

**Toronto Transit Commission Environmental Assessments
for Transit Projects in the Eastern Waterfront**

Assignment 4:

**Stage 1 Archaeological Resource Assessment of the
East Bayfront Transit Precinct**

City of Toronto, Ontario

Prepared for:

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EXECUTIVE SUMMARY

The Stage 1 Archaeological Resource Assessment of East Bayfront Transit Precinct from approximately Bay Street to Parliament Street has determined that the study area is entirely comprised of artificial land formed in the late nineteenth through mid-twentieth centuries. The fills associated with these landmaking activities are not considered to be of any cultural heritage value or interest as they are essentially modern. Nevertheless, the research undertaken for this study resulted in the identification of a number of features or feature complexes of potential heritage interest within the study area. These have been evaluated using the system prepared as part of Waterfront Toronto's *Archaeological Conservation and Management Strategy*, with the resulting conclusion that seven of the features present within the study area (the remains of the heads of a series of wharves and the remains of Knapp's roller boat) are of potential heritage value. In light of these considerations, it is recommended that any construction activities that are likely to result into impacts upon these deeply buried features should be subject to archaeological monitoring. The balance of the East Bayfront Transit Precinct may be considered clear of any further archaeological concern, with the proviso that the appropriate authorities must be notified should deeply buried archaeological or human remains be encountered during any future work within the study area.



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ENVIRONMENTAL ASSESSMENT DIVISION**

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1.0 INTRODUCTION

Archaeological Services Inc. was retained by McCormick Rankin Corporation (Mississauga) to conduct a Stage 1 Archaeological Resource Assessment of the East Bayfront Transit Precinct in the City of Toronto (Figure 1). The study area defined for the purposes of the assessment extends from Bay Street east to Parliament Street and from Lakeshore Boulevard south to Lake Ontario, and encompasses an area of approximately 55 hectares. It is anticipated that the project impacts will, for the most part, occur within the existing Queen's Quay road allowance and will involve construction of a streetcar line in a dedicated right-of-way. This line will likely be underground from Bay Street to Yonge Street and will rise to the surface between Yonge Street and Freeland Street. East of Freeland the streetcar line will be at grade.

The study area is entirely comprised of artificial land formed in the twentieth century, as has been documented in numerous studies, most recently the *Waterfront Toronto Archaeological Conservation and Management Strategy* (ASI et al. 2008).

Project confirmation and authorization to proceed was received from McCormick Rankin Corporation (Mississauga) on March 5, 2008. This Stage 1 archaeological assessment was conducted under the project direction of Ms. Katie Bryant, ASI, under an archaeological licence (P264) issued pursuant to the *Ontario Heritage Act*.

This report presents the results of the Stage 1 background research and field review and makes several recommendations.

2.0 BACKGROUND RESEARCH

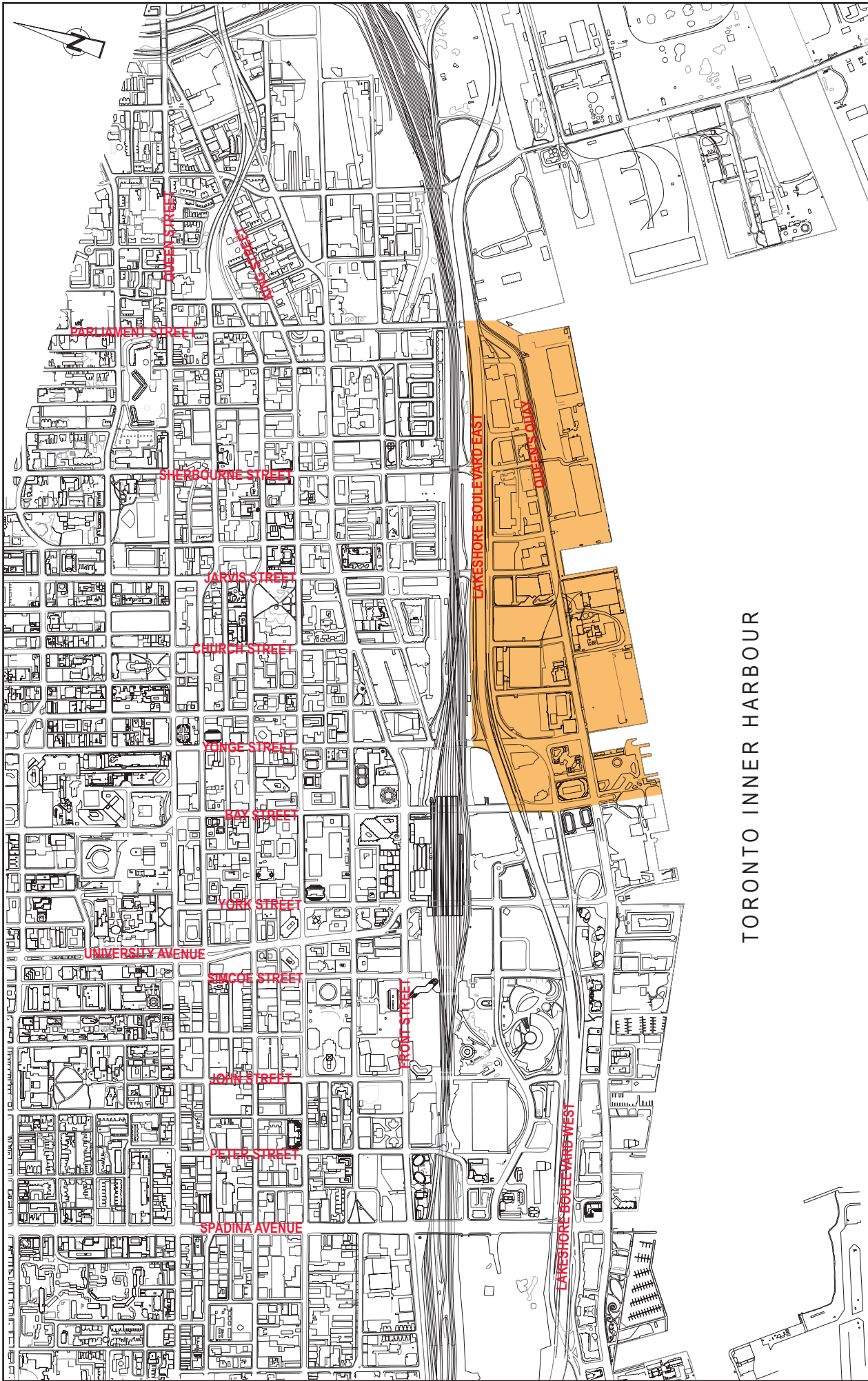
2.1 Physiographic Setting

The Toronto waterfront is an area in which massive landscape changes have occurred. In the vicinity of the subject property, the most dramatic changes began to occur during the mid-nineteenth century, in association with the development of the railway facilities along the edge of the harbour.

While the study area consists entirely of made land, it essentially lies within the Iroquois Plain physiographic region (Chapman and Putnam 1984), which is the former bed of glacial Lake Iroquois. In the Toronto area, the Lake Iroquois strand is situated approximately 4.5 kilometres inland from the current Lake Ontario shore. Below the strand, the Quaternary sediments are dominated by outwash sands typical of nearshore deposits. The balance of the plain, towards the modern lake shore, is dominated by fine sediments of silt and clay, typical of off-shore deposits, overlying till (Chapman and Putnam 1984; Gravenor 1957).

Glacial Lake Iroquois came into existence by about 12,000 B.P., as the Ontario lobe of the Wisconsin glacier retreated from the Lake Ontario basin. Isostatic uplift of its outlet, combined with blockage of subsequent lower outlets by glacial ice, produced a water plain substantially higher than modern Lake Ontario. Beginning around 12,000 B.P., water levels dropped stepwise during the next few centuries in





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<p>SCALE</p> <p style="text-align: center;">0  1000m</p>		<p>ASI PROJECT NO.: 07EA-291 DATE: MAR 309</p> <p>DRAWN BY: DAR FILE: 07EA-291 figure 1.ai</p>

Figure 1: The East Bayfront Transit EA Stage 1 Archaeological Resource Assessment Study Area.

response to sill elevations at the changing outlet. By about 11,500 B.P., when the St. Lawrence River outlet became established, the initial phase of Lake Ontario began, and this low water phase appears to have lasted until at least 10,500 B.P. At this time the waters stood as much as 100 metres below current levels. However, isostatic uplift was already raising the outlet at Kingston so that by 10,000 B.P., the water level had risen to about 80 metres below present. Uplift since then has continued to tilt Lake Ontario upward to the northeast, propagating a gradual transgressive expansion throughout the basin. The flooded mouths of creeks and rivers that rim the basin—such as are preserved at Grenadier Pond and the mouth of the Humber—provide visible reminders of this process (Anderson and Lewis 1985; Karrow 1967:49; Karrow and Warner 1988, 1990).

In the vicinity of the study area it has been estimated that the earliest Lake Ontario shoreline (circa 10,400 B.P.) was about five kilometres south of its present location. Over the following millennia, the shoreline gradually moved northward. Even by about 5,000 B.P., however, it is still unlikely that Toronto Harbour, protected by the submerged bank of sediment associated with the emergent Toronto spit, had yet begun to fill. Between about 5,000 and 4,000 B.P., the Nipissing Flood phase increased water levels to near or slightly above nineteenth century levels (Anderson and Lewis 1985; Weninger and McAndrews 1989). Levels subsided by three to four metres again between about 4,000 and 3,500 years ago, and by circa 3,000 B.P., the shoreline was established more or less in the location at which it stood, in the vicinity of Front Street, at the time of the founding of York in the 1790s.

