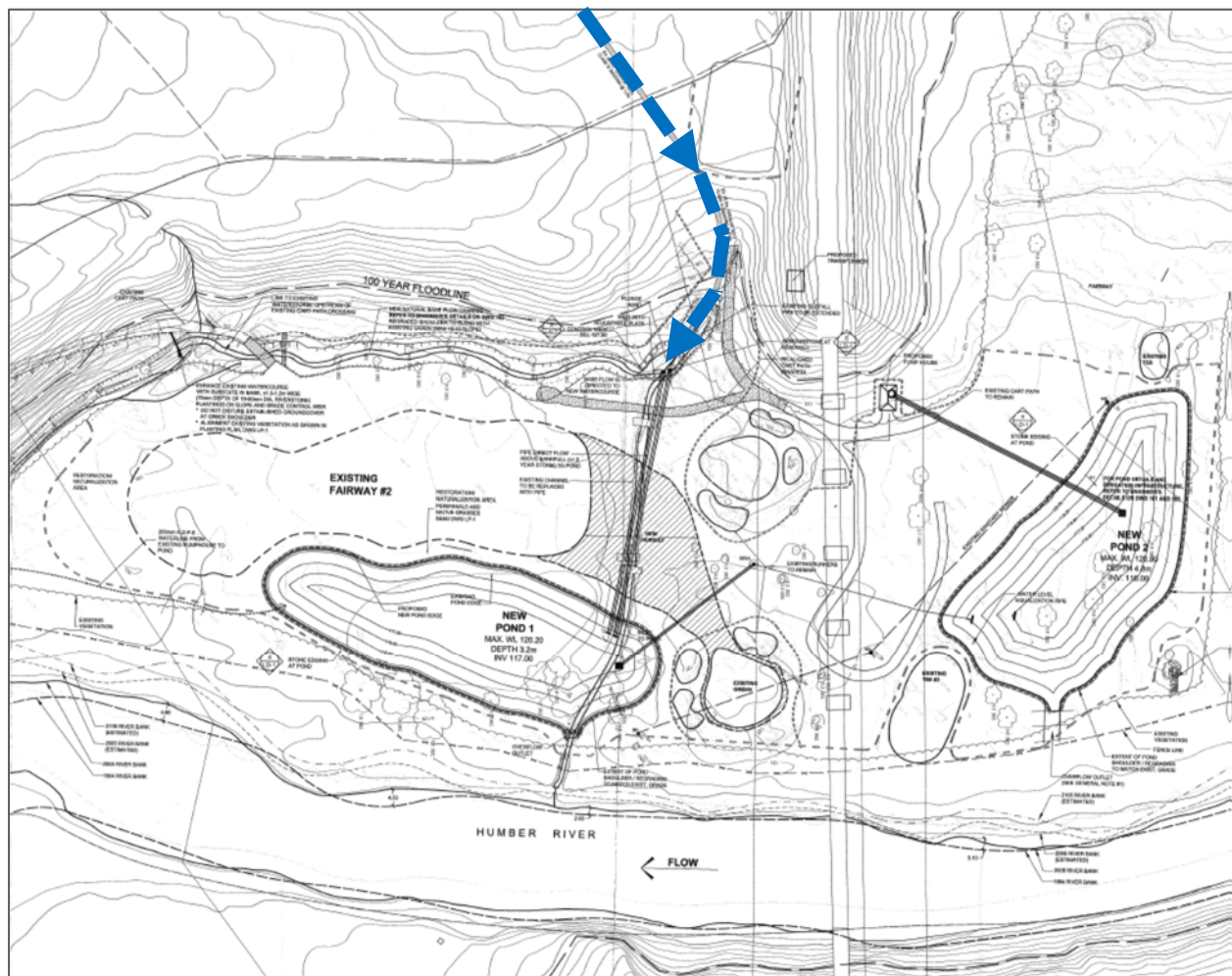


Figure 3-4: Weston Golf Club Culvert Alignment

The downstream boundary condition of the PCSWMM2D model is defined by outfalls. Outfalls are connected to the 2D mesh to allow the inflow time series to exist the system. The outfall flow condition assigned in the PCSWMM2D model has been defined as “free”, which allows flow within the mesh to exit the system without impedance. An invert elevation was assigned to the outfalls for each storm event, which corresponds to the water surface elevations computed by the HEC-RAS model at cross-section 3047.155.

The Weston Golf Course culvert is represented by a 1D conduit within the PCSWMM2D model. The culvert size and length were obtained from a drawing provided by the TRCA as part of the background information. The drawing, named *Layout and Grading Plan, Weston Golf Club Irrigation Pond, Drawing LG-1*, prepared by Schollen & Company Inc., dated December 1, 2008, provides a plan view of approximately 90 m of the total 140 m length, and includes the culvert dimension, length and slope details. The invert of the culvert outlet was not provided on the drawing. As such, the invert assigned at the culvert outlet was taken from the LiDAR data surrounding the outlet location. The upstream invert was initially calculated using the pipe slope (i.e. 1%) indicated on the drawing, however calculations positioned the upstream invert approximately 5 m – 6 m below the surrounding LiDAR data. As such, the invert assigned at the culvert inlet was taken from the LiDAR data surrounding the inlet location, and the slope of culvert modelled in PCSWMM2D is approximately 5.2%.

The 1D element is connected to the 2D elements using standard conduit connections between the culvert junctions and the nearest mesh junction. The connecting conduits embody the same geometry as the mesh conduits, so as to not influence the hydraulic performance of the culvert inlet/outlet.

The inflow time series input location into the 2D mesh has been defined at the upstream end of the tributary channel. The time series data has been entered into the PCSWMM2D model such that peak flows for any given storm event are ramped up over 1 hour and held steady for 6 hours. Peak flows assigned in the PCSWMM2D model correspond to those assigned to the tributary channel within the HEC-RAS model.

The model has been executed for a duration of 72 hours with a routing time step of 0.5 seconds. The resultant computed water surface elevations at the upstream end of the culvert are summarized in Table 3-3.

The computed water surface elevations presented in Table 3-3 have been transposed into the HEC-RAS model at cross-section 349.1465, located on Lower Humb TribB – Reach2 as a known water surface elevation.

Table 3-3: Weston Golf Club Culvert – Computed Water Surface Elevations

Event	Computed Water Surface Elevations (m)
2 Year	130.75
5 Year	132.74
10 Year	135.17
25 Year	135.26
50 Year	135.32
100 Year	135.37
350 Year	135.48
Regional Storm	135.31

3.4 Model Sensitivity and Uncertainty Analysis

The new hydraulic model has been developed based on a review of available data, site reconnaissance of structures, new LiDAR data, and selection of appropriate input data. However, as is the case in all numerical modelling of physical processes, there is the inherent potential for errors or uncertainty to be associated with the selection of input variables which could affect the resulting flood flows. Sensitivity analysis can be useful for a range of purposes, including:

- Testing the robustness of simulation model results in the presence of uncertainty.
- Increasing the understanding of the relationships between input and output variables in simulation models.
- Increasing confidence in simulation model results by identifying model inputs that cause significant uncertainty in the output. Increased attention to these specific model inputs can then be applied to ensure proper definition and/or parameterization.
- Ensuring the model accurately reflects watercourse conditions and responses by identifying errors in the model output as reflected by unexpected relationships between inputs and outputs.

Please note that the Albion Creek reach was not included in the sensitivity analysis. As well, all modelling has been completed using a Subcritical flow regime in HEC-RAS.

3.4.1 Manning's Roughness

The Manning's Roughness input parameter of the hydraulic model defines the relative roughness of the main channel and floodplain areas. A higher Manning's Roughness coefficient will, generally, increase flooding levels and reduce velocities. The Manning's Roughness definitions at

each cross-section were increased and decreased by 20 percent. The results of the analysis are presented in Table 3-4.

The selection of Manning's Roughness coefficient generally has a limited overall impact. However, significant impacts in localized reaches are demonstrated through this analysis where changes in flow regime occur as a result of roughness variation (i.e. from critical to subcritical or vice-versa). Large changes in water surface can also occur in cross-sections near (typically upstream) critical culvert and bridge locations where flow changes from open surface flow to surcharged or overtopping situations. The analysis has demonstrated that altering of Manning's Roughness coefficient by 20% (positive or negative) results in an average change in computed water surface elevation up to about 10 cm.

A comparative assessment of the occurrence of critical depth at cross-sections was also completed (ref. Table 3-5). The results indicate that variation of Manning's roughness co-efficient has a significant influence on critical depth occurrence across the model. As would be expected, an upward change in this variable tends to decrease the number of sections where critical depth is the resultant computed water surface elevation. Similarly, a downward change in Manning's roughness tends to increase the occurrence of critical depth.

**Table 3-4: Sensitivity Analysis - Manning's Roughness –
Change in Computed Water Surface Elevations**

Event	Manning's n + 20%			Manning's n - 20%		
	Average Change in CWSE ¹ (m)	Maximum Increase in CWSE (m)	Maximum Decrease in CWSE (m)	Average Change in CWSE (m)	Maximum Increase in CWSE (m)	Maximum Decrease in CWSE (m)
2 year	-0.082	0.082	-0.879	0.076	0.211	-0.653
5 year	-0.086	0.126	-0.284	0.088	0.495	-0.063
10 year	-0.094	0.256	-0.431	0.096	0.308	-0.355
25 year	-0.093	0.365	-0.478	0.100	0.340	-0.235
50 year	-0.095	0.438	-0.545	0.105	0.383	-0.080
100 year	-0.096	0.690	-0.612	0.106	0.690	-0.349
350 year	-0.102	0.054	-0.810	0.113	0.576	-0.367
Regional	-0.073	0.922	-0.834	0.137	1.560	-0.350

Notes:

- 1 Computed Water Surface Elevation

**Table 3-5: Sensitivity Analysis - Manning's Roughness –
Change in Critical Depth Occurrence**

Scenario	Critical Depth Occurrence by Event							
	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	350 yr	Regional
Base Model	171	179	194	185	178	168	163	157
Manning's n -20%	255	262	276	256	251	254	231	218
Manning's n +20%	119	125	128	132	137	131	118	109

Notes:

- 1 The values presented in this table are the number of computational cross-section in the HEC-RAS model where critical depth is the resultant computed water surface elevation.

3.4.2 Peak Discharge

To determine the impact of the changes in peak flows on the resulting water surface profile, the peak flows for the various flow scenarios were increased and decreased by 10, and 20 percent. Table 3-6 summarizes the changes in water levels for modelled events associated with the varying peak flow conditions.

As for Manning's Roughness, the selection of peak discharge generally has a limited impact on average (<0.2 m). However, significant impacts in localized reaches is demonstrated through this analysis where changes in flow regime occur (i.e. from critical to subcritical or vice-versa). Large changes in water surface can also occur in cross-sections near (typically upstream) critical culvert and bridge locations where flow changes from open surface flow to surcharged or overtopping situations.

A comparative assessment of the occurrence of critical depth at cross-sections was also completed (ref. Table 3-7). The results indicate that variation of flow has a minimal influence on critical depth occurrence across the model.

3.4.3 Starting Water Surface Elevation

The downstream boundary condition was provided to the study by TRCA for all modelled flood events. For this aspect of the sensitivity analysis, the downstream boundary condition was increased by 1.0 m for the modelled flow scenarios. The results of the analysis are presented in Table 3-8.

The resulting increase in water level is consistent with the incremental increase in the downstream boundary condition of 1.0 m. The maximum increase in water level is 1.127 m associated with the Regional Flood event. For all results, the impact of the increase in the downstream boundary condition propagates upstream approximately two (2) kilometres; approximately 700 m upstream of Old Mill Road.

Table 3-6: Sensitivity Analysis – Steady Flow –

Event	Average Change in CWSE ¹ (m)	Maximum Increase in CWSE (m)	Maximum Decrease in CWSE (m)	Average Change in CWSE (m)	Maximum Increase in CWSE (m)	Maximum Decrease in CWSE (m)
	Inflow + 10%			Inflow - 10%		
2 year	-0.072	0.129	-0.818	0.067	0.520	-0.702
5 year	-0.085	0.145	-0.617	0.080	0.525	-0.113
10 year	-0.106	0.271	-0.743	0.101	0.676	-0.228
25 year	-0.128	0.340	-0.953	0.122	1.018	-0.109
50 year	-0.150	0.318	-1.214	0.149	1.293	-0.098
100 year	-0.171	0.227	-1.263	0.154	1.435	-0.325
350 year	-0.201	0.173	-1.492	0.190	4.202	-0.400
Regional	-0.202	2.008	-1.406	0.221	1.741	-0.531
Event	Inflow + 20%			Inflow - 20%		
2 year	-0.148	0.058	-0.882	0.128	0.562	-0.648
5 year	-0.173	0.272	-0.844	0.157	0.682	-0.053
10 year	-0.218	0.049	-0.910	0.203	1.397	-0.226
25 year	-0.255	0.200	-1.731	0.251	1.753	-0.209
50 year	-0.296	0.332	-2.322	0.297	2.327	-0.532
100 year	-0.342	0.026	-2.439	0.300	2.845	-0.272
350 year	-0.381	0.171	-2.550	0.340	4.397	-0.445
Regional	-0.451	1.258	-2.088	0.396	1.913	-0.152

Notes:

- 1 Computed Water Surface Elevation

Table 3-7: Sensitivity Analysis - Steady Flow – Change in Critical Depth Occurrence

Scenario	Critical Depth Occurrence by Event							
	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	350 yr	Regional
Base Model	171	179	194	185	178	168	163	157
Peak Flow - 20%	160	174	188	193	186	180	170	164
Peak Flow - 10%	165	175	187	187	185	174	172	157
Peak Flow + 10%	173	184	191	181	171	173	160	154
Peak Flow + 20%	178	186	183	177	172	175	163	158

Notes:

- 1 The values presented in this table are the number of computational cross-section in the HEC-RAS model where critical depth is the resultant computed water surface elevation.

**Table 3-8: Sensitivity Analysis – Starting Water Level –
Summary of Changes in Computed Water Surface Elevations**

Event	Starting Water Surface Elevation + 1 m			
	Average Change in CWSE ¹ (m)	Maximum Increase in CWSE (m)	Maximum Decrease in CWSE (m)	Maximum Upstream Propagation
				Cross-section ^{2,3}
2 year	0.292	0.696	0.021	1926.444
5 year	0.509	1.051	0.058	1926.444
10 year	0.537	1.012	-0.001	2048.273
25 year	0.596	1.012	0.141	1926.444
50 year	0.619	1.014	0.182	1926.444
100 year	0.663	1.024	0.242	1926.444
350 year	0.599	1.069	-0.032	2286.251
Regional	0.562	1.127	-0.033	2286.251

Notes:

- 1 Computed Water Surface Elevation over the reach of affected cross-sections
- 2 All affected cross-sections are located within HEC-RAS Reach "Lower Humber Reach 1"
- 3 The cross-section number is indicative of the zone of influence of the change in boundary conditions.

It is noted in Table 3-8 that the changes in computed water surface elevations propagates upstream two additional cross sections for the 10 year flow scenario when compared with the other return flow scenarios (not including the 350 year event). As can be seen in Table 3-9, the changes in computed water surface elevations for the additional two cross sections, when compared with the base case, is about 1 mm for sections 1954.422 and 2048.273. This result is not considered significant.

3.4.4 Summary of Hydraulic Model Sensitivity

Average changes in computed water levels resulting from the sensitivity runs were reasonably close to base case results. More significant changes in computed water levels were attributed to changes in flow regime (i.e. from critical to subcritical or vice-versa) or changes in flow conditions around bridges and culverts (i.e. changes from open surface flow to surcharged or overtopping situations).

As noted previously, sensitivity analysis is used to:

- *Increase confidence in simulation model results by identifying model inputs that cause significant uncertainty in the output thereby focusing increased attention towards estimation of these specific model inputs.*

- The sensitivity analysis results associated with river reach roughness and flows did not justify any additional effort towards refining initial model estimates for these parameters.
- *Ensuring the model is accurately reflecting watershed conditions and responses by identifying errors in the model output as reflected by unexpected relationships between inputs and outputs.*

The sensitivity analysis results did not demonstrate any unexpected relationships or model errors.

The sensitivity analysis results associated with the hydraulic model indicate a general insensitivity to changes in input parameters when viewed as average changes to computed water surface elevations. Some specific locations do experience larger variation in computed water levels but these are associated with changes in the flow regime between sub-critical flow and critical flow (and vice versa) and changes in bridge hydraulics associated with open water to pressure flow situations (and vice versa).

The sensitivity analysis results of the hydraulic models did not suggest a need to alter the parameterization of the hydraulic models for the present study.

**Table 3-9: Sensitivity Analysis – Starting Water Level –
Detailed View of Changes in Computed Water Surface Elevations**

Cross Section	Starting Water Surface Elevation + 1 m Changes in Computed Water Surface Elevations When Compared with the Base Scenario							
	2 year	5 year	10 year	25 year	50 year	100 year	350 year	Regional
2690.751	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2613.884	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2513.361	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2440.847	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2336.624	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2286.251	0.000	0.000	0.000	0.000	0.000	0.000	-0.022	-0.023
2213.21	0.000	0.000	0.000	0.000	0.000	0.000	-0.019	-0.022
2126.572	0.000	0.000	0.000	0.000	0.000	0.000	-0.026	-0.029
2048.273	0.000	0.000	-0.001	0.000	0.000	0.000	-0.032	-0.033
1954.422	0.000	0.000	0.001	0.000	0.000	0.000	0.151	0.184
1926.444	0.021	0.058	0.096	0.141	0.182	0.242	0.355	0.158
1880.411	0.044	0.117	0.225	0.257	0.296	0.351	0.367	0.161
1785.899	0.136	0.244	0.280	0.283	0.317	0.364	0.374	0.162
1667.885	0.180	0.291	0.308	0.303	0.337	0.382	0.384	0.166
1628.946	0.189	0.302	0.317	0.309	0.343	0.387	0.383	0.165
1604.217	0.194	0.312	0.322	0.314	0.348	0.392	0.387	0.166
1575.188	0.199	0.314	0.319	0.317	0.355	0.405	0.429	0.191
1557.541	0.211	0.336	0.345	0.347	0.394	0.451	0.590	0.577
1475.785	0.225	0.358	0.371	0.398	0.412	0.469	0.548	0.566
1400.797	0.233	0.369	0.389	0.400	0.442	0.502	0.587	0.600
1326.953	0.250	0.406	0.476	0.525	0.527	0.580	0.637	0.633
1257.24	0.274	0.453	0.512	0.554	0.582	0.635	0.673	0.657
1237.168	0.278	0.470	0.546	0.590	0.617	0.676	0.700	0.684
1223.744	0.282	0.477	0.548	0.593	0.619	0.676	0.700	0.683
1211.109	0.288	0.488	0.549	0.587	0.609	0.664	0.680	0.668
1186.444	0.275	0.510	0.608	0.655	0.682	0.733	0.741	0.746
1160.968	0.284	0.532	0.605	0.648	0.673	0.721	0.735	0.747
1139.437	0.291	0.518	0.608	0.650	0.675	0.724	0.736	0.745
1086.698	0.295	0.550	0.628	0.671	0.694	0.741	0.754	0.759
1073.966	0.291	0.557	0.637	0.680	0.704	0.749	0.762	0.764
1068.997	0.300	0.568	0.648	0.690	0.713	0.758	0.768	0.768
1057.39	0.295	0.567	0.664	0.697	0.720	0.764	0.770	0.769
1041.107	0.303	0.583	0.660	0.695	0.716	0.759	0.764	0.767
1021.189	0.313	0.598	0.667	0.702	0.723	0.765	0.768	0.769
1006.631	0.305	0.576	0.666	0.702	0.722	0.765	0.766	0.767
960.4363	0.363	0.586	0.673	0.707	0.727	0.769	0.770	0.767
877.4253	0.356	0.604	0.691	0.723	0.743	0.784	0.785	0.783
801.4101	0.365	0.618	0.701	0.732	0.750	0.790	0.788	0.784
722.9977	0.378	0.642	0.720	0.749	0.766	0.804	0.800	0.797
659.7292	0.391	0.668	0.746	0.774	0.791	0.827	0.828	0.823
593.969	0.422	0.738	0.822	0.849	0.864	0.894	0.907	0.923
542.9059	0.458	0.843	0.975	1.002	1.014	1.024	1.069	1.127
458.1035	0.529	1.051	1.012	1.012	1.010	1.007	1.013	1.008
382.1867	0.696	0.992	0.994	0.996	0.996	0.997	0.997	0.998
284.8769	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Notes:

- 1 All affected cross-sections are located within HEC-RAS Reach "Lower Humber Reach 1"

4.0 Flood Characterization and Screening (Task 3)

4.1 Task 3A - HEC-RAS Model Finalization and Flood Map Preparation

Upon receipt of TRCA approval for the new hydraulic model, preparation of the floodplain delineations for the required suite of flow scenarios required for this assignment (ref. Task 1D) was completed in collaboration with TRCA. The flow scenarios were the Regional Storm and, the 2, 5, 10, 25, 50, 100, and 350 year design storms.

The delineation of the Regulatory floodline was completed in compliance with MNRF procedures, whereby the greater of the 100 year, or Hurricane Hazel inundation limits has been used to establish the Regulatory floodline. The 100 year and Hurricane Hazel inundation limits were subjected to a greater level of scrutiny for accuracy commensurate with an engineering flood delineation approach.

Flood inundation limits for the other flow scenarios were not subjected to the same “clean-up” effort as the engineered flood delineations as the 2, 5, 10, 25, 50, 100, 350 year design storm flood zones are to be used for flood risk screening and characterization only.

4.1.1 Structure Overtopping

Table 4-1 summarizes all of the watercourse crossings/structures modelled in the new HEC-RAS model and the associated computed water surface elevations for each of the modelled flow scenarios.

Table 4-2 summarizes the available freeboard and overtopping depths for all watercourse crossings and all modelled flow scenarios.

It is worth noting that Table 4-2 highlights eight (8) crossings that do not have the conveyance capacity to accommodate the 2 year peak flow subject to the crossing. Furthermore, an additional five (5) crossing do not have the conveyance capacity to accommodate the 5 year peak flow subject to the crossing.

This page left intentionally blank



Table 4-1: Modelled Bridges – Computational Summary

Crossing #	Crossing Location/Designation	Structure Type	HEC-RAS Watercourse Designation	Top of Road (m)	HEC-RAS Section Upstream of Bridge	Computed Water Surface Elevations (m)								Regulatory
						2 year	5 year	10 year	25 year	50 year	100 year	350 year	Regional	
1	Bloor Street	Bridge	Lower Humber	90.90	1211.109	76.905	77.153	77.739	78.087	78.327	78.621	80.248	81.638	Regional
2	Bloor Subway Bridge	Bridge	Lower Humber	85.22	1257.24	76.987	77.248	77.816	78.147	78.372	78.654	80.271	81.684	Regional
3	Old Mill Road	Bridge	Lower Humber	82.90	1575.188	77.228	77.588	78.267	78.669	78.903	79.2	81.435	82.862	Regional
10	Dundas Street West	Bridge	Lower Humber	108.90	3985.634	90.968	91.335	91.823	92.107	92.306	92.511	94.139	96.216	Regional
11	Pedestrian Bridge - Lambton Woods - Bridge (4)	Pedestrian	Lower Humber	95.50	4537.493	92.878	93.284	93.918	94.306	94.597	95.384	96.959	98.186	Regional
12	Railway (CP)	Bridge	Lower Humber	122.10	4589.754	93.164	93.601	94.29	94.72	95.041	95.772	97.618	99.277	Regional
15	Scarlett Road	Bridge	Lower Humber	101.90	765.688	97.305	97.521	98.077	98.36	98.568	98.767	100.924	102.297	Regional
16	Eglinton Avenue West	Bridge	Lower Humber	114.00	1697.214	102.82	103.09	103.688	103.863	103.986	104.169	104.944	105.715	Regional
20	Lawrence Avenue	Bridge	Lower Humber	119.96	1579.941	113.406	113.788	114.662	115.034	115.273	115.563	119.378	120.785	Regional
22	St Philips Road	Bridge	Lower Humber	130.25	2748.79	118.323	118.632	119.374	119.707	119.94	120.18	121.604	122.864	Regional
23	Railway (CN)	Bridge	Lower Humber	139.80	3295.665	120.337	120.675	121.698	121.891	122.217	122.836	123.761	125.079	Regional
25	Hwy 401 HUMBER R. BR#4 E-N & SB RAMP A	Bridge	Lower Humber	128.34	4105.835	121.953	122.341	123.202	123.596	123.886	124.191	126.019	127.974	Regional
26 & 27	Hwy 401 HUMBER R. BR#3 EB 401 COLLECTOR & Hwy 401 HUMBER R. BR#2 WB 401 COLLECTOR	Bridge	Lower Humber	128.34	4245.695	122.471	122.857	123.699	124.084	124.367	124.673	126.356	128.647	Regional
28	Hwy 401 HUMBER R.BR 1	Bridge	Lower Humber	135.34	4270.935	122.488	122.875	123.75	124.136	124.417	124.718	126.413	128.715	Regional
29	Albion Road (north structure)	Bridge	Lower Humber	128.20	89.43835	123.142	123.553	124.418	124.794	125.053	125.352	128.012	129.521	Regional
30	Recreational Trail Bridge	Pedestrian	Lower Humber	127.80	153.0172	123.259	123.68	124.601	125.007	125.289	125.62	128.562	129.843	Regional
48	Edenbridge Drive	Bridge	Silver Creek	102.87	216.869	100.84	101.208	101.536	101.856	102.092	102.382	103.604	102.407	Regional
49	Royal York Road	Culvert	Silver Creek	129.86	1210.623	124.782	125.673	126.404	128.082	129.625	129.963	130.117	129.969	Regional
57	Scarlett Road	Bridge	Lower Humber Trib A	120.84	205.2044	115.149	116.299	117.006	117.972	119.173	120.668	121.09	120.894	Regional
58	Westmount Park	Pedestrian	Lower Humber Trib A	135.50	1405.216	134.513	134.932	135.547	135.655	135.743	135.965	136.023	135.906	100 Year
59	Brittany Court	Bridge	Lower Humber Trib A	138.80	1738.134	136.129	136.552	137.034	137.293	137.716	138.14	138.57	138.345	Regional
60	Royal York Road	Bridge	Lower Humber Trib A	138.39	1818.931	136.384	136.867	137.465	137.951	138.474	138.735	139.002	138.855	Regional
61	The Westway	Bridge	Lower Humber Trib A	141.08	2127.329	139.132	140.375	140.812	141.061	141.145	141.319	141.533	141.416	Regional
62	Alex Marchetti Park - Bridge (1)	Pedestrian	Lower Humber Trib A	140.63	2383.032	140.031	140.917	141.159	141.429	141.6	141.815	142.226	141.984	Regional
63	Alex Marchetti Park - Bridge (2)	Pedestrian	Lower Humber Trib A	140.55	2587.036	140.225	140.998	141.239	141.508	141.688	141.909	142.331	142.084	Regional
64	Alex Marchetti Park - Bridge (3)	Pedestrian	Lower Humber Trib A	142.50	2772.635	140.593	141.218	141.462	141.725	141.947	142.226	142.868	142.503	Regional
65	Islington Avenue	Bridge	Lower Humber Trib A	145.51	3196.578	142.775	143.311	143.558	143.908	144.2	145.41	145.738	145.601	Regional
66	Parallel with Dixon Rd, Private Driveway	Driveway	Lower Humber Trib A	147.70	3558.968	144.916	145.718	146.39	146.991	146.952	147.37	147.693	147.284	100 Year
67	Wincott Drive	Culvert	Lower Humber Trib A	146.74	3966.989	146.497	147.123	147.32	147.45	147.461	147.619	147.941	147.551	100 Year
69	Norfield Crescent	Culvert	Berry Creek	136.46	732.5167	129.847	130.235	130.851	131.241	131.538	132.242	133.408	132.253	Regional
70	Trail bridge - The Elms Park	Pedestrian	Berry Creek	135.42	1079.825	133.707	134.027	134.488	135.331	135.502	135.575	135.822	135.578	Regional
71	Islington Avenue	Bridge	Berry Creek	140.61	1366.239	139.326	140.162	140.772	140.939	141.043	141.128	141.36	141.135	Regional
72	Redwater Drive	Culvert	Berry Creek	142.89	1590.892	143.224	143.447	143.625	143.73	143.806	143.873	144.066	143.73	100 Year
73	Drumheller Road	Culvert	Berry Creek	146.26	1989.415	146.327	146.601	146.883	147.001	147.099	147.297	147.65	147.006	100 Year
74	Berry Creek Drive	Culvert	Berry Creek	151.17	2434.607	150.304	150.984	151.2	151.351	151.423	151.492	151.624	151.355	100 Year
75	Kipling Avenue	Culvert	Berry Creek	154.64	2681.778	152.981	153.469	154.666	154.753	154.765	154.788	154.924	154.759	100 Year
76	Trail bridge – Brydon Road	Pedestrian	Berry Creek	153.82	2890.387	153.83	154.26	154.883	154.991	155.045	155.103	155.247	154.993	100 Year
77	Martin Grove Road	Sewer Outfall	Berry Creek	160.81	3788.667	160.895	161.349	161.681	161.807	161.877	161.944	162.115	161.812	100 Year
79	Albion Road (Grubbes Bridge)	Bridge	West Humber Creek	129.98	696.079	126.53	126.767	127.597	127.772	128.23	128.283	129.754	130.552	Regional
80	Islington Avenue	Bridge	West Humber Creek	140.14	1561.081	131.201	131.464	132.141	132.482	132.534	132.708	133.771	135.452	Regional
81	Kipling Avenue	Bridge	West Humber	151.59	644.3394	141.142	141.324	142.14	142.419	142.633	142.835	143.943	145.496	Regional
82	Martin Grove Road	Bridge	West Humber	156.57	2117.912	147.277	147.509	148.456	148.781	149.009	149.223	150.189	151.787	Regional





Crossing #	Crossing Location/Designation	Structure Type	HEC-RAS Watercourse Designation	Top of Road (m)	HEC-RAS Section Upstream of Bridge	Computed Water Surface Elevations (m)								Regulatory
						2 year	5 year	10 year	25 year	50 year	100 year	350 year	Regional	
84	Highway 27	Bridge	West Humber	159.14	3760.637	151.157	151.155	152.278	152.703	152.993	153.283	154.061	157.105	Regional
88	Humberwood Boulevard	Bridge	West Humber	164.29	6299.445	156.641	156.914	157.754	158.065	158.303	158.529	160.51	162.966	Regional
89	Finch Avenue West	Bridge	West Humber	165.99	6874.809	159.239	158.764	159.663	159.938	160.153	160.335	161.436	164.694	Regional
90	Highway 427 - Humber River SBL/NBL	Bridge	West Humber	169.50	6874.809	159.239	158.764	159.663	159.938	160.153	160.335	161.436	164.694	Regional
91	Highway 427 - RAMP 427N - Finch Ave E/W	Bridge	West Humber	169.11	7337.198	159.249	159.596	160.74	161.118	161.386	161.637	162.742	165.727	Regional
98	Finch Avenue West / Islington Avenue intersection	Bridge	Lower Humber	134.80	2957.753	128.596	129.023	129.483	129.793	129.988	130.126	131.27	132.641	Regional
100	Trail bridge - Rowntree Mills Park - Bridge (2)	Pedestrian	Lower Humber	134.14	292.9829	131.346	131.75	132.2	132.437	132.521	132.609	134.28	134.979	Regional
102	Steeles Avenue West	Bridge	Lower Humber	145.20	2369.122	134.617	134.963	135.294	135.473	135.604	135.709	136.75	138.125	Regional
119	Trail/Construction Bridge	Pedestrian	Emery Creek	131.84	840.4763	132.075	132.246	132.464	132.579	132.664	132.733	132.954	132.613	100 Year
120	Lanyard Road (modelled using PCSWMM2D)	Culvert/Sewer	Emery Creek	142.54	N/A	141.98	144.73	145.39	145.52	145.60	145.67	145.87	145.56	100 Year
137	Jane Street	Culvert	Black Creek	142.20	1604.448	137.724	138.265	139.65	140.637	141.814	142.61	143.646	143.937	Regional
138	Black Creek Retardation Dam	Dam	Black Creek	143.25	1940.881	143.599	143.81	144.221	144.454	144.614	144.769	145.577	145.871	Regional
140	Vehicular Bridge - Downsview Dells Park - #2	Pedestrian	Black Creek	147.06	3570.174	147.306	147.396	147.532	147.623	147.695	147.736	148.115	148.172	Regional
143	Sheppard Avenue West	Culvert	Black Creek	155.00	4436.499	148.786	149.279	150.373	151.371	152.111	152.856	155.187	155.301	Regional
145	Grandravine Drive	Culvert	Black Creek	166.10	5645.148	153.266	154.079	155.905	157.659	159.247	160.596	167.646	167.799	Regional
148	Trail bridge	Pedestrian	Black Creek	163.70	109.8851	163.187	163.408	163.601	163.725	163.768	163.816	167.701	167.858	Regional
149	Finch Avenue West	Culvert	Black Creek	173.00	621.9783	165.089	165.32	165.82	166.064	166.416	166.858	169.95	169.919	Regional
152	Shoreham Drive	Bridge	Black Creek	183.30	3051.898	176.877	177.053	177.368	177.514	177.626	177.738	178.641	178.645	Regional
153	Intersection of Steeles Avenue and Jane Street	Bridge	Black Creek	186.80	4031.734	181.532	181.779	182.281	182.552	182.754	182.961	184.526	184.535	Regional
156	Finch Avenue West	Culvert	Black Creek Trib A	174.70	432.9291	173.043	173.929	174.862	175.022	175.099	175.177	175.354	175.142	100 Year
157	Potsdam Road	Culvert	Black Creek Trib A	177.55	583.2371	176.796	177.649	177.839	177.94	177.972	178.012	178.161	177.996	100 Year
159	Driftwood Avenue	Culvert	Black Creek Trib A	181.97	1104.302	182.35	182.399	182.518	182.591	182.625	182.661	182.735	182.66	100 Year
160	Weston Golf Course (modelled using PCSWMM2D)	Culvert	Lower Humber Trib B	134.88	N/A	130.75	132.74	135.17	135.26	135.32	135.37	135.48	135.31	100 Year
168	Kipling Avenue	Culvert	Lower Humber Trib C	156.00	808.9781	151.529	152.067	153.235	154.083	155.082	156.104	156.383	155.943	100 Year





Table 4-2: Modelled Bridges – Overtopping Crossings

Crossing #	Crossing Location/Designation	Structure Type	HEC-RAS Watercourse Designation	Top of Road (m)	HEC-RAS Section Upstream of Structure	Difference between CWSE and Top of Road Elevation (m)							
						2 year	5 year	10 year	25 year	50 year	100 year	350 year	Regional
1	Bloor Street	Bridge	Lower Humber	90.90	1211.109	14.00	13.75	13.16	12.81	12.57	12.28	10.65	9.26
2	Bloor Subway Bridge	Bridge	Lower Humber	85.22	1257.24	8.23	7.97	7.40	7.07	6.85	6.57	4.95	3.54
3	Old Mill Road	Bridge	Lower Humber	82.90	1575.188	5.67	5.31	4.63	4.23	4.00	3.70	1.47	0.04
10	Dundas Street West	Bridge	Lower Humber	108.90	3985.634	17.93	17.57	17.08	16.79	16.59	16.39	14.76	12.68
11	Pedestrian Bridge - Lambton Woods - Bridge (4)	Pedestrian	Lower Humber	95.50	4537.493	2.62	2.22	1.58	1.19	0.90	0.12	-1.46	-2.69
12	Railway (CP)	Bridge	Lower Humber	122.10	4589.754	28.94	28.50	27.81	27.38	27.06	26.33	24.48	22.82
15	Scarlett Road	Bridge	Lower Humber	101.90	765.688	4.60	4.38	3.82	3.54	3.33	3.13	0.98	-0.40
16	Eglinton Avenue West	Bridge	Lower Humber	114.00	1697.214	11.18	10.91	10.31	10.14	10.01	9.83	9.06	8.29
20	Lawrence Avenue	Bridge	Lower Humber	119.96	1579.941	6.55	6.17	5.30	4.93	4.69	4.40	0.58	-0.83
22	St Philips Road	Bridge	Lower Humber	130.25	2748.79	11.93	11.62	10.88	10.54	10.31	10.07	8.65	7.39
23	Railway (CN)	Bridge	Lower Humber	139.80	3295.665	19.46	19.13	18.10	17.91	17.58	16.96	16.04	14.72
25	Hwy 401 HUMBER R. BR#4 E-N & SB RAMP A	Bridge	Lower Humber	128.34	4105.835	6.39	6.00	5.14	4.74	4.45	4.15	2.32	0.37
26 & 27	Hwy 401 HUMBER R. BR#3 EB 401 COLLECTOR & Hwy 401 HUMBER R. BR#2 WB 401 COLLECTOR	Bridge	Lower Humber	128.34	4245.695	5.87	5.48	4.64	4.26	3.97	3.67	1.98	-0.31
28	Hwy 401 HUMBER R.BR 1	Bridge	Lower Humber	135.34	4270.935	12.85	12.47	11.59	11.20	10.92	10.62	8.93	6.63
29	Albion Road (north structure)	Bridge	Lower Humber	128.20	89.43835	5.06	4.65	3.78	3.41	3.15	2.85	0.19	-1.32
30	Recreational Trail Bridge	Pedestrian	Lower Humber	127.80	153.0172	4.54	4.12	3.20	2.79	2.51	2.18	-0.76	-2.04
48	Edenbridge Drive	Bridge	Silver Creek	102.87	216.869	2.03	1.66	1.33	1.01	0.78	0.49	-0.73	0.46
49	Royal York Road	Culvert	Silver Creek	129.86	1210.623	5.08	4.19	3.46	1.78	0.24	-0.10	-0.26	-0.11
57	Scarlett Road	Bridge	Lower Humber Trib A	120.84	205.2044	5.69	4.54	3.83	2.87	1.67	0.17	-0.25	-0.05
58	Westmount Park	Pedestrian	Lower Humber Trib A	135.50	1405.216	0.99	0.57	-0.05	-0.16	-0.24	-0.47	-0.52	-0.41
59	Brittany Court	Bridge	Lower Humber Trib A	138.80	1738.134	2.67	2.25	1.77	1.51	1.08	0.66	0.23	0.46
60	Royal York Road	Bridge	Lower Humber Trib A	138.39	1818.931	2.01	1.52	0.92	0.44	-0.08	-0.35	-0.61	-0.47
61	The Westway	Bridge	Lower Humber Trib A	141.08	2127.329	1.95	0.71	0.27	0.02	-0.06	-0.24	-0.45	-0.34
62	Alex Marchetti Park - Bridge (1)	Pedestrian	Lower Humber Trib A	140.63	2383.032	0.60	-0.29	-0.53	-0.80	-0.97	-1.19	-1.60	-1.35
63	Alex Marchetti Park - Bridge (2)	Pedestrian	Lower Humber Trib A	140.55	2587.036	0.33	-0.45	-0.69	-0.96	-1.14	-1.36	-1.78	-1.53
64	Alex Marchetti Park - Bridge (3)	Pedestrian	Lower Humber Trib A	142.50	2772.635	1.91	1.28	1.04	0.78	0.55	0.27	-0.37	0.00
65	Islington Avenue	Bridge	Lower Humber Trib A	145.51	3196.578	2.73	2.20	1.95	1.60	1.31	0.10	-0.23	-0.09
66	Parallel with Dixon Rd, Private Driveway	Driveway	Lower Humber Trib A	147.70	3558.968	2.78	1.98	1.31	0.71	0.75	0.33	0.01	0.42
67	Wincott Drive	Culvert	Lower Humber Trib A	146.74	3966.989	0.24	-0.38	-0.58	-0.71	-0.72	-0.88	-1.20	-0.81
69	Norfield Crescent	Culvert	Berry Creek	136.46	732.5167	6.61	6.22	5.61	5.22	4.92	4.22	3.05	4.21
70	Trail bridge - The Elms Park	Pedestrian	Berry Creek	135.42	1079.825	1.71	1.39	0.93	0.09	-0.08	-0.16	-0.40	-0.16
71	Islington Avenue	Bridge	Berry Creek	140.61	1366.239	1.28	0.45	-0.16	-0.33	-0.43	-0.52	-0.75	-0.52
72	Redwater Drive	Culvert	Berry Creek	142.89	1590.892	-0.33	-0.56	-0.74	-0.84	-0.92	-0.98	-1.18	-0.84
73	Drumheller Road	Culvert	Berry Creek	146.26	1989.415	-0.07	-0.34	-0.62	-0.74	-0.84	-1.04	-1.39	-0.75
74	Berry Creek Drive	Culvert	Berry Creek	151.17	2434.607	0.87	0.19	-0.03	-0.18	-0.25	-0.32	-0.45	-0.19
75	Kipling Avenue	Culvert	Berry Creek	154.64	2681.778	1.66	1.17	-0.03	-0.11	-0.13	-0.15	-0.28	-0.12
76	Trail bridge – Brydon Road	Pedestrian	Berry Creek	153.82	2890.387	-0.01	-0.44	-1.06	-1.17	-1.22	-1.28	-1.43	-1.17
77	Martin Grove Road	Sewer Outfall	Berry Creek	160.81	3788.667	-0.09	-0.54	-0.87	-1.00	-1.07	-1.13	-1.31	-1.00
79	Albion Road (Grubbes Bridge)	Bridge	West Humber Creek	129.98	696.079	3.45	3.21	2.38	2.21	1.75	1.70	0.23	-0.57
80	Islington Avenue	Bridge	West Humber Creek	140.14	1561.081	8.94	8.68	8.00	7.66	7.61	7.43	6.37	4.69
81	Kipling Avenue	Bridge	West Humber	151.59	644.3394	10.45	10.27	9.45	9.17	8.96	8.76	7.65	6.09
82	Martin Grove Road	Bridge	West Humber	156.57	2117.912	9.29	9.06	8.11	7.79	7.56	7.35	6.38	4.78
84	Highway 27	Bridge	West Humber	159.14	3760.637	7.98	7.98	6.86	6.44	6.15	5.86	5.08	2.04





Crossing #	Crossing Location/Designation	Structure Type	HEC-RAS Watercourse Designation	Top of Road (m)	HEC-RAS Section Upstream of Structure	Difference between CWSE and Top of Road Elevation (m)							
						2 year	5 year	10 year	25 year	50 year	100 year	350 year	Regional
88	Humberwood Boulevard	Bridge	West Humber	164.29	6299.445	7.65	7.38	6.54	6.22	5.99	5.76	3.78	1.32
89	Finch Avenue West	Bridge	West Humber	165.99	6874.809	6.75	7.23	6.33	6.05	5.84	5.66	4.55	1.30
90	Highway 427 - Humber River SBL/NBL	Bridge	West Humber	169.50	6874.809	10.26	10.74	9.84	9.56	9.35	9.16	8.06	4.81
91	Highway 427 - RAMP 427N - Finch Ave E/W	Bridge	West Humber	169.11	7337.198	9.86	9.51	8.37	7.99	7.72	7.47	6.37	3.38
98	Finch Avenue West / Islington Avenue intersection	Bridge	Lower Humber	134.80	2957.753	6.20	5.78	5.32	5.01	4.81	4.67	3.53	2.16
100	Trail bridge - Rowntree Mills Park - Bridge (2)	Pedestrian	Lower Humber	134.14	292.9829	2.79	2.39	1.94	1.70	1.62	1.53	-0.14	-0.84
102	Steeles Avenue West	Bridge	Lower Humber	145.20	2369.122	10.58	10.24	9.91	9.73	9.60	9.49	8.45	7.07
119	Trail/Construction Bridge	Pedestrian	Emery Creek	131.84	840.4763	-0.23	-0.41	-0.62	-0.74	-0.82	-0.89	-1.11	-0.77
120	Lanyard Road (modelled using PCSWMM2D)	Culvert/Sewer	Emery Creek	142.54	N/A	0.56	-2.19	-2.85	-2.98	-3.06	-3.13	-3.33	-3.02
137	Jane Street	Culvert	Black Creek	142.20	1604.448	4.48	3.94	2.55	1.56	0.39	-0.41	-1.45	-1.74
138	Black Creek Retardation Dam	Dam	Black Creek	143.25	1940.881	-0.35	-0.56	-0.97	-1.20	-1.36	-1.52	-2.33	-2.62
140	Vehicular Bridge - Downsview Dells Park - #2	Pedestrian	Black Creek	147.06	3570.174	-0.25	-0.34	-0.47	-0.56	-0.63	-0.68	-1.06	-1.11
143	Sheppard Avenue West	Culvert	Black Creek	155.00	4436.499	6.21	5.72	4.63	3.63	2.89	2.14	-0.19	-0.30
145	Grandravine Drive	Culvert	Black Creek	166.10	5645.148	12.83	12.02	10.20	8.44	6.85	5.50	-1.55	-1.70
148	Trail bridge	Pedestrian	Black Creek	163.70	109.8851	0.51	0.29	0.10	-0.03	-0.07	-0.12	-4.00	-4.16
149	Finch Avenue West	Culvert	Black Creek	173.00	621.9783	7.91	7.68	7.18	6.94	6.58	6.14	3.05	3.08
152	Shoreham Drive	Bridge	Black Creek	183.30	3051.898	6.42	6.25	5.93	5.79	5.67	5.56	4.66	4.66
153	Intersection of Steeles Avenue and Jane Street	Bridge	Black Creek	186.80	4031.734	5.27	5.02	4.52	4.25	4.05	3.84	2.27	2.27
156	Finch Avenue West	Culvert	Black Creek Trib A	174.70	432.9291	1.66	0.77	-0.16	-0.32	-0.40	-0.48	-0.65	-0.44
157	Potsdam Road	Culvert	Black Creek Trib A	177.55	583.2371	0.75	-0.10	-0.29	-0.39	-0.42	-0.46	-0.61	-0.45
159	Driftwood Avenue	Culvert	Black Creek Trib A	181.97	1104.302	-0.38	-0.43	-0.55	-0.62	-0.66	-0.69	-0.77	-0.69
160	Weston Golf Course (modelled using PCSWMM2D)	Culvert	Lower Humber Trib B	134.88	N/A	4.13	2.14	-0.29	-0.38	-0.44	-0.49	-0.60	-0.43
168	Kipling Avenue	Culvert	Lower Humber Trib	156.00	808.9781	4.47	3.93	2.76	1.92	0.92	-0.10	-0.38	0.06
	- Structure not overtopping												
	- Structure overtopping												



4.2 Task 3B – Identification of Spills and Spill Paths

The MNRF's Technical Guide River & Stream Systems: Flooding Hazard Limit (2002) (ref. Section 4.13 of the guidelines) defines a spill as occurring when flood levels overtop the banks of a watercourse and spill overland away from the watercourse channel. Frequently, this spill will move into another watershed or join the originating watercourse at a distance downstream. Further, the guidelines describe that:

"The effect of spills moving into another watershed should be assessed to determine the potential flood risks. Alternative measures should be investigated to prevent the spill moving into the adjacent watershed. If the amount of spill is relatively small, less than 10% of the peak flow, the flood plain mapping for the watercourse should be based on the original flow, without any deduction for the spill. For larger spills, allowance for the reduced flow should only be made where the review of alternatives proves that the spill cannot be prevented, either because there are no feasible alternatives or the costs, when compared to the potential benefits, are too high. Where the spill re-joins the watercourse further downstream, the route of the spill should be examined to determine the potential harmful effects of overland flow. No reduction should be made for the spill in the downstream flood plain computations."

For the current study, four (4) spill areas have been identified as an outcome of the finalization of the delineations of the flood inundation limits. Details regarding these four (4) locations are described in greater detail in the following sections.

As noted in the Terms of Reference for this study, the deliverable from the assessment of possible spill locations was to identify to TRCA areas of legitimate spill only. Modelling of any spill is beyond the identified study scope of work.

4.2.1 Spill Area #1 – Finch Avenue West and Islington Avenue

Spill Area #1 is located near the intersection of Islington Avenue and Finch Avenue West. The spill originates downstream from the Albion Centre with contributors to spill from two adjacent locations 1-A and 1-B (ref. Figure 4-1).

Spill related to Location 1-A has a width of flow of about 15 m, maximum depth of about 3 cm and an estimated flow rate of about 1.3 m³/s with a flow velocity of about 0.5 m/s². Spill along this path will flow along Finch Avenue West towards the intersection with Islington Avenue. Based on the contours and flood lines, the spill flow is interpreted to be contained within the road right-of-way. The intersection of the two roads is a bridge which spans the HEC-RAS reach designated

² Abstracted from the TRCA 2D hydraulic model for Albion Creek.

"Lower Humber - Reach 7". There is a general downward grade along Finch Avenue West from the pedestrian bridge near Farr Avenue. The ground elevation in the vicinity of the pedestrian bridge is 155.0 m. The distance to the Finch/Islington intersection is about 1 km with an average grade of about 2%. Grades begin to rise to the immediately east of the intersection along Finch Avenue West. Grades similarly rise on the north and south sides of the intersection along Islington Avenue. This suggests, not accounting for momentum of flow, spill waters will pool in the intersection until a depth is attained that allows spill outside of the road right-of-way to the creek.



Figure 4-1: Spill Area #1 – Finch Avenue West / Islington Avenue

Spill related to Location 1-B begins at the eastern terminus of Lamella Road, near the intersection with Taysham Crescent. Spill will flow down slope through the wooded area towards the intersection of Islington Avenue and Finch Avenue West. The available contours suggest that spill flow may emerge from the wooded area on Islington Avenue just to the south of the intersection. Flow would then follow road grades to the intersection. Spill related to this location has a width of flow of about 20 m, maximum depth of about 0.4 m and an estimated flow rate of about 9.8 m³/s with a flow velocity of about 2 m/s.

As the Regional Flood flow at this location is approximately 135 m³/s, the estimated spill flow rates at Locations 1-A and 1-B represent about 1% and 7%, respectively, of the overall flow at this location.

4.2.2 Spill Area #2 – Humberwood Boulevard

Spill Area #2 is located on the upstream side of the Humberwood Blvd Bridge with spill waters flowing to the south (ref. Figure 4-2). This area was modelled using HEC-RAS and, as such, spill flow and velocity cannot be abstracted directly from the model results. However, the following metrics are available:

- The width of the spill zone is about 25 m.
- The computed water surface elevation of the location of the spill is 162.99 m.
- The ground elevation at the spill initiation location is about 162.50 m suggesting the depth of the spill flow is about 0.5 m.
- The steepest grades along the spill path are approximately 2%
- Using a broad-crested weir approach, the spill flow is approximated as 15 m³/s.

As the Regional Flood flow at this location is approximately 850 m³/s, the estimated spill flow rate at this location represents about 2% of the overall flow at this location.

Contours, downstream from the point where the spill initiates, suggests that spill flow be conveyed along Humberwood Blvd for a distance of about 200 m and will re-enter the floodplain near the north parking lot entrance to the Humberwood Community Centre. South of this parking lot entrance grades begin to rise along Humberwood Blvd. It is surmised that some ponding of floodwaters would occur near the parking lot entrance.

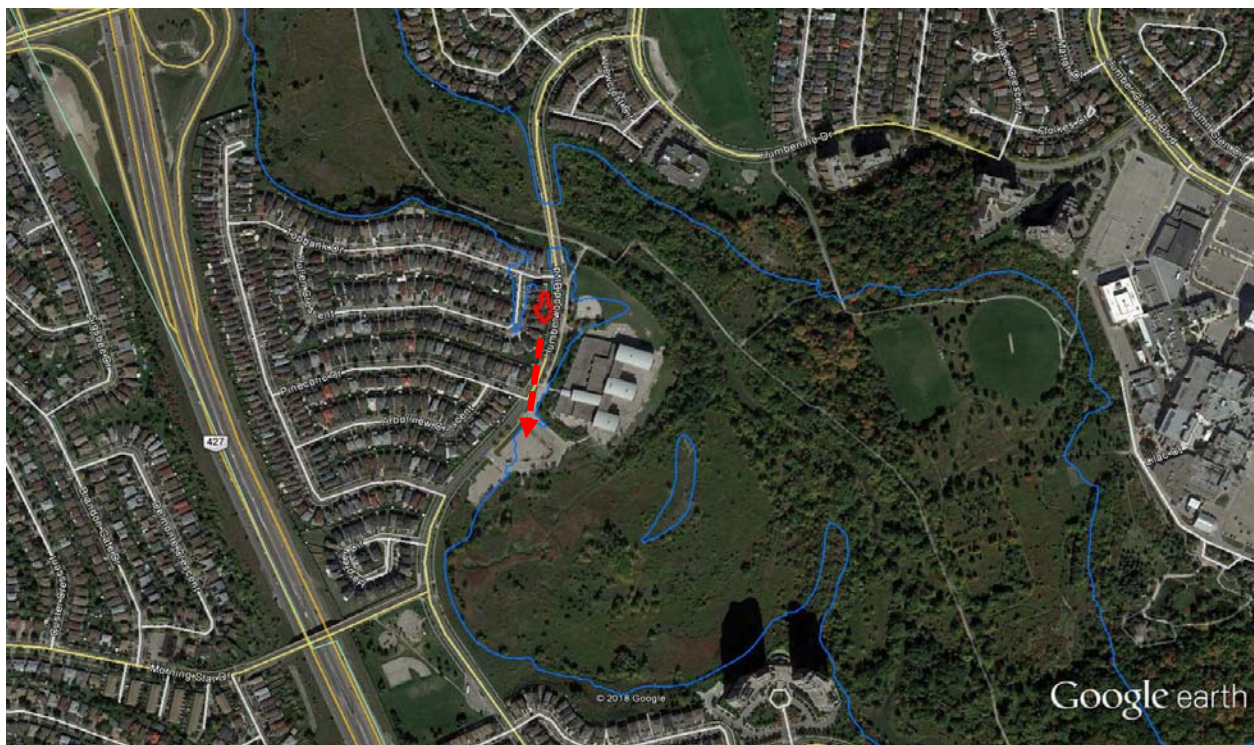


Figure 4-2: Spill Area #2 – Humberwood Boulevard

4.2.3 Spill Area #3 – Lawrence Avenue West / Hickory Tree Road

Spill Area #3 is located on the upstream and east side of the Lawrence Avenue West Bridge with spill waters flowing to the south-east (ref. Figure 4-3). This area was modelled using HEC-RAS and, as such, spill flow and velocity cannot be abstracted directly from the model results. However, the following metrics are available:

- The computed water surface elevations on the downstream and upstream sides of the Lawrence Avenue West Bridge are 117.43 m and 120.79 m, respectively, a difference of 3.36 m (about 11 feet).
- The width of the spill zone is potentially about 150 m long; representing the available length between the flood limit on the downstream and upstream sides of the bridge.
- The grades along the spill path are approximately 3.5%.
- The Regional Flood flow at this location is approximately 1410 m³/s.

Contours, downstream from Lawrence Avenue West where the spill initiates, suggests that spill flow will be conveyed over the road and the cascade would re-join the floodplain a short distance downstream. Numerous homes along Lawrence Avenue West, the Hickory Tree Road Co-Operative Homes and Weston Lions Park are anticipated to be in the spill zone. The area anticipated to experience spill flow is about 1.8 ha (ref. hatched area illustrated on Figure 4-3).

It is recommended that 2D modelling be used for this area to better delineate the floodplain on the east side of the Lawrence Avenue West Bridge and to better understand the flood risk associated with those properties in the spill zone.



Figure 4-3: Spill Area #3 – Lawrence Avenue West / Hickory Tree Road

4.2.4 Spill Area #4 – Scarlett Road / Chapman Road

Spill Area #4 is located on the upstream side of the Scarlett Road Bridge, near the intersection with Chapman Road (just south of the bridge), with spill waters flowing to the south and east (ref. Figure 4-4). This area was modelled using HEC-RAS and, as such, spill flow and velocity cannot be abstracted directly from the model results. However, the following metrics are available:

- The computed water surface elevations on the downstream and upstream sides of the Scarlett Road Bridge are 110.12 m and 120.89 m, respectively, a difference of 10.8 m (about 35 feet).
- The width of the spill zone is potentially about 25 m long; representing the approximate width of Scarlett Road at the spill location.
- The top of road of the Scarlett Road Bridge at the spill start location is about 120.5 m, suggesting the spill depth at this location is about 0.4 m.
- Using a broad-crested weir approach, the spill flow is approximated as 11 m³/s.
- The grades along the spill path are approximately 2%.
- The Regional Flood flow at this location is approximately 90 m³/s.

As the Regional Flood flow at this location is approximately 90 m³/s, the estimated spill flow rate at this location represents about 12% of the overall flow at this location.

It is surmised that spill flow on the north side of the bridge will cascade over the Scarlett Road and flow down the downstream side embankment to the watercourse.

Contours, to the south of the Scarlett Road Bridge where the spill initiates, suggest that spill flow will be conveyed along Scarlett Road (ref. Figure 4-5). Scarlett Road has an approximately 16 m wide urban roadway section along the spill path from the point of spill and then south to the Scarlett Road Bridge over the Lower Humber River (Structure #15). Approximating normal depth of flow for the defined urban roadway section, based on Manning's Equation, yields an approximate spill flow depth of about 0.2 m. Further, assuming that the roadway curb height along the spill path is the typical 0.15 m, it can be generally concluded that the majority of the spill flow will be contained within the roadway section. Given that some spill flow will be outside of the roadway section, it can be expected that some properties along the flow path may experience impacts. Further along the spill path, near the intersection of Scarlett Road and Richview Road, a section of Scarlett Road has near roadway 0% grade with a slight cross grade in the direction of the Lower Humber River. This suggests the potential for some ponding of spill waters in this area as well as return of spill flow to the Lower Humber River (Reach 2) near Sections 1894.84 and 1839.60.

It is recommended that 2D modelling be used for this area to better delineate the floodplain along the section of Scarlett Road potentially impacted by the spill and to better understand the flood risk associated with those properties in the spill zone.

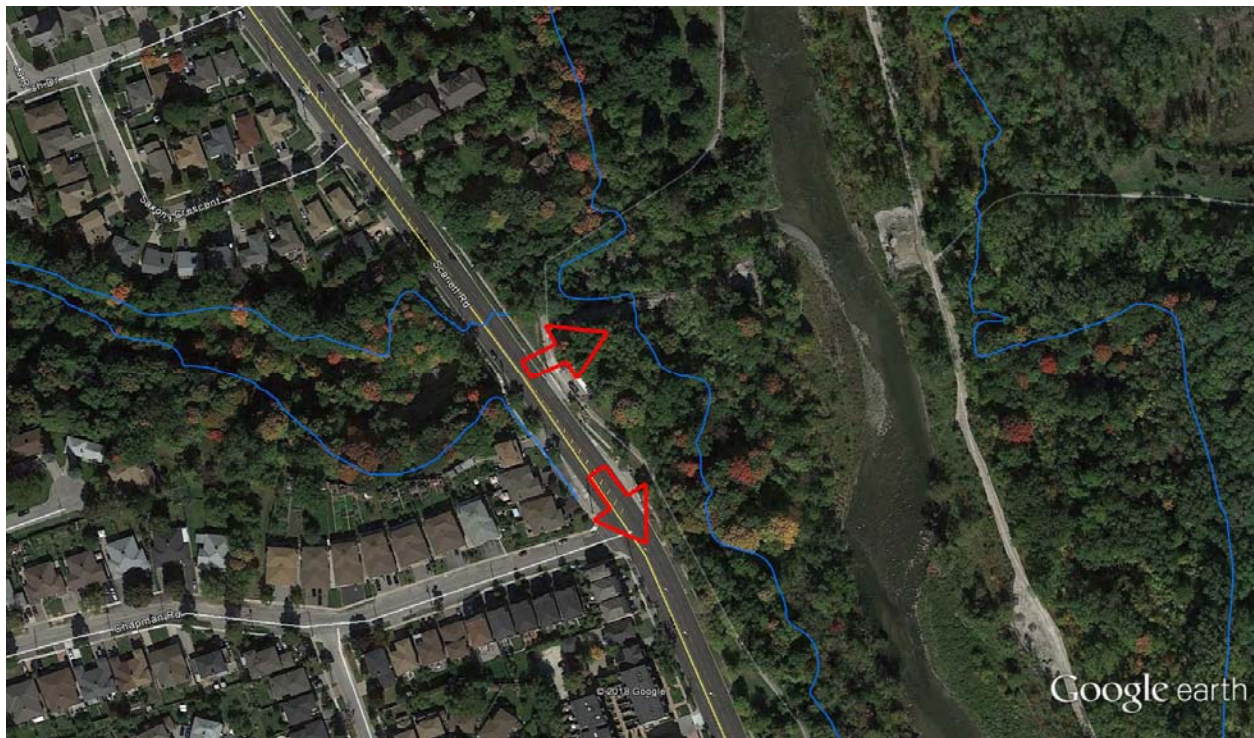


Figure 4-4: Spill Area #4 – Scarlett Road / Chapman Road

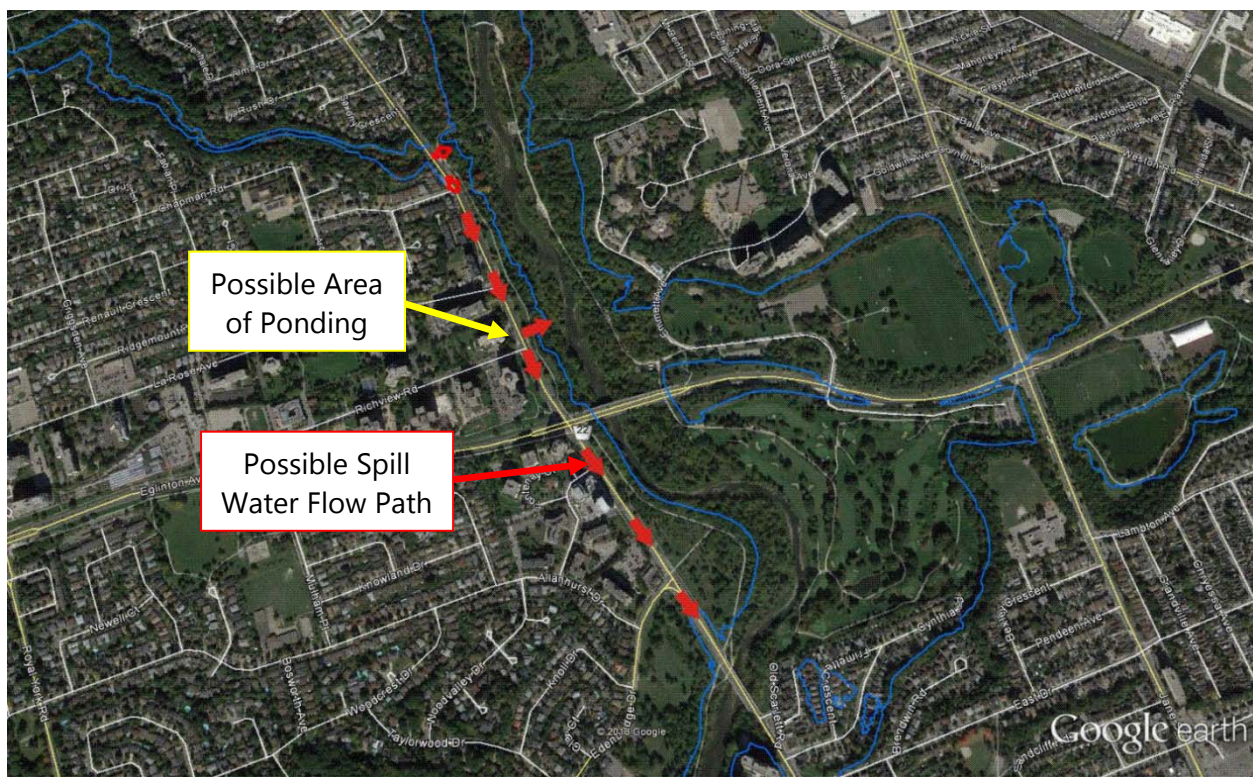


Figure 4-5: Spill Area #4 – Possible Spill Flow Paths

4.3 Task 3C - Development of Graphical Representations of Model Data

The graphical representations of the new hydraulic model computations, namely:

- water surface elevation
- water depth
- velocity rasters
- cross-sections attributed with the water surface elevations and other relevant data
- polygon features of the flood extents for the Regional Storm and, the 2, 5, 10, 25, 50, 100, 350 year design storms

have been prepared and submitted to TRCA in accordance with the requirements for this study.

The finalization of the study geomatic deliverables was completed in collaboration with TRCA.

This page left intentionally blank

5.0 Recommendations

Two recommendations have been advanced as outcomes of the spills assessment, namely that 2D modelling be used to better delineate floodplains and to better understand flood risk associated with those properties in the spill zones:

- Associated with Spill #3 on the east side of the Lawrence Avenue West Bridge; and,
- Associated with Spill #4 along the section of Scarlett Road potentially impacted by the spill.

This page left intentionally blank

6.0 References

Civica (2018). Humber River Hydrology Update, April 2018, Civica Infrastructure Inc.

Stantec (2016). Lower Humber Weirs Assessment, Phase 1 Report, prepared by Stantec, dated January 12, 2016.

TRCA (2008). Humber River Watershed Plan Pathways to a Healthy Humber, Prepared by Toronto and Region Conservation, ISBN: 978-0-9811107-1-4, June 2008.

TRCA (2018). <https://trca.ca/conservation/watershed-management/humber-river/watershed-features/>

Valdor (2016). Floodplain Mapping in Jane and Wilson Special Policy Area, Black Creek, Valdor Engineering Inc., December 2016.

Valdor (2017). Lower Humber River 2D Flood Modelling, Valdor Engineering Inc., March 2017.

This page left intentionally blank

Appendix A

Watercourse Crossing Data Sheets

This page left intentionally blank

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-1

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	6	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete/Steel			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	11.12	Width (m):	230	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	20			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	74.78	U/S Obvert Elev. (m):	85.9	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1200	D/S Invert Elev. (m):	74.69	D/S Obvert Elev. (m):	85.9		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Bloor Street		Height from Obvert to Top of Road (m):	5				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	56
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1924
Last Inspection:	2015
Next Inspection:	2017

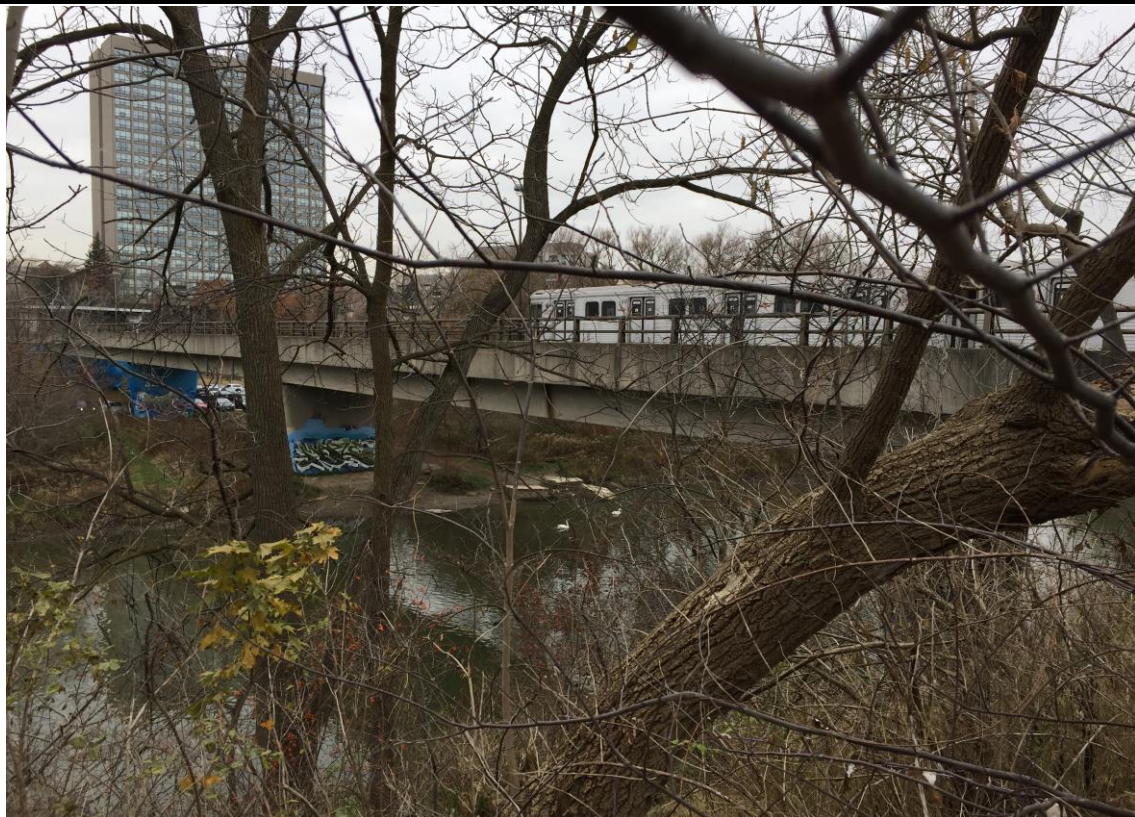
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-2

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	8	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	7.57	Width (m):	230	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	11			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	74.85	U/S Obvert Elev. (m):	82.42	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1247.204	D/S Invert Elev. (m):	74.8	D/S Obvert Elev. (m):	82.4		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Subway - Bloor Line		Height from Obvert to Top of Road (m):	1.78				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:	
Structure ID:	N/A
Condition:	N/A
Owner:	N/A
Year Constructed:	N/A
Last Inspection:	N/A
Next Inspection:	N/A

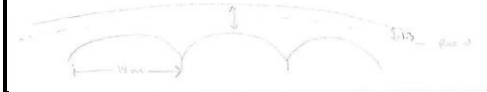
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-3

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Stone			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	6.65	Width (m):	54	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	9			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	75.45	U/S Obvert Elev. (m):	82.1	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1566.188	D/S Invert Elev. (m):	75.45	D/S Obvert Elev. (m):	82.1		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Old Mill Road	Skew Angle of Crossing (Degrees):	30				
		Height from Obvert to Top of Road (m):	0.8				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	634
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1916
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-4

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Weir			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #1		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

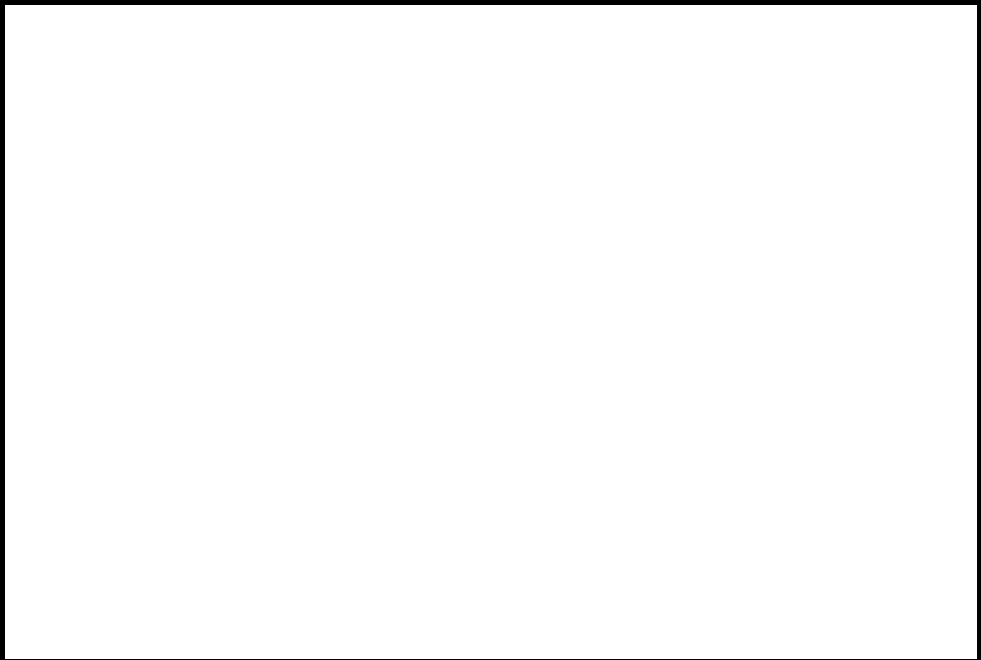
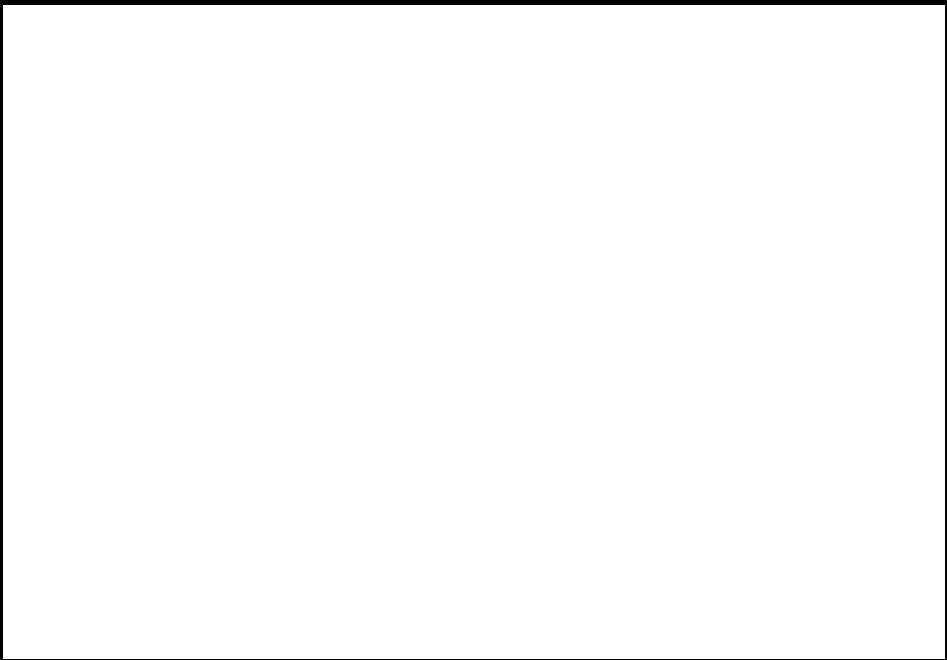
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

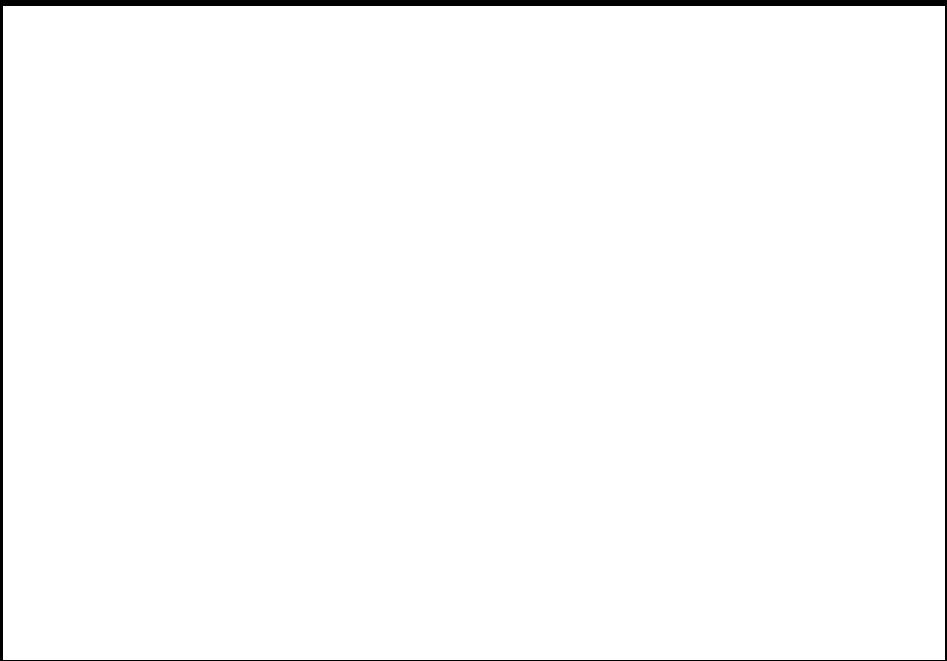
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-5

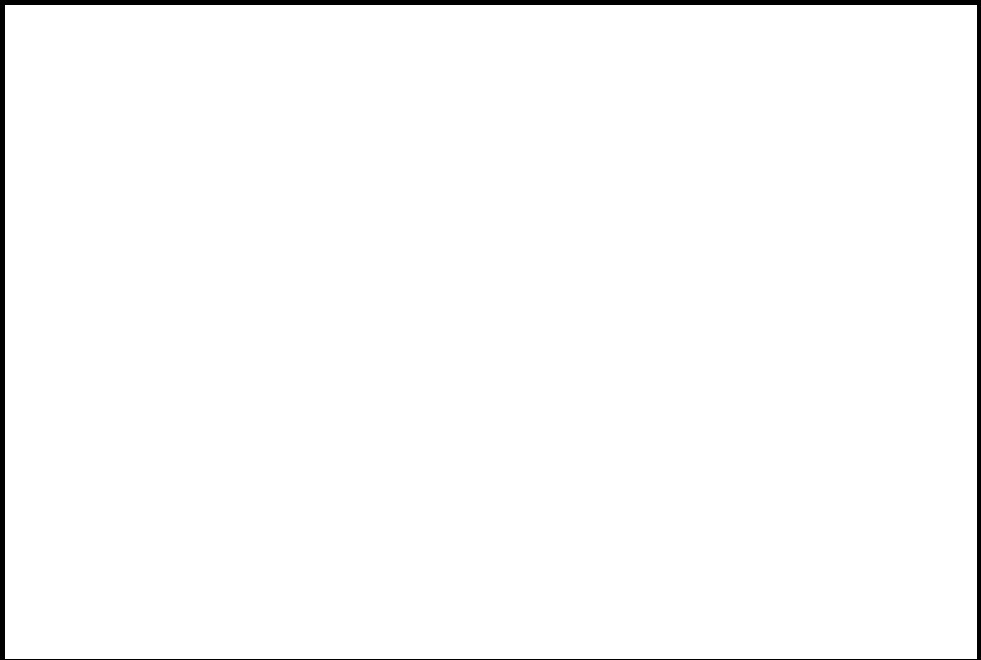
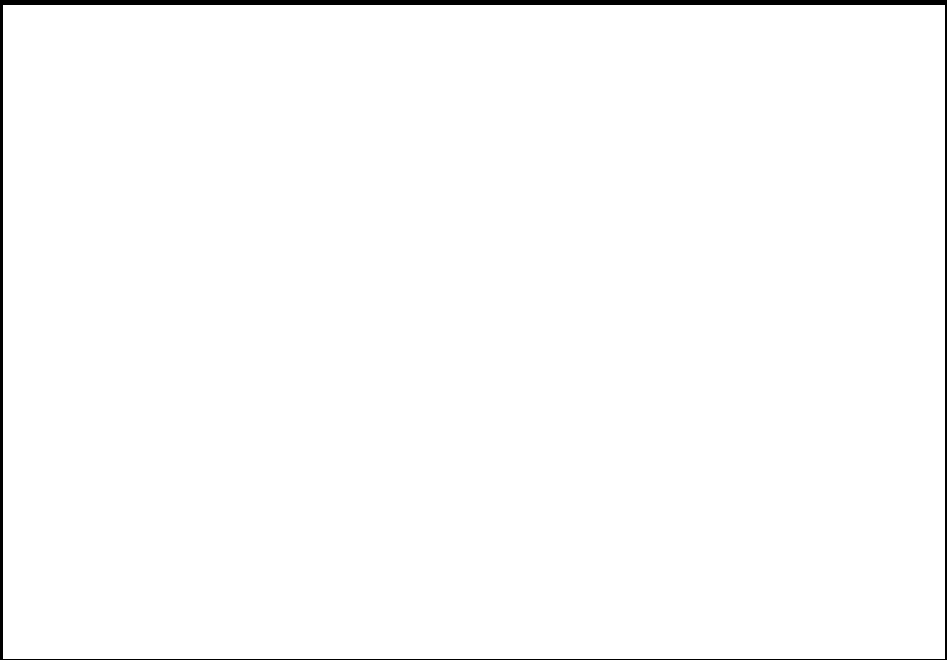
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Weir			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Weir #2		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

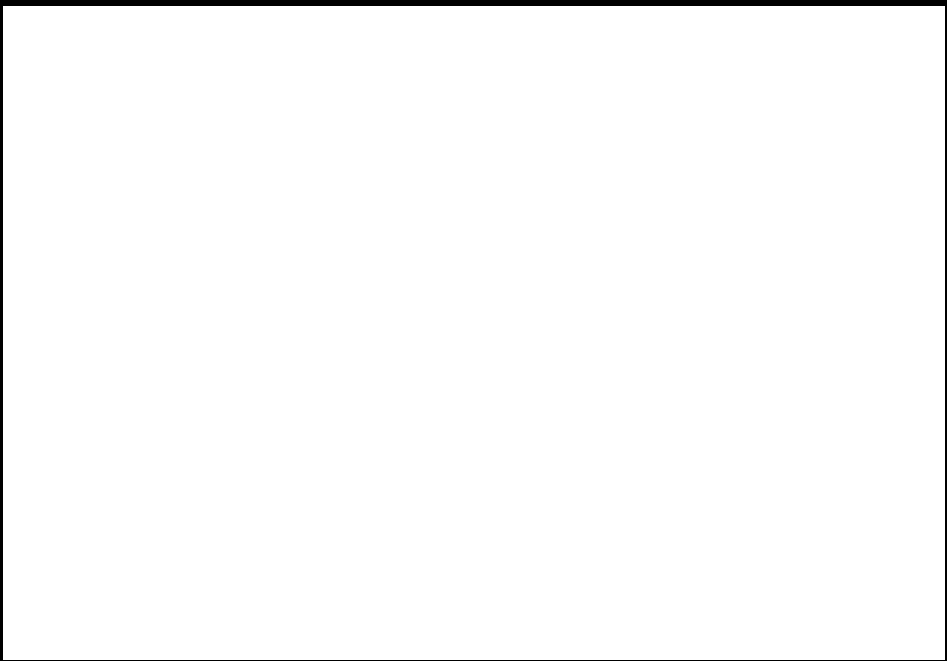
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

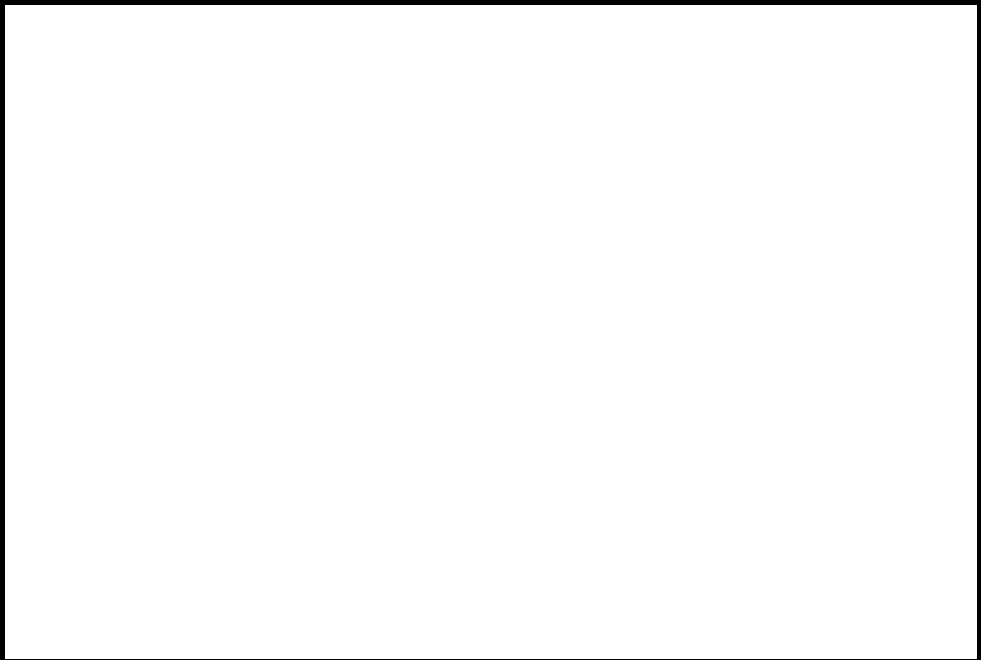
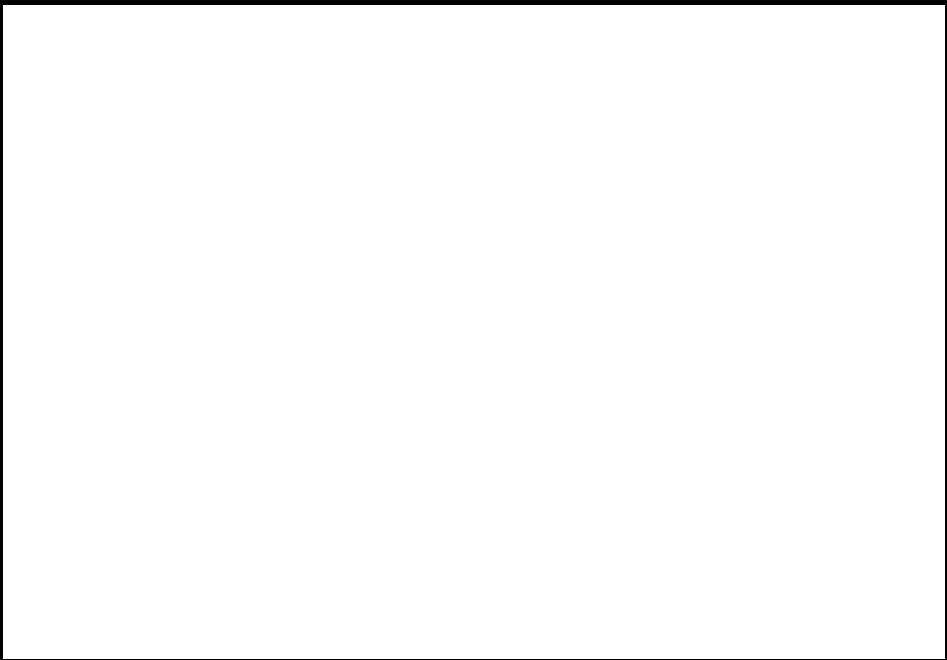
CROSSING # : Humber River-6

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Weir			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #3		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

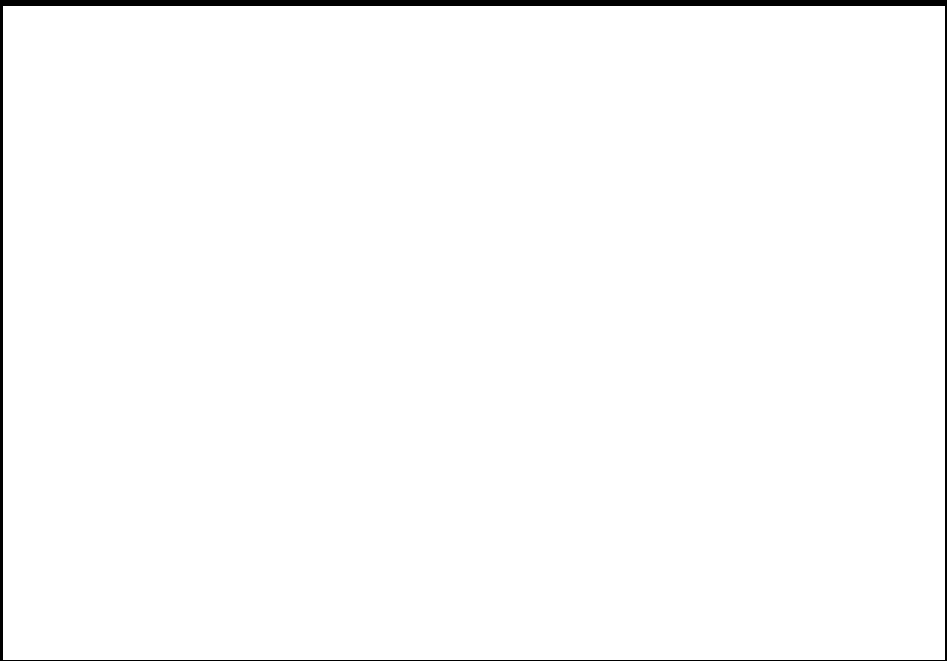
<div style="border-bottom: 1px solid black; padding-bottom: 5px;">Site Sketch:</div> <div style="border-bottom: 1px solid black; height: 30px;"></div> <div style="height: 300px;"></div>	<div style="display: flex; justify-content: space-between;"> <div>Description of Photograph:</div> <div>Downstream face of structure</div> </div>
---	---

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-7

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Weir			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #4		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

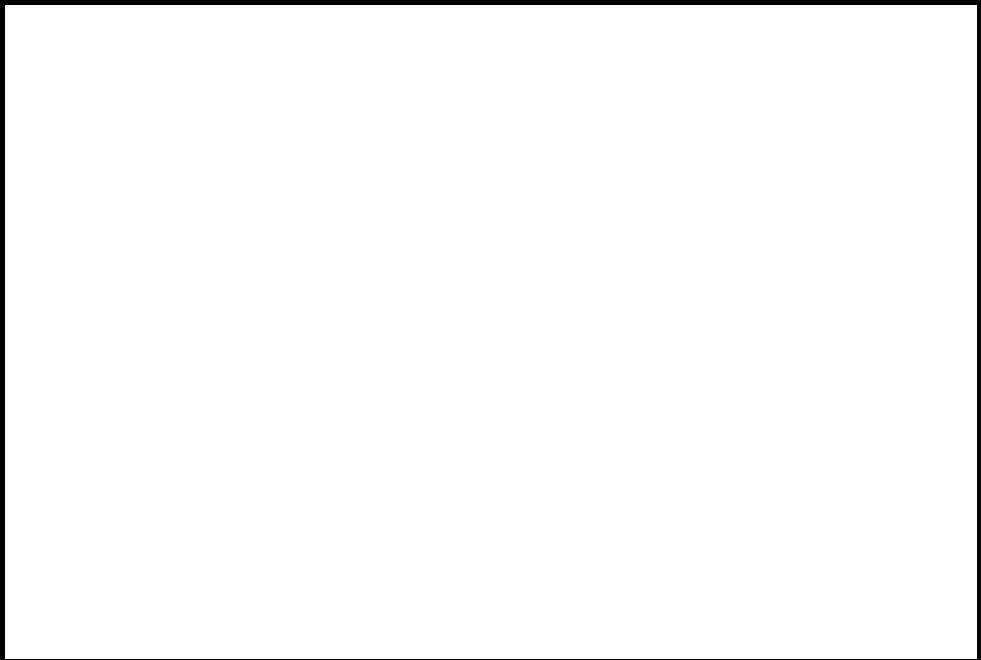
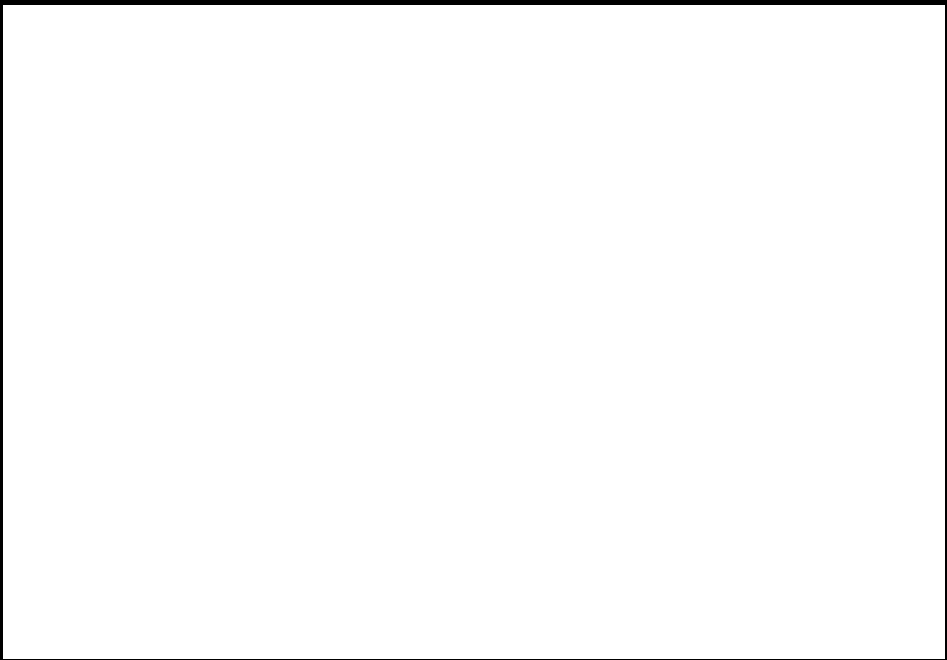
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

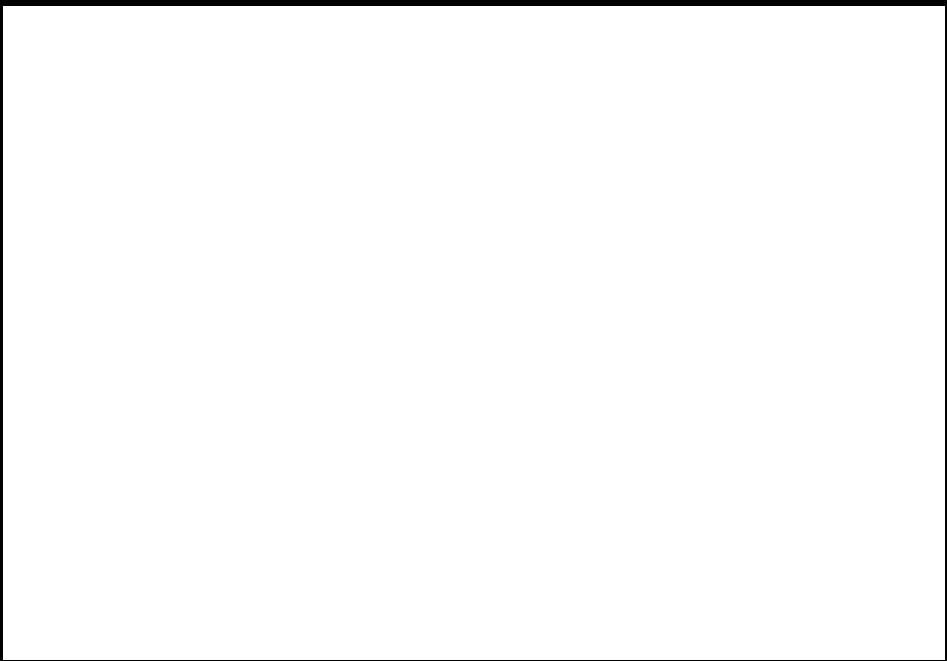
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-8

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Weir			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #5		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

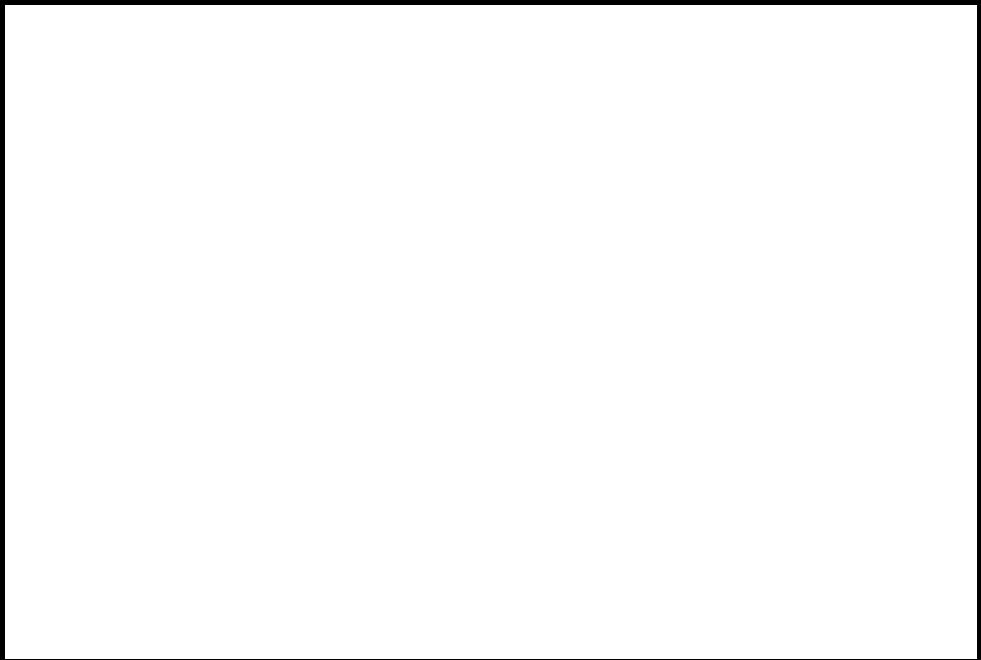
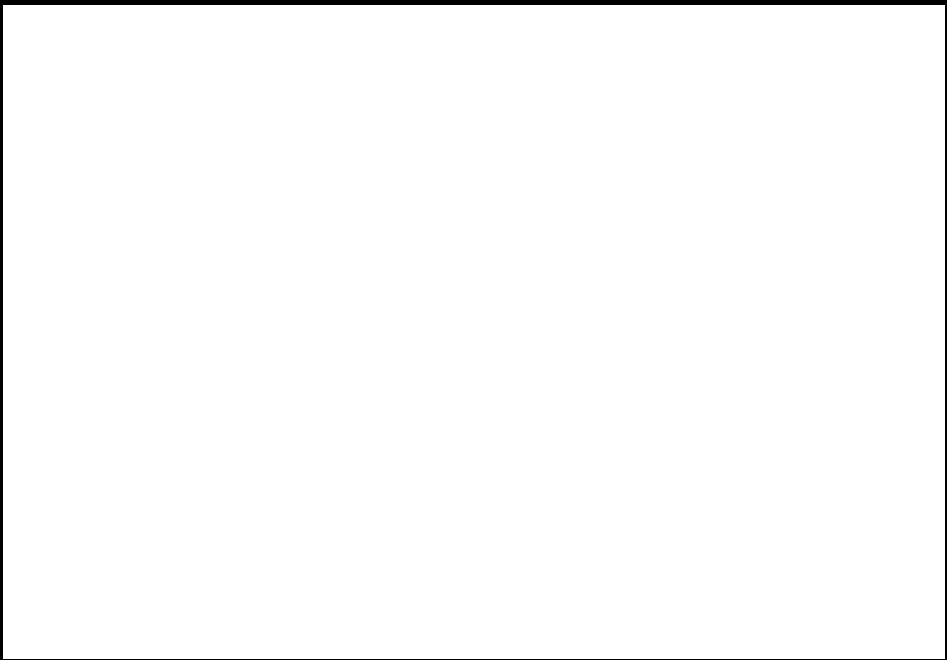
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

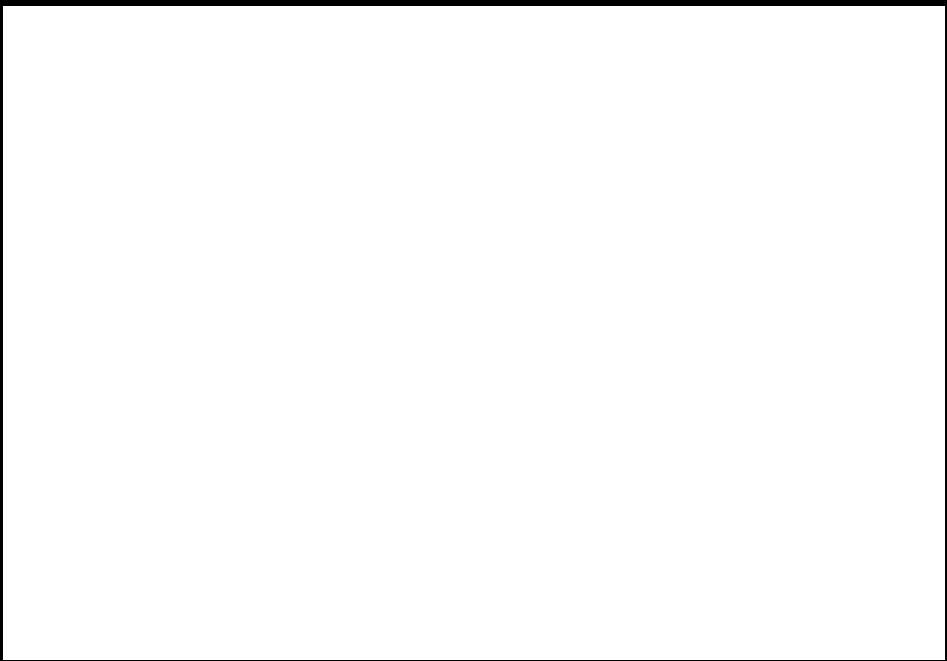
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-9

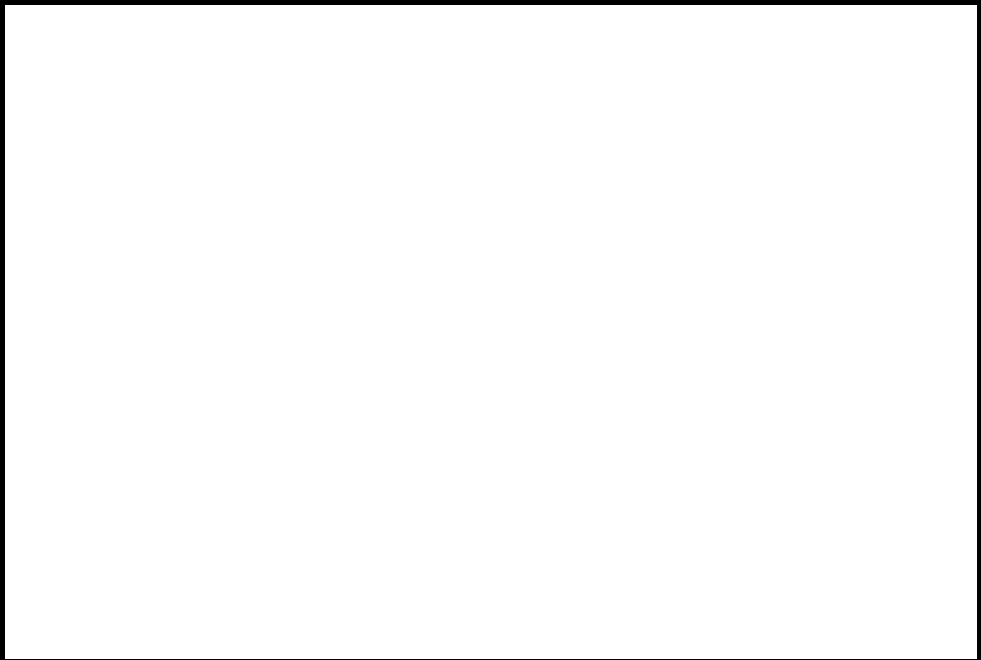
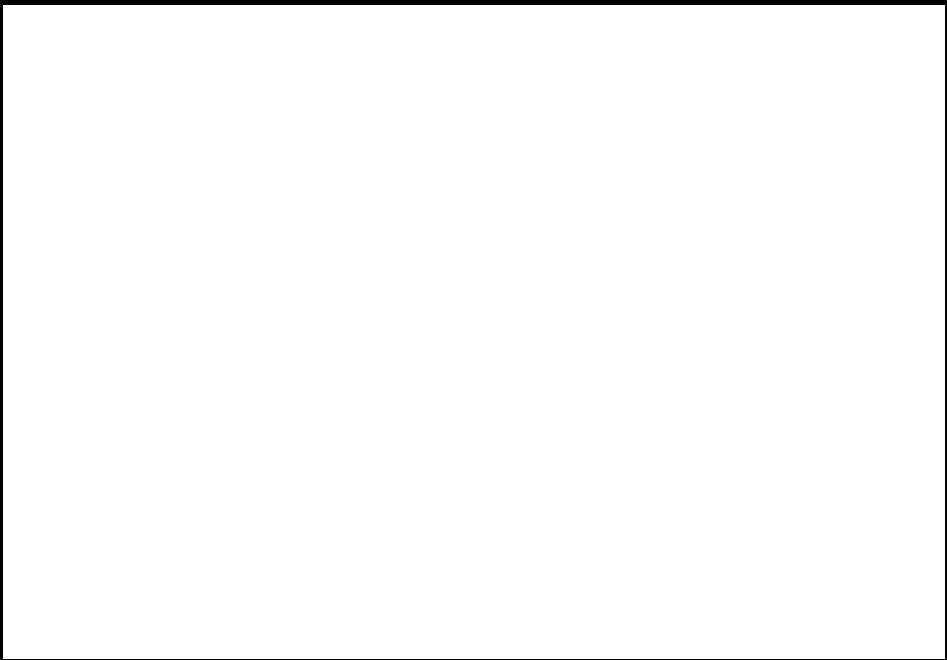
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Weir			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Weir #6		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

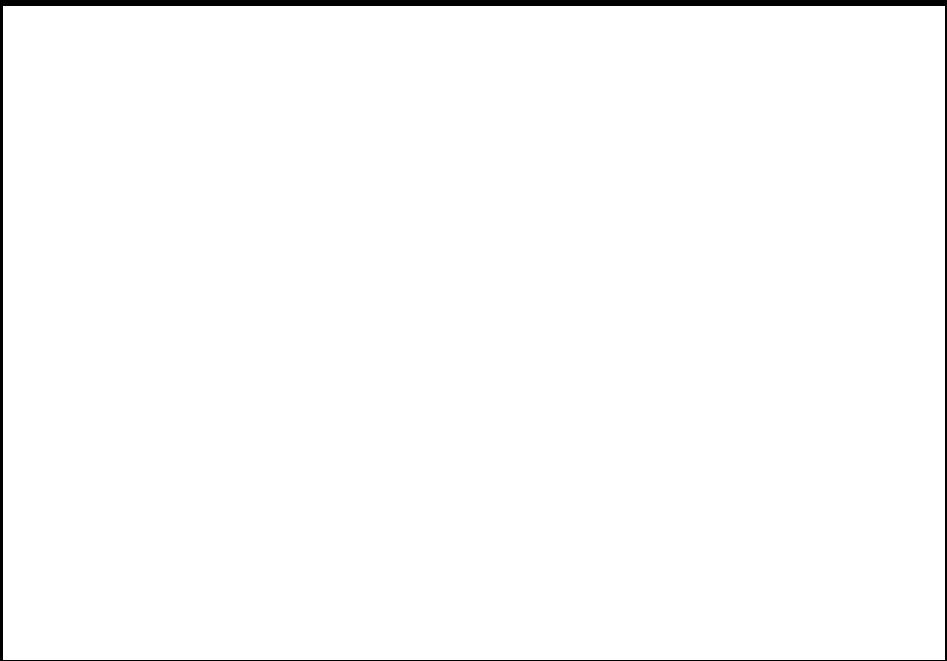
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-10

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	10	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	15.2	Width (m):	205	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	21			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	89.42	U/S Obvert Elev. (m):	104.6	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3972.244	D/S Invert Elev. (m):	89.18	D/S Obvert Elev. (m):	104.6		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Dundas Street West		Height from Obvert to Top of Road (m):	4.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	55
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1923
Last Inspection:	2015
Next Inspection:	2017

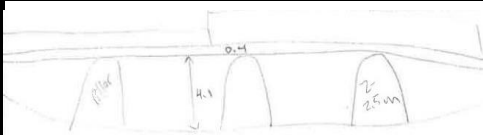
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-11

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal/Wood			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	4.1	Width (m):	65.3	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	2.5 & 5.5			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	91.37	U/S Obvert Elev. (m):	94.88	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4535.243	D/S Invert Elev. (m):	91.37	D/S Obvert Elev. (m):	94.88		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Pedestrian Bridge - Lambton Woods - Bridge (4)		Height from Obvert to Top of Road (m):	0.4				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure

City of Toronto Structure Data:

Structure ID:	308529
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1974
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

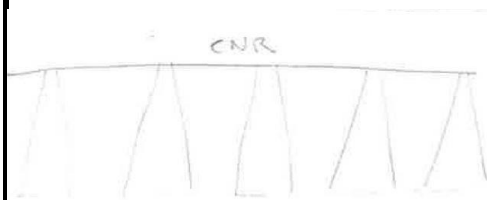
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-12

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	6	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	28.9	Width (m):	200	Upstream Erosion (Y/N):	Y
Tributary Name:	Main Channel	Length (m):	9			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	91.5	U/S Obvert Elev. (m):	120.4	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4571.18	D/S Invert Elev. (m):	91.43	D/S Obvert Elev. (m):	120.4		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Railway (CP)		Height from Obvert to Top of Road (m):	1.7				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-13

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #7		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

0

Additional Site Photographs

Description of Photograph: 0

0

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: 0

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-14

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #8		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

0

Additional Site Photographs

Description of Photograph: 0

0

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: 0

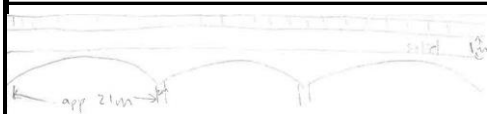
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-15

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	4.2	Width (m):	80	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	23			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	96.35	U/S Obvert Elev. (m):	100.4	Additional Flow Information: N/A	
HEC-RAS Cross Section:	734.8901	D/S Invert Elev. (m):	96.19	D/S Obvert Elev. (m):	100.4		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	45				
Scarlett Road		Height from Obvert to Top of Road (m):	1.5				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	364
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1930
Last Inspection:	2015
Next Inspection:	2017

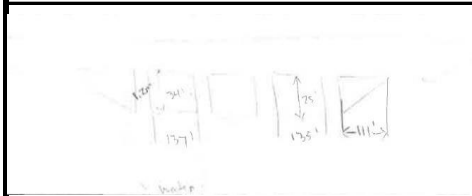
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-16

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	5	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	10.3	Width (m):	193.19	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	34			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	101.71	U/S Obvert Elev. (m):	114	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1679.951	D/S Invert Elev. (m):	101.34	D/S Obvert Elev. (m):	114		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Eglinton Avenue West	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	305
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1970
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-17

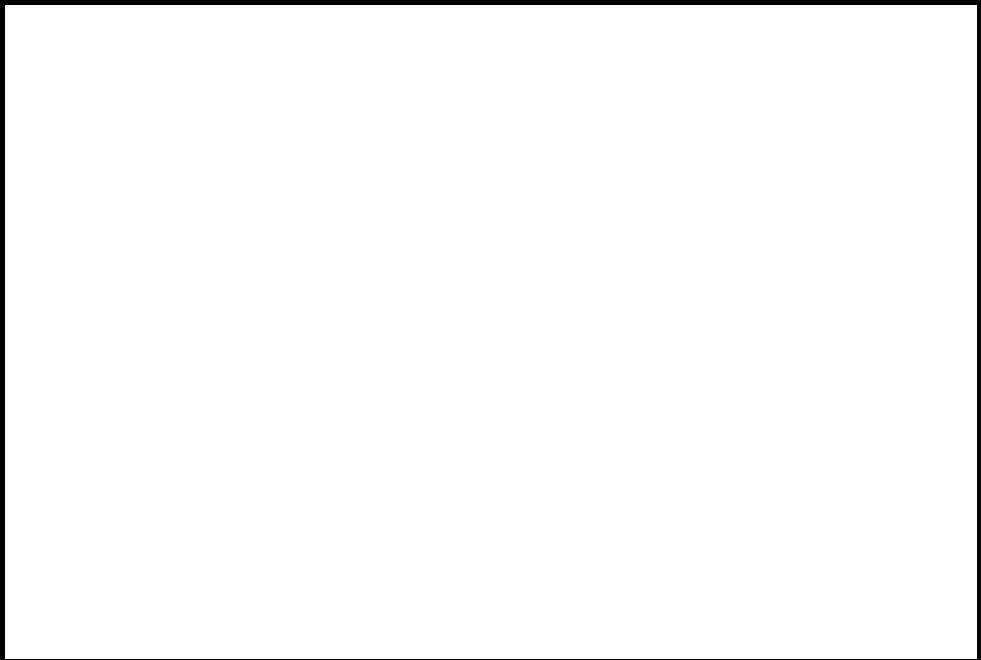
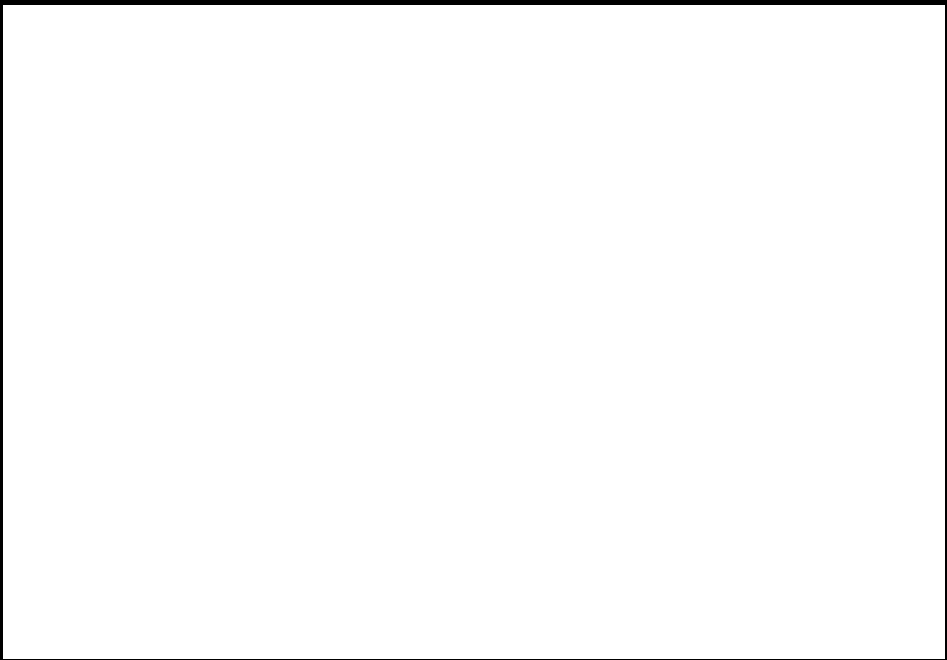
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Dam			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Weir #9		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

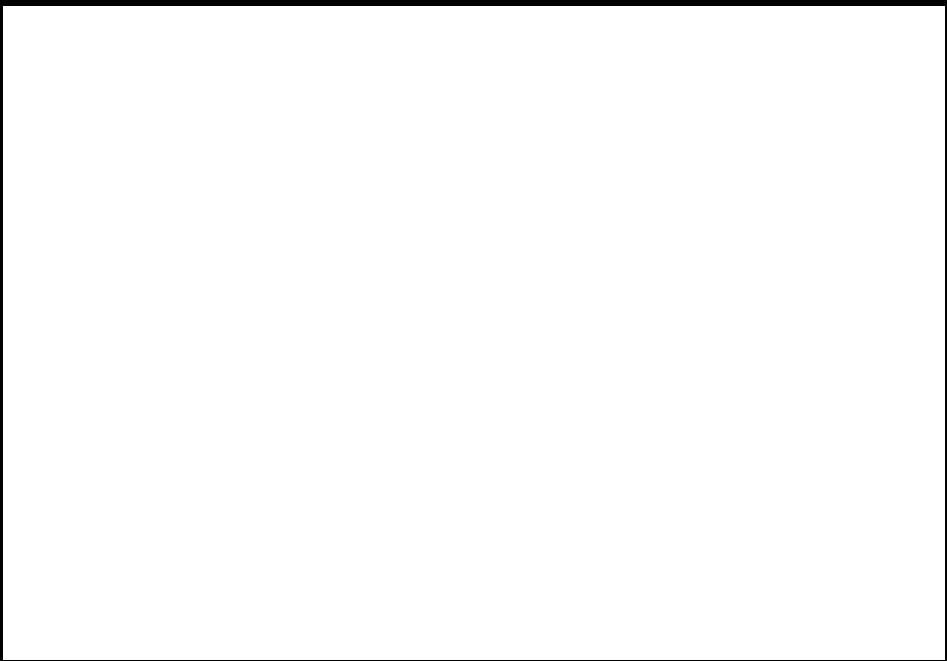
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-18

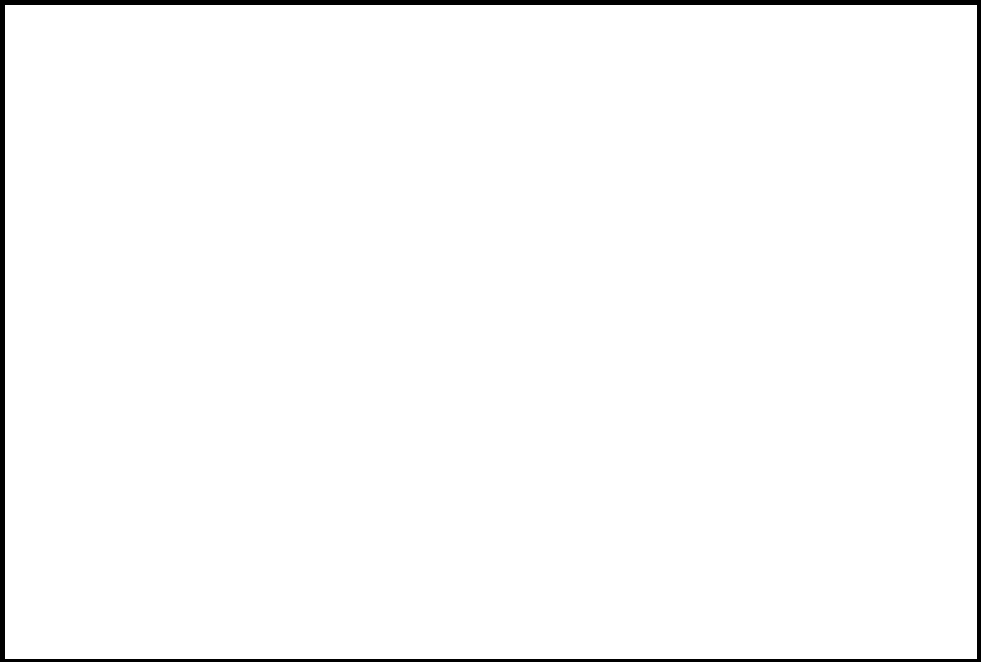
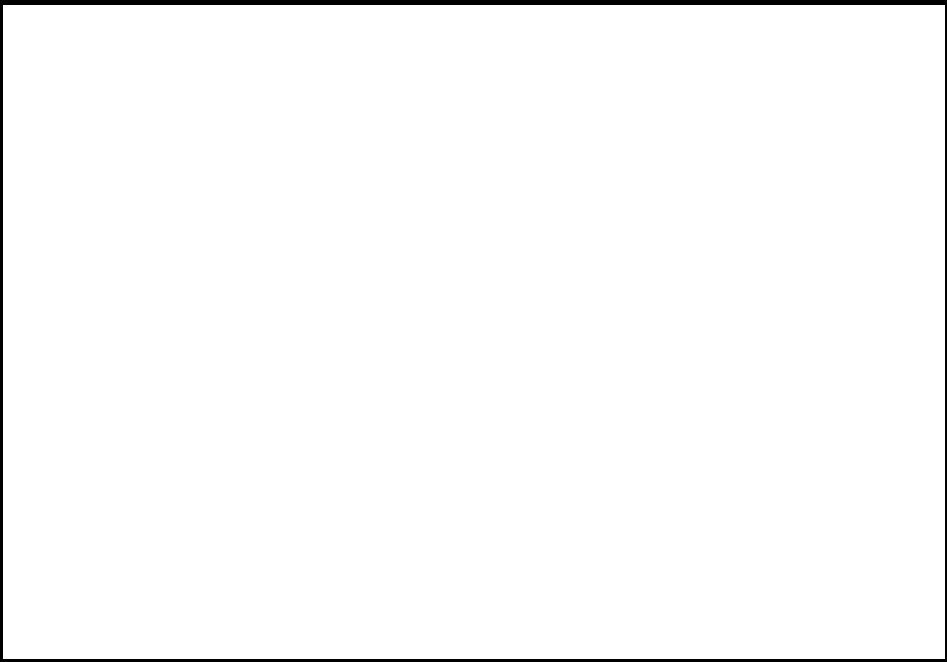
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Construction Bridge?			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Construction Bridge?		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

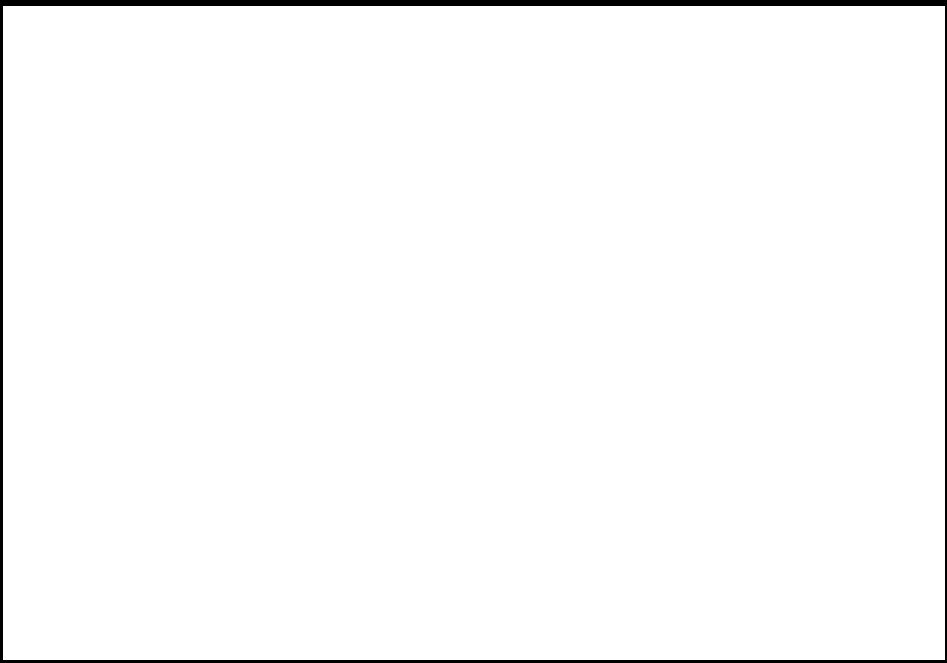
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-19

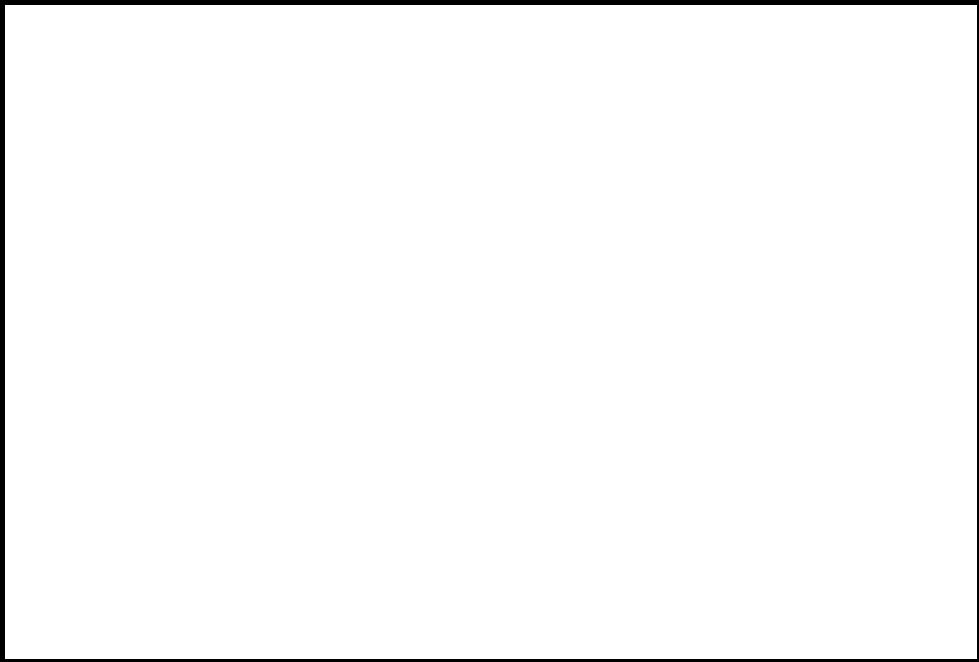
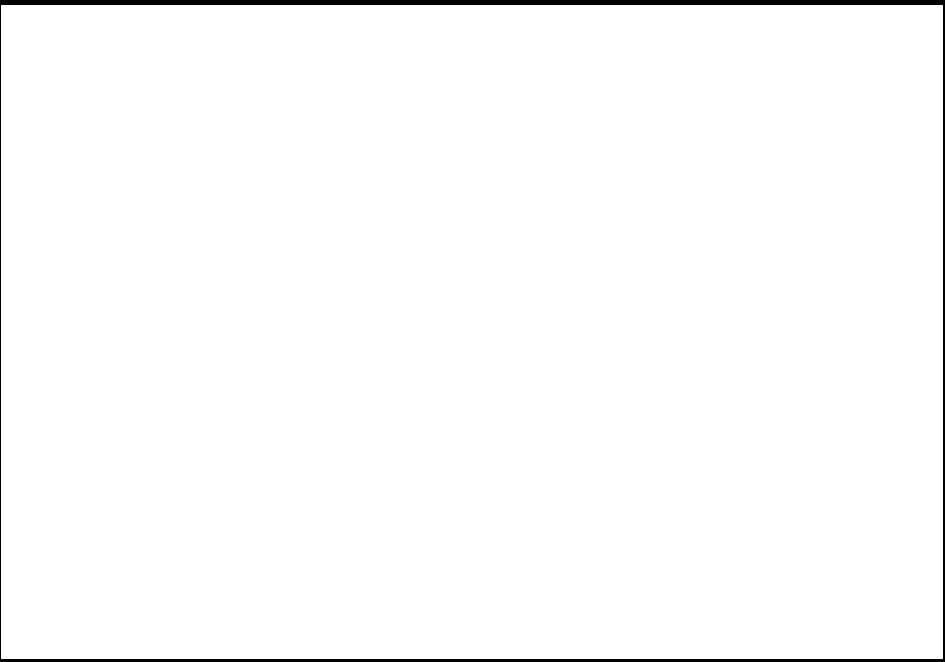
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Pedestrian Bridge - Raymore Park - Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

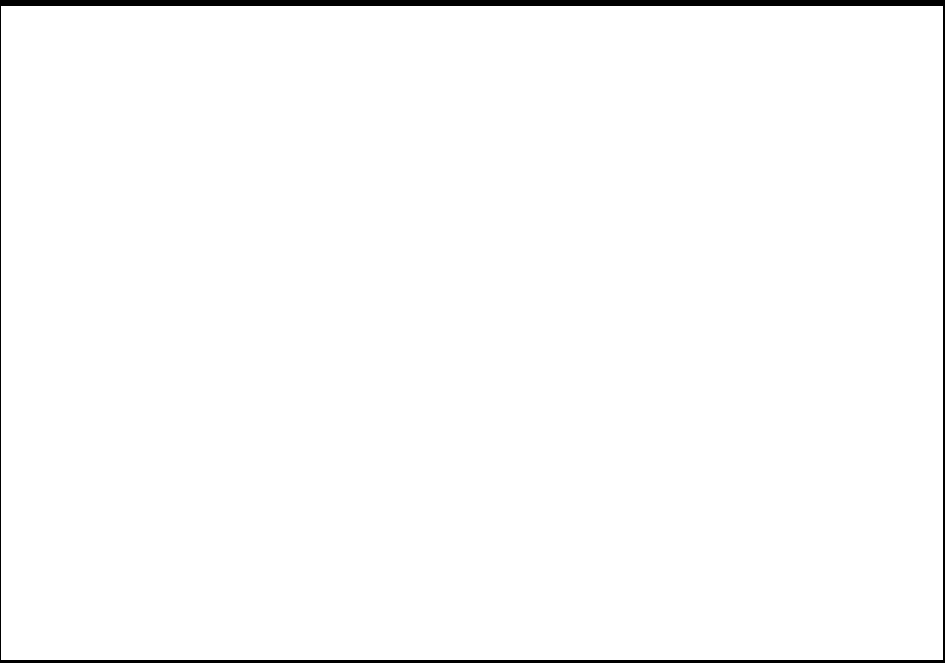
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308531
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1995
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-20

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	5.33	Width (m):	36.8	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	17.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	112.2	U/S Obvert Elev. (m):	117.46	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1567.575	D/S Invert Elev. (m):	112.17	D/S Obvert Elev. (m):	117.46		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Lawrence Avenue		Height from Obvert to Top of Road (m):	2.5				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	135
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1955
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-21

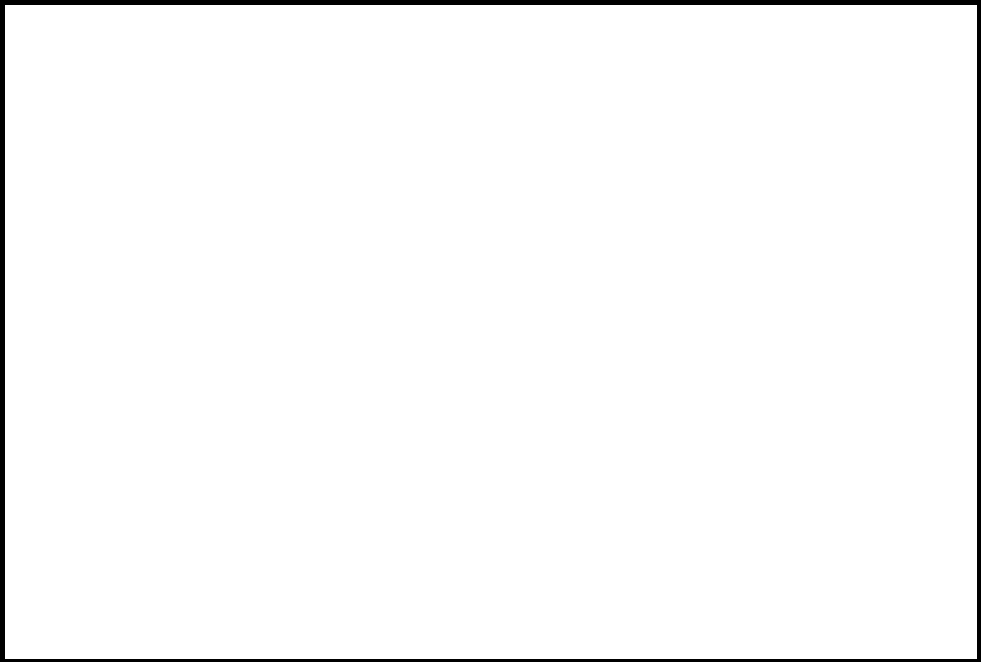
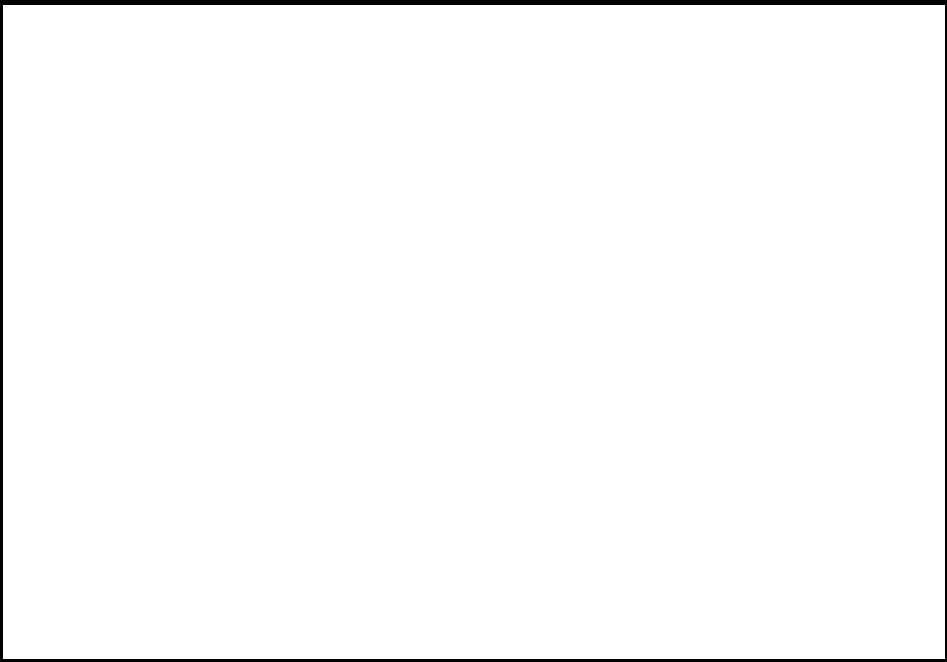
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Dam			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Weir #10		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

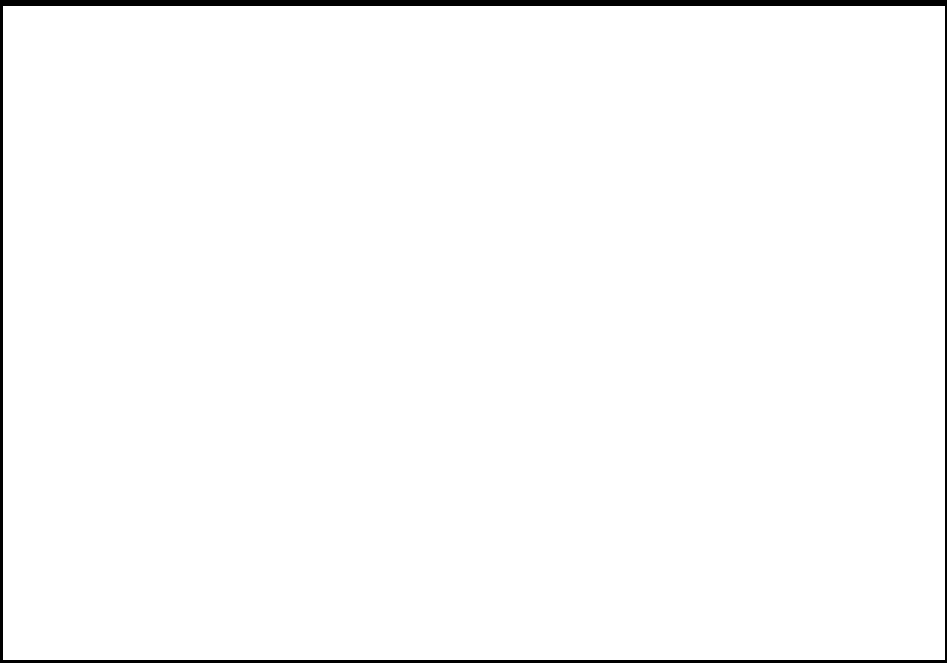
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

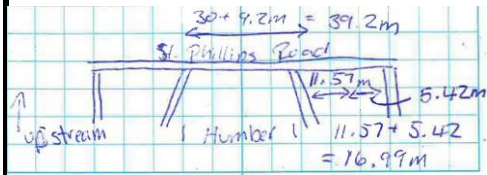
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-22

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	5	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	10.12	Width (m):	39	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	20			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	117.22	U/S Obvert Elev. (m):	128.25	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2734.193	D/S Invert Elev. (m):	117.16	D/S Obvert Elev. (m):	128.25		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): St Philips Road		Skew Angle of Crossing (Degrees):	10				
		Height from Obvert to Top of Road (m):	2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	300
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1968
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-23

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	7	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	18.78	Width (m):	212.8	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	19.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	119.07	U/S Obvert Elev. (m):	137.8	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3279.97	D/S Invert Elev. (m):	119.02	D/S Obvert Elev. (m):	137.8		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Railway (CN)		Height from Obvert to Top of Road (m):	2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

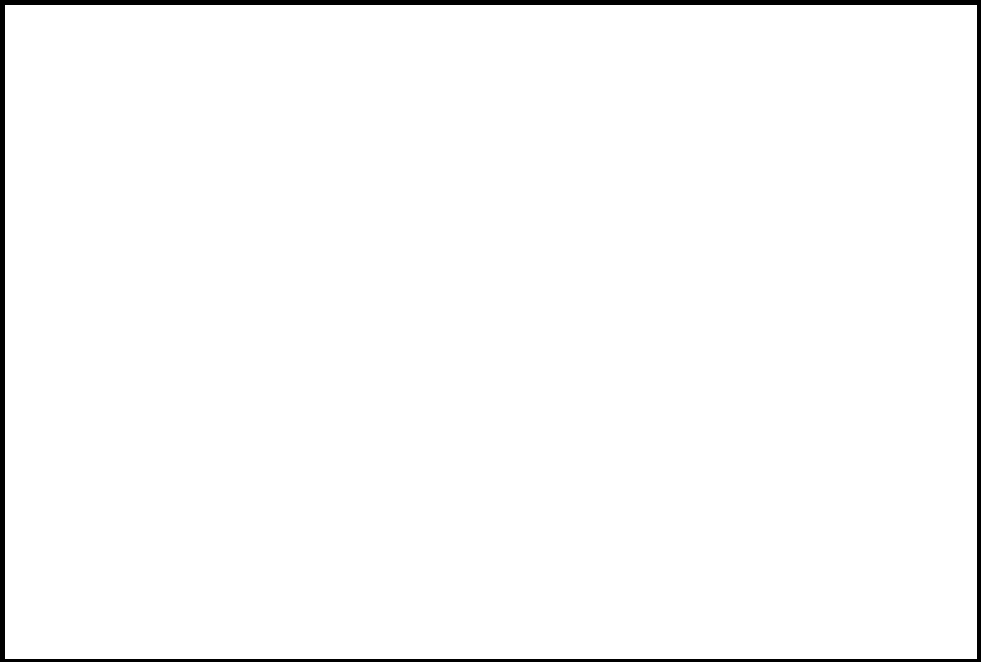
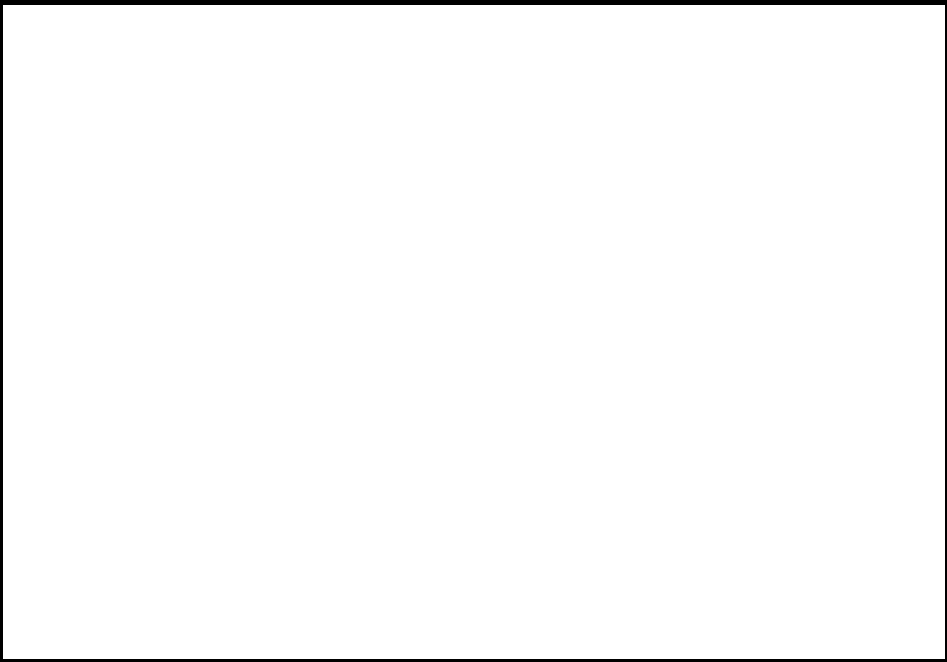


Description of Photograph:

Downstream face of structure

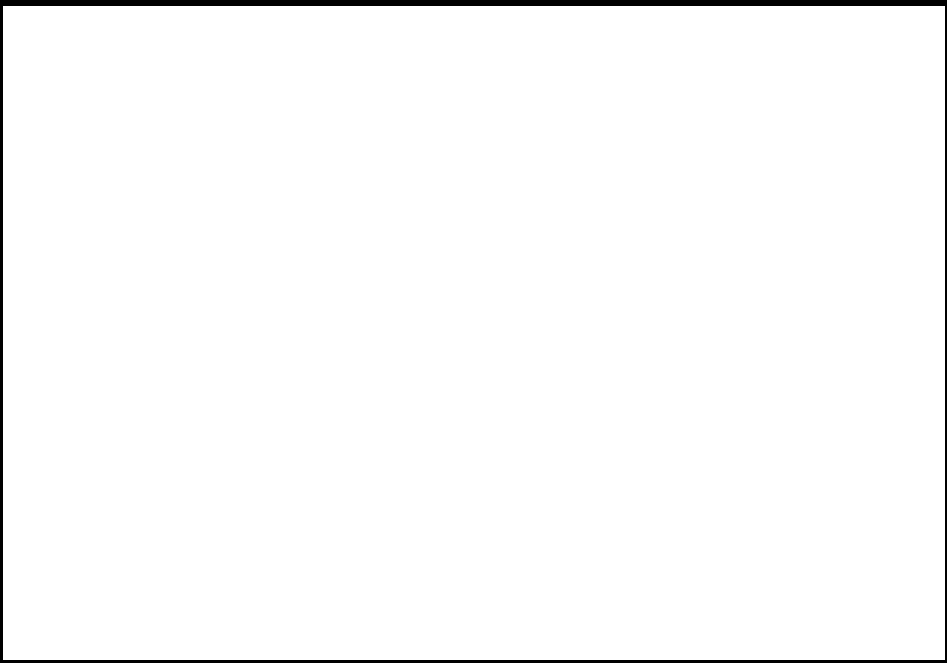
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-24

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	5.3	Width (m):	48.75	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	2.56			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Foot bridge		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308501
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1995
Last Inspection:	2012
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-25

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	8.57	Width (m):	95.89	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	10.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	120.37	U/S Obvert Elev. (m):	126.25	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4098.95	D/S Invert Elev. (m):	120.32	D/S Obvert Elev. (m):	126.25		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): Hwy 401 HUMBER R. BR#4 E-N & SB RAMP A		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	2.5				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	37 - 188/5
Condition:	Good
Owner:	Province of Ontario
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

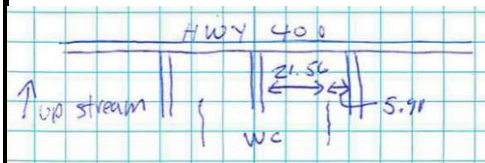
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-26

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	4	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	7.42	Width (m):	27.47	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	44			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	120.54	U/S Obvert Elev. (m):	126.19	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4201.13	D/S Invert Elev. (m):	120.36	D/S Obvert Elev. (m):	126.19		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Hwy 401 HUMBER R. BR#3 EB 401 COLLECTOR		Height from Obvert to Top of Road (m):	1.56				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	37 - 188/1
Condition:	Good
Owner:	Province of Ontario
Year Constructed:	1965
Last Inspection:	2014
Next Inspection:	2016

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-27

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	4	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	7.42	Width (m):	27.47	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	44			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	120.54	U/S Obvert Elev. (m):	126.19	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4201.13	D/S Invert Elev. (m):	120.36	D/S Obvert Elev. (m):	126.19		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Hwy 401 HUMBER R. BR#2 WB 401 COLLECTOR		Height from Obvert to Top of Road (m):	1.56				
(Same structure as Humber River-26)		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs		
Description of Photograph: Looking downstream from structure	Upstream face of structure	
	City of Toronto Structure Data:	
	Structure ID:	37 - 188/2
	Condition:	Good
	Owner:	Province of Ontario
	Year Constructed:	1965
	Last Inspection:	2014
	Next Inspection:	2016
Description of Photograph: Looking upstream from structure		

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-28

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	4	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	10.43	Width (m):	137.25	Upstream Erosion (Y/N):	Y
Tributary Name:	Main Channel	Length (m):	8.9			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	120.58	U/S Obvert Elev. (m):	130.75	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4264.165	D/S Invert Elev. (m):	120.54	D/S Obvert Elev. (m):	130.75		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): Hwy 401 HUMBER R.BR 1		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	2.42				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	37 - 188/6
Condition:	Good
Owner:	Province of Ontario
Year Constructed:	1965
Last Inspection:	2014
Next Inspection:	2016

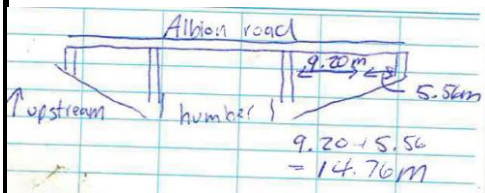
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-29

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	6.64	Width (m):	50.4	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	19.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	120.76	U/S Obvert Elev. (m):	127.22	Additional Flow Information: N/A	
HEC-RAS Cross Section:	75.84924	D/S Invert Elev. (m):	120.62	D/S Obvert Elev. (m):	127.22		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Albion Road	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0.98				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	304
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1972
Last Inspection:	2015
Next Inspection:	2017

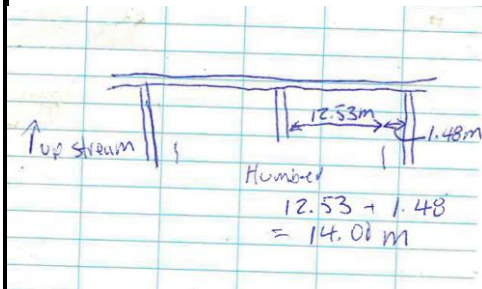
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-30

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	5.75	Width (m):	53.2	Upstream Erosion (Y/N):	N
Tributary Name:	Main Channel	Length (m):	4.55			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	120.86	U/S Obvert Elev. (m):	126.6	Additional Flow Information: N/A	
HEC-RAS Cross Section:	148.4585	D/S Invert Elev. (m):	120.85	D/S Obvert Elev. (m):	126.6		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Recreational Trail Bridge (Labelled Albion Rd North in old model)		Height from Obvert to Top of Road (m):	1.2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	159
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1950
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-31

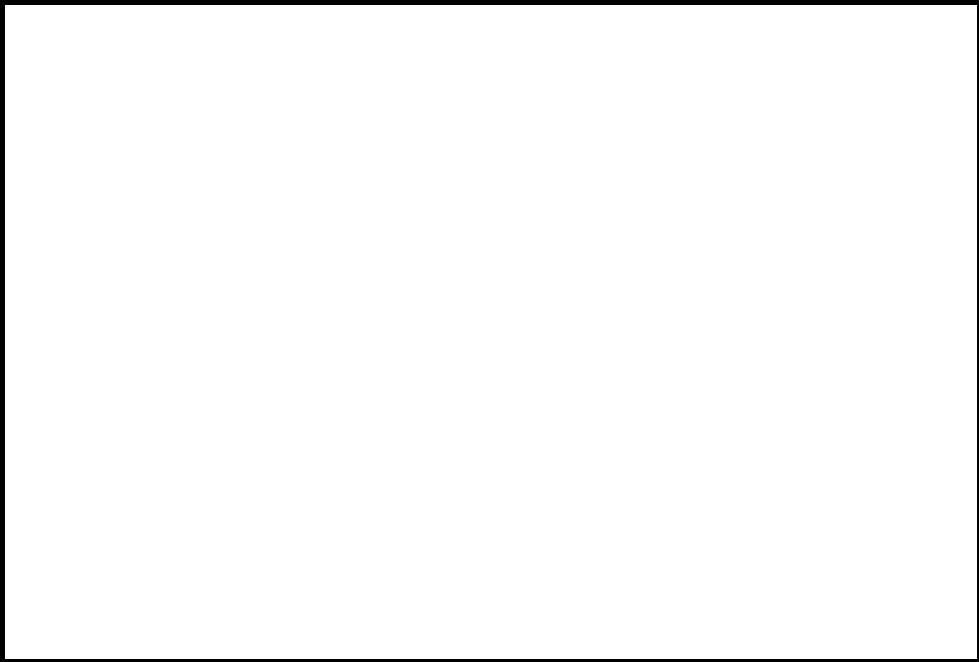
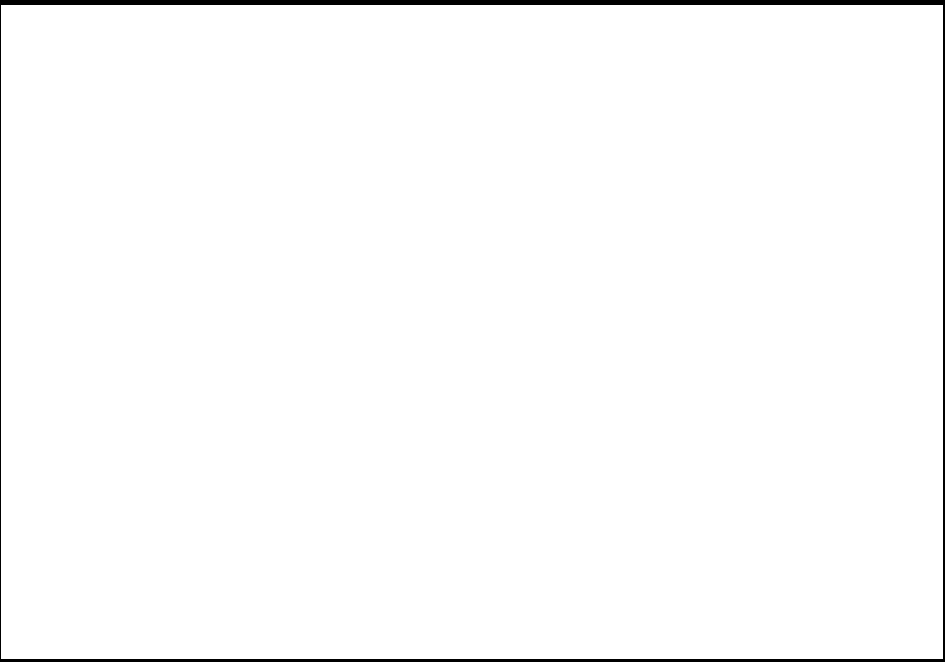
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Main Channel	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
West Humber Parkland – Trail Bridge (2)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

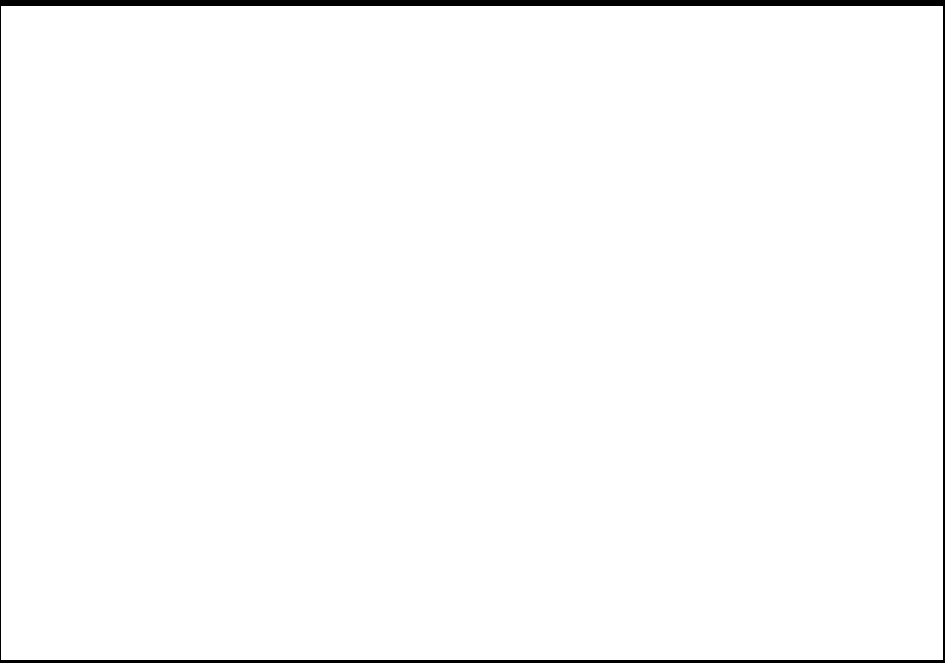
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308502
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1988
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-32

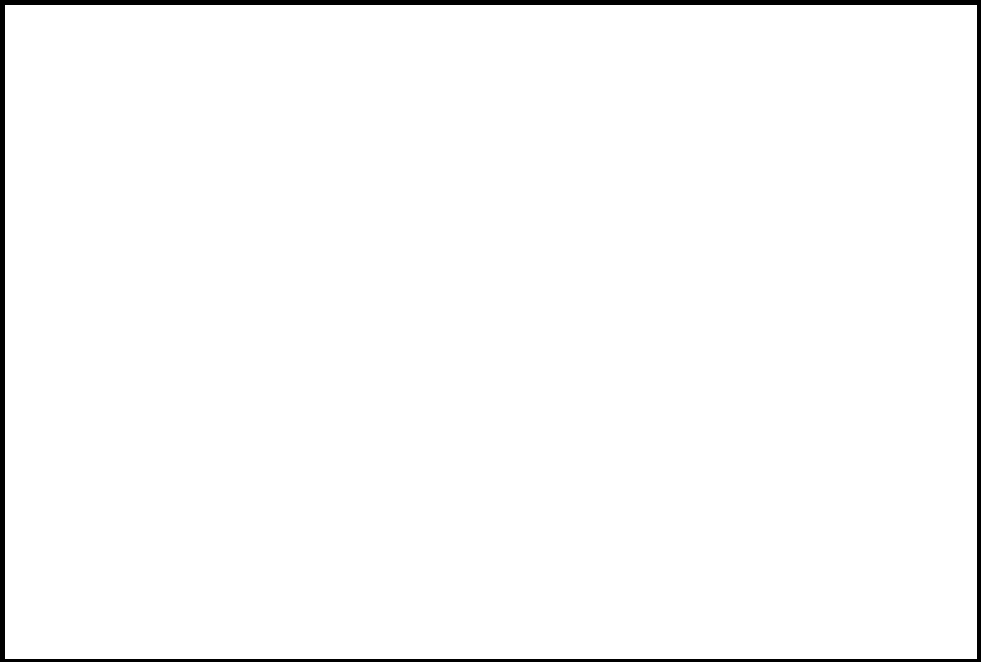
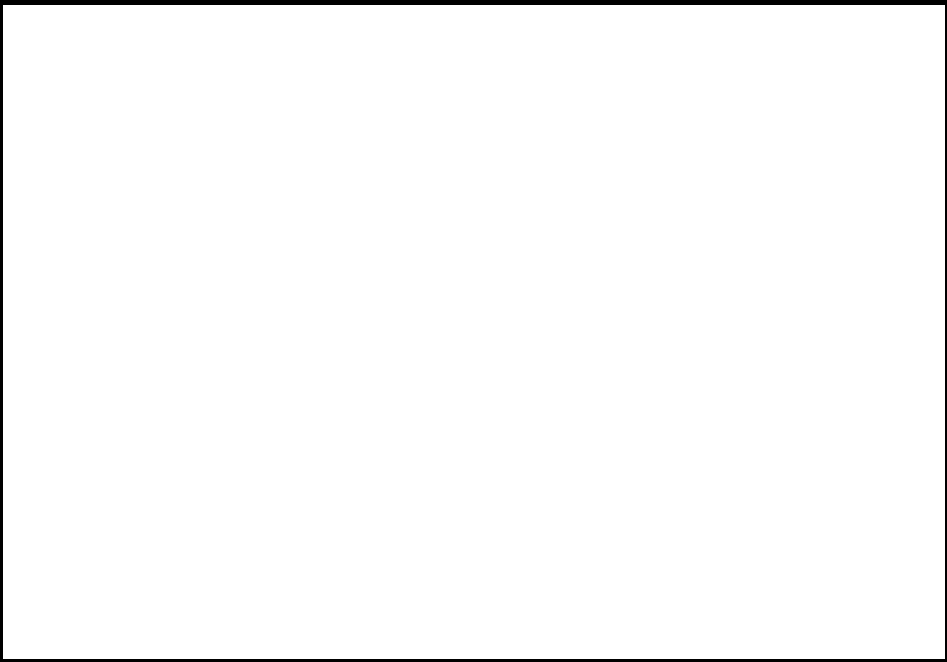
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Crossing		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

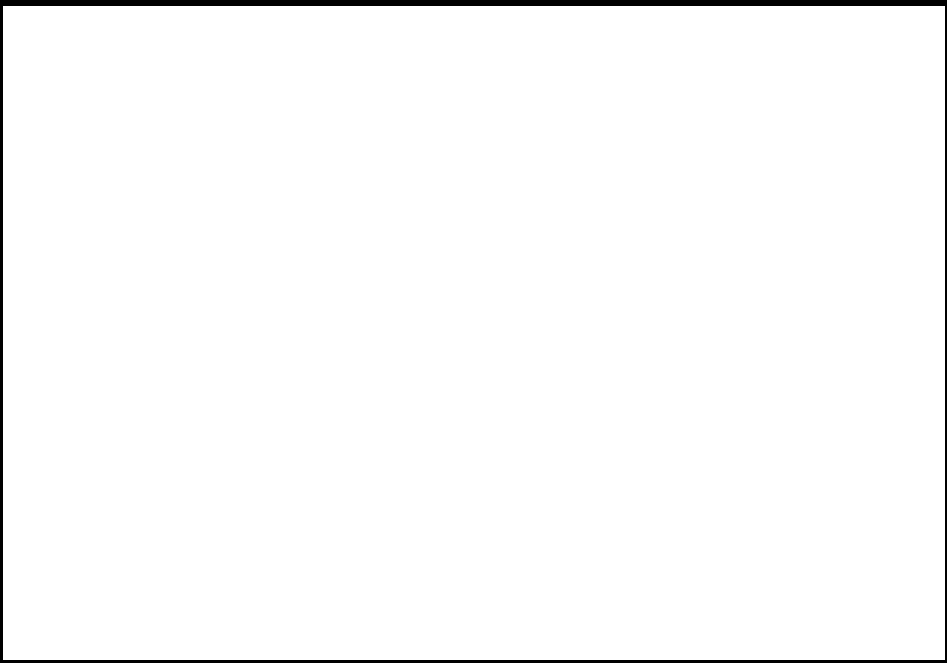
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-33

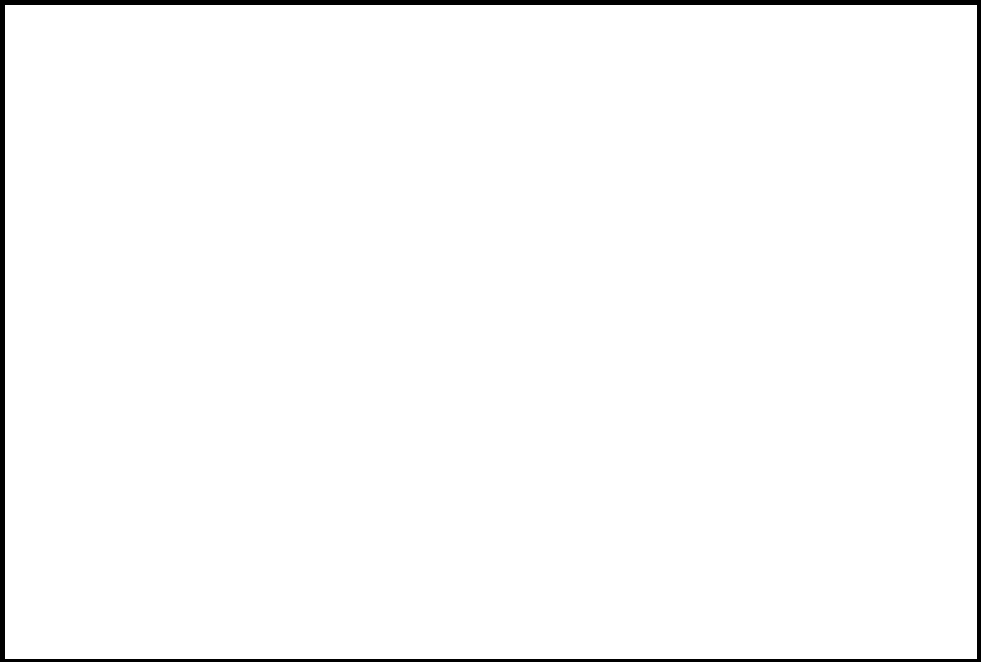
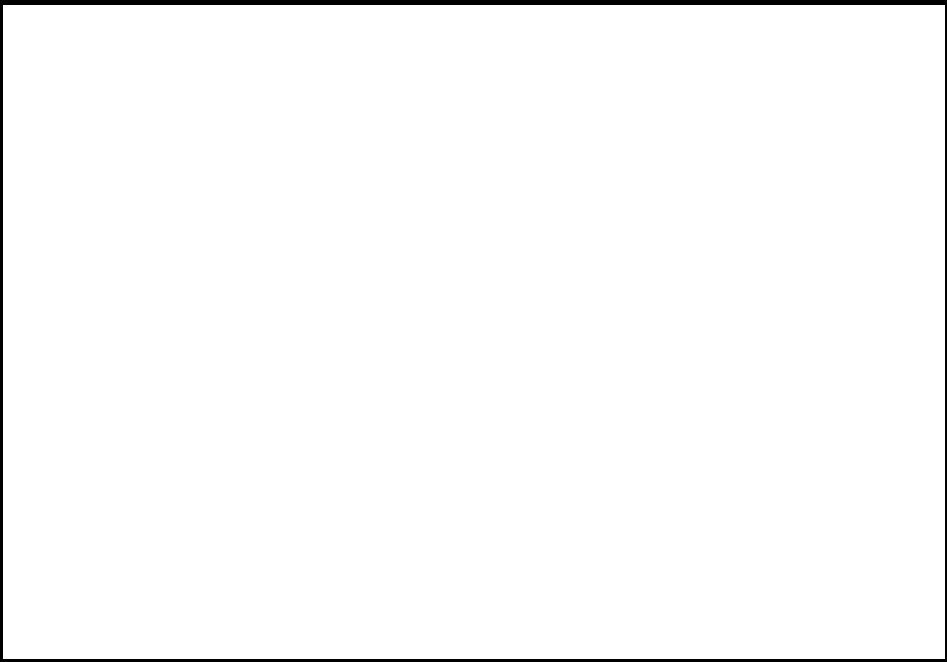
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

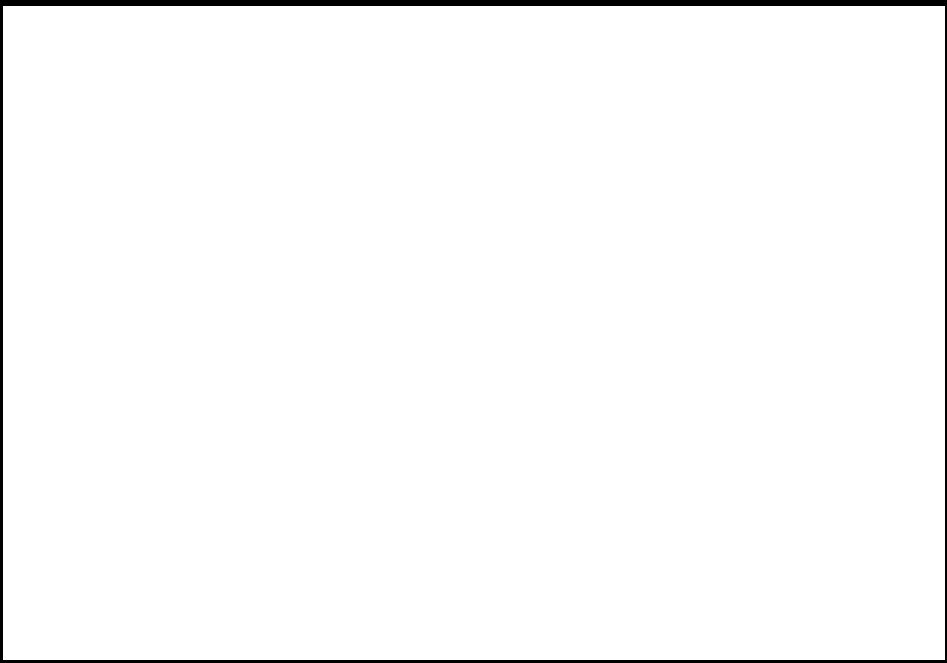
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-34

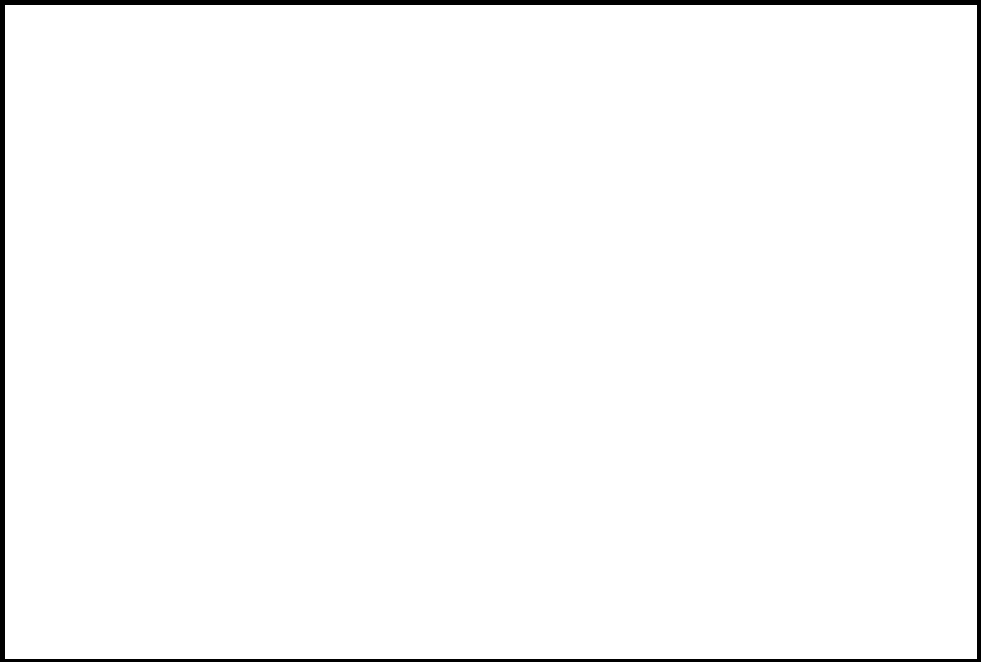
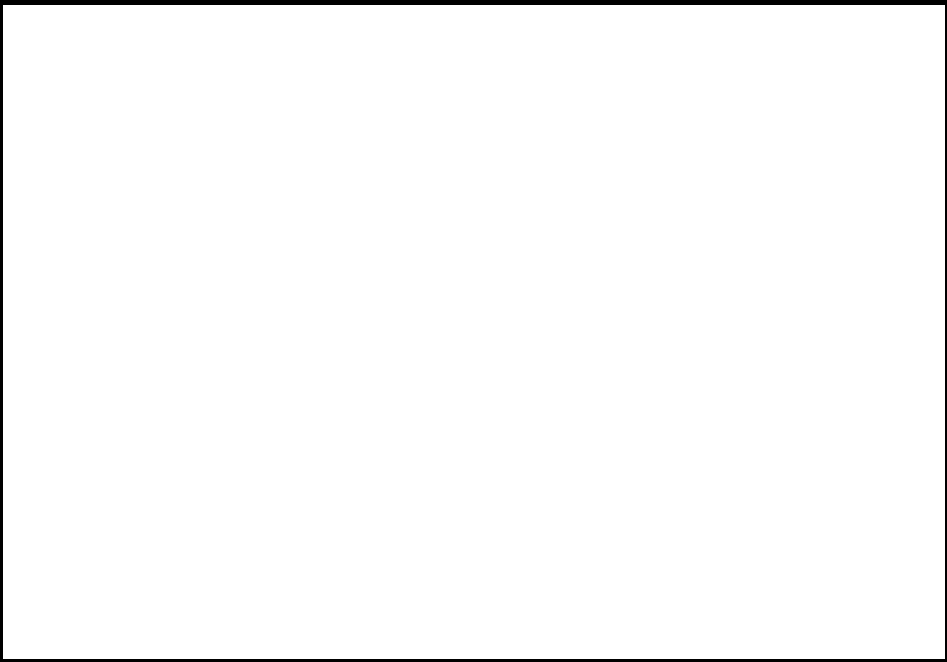
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Crossing		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