The present study area likely stands in the approximate position of the circa 5,000-3,000 B.P shore. Despite the fact that the Toronto area lakeshore in general, and more particularly the mouths of the creeks and rivers flowing into it, would have been extremely attractive to precontact aboriginal peoples, the potential for the recovery of precontact aboriginal material within the study area is nil. Sites dating to the circa 5,000-3,000 B.P. period are unlikely to have survived the historic development activities (i.e., dredging, filling, etc.) that have disturbed the original topography of the lakebottom.

2.2 Previous Archaeological Research

In order that an inventory of archaeological resources could be compiled for the subject property and surrounding area, three sources of information were consulted: the site record forms for registered sites housed at the Ministry of Culture (MCL); published and unpublished documentary sources; and files located at Archaeological Services Inc.

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MCL. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 kilometres east to west, and approximately 18.5 kilometres north to south. Each Borden block is referenced by a four-letter designator, and sites within a Borden block are numbered sequentially as they are found. The subject property under review is located within Borden Block *AjGu*.



No archaeological sites have been registered within the limits of the subject property. Thirteen sites have been documented within approximately one kilometre of the study area's boundaries. All are related to the nineteenth-early twentieth century development of the City of Toronto, although one site has yielded limited evidence of precontact Late Woodland occupation. Particulars concerning these sites are provided in Table 1.

Table 1: Registered Archaeological Sites within an Approximate 1km Radius of the Subject Property

Borden	Site Name	Cultural Affiliation	Site Type	Researcher
AjGu-15	Front Street	Euro-Canadian	Public Building	R. O'Brien (no date)
AjGu-16	Thornton Blackburn	Multi-component	Afro-Canadian Residence/ Late Iroquoian Camp	K. Smardz 1985
AjGu-17	St. James Cathedral	Euro-Canadian	Cemetery	S. Janusas 1985
AjGu-21	Navy Wharf	Euro-Canadian	Commercial/Transport Structure	MPP 1986
AjGu-23	Esplanade Crib	Euro-Canadian	Commercial/Transport Structure	MPP 1986
AjGu-24	Furniss Water Works Wharf	Euro-Canadian	Commercial/Transport Structure	MPP 1986
AjGu-25	1894 Landfill	Euro-Canadian	Commercial/Transport Structure	MPP 1986
AjGu-28	Elgin-Winter Garden Theatre	Euro-Canadian	Well	D. Doroszenko 1988
AjGu-34	Southtown	Euro-Canadian	Commercial/Transport Structure	ASI 1995
AjGu-35	Worts Estate	Euro-Canadian	Residence	ASI 1996
AjGu-41	First Parliament	Euro-Canadian	Public Building	ASI 2000
AjGu-46	Gooderham Mill	Euro-Canadian	Industrial	ASI 2003
AjGu-51	Barchard Box Factory	Euro-Canadian	Industrial	ASI 2007

ASI=Archaeological Services Inc.

2.3 The Late-Nineteenth and Twentieth-Century Formation of the Study Area

The lands within, and flanking, the study area were all formed during late-nineteenth and mid-twentieth-century landmaking operations. The relevant developments were those that extended the shoreline wharves between Simcoe Street and Church Street to the New Windmill Line, which was established in 1893 and followed roughly the alignment preserved by Harbour Street. The study area incorporates the heads of five wharves that were built to the New Windmill Line during the 1890s: the Harbour Square wharf and the Toronto Ferry Terminal wharf which flanked the west and east sides of Bay Street, respectively; the City wharf and the Yonge Street wharf, which lay on either side of Yonge Street; and the Toronto Electric Light Co. wharf at Freeland Street. Slightly later (circa 1910) wharf expansions south into the east part of the study area consist of the Polson Iron Works wharf at the Foot of Frederick Street and the City Corporation wharf, located between Sherbourne and Princess streets. Each of these wharves was built using ballasted timber cribs.

These shoreline features were quickly succeeded by the massive campaigns of filling to the Harbour Head Line, which is essentially the modern shoreline. Construction of the Harbour Head Line began in 1916 at the foot of Bathurst and had reached the foot of Yonge Street by 1923. The shorewalls, slips, and docks associated with this section of the Head Line were formed by timber cribbing capped with concrete. The areas behind were filled using hydraulic dredges working in the harbour. Use of this material for the fill behind the Head Line had the advantage of deepening the harbour at the same time.



Filling of the area behind the Harbour Head Line between Yonge Street and Jarvis was completed in the mid- to late 1920s. This work also involved construction of a timber retaining wall, known as the Pierhead or Bulkhead Line, located along the future alignment of Queen's Quay), stretching from Yonge Street to Berkeley Street. This feature was built using timber piles driven to bedrock and joined by waling and was faced, on the south side, with sheet piling which also extended to bedrock depth. Steel rods that were run to anchor piles on the inland side were used to reinforce the structure (Stinson and Moir 1991). The final campaign of filling, to the Harbour Head Line, which achieved the modern configuration of the central waterfront, took place between the 1930s and the 1950s across the central waterfront.

Following the basic proposal outlined in the 1912 Harbour Commission Plan, the areas developed in the twentieth century were occupied by a mix of industrial concerns. Proceeding from west to east, north of the Pierhead Line, developments on the lands formed in the 1920s included the emergence of a largely industrial precinct at the foot of Bathurst Street; the reconfiguration and expansion of the Canadian National Railway's Spadina Yard; the continued use of the Canadian Pacific Railway's John Street Yard; and the construction of as many as 17 commercial and civic wharves between Simcoe and Jarvis streets.

Two short-lived developments of note in the west-central part of the study area were the Air Harbour at the foot of Freeland Street (1929-1939) and the Royal Canadian Air Force's Equipment Depot No. 1 (1940-1946), which encompassed the grounds between Yonge, Sherbourne and Fleet (Lakeshore Boulevard) and Queen's Quay.

Expansion of the commercial, industrial and warehousing functions of the waterfront continued through to the 1950s. The most notable of the warehousing and shipping concerns were the Canada Steamship Lines' piers and warehouses on Piers 6-8 between York and Yonge streets, and the marine terminals of the Queen Elizabeth Docks built to the east of Yonge Street. Marine Terminal 28 was completed in 1958 while Marine Terminal 29 and the Redpath Sugar refinery were opened in 1959. A related development, the Redpath Sugar Refinery, opened in 1959. The 1950s projects were undertaken in anticipation of an increase in port activity that would be brought about by the completion of the St. Lawrence Seaway. However, ocean shipping never developed as a significant business in Toronto harbour.

3.0 INVENTORY OF FEATURES

The inventory of the study area (Figure 2) has been compiled using selected cartographic sources from the late-nineteenth through mid-twentieth centuries, as well as other reconstructions of site locations prepared for previous historical/archaeological studies. These have been overlaid on the modern base map for the project. The process of overlaying historic maps on the modern streetscape, using common reference points between the various sources is one in which there are numerous potential sources of error, given the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping. In present exercise, there has been considerable variation in all dimensions.



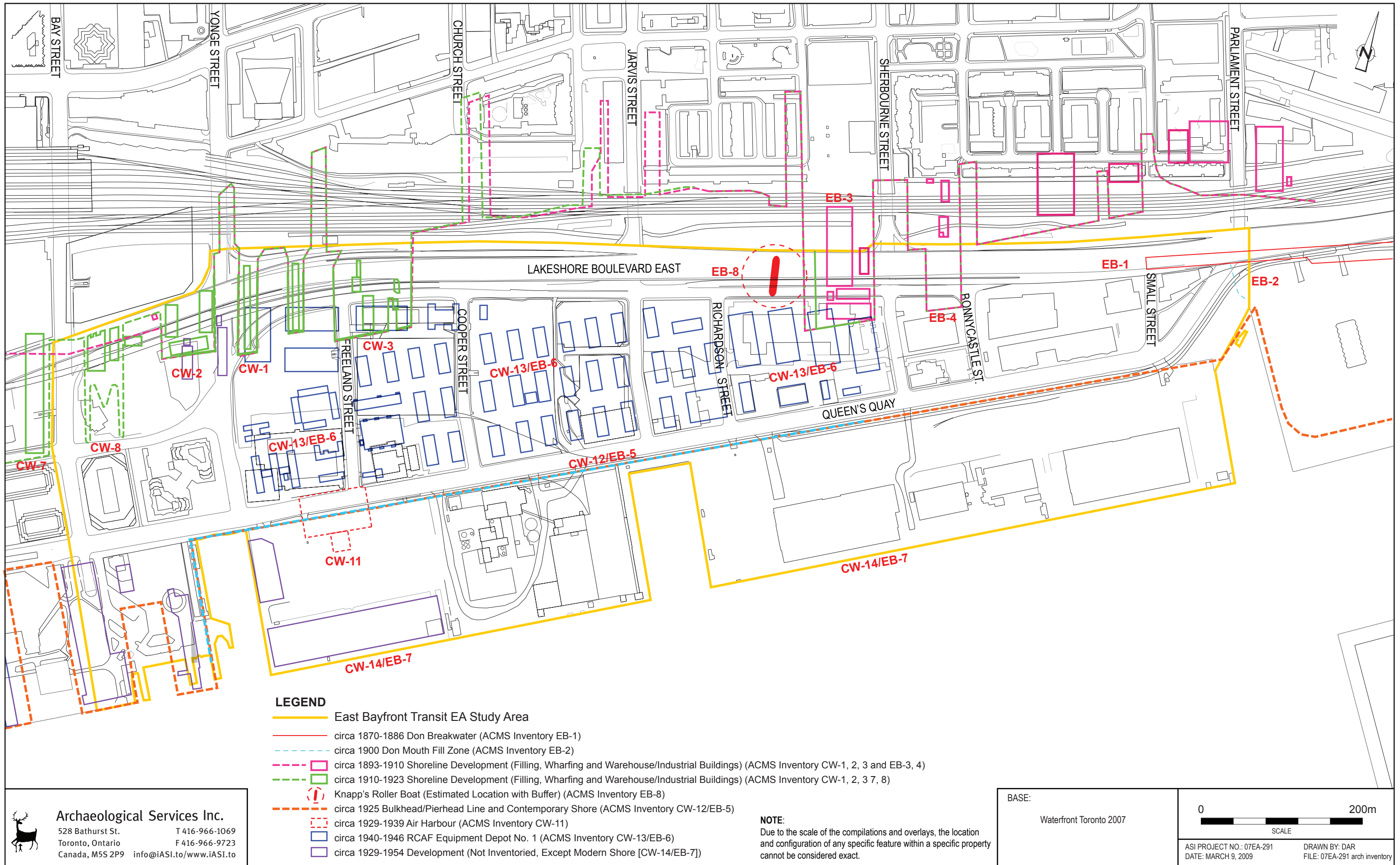


Figure 2: The East Bayfront Transit EA Stage 1 Archaeological Resource Assessment Study Area—Inventory of Features

In view of these constraints, the location or configuration of any feature relative to a particular parcel of land is only approximate, but is sufficient for the purposes of this study.

The mapping identifies both the features of potential archaeological interest—as established through the work of the *Archaeological Conservation and Management Strategy*, with particular focus upon those which fall within the study area (in whole or in part)—as well as a variety of more recent features that were formerly located within the study area.

The inventory of resources of potential archaeological interest consists of a total of nine complexes of features. These are:

- The head of the circa 1870-1886 Don Breakwater (ACMS Inventory EB-1);
- A small area of circa 1900 fill at the former mouth of the Don River (ACMS Inventory EB-2);
- The circa 1893-1910 shoreline, including various wharf and shorewall structures, lakefill to their landward sides and related industrial and warehousing buildings (ACMS Inventory CW-1, 2, 3 and EB-3 and 4);
- The circa 1910-1923 shoreline, including various wharf and shorewall structures, lakefill to their landward sides and related industrial and warehousing buildings (ACMS Inventory CW-1, 2, 3, 7 and 8);
- The probable final resting place of Knapp's roller boat (ACMS Inventory EB-8) (*see Appendix A*);
- The circa 1925 Bulkhead/Pierhead line and contemporary shorewall constructions (ACMS Inventory CW-12/EB-5);
- The circa 1929-1939 Air Harbour (ACMS Inventory CW-11);
- The circa 1940-1946 Royal Canadian Air Force Equipment Depot No. 1 (ACMS Inventory CW-13/EB-6); and
- The modern shore, established in the 1950s (ACMS Inventory CW-14/EB-7).

Summary descriptions of these features are provided in Table 2.



Table 2: Features within the East Bayfront Transit EA Study Area Inventoried as Part of the Waterfront Toronto *Archaeological Conservation and Management Strategy*

Resource/Feature	Description
Don Breakwater (EB-1)	During much of the late nineteenth century, the city spent considerable energy in addressing the issue of silting at the mouth of the Don. In 1870, a long, timber crib breakwater was built on the south side of the river—roughly at the foot of Cherry Street into the harbour to a point below Berkeley Street. By 1878, the <i>Globe</i> noted that the Don channel still needed to be frequently dredged. The structure was in ruins by 1886. Deeply buried remains may survive, although it is highly unlikely that the cribbing forms a continuous feature.
Shoreline Fill Zone (EB-2)	To the immediate south of the head of the Don Breakwater lies a small area of circa 1900 made land associated with the re-engineering the mouth of the Don River.
circa 1893-1910 shoreline	<p>CW-1: The heads of the Yonge Street Wharf (also known as Wharves 21 and 22) extend south of Lakeshore Boulevard into the study area. The complex, which is the successor of the earlier Milloy’s wharf located further north, consisted of two piers flanking a wide slip. These sections of the wharf date between circa 1893 and circa 1925, with the Wharf 21 pier being the earlier of the two. A warehouse-type structure ran much of the length of both piers. The site was subsumed by lake fill between 1926 and 1928. Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills.</p> <p>CW-2: The head of the City Wharf (also known as Wharf 20) extends south of Lakeshore Boulevard into the study area. This section of the wharf dates between circa 1893 and circa 1925. Up to three structures occupied the end of the wharf. The site was subsumed by lake fill between 1926 and 1928. Any surviving remnants of this structure were destroyed by construction of a condominium tower in 2004-2005.</p> <p>CW-3: The head of the Toronto Electric Light Co. Wharf (also known as Wharves 23-25) extends south of Lakeshore Boulevard into the study area. The earliest portion of this section of the wharf dates to circa 1893 (Wharves 23-24). The complex was expanded to the east between circa 1903 and 1910 (Wharf 25). Up to two structures occupied the end of the wharf. The site was subsumed by lake fill between 1926 and 1928. Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.</p> <p>EB-3: The head of the Polson’s wharf (also known as Wharves 36 and 37) on the site of Polson’s Iron Works, extends approximately 40 metres south of Lakeshore Boulevard into the study area. This portion of the wharf is associated with the expansion of the iron works complex that occurred between 1903 and 1910. Three buildings are</p>



Table 2: Features within the East Bayfront Transit EA Study Area Inventoried as Part of the Waterfront Toronto *Archaeological Conservation and Management Strategy*

Resource/Feature	Description
	<p>shown occupying the extreme end of the wharf on the 1910 Goad's Atlas. They do not appear on the 1923 edition, by which time the firm had gone bankrupt. The site was cleared and subsumed by lake fill between 1926 and 1928. Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.</p> <p>EB-4: The head of the City Corporation wharf (also known as Wharves 38 and 39) extends approximately 20 metres south of Lakeshore Boulevard into the study area. This section of the wharf dates between 1903 and 1910. The principal purpose of this facility was to carry street sweepings for dumping at the Toronto Islands. In 1906, the Polson Iron Works purchased this property to expand their shipbuilding facilities. According to available map sources, no structures were located at the extreme end of the wharf. The site was subsumed by lake fill between 1926 and 1928. Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.</p>
<p>circa 1910-1923 shoreline</p>	<p>CW-1: see above</p> <p>CW-2: see above</p> <p>CW-3: see above</p> <p>CW-7: The heads of Harbour Square Wharf (also known as Wharves 18 and 19) extend south of Lakeshore Boulevard into the precinct study area. The wharf was completed by 1903. Two structures extended along the east and west edges of the pier. The west side of the wharf was badly damaged by the burning of the steamer White Star in 1903. Although it was proposed that the area occupied by the wharf be used as a park, it instead became the site of the Harbour Commission Office. The site was subsumed by lake fill between 1926 and 1928. Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.</p> <p>CW-8: The heads of the Toronto Ferry Terminal wharves extend south of Lakeshore Boulevard into the study area. The complex was built between 1903 and 1910. The structure featured two central slips with</p>



Table 2: Features within the East Bayfront Transit EA Study Area Inventoried as Part of the Waterfront Toronto *Archaeological Conservation and Management Strategy*

Resource/Feature	Description
Knapp's Roller Boat (EB-8)	multiple berths. A terminal building, freight shed and coal storage areas were located on the wharf. The wharf first appears in the 1893 edition of the Goad's Atlas, although it is shown only incompletely. The Atlas of 1910 shows that three large storage houses and two ancillary structures were located on the wharf. The latter buildings had been removed by the time of the compilation of the 1923 edition. The vast majority of the structure was destroyed by construction of a condominium tower in 2007. This work was subject to archaeological monitoring (ASI 2007).
Bulkhead/Pierhead Line (CW-12/EB-5)	Circa 1925 limit of lake fill operations between Yonge and Berkeley streets. The feature was built using timber piles driven to bedrock and joined by waling and was faced, on the south side, with sheet piling which also extended to bedrock depth. Steel rods that were run to anchor piles on the inland side were used to reinforce the structure. The waters to the south of this structure were filled between the 1930s and 1950s. Substantial portions of the feature may be expected to have survived. It is probable that roughly contemporary secondary fill retaining structures, sewage outfall features, etc. survive to the north of the Bulkhead Line.
Air Harbour (CW-11)	Seaplane base for mail and passenger traffic located at the foot of Freeland Street. The facility originally opened in 1929, but closed two years later due to a combination of high costs and low levels of use. It was reopened in 1934 and operated until 1939 when it was superseded by the Toronto Island Airport. Its facilities included a 100x36 foot wooden ramp, floating docks, and buildings for passengers, customs and immigration, all of which were demolished when the site went out of use (Stinson and Moir 1991).
Royal Canadian Air Force Equipment Depot No. 1 (CW-13/EB-6)	1940-1946 military base. The majority of the 65 buildings that made up the base were temporary frame-built structures that were removed after the war.



4.0 RESOURCE EVALUATION

4.1 Identified Resource Evaluations

In order to assess the potential archaeological significance of any material remains associated with the inventoried features, it is necessary to evaluate their character and the likely contribution that any detailed archaeological investigations of these sites may be expected to provide.

The first comprehensive archaeological evaluation system for the Toronto waterfront was developed in the 1980s by Historica Research Limited for “Railway Lands Precinct A,” which consisted of major portions of the lands between Spadina Avenue and Yonge Street, and the railway lines and Lakeshore Boulevard (HRL 1986). This system was adapted from the Toronto Historical Board’s evaluation process for built heritage features and involved the definition of a series of overlapping evaluation criteria, to be applied on a case-by-case-basis, to rank sites according to their relative significance.

In the subsequent 20 years, the basic evaluation criteria were used, with slight modifications, in numerous studies carried out along portions of the waterfront between Bathurst Street and the Don River, for both large-scale, broad-brush reviews and detailed, property-specific studies (e.g., ASI and HRL 1992, 2004; HHI 1994; HRL 1989). The criteria, which were refined for the *Waterfront Toronto Archaeological Conservation and Management Strategy* (ASI et al. 2008), consist of the following:

Site/Feature Type: the site/feature is illustrative of patterns of cultural, political, military, economic or industrial history (e.g., an industry typical of a particular activity in Toronto).