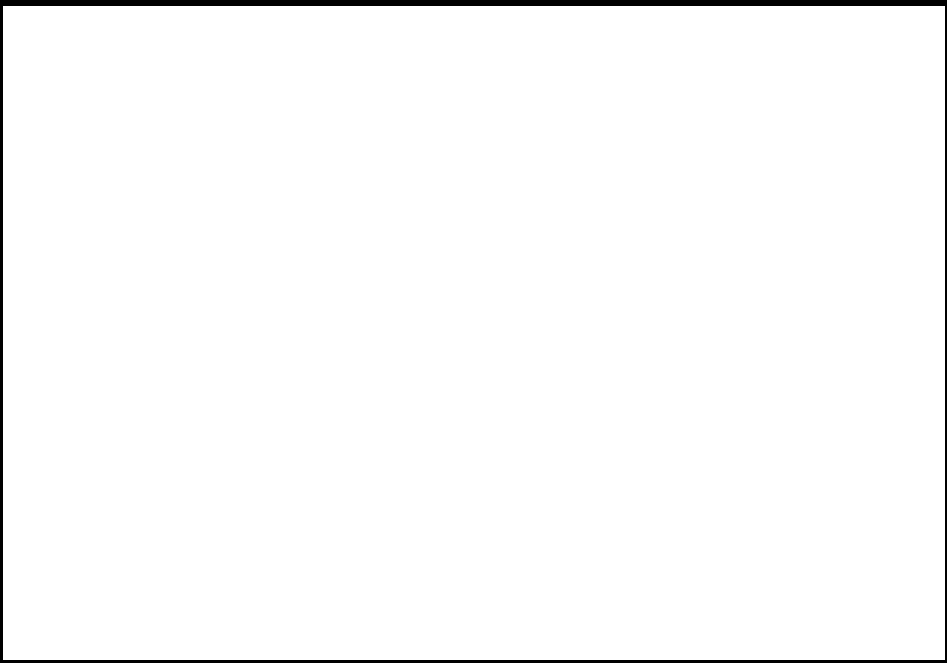
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

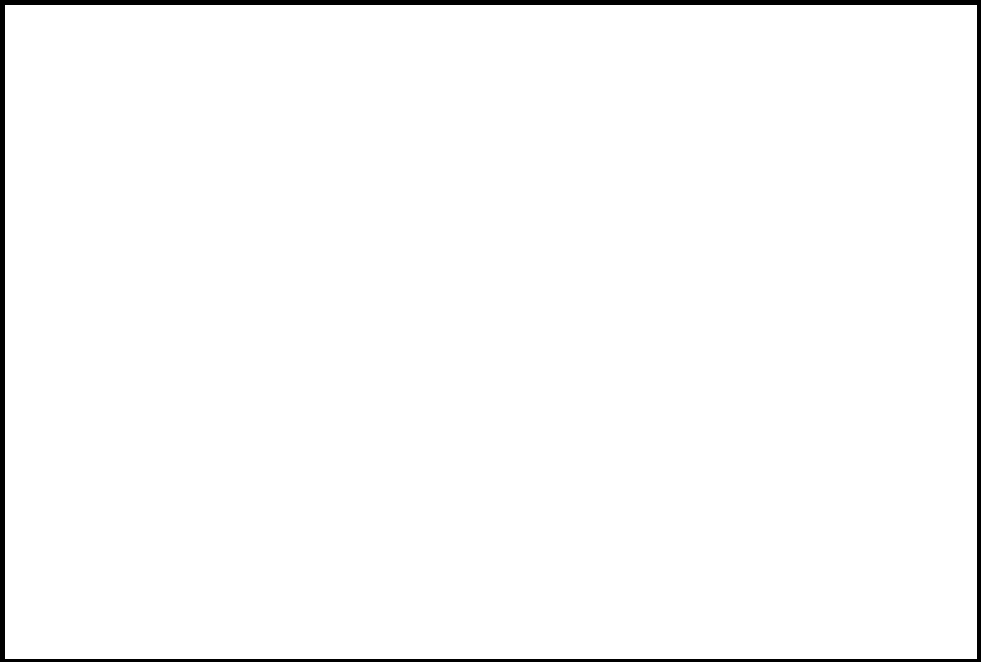
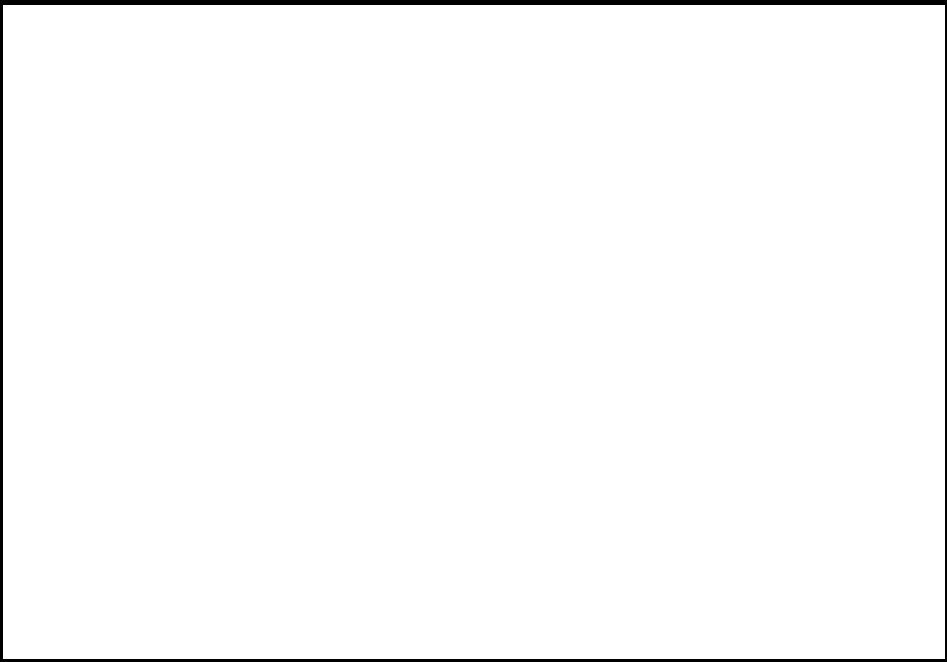
CROSSING # : Humber River-35

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

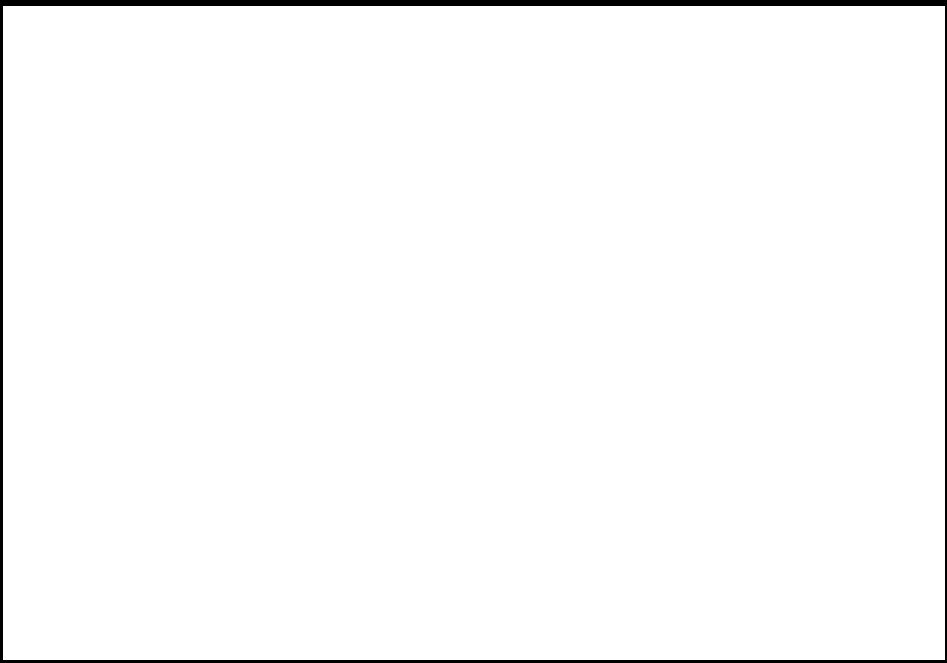
<div style="border-bottom: 1px solid black; padding-bottom: 5px;">Site Sketch:</div> <div style="border-bottom: 1px solid black; height: 30px;"></div> <div style="height: 300px;"></div>	<div style="display: flex; justify-content: space-between;"> <div>Description of Photograph:</div> <div>Downstream face of structure</div> <div>page 1</div> </div>
---	---

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-36

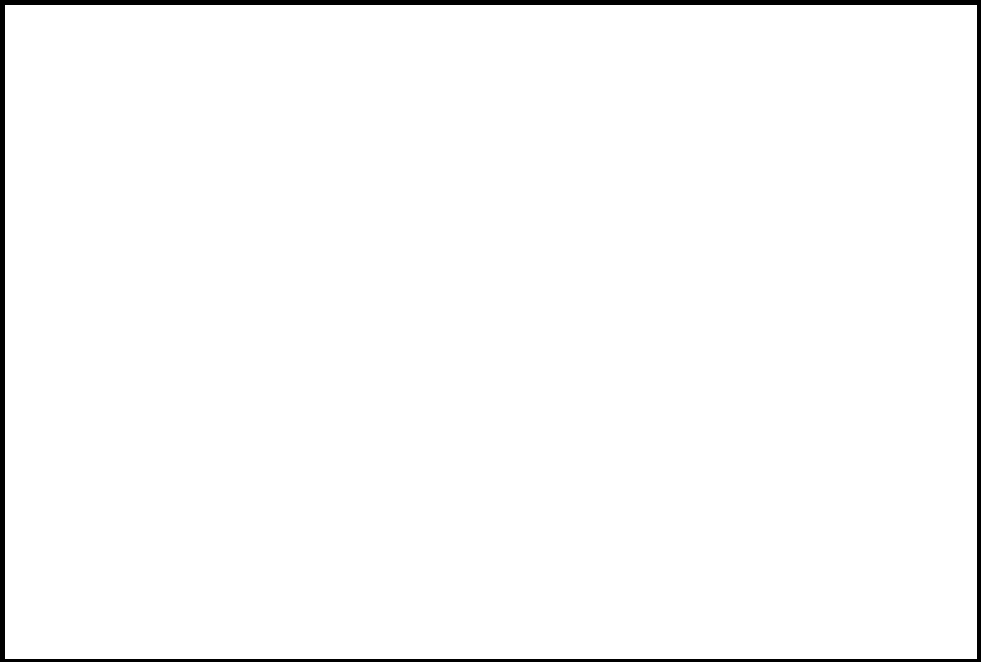
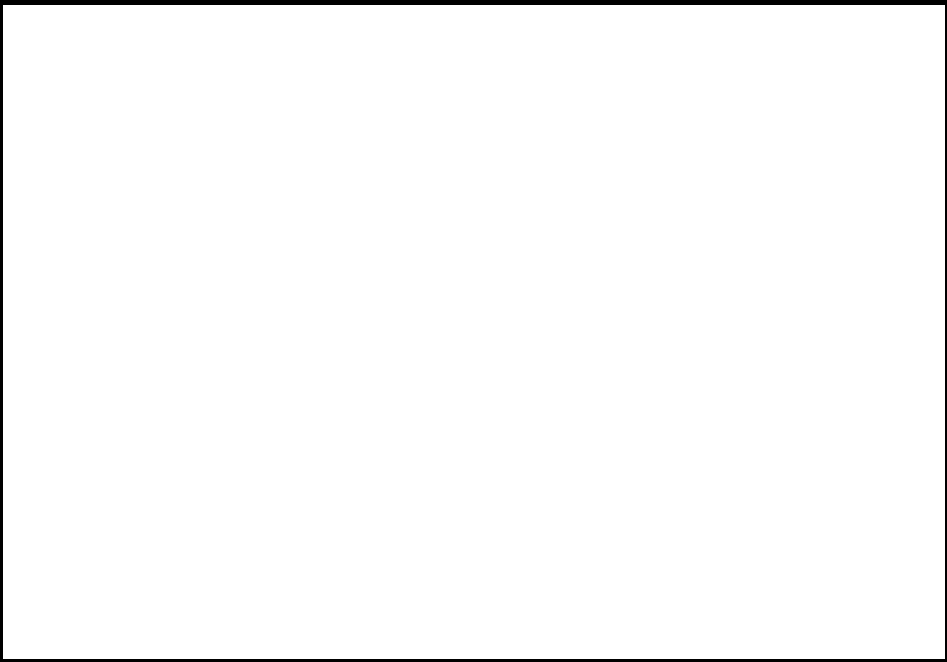
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

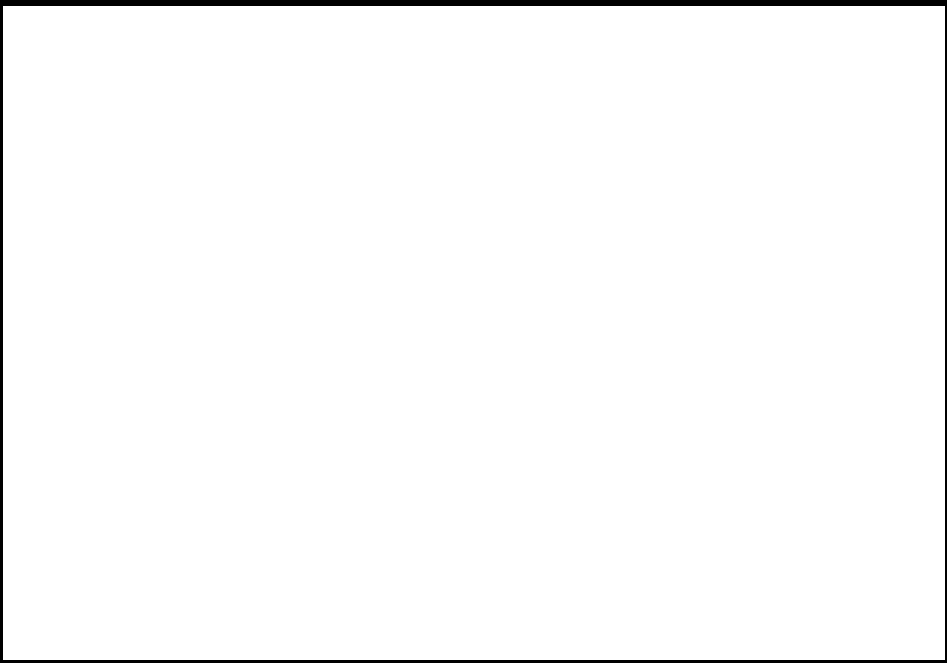
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-37

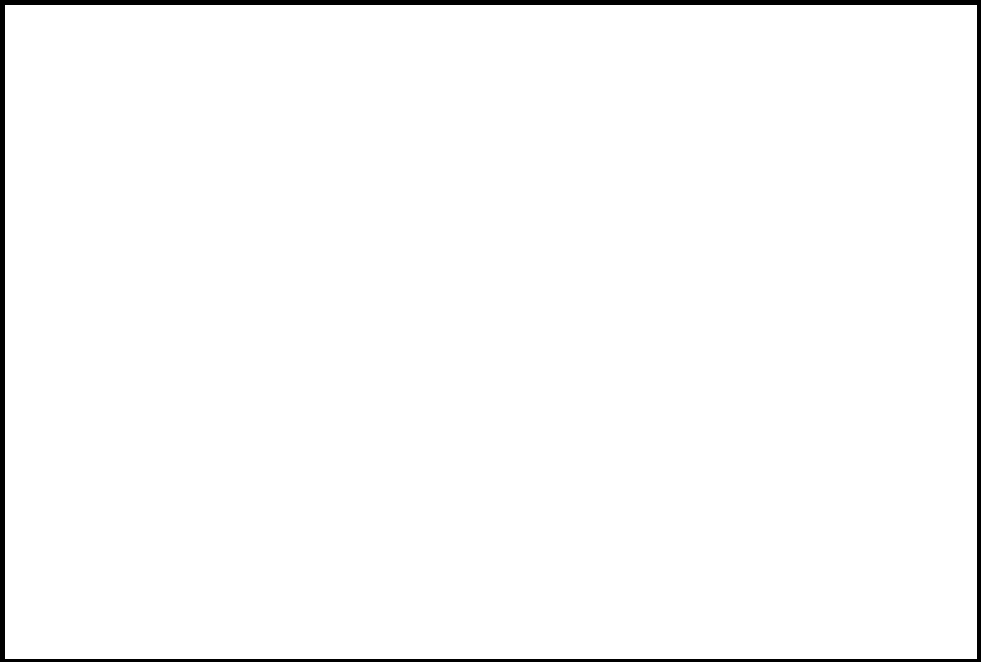
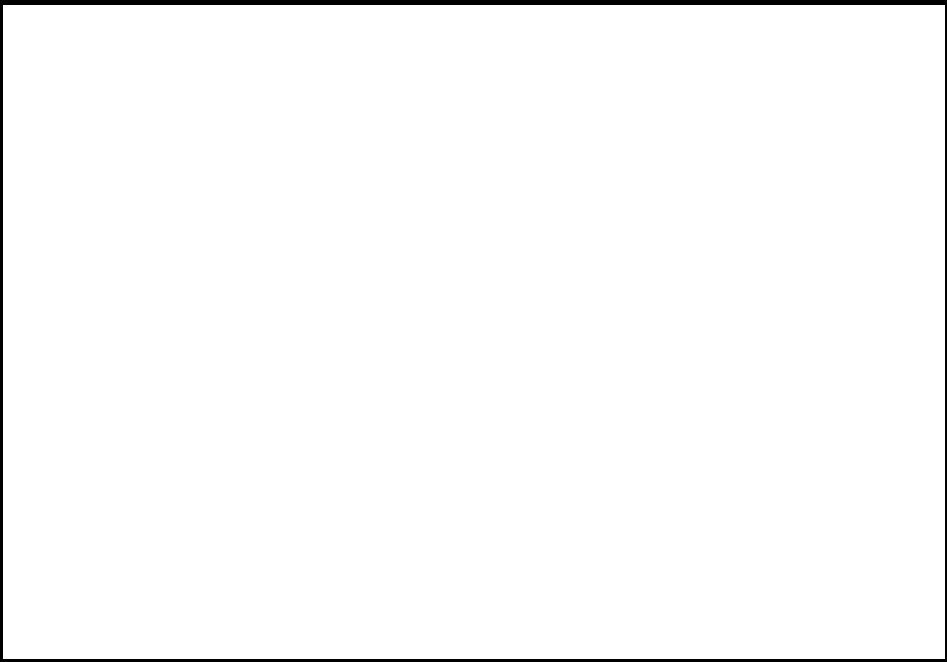
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

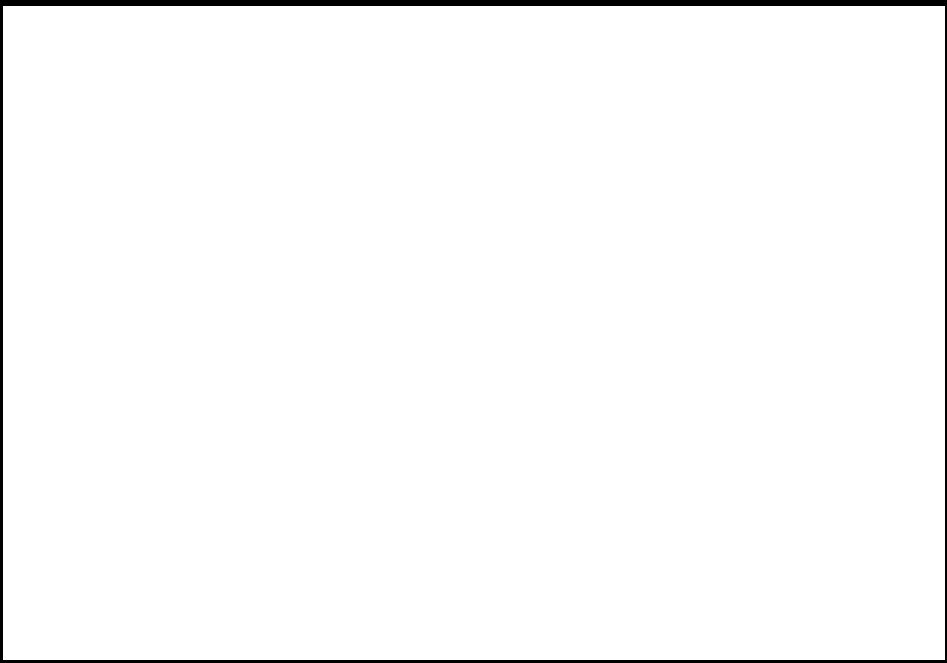
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

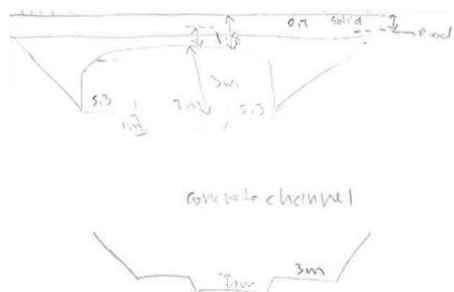
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-38

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	400
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	4	Width (m):	13.6	Upstream Erosion (Y/N):	N
Tributary Name:	Black Creek	Length (m):	20			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Scarlett Road	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.1				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	360
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1983
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-39

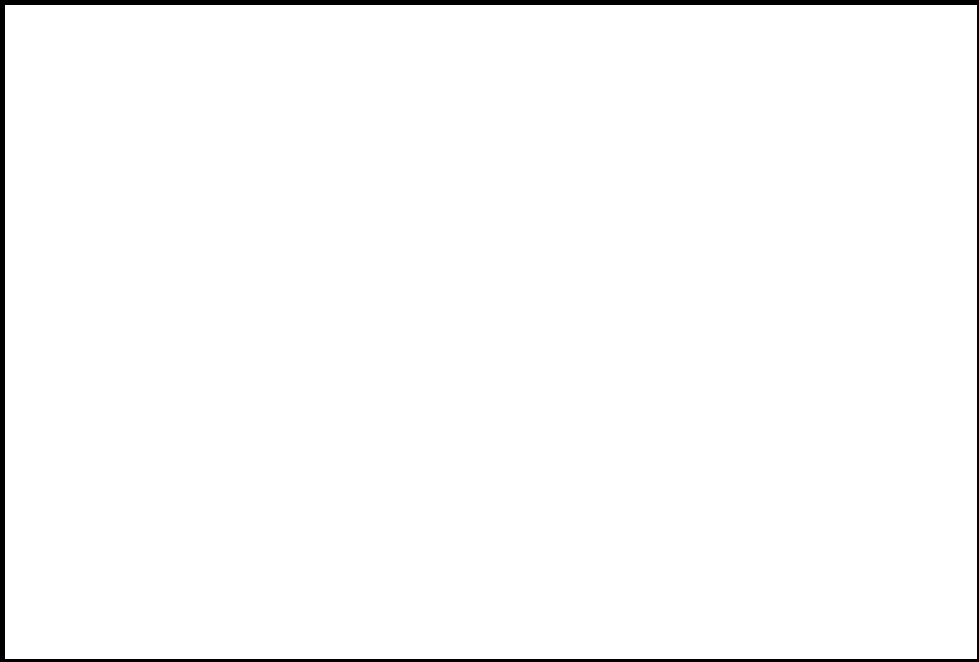
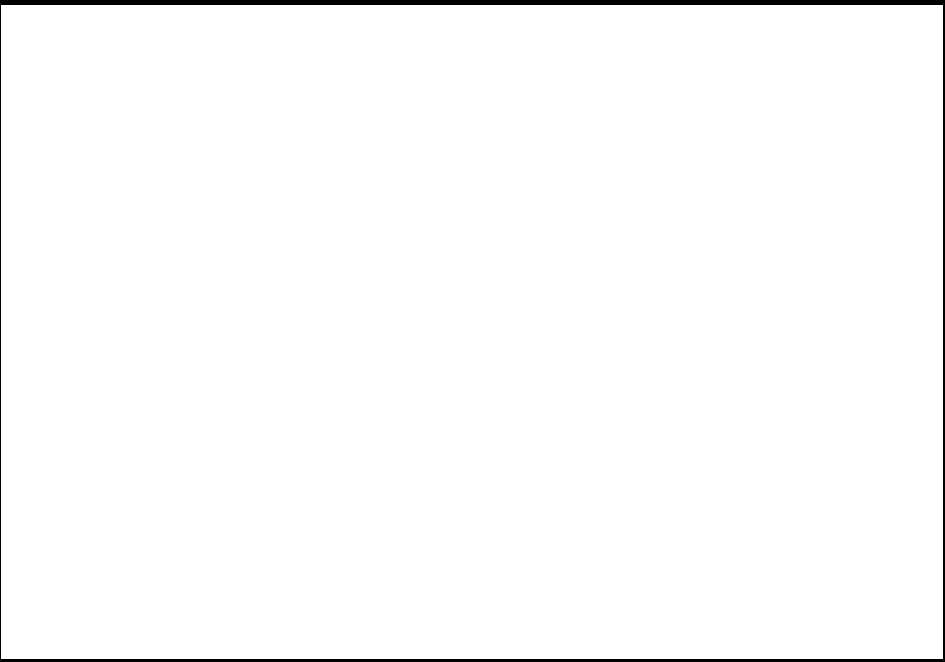
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Park Vehicular Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Vehicular Bridge - Smythe Park - Bridge (3)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

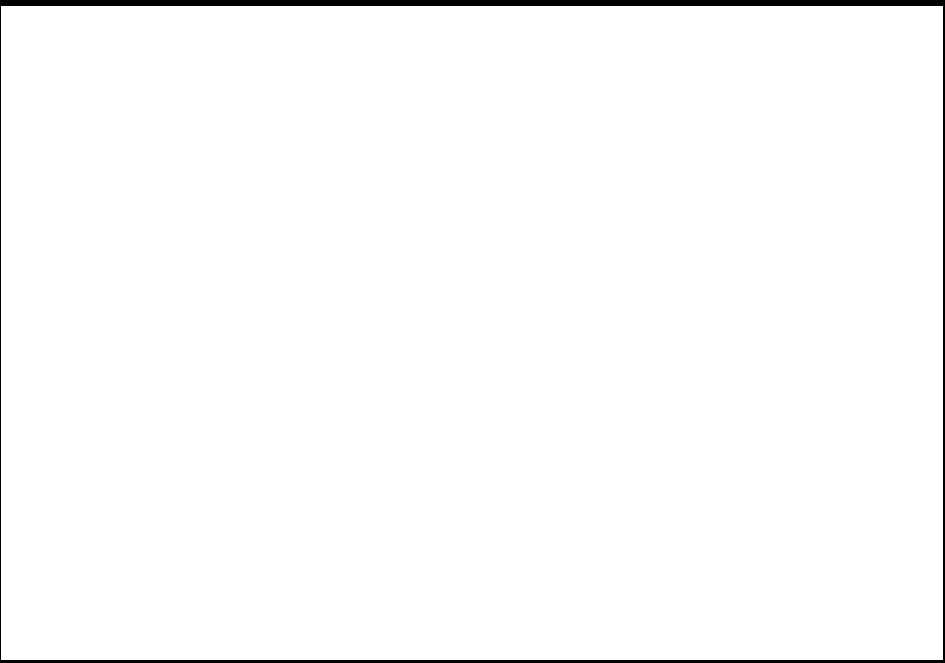
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308522
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	2005
Last Inspection:	2014
Next Inspection:	2016

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-40

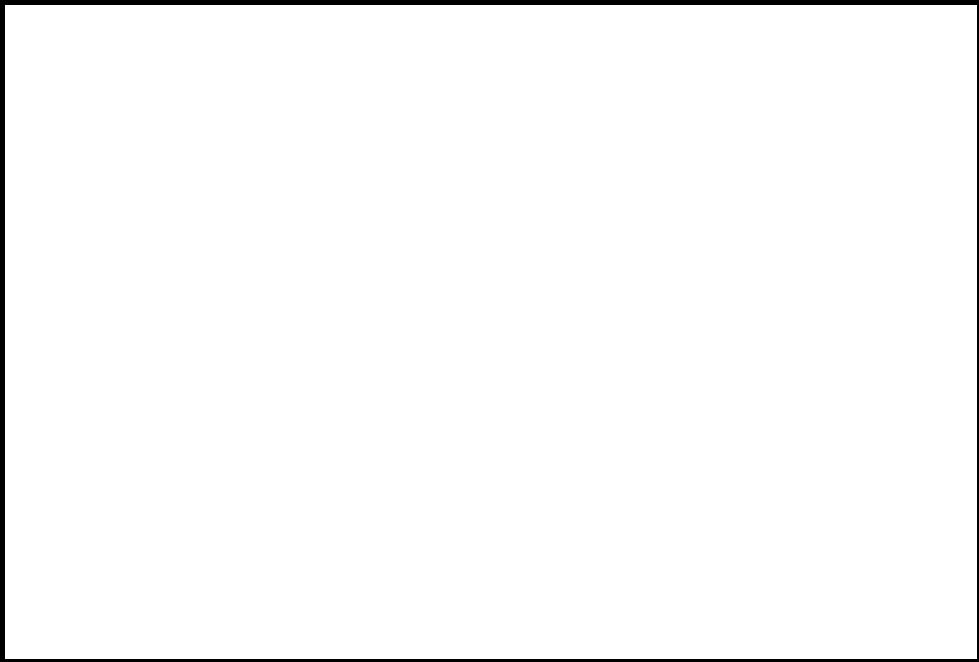
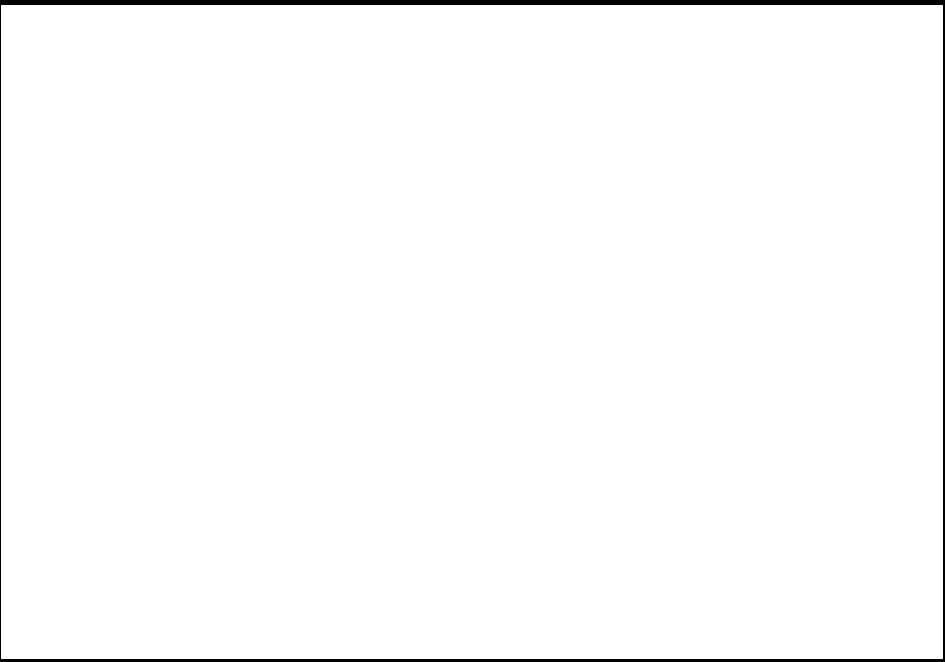
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Park Vehicular Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Vehicular Bridge - Smythe Park - Bridge (2)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

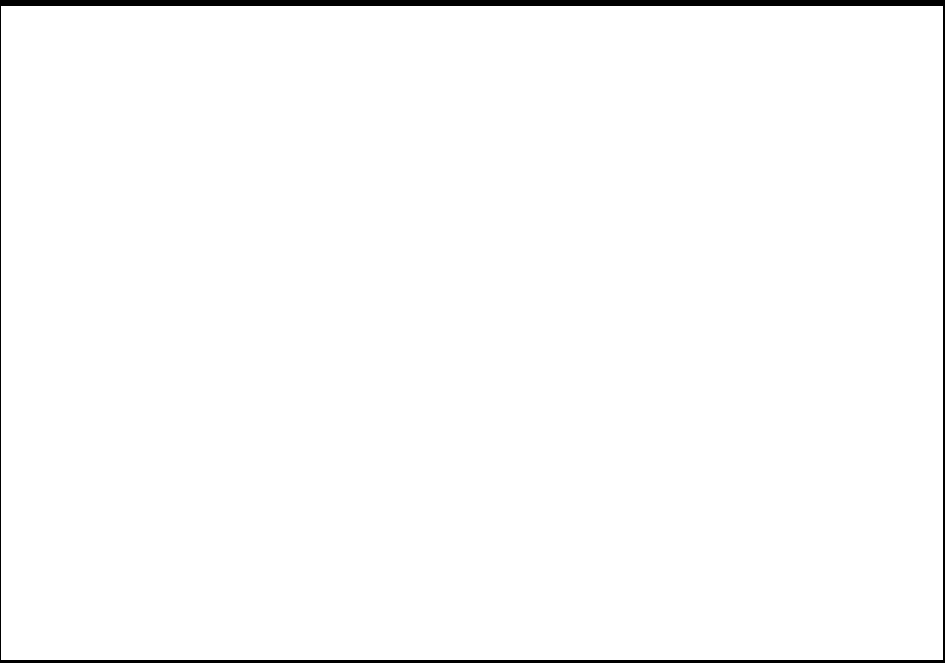
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308523
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1980
Last Inspection:	2014
Next Inspection:	2016

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-41

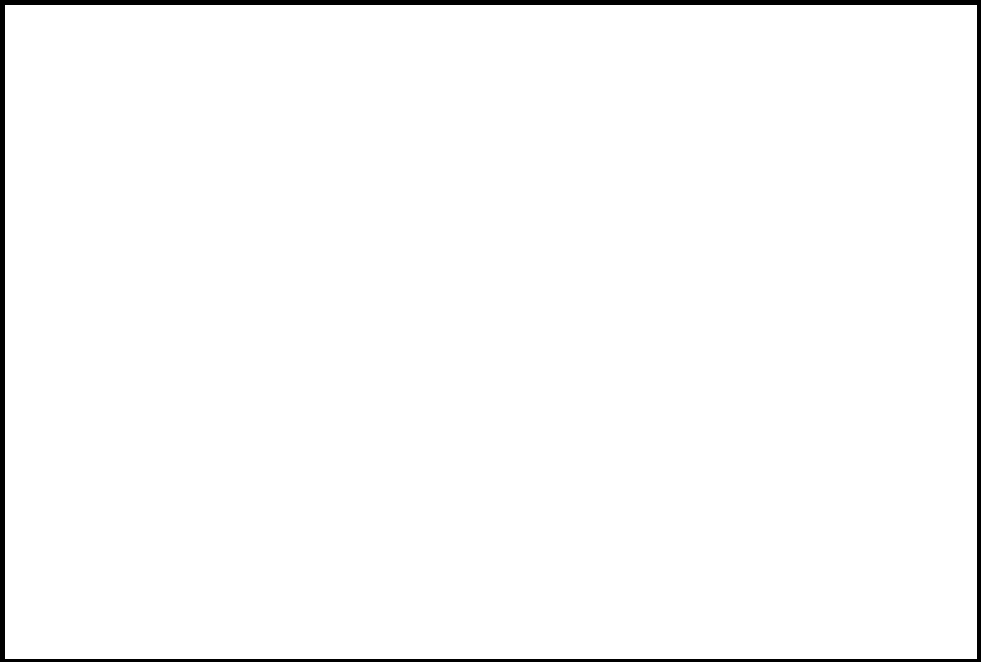
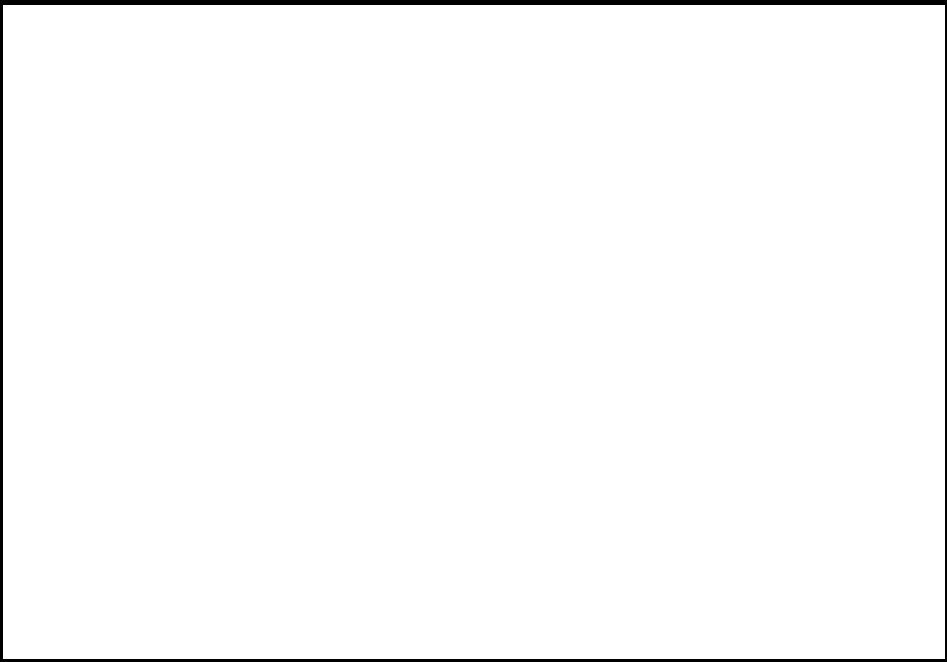
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Jane Street		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

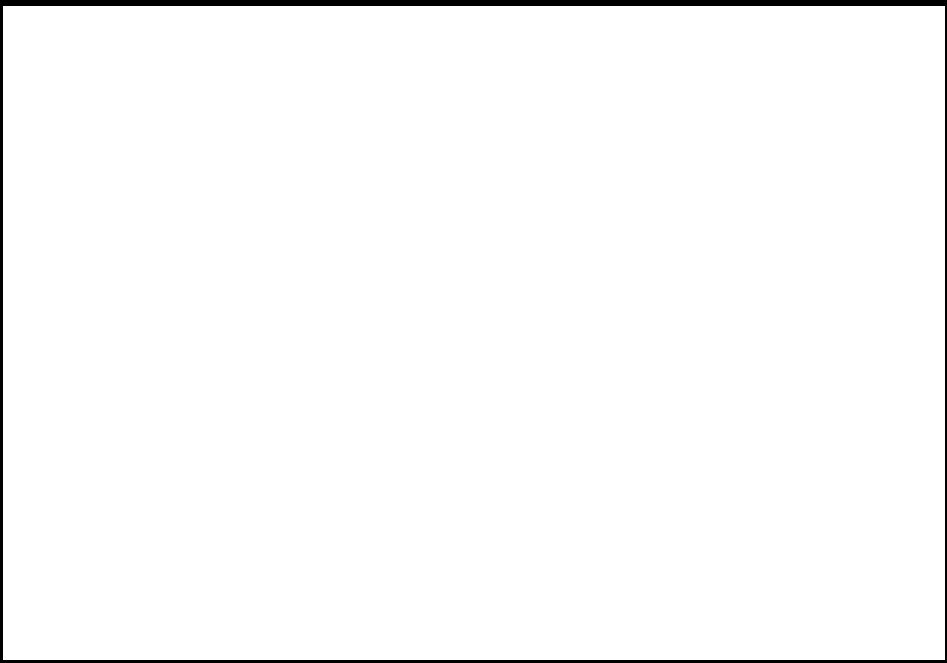
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	91
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1948
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-42

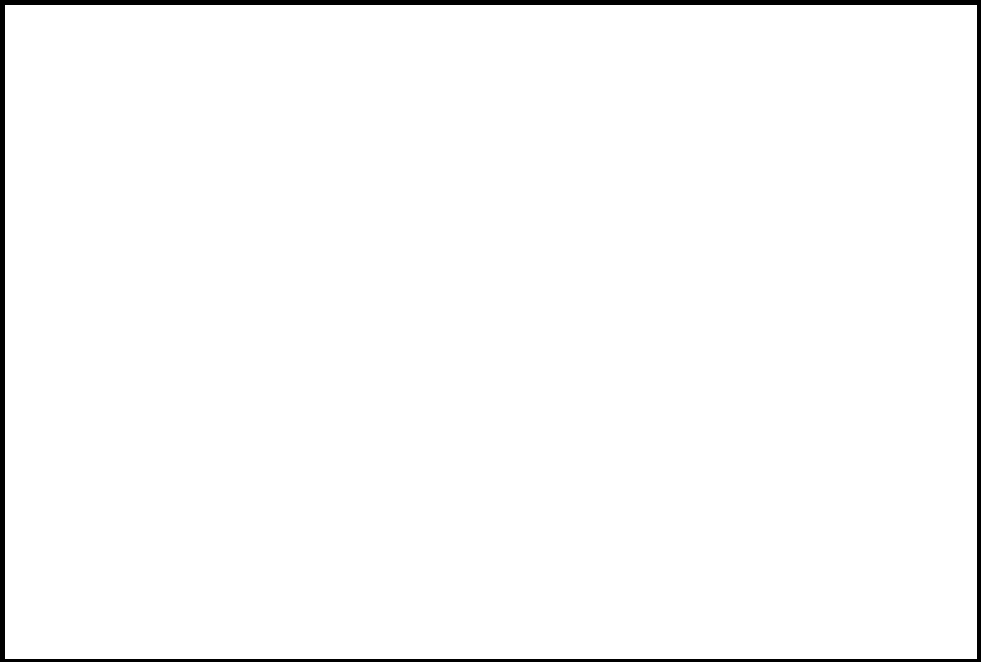
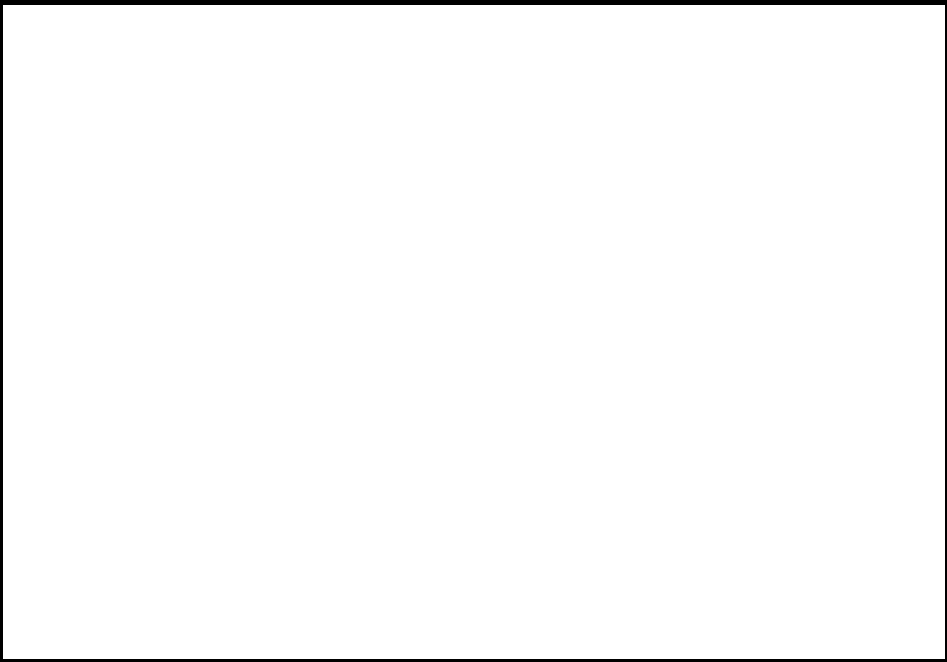
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Rockcliffe Boulevard		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

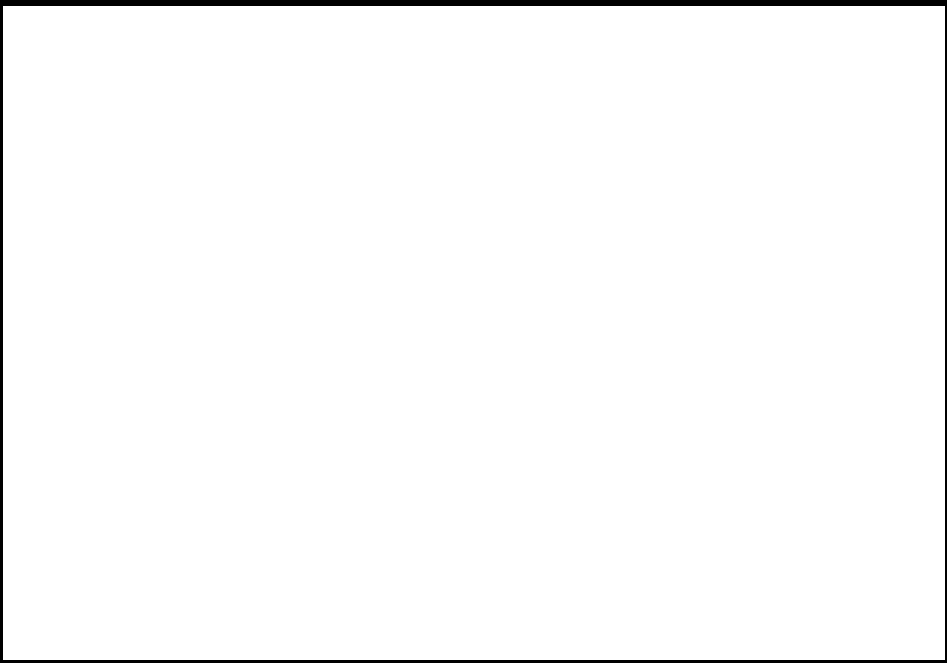
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	702
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1963
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-43

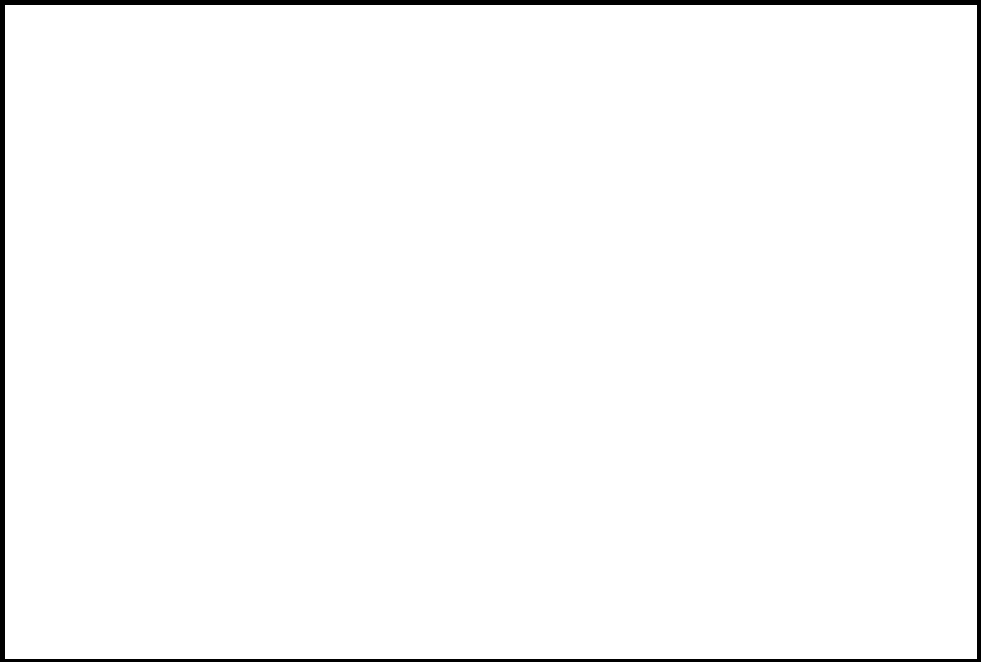
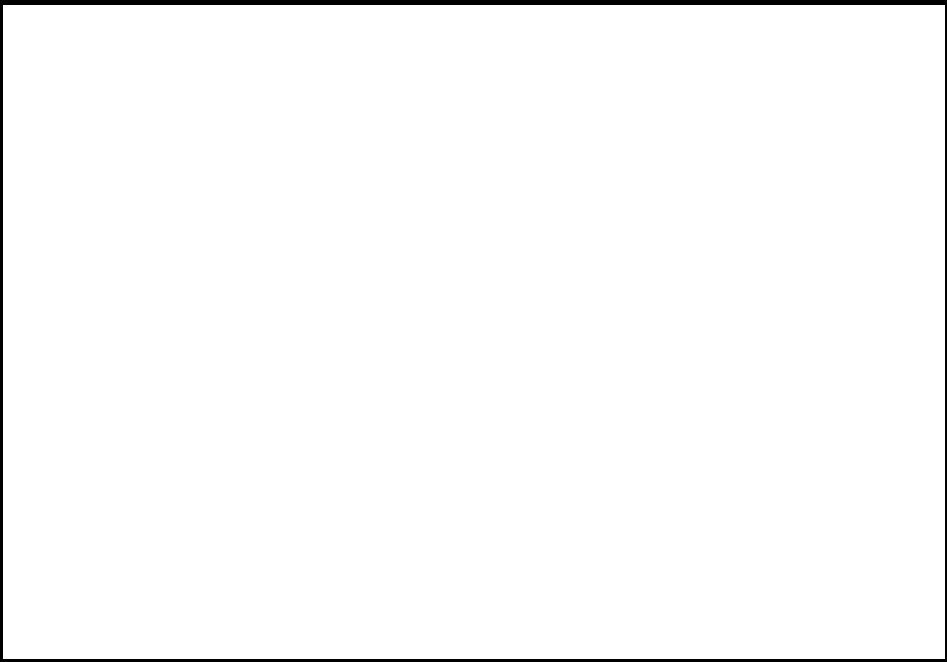
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Alliance Avenue		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

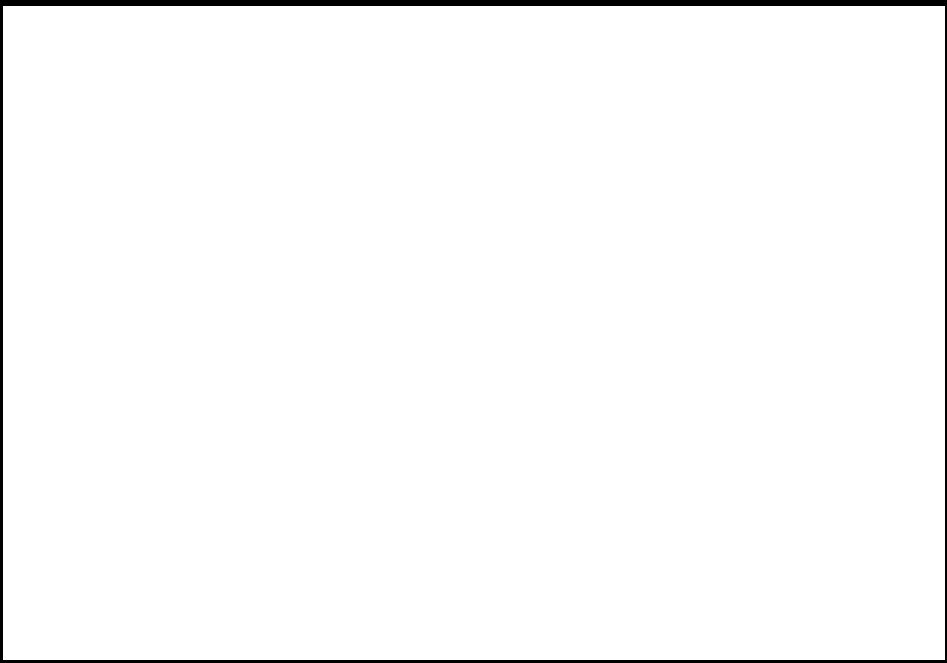
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	704
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1975
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-44

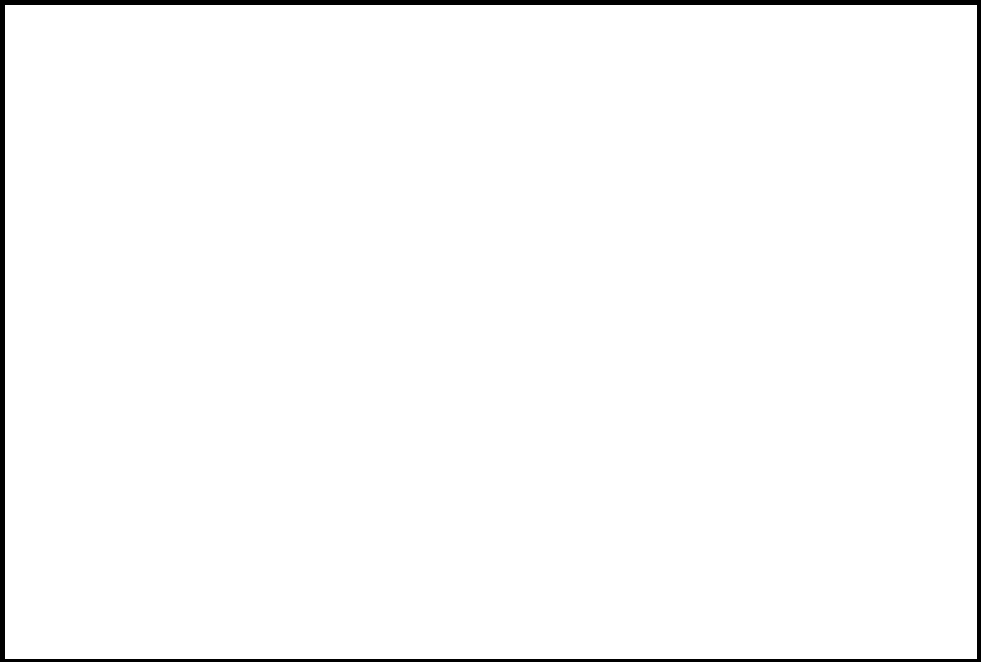
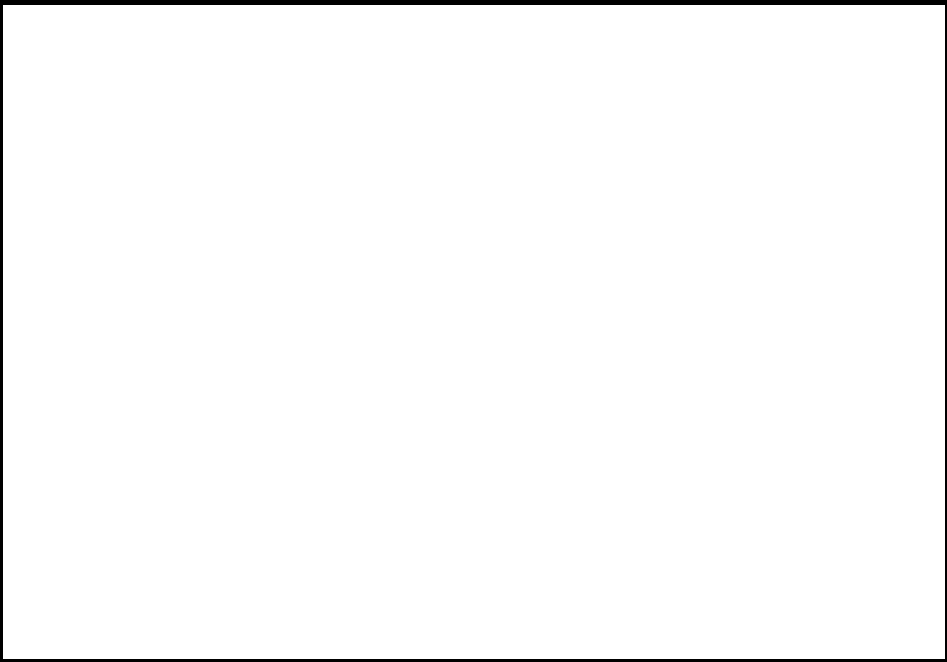
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Hilldale Road (Humber Blvd in previous model)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

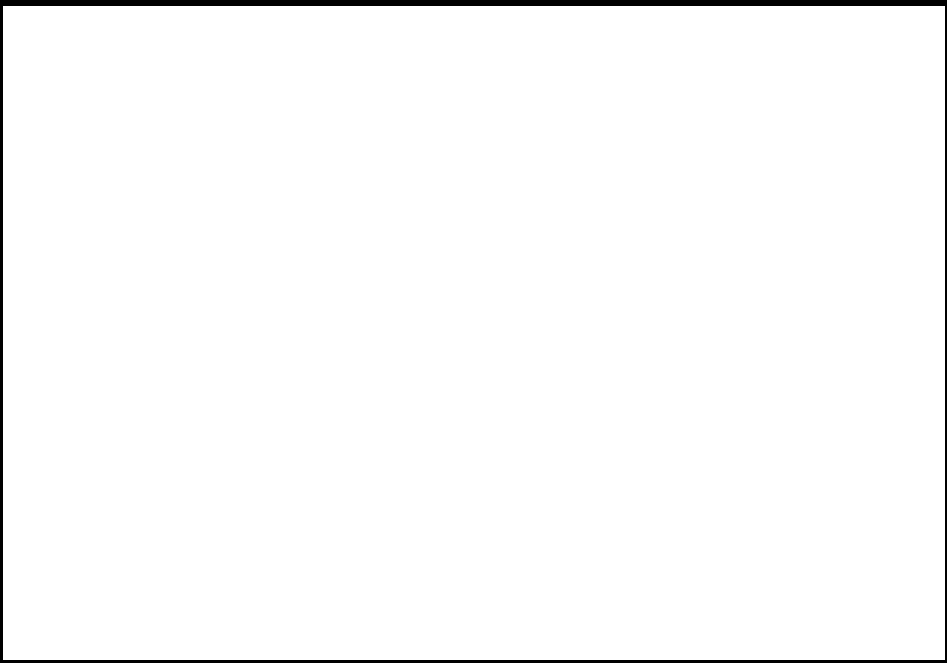
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	703
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1975
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-45

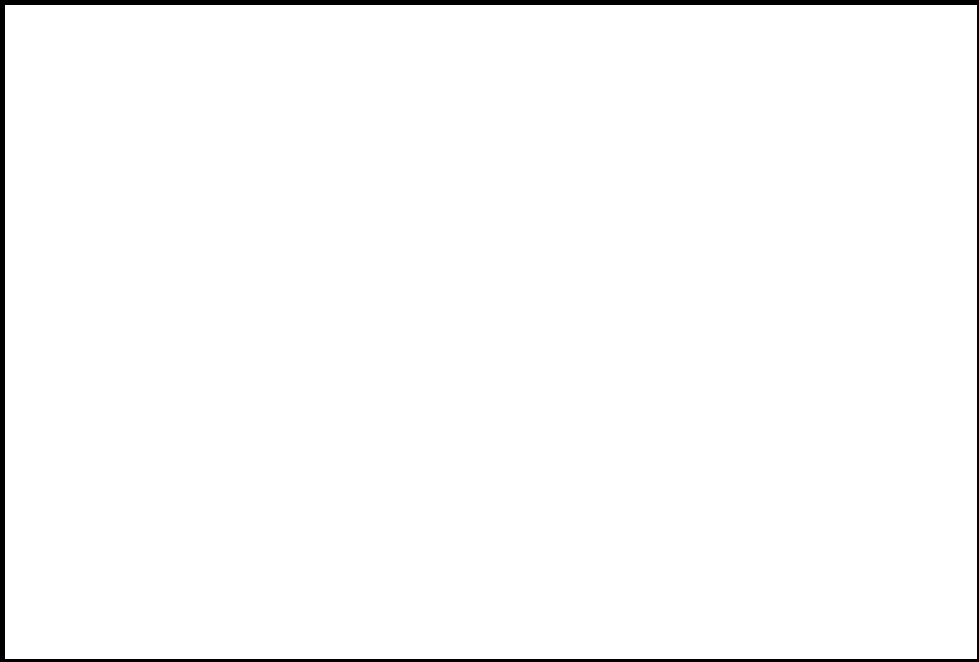
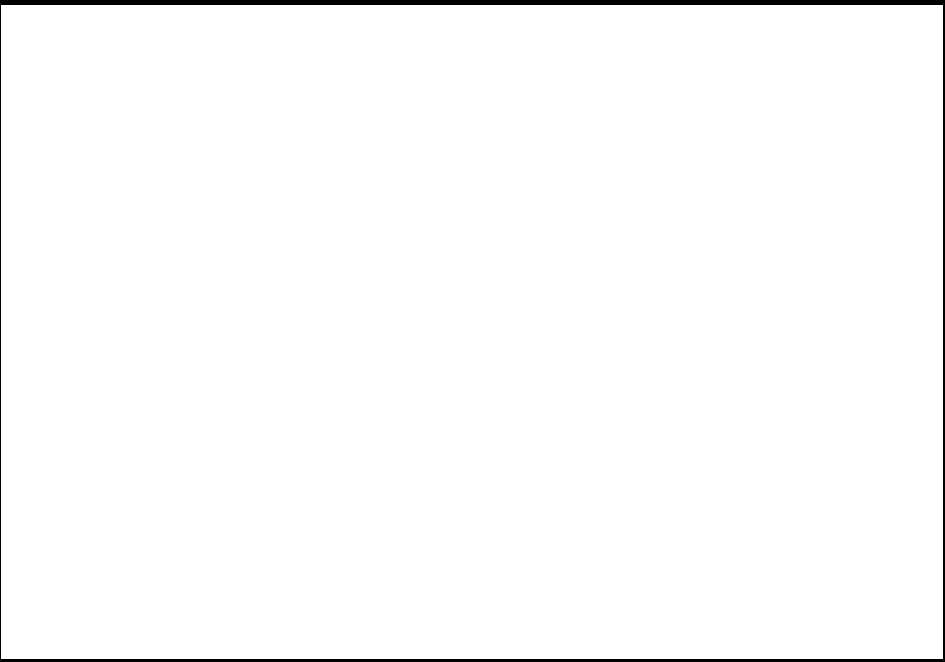
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Pedestrian Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

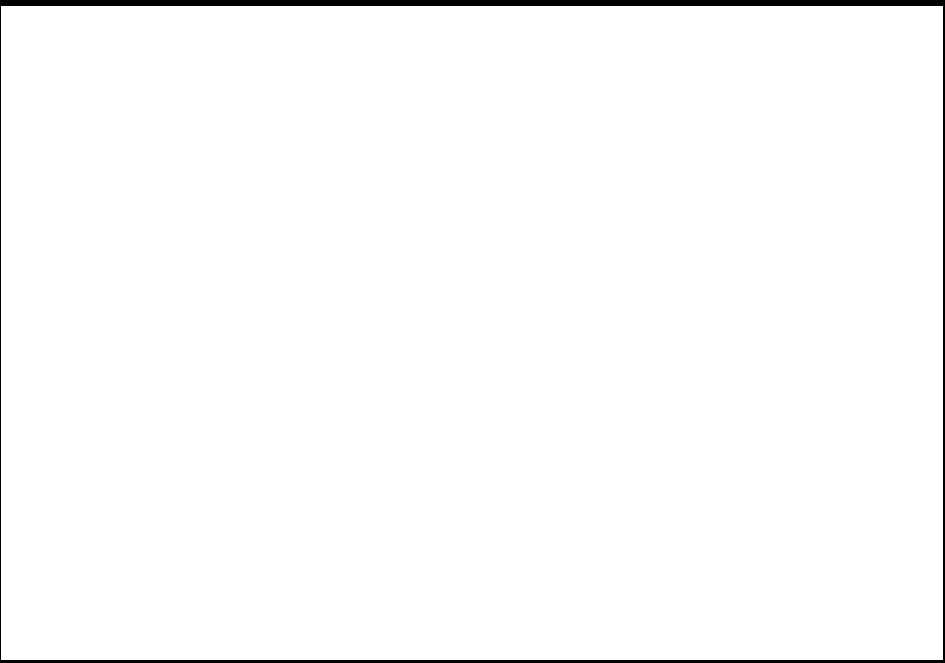
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	705
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1975
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

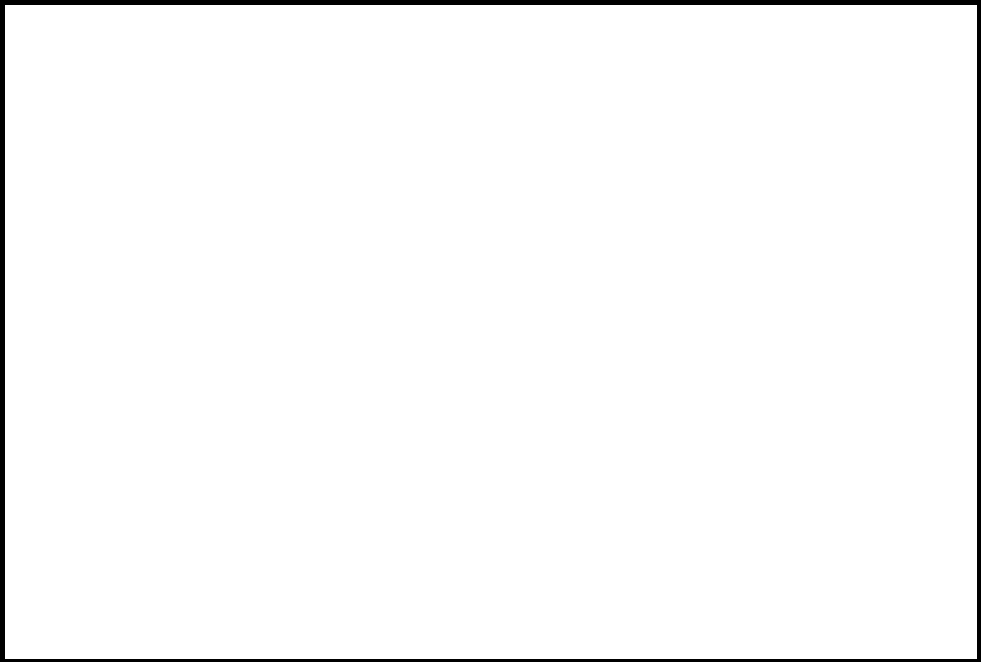
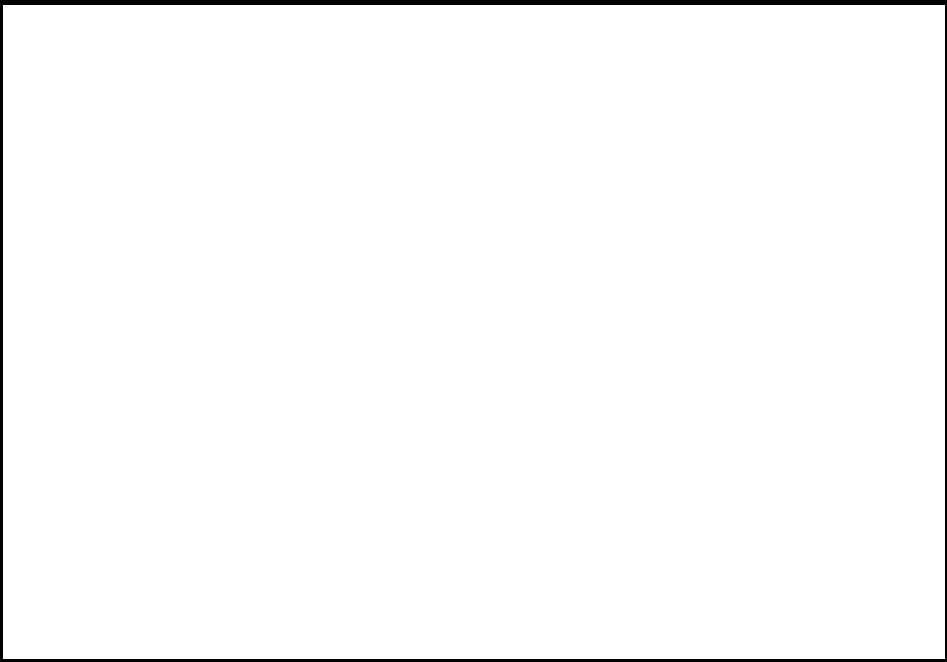
CROSSING # : Humber River-46

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Weston Road		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

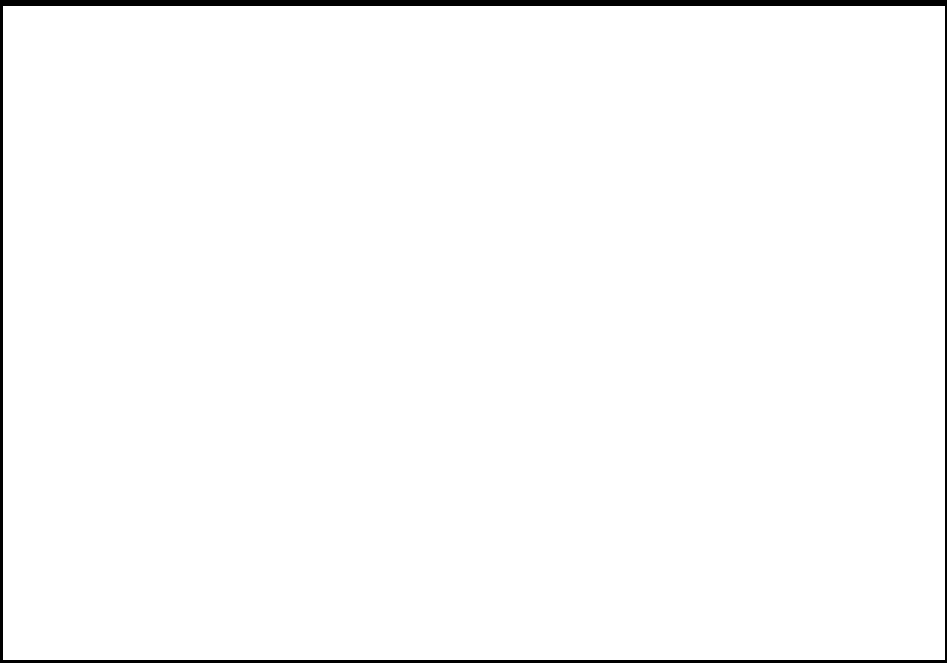
Site Sketch:	
Description of Photograph: Downstream face of structure	

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	92
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1980
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-47

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

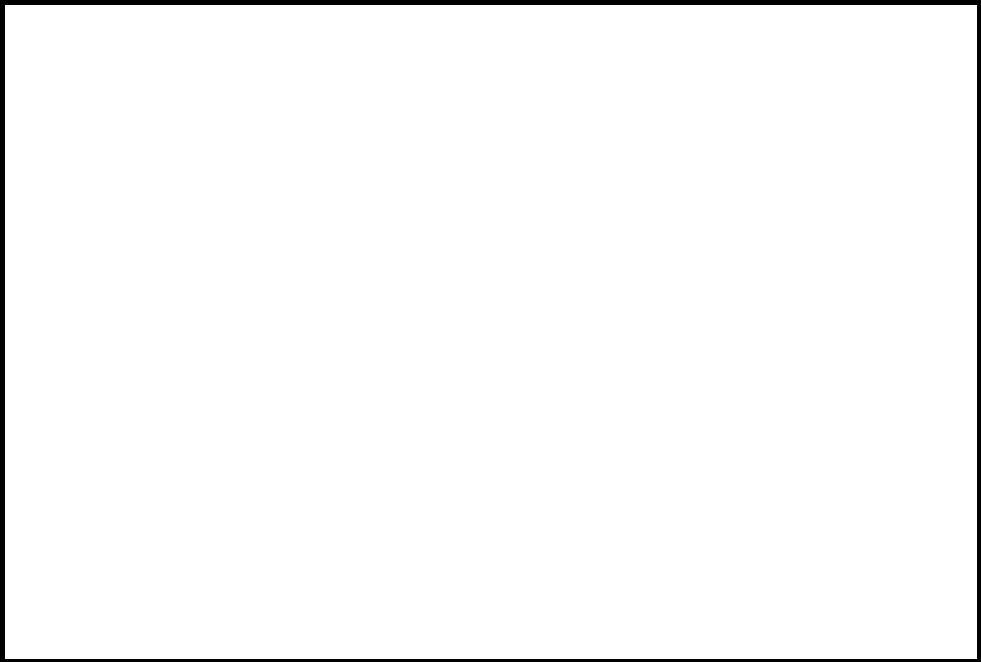
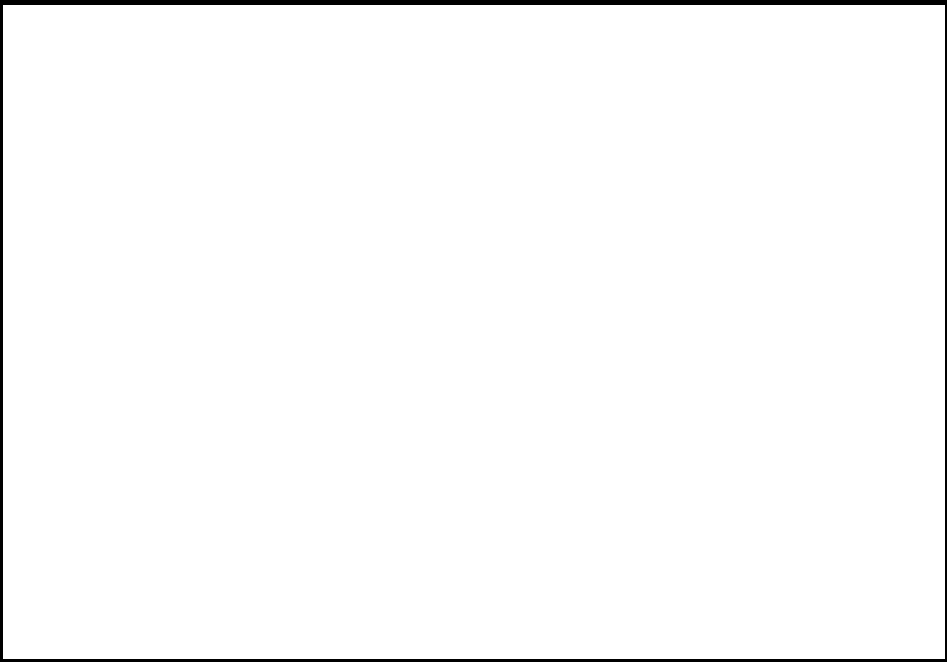
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

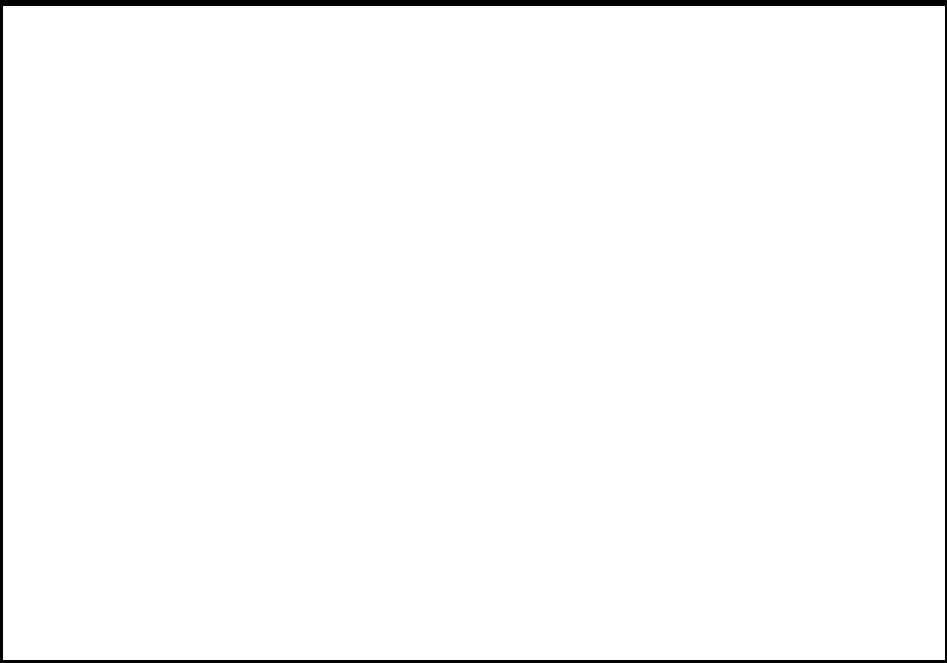
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308510
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1995
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

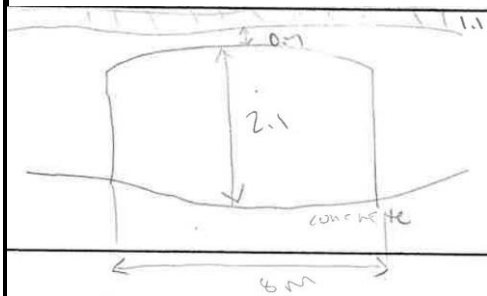
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-48

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	150
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.1	Width (m):	8	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #1	Length (m):	12.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	98.87	U/S Obvert Elev. (m):	102.27	Additional Flow Information: N/A	
HEC-RAS Cross Section:	209.441	D/S Invert Elev. (m):	98.65	D/S Obvert Elev. (m):	102.26		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Edenbridge Drive	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0.6				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	620
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

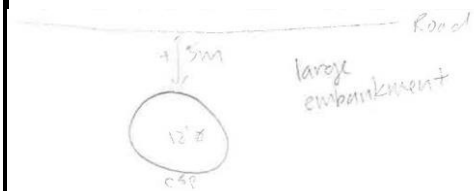
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-49

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	350
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.8	Width (m):	N/A	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #1	Length (m):	53.91			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	121.68	U/S Obvert Elev. (m):	125.12	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1180.649	D/S Invert Elev. (m):	120.88	D/S Obvert Elev. (m):	124.07		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	15				
Royal York Road		Height from Obvert to Top of Road (m):	4.74				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	665
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1955
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-50

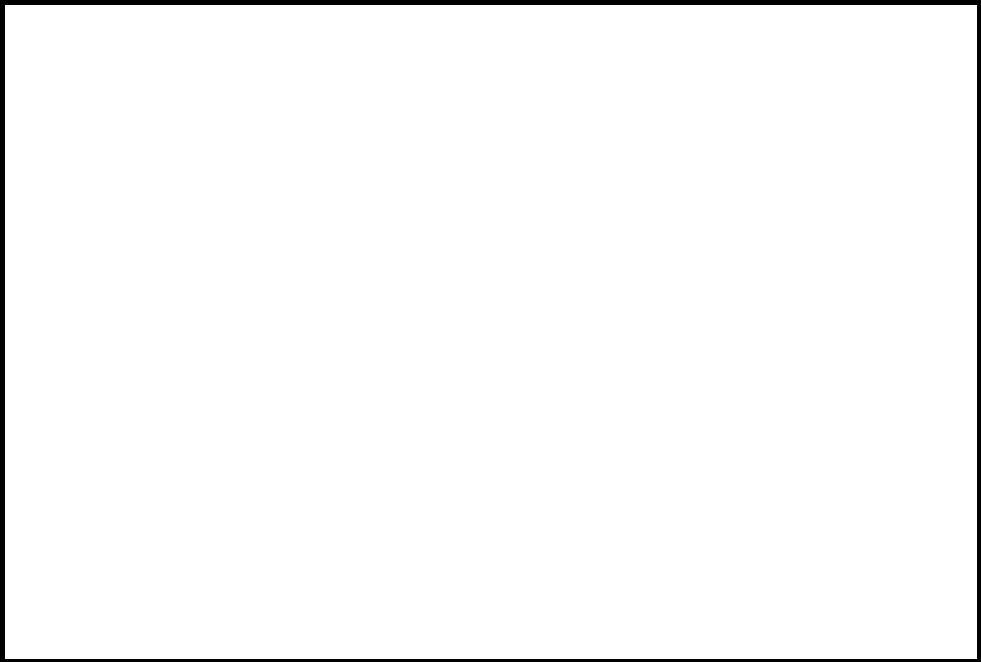
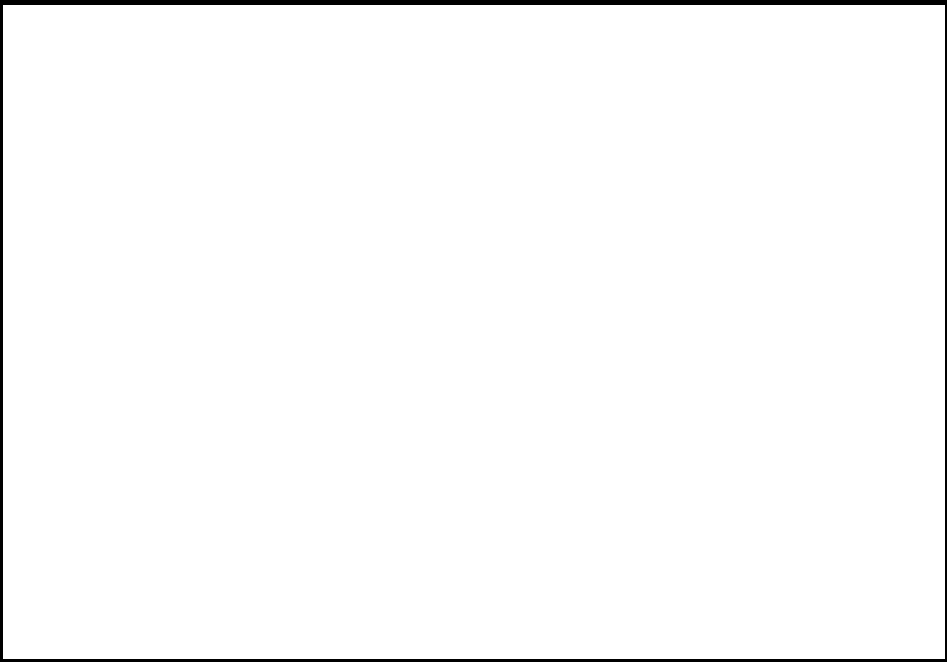
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

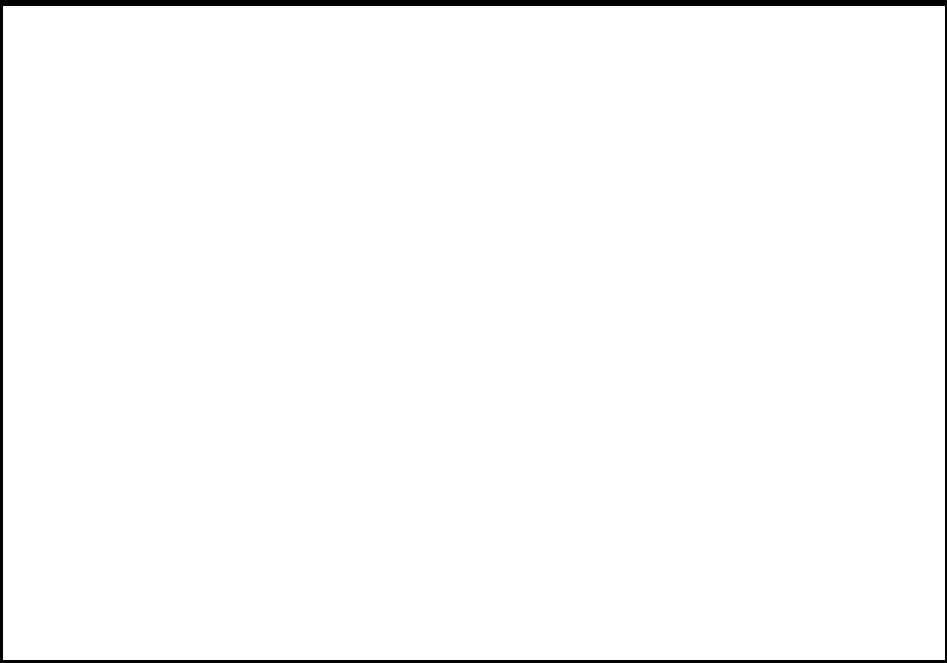
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-51

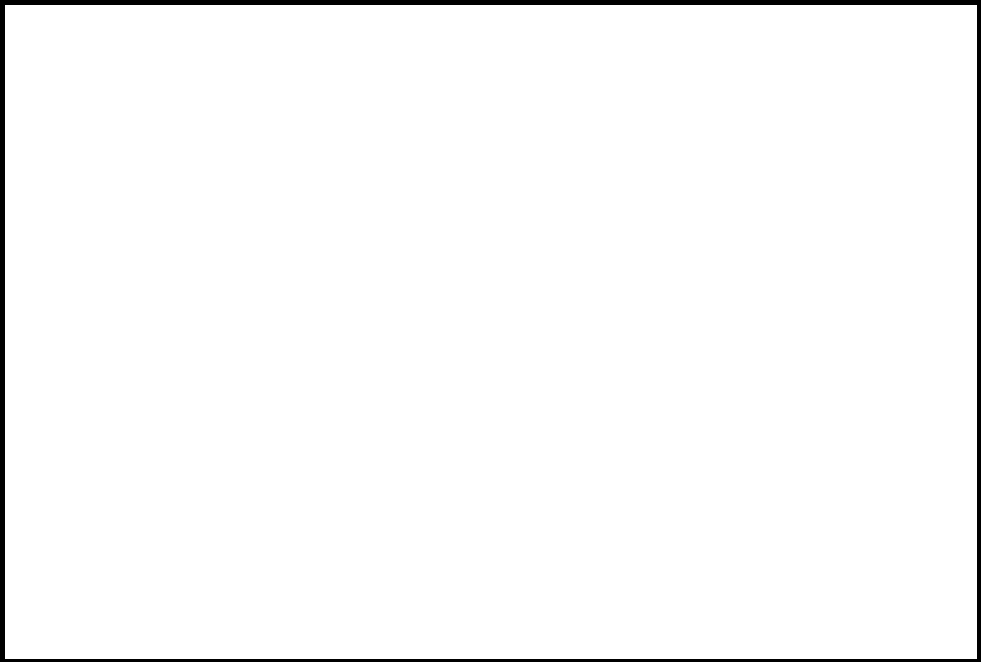
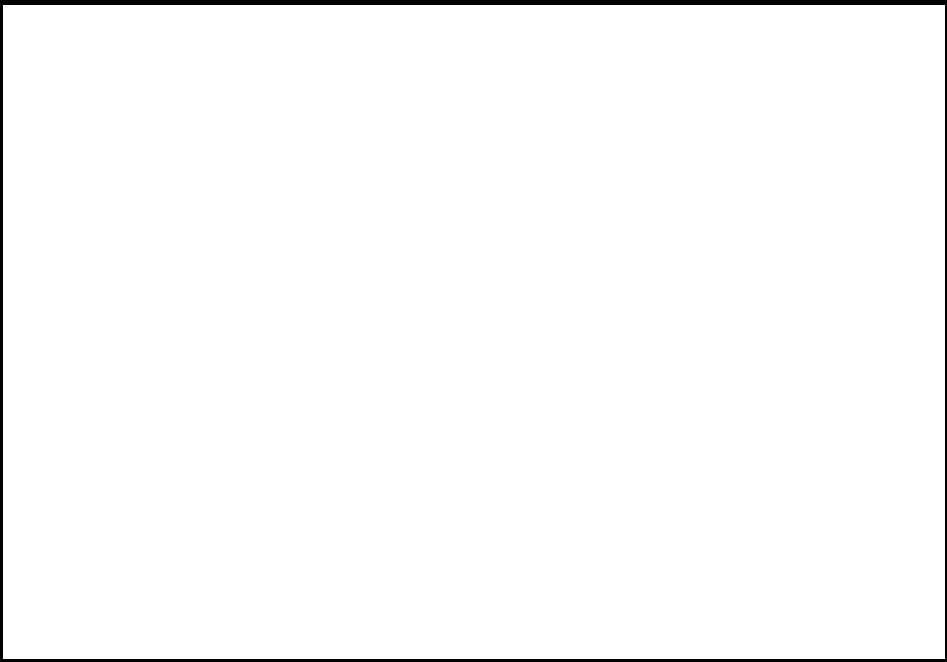
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

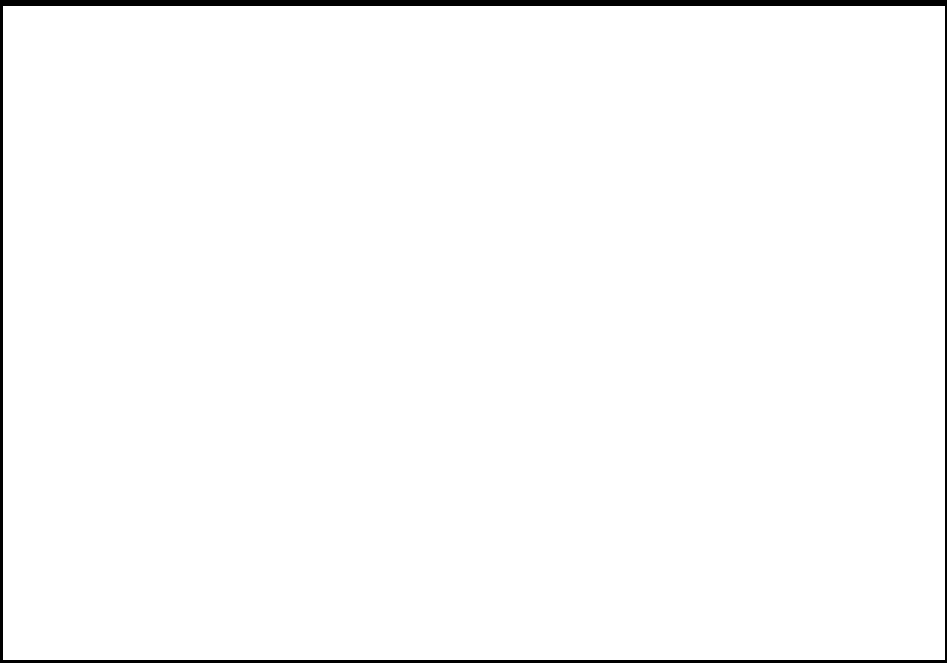
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-52

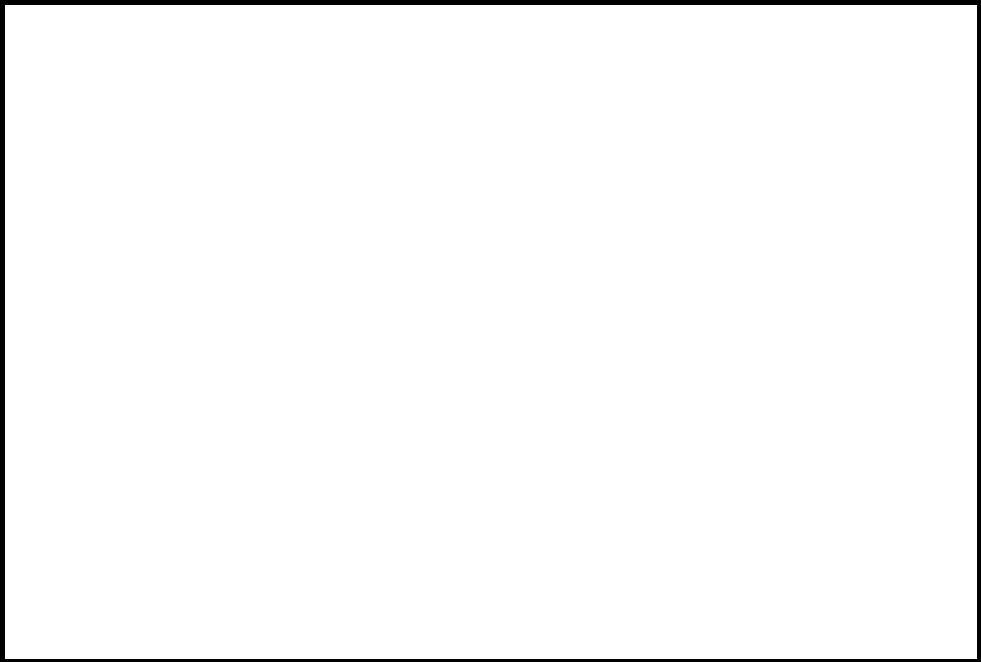
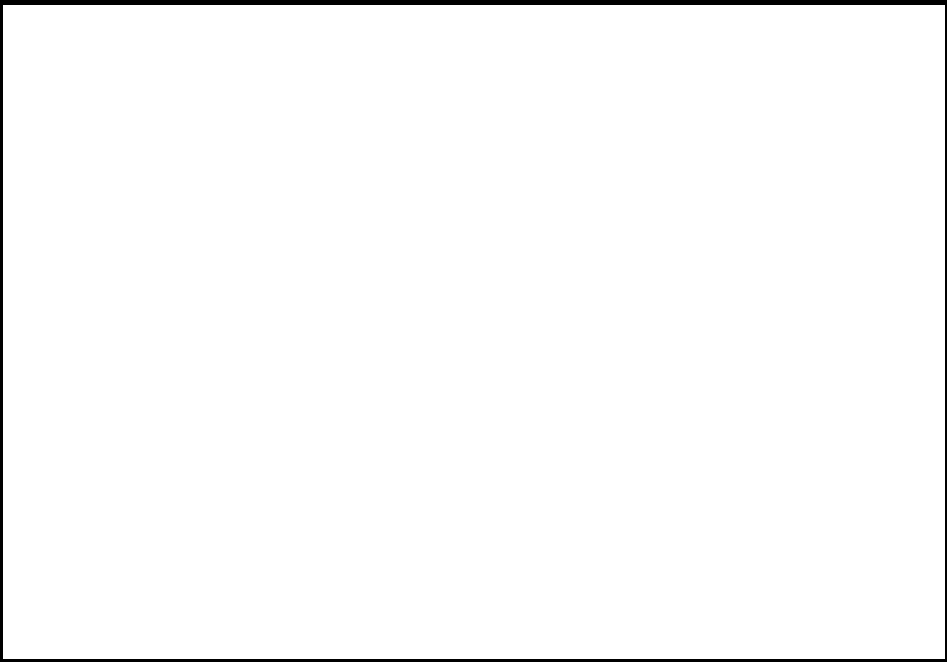
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Crossing		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

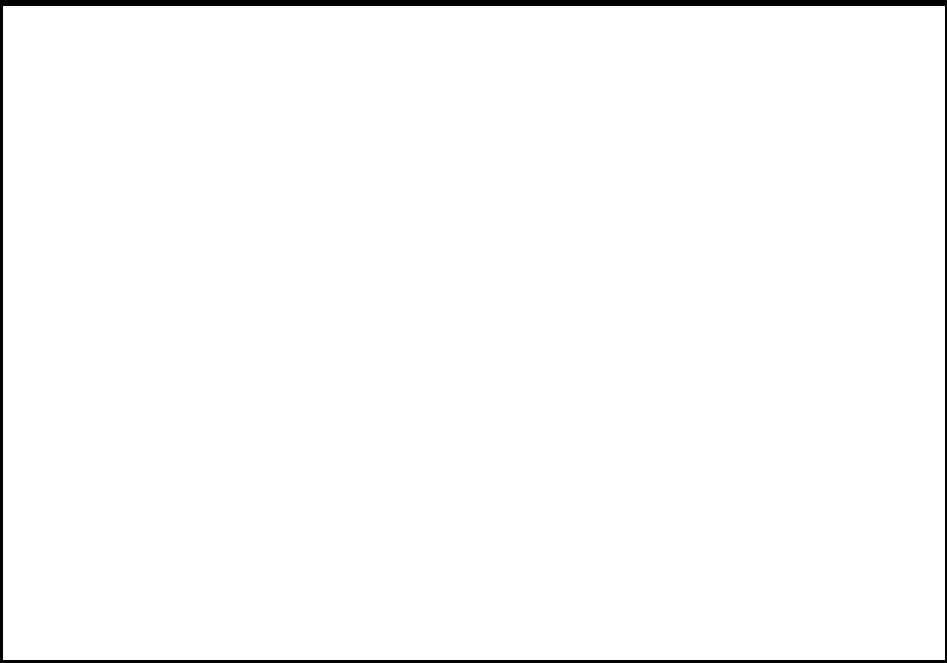
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-53

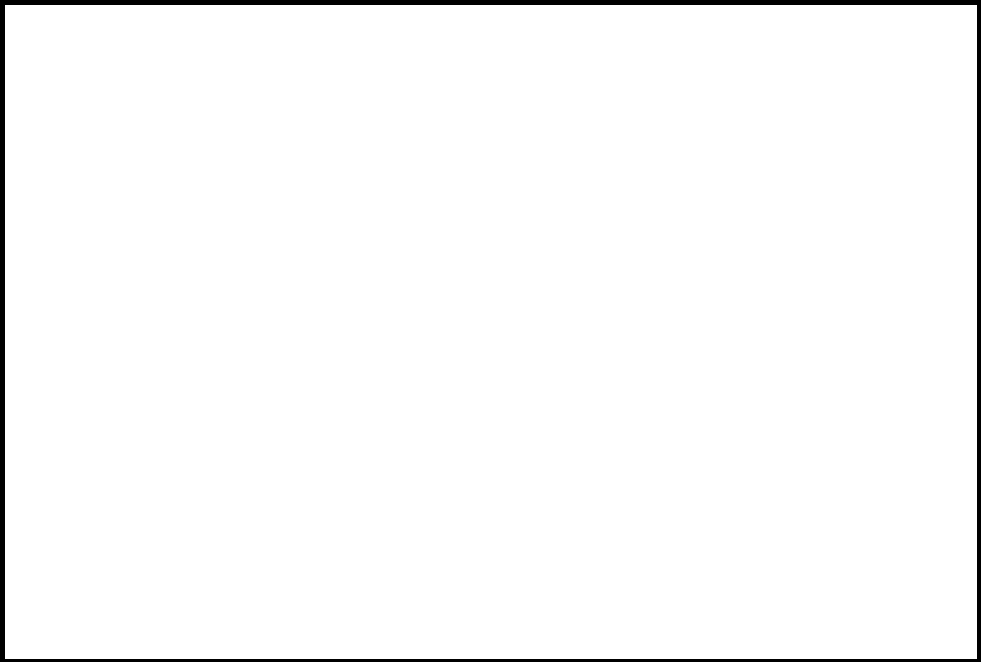
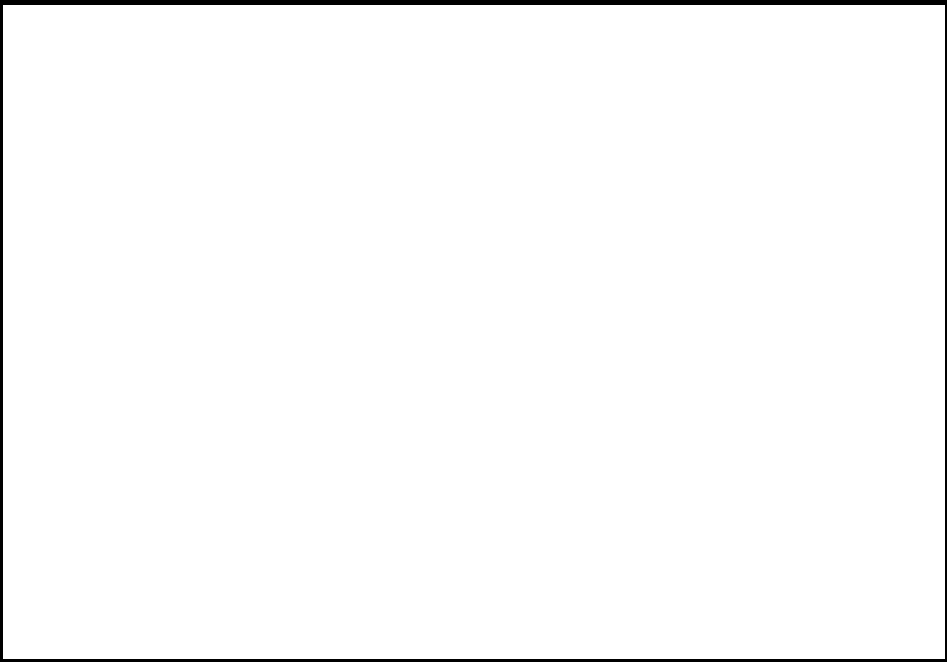
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Crossing		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

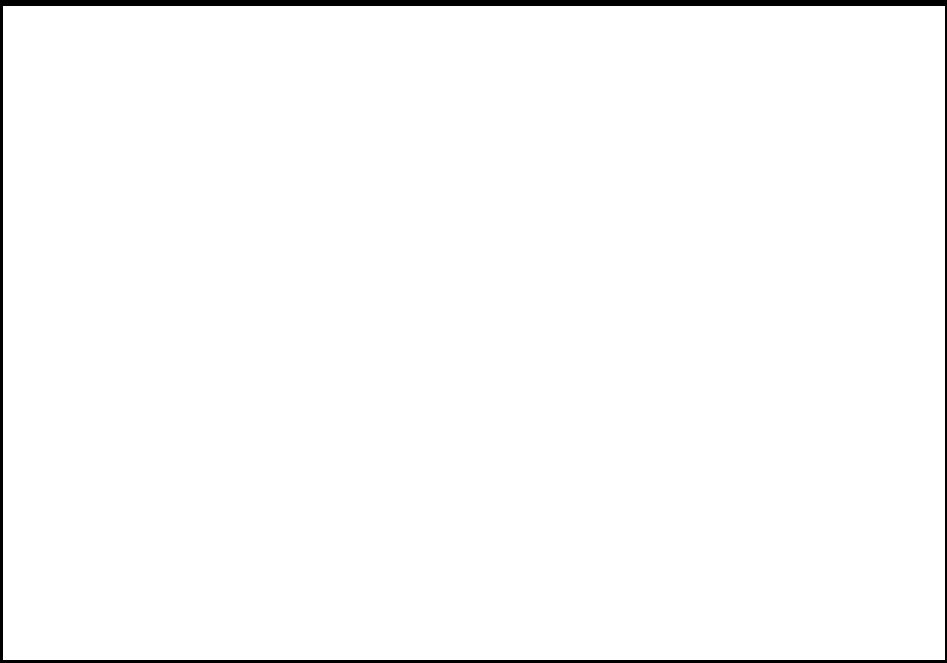
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

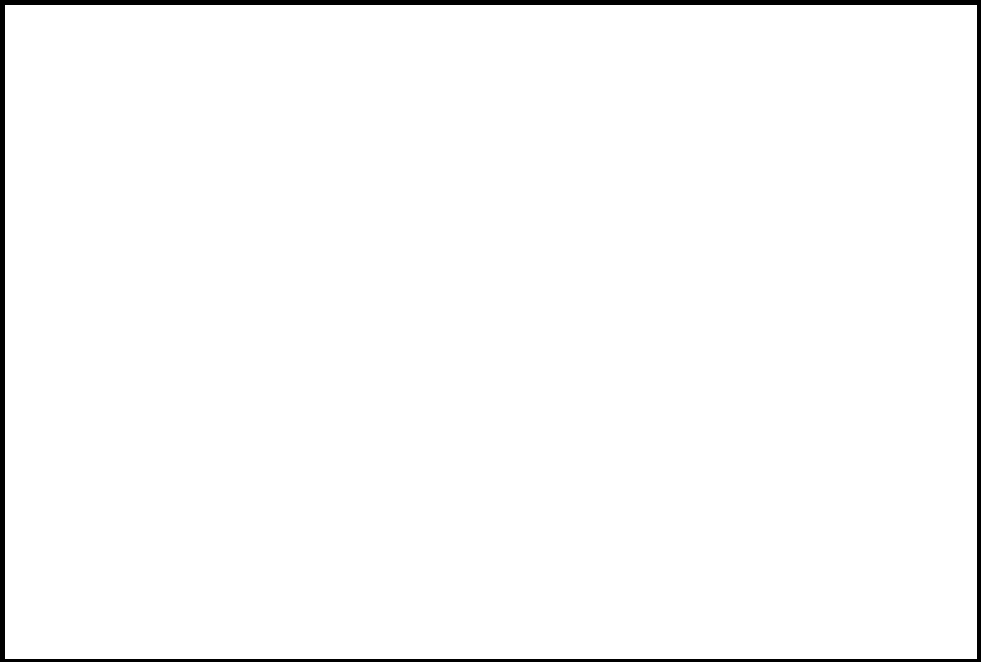
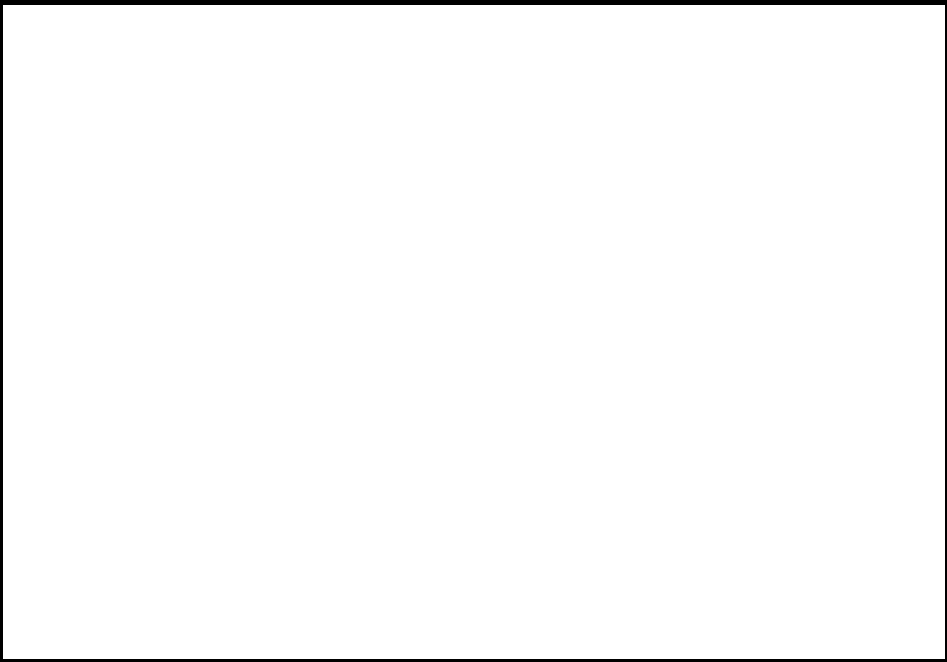
CROSSING # : Humber River-54

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Crossing		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

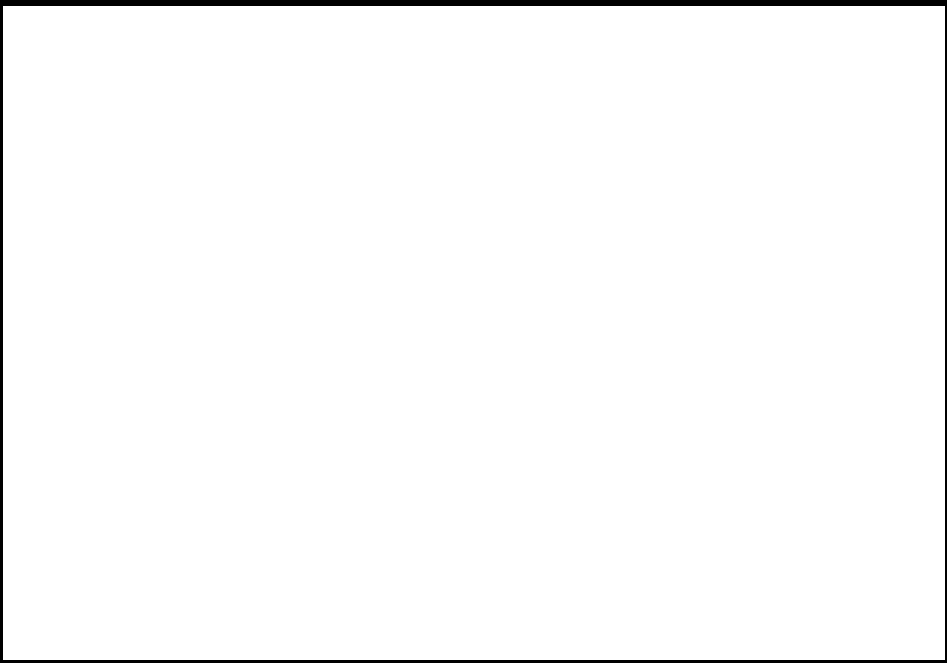
<div style="border-bottom: 1px solid black; padding-bottom: 5px;">Site Sketch:</div> <div style="border-bottom: 1px solid black; height: 30px;"></div> <div style="height: 300px;"></div>	<div style="display: flex; justify-content: space-between;"> <div>Description of Photograph:</div> <div>Downstream face of structure</div> <div>page 1</div> </div>
---	---

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-55

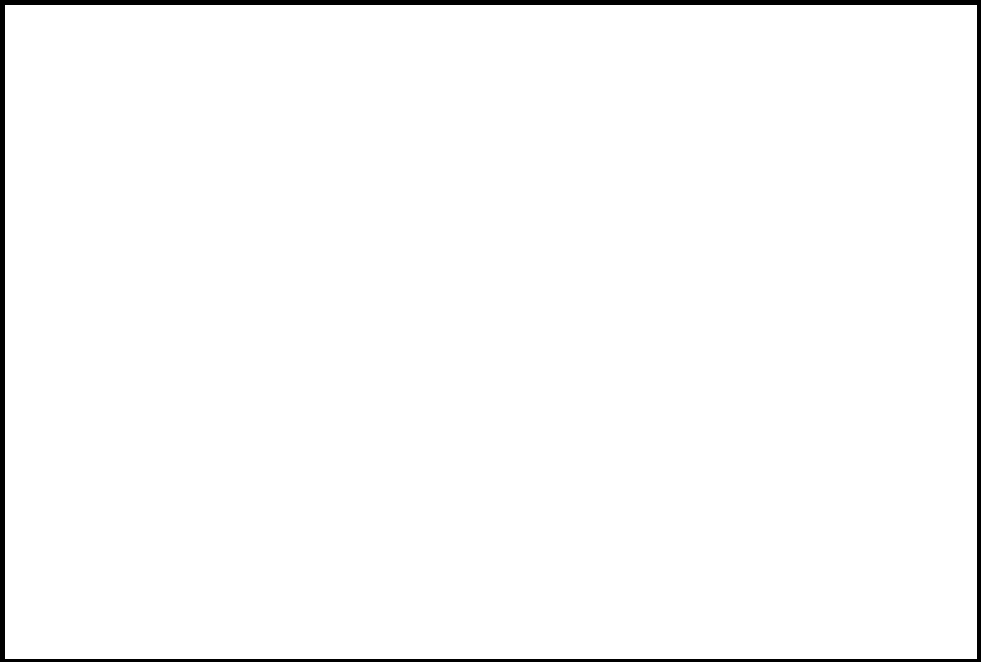
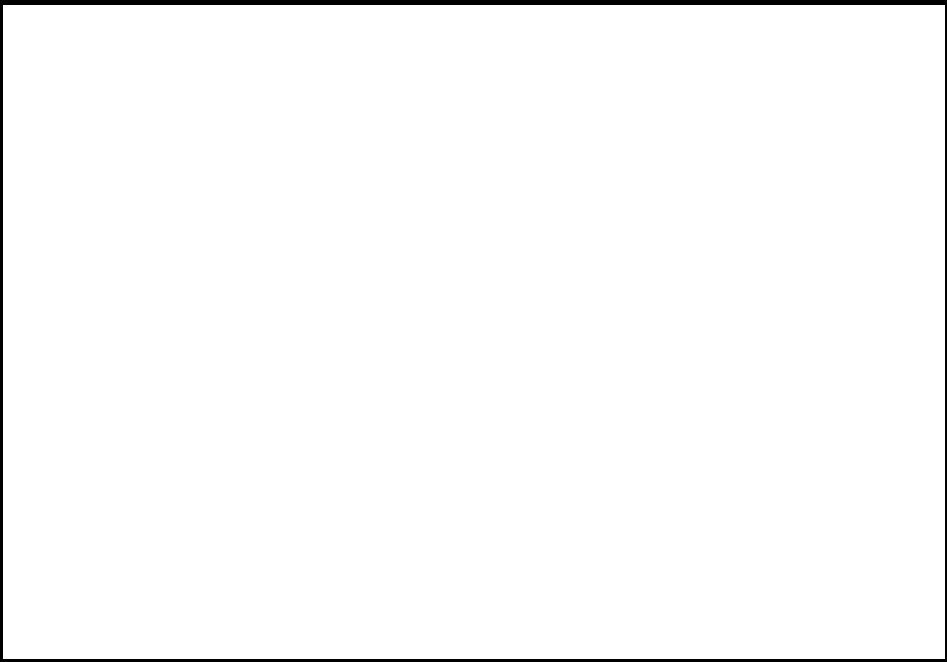
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #1	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Eden Valley Drive		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

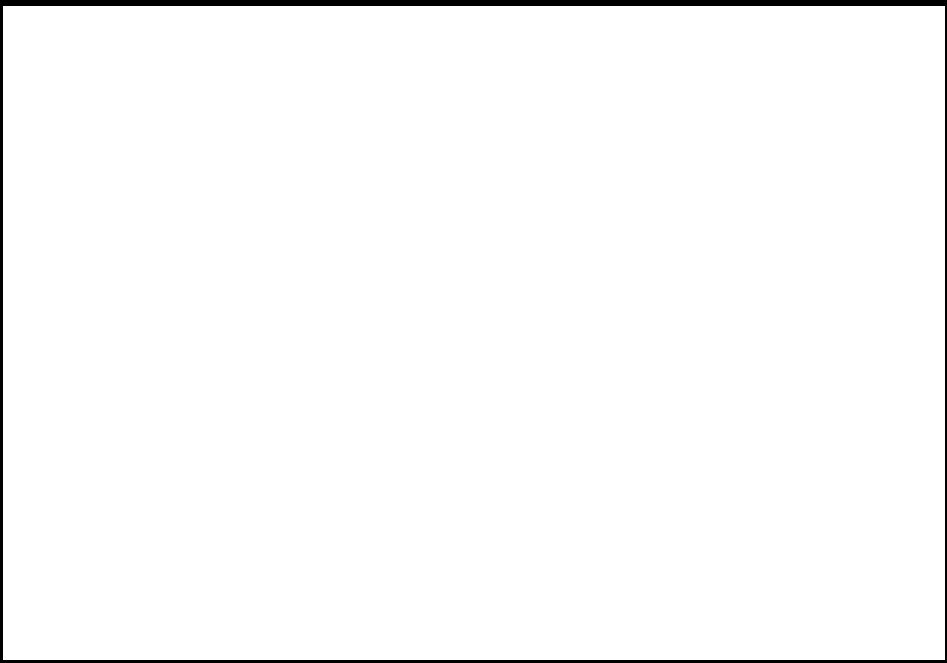
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-56

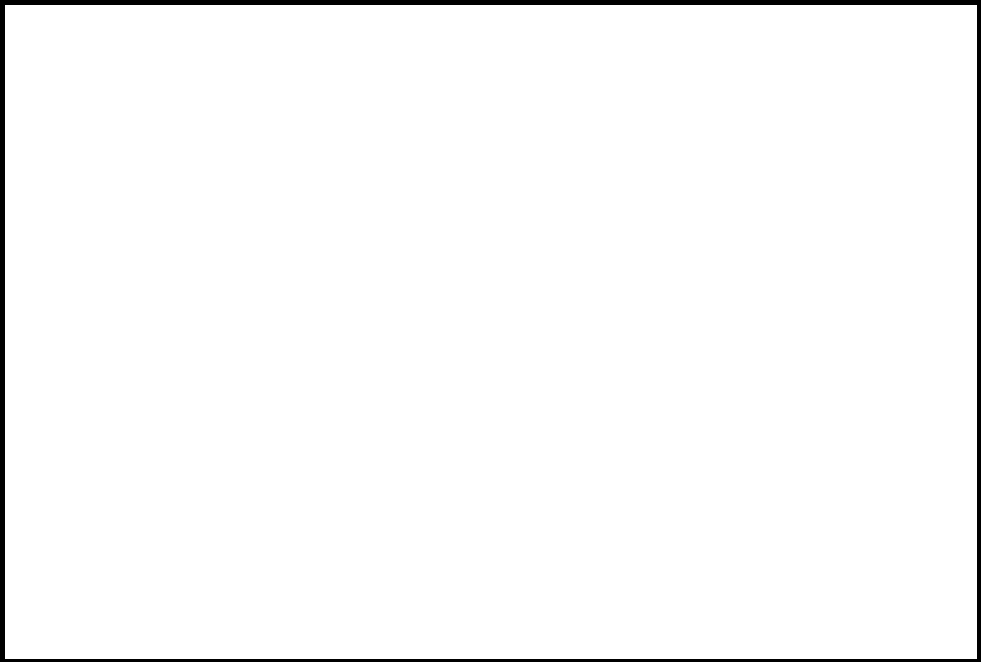
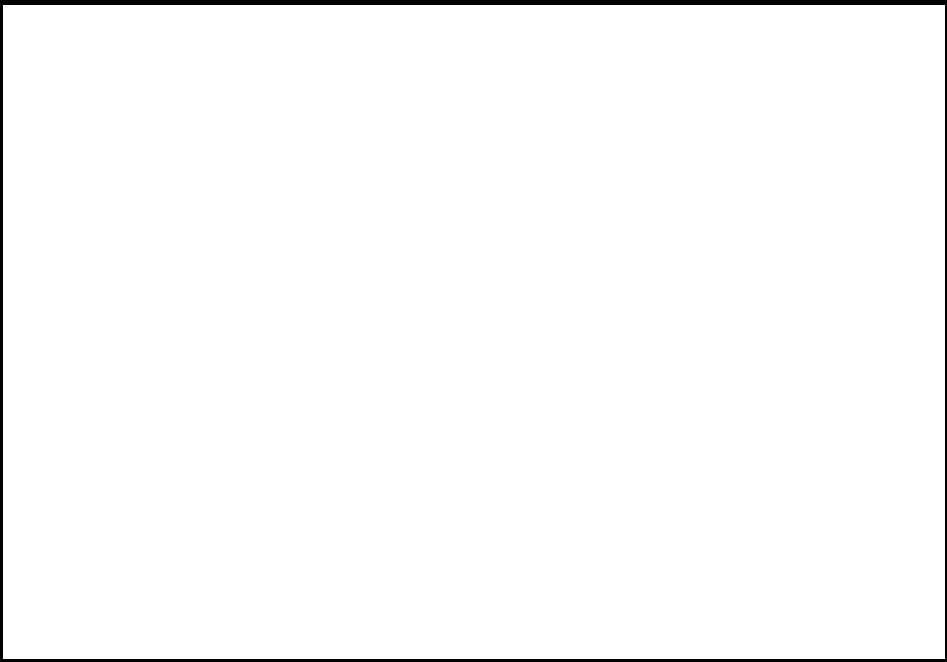
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Humber Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

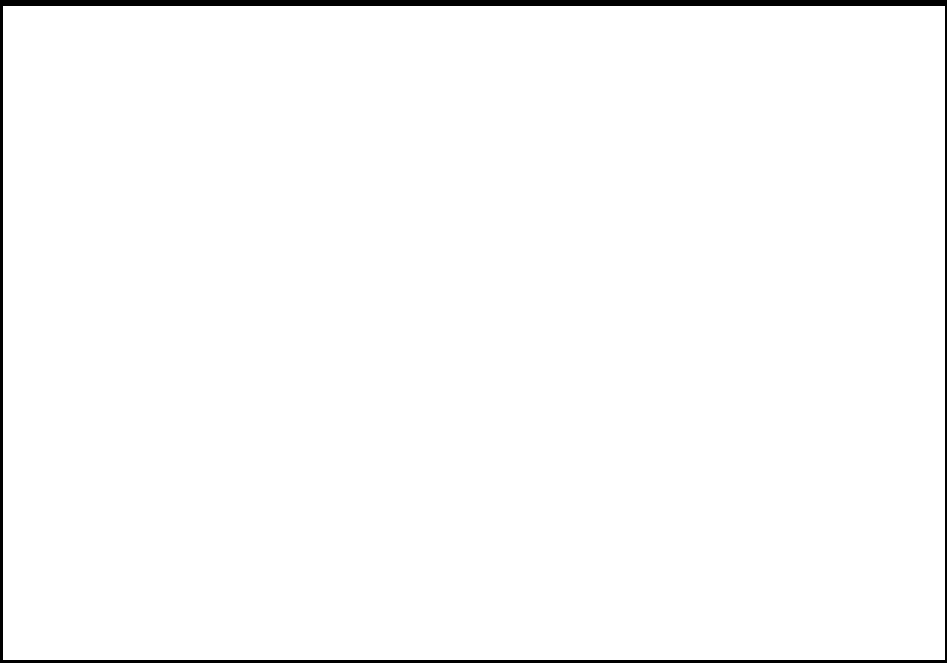
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

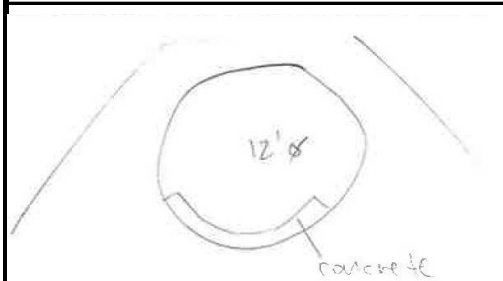
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-57

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.95	Width (m):	N/A	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	61			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	111.61	U/S Obvert Elev. (m):	115.56	Additional Flow Information: Leak inside culvert (left side if facing downstream)	
HEC-RAS Cross Section:	167.7546	D/S Invert Elev. (m):	110.03	D/S Obvert Elev. (m):	113.98		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Scarlett Road	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	5.28				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	396
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1960
Last Inspection:	2015
Next Inspection:	2017

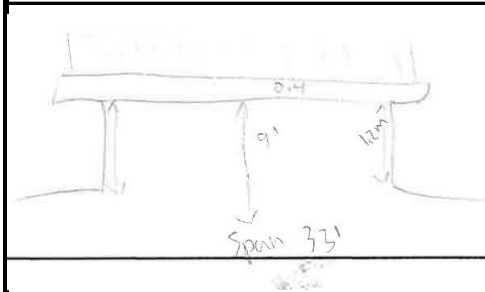
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-58

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.42	Width (m):	10	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	1.4			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	132.78	U/S Obvert Elev. (m):	135.2	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1402.237	D/S Invert Elev. (m):	132.78	D/S Obvert Elev. (m):	135.2		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Westmount Park (btw Leggat Ave & Westmount Park Road)		Height from Obvert to Top of Road (m):	0.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308530
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1980
Last Inspection:	2012
Next Inspection:	2017

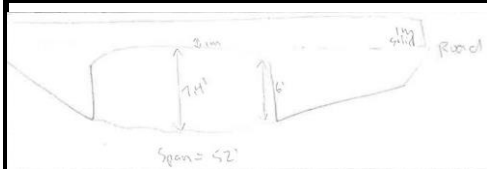
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-59

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.25	Width (m):	15.8	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	14.2			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	134.55	U/S Obvert Elev. (m):	136.8	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1725.08	D/S Invert Elev. (m):	134.49	D/S Obvert Elev. (m):	136.74		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	45				
Brittany Court		Height from Obvert to Top of Road (m):	2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	666
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1994
Last Inspection:	2015
Next Inspection:	2017

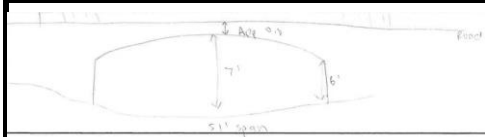
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-60

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	400
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.1	Width (m):	15.5	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	30			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	134.99	U/S Obvert Elev. (m):	137.06	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1801.486	D/S Invert Elev. (m):	134.75	D/S Obvert Elev. (m):	136.85		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	45				
Royal York Road		Height from Obvert to Top of Road (m):	1.33				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	623
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1994
Last Inspection:	2015
Next Inspection:	2017

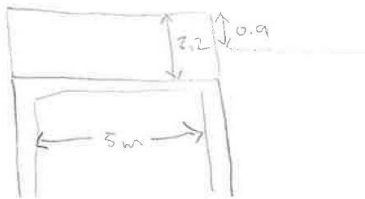
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-61

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.18	Width (m):	4.9	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	25			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	137.3	U/S Obvert Elev. (m):	139.48	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2113.388	D/S Invert Elev. (m):	137.25	D/S Obvert Elev. (m):	139.34		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
The Westway		Height from Obvert to Top of Road (m):	1.6				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	677
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1956
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-62

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel/Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.96	Width (m):	10.94	Upstream Erosion (Y/N):	N
Tributary Name:	Humber Creek	Length (m):	2.1			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	137.71	U/S Obvert Elev. (m):	139.6	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2375.916	D/S Invert Elev. (m):	137.64	D/S Obvert Elev. (m):	139.6		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Alex Marchetti Park - Bridge (1)	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.03				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308499
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1955
Last Inspection:	2012
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-63

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.1	Width (m):	17.74	Upstream Erosion (Y/N):	N
Tributary Name:	Humber Creek	Length (m):	1.2			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	138.1	U/S Obvert Elev. (m):	140.2	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2585.436	D/S Invert Elev. (m):	138.1	D/S Obvert Elev. (m):	140.2		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Alex Marchetti Park - Bridge (2)		Height from Obvert to Top of Road (m):	0.35				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308500
Condition:	Good
Owner:	City of Toronto
Year Constructed:	2000
Last Inspection:	2012
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-64

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel/Wood			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.03	Width (m):	24	Upstream Erosion (Y/N):	N
Tributary Name:	Humber Creek	Length (m):	1.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	138.81	U/S Obvert Elev. (m):	141.75	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2761.94	D/S Invert Elev. (m):	138.72	D/S Obvert Elev. (m):	141.75		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Alex Marchetti Park - Bridge (2)	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0.75				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308546
Condition:	Good
Owner:	City of Toronto
Year Constructed:	2011
Last Inspection:	2012
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-65

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.6	Width (m):	9	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	21			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	141.2	U/S Obvert Elev. (m):	144.8	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3182.91	D/S Invert Elev. (m):	141.08	D/S Obvert Elev. (m):	144.8		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	30				
Islington Avenue		Height from Obvert to Top of Road (m):	0.71				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	176
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1959
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-66

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Private Driveway			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.75	Width (m):	5.5	Upstream Erosion (Y/N):	N
Tributary Name:	Humber Creek	Length (m):	117.1			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	142.31	U/S Obvert Elev. (m):	144.96	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3490.4	D/S Invert Elev. (m):	141.94	D/S Obvert Elev. (m):	144.48		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	30				
Parallel with Dixon Rd, Private Driveway		Height from Obvert to Top of Road (m):	2.74				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	231
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1976
Last Inspection:	2015
Next Inspection:	2017

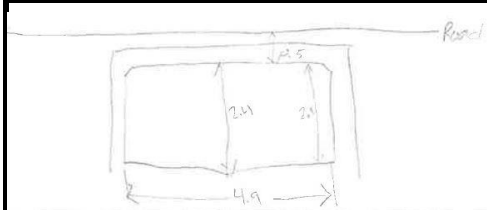
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-67

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	16/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.44	Width (m):	4.88	Upstream Erosion (Y/N):	Y
Tributary Name:	Humber Creek	Length (m):	80			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	144.09	U/S Obvert Elev. (m):	145.97	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3919.765	D/S Invert Elev. (m):	143.47	D/S Obvert Elev. (m):	145.91		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): Wincott Drive		Skew Angle of Crossing (Degrees):	10				
		Height from Obvert to Top of Road (m):	0.77				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	679
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1960
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-68

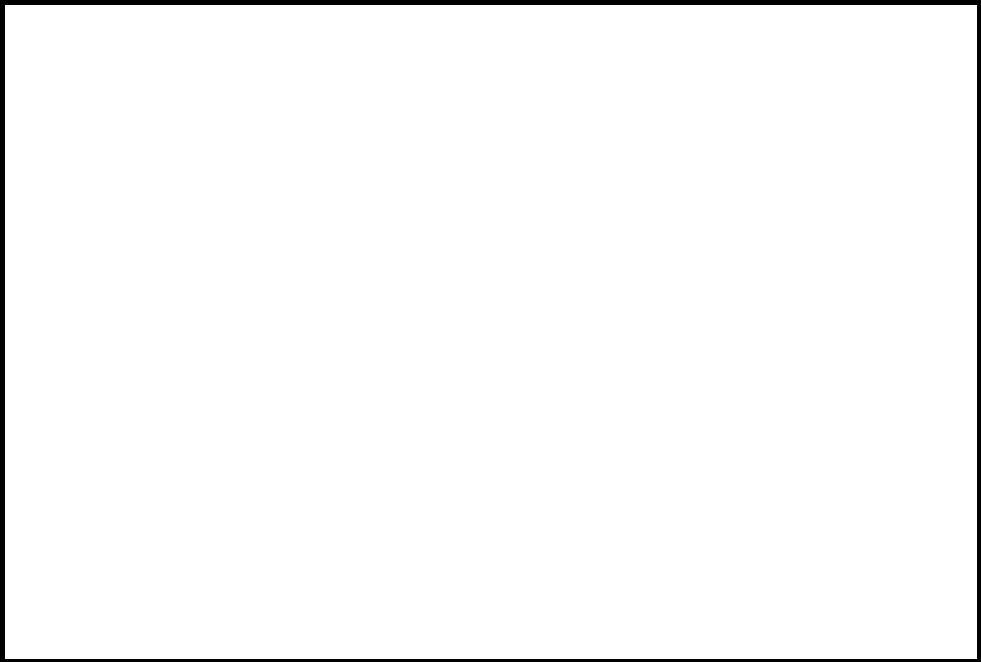
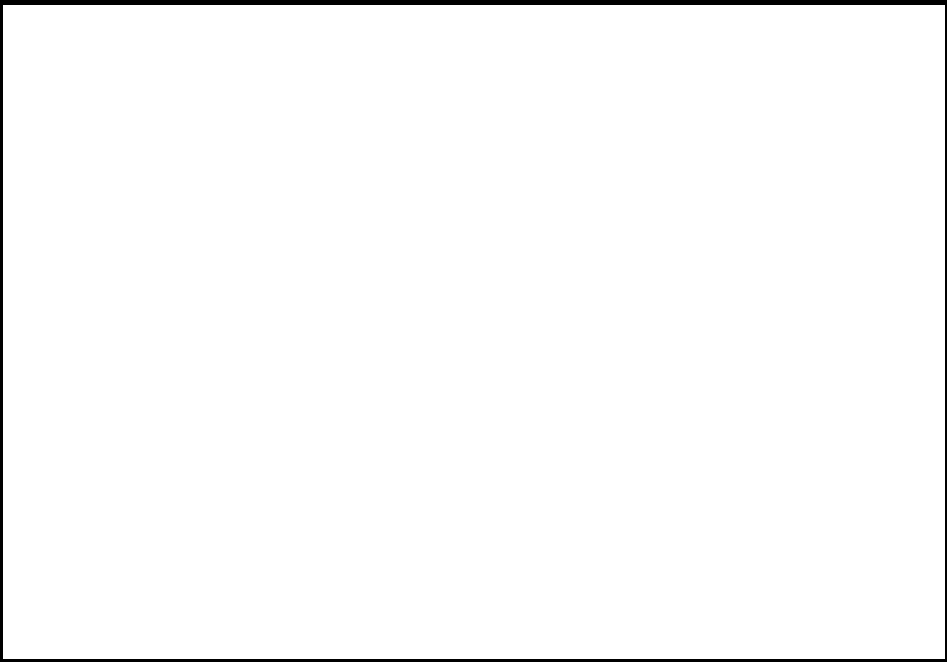
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #3	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Pine Point Park		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

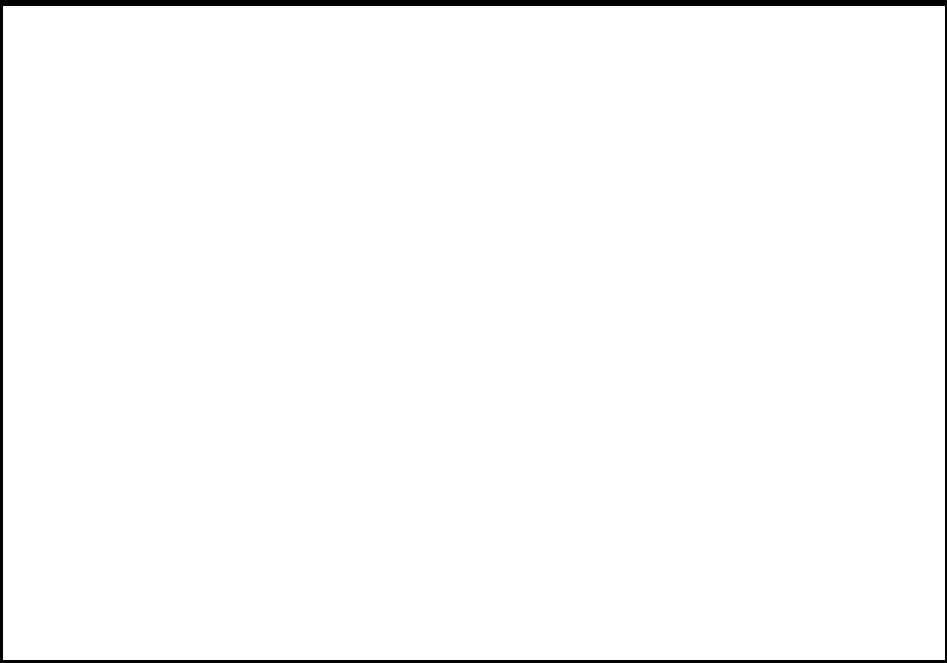
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308503
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1990
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-69

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.65	Width (m):	5.48	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	31			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	128.08	U/S Obvert Elev. (m):	131.72	Additional Flow Information: N/A	
HEC-RAS Cross Section:	709.2499	D/S Invert Elev. (m):	127.43	D/S Obvert Elev. (m):	131.12		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Norfield Crescent	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	4.74				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	667
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1964
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-70

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.11	Width (m):	9.8	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	1.7			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	131.96	U/S Obvert Elev. (m):	135.07	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1077.975	D/S Invert Elev. (m):	131.84	D/S Obvert Elev. (m):	135.07		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - The Elms Park		Height from Obvert to Top of Road (m):	0.35				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308532
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1985
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-71

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.6	Width (m):	4.88	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	34			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	137.5	U/S Obvert Elev. (m):	139.79	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1336.632	D/S Invert Elev. (m):	136.36	D/S Obvert Elev. (m):	138.86		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	60				
Islington Avenue		Height from Obvert to Top of Road (m):	0.82				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	274
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1956
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-72

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.2	Width (m):	3.2	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	16			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	140.36	U/S Obvert Elev. (m):	142.09	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1579	D/S Invert Elev. (m):	139.9	D/S Obvert Elev. (m):	142.1		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Redwater Drive	Skew Angle of Crossing (Degrees):	10				
		Height from Obvert to Top of Road (m):	0.8				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	668
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1950
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-73

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.15	Width (m):	3.66	Upstream Erosion (Y/N):	Y
Tributary Name:	Tributary #3	Length (m):	12.4			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	143.52	U/S Obvert Elev. (m):	145.66	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1980.414	D/S Invert Elev. (m):	143.54	D/S Obvert Elev. (m):	145.69		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Drumheller Road		Height from Obvert to Top of Road (m):	0.6				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	669
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1950
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-74

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	150
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.66	Width (m):	3.7	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	13			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	147.8	U/S Obvert Elev. (m):	150.46	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2425.411	D/S Invert Elev. (m):	147.16	D/S Obvert Elev. (m):	150.46		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Berry Creek Drive		Height from Obvert to Top of Road (m):	0.75				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure

City of Toronto Structure Data:

Structure ID:	670
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1950
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-75

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.56	Width (m):	5	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	30			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	150.48	U/S Obvert Elev. (m):	154.04	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2666.036	D/S Invert Elev. (m):	150	D/S Obvert Elev. (m):	153.88		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection): Kipling Avenue		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0.6				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	391
Condition:	Poor - Structure to be
Owner:	City of Toronto
Year Constructed:	1960
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-76

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal/Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.4	Width (m):	10.87	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	1.8			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	152.03	U/S Obvert Elev. (m):	153.43	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2883.22	D/S Invert Elev. (m):	152.02	D/S Obvert Elev. (m):	153.42		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Trail bridge – Brydon Road		Height from Obvert to Top of Road (m):	0.4				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

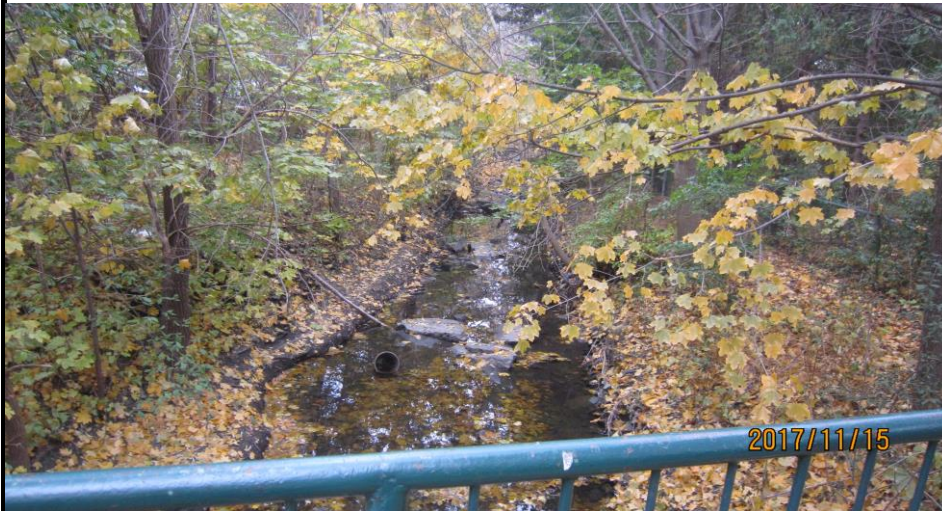
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	628
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1969
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-77

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Sewer Outfall			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.83	Width (m):	2.75	Upstream Erosion (Y/N):	N
Tributary Name:	Tributary #3	Length (m):	30			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	157.48	U/S Obvert Elev. (m):	159.31	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3768.831	D/S Invert Elev. (m):	157.48	D/S Obvert Elev. (m):	159.31		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Martin Grove Road	Skew Angle of Crossing (Degrees):	10				
		Height from Obvert to Top of Road (m):	1.5				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

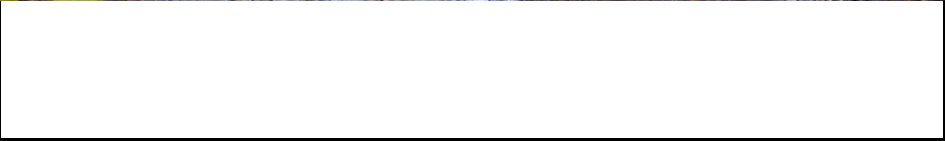


Description of Photograph:

Downstream face of structure

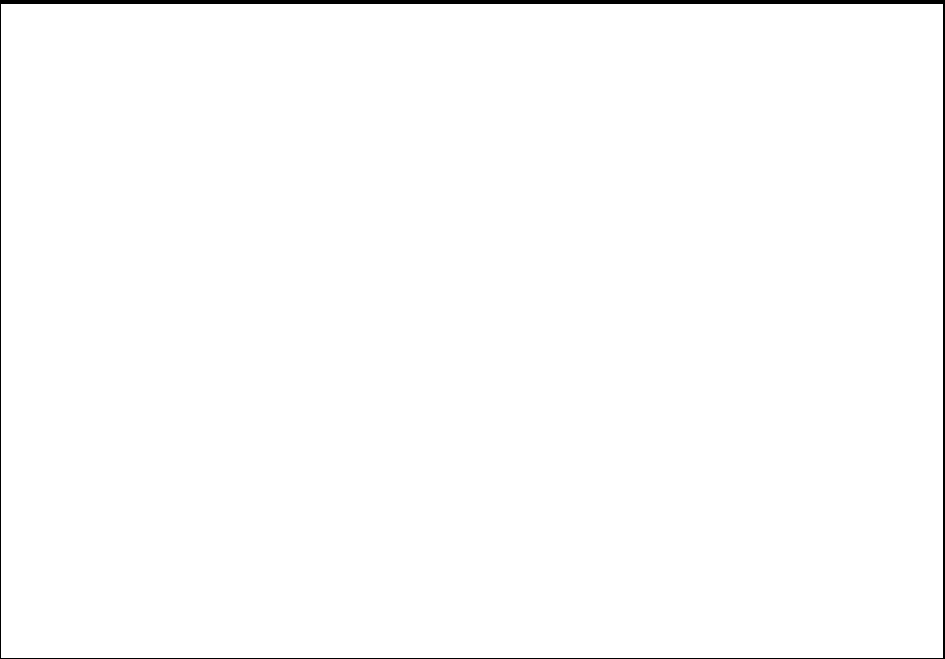
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-78

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	West Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Summerlea Park		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Description of Photograph: Looking upstream from structure

Upstream face of structure

City of Toronto Structure Data:

Structure ID:	308504
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1990
Last Inspection:	2012
Next Inspection:	2017

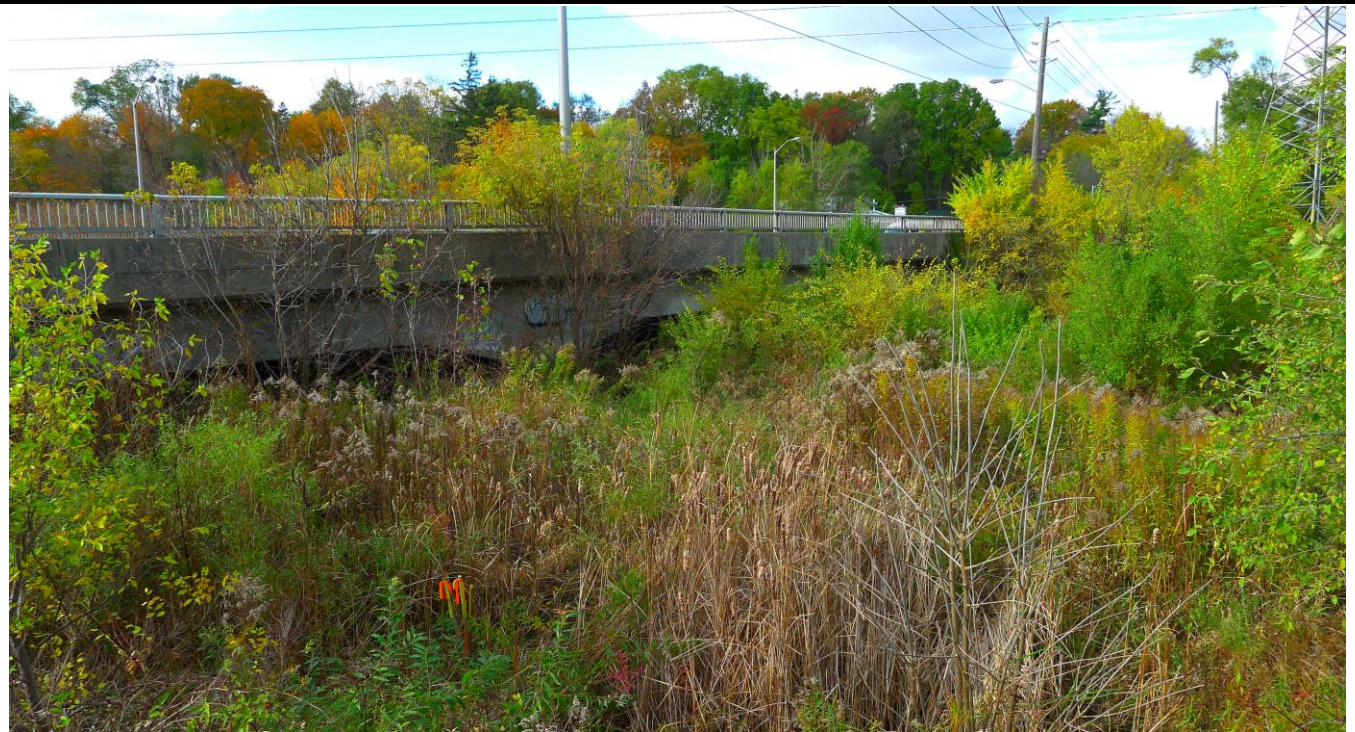
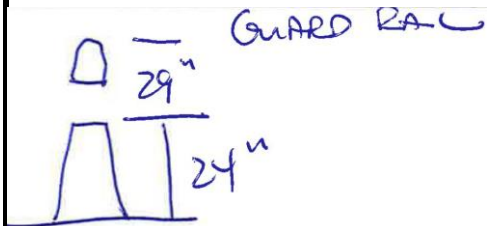
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-79

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	750
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.31	Width (m):	42.36	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	29.3			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	125.41	U/S Obvert Elev. (m):	127.4	Additional Flow Information: N/A	
HEC-RAS Cross Section:	679.4845	D/S Invert Elev. (m):	125.09	D/S Obvert Elev. (m):	127.4		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Albion Road (Grubbes Bridge)		Height from Obvert to Top of Road (m):	2.58				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

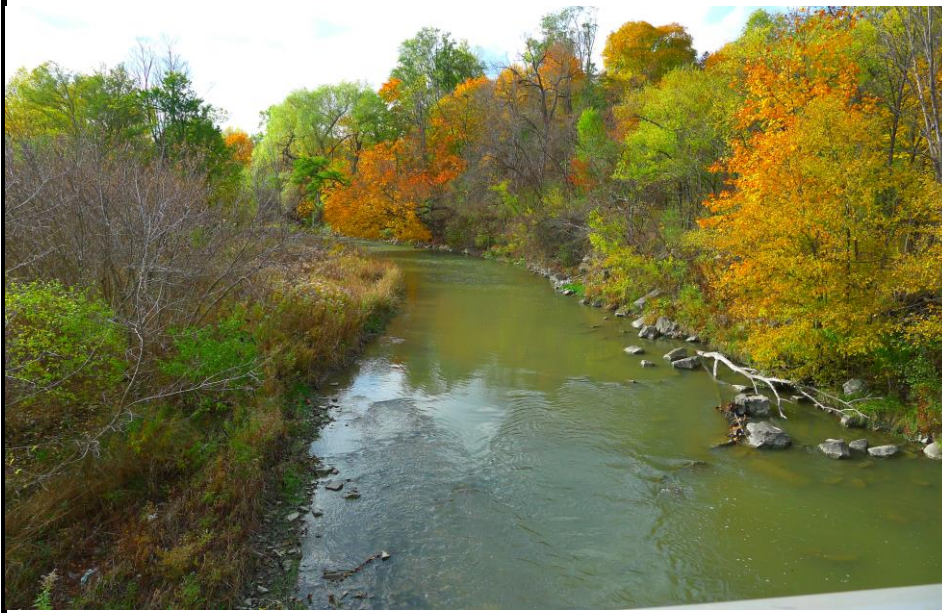
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	158
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1948
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-80

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	500
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete/Steel			Approx. Velocity (m/s):	1
Subcatchment Area No:	1	Height (m) or Diameter (m):	5.84	Width (m):	48	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	30.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	130.05	U/S Obvert Elev. (m):	137.9	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1514.738	D/S Invert Elev. (m):	129.98	D/S Obvert Elev. (m):	137.88		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	15				
Islington Avenue		Height from Obvert to Top of Road (m):	2.26				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

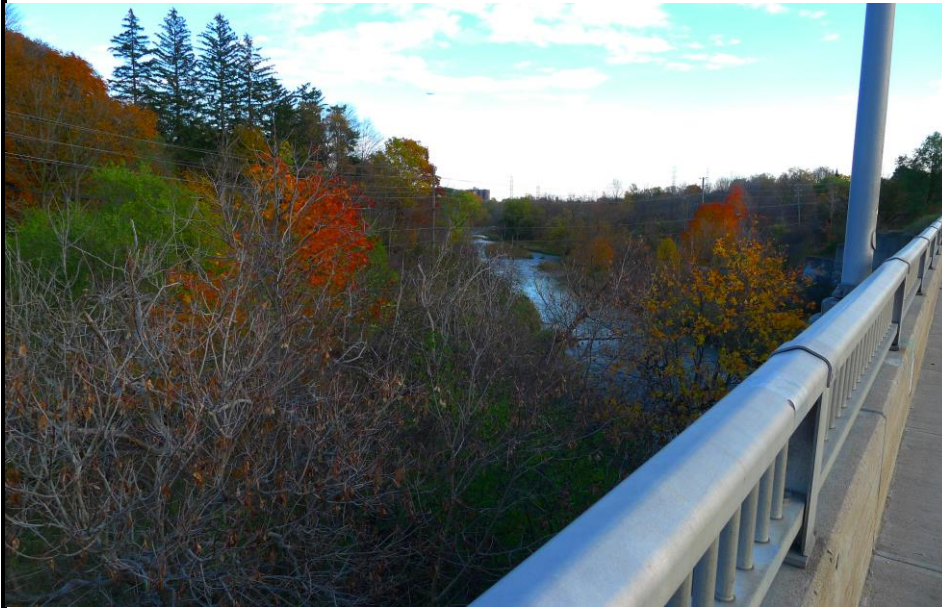


Description of Photograph:

Downstream face of structure

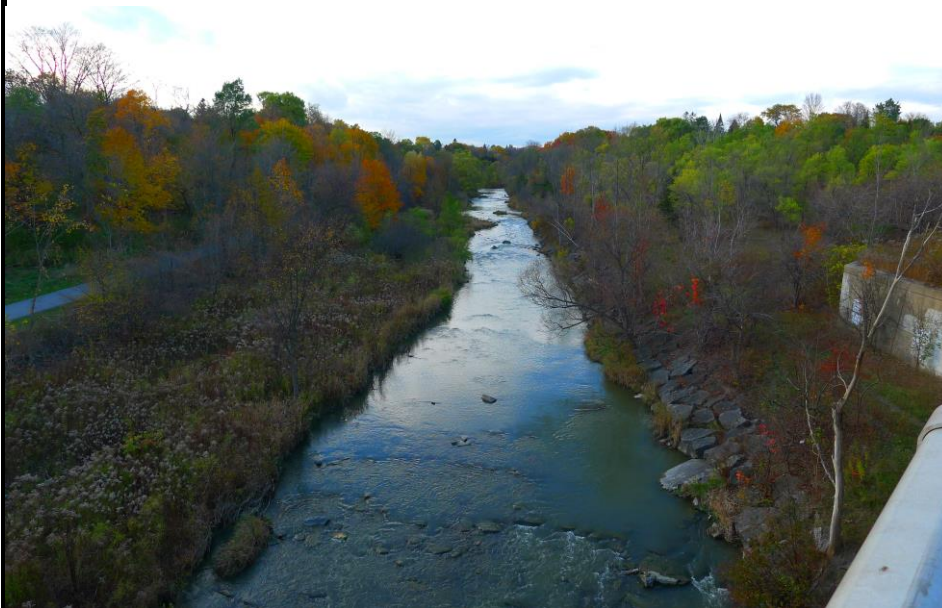
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	157
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1959
Last Inspection:	2015
Next Inspection:	2017

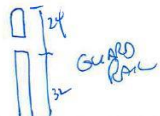
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-81

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	7.98	Width (m):	67.21	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	20			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	140.51	U/S Obvert Elev. (m):	148.29	Additional Flow Information: N/A	
HEC-RAS Cross Section:	631.1946	D/S Invert Elev. (m):	140.31	D/S Obvert Elev. (m):	148.29		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Kipling Avenue		Height from Obvert to Top of Road (m):	3.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

POR L = 67 ft
 W = 36


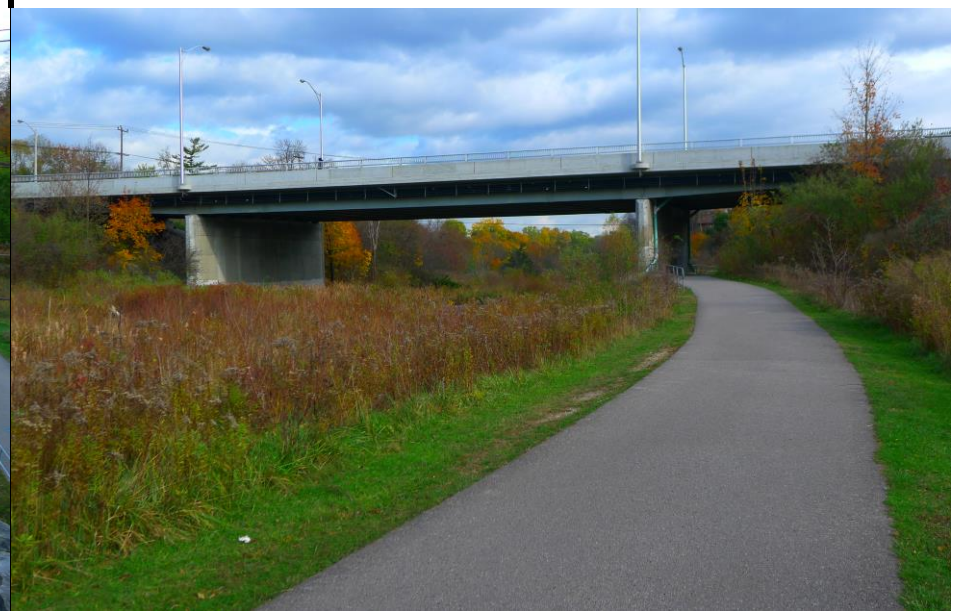


Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	325
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1959
Last Inspection:	2015
Next Inspection:	2017

page 2

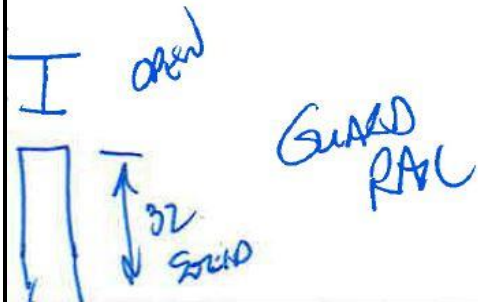
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-82

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	1000
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	8.19	Width (m):	58	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	23			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	146.37	U/S Obvert Elev. (m):	154.5	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2103.113	D/S Invert Elev. (m):	146.31	D/S Obvert Elev. (m):	154.5		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Martin Grove Road	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	2.07				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

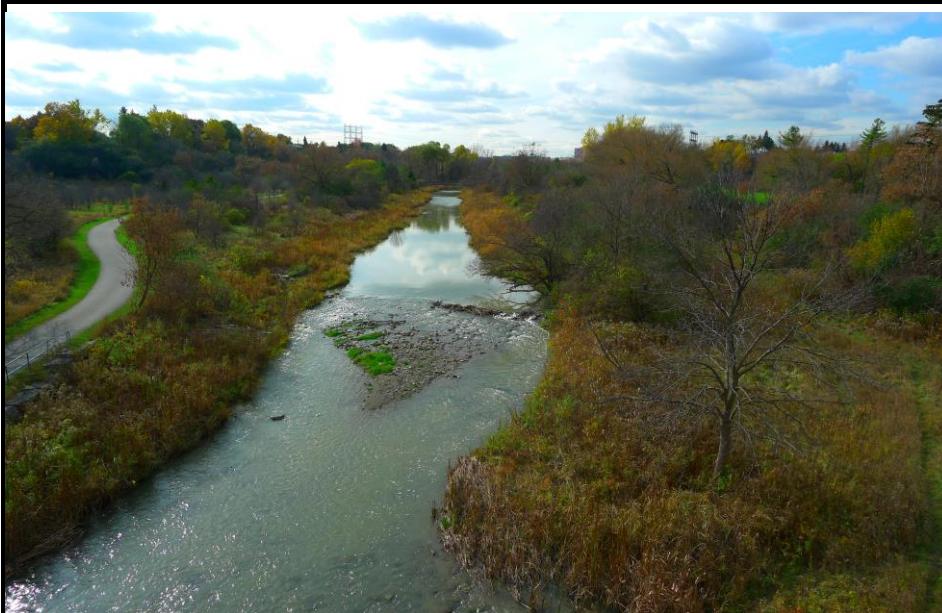
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	629
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1963
Last Inspection:	2015
Next Inspection:	2017

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-83

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	500
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal			Approx. Velocity (m/s):	1
Subcatchment Area No:	1	Height (m) or Diameter (m):	N/A	Width (m):	N/A	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	N/A			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - West Humber Parkland - Bridge (1)		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

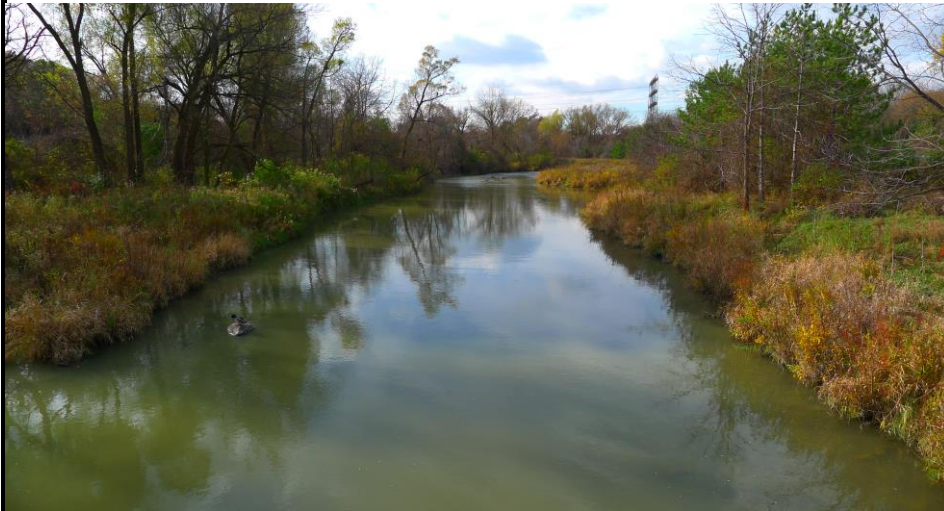
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308488
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1988
Last Inspection:	2012
Next Inspection:	2017

page 2

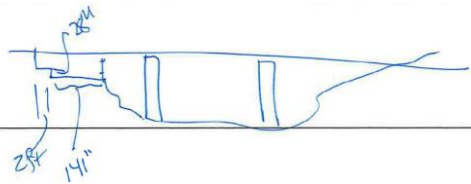
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-84

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	500
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	1
Subcatchment Area No:	1	Height (m) or Diameter (m):	6.34	Width (m):	50.3	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	28.3			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	150.28	U/S Obvert Elev. (m):	156.06	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3746.331	D/S Invert Elev. (m):	149.78	D/S Obvert Elev. (m):	156.06		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Highway 27		Height from Obvert to Top of Road (m):	3.08				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	427
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1971
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-85

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	500
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal			Approx. Velocity (m/s):	1
Subcatchment Area No:	1	Height (m) or Diameter (m):	N/A	Width (m):	N/A	Upstream Erosion (Y/N):	Y
Tributary Name:	West Branch	Length (m):	N/A			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Humber Arboretum - Bridge (4)		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

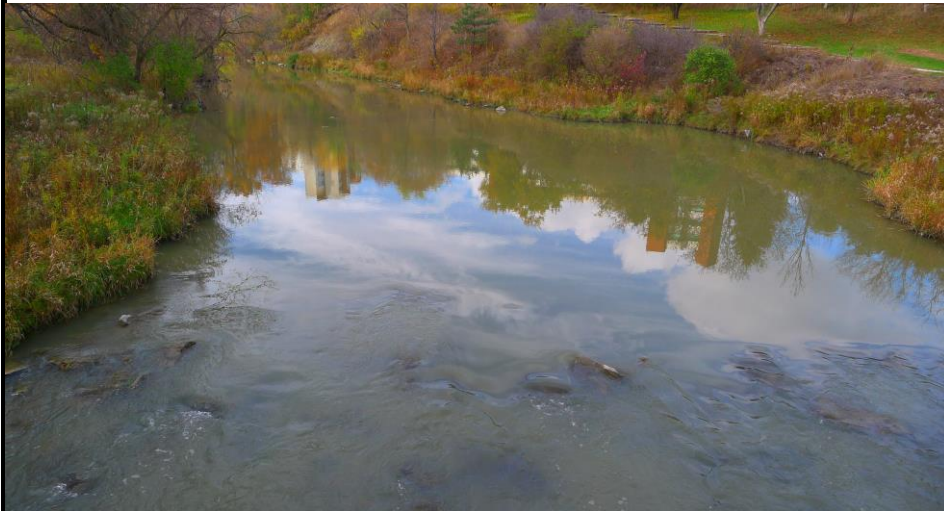
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308479
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1980
Last Inspection:	2012
Next Inspection:	2017

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-86

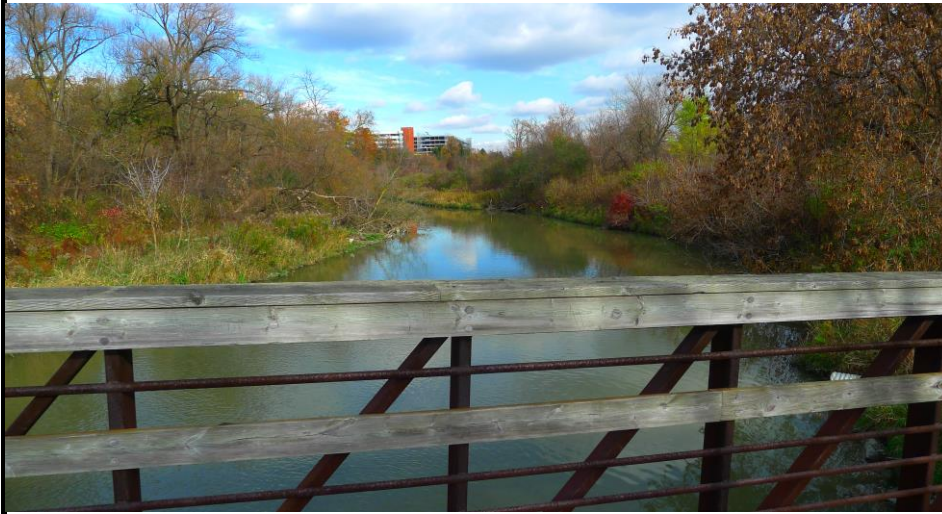
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	1000
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal/Wood			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	N/A	Width (m):	N/A	Upstream Erosion (Y/N):	Y
Tributary Name:	West Branch	Length (m):	N/A			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Humber Arboretum - Bridge (3)		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308480
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1990
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

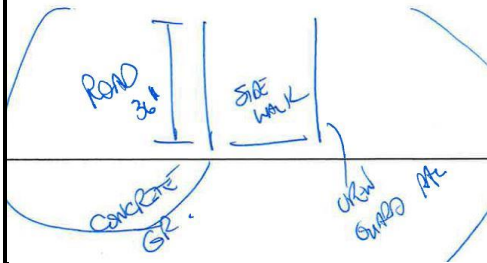
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-87

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal/Wood			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	N/A	Width (m):	N/A	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	N/A			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Humber Arboretum - Bridge (2)		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

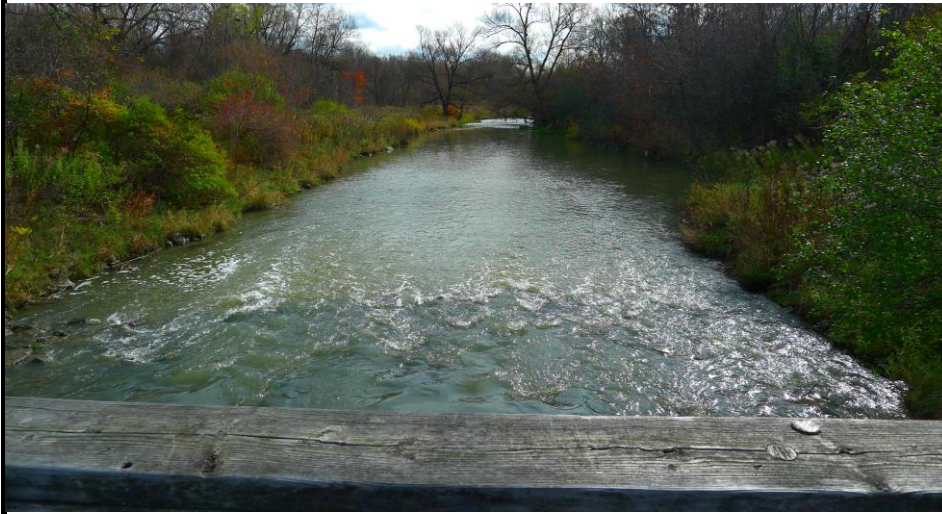


Description of Photograph:

Downstream face of structure

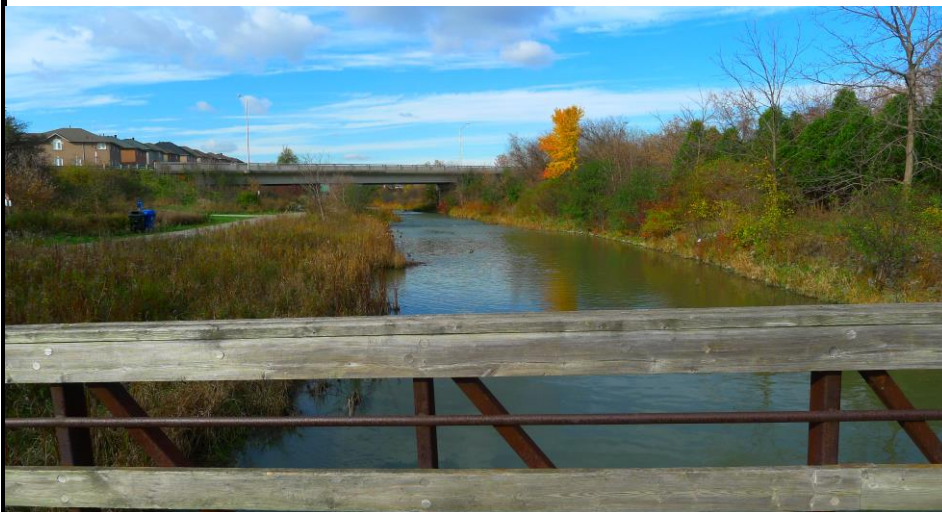
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308481
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1990
Last Inspection:	2012
Next Inspection:	2017

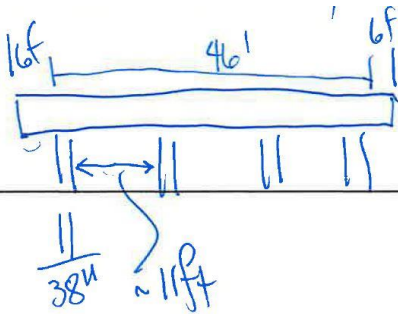
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-88

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	4.73	Width (m):	57.09	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	17.5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	155.68	U/S Obvert Elev. (m):	160.2	Additional Flow Information: N/A	
HEC-RAS Cross Section:	6288.086	D/S Invert Elev. (m):	155.47	D/S Obvert Elev. (m):	160.2		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Humberwood Boulevard	Skew Angle of Crossing (Degrees):	15				
		Height from Obvert to Top of Road (m):	4.09				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

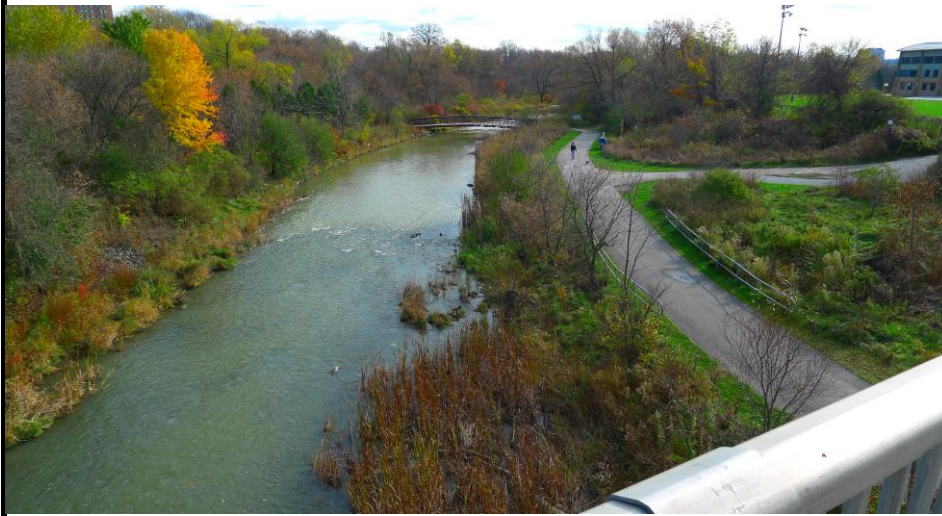


Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	630
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1989
Last Inspection:	2015
Next Inspection:	2017

page 2

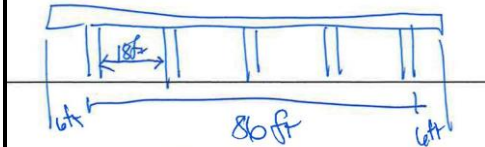
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-89