Site/Feature Integrity: the degree to which a site/feature has been physically altered or disturbed. The integrity of the site/feature will affect the importance of the feature type.

Age: importance of sites/features is often based upon arbitrary time periods (e.g., pre-1850). Nevertheless, age alone is not a criterion of significance; it must be combined with another characteristic. A relatively unique twentieth-century site/feature for which little documentation exists, for example, may be important. Conversely, an older site/feature which is typical of numerous others may be relatively unimportant.

Historical Importance: the site/feature is associated with a person, or group of people, of local, provincial, national or international importance; or associated with an event or process of local, provincial, national or international importance. This may include a short time period, such as a military battle, or an activity that occurred over a long time period. A process may include manufacturing, repair or servicing that form an integral part of the design of a structure.

Landscape Setting: applies to sites/features manifested as visible ruins or earthworks. The removal of the ruin or earthworks, even if fully documented, or changes to the surrounding landscape, may modify society's perception of the area. This type of feature would be a landmark; one that forms an essential part of a distinctive skyline; or defines or terminates a vista.



Quality of Documentary Material: applies only to large scale features that cover large areas (e.g., cribbing). If good quality drawings, illustrations and written records are available or other portions of the feature have been subject to archaeological investigation and recording, little additional *new* or *non-redundant* information may be obtained from the archaeological investigation of the feature. If, however, little documentation exists, or it is contradictory, physical examination may be necessary.

Consideration of these basic criteria were used to assign significance ratings for individual features to one of four basic categories:

- **Grade 1:** Historically significant feature for which field work (e.g., archaeological test excavations, possible mitigation) is recommended.
- **Grade 2:** Historically important feature for which limited archaeological fieldwork (monitoring) is recommended. This grade also applies to sites that would otherwise be ranked as Grade I, but cannot be mitigated as such for technical reasons or because of economic constraints.
- **Grade 3:** Feature of little historical significance, or for which the significance is not apparent; no form of mitigation or monitoring is necessary.
- **Grade 4:** Lakefill within Toronto Harbour.

For a variety of logistical and administrative reasons, subsequent practice has seen this system reduced to two levels of significance in day-to-day practice along the waterfront: those resources that require some form of Stage 4 mitigation (typically monitoring), and those that do not. Coincidentally, this situation is mirrored, in some respects, by the generic significance evaluation process outlined in the Ministry of Culture's 2006 draft *Standards and Guidelines for Consultant Archaeologists*, even though this document is focused largely on the archaeological assessment process in rural/greenfield contexts (and the site types encountered in those settings) and generally assumes that the evaluation exercise for specific identified archaeological resources will not be carried out until the completion of at least Stage 2 of the overall assessment process.

The Ministry of Culture system (MCL 2006a: Unit 1E) divides the evaluation criteria to be considered into three basic categories: information value, community value and value as a public resource.

Information value refers to the likelihood that investigation of a site will contribute to an increased understanding of the past. Such an assessment must be carried out through consideration of several major criteria: the degree to which a site will contribute to our understanding of the past (its cultural, historical and scientific value); the relative rarity or ubiquity of similar sites locally or regionally; the site's productivity or richness in terms of the artifacts it contains; and the degree to which the site has been disturbed by more recent land uses or natural processes.

Value as a public resource refers to the degree that a site will contribute to an enhanced understanding and appreciation of Ontario's past on the part of the general public.



Value to a community refers to whether or not the site has intrinsic value to a particular community, First Nation or other group.

It seems that consideration of these criteria is also expected to lead to a comparatively straight-forward “yes/no” decision; either the archaeological resource is of “high heritage value or interest” (i.e., significance) and requires further investigation and/or mitigation, or it is of “low or no heritage value or interest” and does not require further action.

Although there are differences in terminology and organization between the criteria outlined in the original HRL Toronto waterfront system and the generic system presented in the Ministry of Culture’s 2006 *Draft Standards and Guidelines for Consultant Archaeologists*, the fundamental criteria and the concepts behind them are, essentially, the same. Likewise, there is also overlap between the HRL system and that presented in the Ministry of Culture’s *Ontario Heritage Tool Kit: Heritage Property Evaluation* document (MCL2006b:23).

The evaluation of the archaeological significance of the potential resources identified in the present inventory follows the same general outline originally developed by Historica Research Limited for the central Toronto waterfront, with the following modifications, which reflect the refinements introduced through the *Waterfront Toronto Archaeological Conservation and Management Strategy*:

- The ranking of a particular resource as either Grade 1, 2 or 3 should be regarded as a statement concerning its potential *archaeological* significance, rather than its overall *historical* significance, as expressed in the original Historica Research Limited-based system. This is a subtle, but important, distinction. While a feature may be of relatively high historical significance in the development of the waterfront, its archaeological investigation may not lead to any new insights into its character or function, or have any meaningful role in any effort to preserve, commemorate and interpret any surviving physical remains of the site.
- The *Quality of Documentation* criterion has not been used in this exercise. The inventory compilation has not entailed the extensive research that would be carried out for a Stage 1 Archaeological Assessment of a specific property or site. Thus the necessary data to permit a sound evaluation of the physical character—or extent of the documentation that is available—for individual features is lacking. This hinders the development of any research questions that archaeology is particularly well-suited to addressing.
- The Grade 4 category, which included lakefills of all types, has not been utilized, as such materials, in and of themselves, are not considered to be archaeological resources.

Each resource within the inventory has been ranked on a scale of 0 to 5 points for each significance criterion, to arrive at a total score out of a possible total of 25 points. The results are presented in Table 3.



Table 3: Summary of Features and Significance Evaluations

Inventory No.	Feature/Resource	Summary Description	Significance Evaluation Criteria (Each criterion rated on a scale of 0-5)							Total Score	Significance Ranking and Recommended Action	Comments
			Feature Type	Feature Integrity	Age	Historical Importance	Landscape Setting	Quality of Documentation				
EB-1	Don Breakwater	The head of the 1870 breakwater built at the mouth of Don.	3	3	3	2	0	—	11	Grade 2: Documentation during construction monitoring.	Deeply buried remains may survive, although it is highly unlikely that the cribbing forms a continuous feature.	
EB-2	Shoreline Fill Zone	Small area of circa 1900 made land associated with the re-engineering the mouth of the Don River.	1	2	1	1	0	—	5	Grade 3: No archaeological action required.		
CW-1	Yonge Street Wharf	The head of the City Corporation wharf (also known as Wharves 21 and 22).	3	3	3	2	0	—	11	Grade 2: Documentation during construction monitoring.	Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.	
CW-2	City Wharf	The head of the City wharf (also known as Wharf 20).	3	0	3	2	0	—	8	Grade 3: No archaeological action required.	No remains of this wharf survive.	
CW-3	Toronto Electric Light Co. Wharf	The head of the Toronto Electric Light Co. wharf (also known as Wharves 23, 24, and 25).	3	3	3	2	0	—	11	Grade 2: Documentation during construction monitoring.	Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.	
EB-3	Polson Iron Works	The head of the Polson's wharf (also known as Wharves 36 and 37).	3	3	3	4	0	—	13	Grade 2: Documentation during construction monitoring.	Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.	
EB-4	City Corporation Yard	The head of the City Corporation wharf (also known as Wharves 38 and 39).	3	3	3	2	0	—	11	Grade 2: Documentation during construction monitoring.	Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.	
CW-7	Harbour Square Wharf	The head of the Harbour Square wharf (also known as Wharf 20).	3	3	3	2	0	—	11	Grade 2: Documentation during construction monitoring.	Substantial portions of the foundation cribs may be expected to have survived. It may be assumed that the wharf featured timber cribbing ballasted with rock and miscellaneous fills. It is less likely that remains of the superstructure (i.e., the active working surface of the facility) are preserved.	
CW-8	Toronto Ferry Terminal Wharf	The head of the Toronto Ferry Terminal wharf (also known as Wharf 20).	3	0	3	2	0	—	8	Grade 3: No archaeological action required.	No remains of this wharf survive.	
EB-8	Knapp's Roller Boat	The buried remains of Knapp's Roller Boat most likely lie to the north of the precinct study area, beneath Lakeshore Boulevard and the Gardiner Expressway.	4	1	3	3	0	—	11	Grade 2: Documentation prior to and possibly during construction monitoring.	Given the reconstructed location of the ship's remains, the only opportunity for investigation appears to be a remote sensing survey on the adjacent portions of the 215 Lakeshore Boulevard East property and possibly monitoring of any construction excavations there during the course of redevelopment.	
CW-12/EB-5	Bulkhead/Pierhead Line	Circa 1925 limit of lake fill operations between Yonge and Berkeley Streets.	1	3	1	1	4	—	10	Grade 3: No archaeological action required.	Substantial portions of the feature may be expected to have survived. It is probable that roughly contemporary secondary fill retaining structures, sewage outfall features, etc. survive to the north of the Bulkhead Line. From an archaeological perspective, none of these features are considered to be of potential high heritage value.	
CW-11	Air Harbour	1929-1939 seaplane base.	3	3	1	2	0	—	9	Grade 3: No archaeological action required.	From an archaeological perspective, none of these features are considered to be of potential high heritage value.	
CW-13/EB-6	Royal Canadian Air Force Equipment Depot No. 1	1940-1946 military base.	3	2	1	2	0	—	8	Grade 3: No archaeological action required.	While subsurface remains of this occupation may survive within portions of the study area, archaeological remains of this period of the precinct's history are not considered to be of potential high heritage value.	