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	450
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	8.77	Width (m):	58	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	30			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	157.4	U/S Obvert Elev. (m):	165.99	Additional Flow Information: N/A	
HEC-RAS Cross Section:	6858.708	D/S Invert Elev. (m):	157.22	D/S Obvert Elev. (m):	165.99		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Finch Avenue West		Height from Obvert to Top of Road (m):	2.09				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

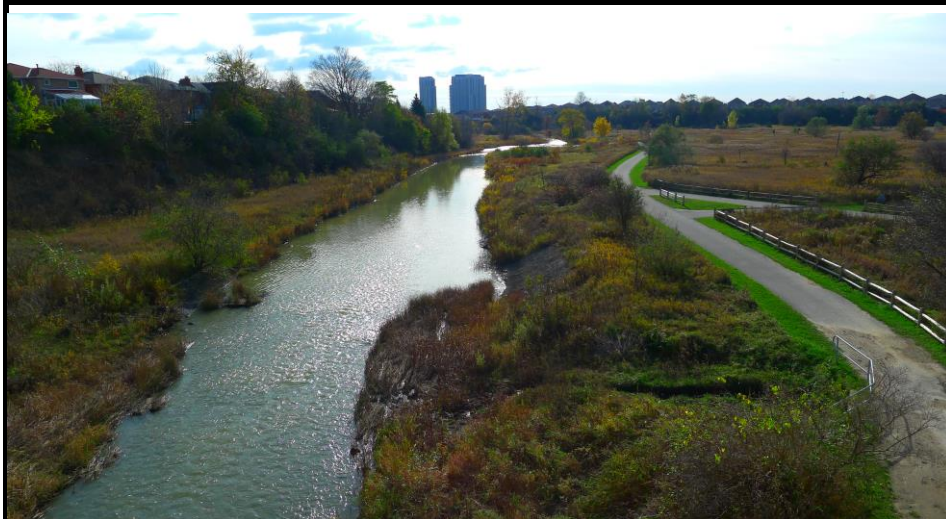


Description of Photograph:

Downstream face of structure

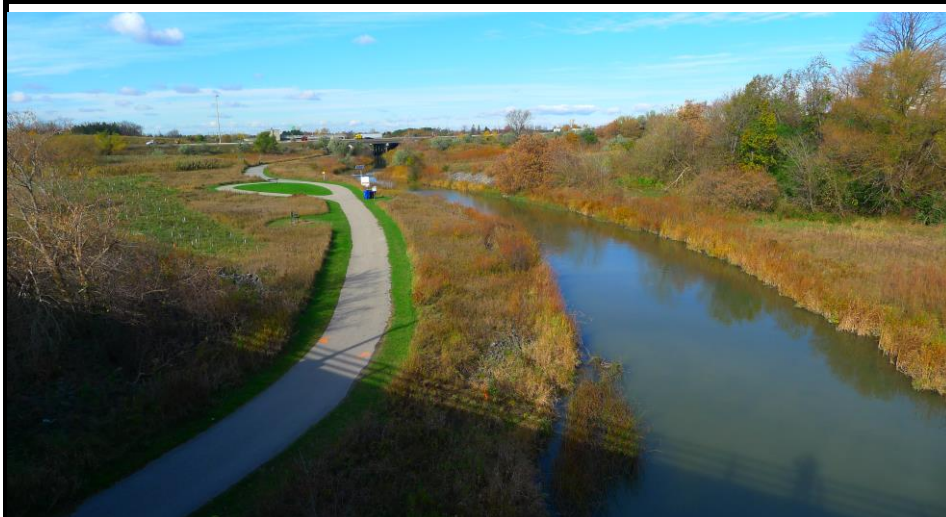
page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	179
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1982
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-90

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	8.5	Width (m):	68.88	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	60.3			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	158	U/S Obvert Elev. (m):	166.37	Additional Flow Information: N/A	
HEC-RAS Cross Section:	7281.613	D/S Invert Elev. (m):	157.87	D/S Obvert Elev. (m):	166.37		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	15				
Highway 427 - Humber River SBL/NBL (West Branch)		Height from Obvert to Top of Road (m):	2.75				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	37 - 633/2
Condition:	Good
Owner:	Province of Ontario
Year Constructed:	1982
Last Inspection:	2015
Next Inspection:	2017

page 2

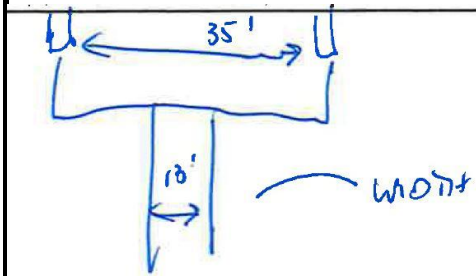
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-91

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	3	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	7.49	Width (m):	72.55	Upstream Erosion (Y/N):	N
Tributary Name:	West Branch	Length (m):	10.7			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	158.04	U/S Obvert Elev. (m):	165.5	Additional Flow Information: N/A	
HEC-RAS Cross Section:	7327.588	D/S Invert Elev. (m):	158.01	D/S Obvert Elev. (m):	165.5		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	15				
Highway 427 - RAMP 427N - FINCH AVE E/W		Height from Obvert to Top of Road (m):	3.07				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure

City of Toronto Structure Data:

Structure ID:	37 -1087/
Condition:	Good
Owner:	Province of Ontario
Year Constructed:	1982
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-92

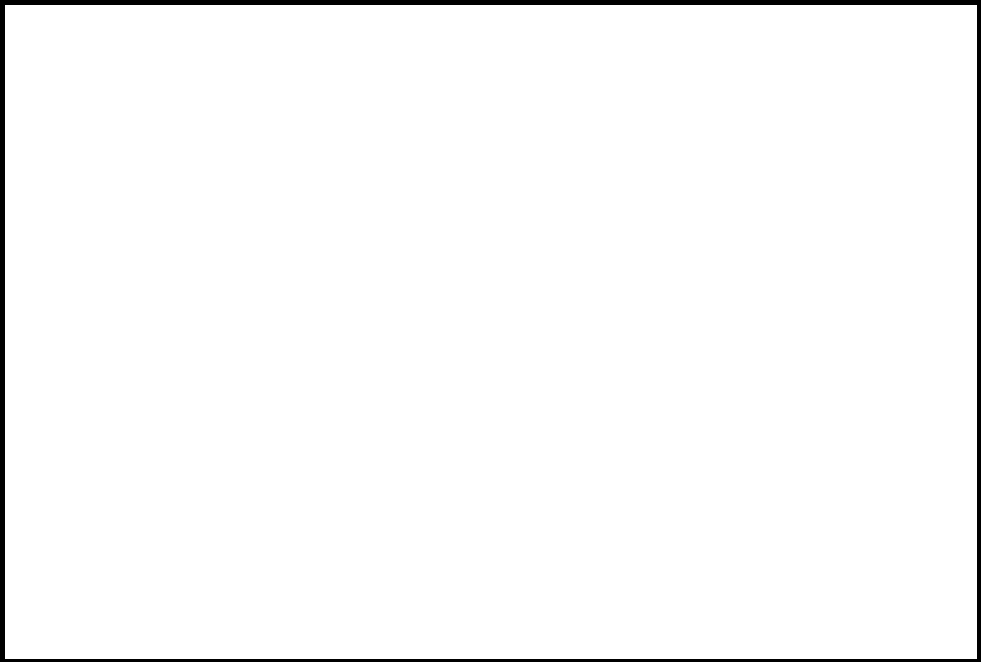
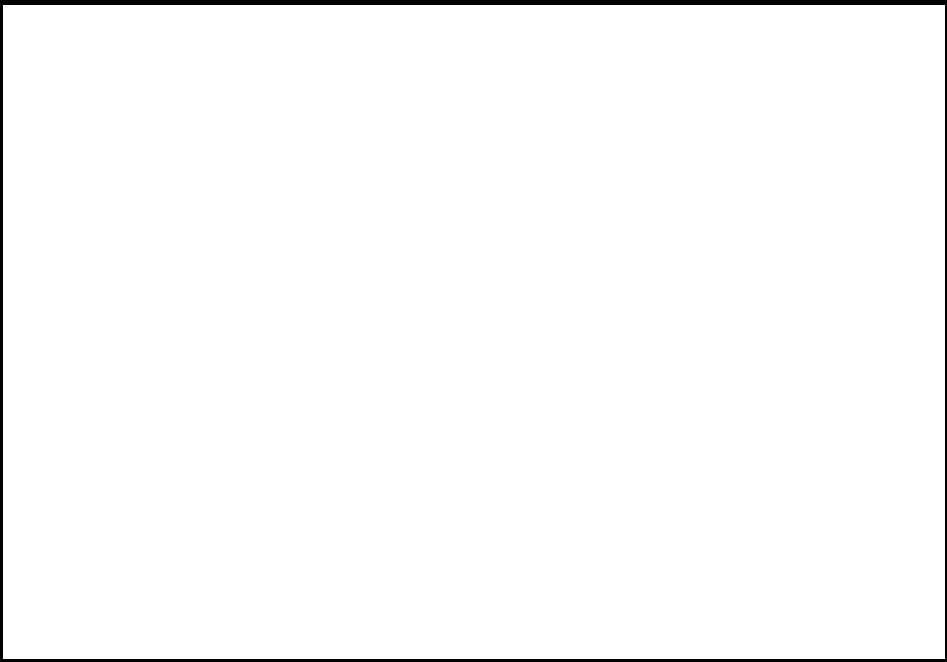
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Dam			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	West Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Claireville Dam		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

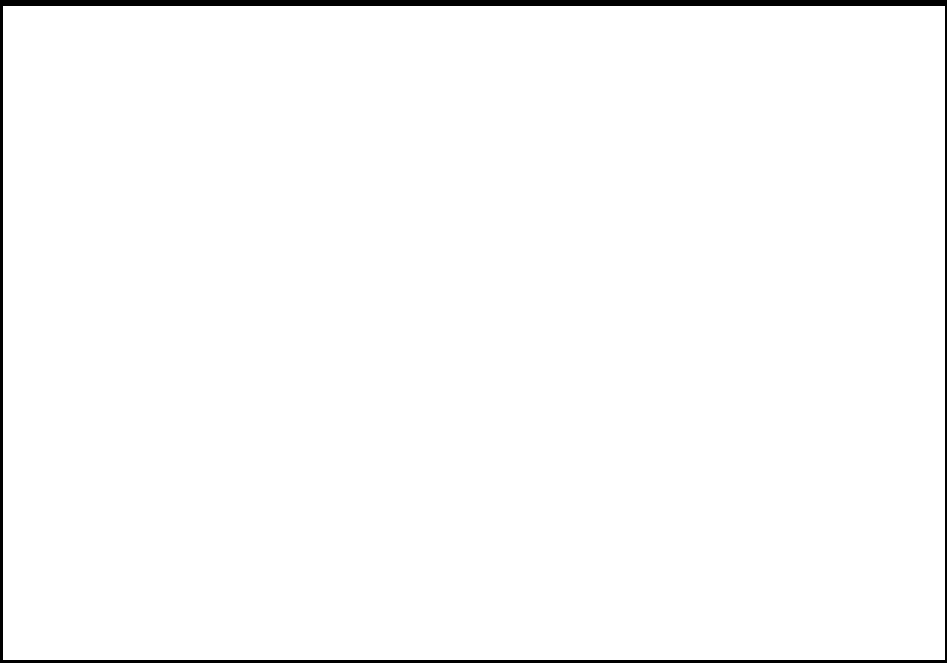
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-93

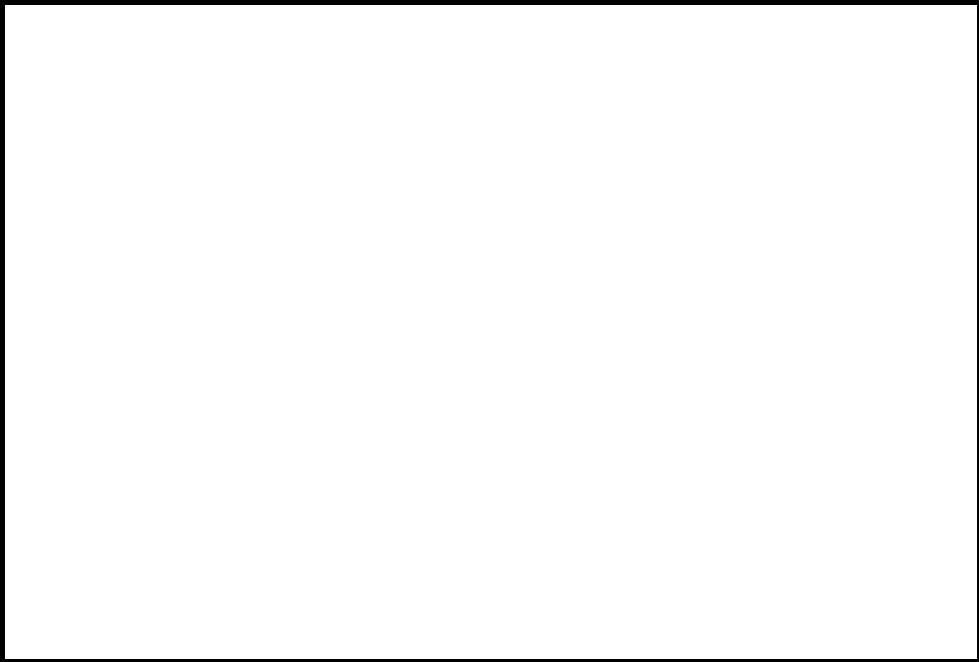
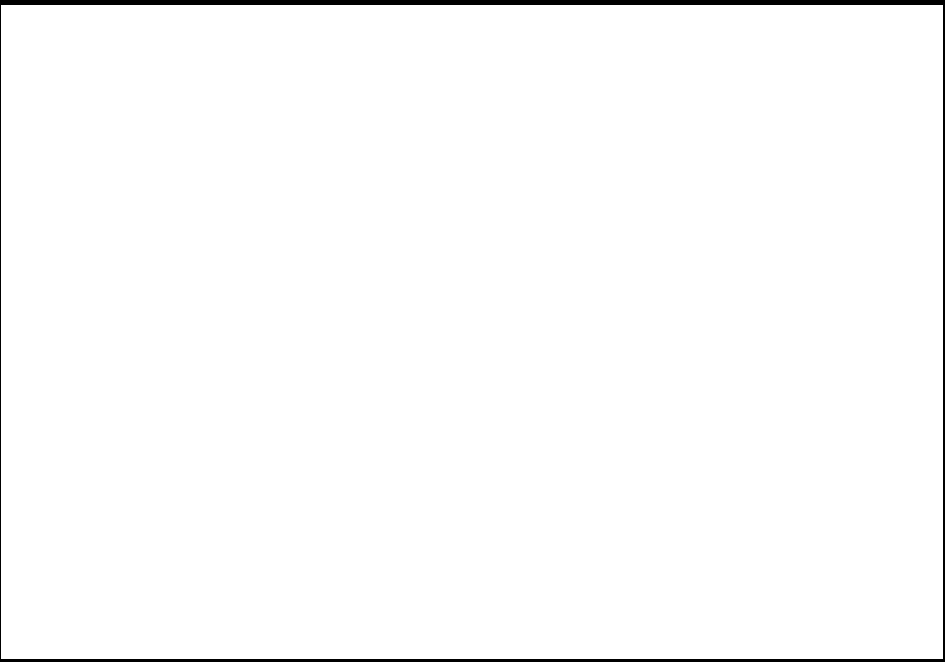
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - North Humber Park - Bridge (4)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

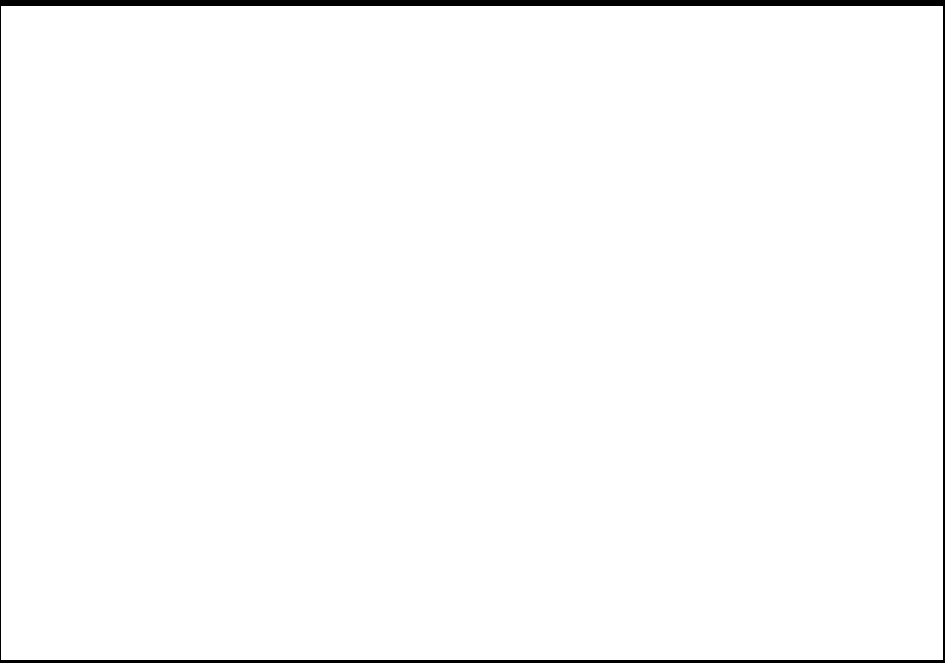
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308493
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1993
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-94

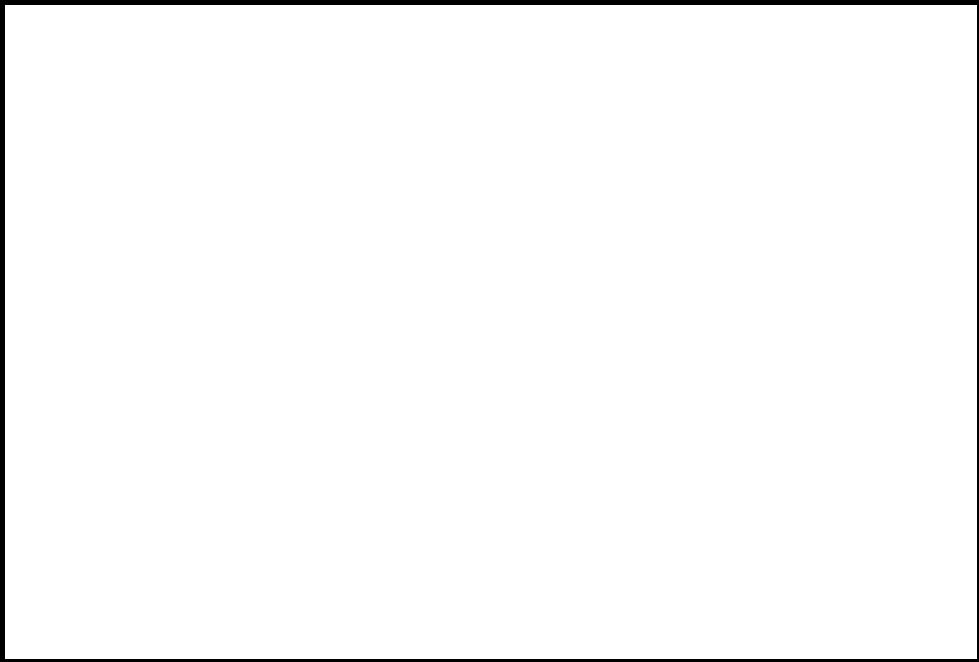
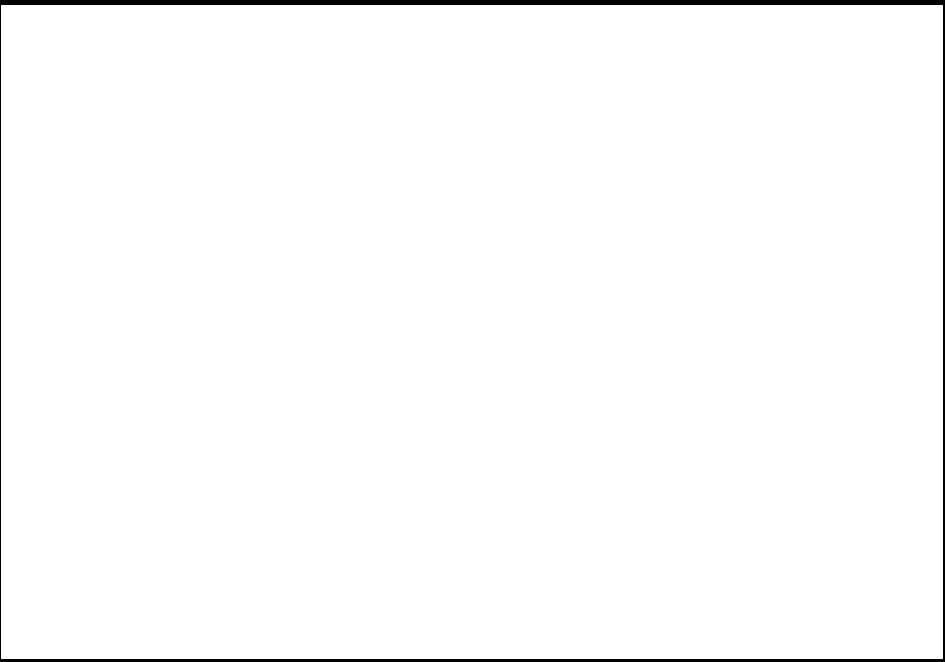
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - North Humber Park - Bridge (1)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

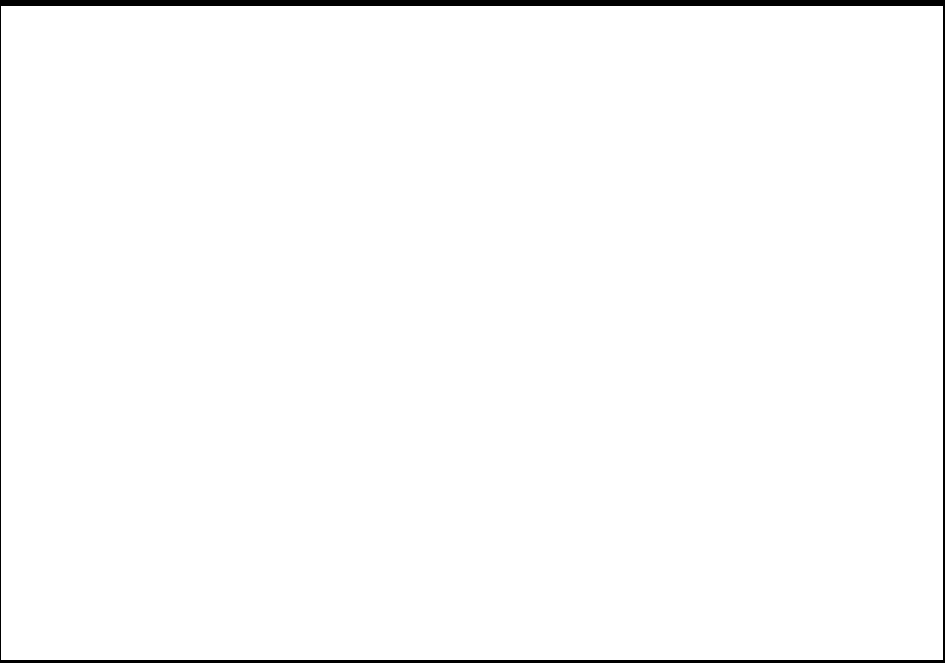
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308490
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1986
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-95

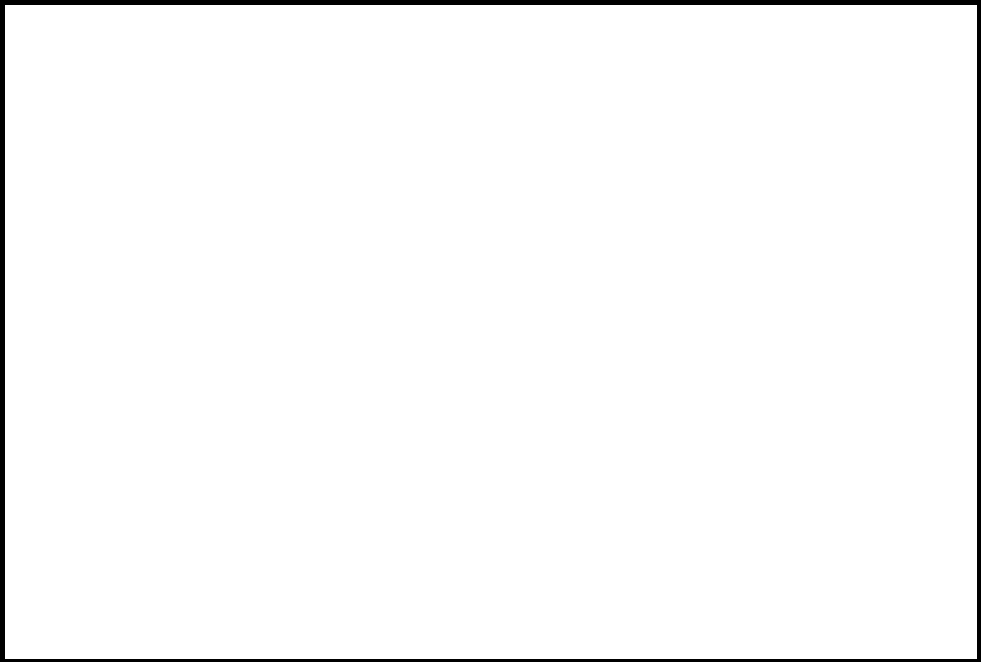
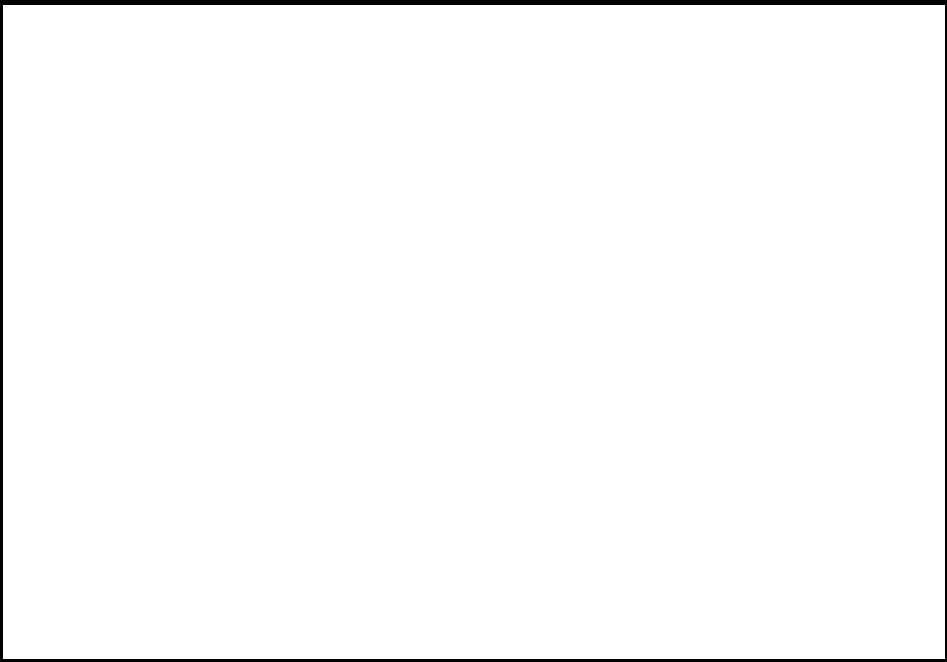
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - North Humber Park - Bridge (3)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

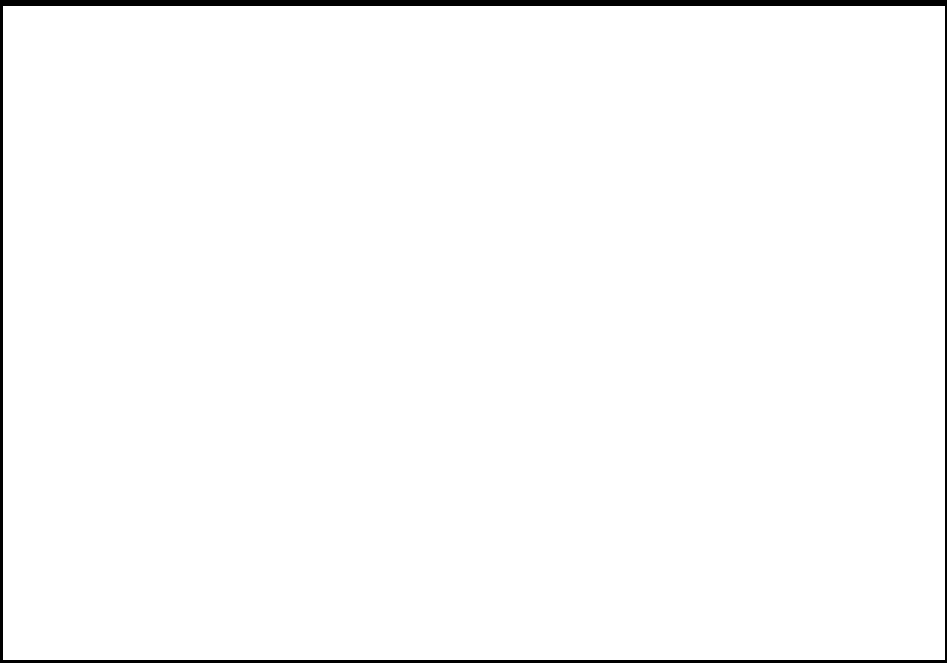
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308492
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1990
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-96

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - North Humber Park - Bridge (2)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs													
Description of Photograph: Looking downstream from structure	Upstream face of structure												
	City of Toronto Structure Data:												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Structure ID:</td> <td>308491</td> </tr> <tr> <td>Condition:</td> <td>Good</td> </tr> <tr> <td>Owner:</td> <td>City of Toronto</td> </tr> <tr> <td>Year Constructed:</td> <td>1993</td> </tr> <tr> <td>Last Inspection:</td> <td>2012</td> </tr> <tr> <td>Next Inspection:</td> <td>2017</td> </tr> </table>	Structure ID:	308491	Condition:	Good	Owner:	City of Toronto	Year Constructed:	1993	Last Inspection:	2012	Next Inspection:	2017
	Structure ID:	308491											
	Condition:	Good											
	Owner:	City of Toronto											
	Year Constructed:	1993											
	Last Inspection:	2012											
Next Inspection:	2017												
Description of Photograph: Looking upstream from structure													

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-97

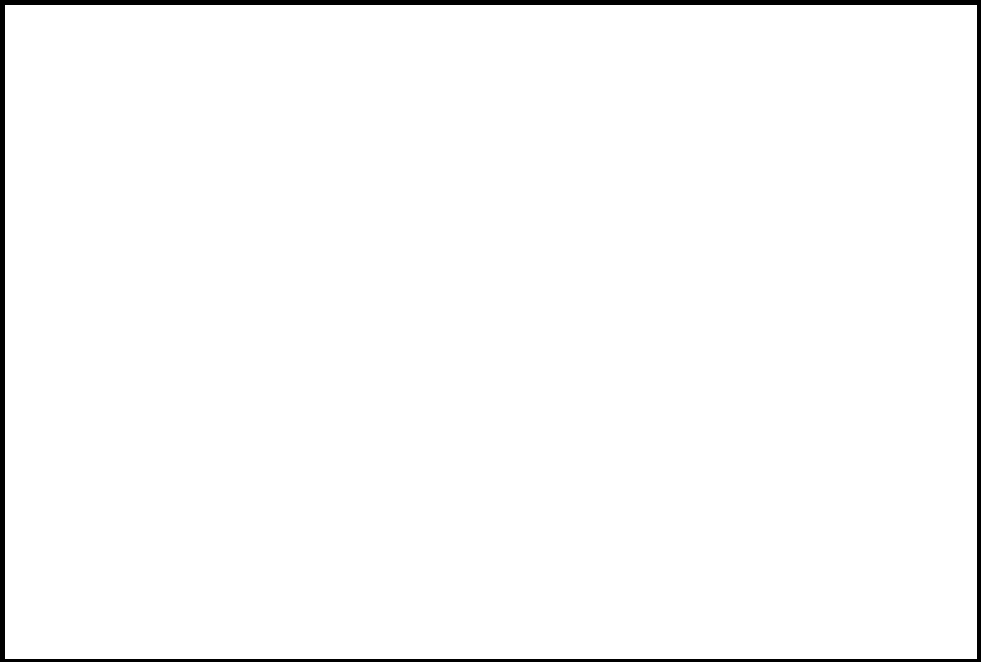
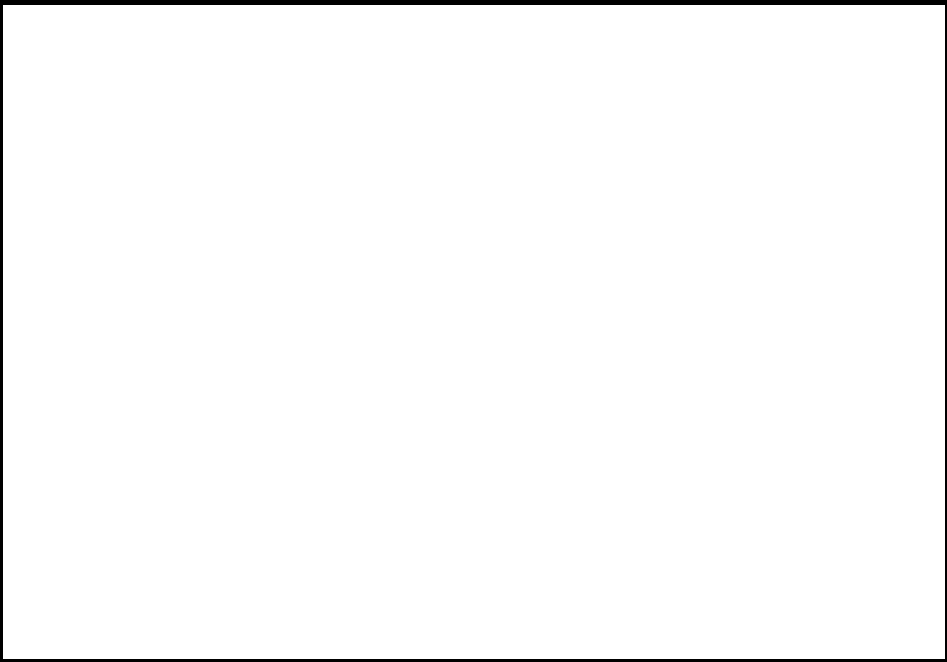
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Unknown Trail Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

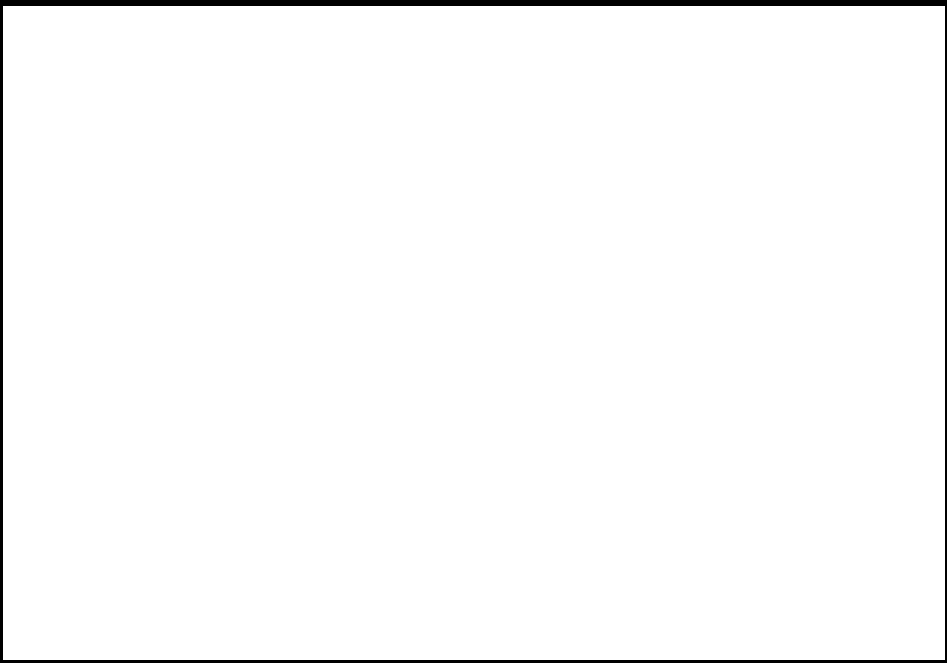
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-98

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	1000
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.5
Subcatchment Area No:	1	Height (m) or Diameter (m):	6.62	Width (m):	41.8	Upstream Erosion (Y/N):	N
Tributary Name:	East Branch	Length (m):	81			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	127.02	U/S Obvert Elev. (m):	133.5	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2910.686	D/S Invert Elev. (m):	126.88	D/S Obvert Elev. (m):	133.5		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Finch Avenue West / Islington Avenue intersection		Height from Obvert to Top of Road (m):	1.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	172
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1971
Last Inspection:	2015
Next Inspection:	2017

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-99

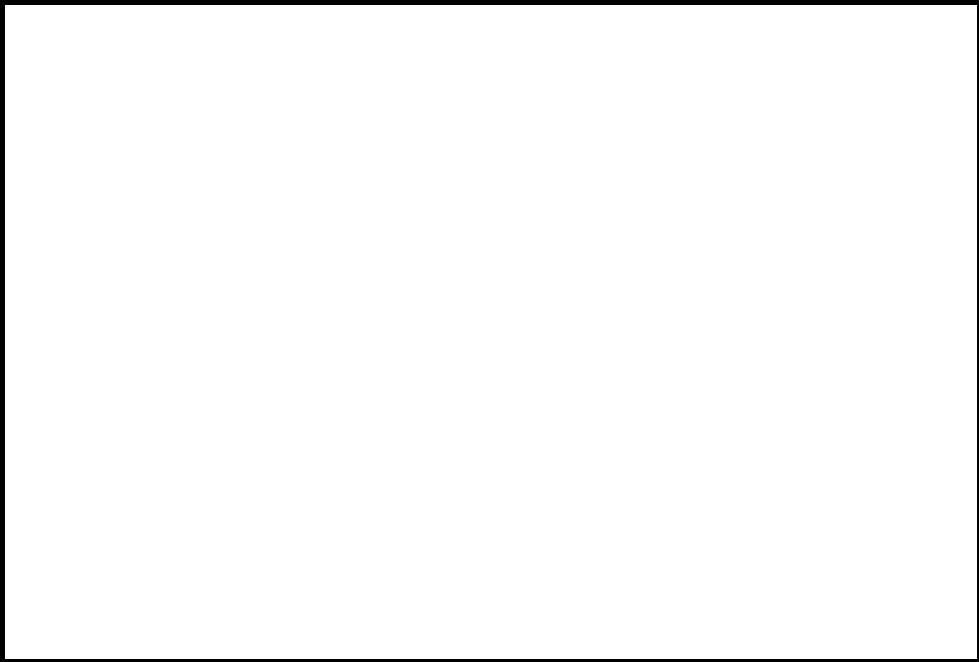
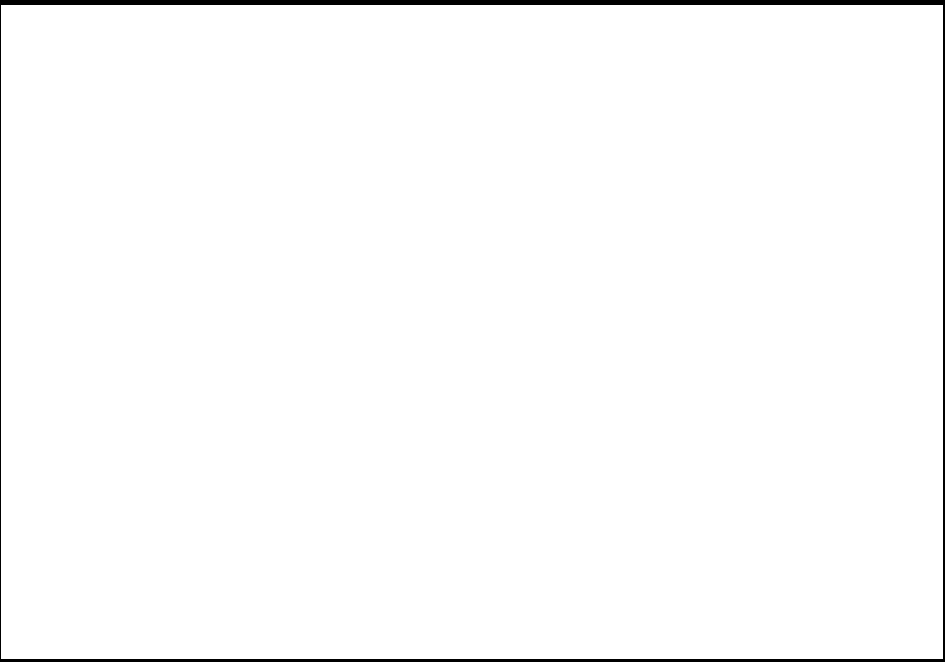
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Rowntree Mills Park - Bridge (1)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

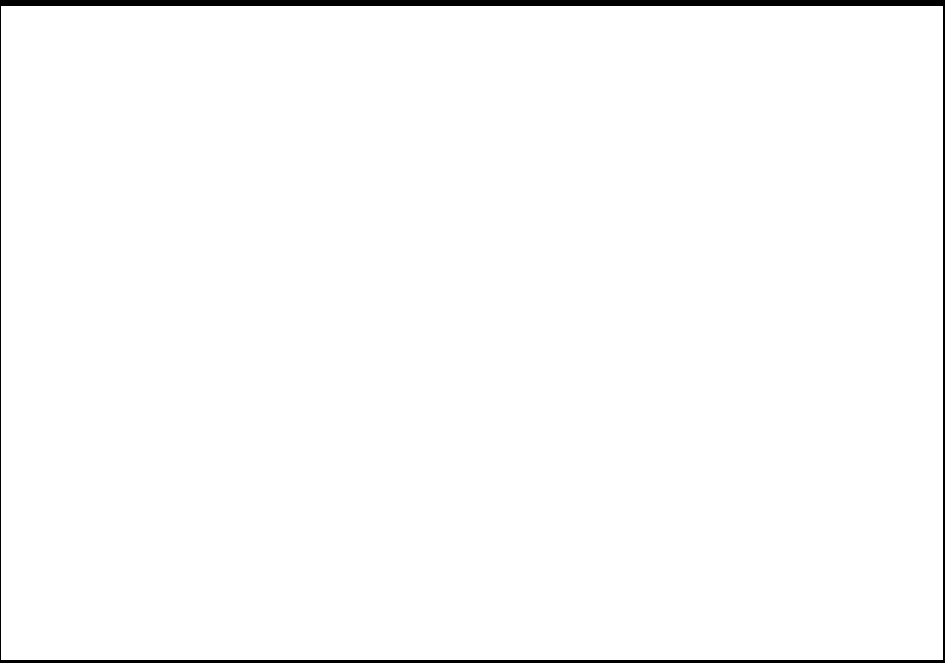
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308495
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1996
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-100

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	>1000
Watershed Name:	Humber River	Material (Concrete/Steel):	Metal/Wood			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.96	Width (m):	55.08	Upstream Erosion (Y/N):	N
Tributary Name:	East Branch	Length (m):	4.13			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	130.04	U/S Obvert Elev. (m):	133.93	Additional Flow Information: N/A	
HEC-RAS Cross Section:	285.1792	D/S Invert Elev. (m):	129.97	D/S Obvert Elev. (m):	133.93		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Trail bridge - Rowntree Mills Park - Bridge (2)		Height from Obvert to Top of Road (m):	0.21				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308494
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2012
Next Inspection:	2017

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-101

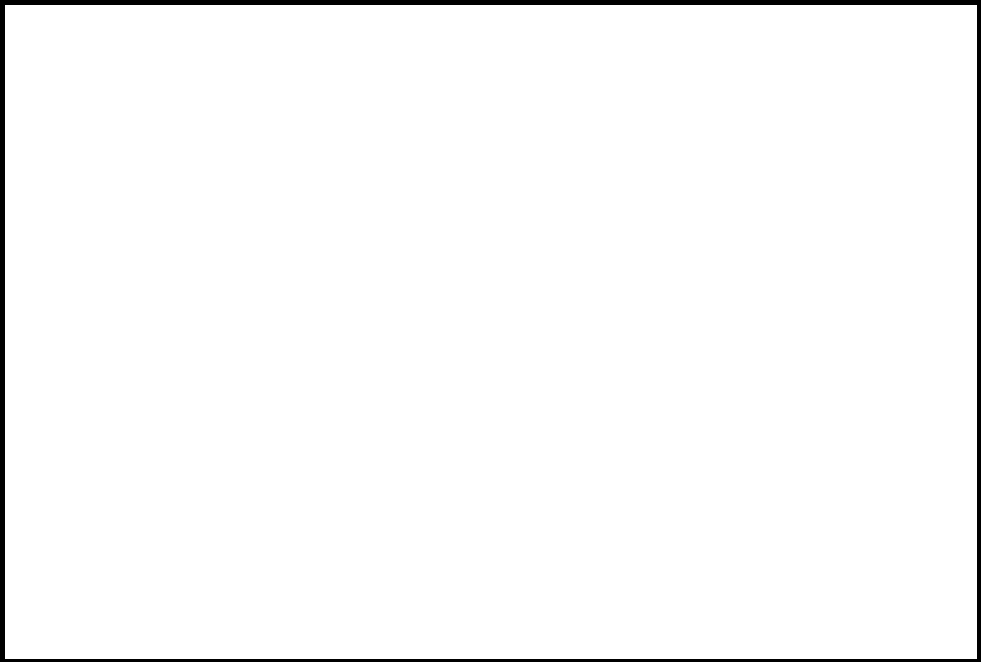
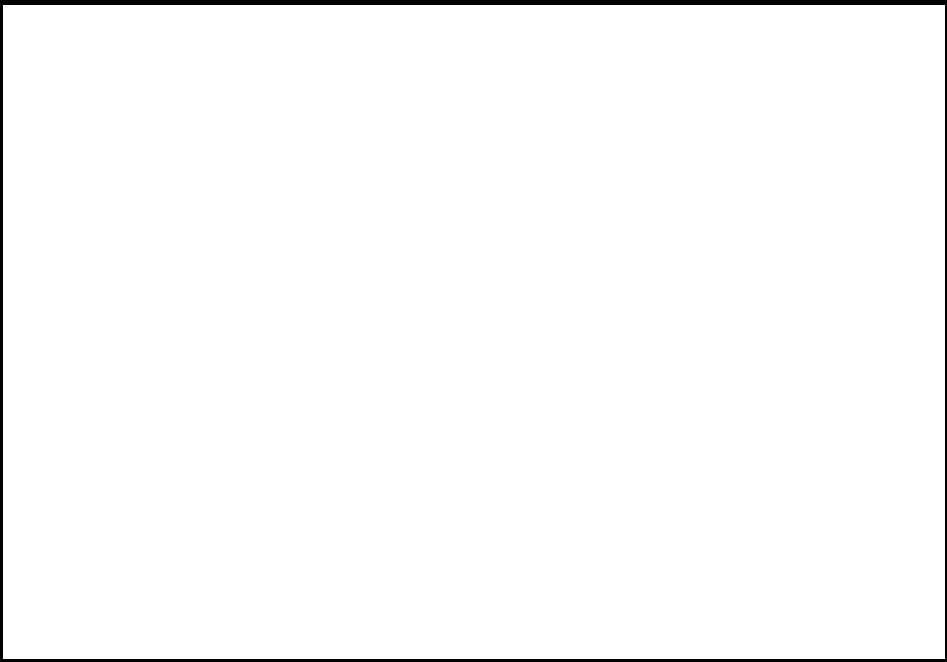
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Rowntree Mills Park - Bridge (3)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

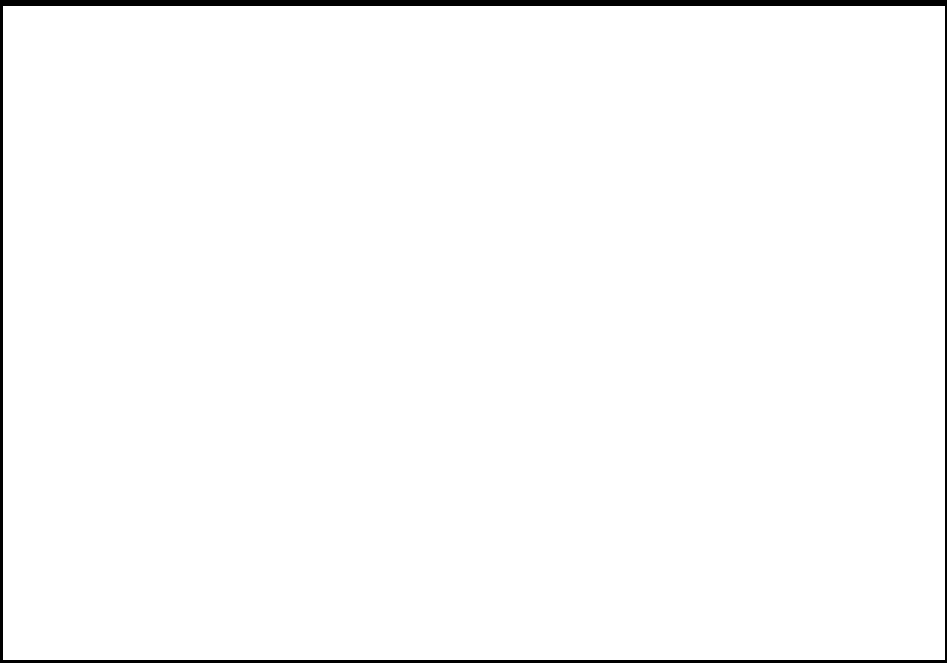
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308551
Condition:	Good
Owner:	City of Toronto
Year Constructed:	2010
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-102

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	5	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	10.85	Width (m):	152.78	Upstream Erosion (Y/N):	N
Tributary Name:	East Branch	Length (m):	28			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	132.41	U/S Obvert Elev. (m):	143.2	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2353.223	D/S Invert Elev. (m):	132.35	D/S Obvert Elev. (m):	143.2		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): Steeles Avenue West		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure

City of Toronto Structure Data:

Structure ID:	361
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1978
Last Inspection:	2015
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

page 2

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-103

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	1000
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3	Width (m):	4.83	Upstream Erosion (Y/N):	N
Tributary Name:	Albion Creek	Length (m):	42.59			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	143.6	U/S Obvert Elev. (m):	146.6	Additional Flow Information: N/A	
HEC-RAS Cross Section:	311.1711	D/S Invert Elev. (m):	143	D/S Obvert Elev. (m):	146		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Mitered				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Albion Road		Height from Obvert to Top of Road (m):	3.04				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	267
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1964
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-104

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Albion Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Beaumonde Heights Park		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs		
Description of Photograph: Looking downstream from structure	Upstream face of structure	
	City of Toronto Structure Data:	
	Structure ID:	308489
	Condition:	Good
	Owner:	City of Toronto
	Year Constructed:	1985
	Last Inspection:	2012
	Next Inspection:	2017
Description of Photograph: Looking upstream from structure		

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-105

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.4	Width (m):	11.87	Upstream Erosion (Y/N):	N
Tributary Name:	Albion Creek	Length (m):	13			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	148.51	U/S Obvert Elev. (m):	150.75	Additional Flow Information: N/A	
HEC-RAS Cross Section:	991.5994	D/S Invert Elev. (m):	147.76	D/S Obvert Elev. (m):	150.75		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Amaron Avenue		Height from Obvert to Top of Road (m):	1.2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	631
Condition:	Poor - Structure to be
Owner:	City of Toronto
Year Constructed:	1961
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-106

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	50
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.8	Width (m):	12	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	12			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	150.29	U/S Obvert Elev. (m):	153.08	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1363.969	D/S Invert Elev. (m):	150.01	D/S Obvert Elev. (m):	152.81		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Taysham Crescent	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	632
Condition:	Poor - Structure to be
Owner:	City of Toronto
Year Constructed:	1958
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-107

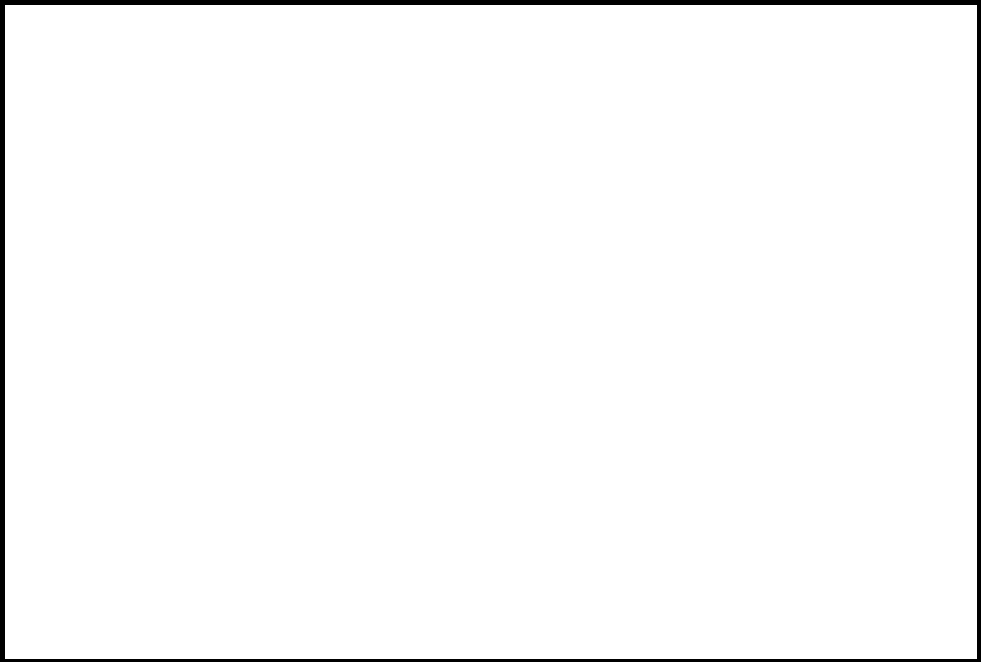
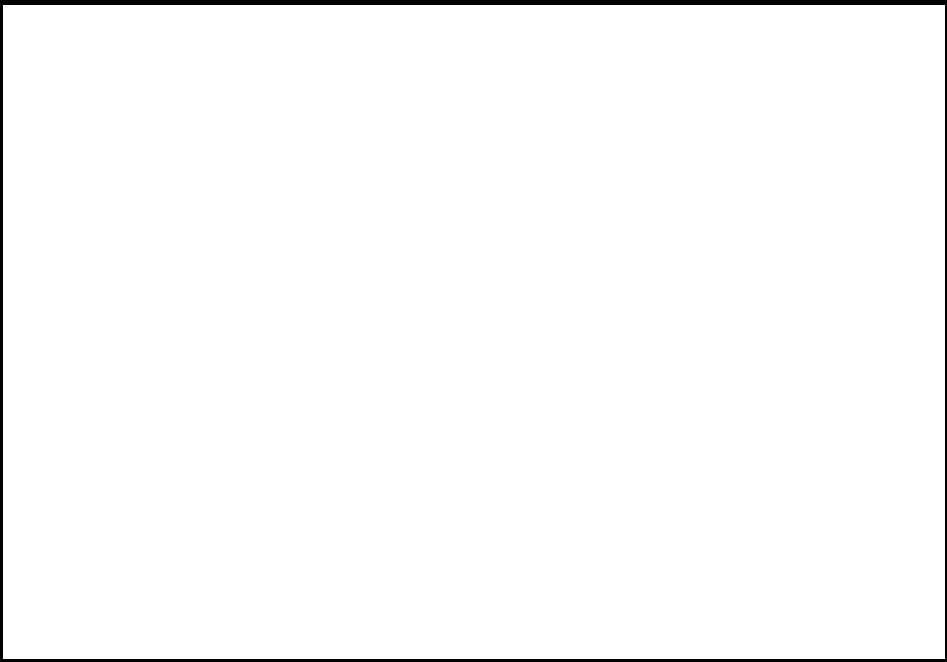
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Albion Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Large Culvert? Kipling Avenue to Stevenson Road		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

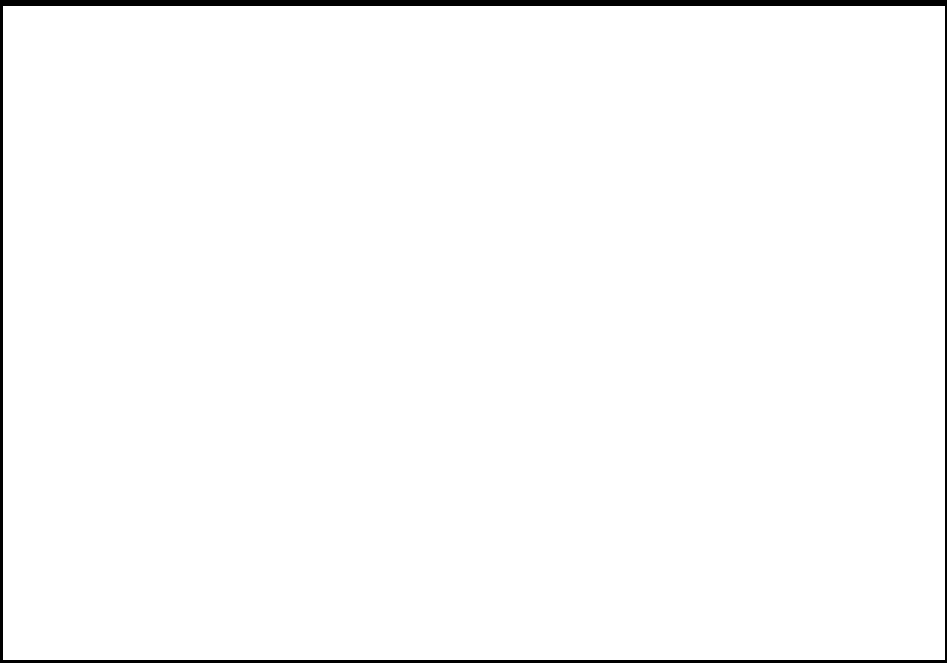
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

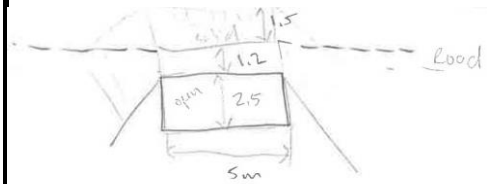
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-108

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.5	Width (m):	4.4	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	11.3			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	155.16	U/S Obvert Elev. (m):	157.66	Additional Flow Information:	
HEC-RAS Cross Section:	2393.418	D/S Invert Elev. (m):	155.01	D/S Obvert Elev. (m):	157.51		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Garfella Drive	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	673
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1962
Last Inspection:	2015
Next Inspection:	2017

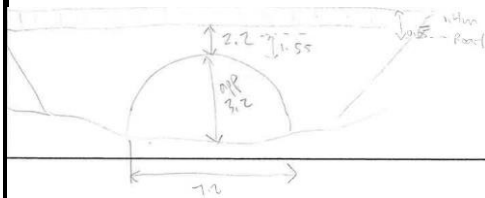
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-109

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP/Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.6	Width (m):	7.25	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	26.1			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	157.07	U/S Obvert Elev. (m):	160.65	Additional Flow Information: N/A	
HEC-RAS Cross Section:	2814.604	D/S Invert Elev. (m):	156.85	D/S Obvert Elev. (m):	160.44		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):	Martin Grove Road	Skew Angle of Crossing (Degrees):	30				
		Height from Obvert to Top of Road (m):	1.96				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	633
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

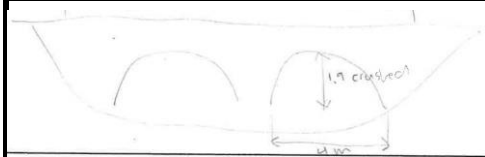
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-110

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	100
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.9	Width (m):	8.6	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	35.7			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	158.32	U/S Obvert Elev. (m):	160.01	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3115.149	D/S Invert Elev. (m):	158.21	D/S Obvert Elev. (m):	159.91		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Projecting				
Location (Road Name/Intersection):	Silverstone Drive	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.78				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	674
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

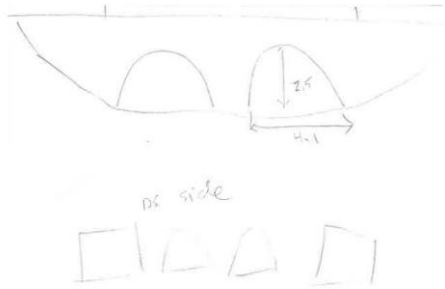
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-111

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.27	Width (m):	9.24	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	24			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	162.61	U/S Obvert Elev. (m):	164.88	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3834.634	D/S Invert Elev. (m):	162.55	D/S Obvert Elev. (m):	164.82		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Mitered				
Location (Road Name/Intersection):	Baywood Road	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.2				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	675
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

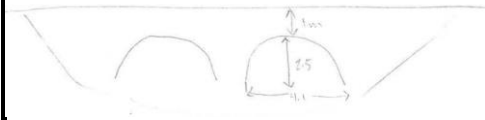
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-112

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.5	Width (m):	9.5	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	20			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	164.87	U/S Obvert Elev. (m):	167.32	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4109.203	D/S Invert Elev. (m):	164.89	D/S Obvert Elev. (m):	167.32		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Mitered				
Location (Road Name/Intersection):	Royalcrest Road	Skew Angle of Crossing (Degrees):	10				
		Height from Obvert to Top of Road (m):	0.7				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	676
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

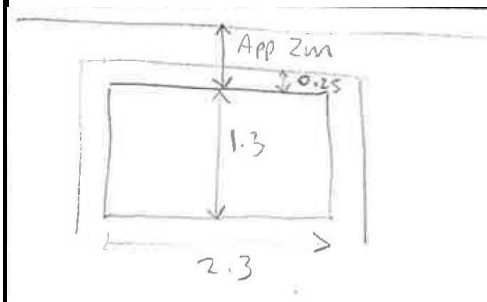
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-113

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	13/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.3	Width (m):	2.5	Upstream Erosion (Y/N):	Y
Tributary Name:	Albion Creek	Length (m):	40.5			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	165.64	U/S Obvert Elev. (m):	166.85	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4262.798	D/S Invert Elev. (m):	165.4	D/S Obvert Elev. (m):	166.7		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	15				
Highway 27		Height from Obvert to Top of Road (m):	2.15				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

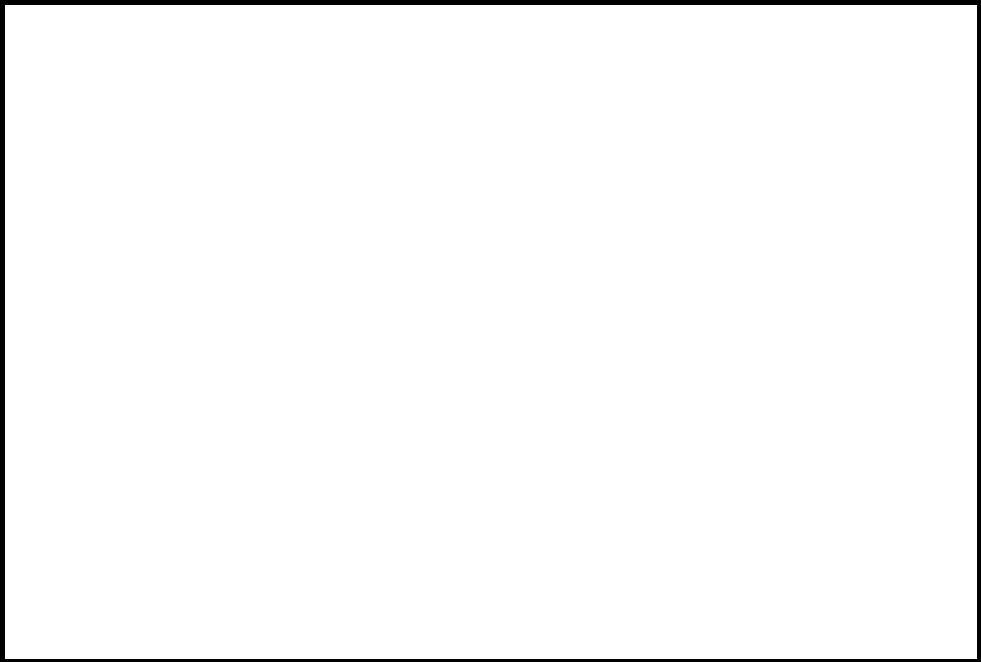
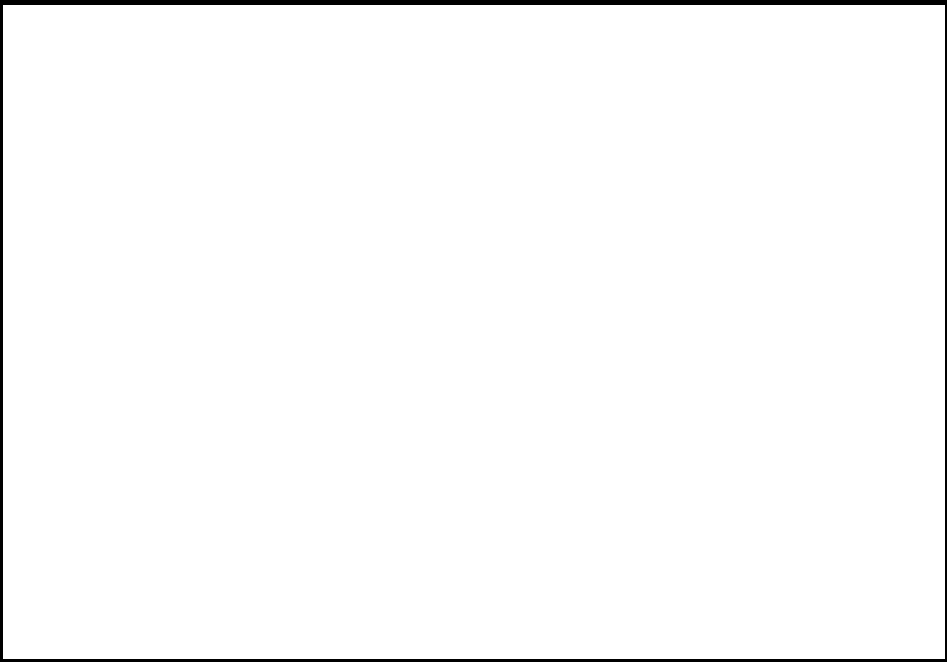
CROSSING # : Humber River-114

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Albion Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Carrier Drive		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

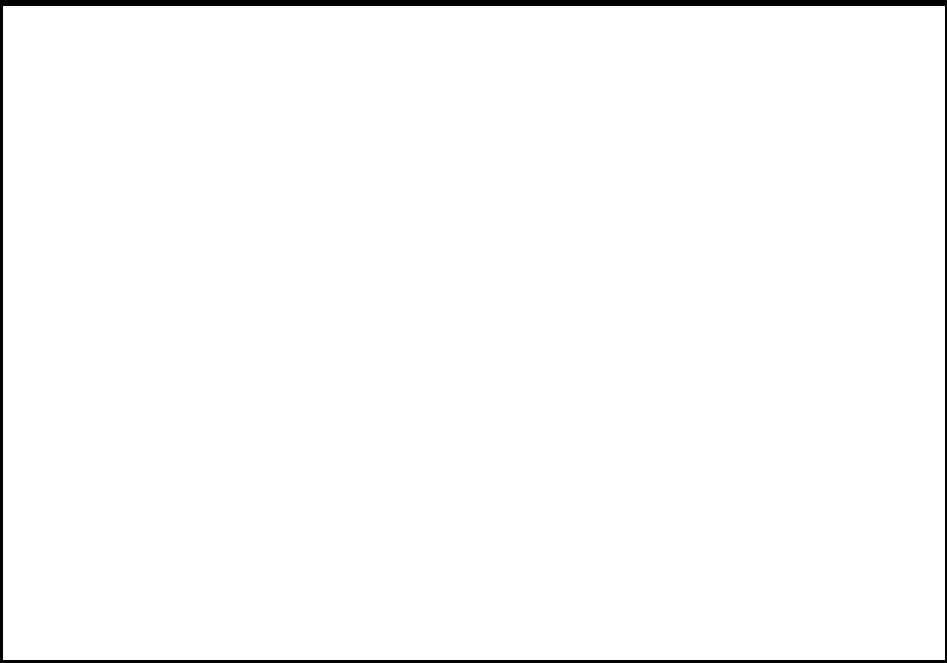
Site Sketch:	
Description of Photograph: Downstream face of structure	

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

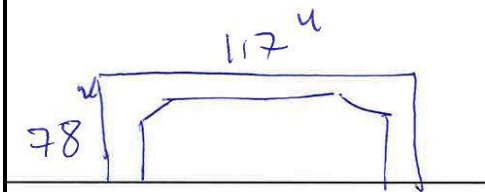
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-115

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Private Accessway			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	400
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.25
Subcatchment Area No:	1	Height (m) or Diameter (m):	2	Width (m):	3	Upstream Erosion (Y/N):	N
Tributary Name:	Albion Creek	Length (m):	21.9			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	167.05	U/S Obvert Elev. (m):	169.03	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4504.875	D/S Invert Elev. (m):	166.73	D/S Obvert Elev. (m):	168.71		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Projecting				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Driveway Accessway		Height from Obvert to Top of Road (m):	0.46				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

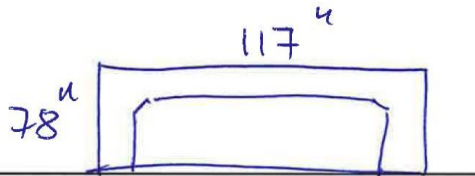
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-116

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Private Accessway			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	N/A	Approx. Depth (mm):	25
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.25
Subcatchment Area No:	1	Height (m) or Diameter (m):	2	Width (m):	3	Upstream Erosion (Y/N):	N
Tributary Name:	Albion Creek	Length (m):	21.9			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	167.85	U/S Obvert Elev. (m):	169.92	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4626.943	D/S Invert Elev. (m):	167.93	D/S Obvert Elev. (m):	169.91		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Projecting				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Driveway Accessway		Height from Obvert to Top of Road (m):	0.52				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Description of Photograph: Looking upstream from structure

--

Upstream face of structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

--

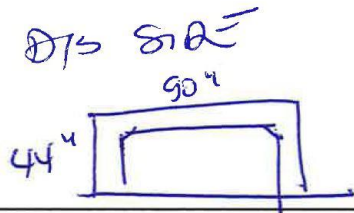
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-117

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	07/11/2017	Structure Type (Culvert/Bridge):	Roadway Crossing			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	25
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	0.25
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.1	Width (m):	2.3	Upstream Erosion (Y/N):	N
Tributary Name:	Albion Creek	Length (m):	42.7			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	30				
Carrier Drive		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-118

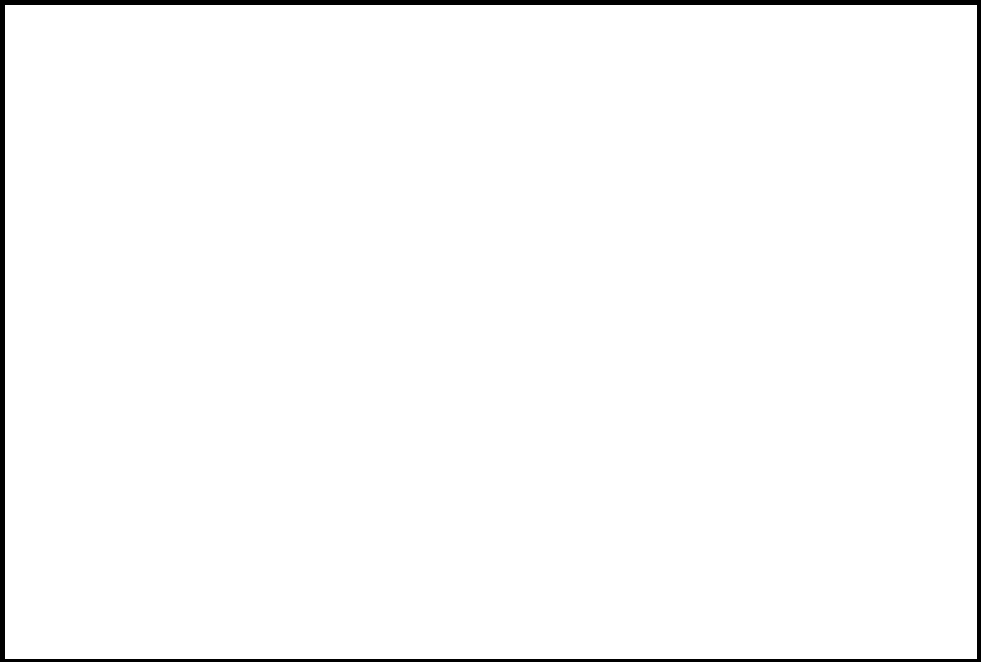
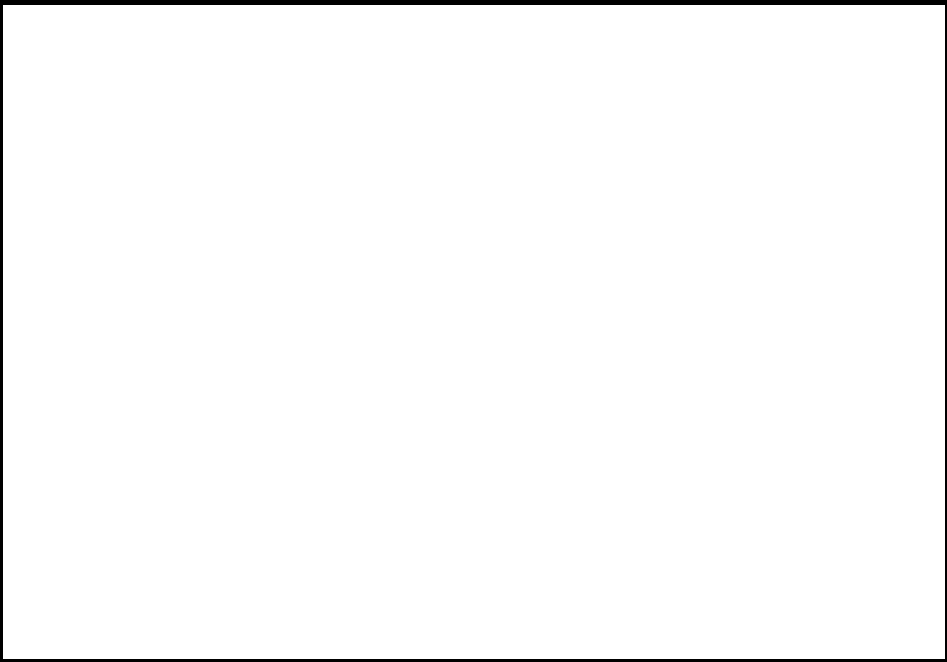
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail/Construction Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

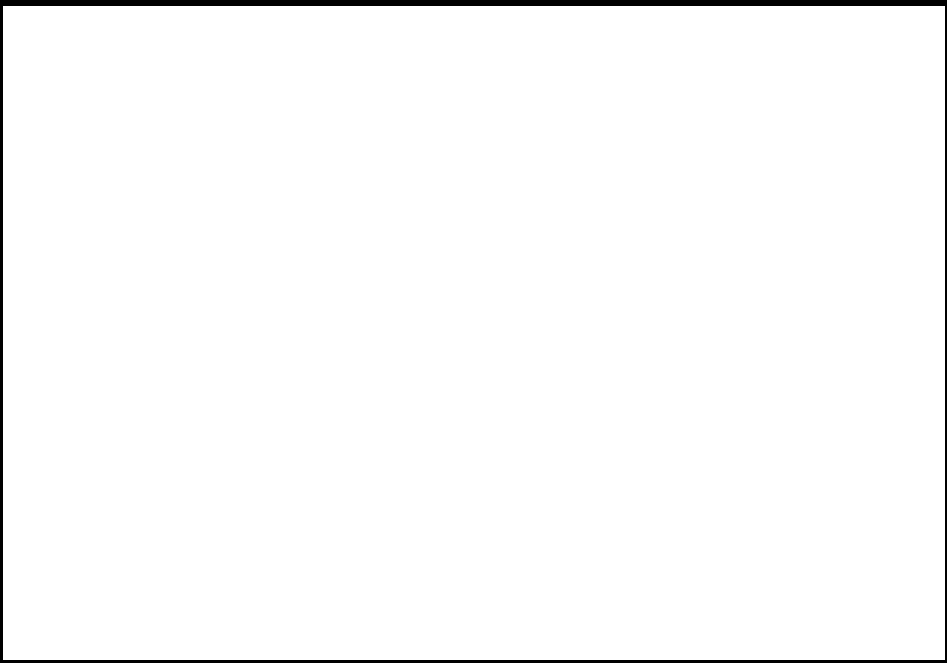
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-119

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.1	Width (m):	4	Upstream Erosion (Y/N):	N
Tributary Name:	East Branch -	Length (m):	5			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	128.5	U/S Obvert Elev. (m):	131.54	Additional Flow Information: N/A	
HEC-RAS Cross Section:	835.6872	D/S Invert Elev. (m):	128.45	D/S Obvert Elev. (m):	131.36		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail/Construction Bridge		Height from Obvert to Top of Road (m):	0.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure

City of Toronto Structure Data:	
Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-120

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3	Width (m):	5.2	Upstream Erosion (Y/N):	N
Tributary Name:	East Branch -	Length (m):	N/A			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Lanyard Road		Height from Obvert to Top of Road (m):	>3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



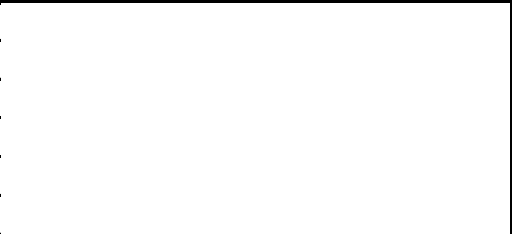
Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0



HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-121

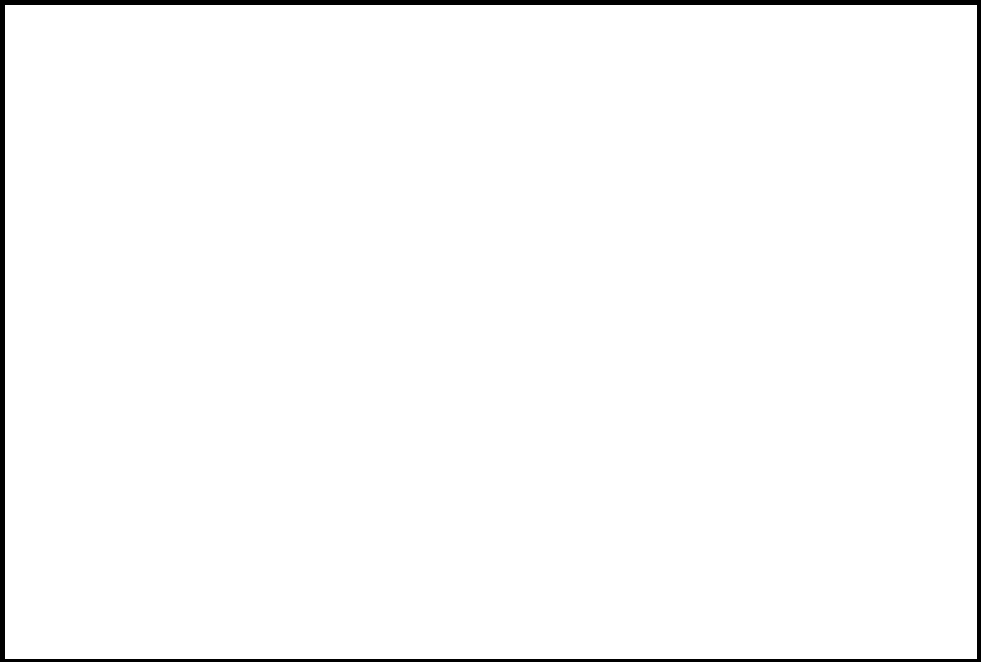
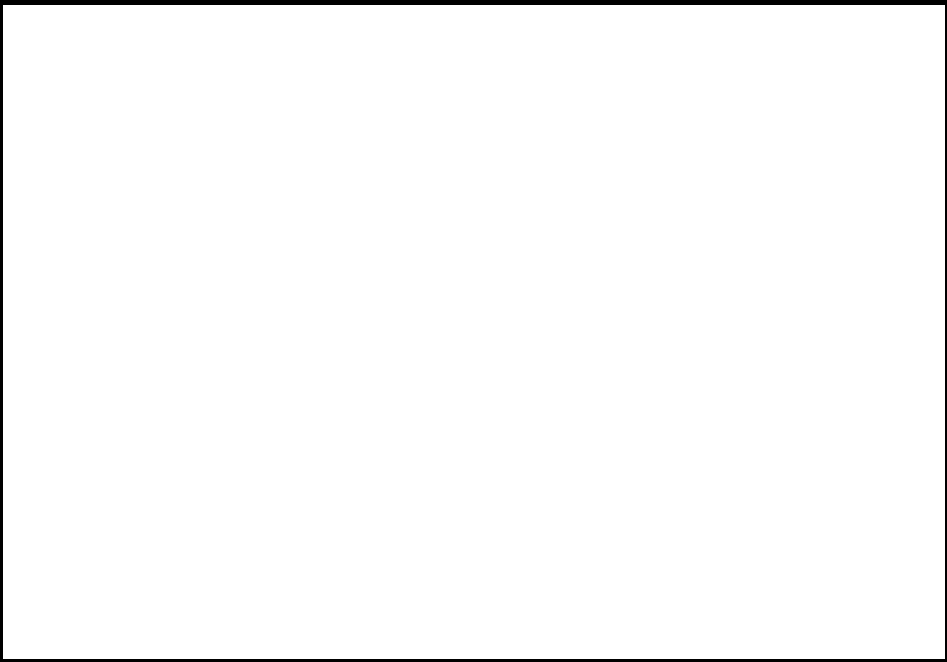
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Pedestrian Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

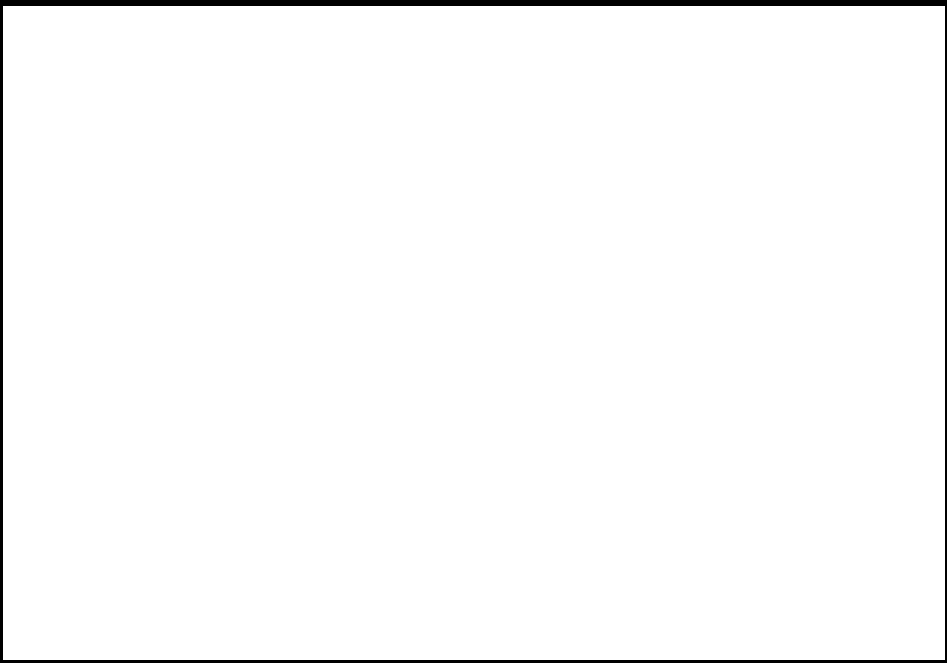
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-122

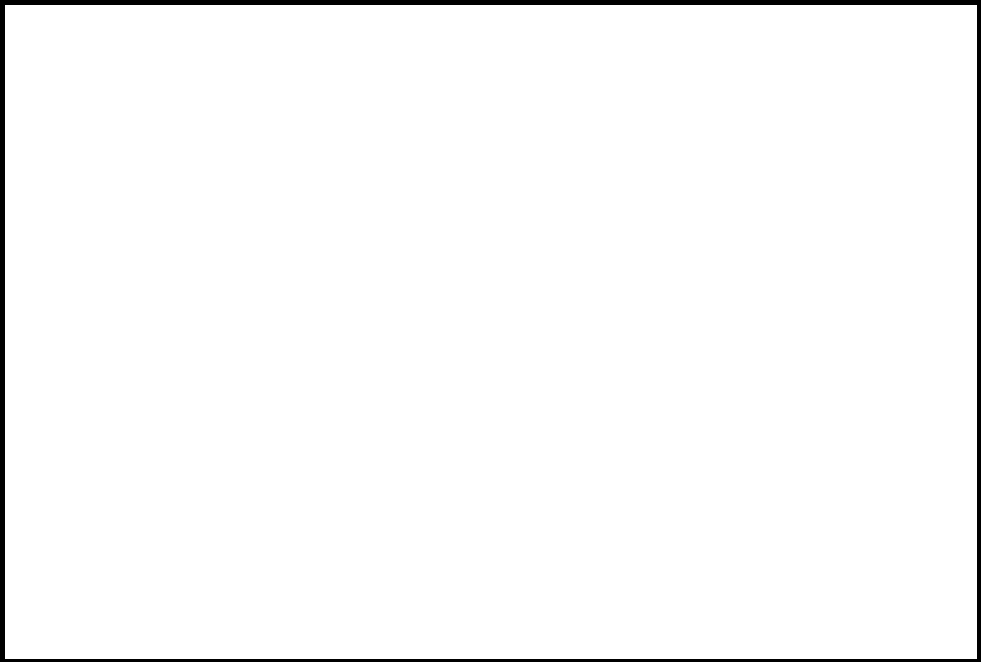
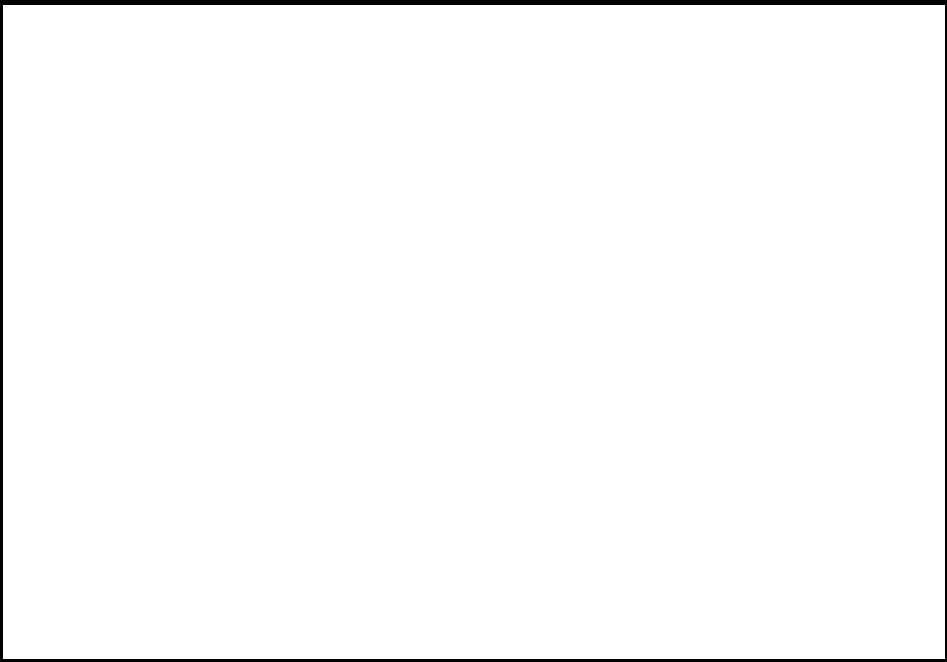
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Finch Avenue West		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

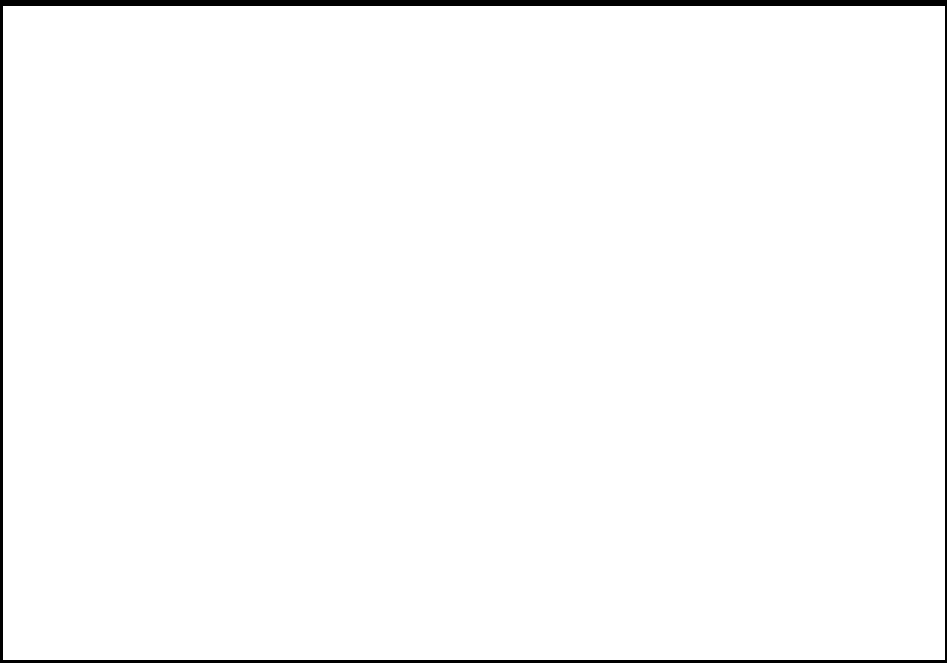
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-123

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Chalkfarm Park - Bridge (2)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph: Downstream face of structure

Additional Site Photographs		
Description of Photograph: Looking downstream from structure	Upstream face of structure	
	City of Toronto Structure Data:	
	Structure ID:	308334
	Condition:	Good
	Owner:	City of Toronto
	Year Constructed:	1985
	Last Inspection:	2012
	Next Inspection:	2017
Description of Photograph: Looking upstream from structure		

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-124

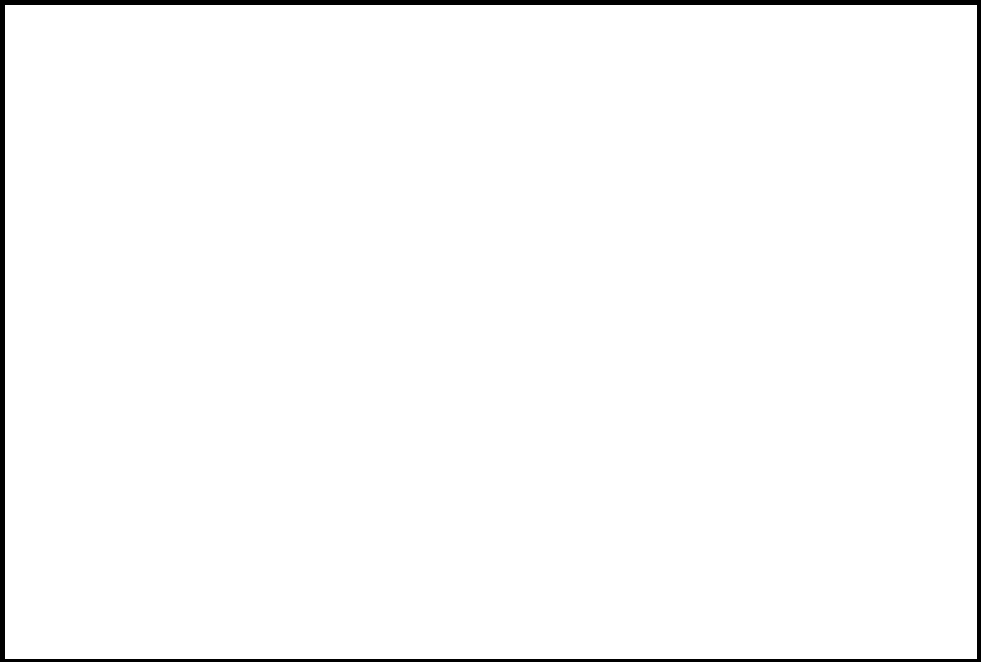
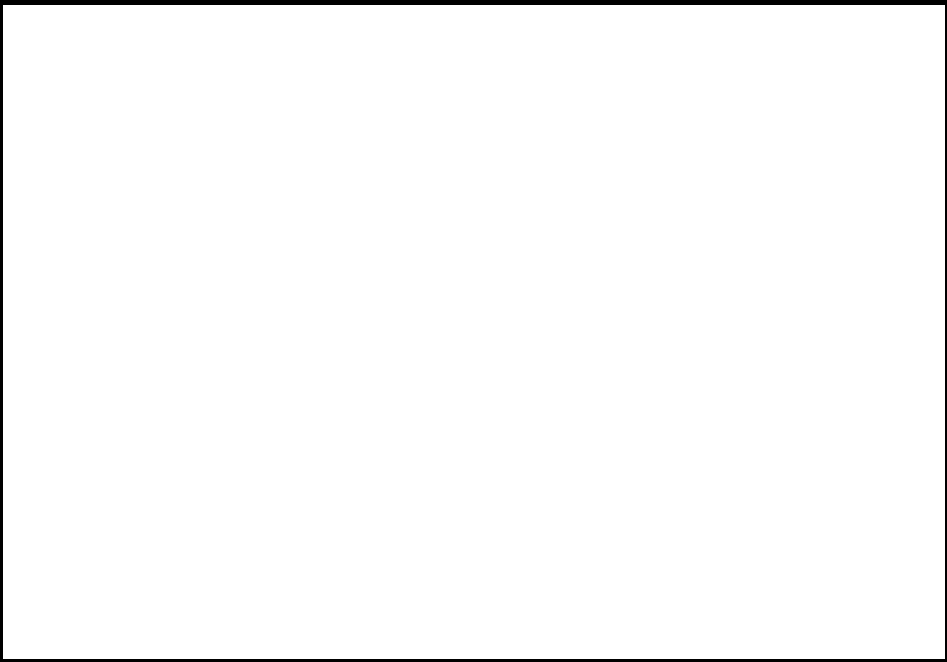
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Chalkfarm Park - Bridge (1)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

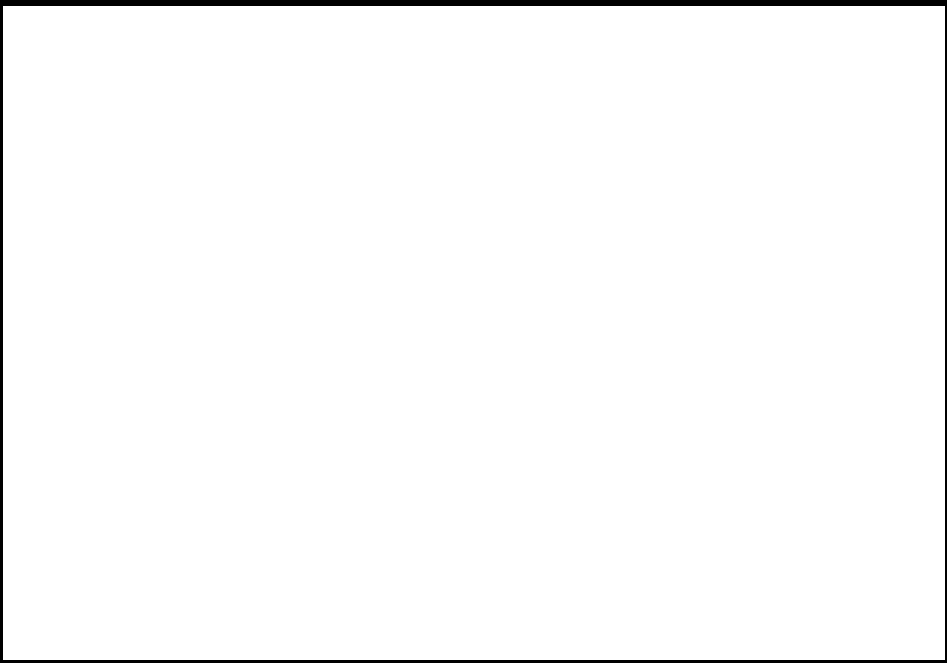
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	308333
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1985
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-125

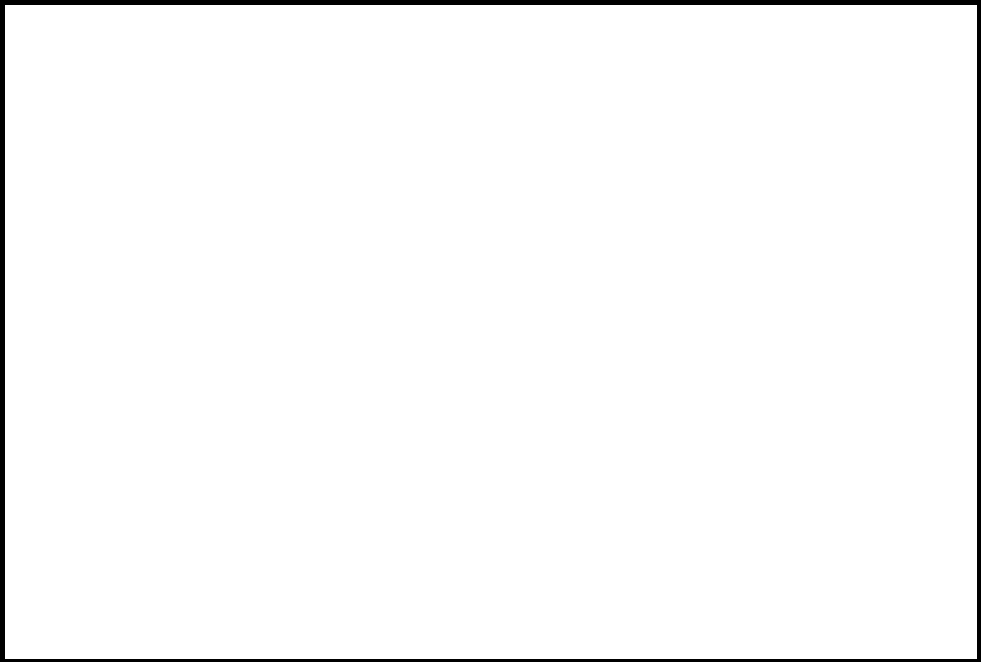
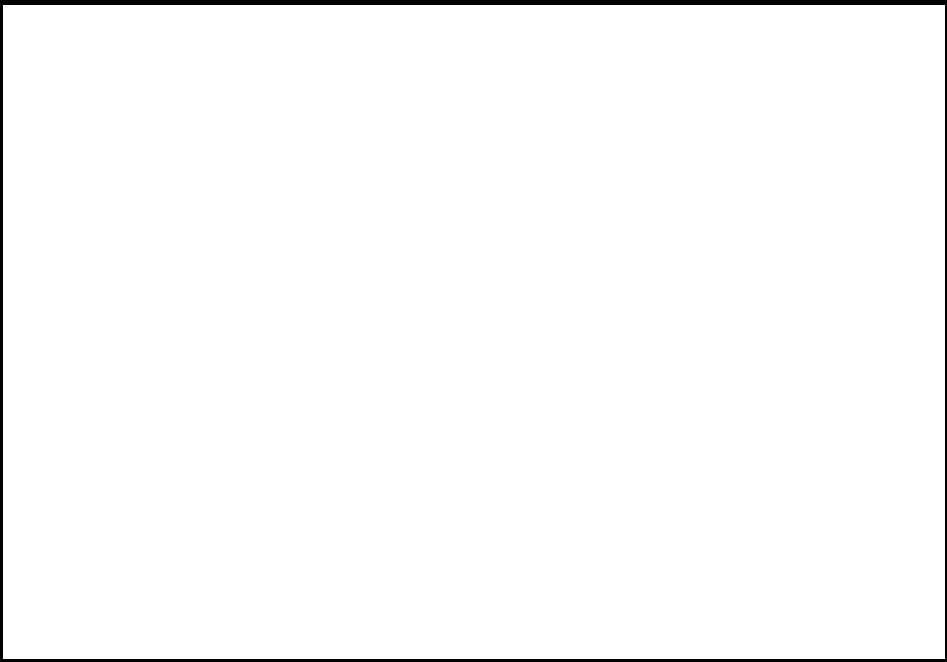
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

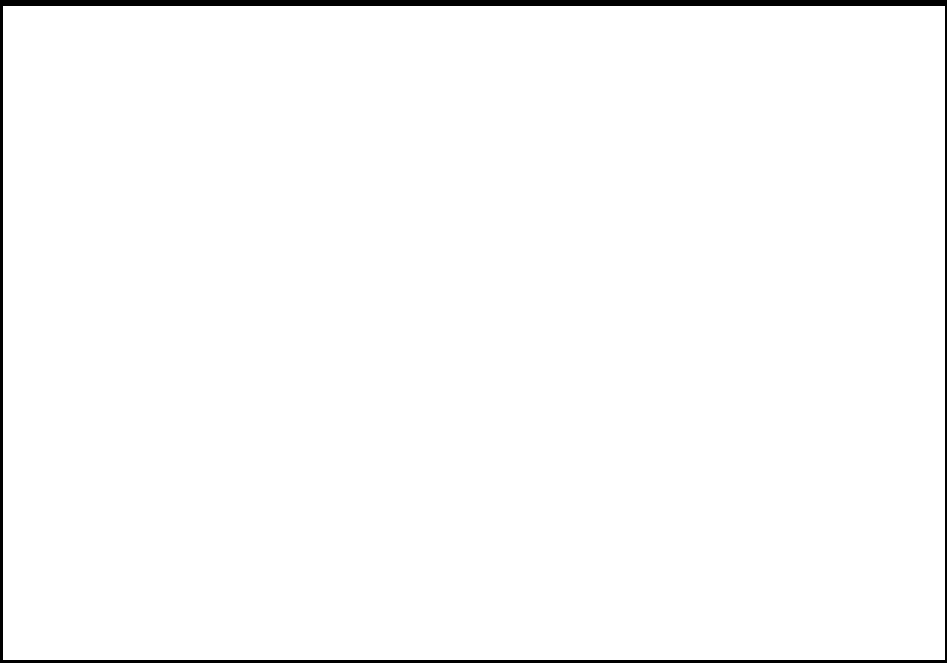
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-126

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

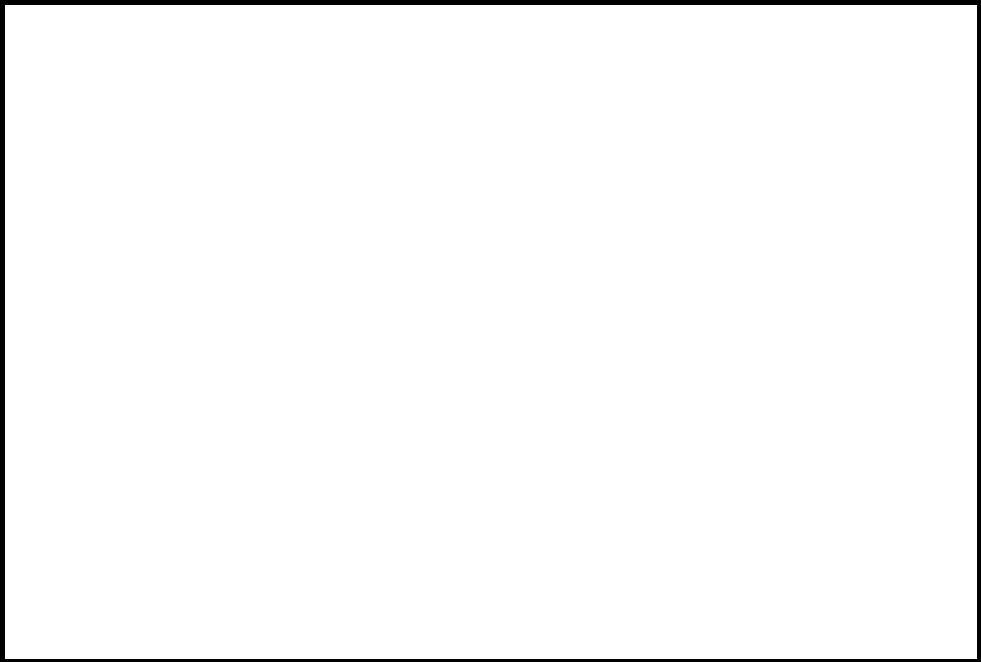
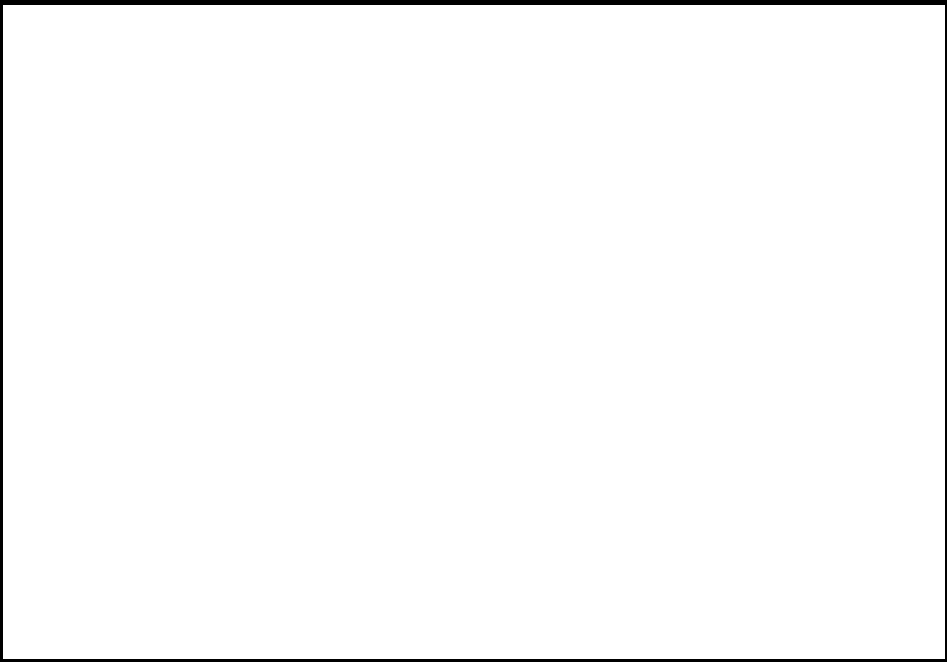
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

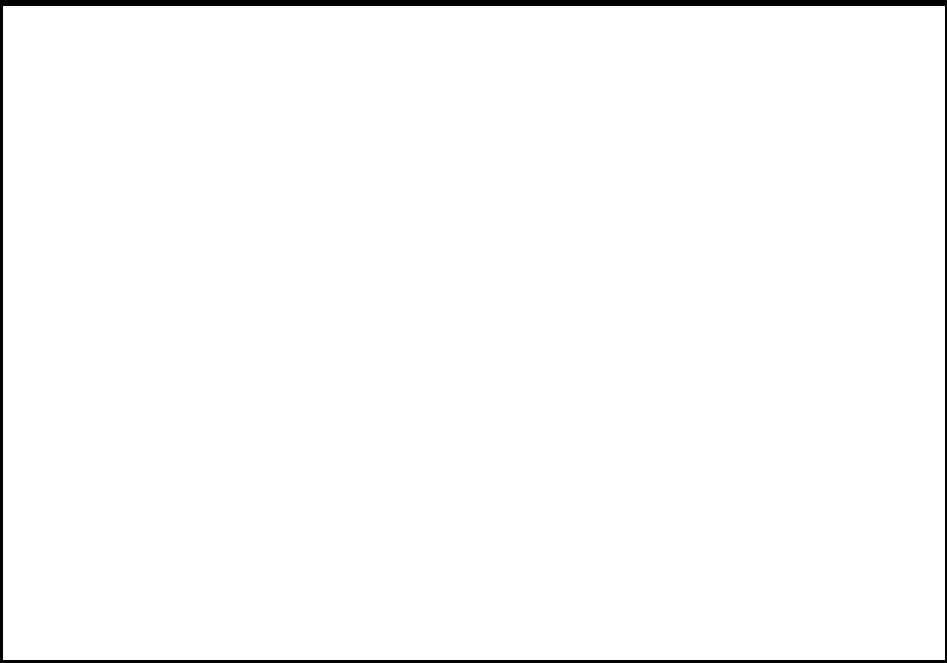
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-127

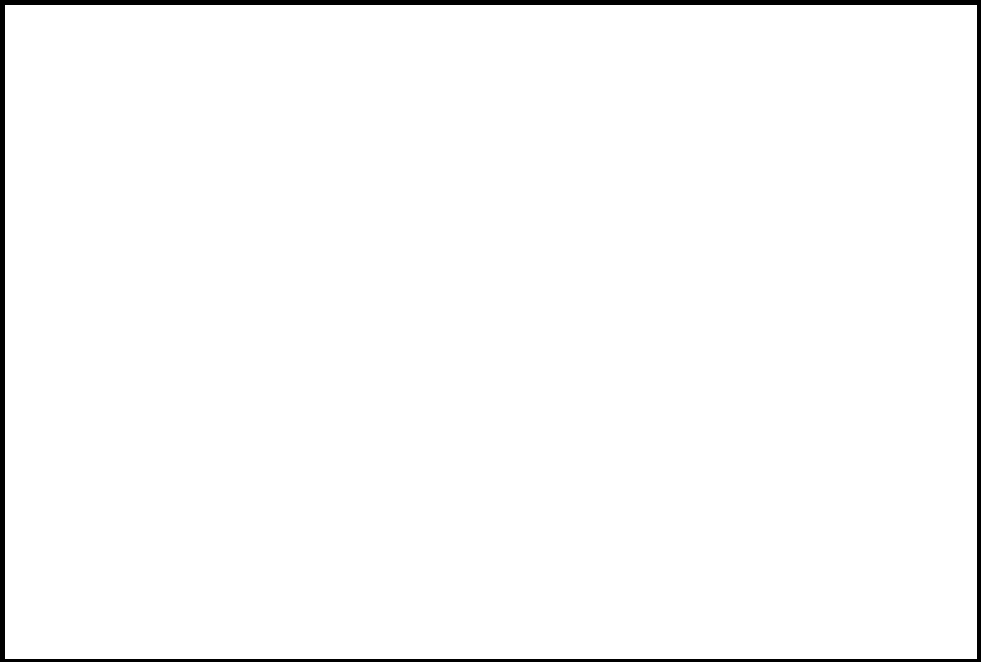
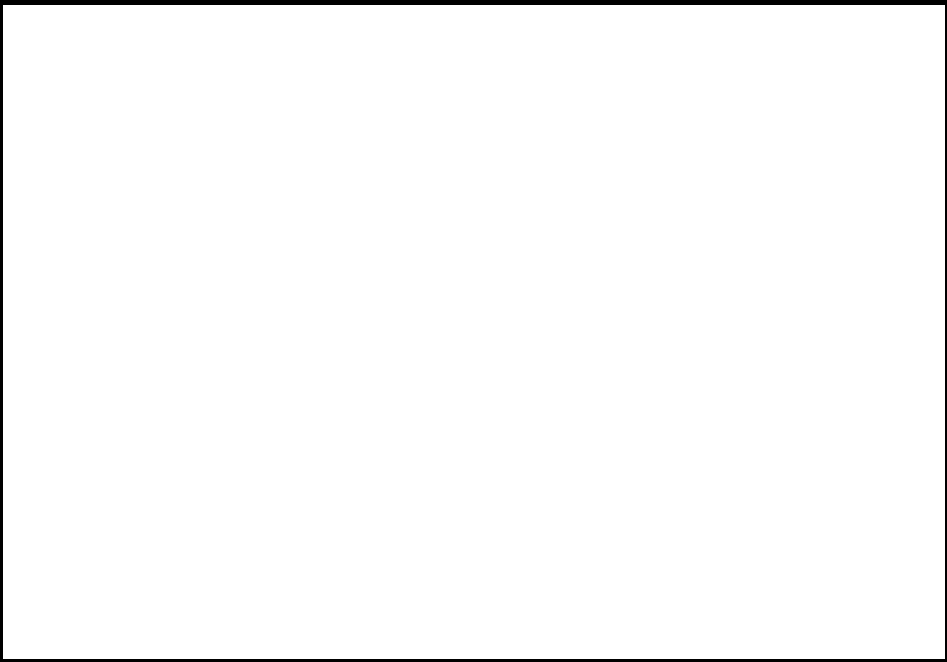
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

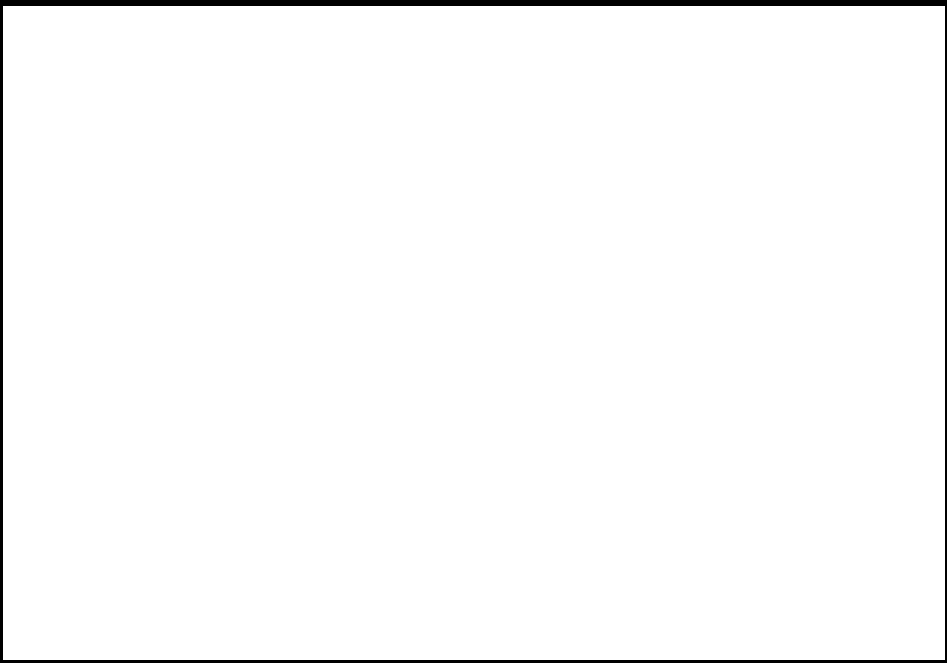
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-128

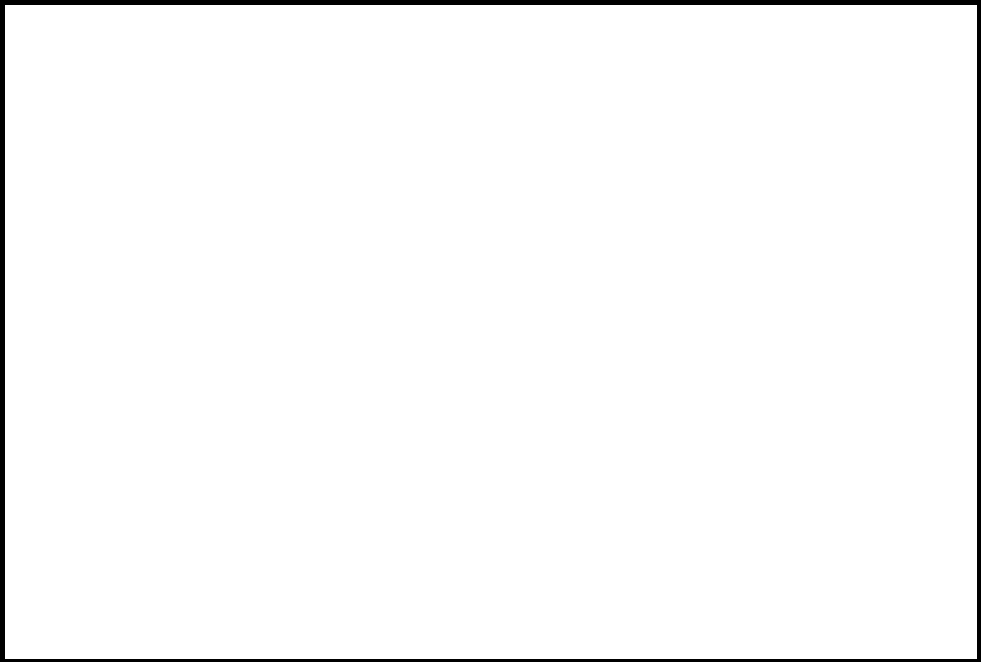
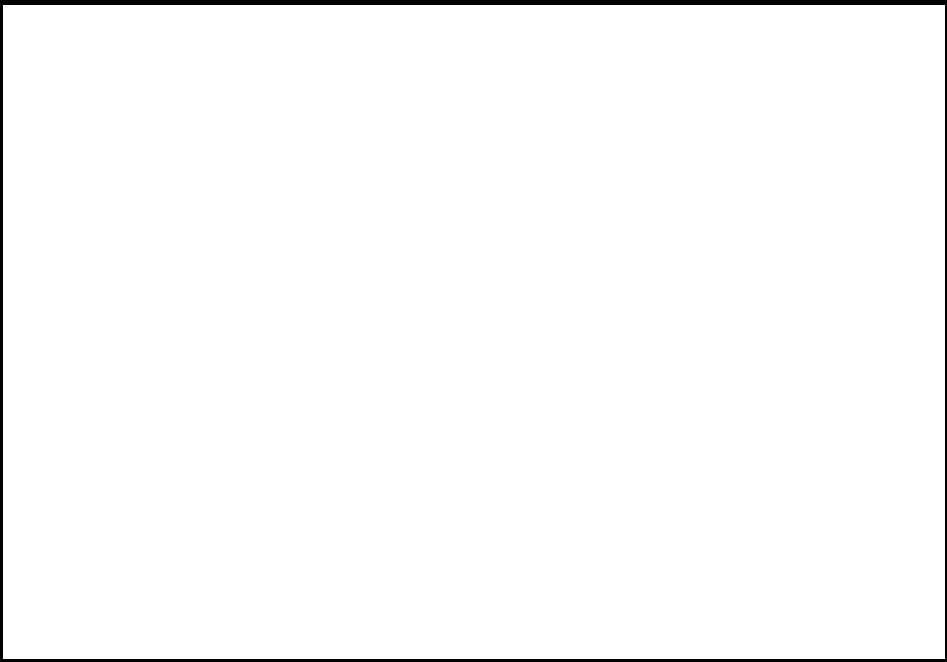
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

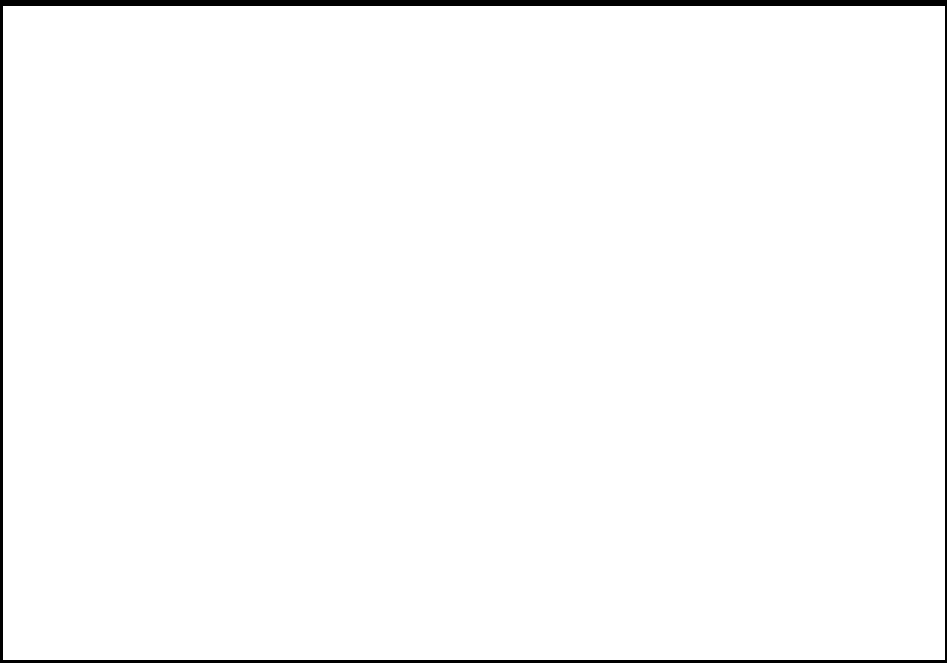
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-129

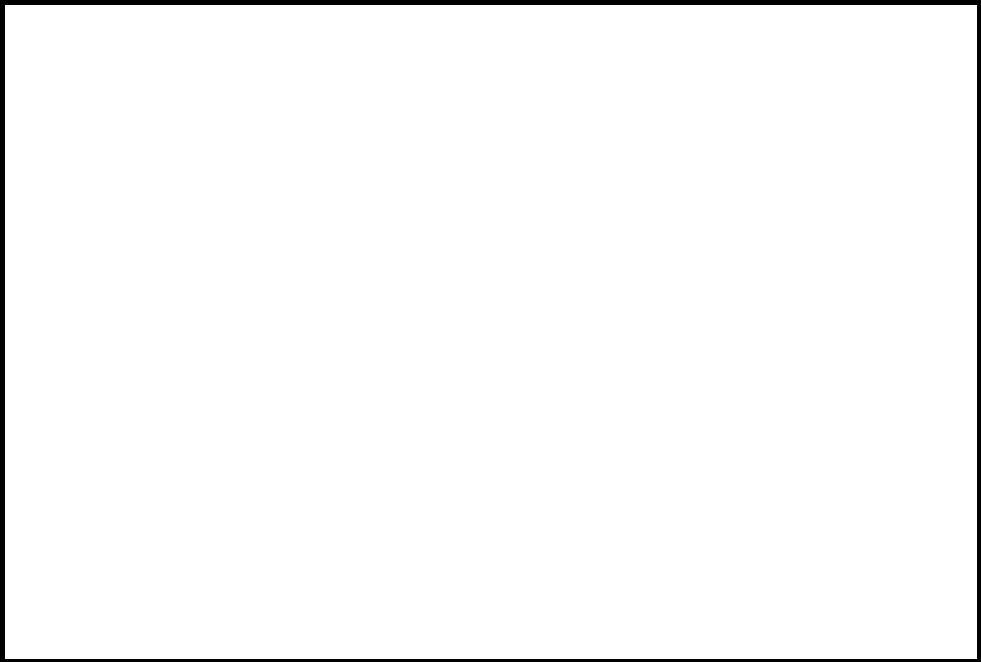
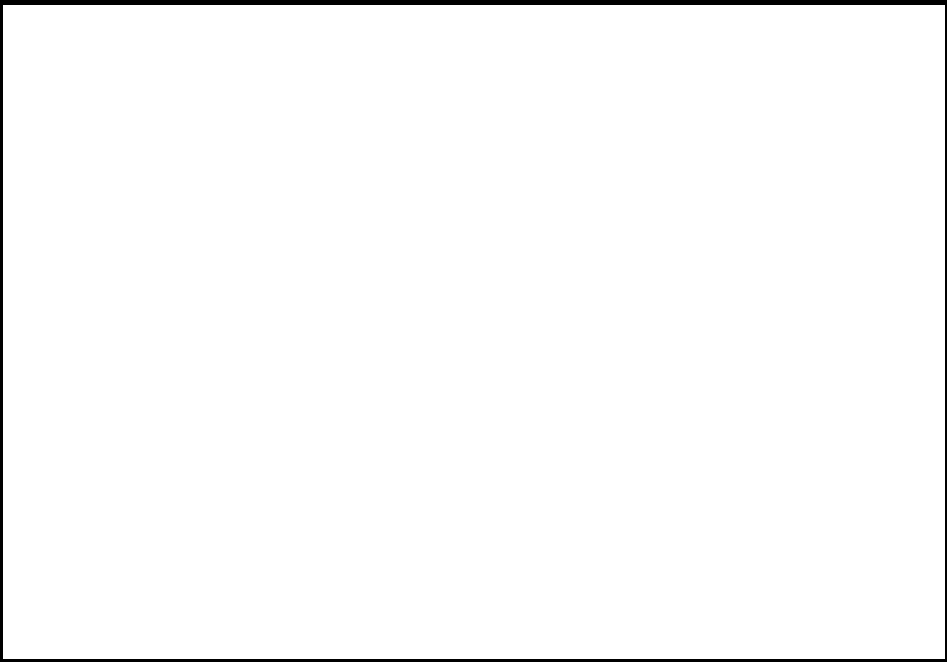
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

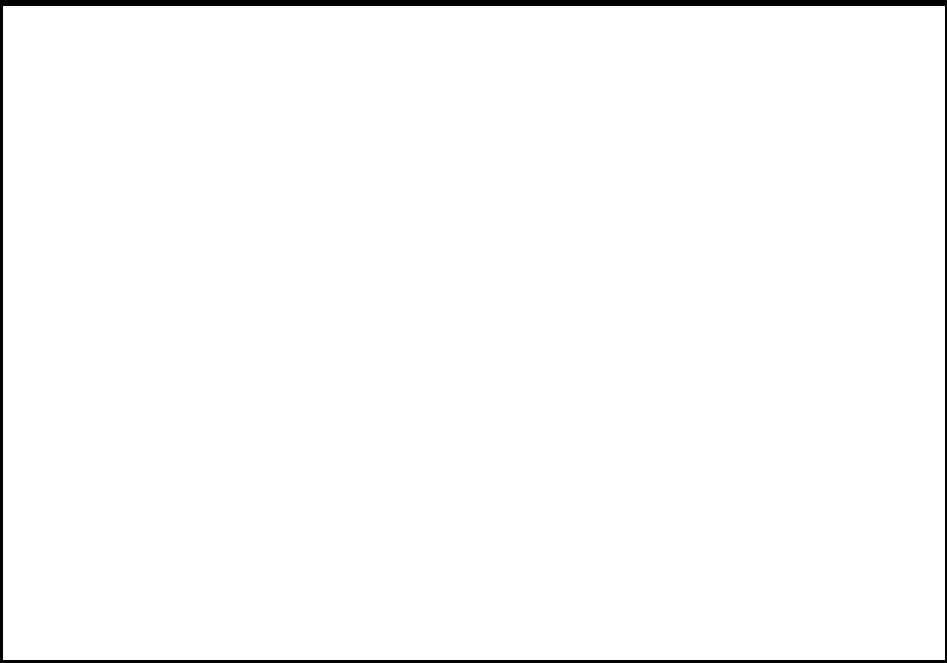
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-130

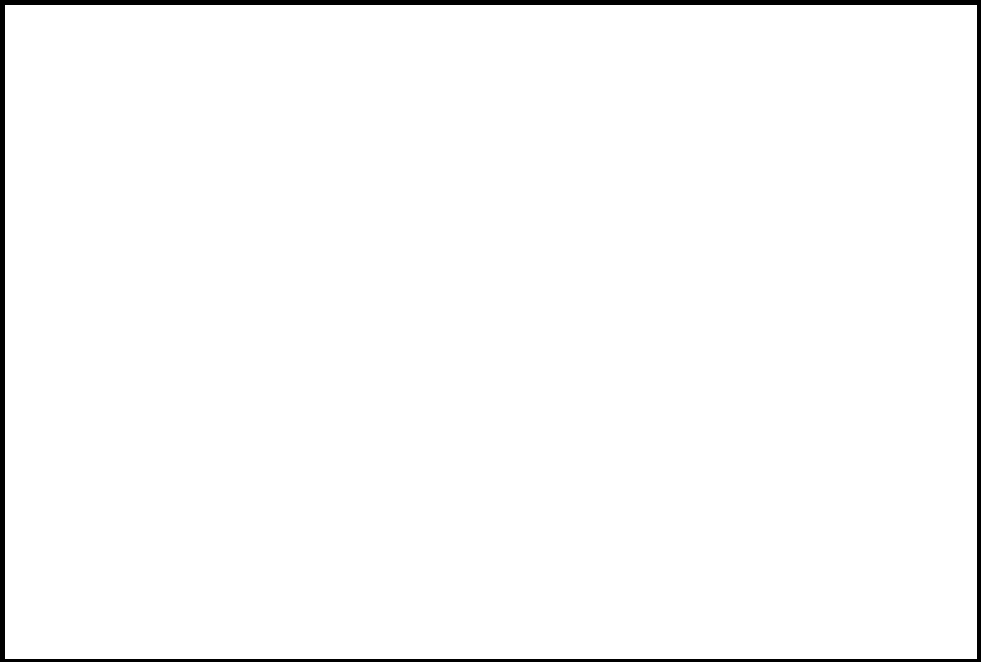
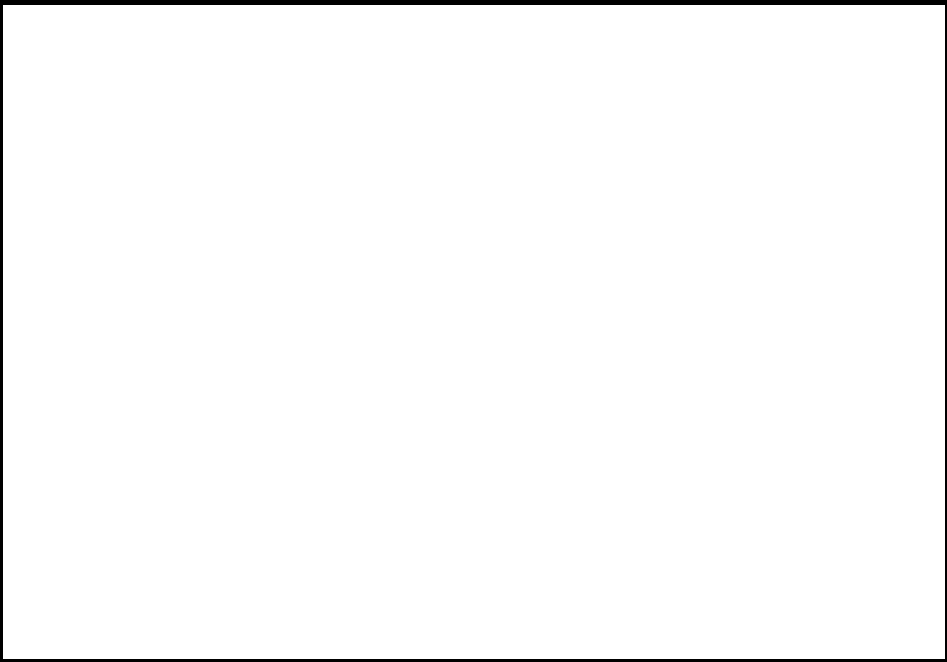
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

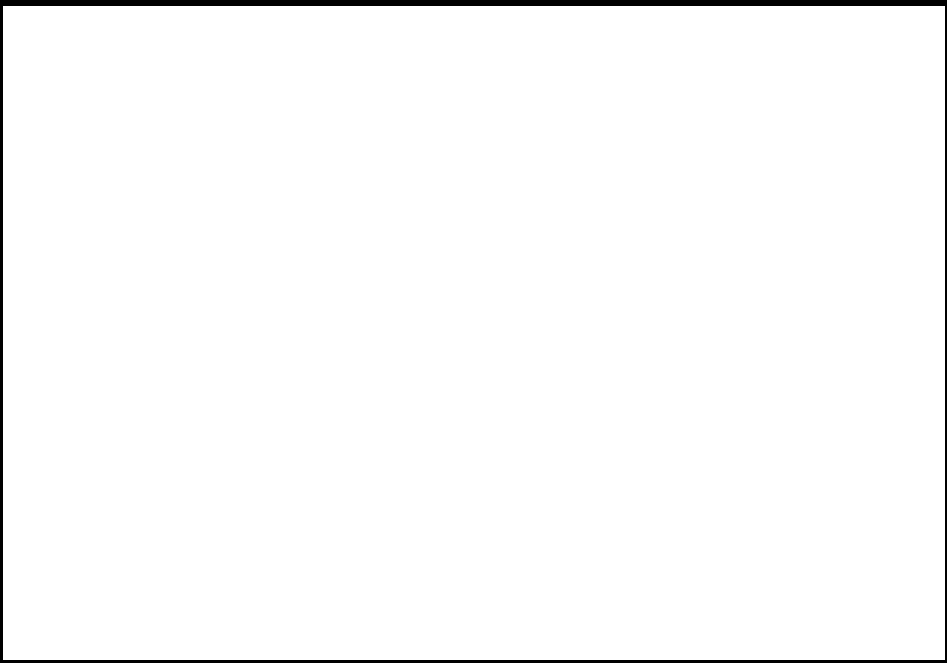
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-131

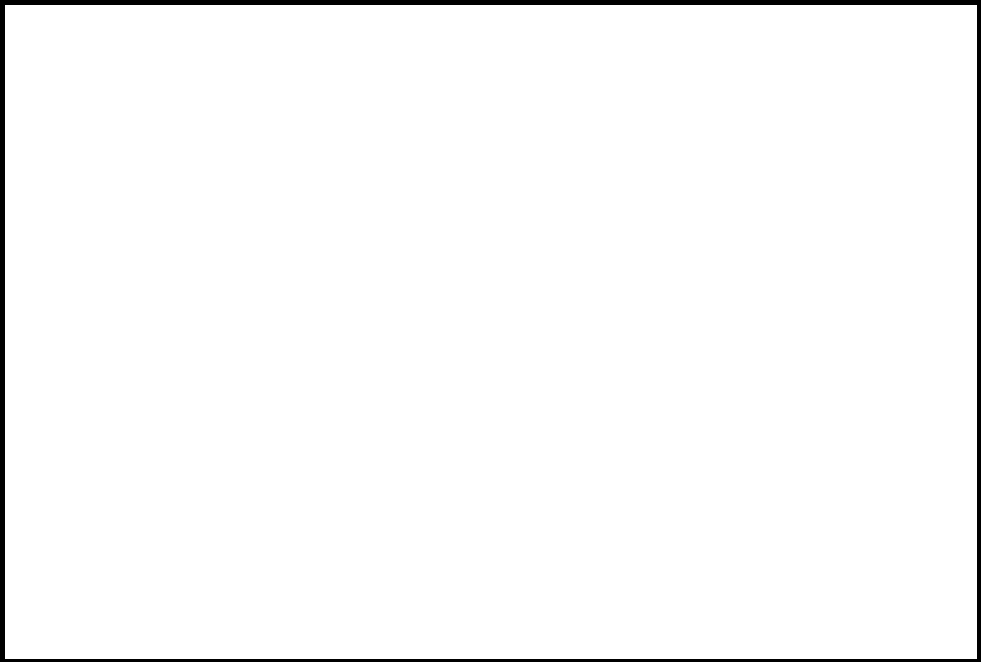
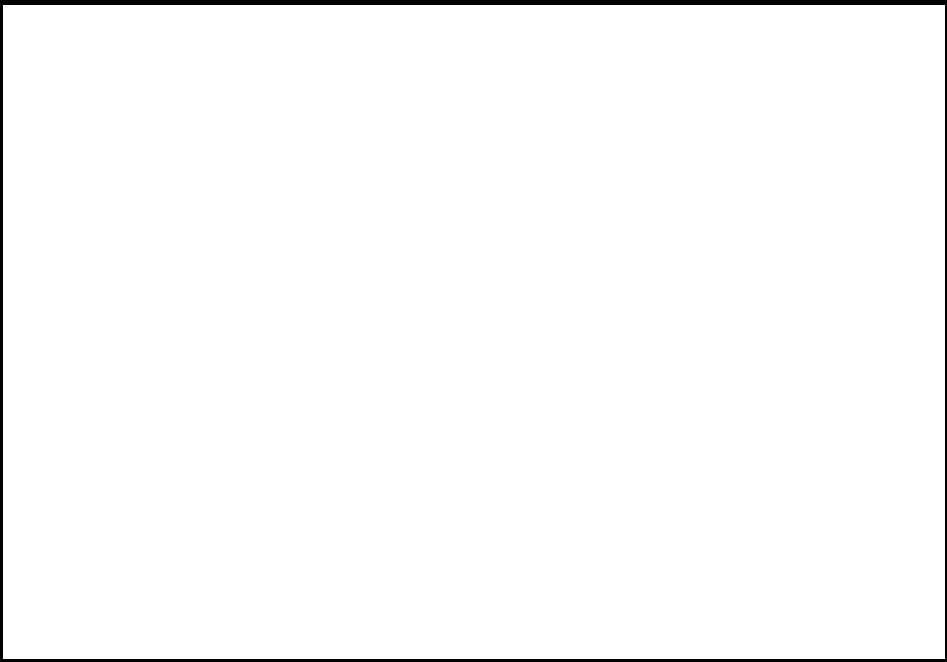
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

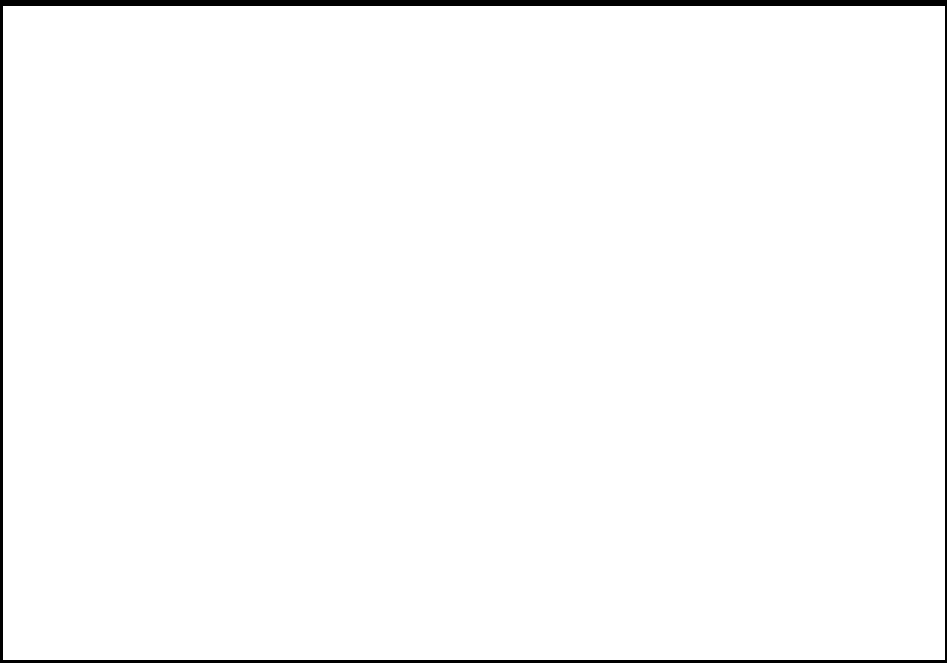
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-132

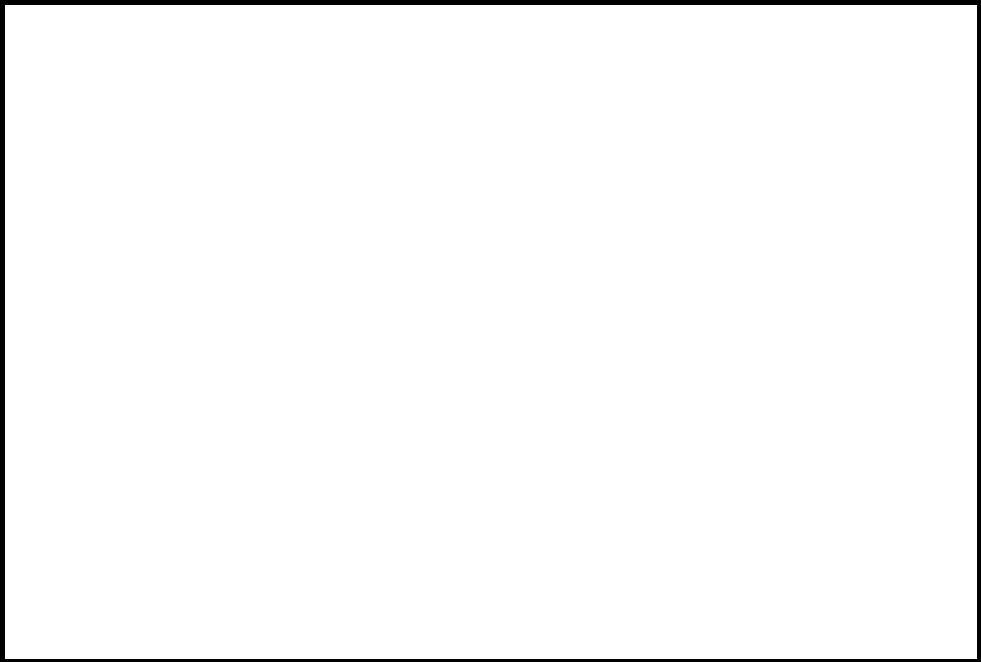
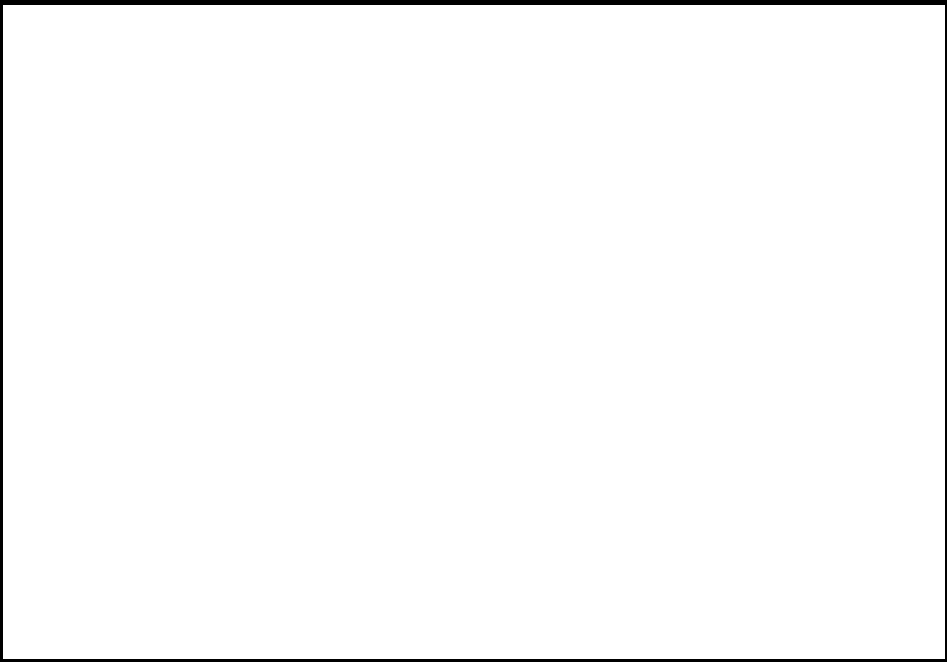
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

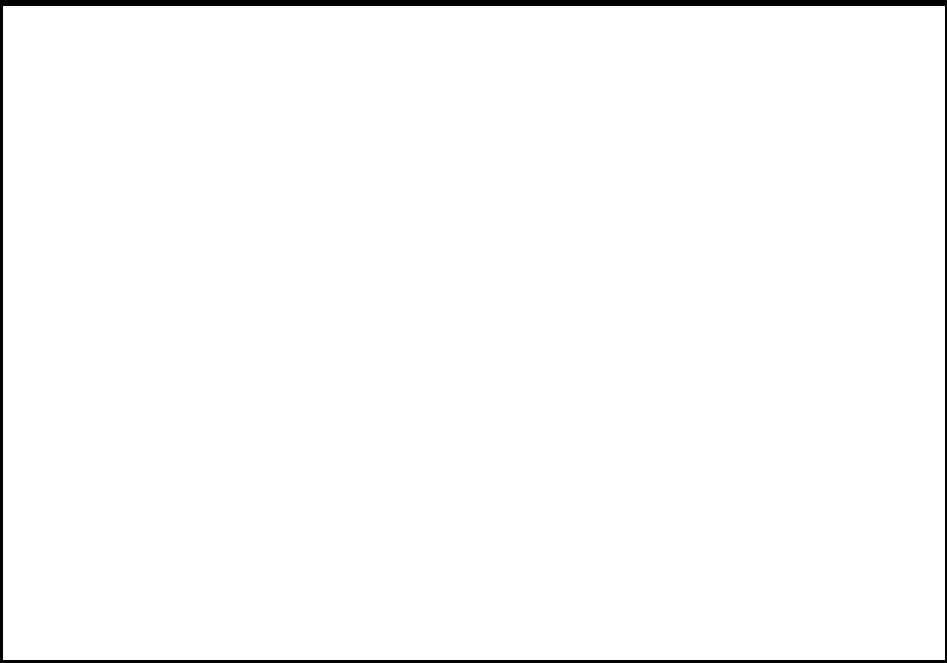
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-133

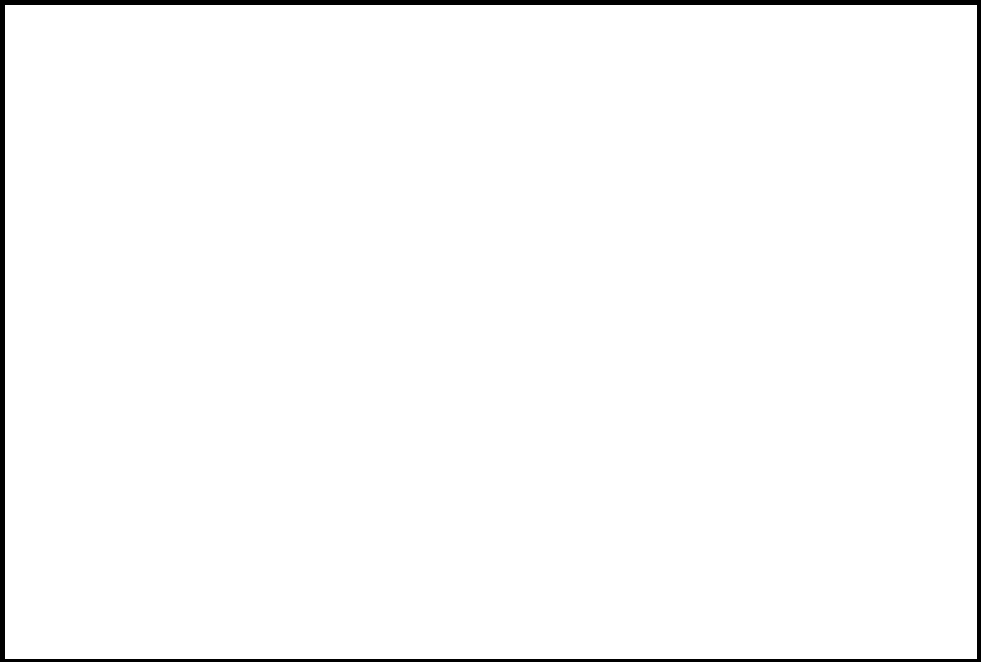
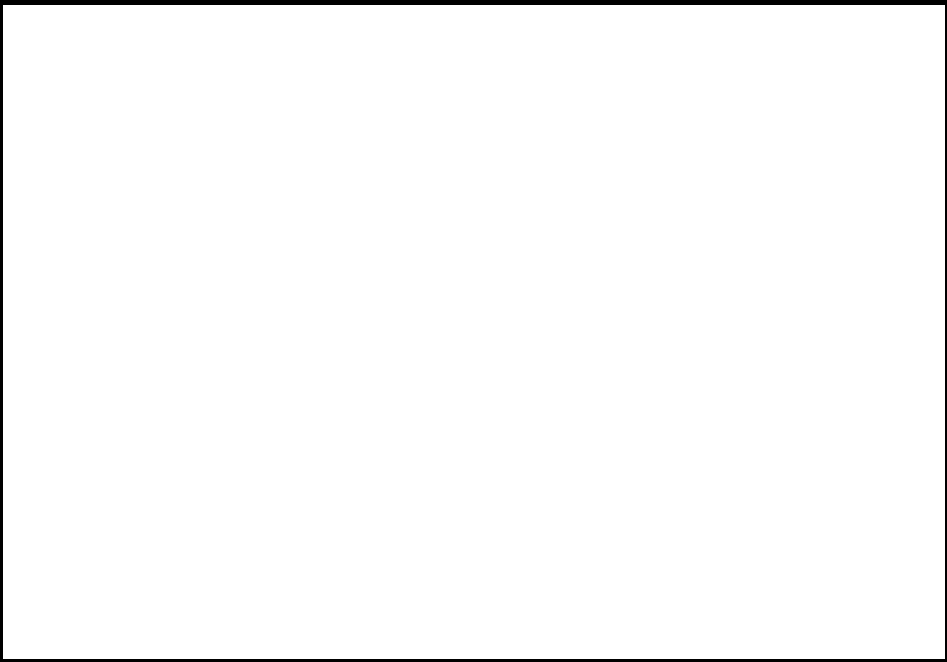
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

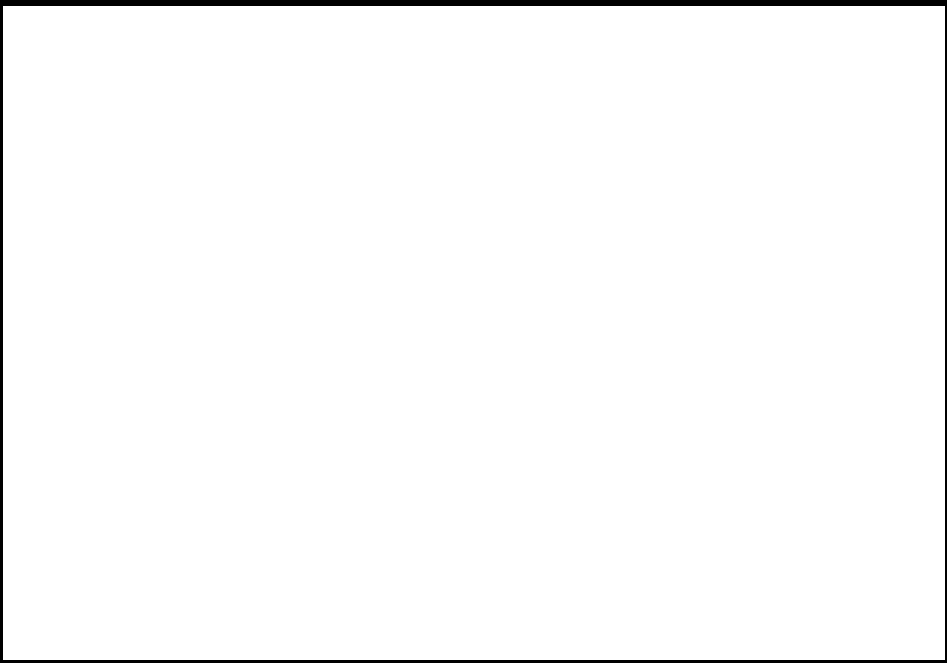
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-134

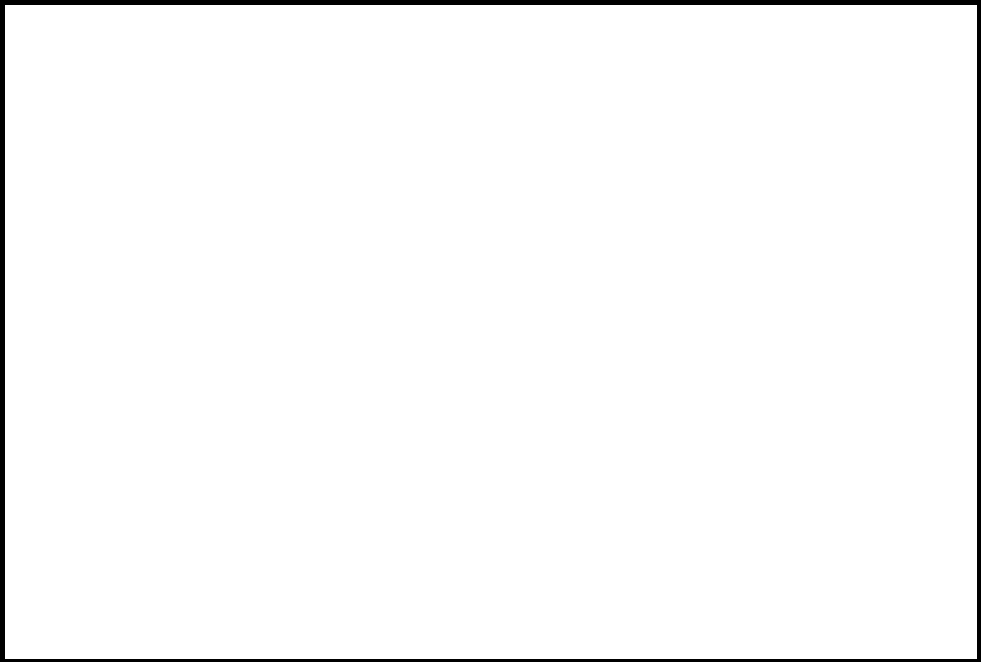
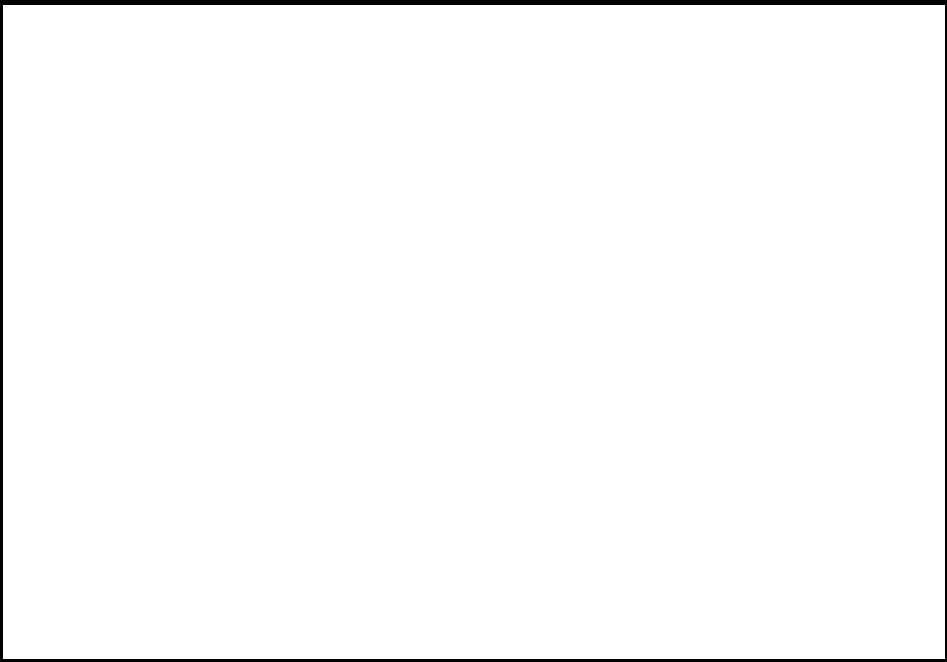
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

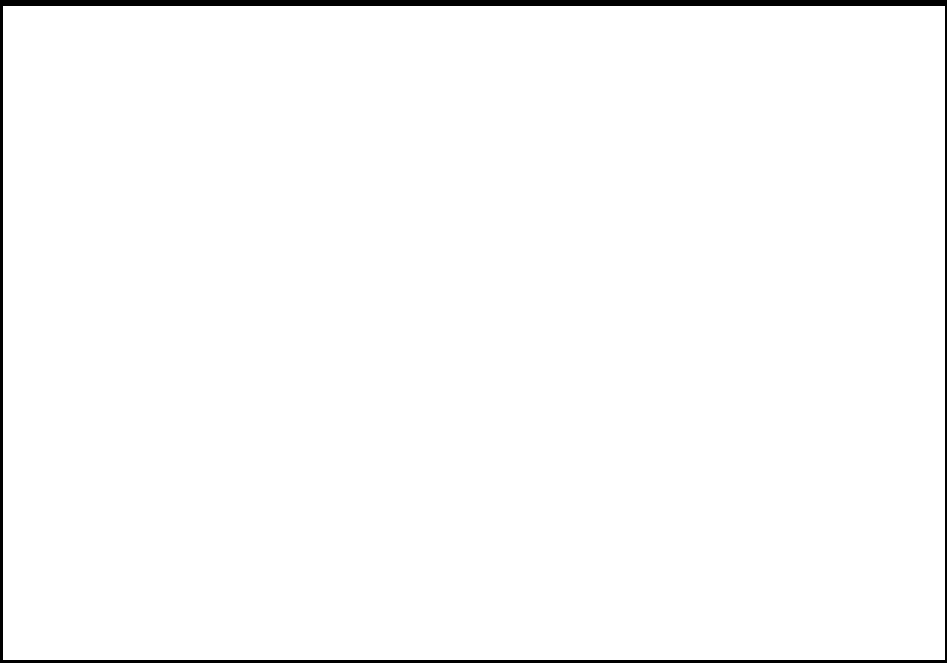
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-135

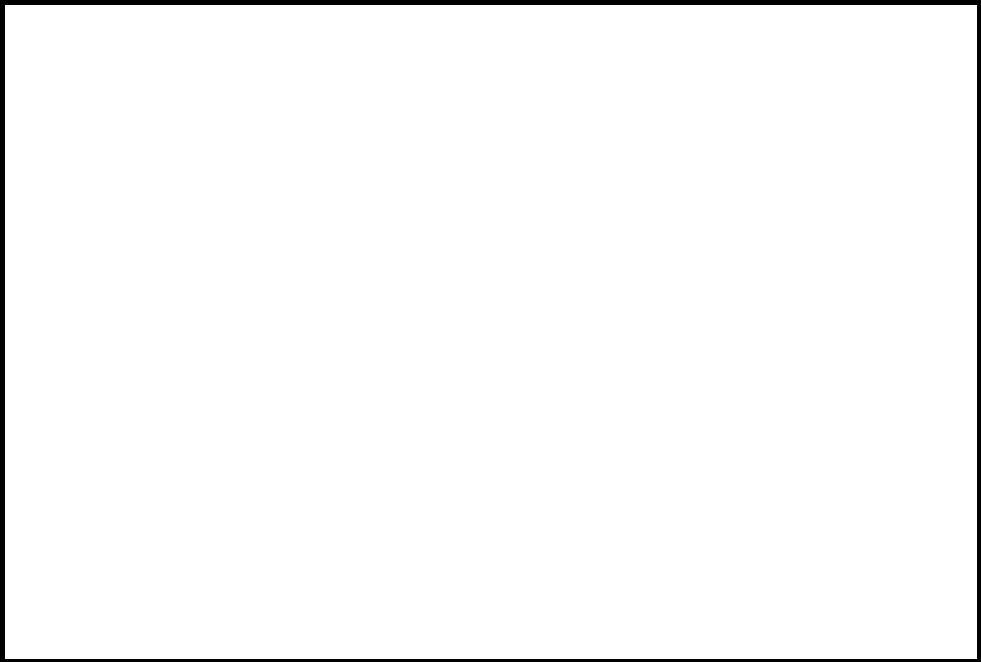
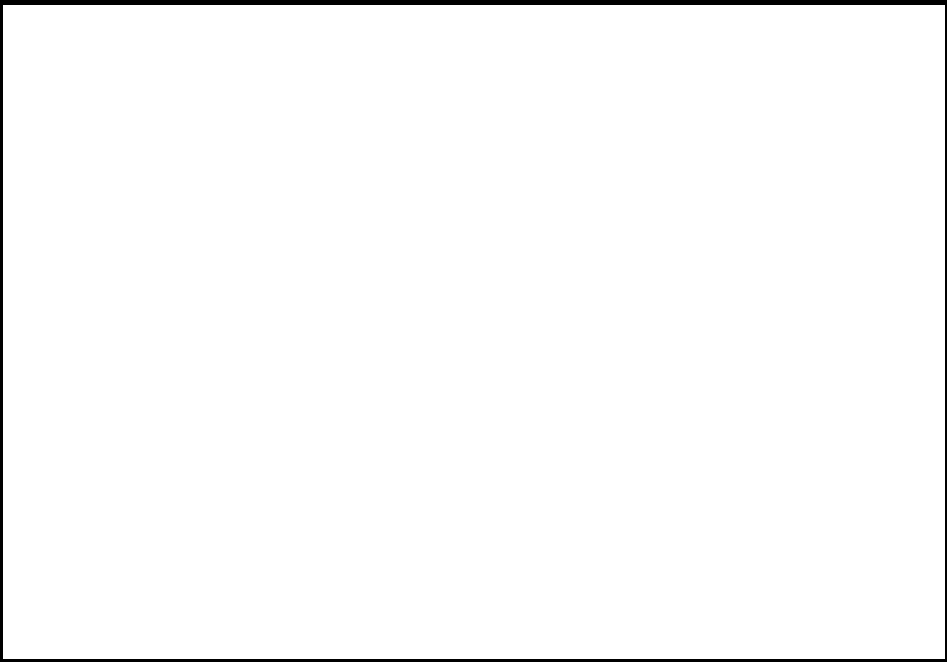
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

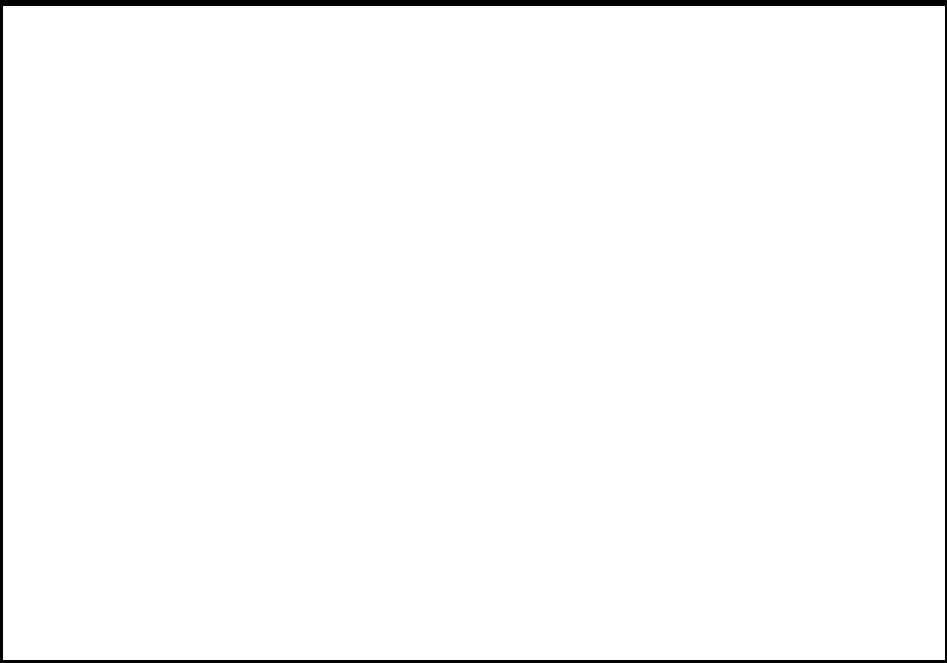
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-136

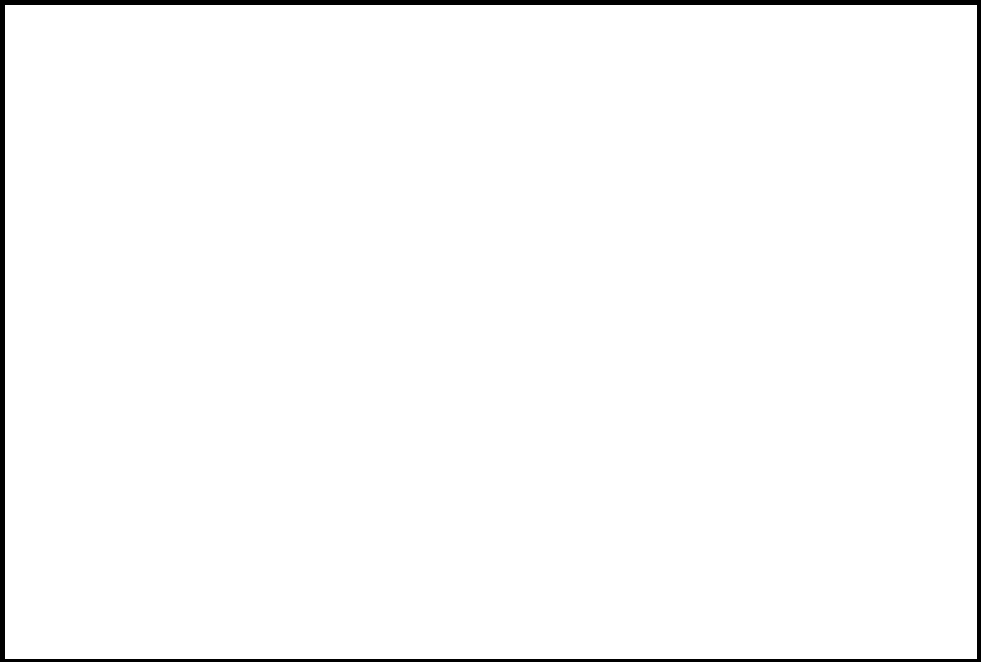
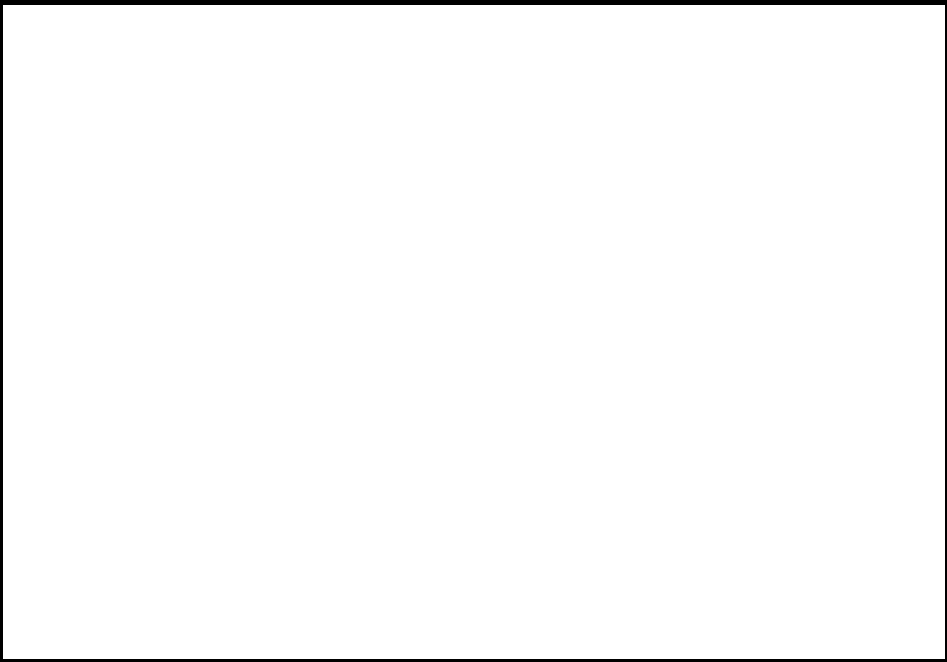
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

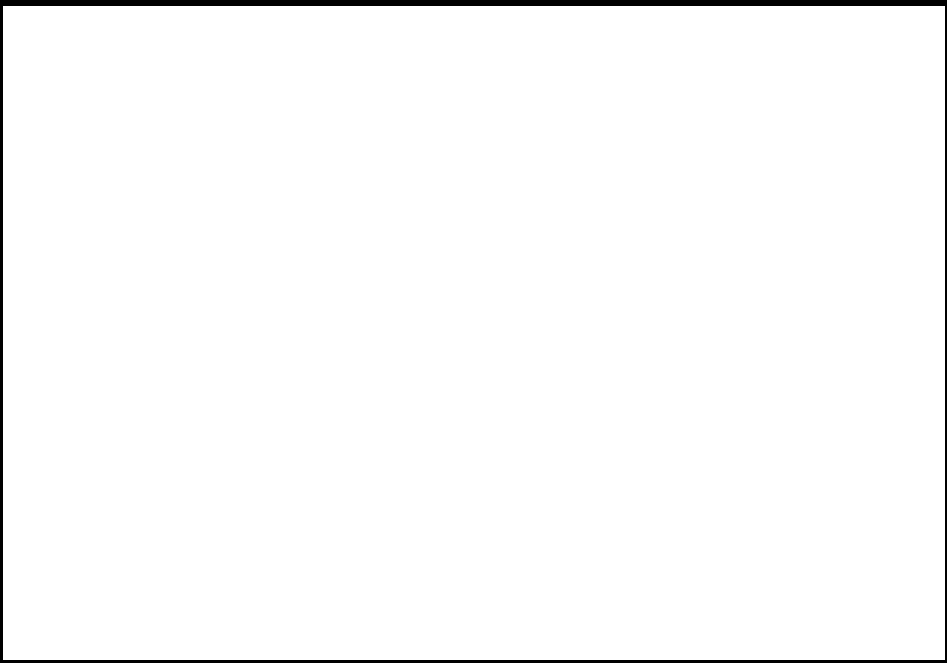
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