Features that score 10 points or less are assigned a Grade 3 ranking (no form of mitigation or monitoring is considered necessary). Six features have been ranked as Grade 3: the Don Rivermouth fill zone (EB-2); the City Wharf (CW-2); the Toronto Ferry Terminal Wharf (CW-8); the Bulkhead/Pierhead Line (CW-12/EB-5); the Air Harbour (CW-11); and the RCAF Equipment Depot (CW-13/EB-6). Of these, portions of the Bulkhead/Pierhead Line and the Air Harbour fall within the Queen's Quay right-of-way in areas that may be impacted by construction of the tunnel portions of the streetcar line.

Those that score from 11 to 17 are assigned a Grade 2 ranking, for which limited archaeological fieldwork (monitoring) is recommended. Seven features have been ranked as Grade 2: the portion of the Don Breakwater (EB-1) that extends into the study area; the heads of the Yonge Street (CW-1), Toronto Electric Light Co (CW-3), Polson Iron Works (EB-3), City Corporation (EB-4) and Harbour Square (CW-7) wharves associated with the development of the waterfront; and any surviving remains of Knapp's roller boat (E-8), which most likely lies to the west of Polson's wharf. None of these features lie within the Queen's Quay right-of-way, although remains of the Don Breakwater may be impacted by any future extension of the streetcar line further east, should such an extension follow Lakeshore Boulevard and involve construction of relatively deep subsurface infrastructure.

Finally, Grade 1 resources (for which archaeological test excavations and possible mitigation efforts are necessary) are those that score 18 or higher. No feature within the study area has been assigned a Grade 1 ranking.

5.0 EXISTING CONDITIONS AND ARCHAEOLOGICAL POTENTIAL

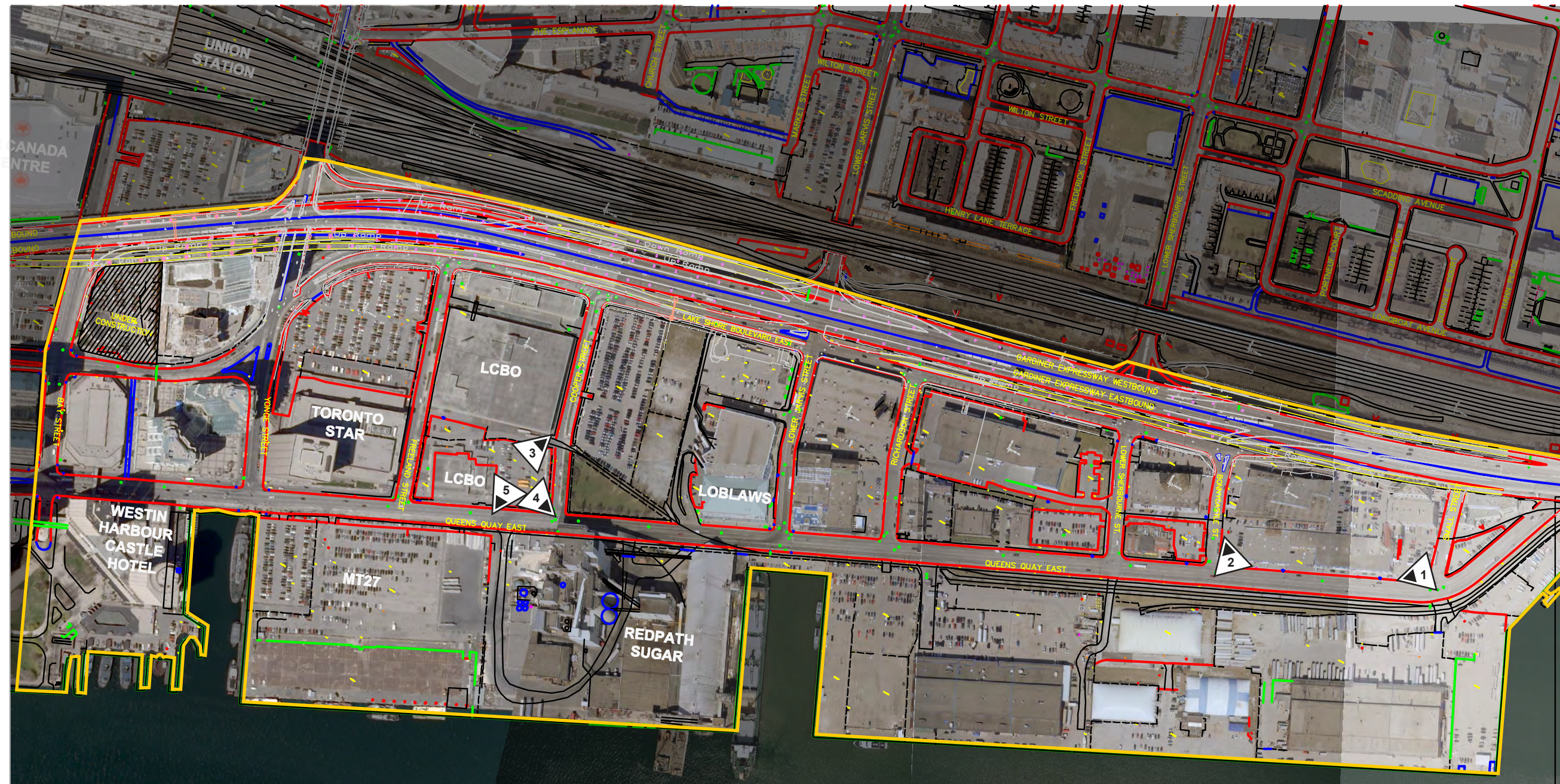
The study area is entirely comprised of late nineteenth- through mid-twentieth-century made lands. As noted in Section 2.1, there is no potential for the survival of precontact Aboriginal archaeological resources.

The majority, if not all, of the inventoried features ranked as Grade 2 resources are likely to occur only as deeply buried remains. Surface conditions in this context are not a particularly reliable or useful indicator of underlying conditions with respect to archaeological integrity or potential. Thus this discussion does not rely on a detailed field review process, as described in the Ministry of Culture's 2006 draft *Standards and Guidelines for Consultant Archaeologists* (MCL 2006a), since such a review would be largely redundant and not especially informative.

At present, the lands that make up the study area are variably built-upon (Figure 3). Existing structures are either built as slab-on-grade or are supported by piles driven to bedrock. Substantial portions of the study area are taken up by parking lots. The various roads that traverse the study area are underlain by services such as sewers, water, etc. Other forms of infrastructure, such as underground storage tanks, etc. may be expected throughout the area.

The upper portions of the wharf features may be expected to occur at and below an elevation of approximately 75 metres ASL (the former median lake level), roughly two metres below the current grade (~77 metres ASL) of the area. It is unlikely that any portions of the cribwork that extended above the





1 View East from Small Street along Queen's Quay



2 View North along Bonnycastle Street from Queen's Quay



3 View Northeast across Cooper Street



4 View Southeast across Cooper Street



5 View Southwest across Queen's Quay at Cooper Street



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— EAST BAYFRONT TRANSIT PRECINCT EA STUDY AREA



LOCATION AND ORIENTATION OF PHOTOGRAPH

BASE:
 McCormick Rankin 2009



ASI PROJECT NO.: 07EA-291
 DATE: MARCH 9, 2009
 DRAWN BY: DAR
 FILE: 07EA-291 existing cond.

Figure 3: The East Bayfront Transit EA Stage 1 Archaeological Resource Assessment Study Area—Existing Conditions

waterline or the superstructures that it carried have survived. In terms of their overall general construction, the cribs are likely to be comparable to other late nineteenth-early twentieth century waterfront structures that have been documented in the City of Toronto, although, as is always the case, minor variations in design, materials and construction techniques are to be expected.

With respect to Knapp's roller boat, it appears to have been stranded on lakebed that varied from between 7 to 14.8 feet (2.1-4.5 metres) in depth at the bow, and 15.7 to 15.9 feet (4.8 metres) at the stern (see Appendix A), suggesting that any surviving remains may be buried by approximately 13 to 23 feet (3.9-7.0 metres) of fill.

As noted previously, none of the Grade 2 resources are expected to occur within the Queen's Quay right-of-way, which is to be the focus of the proposed streetcar line.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Stage 1 Archaeological Resource Assessment of the East Bayfront Transit Precinct between Bay Street, Lakeshore Boulevard, Parliament Street and Lake Ontario in the City of Toronto has determined that no registered archaeological sites are located within the study area limits and that the entire area consists of lands created through lakefilling operations in the late nineteenth through mid-twentieth-centuries.

The research determined that nine complexes of features of potential archaeological interest occur within the study area. These are:

- The head of the circa 1870-1886 Don Breakwater;
- A small area of circa 1900 fill at the former mouth of the Don River;
- The circa 1893-1910 shoreline, including various wharf and shorewall structures, lakefill to their landward sides and related industrial and warehousing buildings;
- The circa 1910-1923 shoreline, including various wharf and shorewall structures, lakefill to their landward sides and related industrial and warehousing buildings;
- The probable final resting place of Knapp's roller boat ;
- The circa 1925 Bulkhead/Pierhead line and contemporary shorewall constructions;
- The circa 1929-1939 Air Harbour;
- The circa 1940-1946 Royal Canadian Air Force Equipment Depot No. 1; and
- The modern shore, established in the 1950s.

These features have been evaluated according the criteria utilized in Waterfront Toronto's *Archaeological Conservation and Management Strategy*, resulting in the determination that the portion of the Don Breakwater that extends into the study area; the heads of the Yonge Street, Toronto Electric Light Co., Polson Iron Works, City Corporation and Harbour Square wharves and any surviving remains of Knapp's roller boat represent resources of Grade 2 archaeological significance. None of these features fall within the Queen's Quay right-of-way in which development of the streetcar line is expected to occur, although remains of the Don Breakwater may be impacted by any future extension of the streetcar line further east,



should such an extension follow Lakeshore Boulevard and involve construction of relatively deep subsurface infrastructure.

The remaining features are considered to be of Grade 3 significance. These include the Don River mouth fill zone; the City Wharf (no longer extant); the Toronto Ferry Terminal Wharf (no longer extant); the Bulkhead/Pierhead Line; the Air Harbour; and the RCAF Equipment Depot (CW-13/EB-6). No further archaeological action is required with respect to these features.

In light of these considerations, the following recommendations are made:

1. Should public transportation improvements within the East Bayfront Transit Precinct require impacts in the locations of the identified Grade 2 resources, and should these impacts extend to such depths that these features are likely to be impacted (i.e., 2.0 metres below grade), then this work should be subject to archaeological monitoring. If such impacts will not occur, then there are no further archaeological concerns with respect to those portions of the feature located within the study area.

Should archaeological monitoring be required, such a program should proceed whereby the site is visited on a regular basis to inspect the progress of the excavations and to document, through photography and the preparation of measured drawings, any significant exposed features that exhibit notable design or construction attributes. In the absence of an archaeological monitor on site, any significant feature encountered during the excavations should be preserved intact for a period of 24-48 hours to allow a licensed archaeologist to visit the site and record its salient attributes.

It should be noted that given the depths at which the Grade 2 features are anticipated, the feasibility of monitoring is, to a large degree, dependent upon the scale of the construction excavations.

It should be further noted that the Ministry of Culture classifies construction monitoring as a Stage 4 archaeological assessment activity, subject to the requirements of the 2006 *Standards and Guidelines for Consultant Archaeologists* (MCL 2006a: Unit 1H).

2. The balance of the East Bayfront Transit Precinct study area as depicted in Figures 1-3, including the identified Grade 3 features, may be considered clear of further archaeological concern.

The following conditions also apply:

- In the event that deeply buried archaeological remains are found on the property during construction activities, the consultant archaeologist, Heritage Preservation Services (Policy and Research Division, City Planning), and the Regional Archaeological Review Officer, Culture Programs Unit, Ontario Ministry of Culture should be notified immediately.



Cemeteries Regulation Unit of Ministry of Government and Consumer Services, Consumer Protection Branch (1.800.889.9768).

The documentation related to this archaeological assessment will be curated by Archaeological Services Inc. until such a time that arrangements for their ultimate transfer to Her Majesty the Queen in right of Ontario, or other public institution, can be made to the satisfaction of the project owner(s), the Ontario Ministry of Culture, and any other legitimate interest groups.



7.0 REFERENCES CITED

- Anderson, T. W. and C. F. M. Lewis
1985 Postglacial Water-Level History of the Lake Ontario Basin. In *Quaternary Evolution of the Great Lakes*, edited by P.F. Karrow and P.E. Calkin, pp. 231-253. Geological Association of Canada Special Paper 30.
- ASI (Archaeological Services Inc.)
2007 Documentation of Twentieth Century Cribbing at 33 Bay Street, TE SPC 2003 0010, City of Toronto, Ontario. Report on file, Heritage Operations Unit, Ontario Ministry of Culture, Toronto and Heritage Preservation Services, City of Toronto Planning Department, Toronto.
- ASI and HRL (Archaeological Services Inc. and Historica Research Limited)
1992 Report on a Background Assessment of Heritage Features of the Railway Lands West, City of Toronto. Report on file, Ontario Ministry of Culture, Toronto.
2004 Stage 1 Archaeological Assessment of the East Bayfront, West Donlands and Portlands Areas, City of Toronto. Report on file, Ontario Ministry of Culture, Toronto.
- ASI et al. (Archaeological Services Inc, Historica Research Limited, The Tourism Company and Maltby & Associates Inc.)
2008 Waterfront Toronto Archaeological Conservation and Management Strategy. <www.waterfronttoronto.ca>
- Chapman, L.J., and D.F. Putnam
1984 *The Physiography of Southern Ontario*. Ontario Geological Survey, Special Volume 2. Ministry of Natural Resources, Toronto.
- Goad, C.E.
1880 *Goad's Atlas of the City of Toronto*. Sheet 9 (1884-1923 editions see sheet 29). Charles E. Goad, Toronto.
- Gravenor, C.P.
1957 *Surficial Geology of the Lindsay-Peterborough Area, Ontario, Victoria, Peterborough, Durham, and Northumberland Counties, Ontario*. Memoir 288. Geological Survey of Canada, Ottawa.
- HHI (Historic Horizon Inc.)
1994 A Heritage Assessment of Block 37, Part of the Railway Lands, Toronto, Ontario. Report on file, Ontario Ministry of Culture, Toronto.
- HRL (Historica Research Limited)
1986 Railway Lands Precinct A Environmental Report: Heritage. Report on file, Historica Research Limited, London, Ontario.
1989 Heritage Assessment of Archaeological Features, Precincts 1,3,4,5 and 6, Southtown Development, Toronto. Report on file, Ontario Ministry of Culture, Toronto.
- Karrow, P.F.
1967 *Pleistocene Geology of the Scarborough Area*. Ontario Geological Survey Report 46. Ministry of Natural Resources, Toronto.
- Karrow, P.F., and B.G. Warner
1990 The Geological and Biological Environment for Human Occupation in Southern Ontario. In *The Archaeology of Ontario to A.D. 1650*, edited by C.J. Ellis and N. Ferris, pp. 5-36. Occasional Publication 5. London Chapter, Ontario Archaeological Society, London.
- MCL (Ontario Ministry of Culture)
2006a Archaeology in Ontario Draft Standards and Guidelines for Consultant Archaeologists: Archaeological Fieldwork, August 2006. Ontario Ministry of Culture, Toronto.
2006b *Ontario Heritage Tool Kit: Heritage Property Evaluation. A Guide to Listing, Researching and Evaluating Cultural Heritage Property in Ontario*. Ontario Ministry of Culture, Toronto.
- Stinson, J. and M. Moir
1991 *Built Heritage on the East Bayfront*. Environmental Audit of the East Bayfront/Port Industrial Area Phase II, Technical Paper 7. Royal Commission on the Future of the Toronto Waterfront, Toronto.
- Weninger, J.M., and J.H. McAndrews
1989 Late Holocene Aggradation in the Lower Humber River Valley, Toronto, Ontario. *Canadian Journal of Earth Sciences* 26:1842-1849.



APPENDIX A: KNAPP'S ROLLER BOAT AND THE POLSON'S IRON WORKS

Introduction

The Knapp's Roller Boat is a feature that represents a "mobile" resource. For this reason, particular effort was devoted to reconstructing the likely final resting place of the vessel for the purposes of the *Waterfront Toronto Archaeological Conservation and Management Plan*. The results of this work are presented herein.

Polson's Iron Works

By the 1880s, railways in Toronto looked after the bulk of the city's transportation requirements, but the port still handled a large quantity of merchandise. The eastern wharves below the Esplanade were home to a number of port-related industries, including Polson's Iron Works, located between Frederick and Sherbourne streets from The Esplanade to just south of the current alignment of Lakeshore Boulevard (Figure A 1).

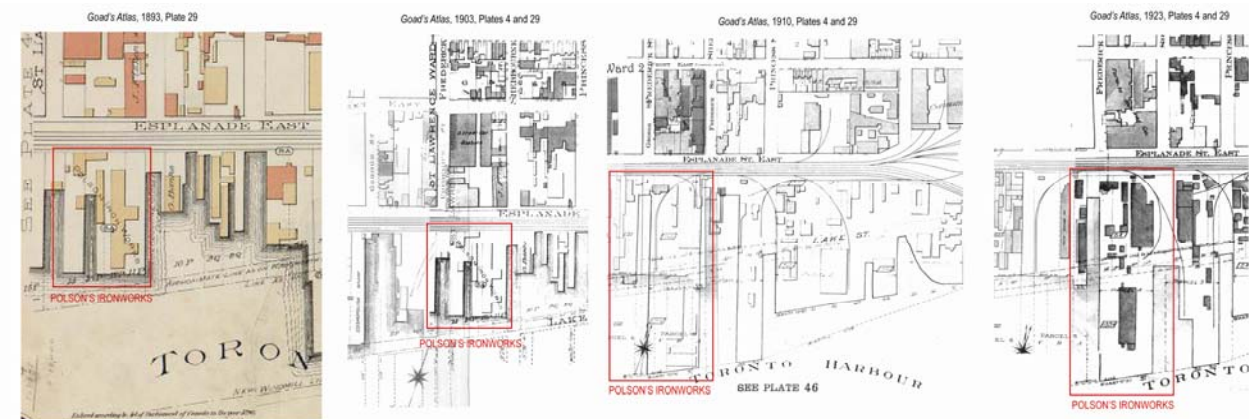


Figure A 1: The changing configuration of Polson's Iron Works as reflected in the Goad's atlases.

Founded in 1883 by father and son railway engineers, William and Franklin Bates Polson, the Polson Iron Works Company built an assortment of marine engines, boilers, and general-purpose motors, including the revolutionary Brown automatic engine. After establishing an Owen Sound shipyard in 1888, the firm became involved in the shipbuilding industry, producing several well-known vessels. The first of these, the passenger vessel *Manitoba*, was the first steamship built in Canada and was reputed to be the largest vessel afloat on fresh water when it was launched in May, 1889 (Stinson and Moir 1991).

Although the Owen Sound shipyard was operating at full production in the 1890s, the Polsons were caught in an economic depression and the company's bankrupt Toronto operation was purchased in 1893 by Frank and James Polson. At this time it appears that all shipbuilding operations were transferred from Georgian Bay to the shore of Lake Ontario. The 1893 and 1903 Goad's maps show the configuration of the site on two 430 foot (130 metre) wharves separated from one another by a slip. By 1907, the yards



employed around 500 men. The *Goad's Atlas* of 1910 shows an expanded and reorganized complex on a single wharf that took almost all of the shore between Frederick and Sherbourne streets and stretched from the rail lines of the Esplanade south approximately 1,050 feet (320 metres) into the harbour. These changes reflect, in part, the 1906 acquisition of the municipal wharf to the east of Frederick Street, the principal purpose of which had been to handle the transfer of street sweepings for dumping at the Toronto Islands.