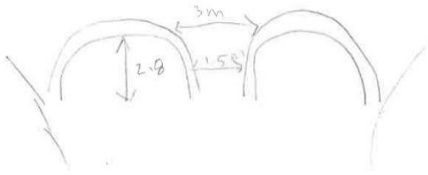
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-137

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	No	Approx. Depth (mm):	600
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.82	Width (m):	4.55	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	42			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	136.18	U/S Obvert Elev. (m):	138.82	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1578.899	D/S Invert Elev. (m):	136	D/S Obvert Elev. (m):	138.82		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Projecting				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Jane Street		Height from Obvert to Top of Road (m):	3.38				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	294
Condition:	Fair
Owner:	City of Toronto
Year Constructed:	1960
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

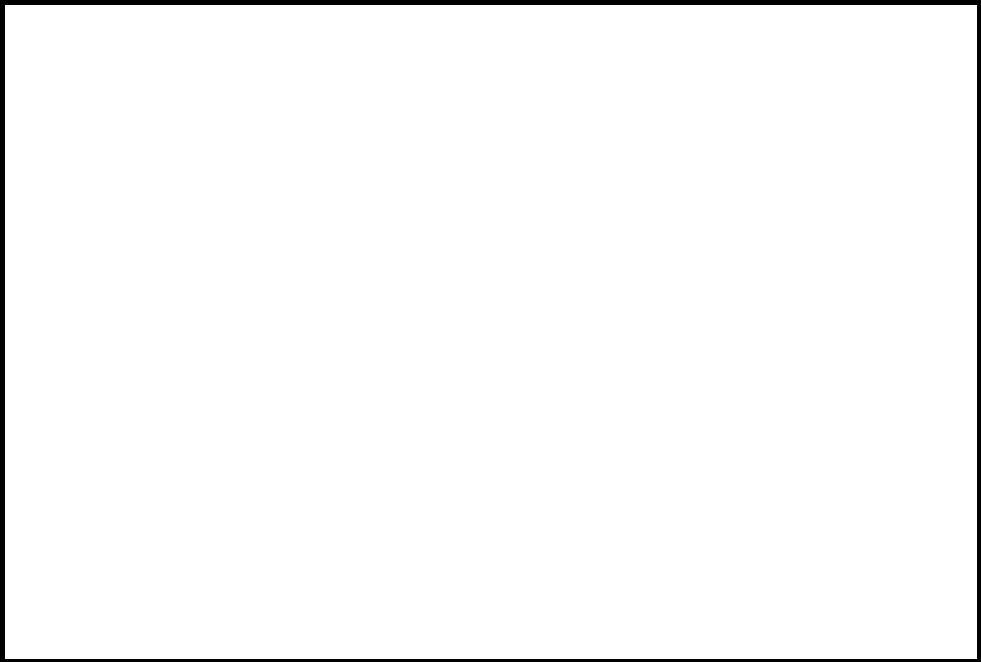
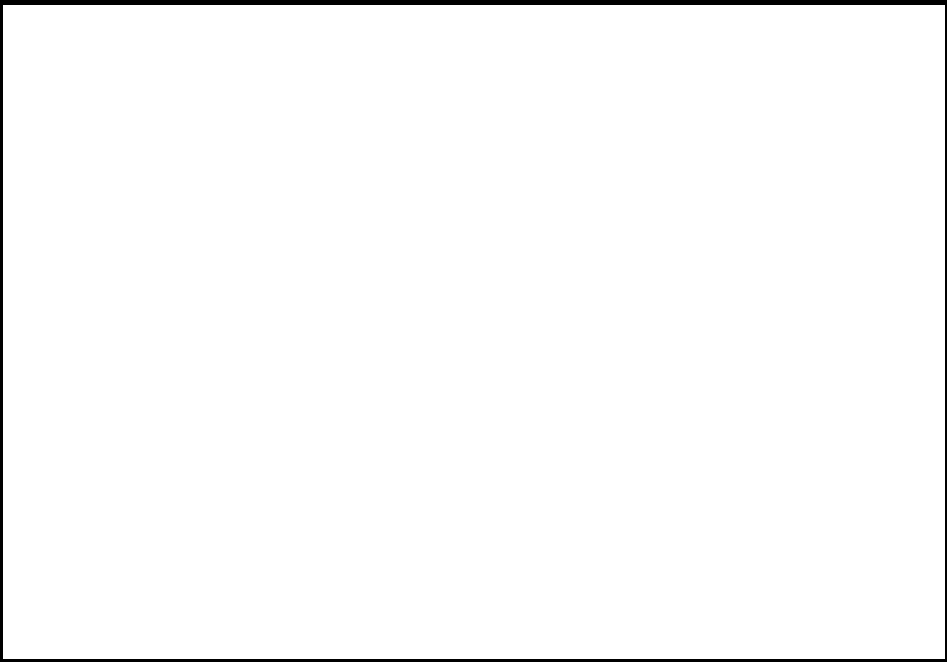
CROSSING # : Humber River-138

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	N/A	Structure Type (Culvert/Bridge):	Dam			Flow Present (Y/N):	N/A
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.3	Width (m):	1.3	Upstream Erosion (Y/N):	N/A
Tributary Name:	Black Creek	Length (m):	30			Downstream Erosion (Y/N):	N/A
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	137.46	U/S Obvert Elev. (m):	138.76	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1934.072	D/S Invert Elev. (m):	137.12	D/S Obvert Elev. (m):	138.19		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): Black Creek Retardation Dam		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	4.5				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

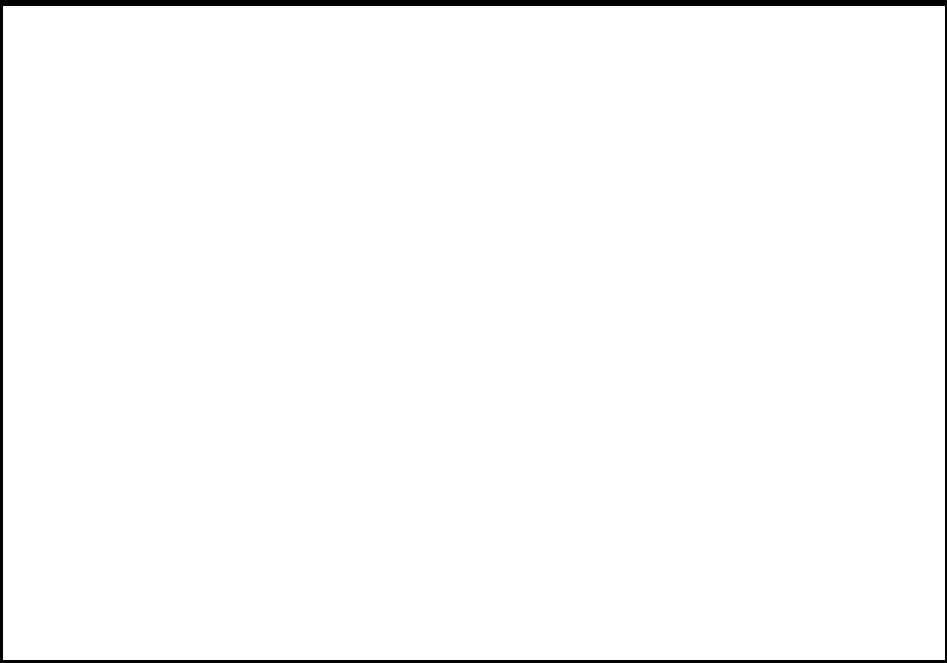
Site Sketch:	
Description of Photograph: Downstream face of structure	

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-139

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail Bridge - Downsview Dells Park - Bridge (1)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

Downstream face of structure

Additional Site Photographs		
Description of Photograph: Looking downstream from structure	Upstream face of structure	
	City of Toronto Structure Data:	
	Structure ID:	308344
	Condition:	Good
	Owner:	TRCA
	Year Constructed:	1985
	Last Inspection:	2012
	Next Inspection:	2017
Description of Photograph: Looking upstream from structure		

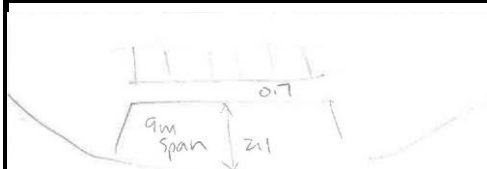
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-140

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.1	Width (m):	9	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	9.2			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	145.7	U/S Obvert Elev. (m):	146.36	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3556.971	D/S Invert Elev. (m):	144.1	D/S Obvert Elev. (m):	146.2		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Vehicular Bridge - Downsview Dells Park - Bridge		Height from Obvert to Top of Road (m):	0.7				
(2)		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308337
Condition:	Good
Owner:	TRCA
Year Constructed:	1965
Last Inspection:	2014
Next Inspection:	2016

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-141

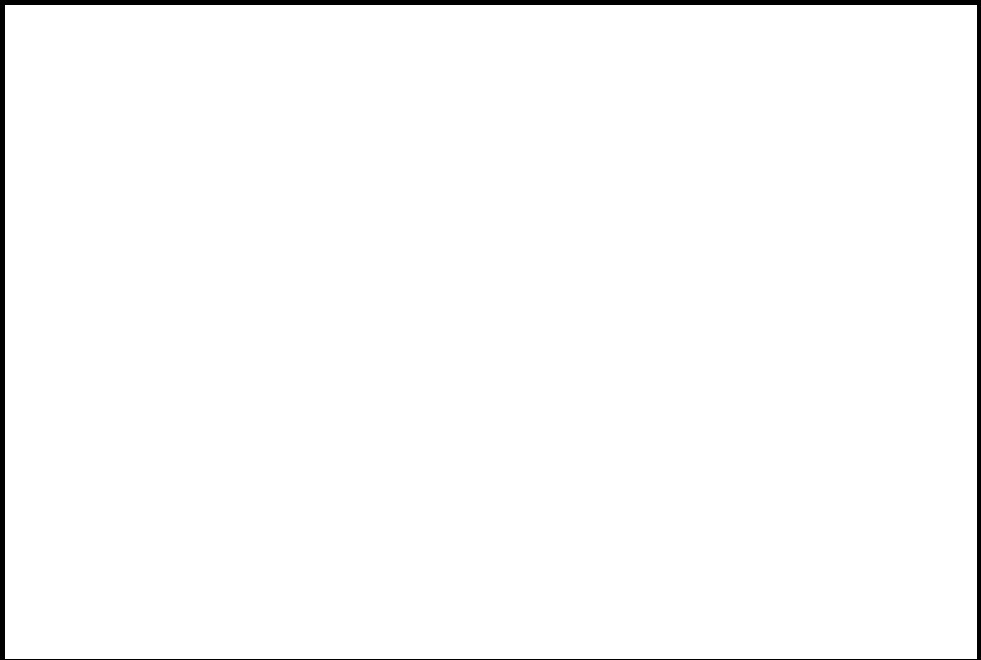
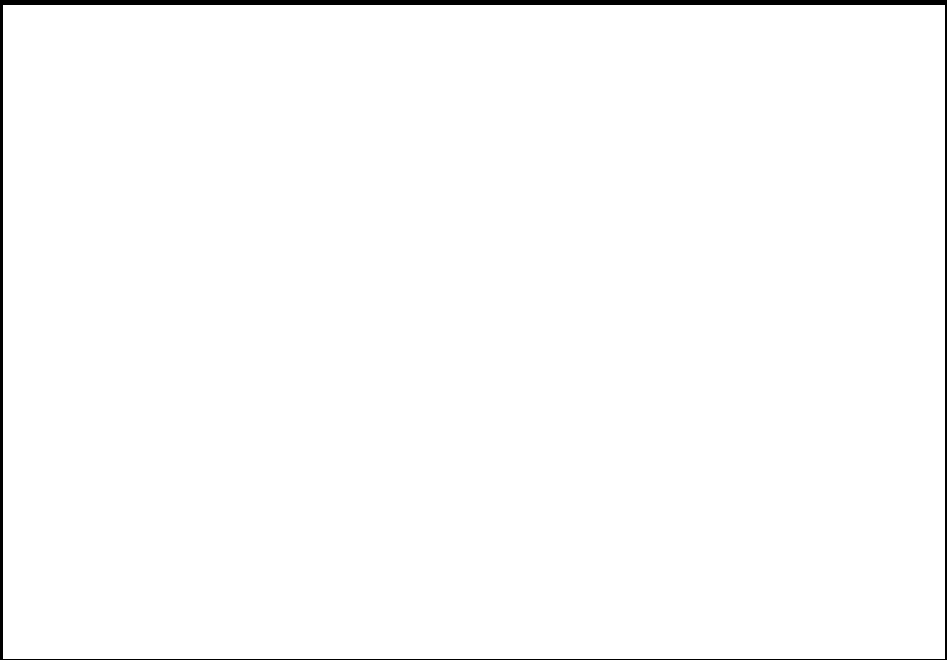
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Crossing?		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

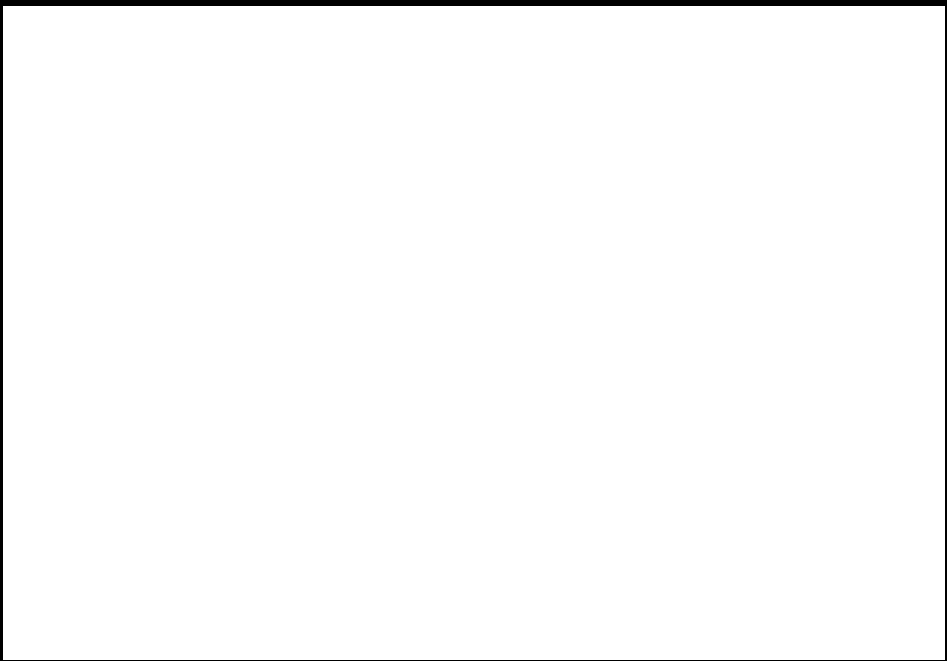
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-142

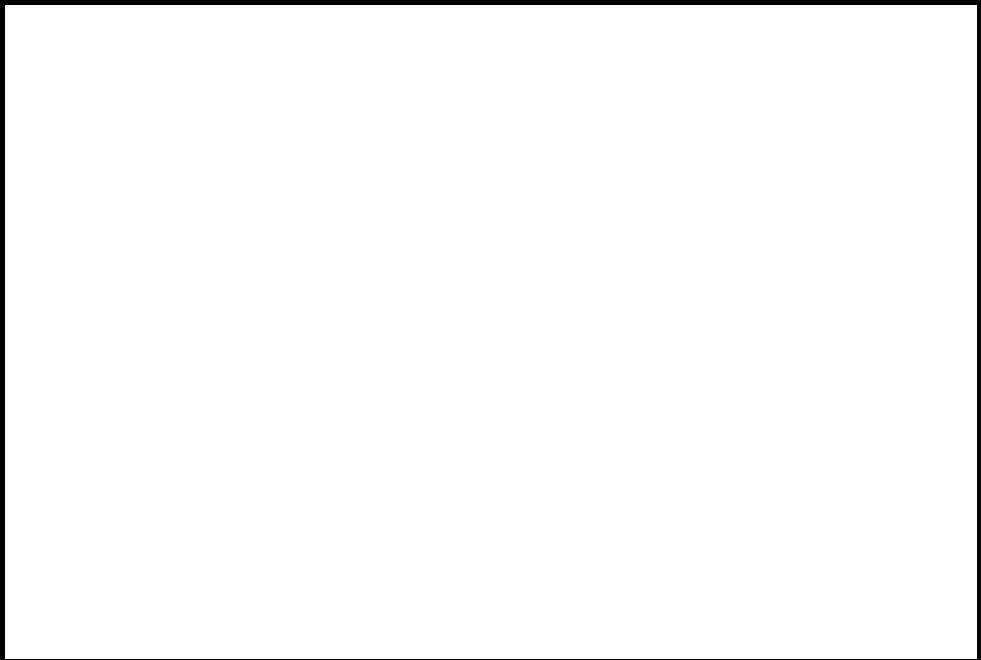
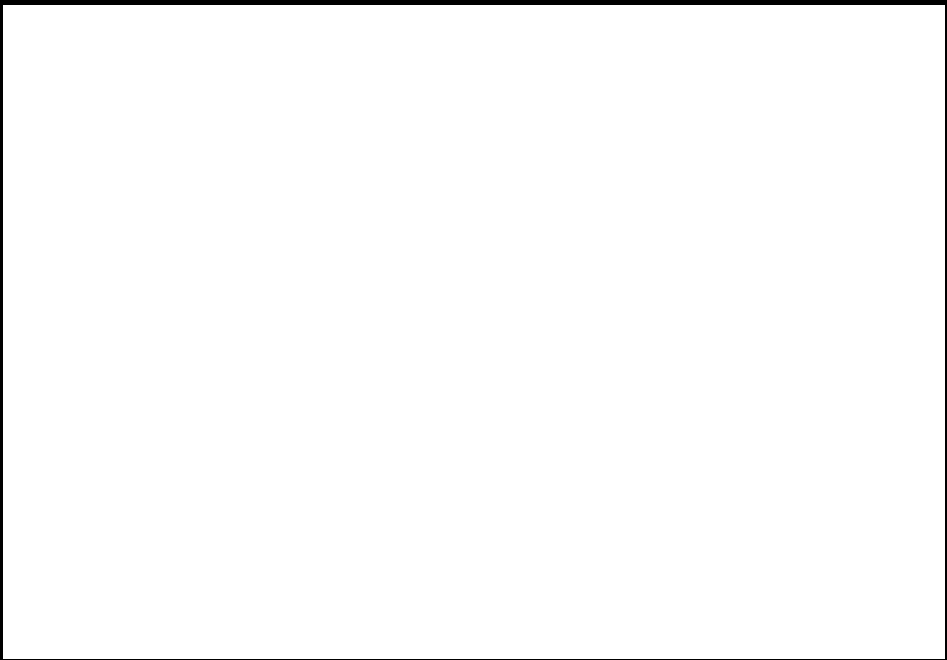
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Crossing?		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

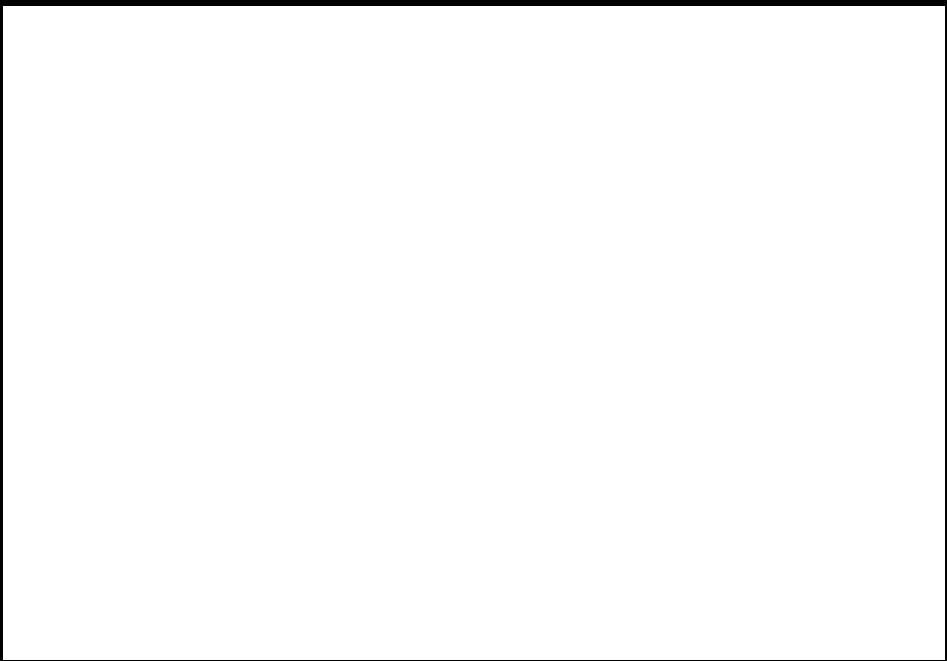
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

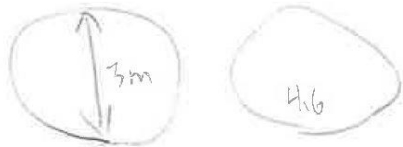
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-143

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	0			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	No	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.09	Width (m):	10.8	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	52			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	147.09	U/S Obvert Elev. (m):	150.09	Additional Flow Information: N/A	
HEC-RAS Cross Section:	4406.016	D/S Invert Elev. (m):	147	D/S Obvert Elev. (m):	150.08		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Projecting				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Sheppard Avenue West		Height from Obvert to Top of Road (m):	4.9				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	340
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1960
Last Inspection:	2015
Next Inspection:	2017

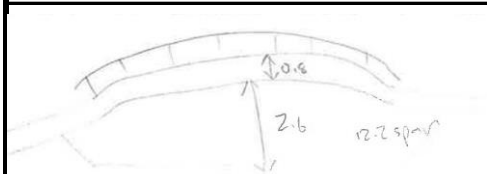
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-144

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	350
Watershed Name:	Humber River	Material (Concrete/Steel):	Steel/Wood			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.6	Width (m):	12.2	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	3			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Northwood Park - Bridge		Height from Obvert to Top of Road (m):	0.8				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

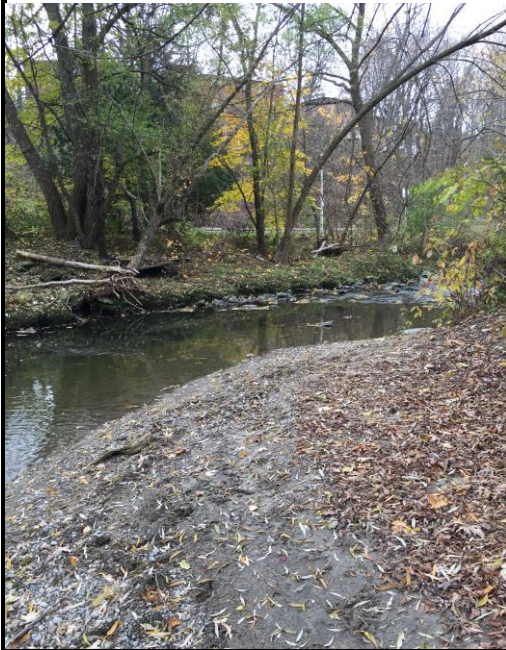
Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308349
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1981
Last Inspection:	2012
Next Inspection:	2017

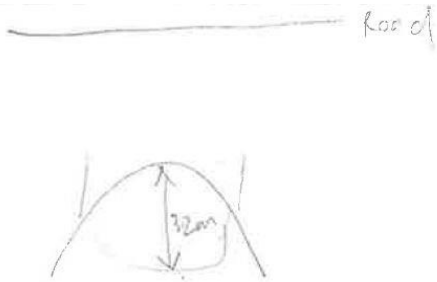
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-145

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	400
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	3.7	Width (m):	5.9	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	131			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	151.3	U/S Obvert Elev. (m):	154.79	Additional Flow Information: N/A	
HEC-RAS Cross Section:	5570.445	D/S Invert Elev. (m):	151.1	D/S Obvert Elev. (m):	154.79		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Mitered				
Location (Road Name/Intersection):	Grandravine Drive	Skew Angle of Crossing (Degrees):	15				
		Height from Obvert to Top of Road (m):	11.31				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	980
Condition:	Good
Owner:	City of Toronto
Year Constructed:	?
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-146

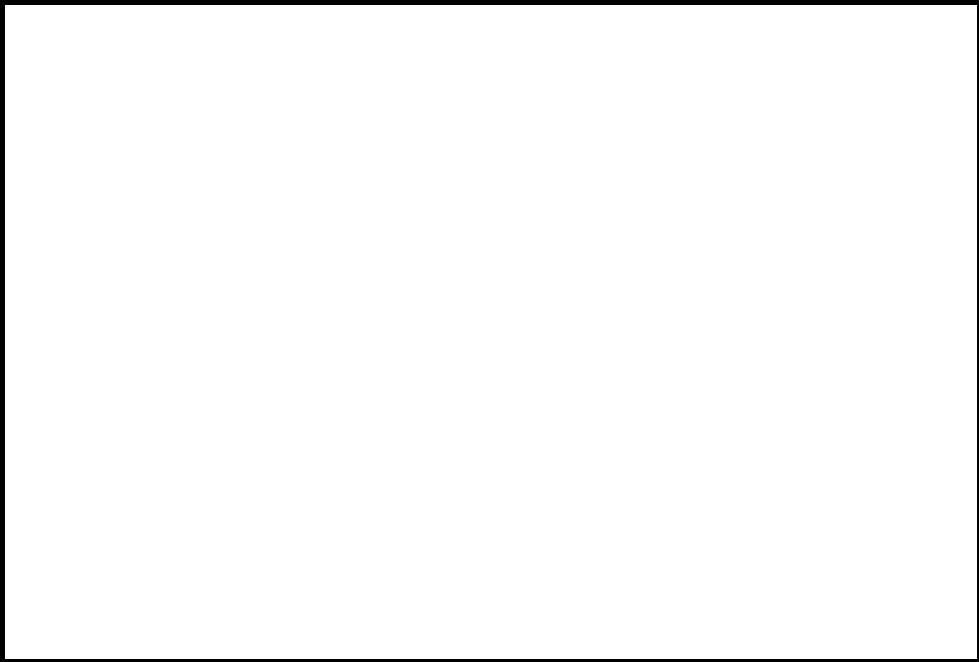
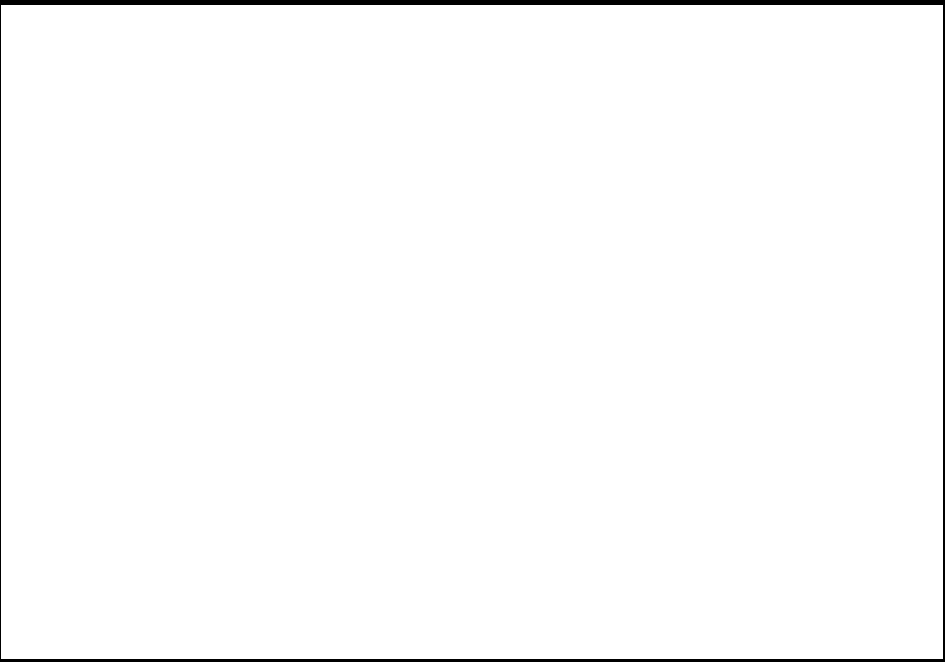
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Derrydowns Park - Bridge (3)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

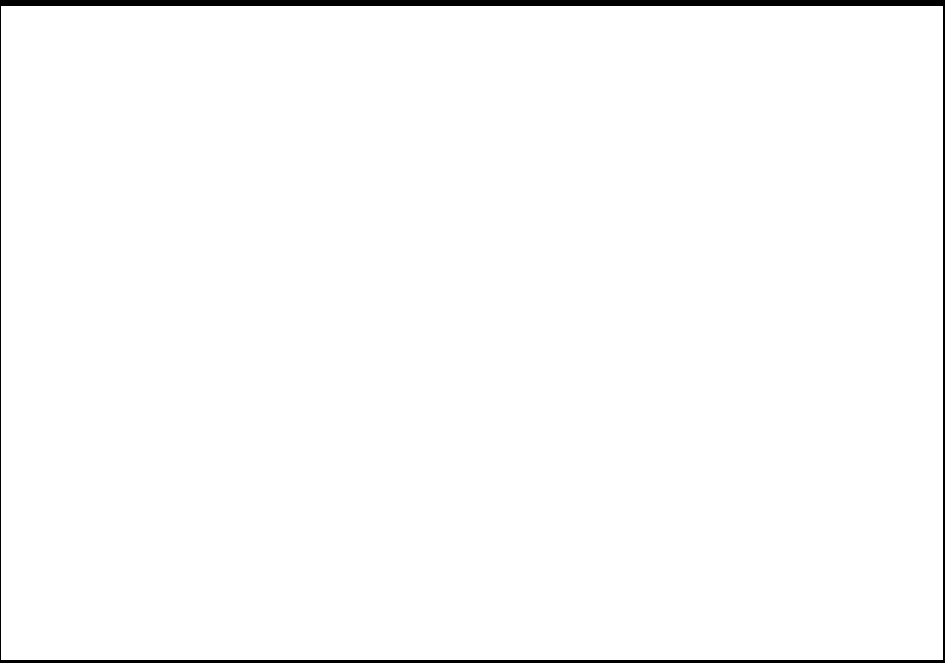
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308348
Condition:	Good
Owner:	TRCA
Year Constructed:	1991
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-147

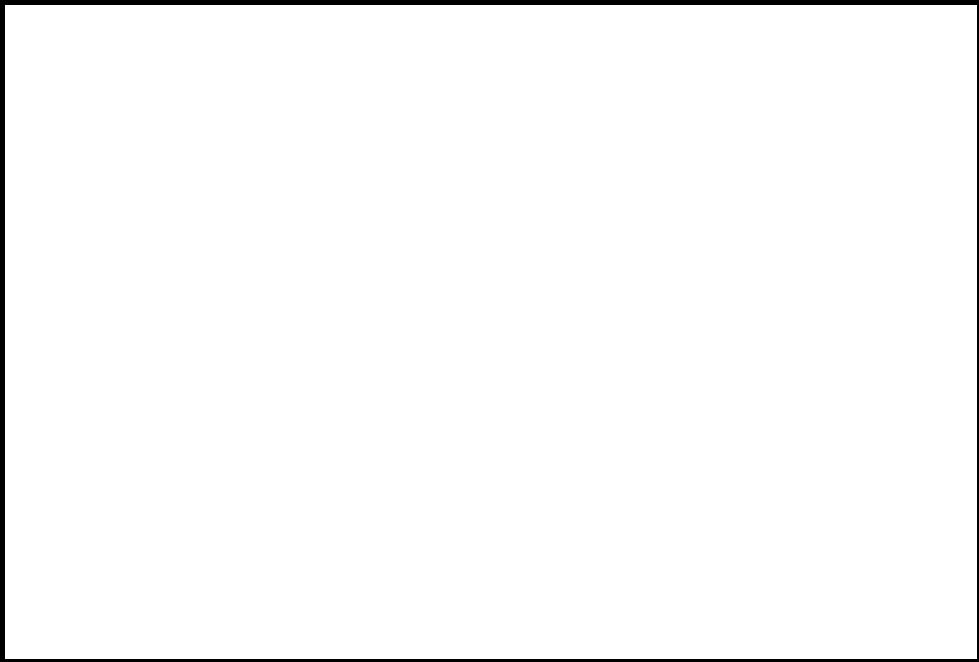
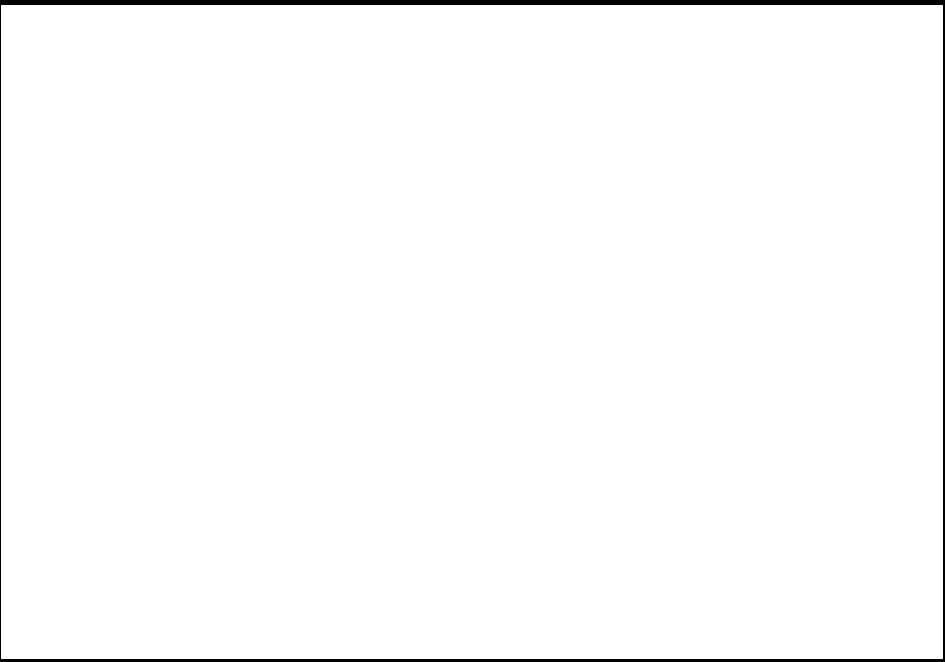
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Derrydowns Park - Bridge (1)		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

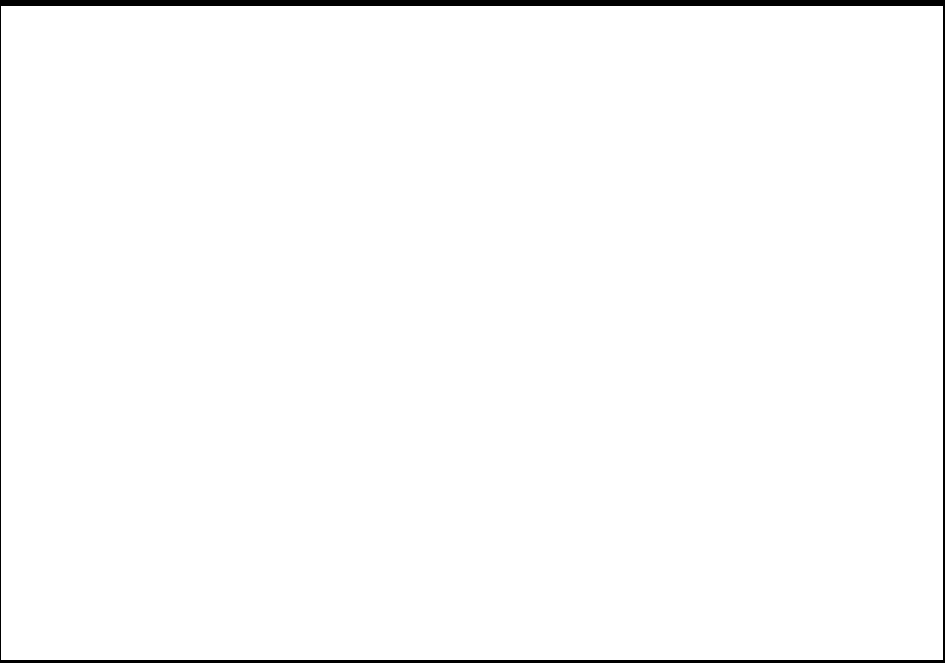
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:	
Structure ID:	308346
Condition:	Good
Owner:	TRCA
Year Constructed:	1950
Last Inspection:	2012
Next Inspection:	2017

Description of Photograph: Looking upstream from structure

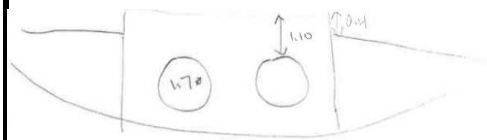
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-148

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	No	Approx. Depth (mm):	700
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.7	Width (m):	1.7	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	5			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	160.9	U/S Obvert Elev. (m):	162.6	Additional Flow Information: N/A	
HEC-RAS Cross Section:	103.2365	D/S Invert Elev. (m):	160.9	D/S Obvert Elev. (m):	162.6		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge		Height from Obvert to Top of Road (m):	1.1				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

0

page 1

Additional Site Photographs



Description of Photograph: 0



0



Description of Photograph: 0

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

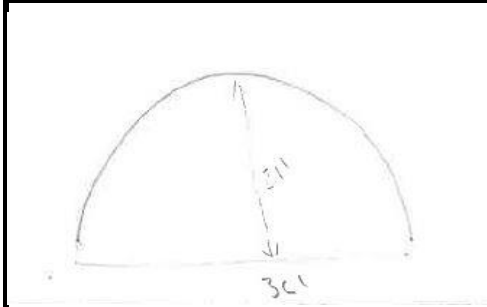
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-149

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	300
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP/Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	6.14	Width (m):	11.5	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	43			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	164.27	U/S Obvert Elev. (m):	170.41	Additional Flow Information: N/A	
HEC-RAS Cross Section:	599.0427	D/S Invert Elev. (m):	163.74	D/S Obvert Elev. (m):	169.88		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection): Finch Avenue West		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	2.59				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	295
Condition:	Good
Owner:	TRCA
Year Constructed:	1960
Last Inspection:	2015
Next Inspection:	2017

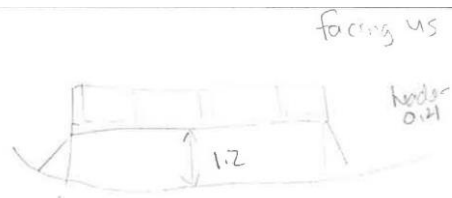
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-150

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	500
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.2	Width (m):	3.4	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	3.1			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Black Creek Parkland - Bridge (2)		Height from Obvert to Top of Road (m):	0.4				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308352
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1983
Last Inspection:	2012
Next Inspection:	2017

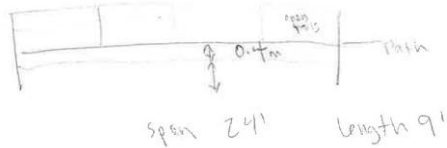
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-151

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	20/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	450
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	0.8	Width (m):	7.3	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	2.75			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Black Creek Parkland - Bridge (1)		Height from Obvert to Top of Road (m):	0.4				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308351
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1983
Last Inspection:	2012
Next Inspection:	2017

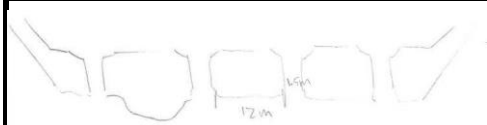
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-152

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	5	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	500
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	6.59	Width (m):	102.71	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	19			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	175.63	U/S Obvert Elev. (m):	182	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3036.412	D/S Invert Elev. (m):	175.41	D/S Obvert Elev. (m):	182		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):	Shoreham Drive	Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	772
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1969
Last Inspection:	2015
Next Inspection:	2017

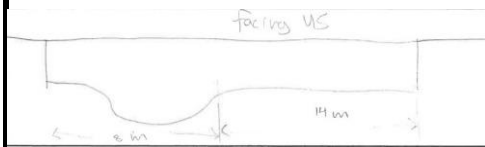
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-153

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	High level bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	5.2	Width (m):	22.91	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek	Length (m):	77.5			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	180.49	U/S Obvert Elev. (m):	185	Additional Flow Information: N/A	
HEC-RAS Cross Section:	3988.09	D/S Invert Elev. (m):	179.8	D/S Obvert Elev. (m):	185		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	10				
Intersection of Steeles Avenue and Jane Street		Height from Obvert to Top of Road (m):	1.8				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	296
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1965
Last Inspection:	2015
Next Inspection:	2017

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-154

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Private Accessway?			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Black Creek	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Private Accessway?		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

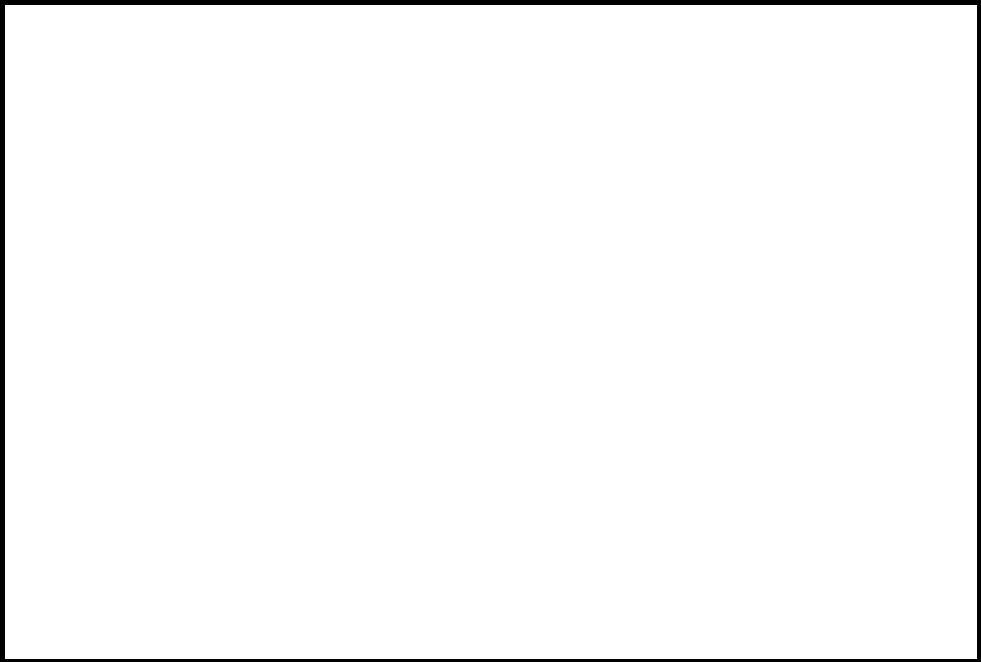
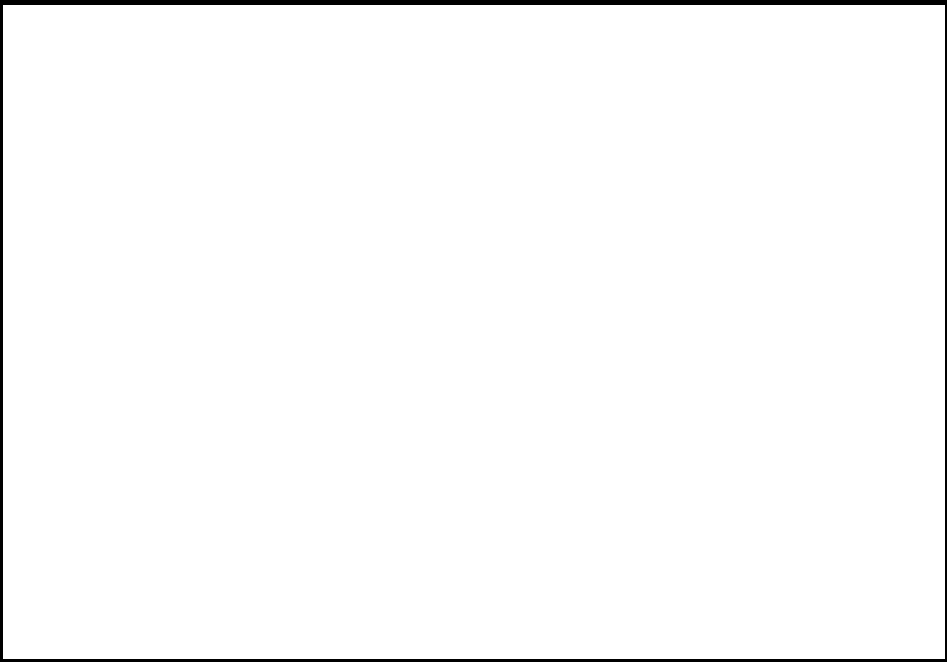
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

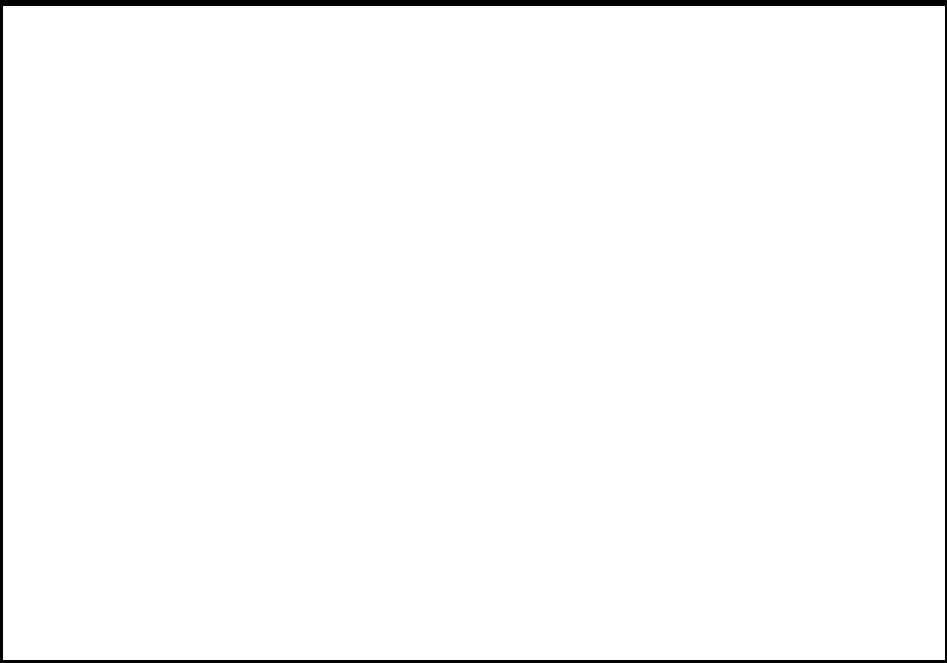
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

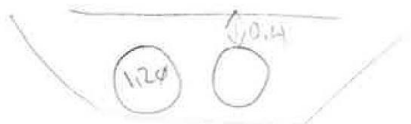
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-155

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	2	Open Footing (Yes/No):	No	Approx. Depth (mm):	100
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.2	Width (m):	1.2	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek -	Length (m):	5.7			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: Not on main branch	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge		Height from Obvert to Top of Road (m):	0.4				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

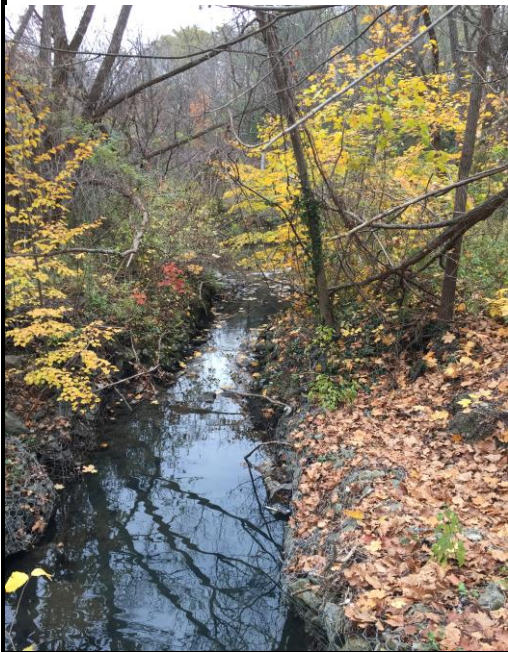


Description of Photograph:

Downstream face of structure

page 1

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-156

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.2	Width (m):	2.2	Upstream Erosion (Y/N):	N/A
Tributary Name:	Black Creek -	Length (m):	64			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	170.26	U/S Obvert Elev. (m):	172.46	Additional Flow Information: N/A	
HEC-RAS Cross Section:	383.1797	D/S Invert Elev. (m):	168.28	D/S Obvert Elev. (m):	170.48		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Finch Avenue West		Height from Obvert to Top of Road (m):	4.22				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

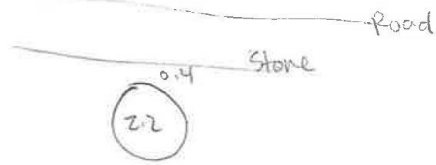
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-157

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2.13	Width (m):	2.13	Upstream Erosion (Y/N):	Y
Tributary Name:	Black Creek -	Length (m):	31.7			Downstream Erosion (Y/N):	Y
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	174.04	U/S Obvert Elev. (m):	176.17	Additional Flow Information: N/A	
HEC-RAS Cross Section:	557.766	D/S Invert Elev. (m):	173.83	D/S Obvert Elev. (m):	175.96		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	N/A				
Location (Road Name/Intersection): Potsdam Road		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	1.59				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

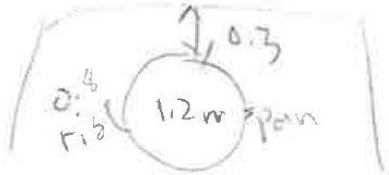
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-158

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	No	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	0.8	Width (m):	1.2	Upstream Erosion (Y/N):	N
Tributary Name:	Black Creek -	Length (m):	2			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Trail bridge - Driftwood Park		Height from Obvert to Top of Road (m):	0.3				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

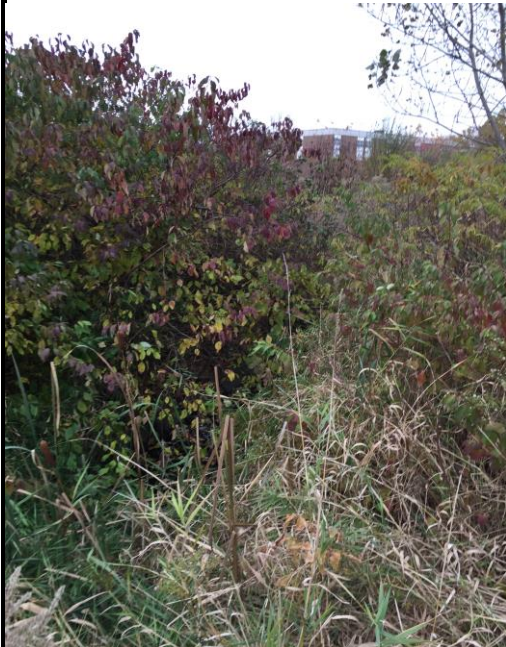
Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	308350
Condition:	Good
Owner:	City of Toronto
Year Constructed:	1955
Last Inspection:	2012
Next Inspection:	2017

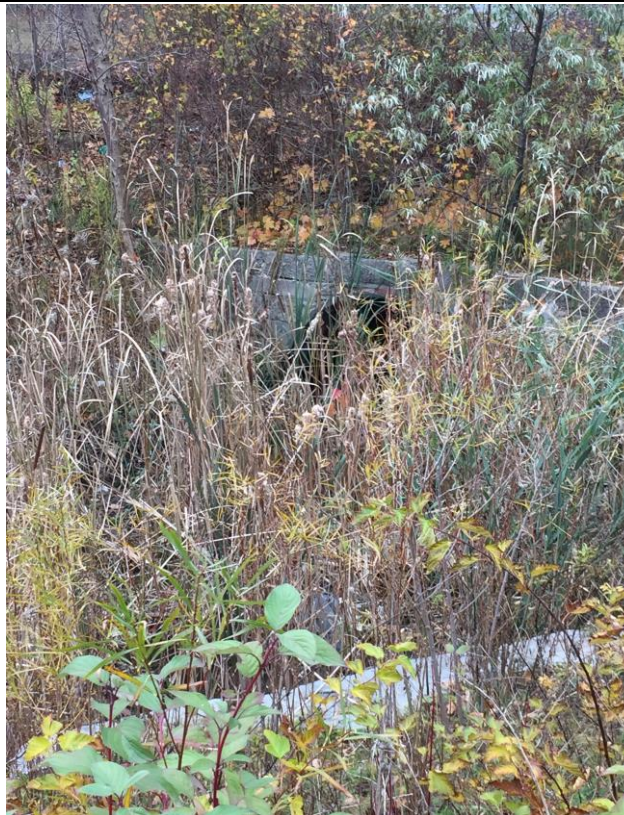
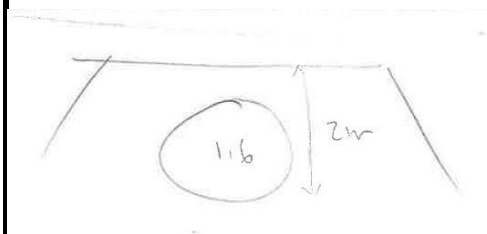
HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-159

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	09/11/2017	Structure Type (Culvert/Bridge):	Culvert			Flow Present (Y/N):	N
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	200
Watershed Name:	Humber River	Material (Concrete/Steel):	CSP			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	1.75	Width (m):	2.49	Upstream Erosion (Y/N):	N/A
Tributary Name:	Black Creek -	Length (m):	43			Downstream Erosion (Y/N):	N/A
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	179.22	U/S Obvert Elev. (m):	180.97	Additional Flow Information: N/A	
HEC-RAS Cross Section:	1079.834	D/S Invert Elev. (m):	179.23	D/S Obvert Elev. (m):	180.98		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	30				
Driftwood Avenue		Height from Obvert to Top of Road (m):	1				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:



Description of Photograph:

Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure



Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-160

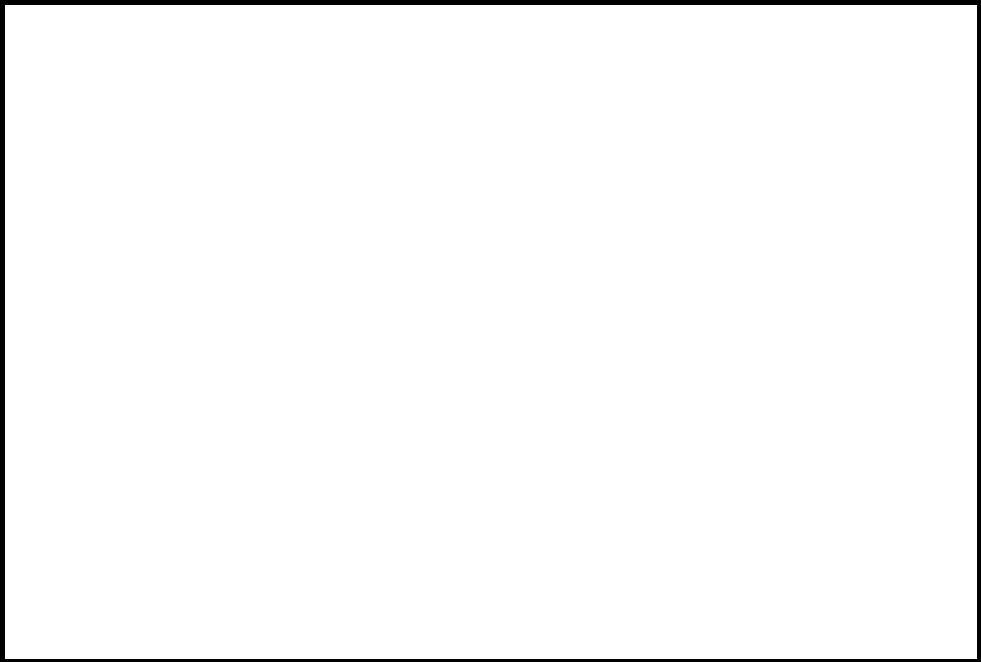
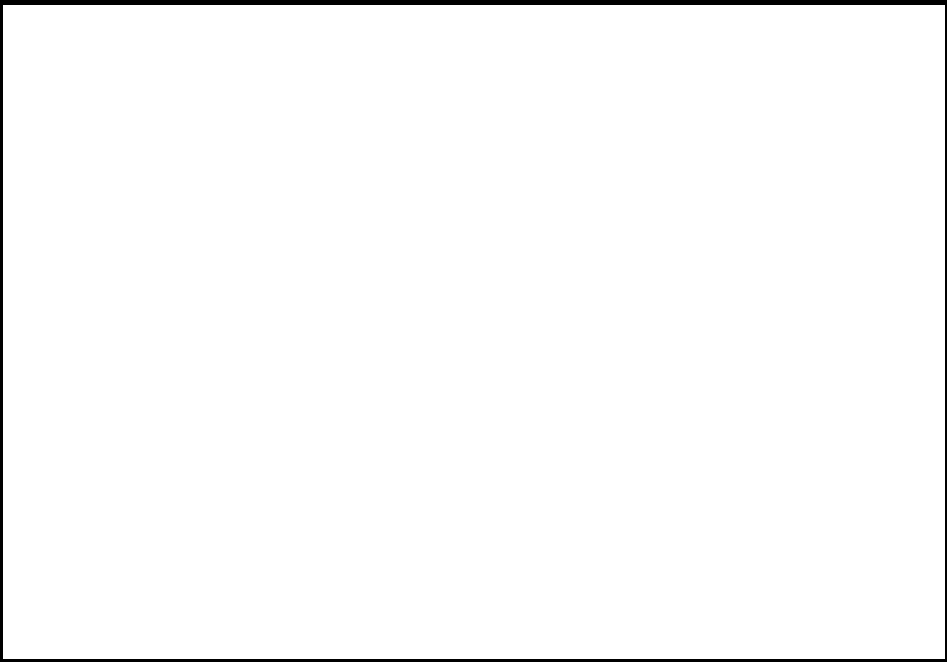
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

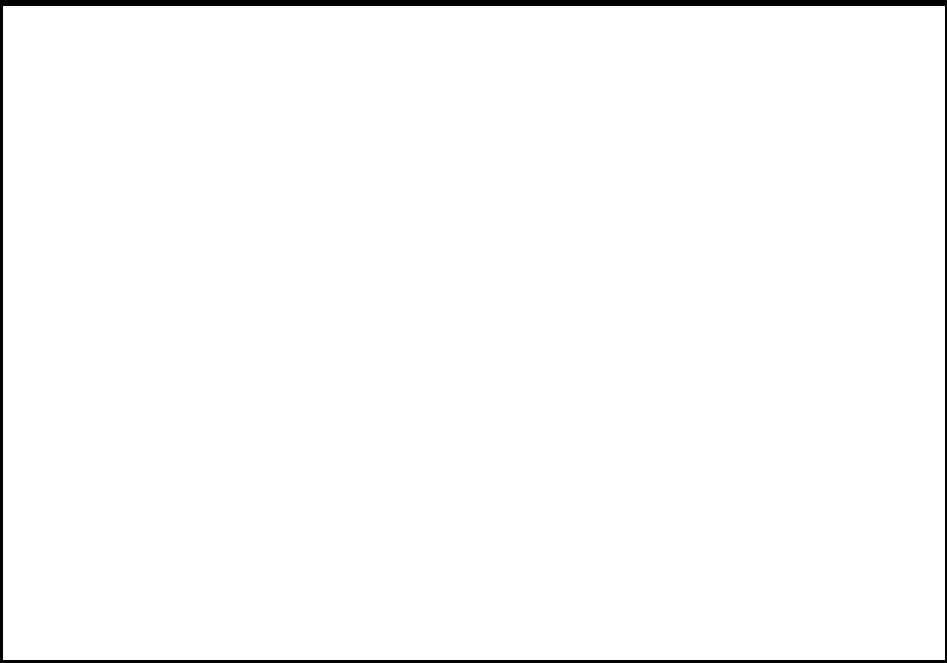
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-161

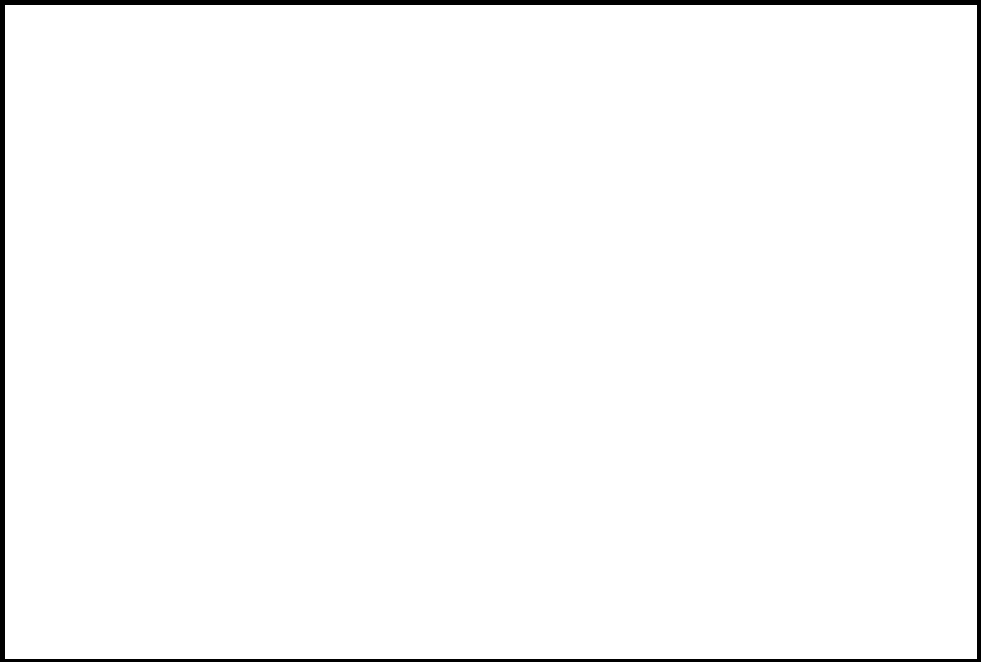
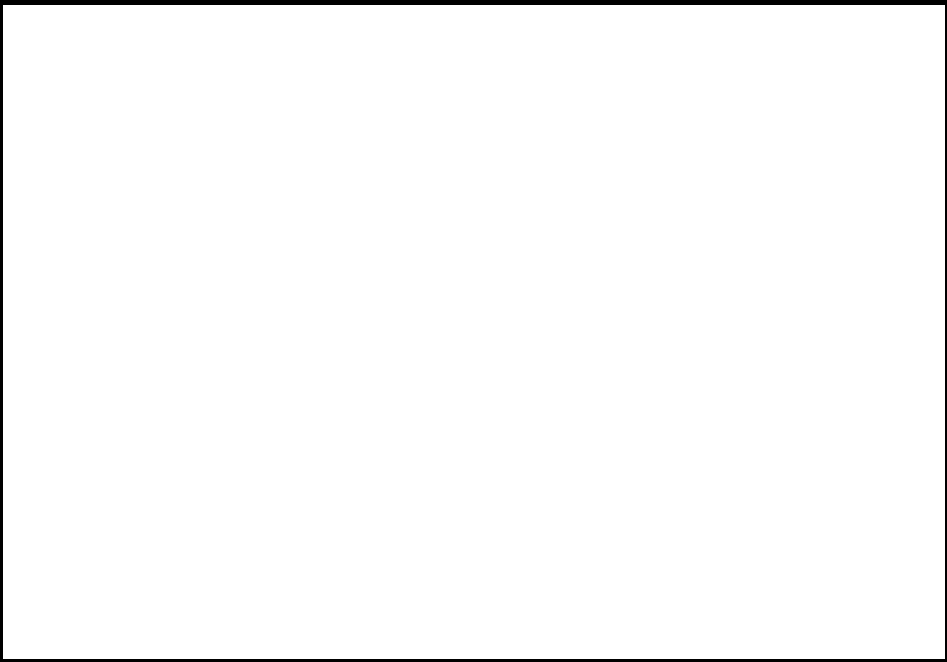
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

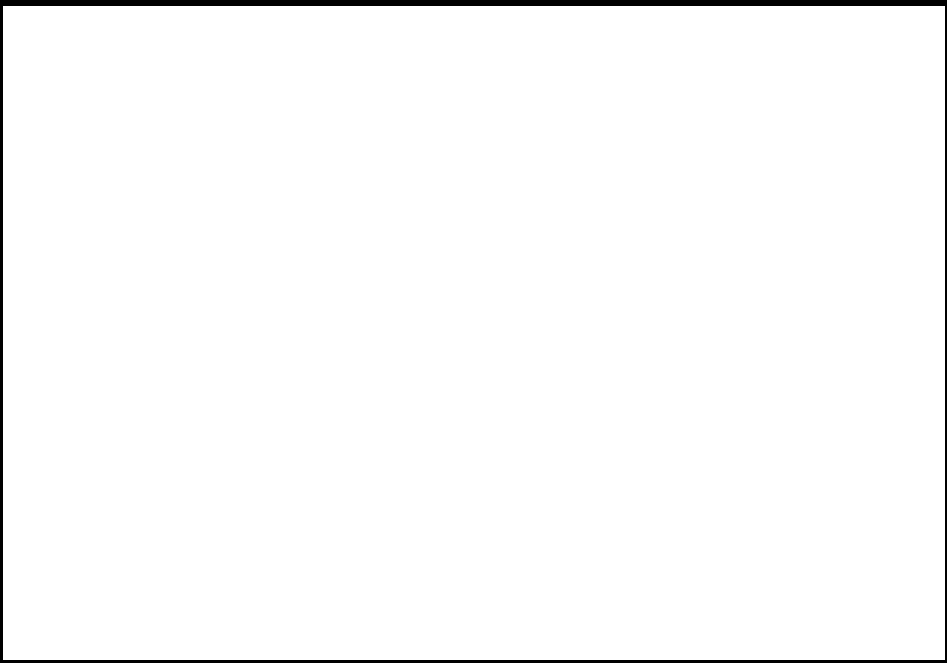
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-162

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

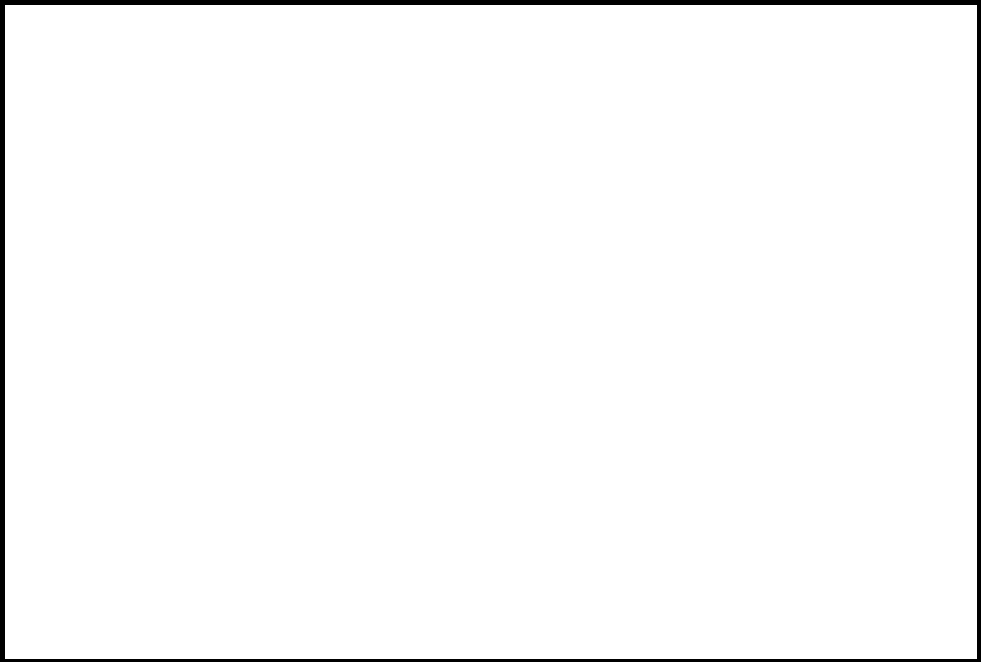
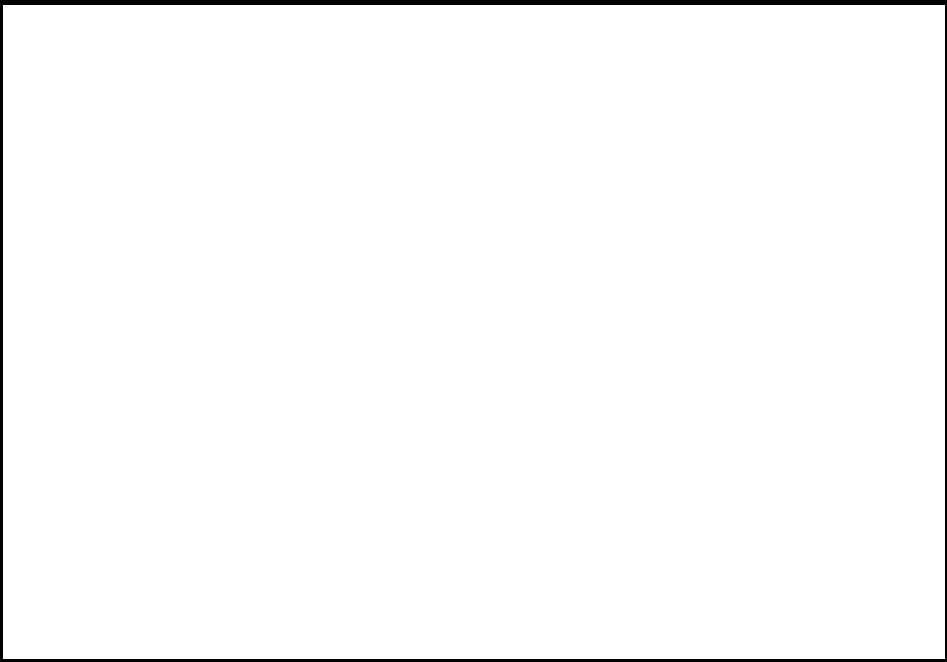
Site Photograph and Additional Field Notes

Site Sketch:

Description of Photograph:

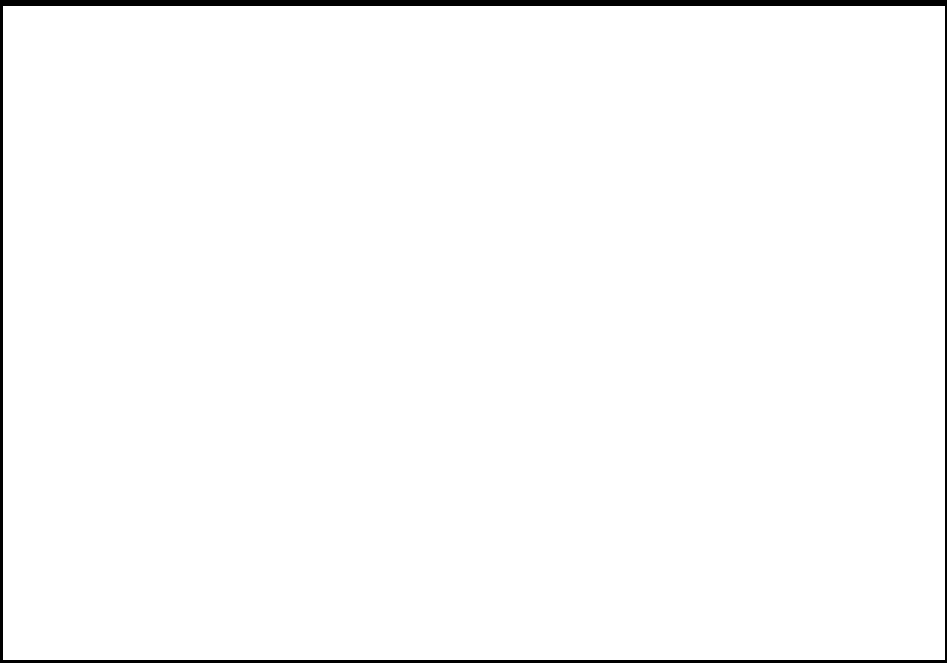
Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-163

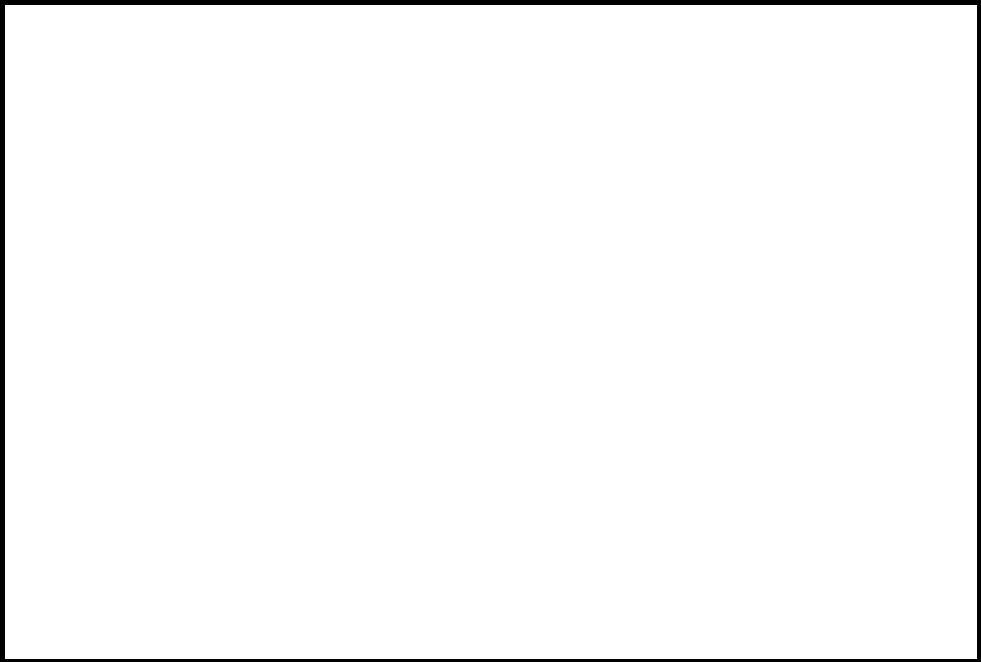
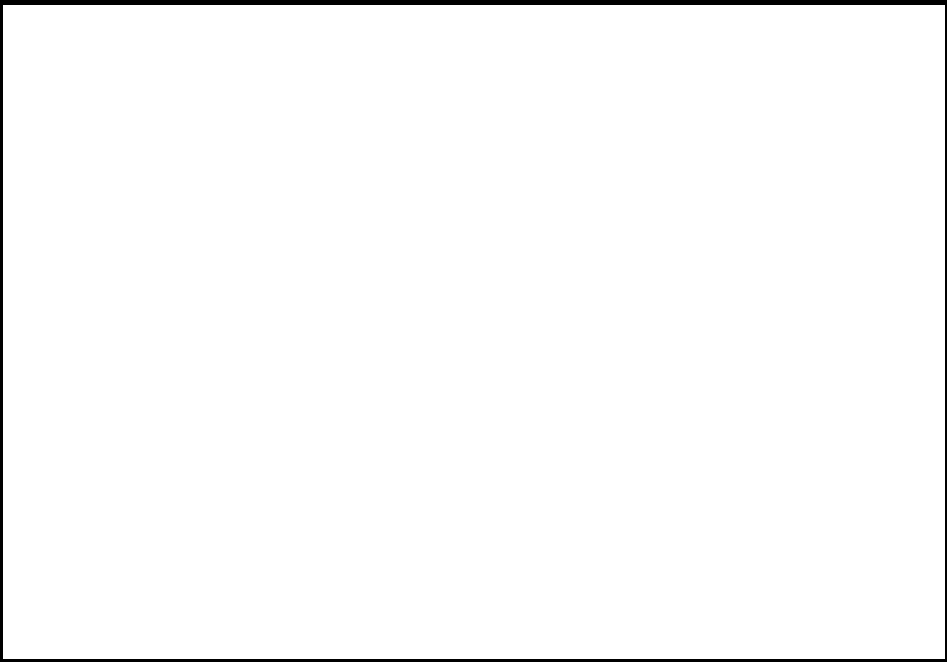
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

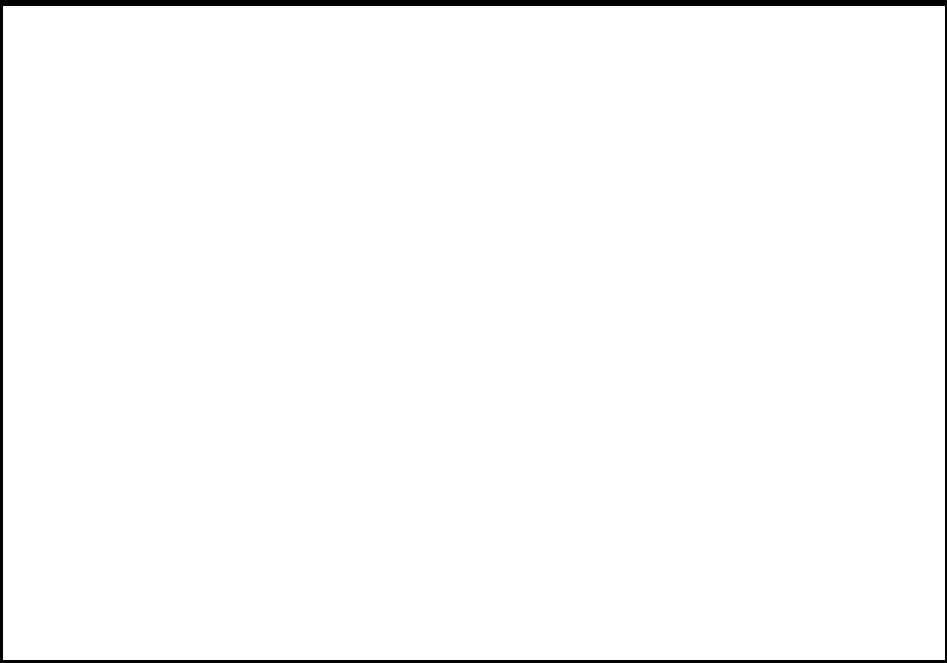
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-164

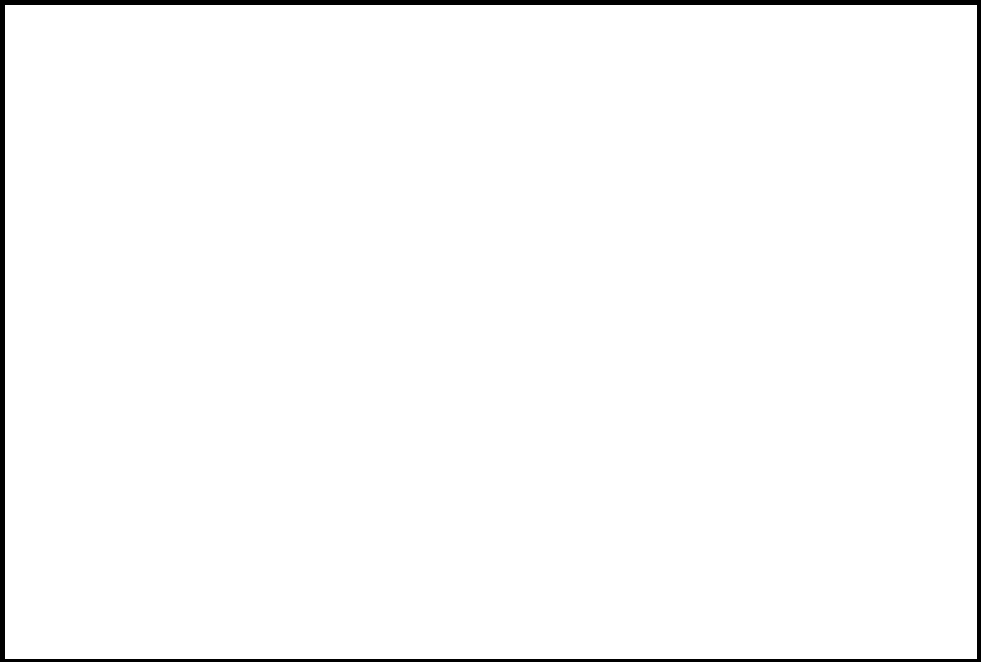
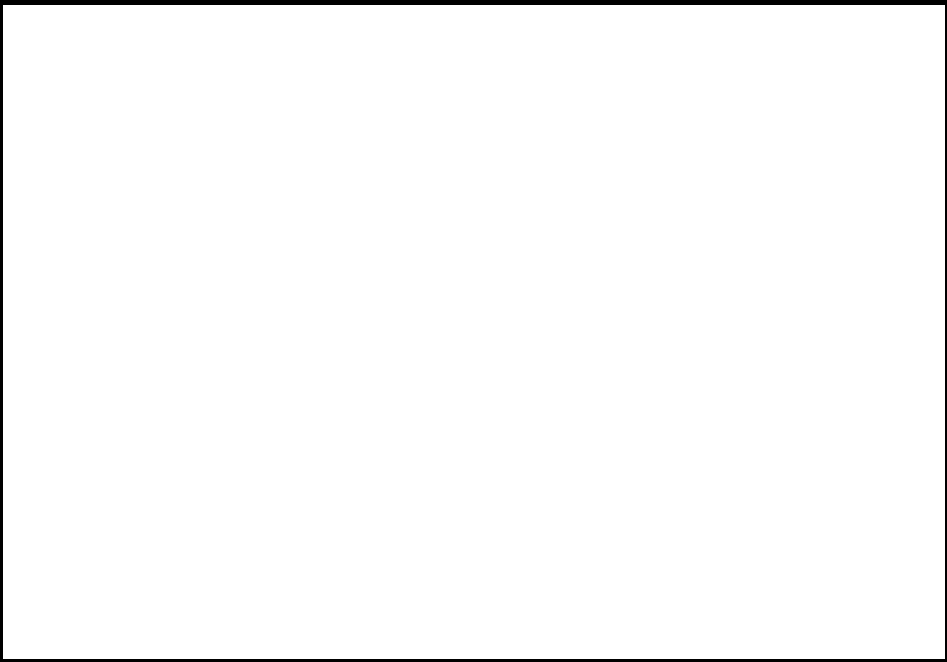
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

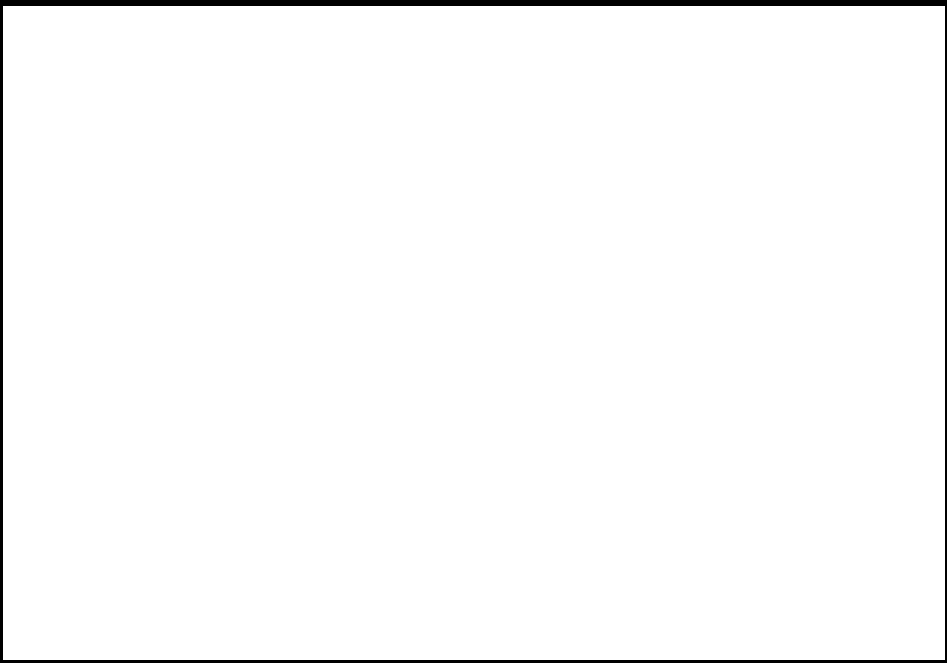
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-165