The Polson Iron Works operation produced a variety of vessels, including launches, car ferries and passenger ferries such as the *Segwun* and the *Trillium*. In addition, the country's first home-built, steam-powered warship, the *Vigilant*, was built and launched at this site, as well as a number of hydraulic dredges.

At first, business was steady, as Toronto established itself as an early centre for the construction of steel-hulled ships on the Canadian side of the Great Lakes. However, overall, shipbuilding in Canada declined substantially after 1900 and the entire industry had difficulty competing with larger and more economical operations in the United States and the United Kingdom. Although construction of Navy trawlers and munitions freighters during World War I kept the company afloat (and even led to an expansion of existing yards) demand for their vessels disappeared with the 1918 armistice, and by March of 1919 the firm had declared bankruptcy (Stinson and Moir 1991). Much of the property lay dormant until the buildings were demolished and the site was subsumed by lake fill, mainly sand dredged from the harbour, between 1926 and 1928. Ironically, two of the dredges used in this operation, the Cyclone and Tornado had been built at the shipyard (Stinson and Moir 1991).

As noted in Section 3, the only portion of the Polson complex that falls within the study area is a roughly 40 metre long stretch that made up the extreme head of the wharf, and a short-lived building that stood on its surface circa 1910. Any remains within the study area other than the foundation cribs (that is those parts below the former waterline) are unlikely to have survived later developments, such as the existing building at 215 Lakeshore Boulevard East, the construction of which will have included driving hundreds of piles to bedrock. There is, however, greater potential for the survival of those portions of the site located north of the road and rail corridors, between Lower Sherbourne and Frederick Streets.

Knapp's Roller Boat

Polson's is perhaps best remembered for building the experimental "Knapp's Roller Boat." This unique cylindrical ship, designed by Prescott lawyer Frederick Knapp, was launched in 1897.

Knapp's Roller Boat has been described by one writer as perhaps the "most exotic Canadian invention ever conceived" (Peacock 1995b:36). This unique ship has been ordinarily referred to as Knapp's Roller Boat, but it was also named "Knapp's Barrel Boat" and derisively called "Knapp's Folly" by the press of 1899 (Anonymous, *Mail and Empire*, January 16, 1899).

The vessel was the invention of Frederick Augustus Knapp (1854-1942) of Prescott, Ontario. Knapp was the son of Van Rensselaer Knapp (1819-1890) and his wife Amelia Spencer (1828-1878), the descendants



of two Loyalist farming families who had settled in Augusta Township in Grenville County, in eastern Ontario. Knapp was educated at McGill University, and was a lawyer by profession and a hobbyist inventor (Peacock 1995b:33). It is unclear as to when, or how, Knapp became interested in the idea of the construction of this boat. It has been suggested that Knapp's idea sprang from his admiration for Queen Victoria:

It was a well-known fact that his queen refused to travel great distances by boat because of her predisposition to sea sickness. Now, if Knapp could invent a vessel that precluded the motions that brought on this distress, Her Majesty would agree to cross the Atlantic and pay a visit to her dominion in North America. While in Canada, she would no doubt request an audience with this remarkable boat's inventor. There could even be a knighthood in it for Knapp (Shaver 2007).

It is known that the basic idea for a Roller Boat was originally developed by an inventor named C. Baillairge in Quebec in the early 1850s. The plans for this vessel, known as "Baillairge's Marine Revolving Steam Express," were exhibited at the New York World's Fair of 1853 where it did not attract much attention "on account of its coming from such an end-of-the-world sort of place as Quebec" (Baillairge 1897:166). The idea was again taken up by a Messr. Bazin in France during the 1890s. This craft also proved to be unsuccessful during its sea trials, mainly due to engines of insufficient power. Bazin's ship only made a top speed of six or seven knots per hour instead of the expected thirty knots. A second cylindrical boat, invented by a Canadian named Charbonneau, was under construction at Montreal at the same time when Knapp's boat was on the stocks in Toronto (Anonymous, *Canadian Engineer* 3 1897:73).

Knapp made a prototype of his invention which worked satisfactorily, and he estimated that a proportionally full-sized boat could achieve 200 miles per hour. Knapp made a scale model of his invention which he took with him to Glasgow. Unfortunately, naval architects and industrialists there did not provide him with the necessary funding to construct his ship. In early 1897, an Ottawa financier named George Goodwin provided Knapp with \$25,000 for the construction of the first roller boat. Sometime during October of that year, Knapp received additional funding from the "Great Farini" who purchased an interest in any future company that Knapp might establish connected with the Roller Boat. By 1907, Farini owned a 15% interest in Knapp's invention and companies (Peacock 1995a:398, 401, 407; 1995b:33).

The "Great Farini" or Guillermo Antonio Farini was actually the stage name of William Hunt (1838-1928), who was born in Bowmanville. During his youth he displayed great feats of athleticism and daring. In the 1870s, he thrilled audiences with a tight-rope walk across the Niagara Gorge, much as Blondin had done during the late 1850s and early 1860s. Farini later went on to greater fame as the "Human Cannonball" in the Greatest Show on Earth. In later life, he became an explorer, author, botanist, painter and inventor. It has been suggested that Farini helped to redesign the Roller Boat and provided more powerful steam engines for the ship. He undoubtedly invested heavily in this enterprise, possibly as much as \$125,000, and he later acquired large blocks of company shares from Knapp in 1905. Between 1905 and 1907, Farini obtained British, Canadian and American patents for a tubular shaped boat, similar in design to the modified Roller Boat, which was strengthened with interior beams (Peacock 1995a:400, 406-407).



The ship itself (Figures A 2 and A 3) was an annular cylinder, made out of steel rings and heavy boiler plate, approximately 110 feet long and 22 feet in diameter. Each end tapered to a 12 foot width, which encased a 12 foot diameter inner cylinder. There was five feet of space between the inner and outer cylinders. Two, 150 horse-power steam engines and their boilers were located at either end of the ship on a 15 ton weighted platform. These engines powered a driving wheel which caused the outer shell of the ship to revolve. The engines, platform and inner cylinder were mounted on four separate driving wheels which kept them in a horizontal position and did not turn with the boat. Paddles about one foot in width were riveted to the exterior of the hull which assisted to propel the ship through the waves, although the drum was largely driven through the inertia of its own weight, which was an estimated 15,000 tons. A system of chains and rudders, or a lee board principal, was used as a steering mechanism at either end of the craft. Unfortunately for the engineers, the ship was steered from the unprotected, open ends of the craft which would have been unpleasant during stormy weather. The principal idea behind the ship was metaphorically compared to that of a squirrel which “might turn the cylinder in its cage” (Anonymous, *Canadian Engineer* 3 1897:73). Knapp hoped that under favourable conditions, this prototype would travel at the rate of one mile per minute on Lake Ontario.

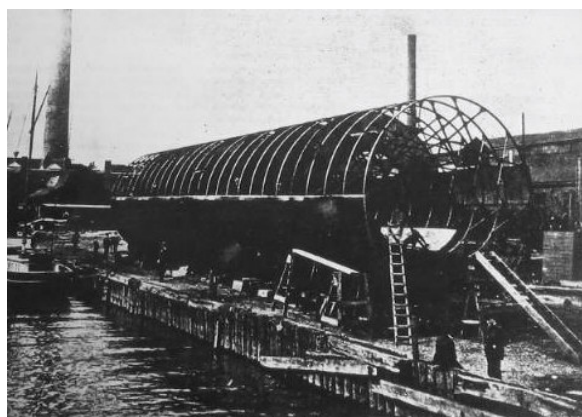


Figure A 2: The Roller Boat under construction at Polson's Iron Works during the summer of 1897.

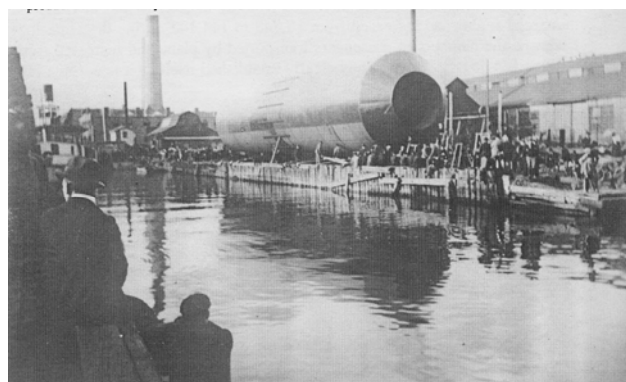


Figure A 3: The launching of Knapp's Roller Boat from the ways of Polson's Iron Works, September, 1897.

The ship was built on Toronto's lakeshore at the Polson Iron Works between Frederick and Sherbourne streets during the spring and summer of 1897. A photograph published in the *Canadian Engineer* magazine showed the ship under construction that year. One of the weaknesses inherent in Knapp's design was the lack of space available for passengers and crew, cargo and fuel storage. This short-coming, which later haunted the inventor, was pointed out by the *Canadian Engineer* 3 (1897:73). Knapp responded with his belief that less fuel was required by his design since the inertia of motion would keep the ship rolling over the waves. There were fears regarding the performance of the ship in rough weather: It seems ungracious to have to discourage a thing before its trial, but it is to be feared that Mr. Knapp has not made any mathematical calculations of the enormous force of a gale acting on the broadside of so large a drum elevated so largely out of the water, and he has evidently not considered that though his engines are to be 150 horse-power, their effective power will be limited to a proportion of their weight plus that of the framework, etc., in which they are set (Anonymous, *Canadian Engineer* 3 1897:73).