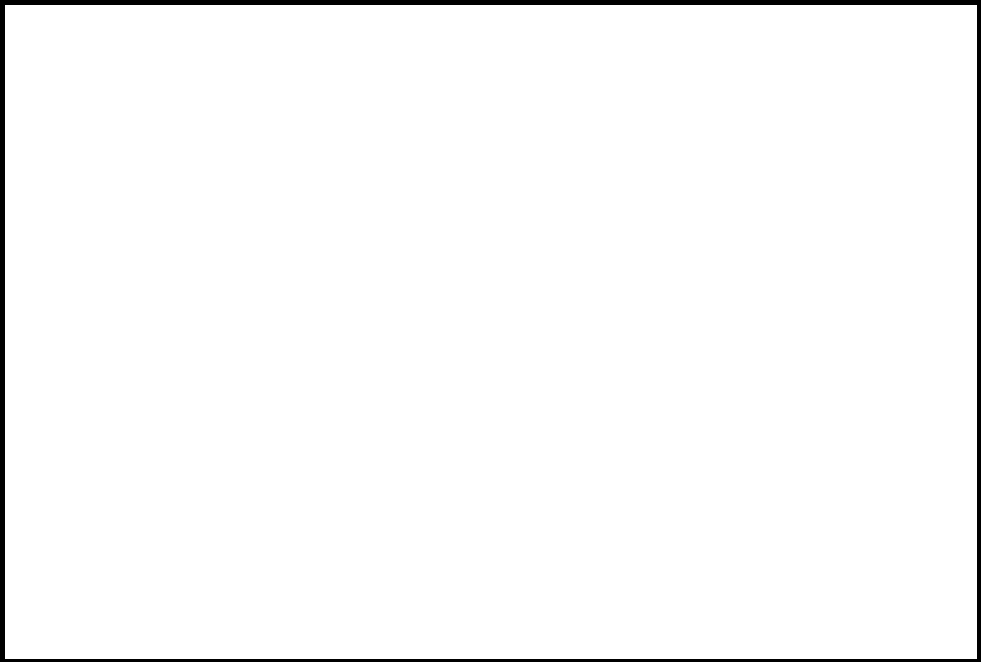
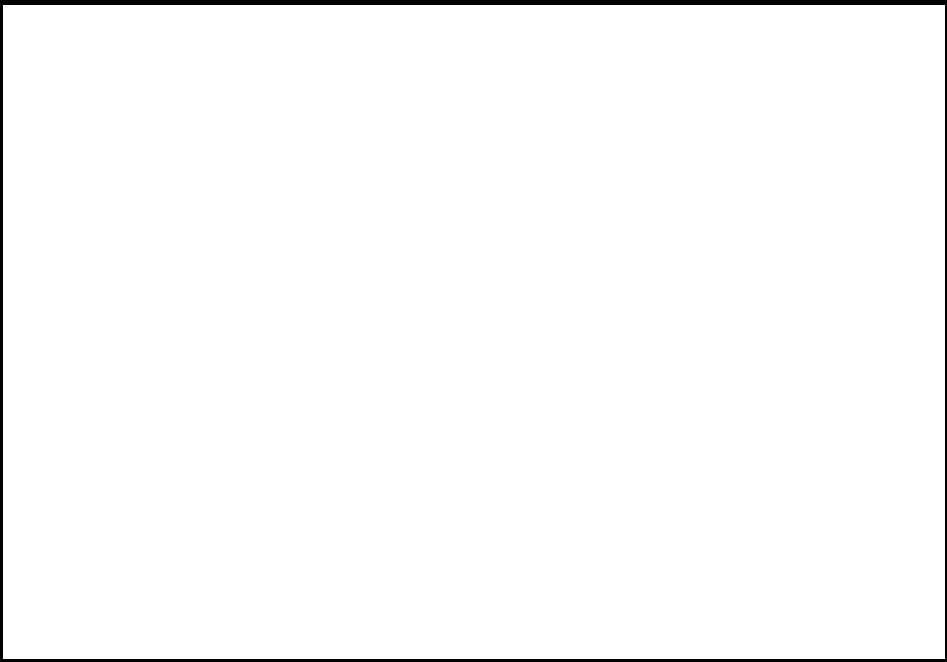
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	0				
Golf Course Bridge		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

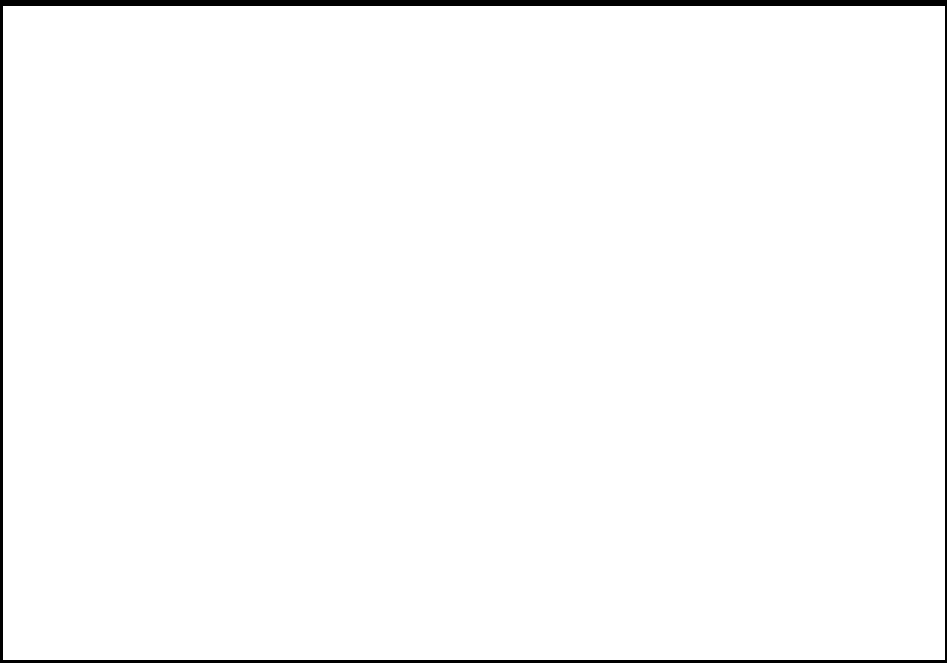
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-166

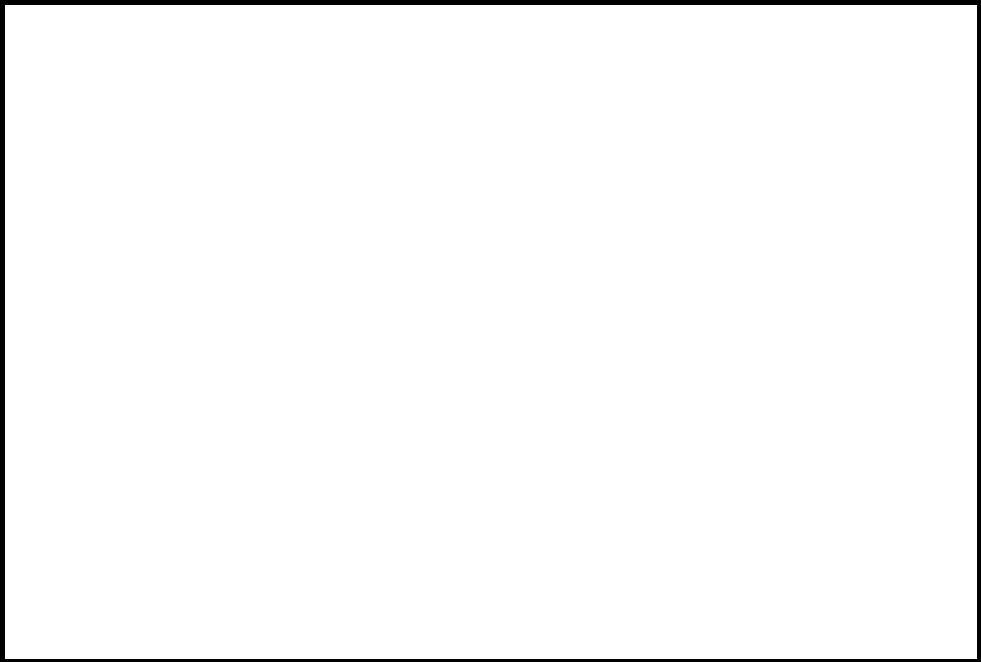
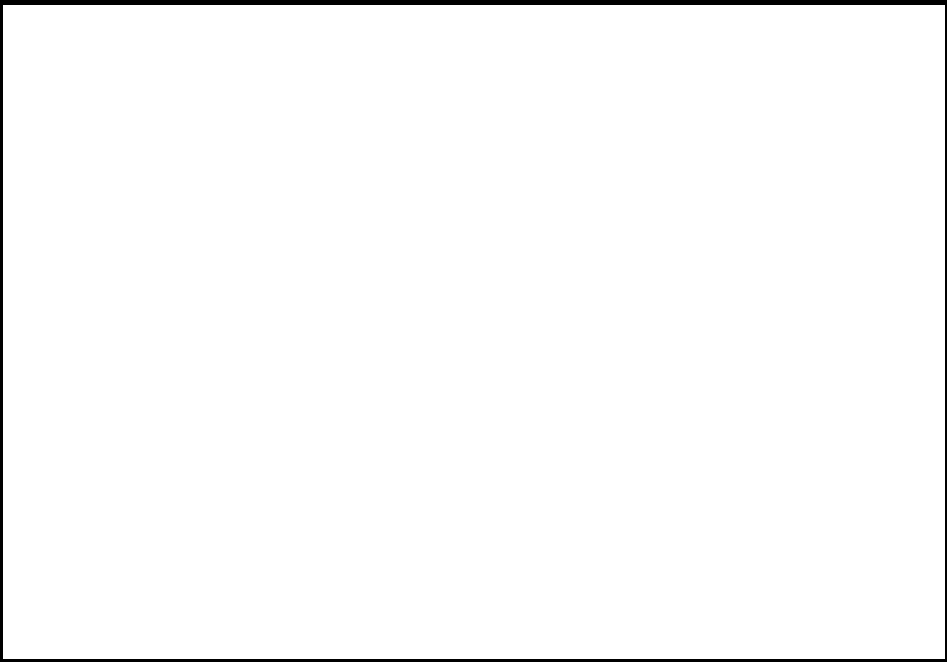
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Golf Course Crossing			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	Tributary #2	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Golf Course Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

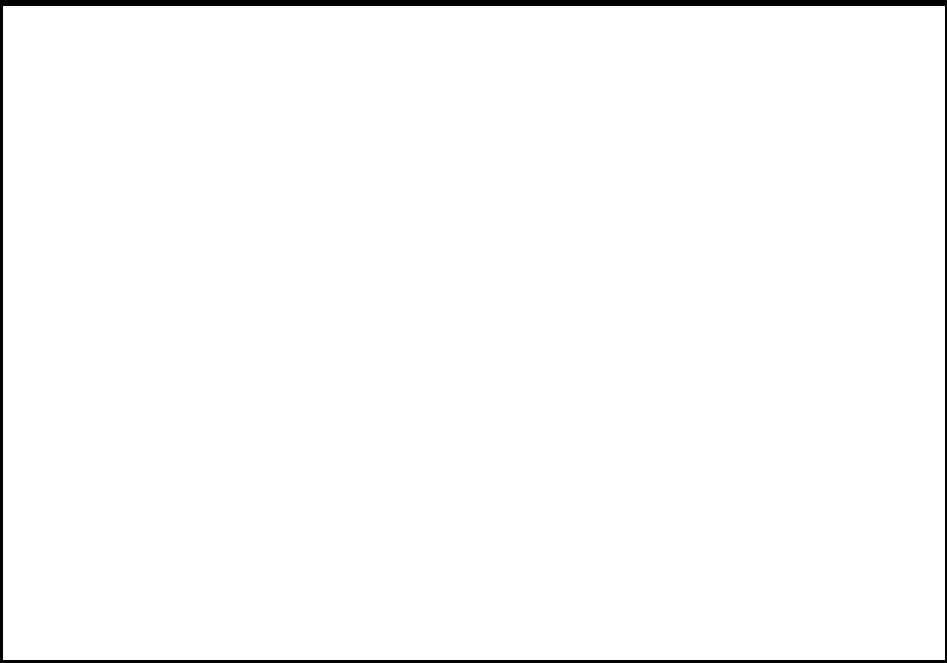
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-167

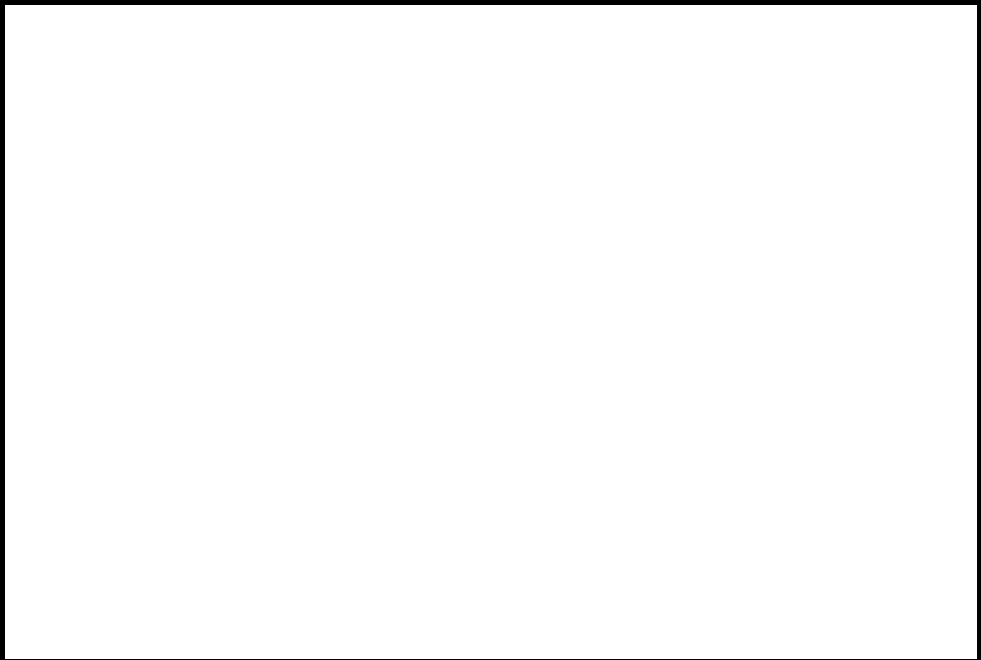
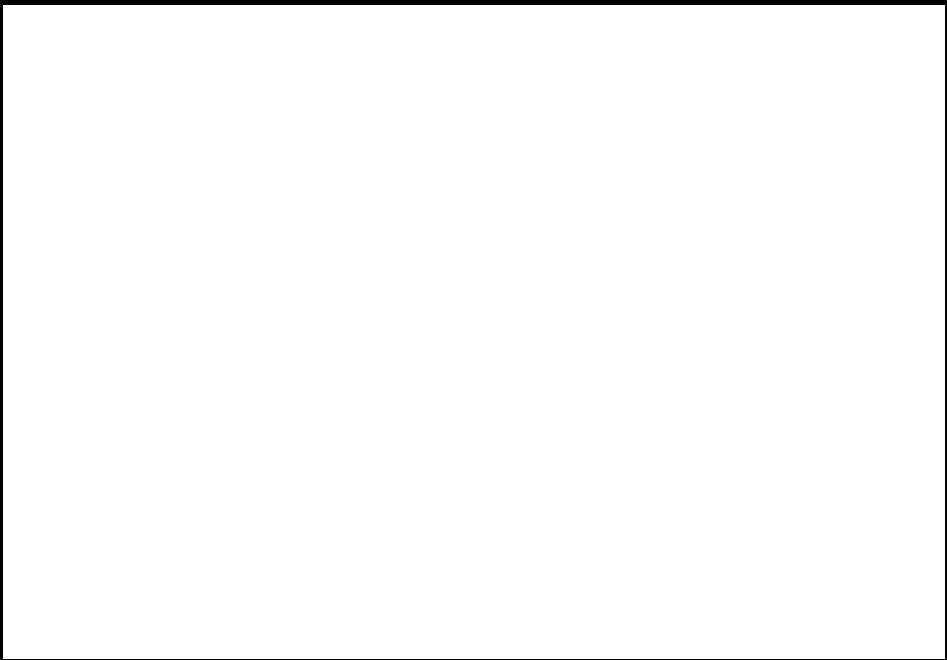
Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	00/01/1900	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	0
Field Crew:	AmecFW	Number of Cells:	0	Open Footing (Yes/No):	0	Approx. Depth (mm):	0
Watershed Name:	Humber River	Material (Concrete/Steel):	0			Approx. Velocity (m/s):	0
Subcatchment Area No:	1	Height (m) or Diameter (m):	0	Width (m):	0	Upstream Erosion (Y/N):	0
Tributary Name:	East Branch -	Length (m):	0			Downstream Erosion (Y/N):	0
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	0	U/S Obvert Elev. (m):	0	Additional Flow Information: 0	
HEC-RAS Cross Section:	0	D/S Invert Elev. (m):	0	D/S Obvert Elev. (m):	0		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	0				
Location (Road Name/Intersection): Trail Bridge		Skew Angle of Crossing (Degrees):	0				
		Height from Obvert to Top of Road (m):	0				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

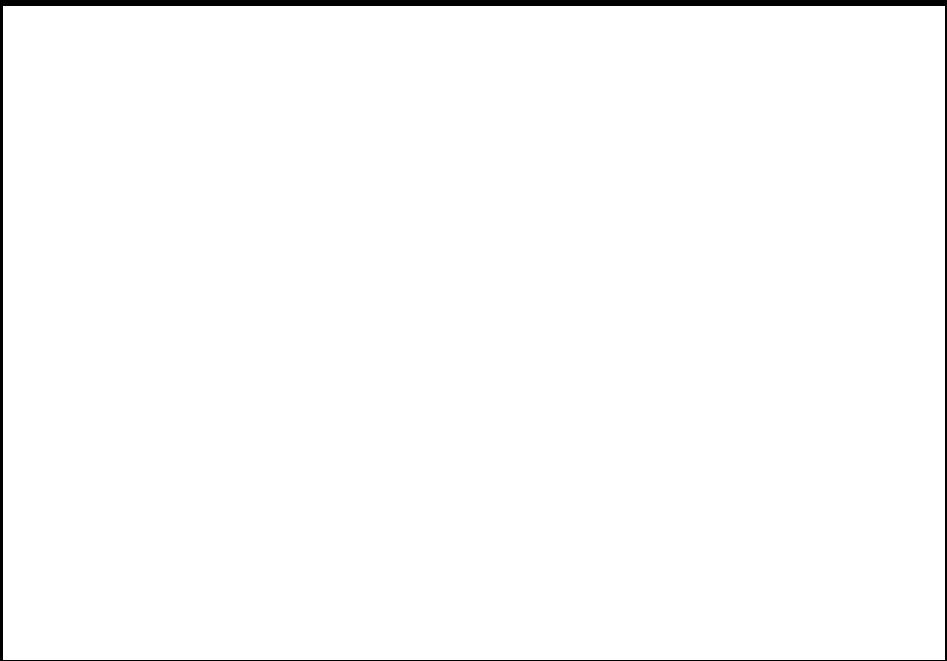
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Description of Photograph: Looking upstream from structure

HYDRAULIC STRUCTURE INVENTORY SHEET

CROSSING # : Humber River-168

Watershed and Location Information		Structure Configuration and Dimensions				Current Flow Information	
Date (dd/mm/yyyy):	14/11/2017	Structure Type (Culvert/Bridge):	Pedestrian Bridge			Flow Present (Y/N):	Y
Field Crew:	AmecFW	Number of Cells:	1	Open Footing (Yes/No):	Yes	Approx. Depth (mm):	N/A
Watershed Name:	Humber River	Material (Concrete/Steel):	Concrete			Approx. Velocity (m/s):	N/A
Subcatchment Area No:	1	Height (m) or Diameter (m):	2	Width (m):	3	Upstream Erosion (Y/N):	N
Tributary Name:	East Branch -	Length (m):	40			Downstream Erosion (Y/N):	N
Floodplain Map Sheet No.:	0	U/S Invert Elev. (m):	N/A	U/S Obvert Elev. (m):	N/A	Additional Flow Information: N/A	
HEC-RAS Cross Section:	N/A	D/S Invert Elev. (m):	N/A	D/S Obvert Elev. (m):	N/A		
Municipality:	City of Toronto	Inlet Type (Projecting/Mitered/Headwall):	Headwall				
Location (Road Name/Intersection):		Skew Angle of Crossing (Degrees):	15				
Trail Bridge		Height from Obvert to Top of Road (m):	N/A				
		Depth of Siltation (mm):	0				

Site Photograph and Additional Field Notes

Site Sketch:

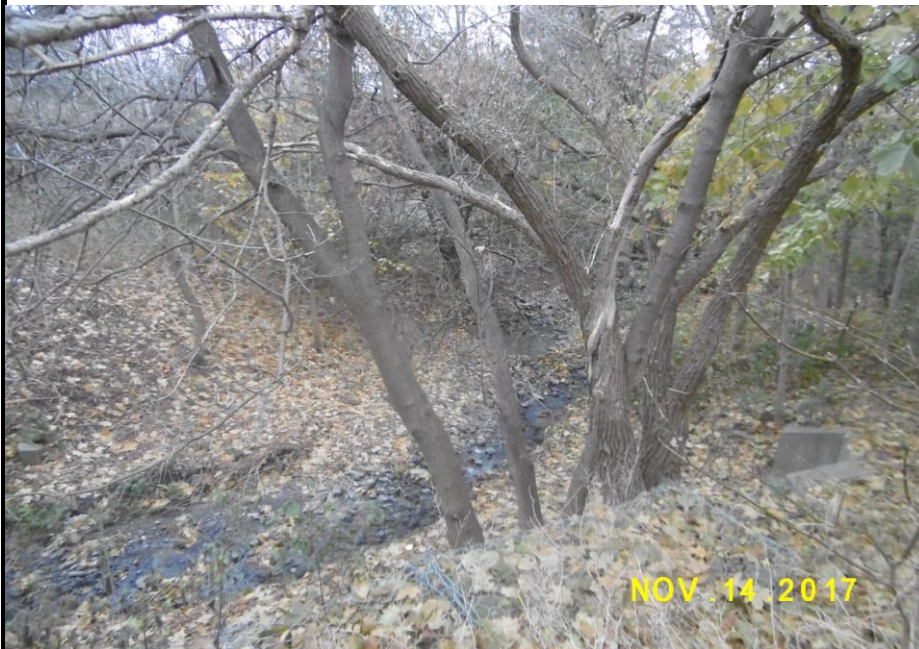
Description of Photograph: Downstream face of structure

Additional Site Photographs



Description of Photograph: Looking downstream from structure

Upstream face of structure



Description of Photograph: Looking upstream from structure

City of Toronto Structure Data:

Structure ID:	0
Condition:	0
Owner:	0
Year Constructed:	0
Last Inspection:	0
Next Inspection:	0

Appendix B

TRCA's Standard Manning's Roughness Coefficients for Watershed Hydraulic Modelling



This page left intentionally blank

Standard Manning's Roughness Coefficients for TRCA Watershed Hydraulic Modelling

Land Use	Description and Conditions	"n" Value ¹
Channel Components		
Watercourse/ Channel	<ul style="list-style-type: none"> low flow channel - extends typically from bank to bank 	0.035
Hydraulic Structures	<ul style="list-style-type: none"> culvert crossings (e.g., corrugated metal, concrete open/closed footing etc.) bridge crossings 	Variable 2
Floodplain Components		
Urban Uses (Impervious)	<ul style="list-style-type: none"> Road crossings, existing parking lots or any large impervious surfaces etc. Typically located within valley and stream corridors Does not include structures or buildings (to be modelled using available ineffective flow area options)² 	0.025
Urban Uses (Pervious)	<ul style="list-style-type: none"> Existing uses including municipal parks, playing fields, golf courses etc. Typically located within valley and stream corridors Regular maintenance of area <u>is</u> required 	0.050
Natural Areas	<ul style="list-style-type: none"> Pasture, meadow, agricultural, riparian vegetation, brush and forest located within urban and/or rural land use setting Typically located within valley and stream corridors <u>Not</u> subject to regular maintenance Assumes regeneration of open space type uses including pasture, meadow and agricultural uses within floodplain areas (Consistent with TRCA's VSCMP and Natural Heritage Strategies) 	0.080
Flood Control Channels	<ul style="list-style-type: none"> Flood control channels and associated works designed specifically for flood flow conveyance (e.g. trapezoidal lined and un-lined channels, etc.) "n" value based on original design or maximum allowable value determined through a sensitivity analysis Regular maintenance of area <u>is</u> required 	Variable ²

Notes:

- Manning's "n" values represent average values based on literature data assuming flooding conditions.
- Refer to HEC-2 and/or HEC-RAS User's Manual for further details



This page left intentionally blank

Appendix C

TRCA Albion Creek 2D Modelling

This page left intentionally blank

MEMORANDUM

TO:	Peter Nimmrichter	DATE:	June 15, 2018
FROM:	Qiao Ying	CFN:	57478
RE:	Humber in Toronto FPM – Albion Creek 2D Modelling		
CC:	Nick Lorrain, Matthew Briton		

1.0 Introduction

The following presents the Albion Creek 2D modelling analysis completed in support of the Humber River in Toronto Floodplain Mapping Update study undertaken by Wood Plc. (Former Amec). The subject study area is located south of CNR railway line, east of Albion Road and Kipling Ave. /Finch Ave. W in City of Toronto as shown in **Figure 1** (below).

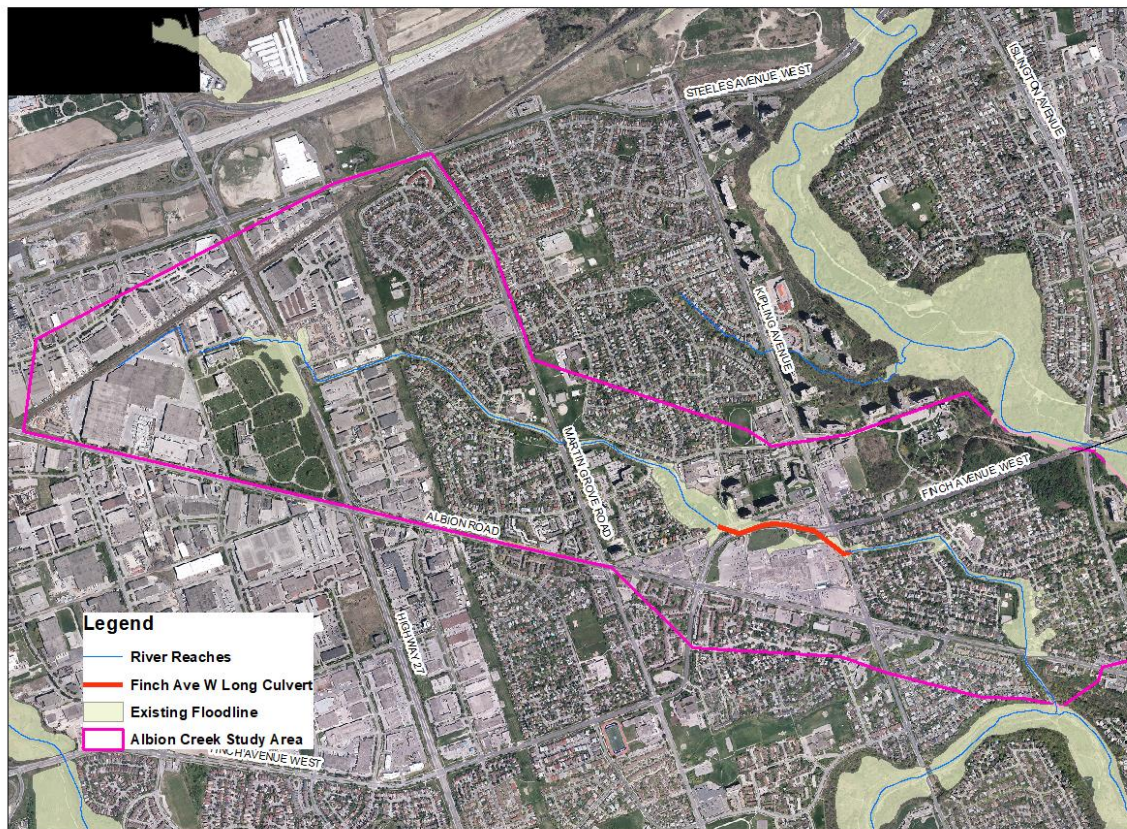


Figure 1 – Subject study area in City of Toronto

1.1 Background

A floodplain mapping study was completed for Albion Creek in Dec. 2006 by R.J. Burnside & Associates Limited. As per the Hydraulics Report prepared by R.J. Burnside (December 2006), due to the complexity of the enclosed box culvert system under the Albion Centre a spreadsheet analysis used in conjunction with the hydraulic model (HEC-RAS) was required to determine the flow rate able to pass through the culvert system and the residual flow rate required to pass overland above the culvert through the Albion Centre lands.

The drainage system in the study area is very complex, there are 13 crossings along Albion Creek, in which Albion Centre enclosed culvert is over 600m long and buried along Finch Ave. W. Based on the latest HEC-RAS model developed by Wood, there are 4 potential spill locations, Carrier Dr., Royalcrest Rd., Albion Mall and Finch Ave. W., as indicated in **Figure 2** below. Considering this unique situation, a 1D HEC-RAS model is not applicable and a 2D modelling approach is more suitable to capture the spill and characterize flood conditions within the study area.

Wood has developed a PCSWMM model using both the 1D and 2D modelling approaches for each location, Carrier Dr. and Albion Centre, but the model domain for each area is not large enough to contain the spill. Further the downstream boundary condition was too close to area of interest and peak flows were not held constant for long enough to reach a steady-state condition. All in all, the whole Albion Creek reach should be modeled within one model domain, and all water crossings and conveyance features should be included in the model. In order to properly model the drainage system along Albion Creek and have accurate floodlines, TRCA decided to build a MIKE Flood model for Albion Creek which takes into account all 13 water crossings, building blockage, land surface roughness for different land cover and detailed topography that defines overland flow paths for the spills.

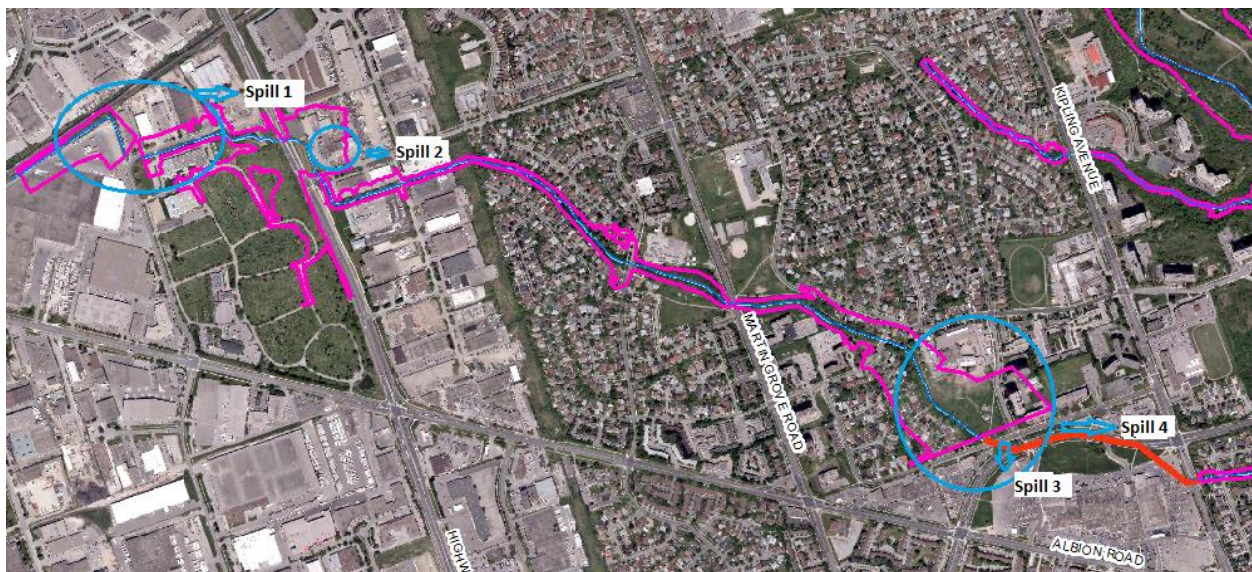


Figure 2 – Location of potential spills in the Albion Creek study area

2.0 Model Setup

The study area was modelled using the MIKE Flood interface that features the dynamic coupling of the MIKE 11 and MIKE 21 hydrodynamic modules. All crossings were handled using the 1D MIKE 11 modelling routine, with channels and overland surfaces being modelled using the 2D MIKE 21 modelling routine. The reason of using 2D approach to represent the channel portions for this study is that a very fine mesh resolution (i.e. 4m^2) is applied which can fully capture the channel geometry since the study area is relative small. MIKE Flood integrates these two models into a single dynamically coupled model.

Figure 3 (below) shows the Albion Creek 2D model domain, which is up to HEC-RAS Station 65.77258 on reach “Reach1” of river “Albion Creek”. The downstream boundary was set as a Q-H relation that was derived from cross-section 65.77258 located on Reach 1 of Albion Creek from the HEC-RAS model developed by Wood as part of the broader Humber River in Toronto Floodplain Mapping Update.

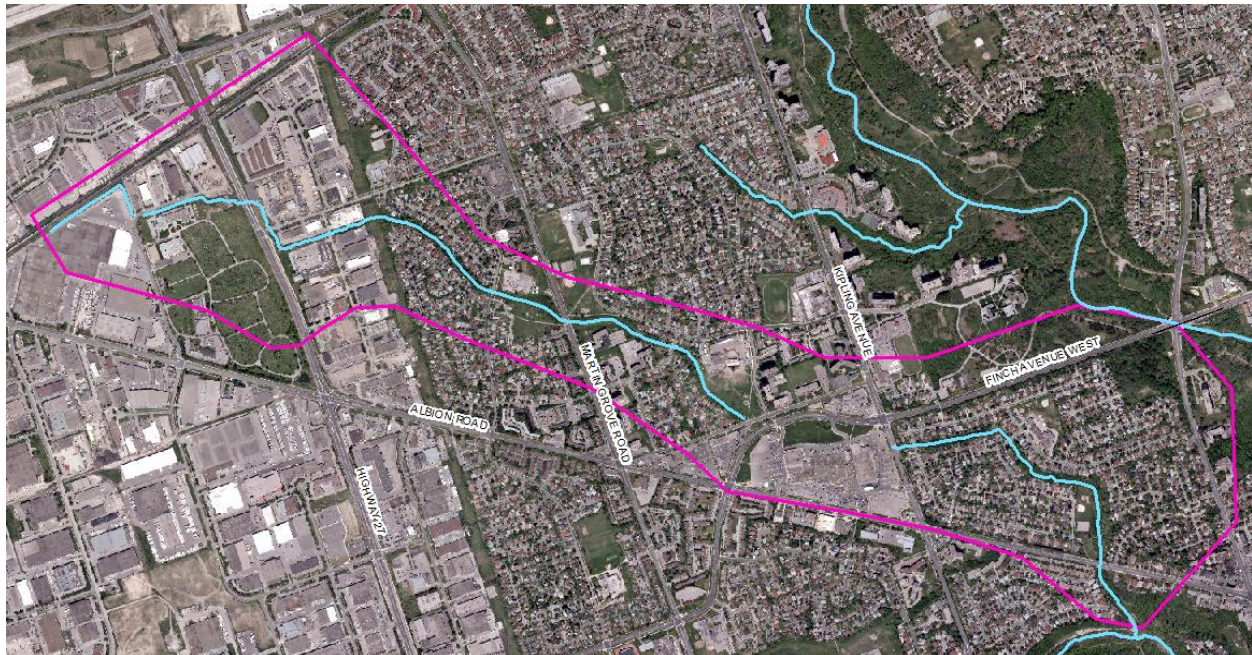


Figure 3 – Albion Creek 2D Model Domain

2.1 MIKE 11 1D River Model

The MIKE 11 1D hydrodynamic (HD) module was used to model all crossings in the study area, in total thirteen (13) crossings were coded in the model. **Figure 4** (below) shows the example of a long culvert which was coded in the 1D MIKE 11 model. The culvert was coded in a way that a short reach was inserted representing the flow path, two cross-sections were cut from the 1m LiDAR and placed immediately upstream and downstream of the crossing location, then the crossing was placed in between these two cross-sections. For exchanging flows between the 1D and 2D models, two cross-sections were connected to the 2D model at the upstream and downstream ends of the short reach.



Figure 4 – Crossing coding in MIKE 11 1D model

Bend loss estimation at Albion Mall enclosed boxed culvert

Three bends in the boxed culvert were identified as significant. Loss coefficients (k values) for each bend were determined by first developing a bend loss chart (**Figure 5**, below) of loss coefficient versus pipe deflection angle for a range of bend radii to pipe diameter ratios with known k values.

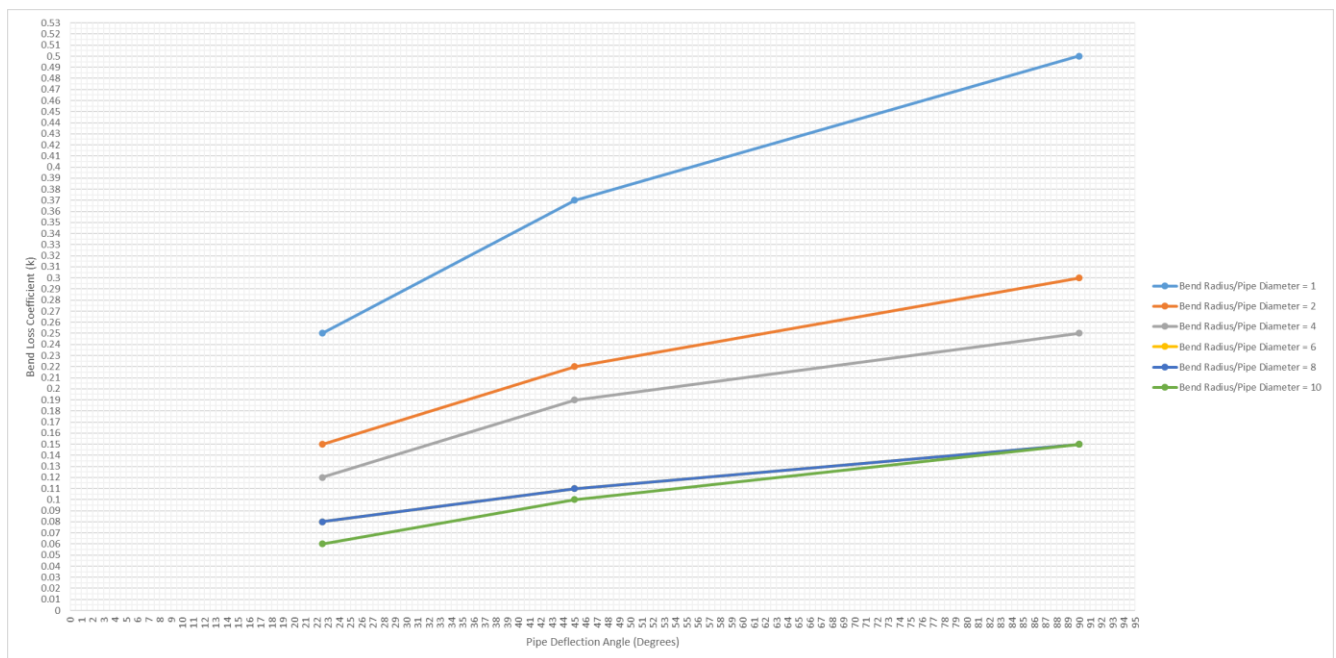


Figure 5 — Bend Loss Coefficient vs. Pipe Deflection Angle (adapted from Table 11-2 in *Water Resources Engineering, 2nd Ed.*, Linsley and Franzini)

Next, the radius for each bend was obtained from drawings and an equivalent diameter calculated based on cross-sectional area of the pipe segments; the bend radii to pipe diameter ratios were then used to interpolate k values from the bend loss chart (**Table 1**, below).

Table 1 — k value for each bend identified in the boxed culvert

Radius (m)	Area (m ²)	Equivalent Diameter (m)	Rad/Dia	k_b
30.48	10.26	3.61	8.43	0.12
21.336	10.26	3.61	5.90	0.105
15.24	10.26	3.61	4.22	0.14

Because the boxed culvert is represented as a single structure in the MIKE 11 setup, a composite k value of 0.37 (total of all bend losses) was applied; this implicitly assumes that flow velocity in the structure is constant. Given that the model is run under steady flow conditions, the assumption of constant flow velocity in the culvert is reasonable.

2.2 MIKE 21 2D Overland Model

The channels and overland area were modelled using MIKE 21 Flexible Mesh (FM) HD, which is a fully dynamic modelling system for 2D free-surface flows. The MIKE 21 editors were used to construct and store various basic and hydrodynamic data layers. The following are the main elements of the MIKE 21 model setup:

- Mesh Generation
- Roughness parameters
- Boundary conditions
- Model settings

Mesh Generation

MIKE 21 FM model uses a mesh-based bathymetry for hydrodynamic computations. The details and the desired accuracy of the model results depends on how the mesh has been designed. In addition, the mesh resolution has a significant impact on the accuracy of the results. A high resolution mesh is required to retain higher variability of the ground elevation surface. High resolution also required to represent in detail topographic features (such as channels, buildings, paved roads, walkways, retaining walls, flood walls, etc.). As such, the mesh was designed as follows:

- A high resolution mesh (i.e. 4m²) was used in areas of greatest concern or interest, i.e. channels and existing flood extent.
- A mesh size of 10m² was used in the rest of model area.

The building polygons were excluded from the mesh generation to avoid computational mesh triangulation from occurring within these polygons. Based on the above resolution zone map, a mesh was created and then 1m LiDAR data was interpolated to each mesh node (see **Figure 6**, below)

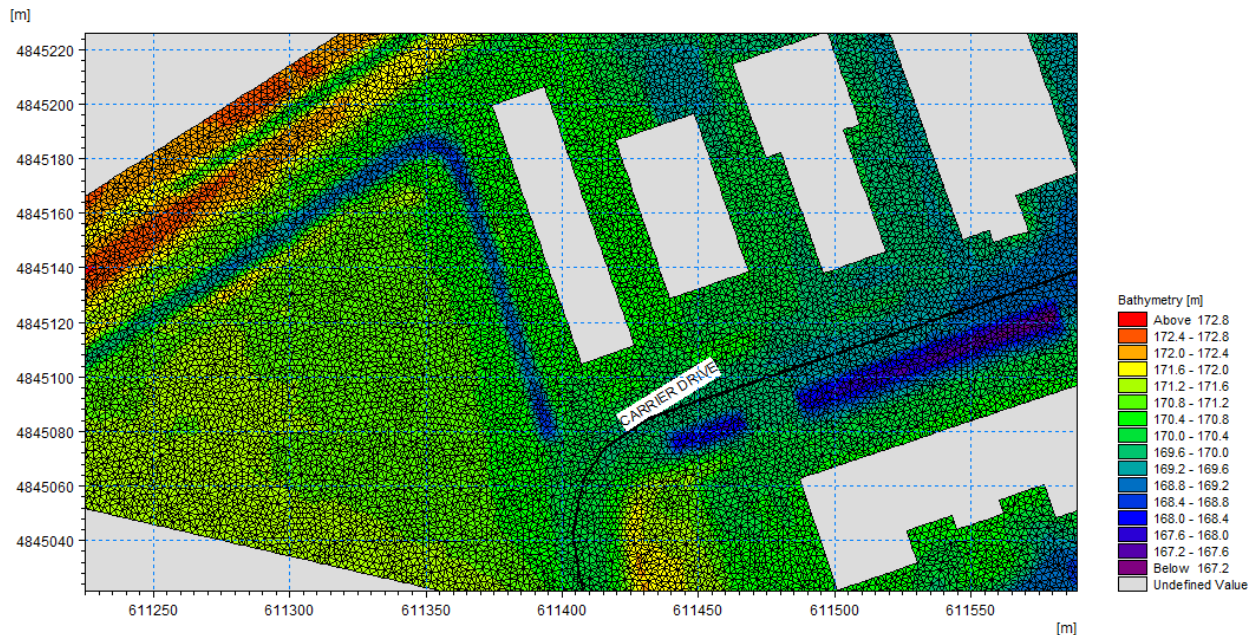


Figure 6 – Close view of mesh around Carrier Drive

Roughness Parameters

MIKE 21 uses roughness parameters for each mesh when completing computations. The land use map (see **Figure 7**) prepared using the TRCA's available land use/land cover information was converted into a MIKE 21 roughness map. In MIKE 21, the roughness was defined in terms of the MIKE system's Manning's resistance number (M), which is the inverse of the Manning's n roughness coefficient value (*i.e.* $1/n$). The Manning's resistance number (M-value) map was prepared based on the TRCA's standard roughness values; the corresponding Resistance numbers used in MIKE 21 are:

- Natural areas: 0.08 (M = 12.50)
- Roads and large parking areas: 0.025 (M = 40)
- Urban large pervious areas: 0.05 (M = 20)
- Streams: 0.035 (M = 28.57)

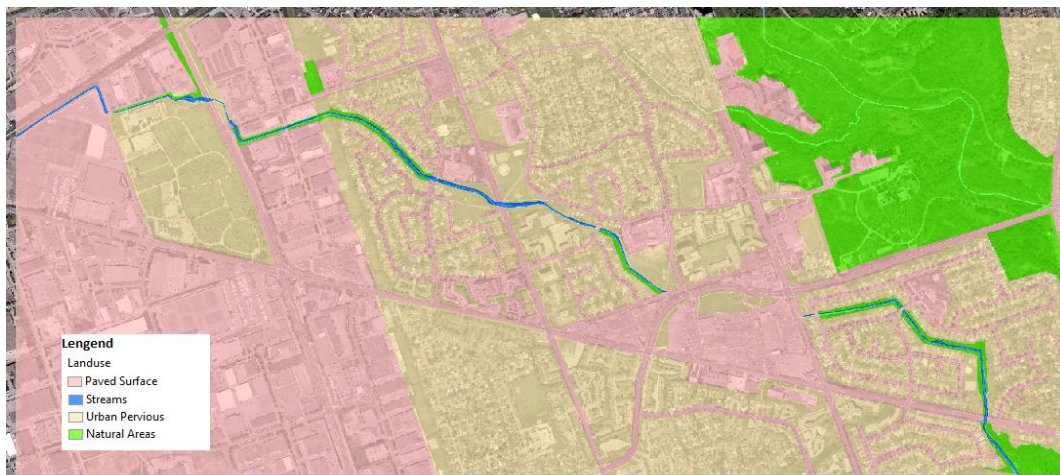


Figure 7 – Landuse map in Albion Creek

Boundary Conditions

Boundary conditions for the MIKE 21 model define how the flow and water levels will be controlled at the peripheral edges of the 2D model domain defined by the bathymetry limits. In the Albion Creek 1D and 2D coupled model, since channels were handled by MIKE 21 2D model, both the upstream inflow boundary and downstream boundary were defined as open boundaries (see **Figure 8**, below). The Regional steady peak flows were ramped for 1hr and then kept constant for 6hrs (see **Figure 9**). The downstream boundary was defined as a rating curve which was derived from the HEC-RAS computed water levels for each storm even at Station 65.77258 (see **Figure 10**, below).

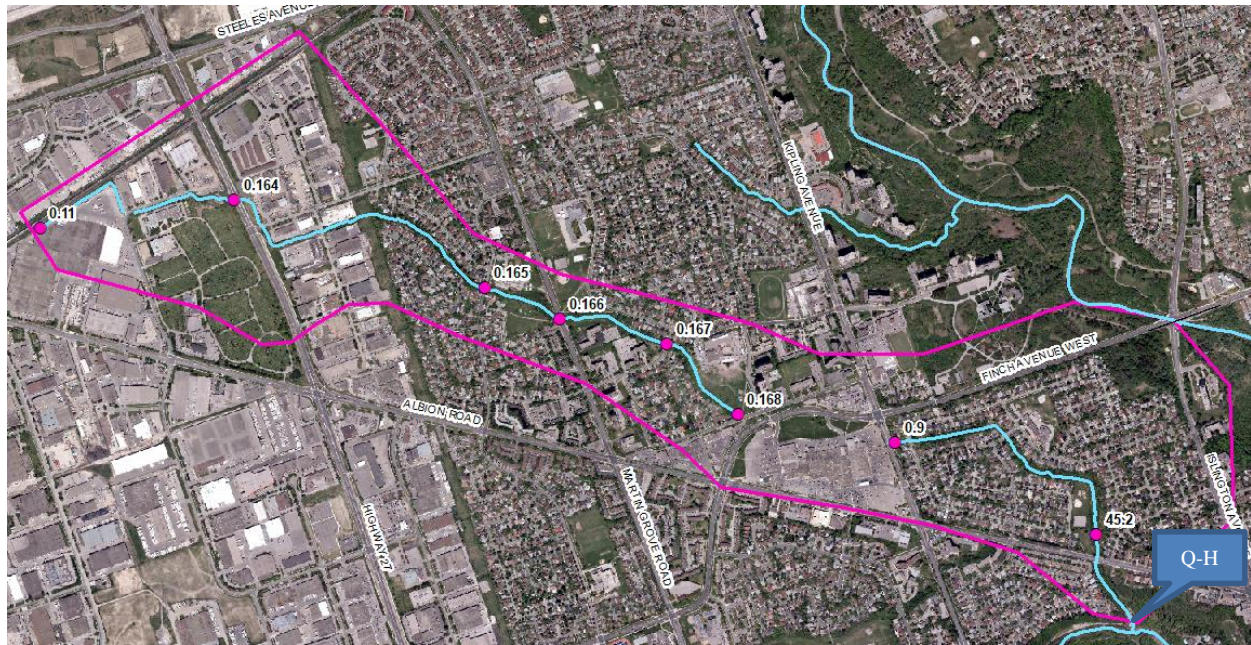


Figure 8 – Boundary conditions defined in the MIKE 21 model

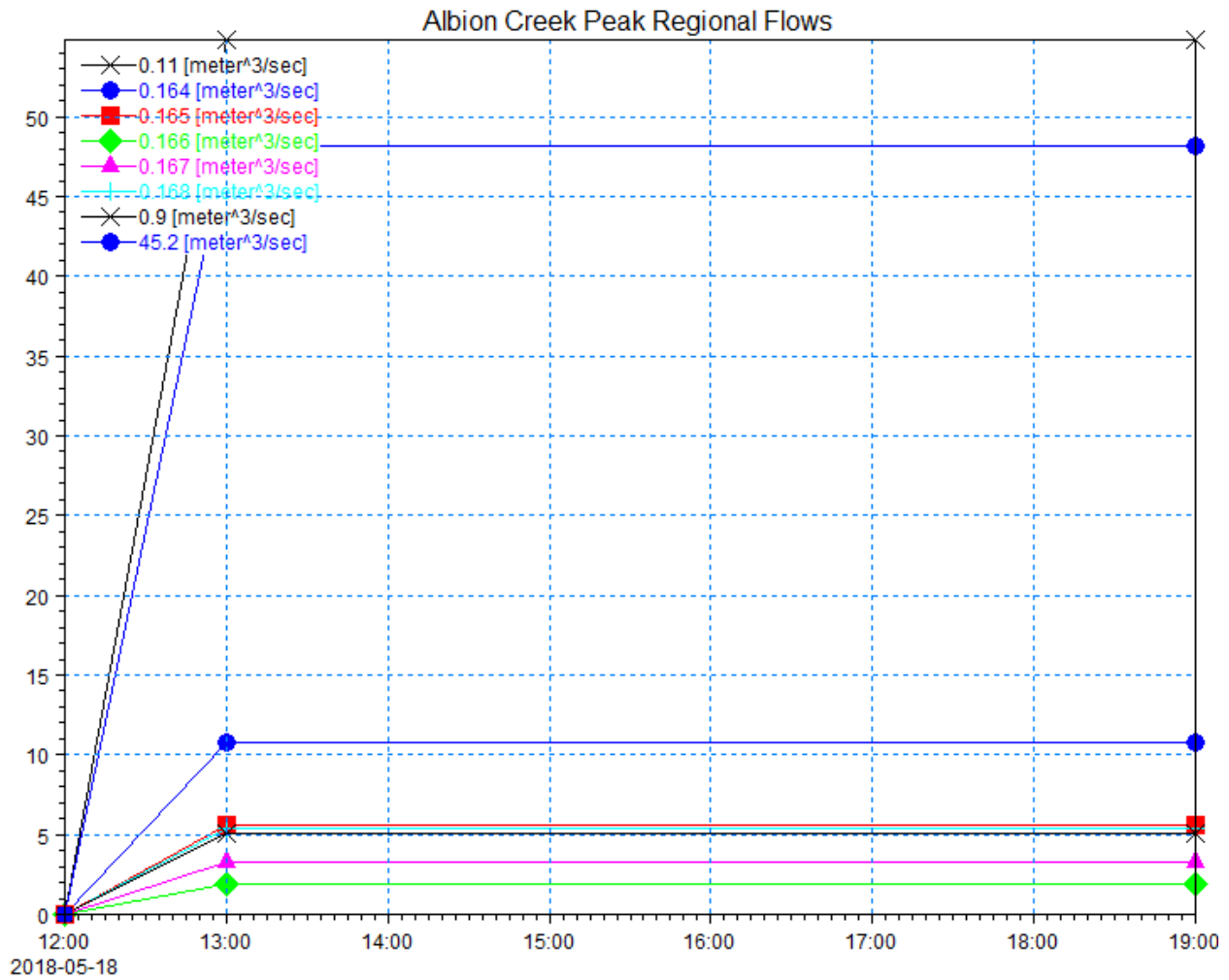


Figure 9 – Regional peak flows applied in the 2D MIKE 21 model

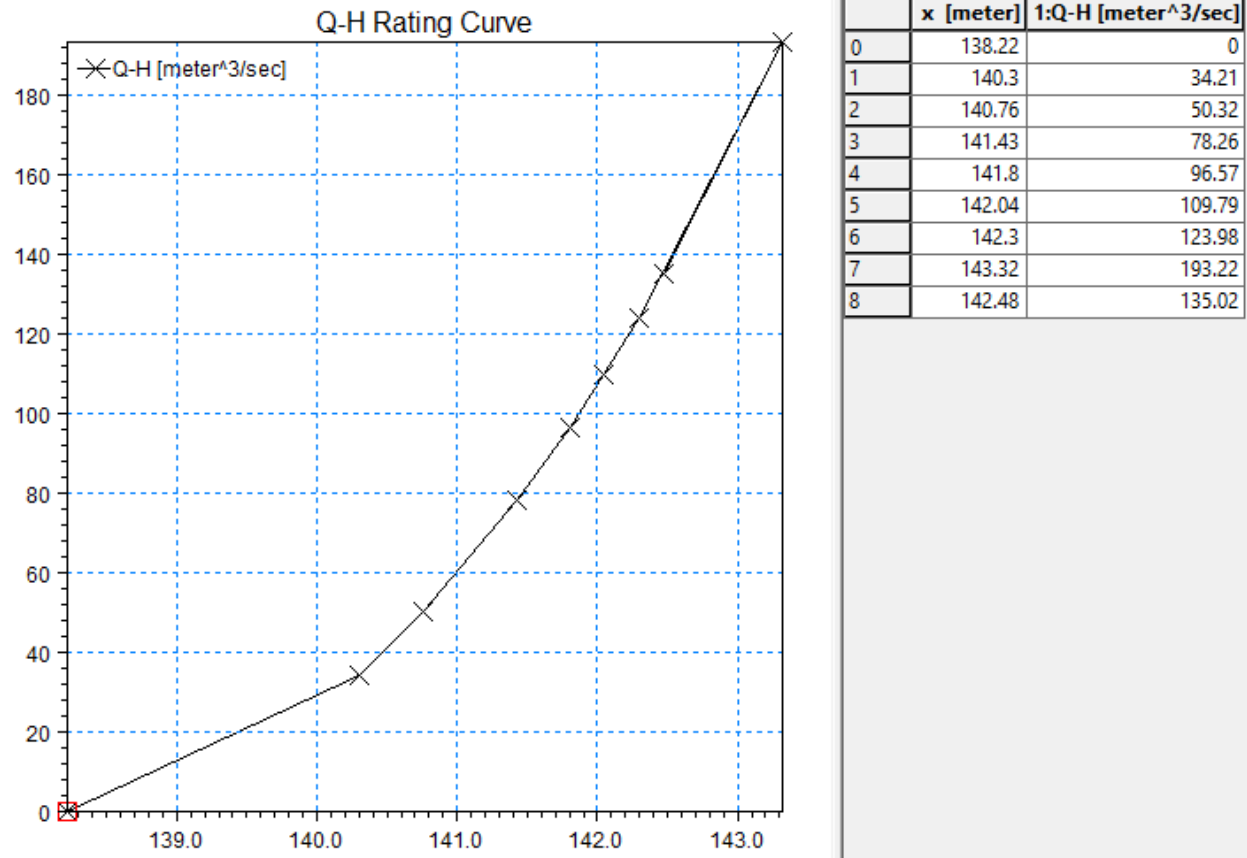


Figure 10 – Rating curve derived from the HEC-RAS model

Model Settings

The MIKE 21 FM Flow Model setup contains descriptions of a number of parameters. The key parameters are simulation period, start and end time, time step interval, flooding and drying depths, output saving duration and saving interval details.

A 7-hour simulation period was used for the steady peak inflow hydrograph simulation. The simulation period was entered using an arbitrary start and end date and time with a specified total number of time steps and time step interval. In this case, the total number of time steps was 126000 with a time step interval of 0.20 seconds.

The drying, flooding and wetting depths used were 0.005 m, 0.01 m and 0.02 m, respectively.

The dynamic output range started from time step 0 to time step 126000 with a saving time interval of 3000.

- The saving output variables were surface elevation, total water depth, U velocity (x-direction), V velocity (y-direction), and current speed.
- The dynamic output file type used was “2D (horizontal)” while the output format was selected as “Area Series” with only wet areas that ensures the saving of specified information at every computational point.

2.3 1D and 2D Coupled Model

The final steps for the Albion Creek 2D model setup was the integration of the 1D MIKE 11 model with the 2D MIKE 21 model using the MIKE Flood model interface. Standard links were

used to connect the crossing branches in the 1D MIKE 11 model with the corresponding mesh elements of the 2D MIKE 21 model. A standard link enables the coupling of the models at the upstream or downstream end of the 1D channel with the 2D area. This integration in MIKE Flood allows a seamless flow exchange between the 1D branches and the 2D area, thereby enabling the space and time-dependent dynamic simulation of flows as they would physically occur in real-world hydraulic systems.

Figure 11 (below) shows the bathymetry of the Albion Creek 1D and 2D coupled model, where the building areas are represented (blocked white cells) and the link line between the 1D and 2D models is shown as a series of red cells.

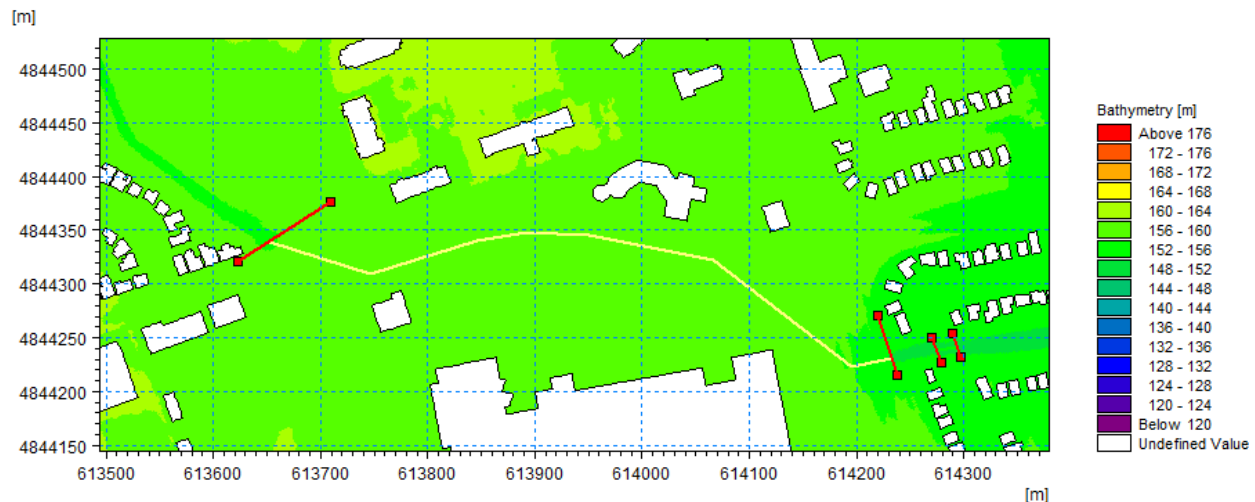


Figure 11 – Standard links used to connect 1D branch to 2D area

2.4 Model Results

Base on 2D model results, spills occur at three major locations: Carrier Dr./Royalcrest Dr., Albion Centre, and Finch Ave. W/Kipling Ave.

Figure 12 shows the spill and flow direction at Carrier Dr./Royalcrest Dr. The depth of flooding is around 0.3m except at Railway/HWY 27 and HWY27/Royalcrest Dr. where depth of flooding range between 1m and 1.5m.

Figure 13 shows the spill and flow direction around the Albion Centre. Spill occurs at the Garfella Dr. crossing and travels along Bulbourne Rd., with the depth of flooding around 1m. Another major spill occurs at Stevenson Rd. and then travels eastward along Finch Ave. W. with depth of flooding around 1.5m on Stevenson Rd./Finch Ave. W/Albion Centre parking lot.

Figure 14 shows the spill and flow direction at Finch Ave. W./Kipling Ave. The spill first occurs at the Amaron Ave. crossing, and later joins the spill from Stevenson Rd./Finch Ave. W. traveling further eastward and across Kipling Ave. The depths of flow are around 0.5m along Taysham Cres., Monterey Dr. and Beaumonde Heights Dr.

Figure 15 shows the steady Regional maximum water depth, **Figure 16** shows the steady Regional maximum water surface elevation and **Figure 17** shows the steady Regional maximum velocity.

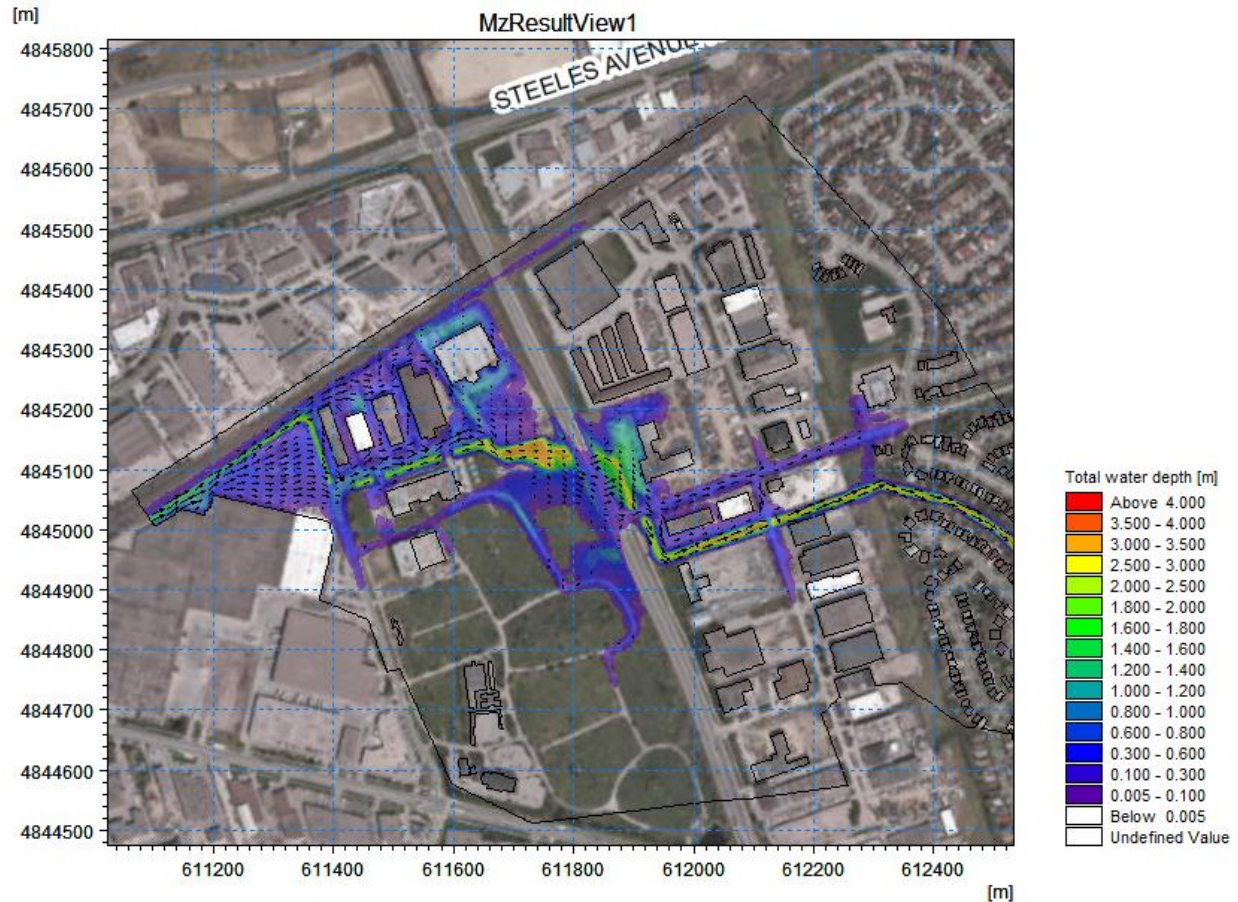


Figure 12 – Spill point and flow direction at Carrier Dr./Royalcrest Rd.

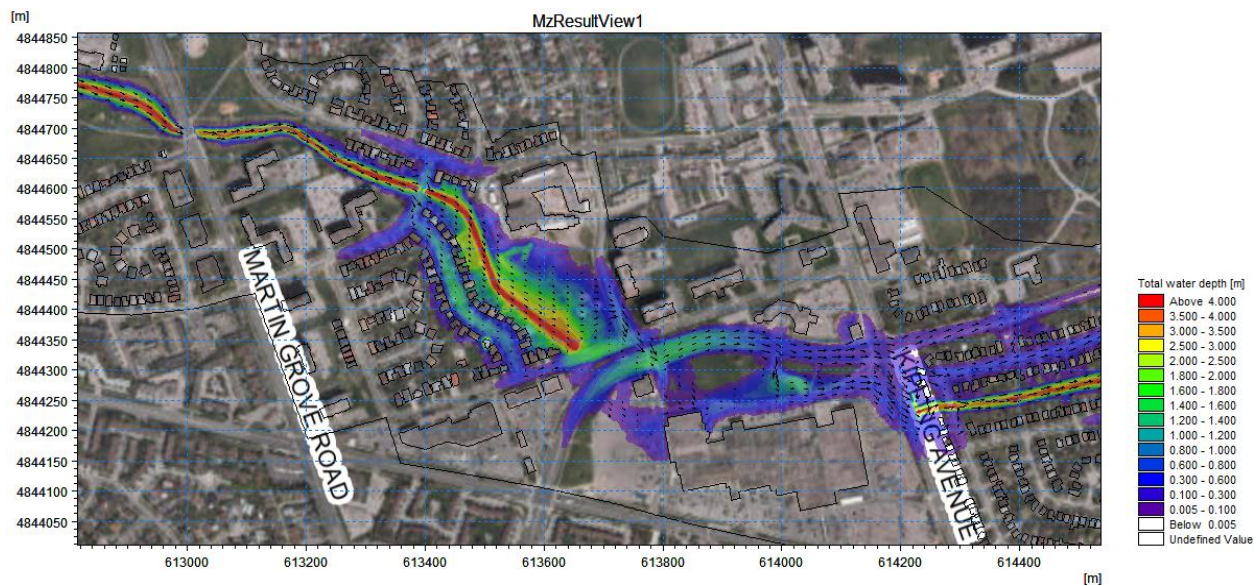


Figure 13 – Spill point and flow direction around Albion Mall

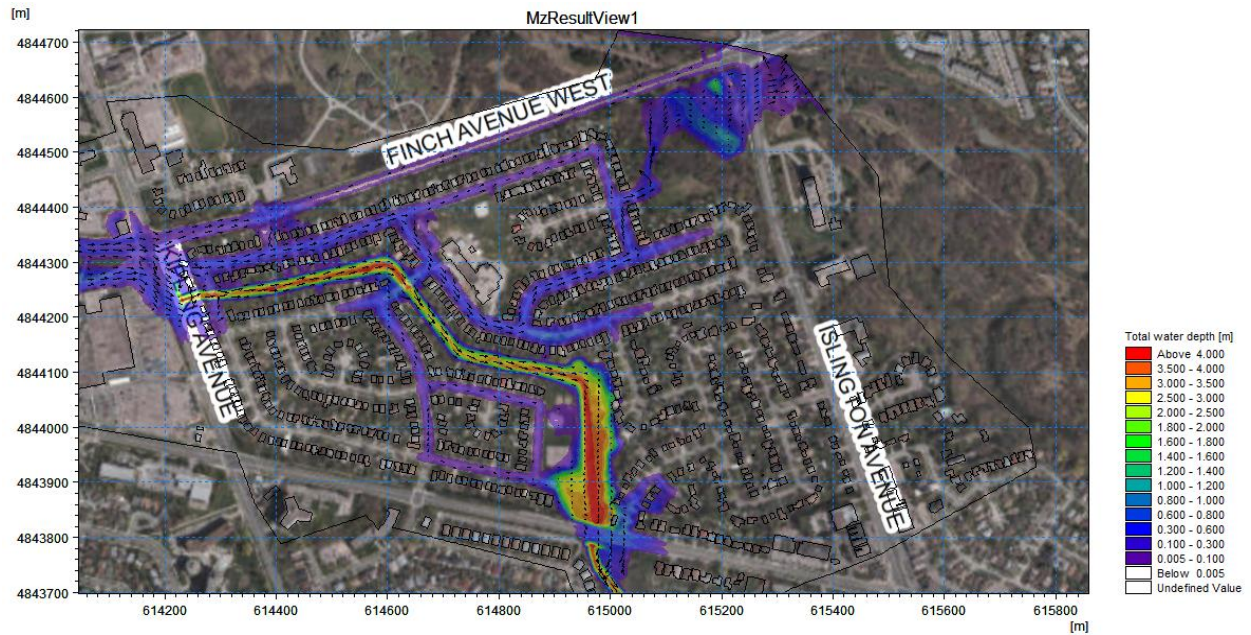




Figure 16 – Steady Regional, maximum water surface elevation



Figure 17 – Steady Regional, maximum velocity

3.0 Flood Risk Mapping

In terms of flood risk analysis, the criteria provided in the *Technical Guide River and Stream Systems: Flooding Hazard Limit* prepared by the Ontario Ministry of Natural Resources (MNR) in 2002 along with the frequency of flooding are typically used in defining and assessing flood risk. Based on work completed recently in other SPA's, the TRCA has revised the flood risk categories and how they are calculated. The revised flood risk categories are divided into low, moderate and high risk and are defined as follows:

- **Low Risk** – Vehicular and Pedestrian Access/Egress is Available (depth <0.3m);
- **Moderate Risk** – Pedestrian Access/Egress ONLY Available (Product Depth and Velocity <0.37m²/s, Depth <0.8m and Velocity <1.7m/s;
- **High Risk** – Depth-velocity product > 0.37 m²/s or Depth >0.8m or Velocity >1.7m/s.

Figure 18 (below) illustrates the distribution of Low-, Moderate- and High-risk flood areas within the domain; it can be seen that High-risk areas are generally confined to the channel except at three major spill locations that lie in High-risk flood areas.

Figure 19 shows the distribution of Low-, Moderate- and High-risk flood areas at Carrier Dr./HWY 27. Two industrial areas lie in High-risk flood areas.

Figure 20 shows the distribution of Low-, Moderate- and High-risk flood areas around Albion Mall. The high risk flood areas lie on Bulbourne Rd., Stevenson Ave./Finch Ave. W. and north-east parking area of Albion Mall.

Figure 21 shows the distribution of Low-, Moderate- and High-risk flood areas at Finch Ave./Kipling Ave. The high risk flood areas lie on Taysham Crescent, Monterey Dr. and Beaumonde Heights Dr.

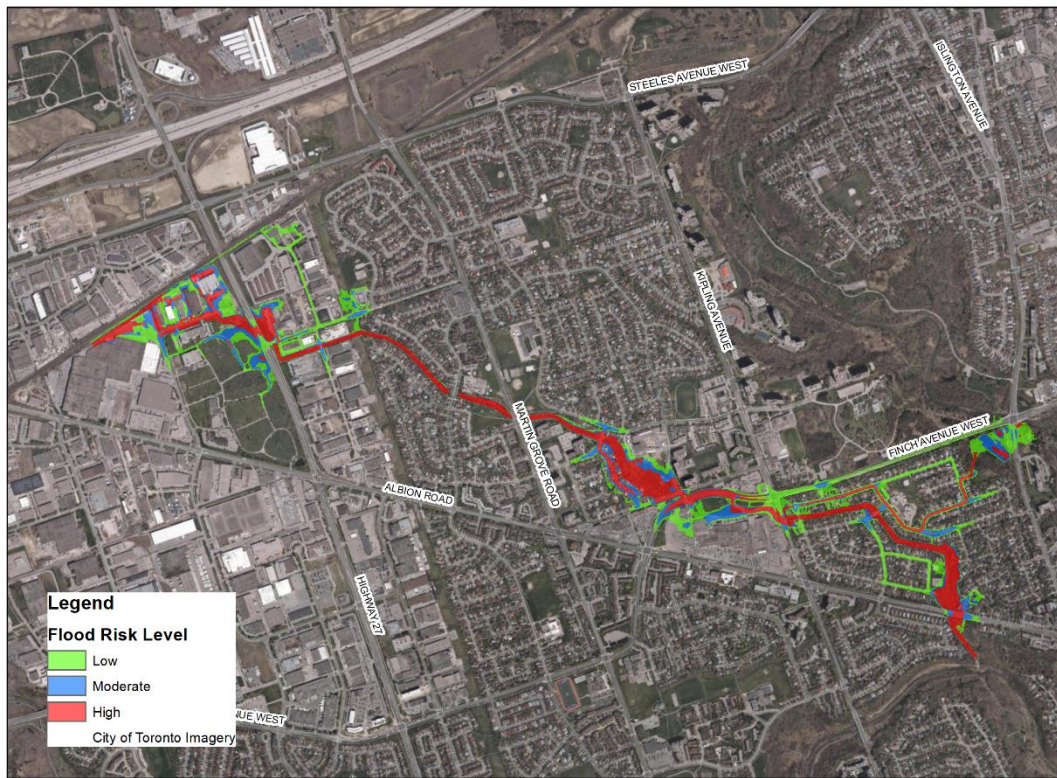


Figure 18 – Distribution of low- moderate- and high-risk flood areas



Figure 19 – Distribution of low- moderate- and high-risk flood areas around Carrier Dr./Hwy 27

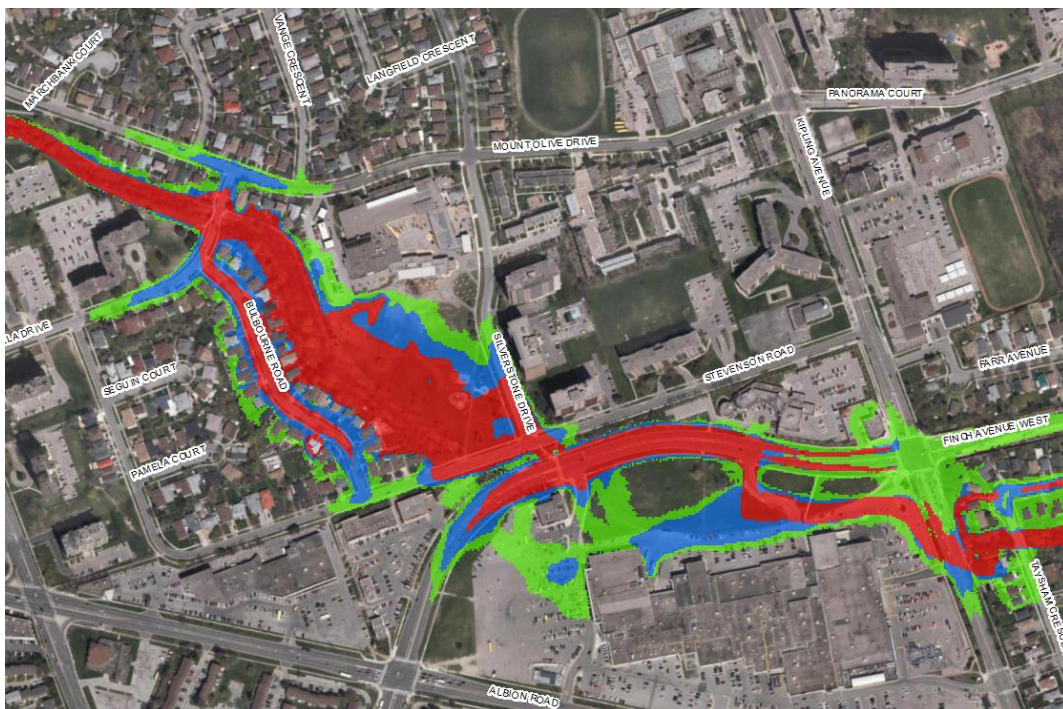


Figure 20 – Distribution of low- moderate- and high-risk flood around Albion Mall



Figure 21 – Distribution of low- moderate- and high-risk flood at Finch Ave. W/Kipling Ave.

4.0 Conclusions and Recommendations

Albion Creek FPM study was completed in Nov. 2006, which included a detailed analysis of the Albion Centre culvert, which included a spreadsheet analysis in conjunction with the HEC-RAS hydraulic model to determine the conveyance capacity of the culvert and the residual overland flow rate through the mall lands. As noted in previous sections of this memo, given the complex drainage system along Albion Creek, a 2D model is more appropriate to define the spill and model shallow overland flow. Therefore, a coupled 1D and 2D MIKE Flood model was built that incorporated all crossings, the latest 1m LiDAR data and updated flow data. The results from the coupled model clearly show the extent of the spill and its flow paths. For floodplain mapping purposes, flood depth and flood extent from the coupled MIKE model should be used for the Albion Creek.

Appendix D

HEC-RAS Output

This page left intentionally blank

Appendix E

Flow Nodes Used for Development of the HEC-RAS Steady Flow Data Table

This page left intentionally blank

Path: P:\2017\Projects\TPB178137 - Humber River Floodplain Mapping\06_DES-ENG\01_CAD\02_DWG\05_WF\2018-09\FigE1 FlowNodePlan.dwg

richard.bartoio

Plotted By:

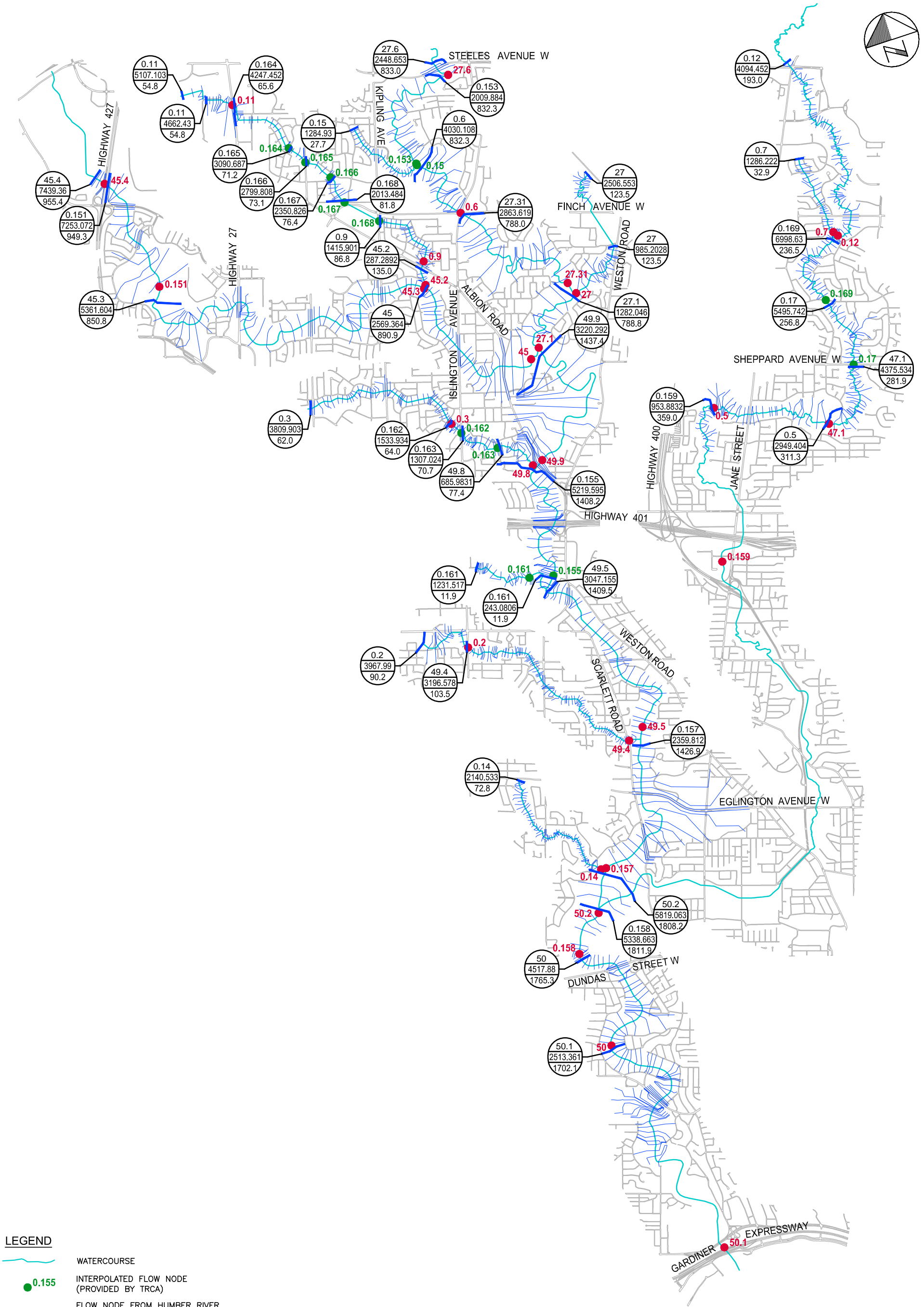
2018-09-12

Plotted:

richard.bartoio

Last Saved: 2018-09-11

Last Saved: 2018-09-11



LEGEND

- WATERCOURSE
- 0.155 INTERPOLATED FLOW NODE (PROVIDED BY TRCA)
- 50 FLOW NODE FROM HUMBER RIVER HYDROLOGY REPORT - 2018 (PROVIDED BY TRCA)
- 0.14 2140.533 72.8 FLOW NODE REFERENCE ID# OF FLOW CHANGE LOCATION
- CROSS SECTION NUMBER OF FLOW CHANGE LOCATION
- CROSS SECTION LOCATION
- REGIONAL FLOW (%) AT FLOW CHANGE LOCATION

HUMBER RIVER FLOODPLAIN
MAPPING UPDATE WITHIN
THE CITY OF TORONTO
TRCA

FLOW NODE LOCATION
PLAN

wood

SCALE VALID ONLY FOR
24"x36" VERSION

Scale 1:25000
0 250 500 1000

Consultant File No.
TPB178137

Figure No.
E1