It was also noted that although each engine ran separately, if one failed it would effect the performance of the other engine and, consequently, that of the entire ship. In short, the Roller Boat “was doomed because it had no practical features” (Taws 1991).

The Roller Boat was launched into the harbour at the Polson Iron Works on September 8, 1897, but it did not take its maiden voyage until several weeks later on October 21st (Taws 1991). We know that those on board the Roller Board during this historic event included Knapp himself, G.A. Farini, the engineer Mr. Robinson, a shareholder named Mr. Serens and A.H. Jeffrey, who was an employee of the Polson Iron Works (“Knapp’s Roller Boat,” undated newspaper clipping; Peacock 1995b). On that first trial, the Roller Boat only achieved seven revolutions per minute. Although Knapp claimed that the vessel attained a speed of six miles per hour, eyewitnesses calculated it at half that rate, or three miles per hour. Afterwards, the paddles on the exterior were extended and a second trial in April 1898 produced a slightly faster speed (Anonymous, *Canadian Engineer* 7 1897:192; Peacock 1995b:33).

During all of the ensuing year 1898, the Roller Boat remained moored in Toronto Harbour. The reasons for this are unclear, although it is not unreasonable to suppose that during this time Knapp was engaged in the process of redesigning the ship and possibly searching for additional financial backers. It was during this period that Knapp established a joint stock company known as the “Knapp Ocean Navigation Company Limited” (Peacock 1995a:403). One of the design changes may have included reverting to Knapp’s original plan for a single engine to be mounted in the centre of the vessel.

During the Spanish-American War, which was fought during the spring and summer of 1898, Knapp proposed to construct a roller boat large enough to carry 30,000 troops and equipment between Florida and Cuba. “This action would ensure a victory over the Spanish troops who occupied the island and help in the liberation of Cuba” (Shaver 2007). These plans did not materialize.

During the late spring of 1899, Knapp decided to take the Roller Boat to Prescott where the design was to have been modified. Thereafter, it was hoped that the vessel would be used as an international ferry across the St. Lawrence River between Prescott and Ogdensburg, New York. The Roller Boat embarked on this voyage on June 9th, but unfortunately the steering mechanism malfunctioned and the ship ran out of fuel about 15 miles off shore at Pickering, near Frenchman’s Bay. Knapp and Farnini were obliged to row into Pickering for coal and then back out to the boat. The ship was restarted and managed to sail as far as Mann’s Point or Raby Point off Port Darlington near Bowmanville, where it ran aground again a few days later on June 12th. There the ship was moored to a tree until Knapp arranged to have it towed to Prescott by the Kingston Wrecking Company for its refitting (Peacock 1995a:404; 1995b:36; Taws 1991).

Knapp’s Tubular Boat

On September 26, 1902, the *Mail and Empire* reported that the former Roller Boat had arrived at the Brockville dock, after covering twelve miles in three hours (Anonymous, *Mail and Empire*, 1902). The design of the ship had been modified and the “roller boat” element eliminated so that it sailed like a regular ship (Figure A 4). The over-all length was extended to 118 feet, with a diameter of 22 or 23 feet. The single engine had been removed from the centre of the ship to the stern, with a single screw propeller



and steering gear. The space between the inner and outer hull had been divided into compartments for carrying from between 700 to 800 tons of freight. It was described as resembling a “whaleback” or “pontoon.” Knapp estimated that it would cost about \$12,000 to construct what was then referred to as “Knapp’s Tubular Boat.” Plans were afoot to sail the vessel to Sydney, Nova Scotia, “where the projector of his barge system is trying to start a shipbuilding industry to manufacture these freight barges.”



Figure A 4: The Roller Boat undergoing renovations, possibly those of 1902. Note the exterior paddles had been extended along the entire length of the hull, although by 1902 the roller function was abandoned.

It appears that the Tubular Boat remained moored for an entire season along the St. Lawrence, but in August 1904 it was towed back to Toronto. There, the design of the ship was to have been modified yet again at Bertram’s Shipyard Docks. The vessel “is rather a dilapidated looking craft. Her plates are rusty in spots, while her engines look rather the worse for her long idleness.” She was to have twin screws installed and the ends enclosed in steel. Part of the hull was to be opened up, with a deck and pilot houses built at the bow. “The accommodations for her officers and crew will be in the dome of the cylinder” (Anonymous, *Daily Star*, August 10, 1904; Peacock 1995a:406).

It is unclear as to where the Tubular Boat sailed during the next few years, although the newspapers reported that she successfully ran the Lachine Rapids and made several trips to Montreal. It was brought back to Toronto from Kingston in the autumn of 1906, where the ship was again radically reconstructed. The new Tubular Boat measured 242 feet long and was given a “cigar” or “pig nose” (Figure A 5) The lower plates were made of heavier gauge than the upper ones, and cement was poured into her for ballast. This was thought to enable her to “cut through the roughest weather without a roll” at an expected 14 knots an hour. The reporter noted that she “looks like a long tub as she lies at the Polson Iron Works docks.” The refurbishing would cost an estimated \$45,000, and she was expected to transport either coal for the Eastern Coal Company or oil between Lake Erie ports via the Welland Canal and Toronto (Anonymous, *Evening Telegram*, July 6, 1907).

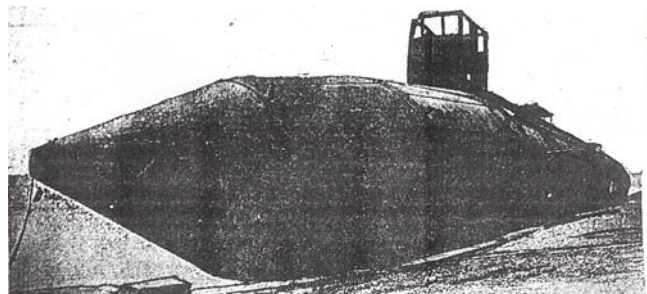


Figure A 5: The remodelled boat in 1907.

It was later reported that the vessel “never carried freight out of the Port of Toronto. With but an occasional lonely ramble around the Bay on dark and stormy nights, she lay at Polson’s dock until 1908” (“Knapp’s Roller Boat,” undated newspaper clipping).



Sometime in 1908, the Tubular Boat collided with a laker named the *Turbinia*, which caused an estimated \$250 in damages. On November 25th of that year, the Tubular Boat was sold at auction for \$595 to pay for these damages. The fittings were sold for \$295 and the hull for \$300, a mere fraction of the total building and refurbishing costs of the original Roller Boat (Anonymous, *Evening Telegram*, November 25, 1908; Peacock 1995a:408).

It has been erroneously reported that Knapp's boat sank in 1908, and was then scrapped for the war effort during the First World War (Taws 1991).

Correspondence from the Polson Iron Works stated that while at their docks for repairs "she broke loose and drifted to the Toronto Electric Light dock where she was tied up." This business was located on the lakeshore at the foot of Church Street. "From there she broke away and drifted to her present position," which was partly on the Polson property and partly on that of the Canadian Pacific Railway. Polson's Iron Works claimed that since the vessel was "in the hands of the Admiralty Court, we have therefore nothing whatever to do with this boat." The manager of Polson's further requested that the Harbour Commissioners remove the boat since "we intend to launch a big car ferry early this spring and are afraid that the suction will either draw the roller boat into the deep cut to the east of her and damage the car ferry, or block the channel." The Commissioners concluded that since the boat was in Polson's charge, "I cannot see that it devolves upon the Harbor Commissioners to undertake to have it removed" (Polson 1915).

Photographs were taken of the Roller Boat or Tubular Boat where she lay at the Polson Iron Works dock in September-October 1914 (Figures A 6 and A 7) and again in September-October 1915. The Tubular Boat is clearly shown along side the car ferry Ontario in a photograph taken on September 22, 1915 (Figure A 8).

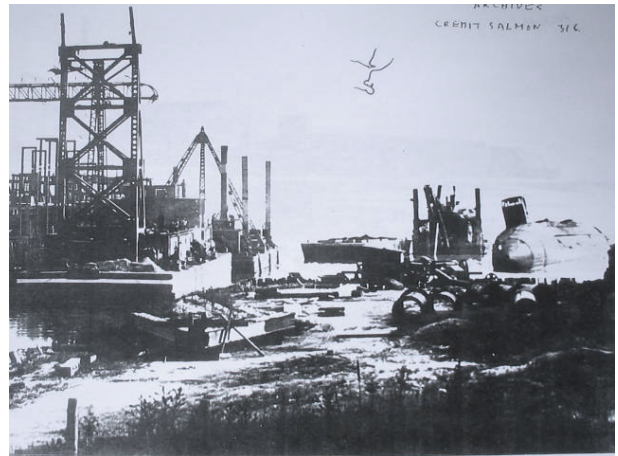


Figure A 6: Knapp's Roller Boat in the Frederick Street Slip, viewed from the shore, September 1914.

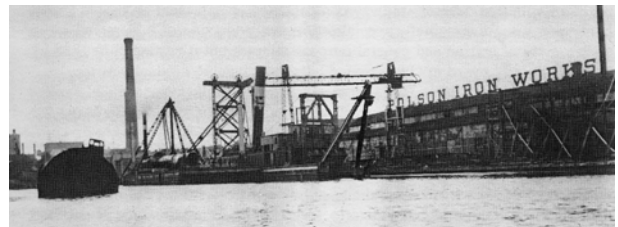


Figure A 7: Knapp's Roller Boat in the Frederick Street Slip, viewed from the lake, September 1914.



Figure A 8: Photo taken September 1915, showing the Roller Boat moored beside/in front of the car carrier *Ontario*. This larger ship was the subject of the 1915 correspondence between Polson's and the Harbour Commissioners.



Following the impasse with the Harbour Commissioners, the Tubular Boat remained moored off in the shallow waters off the end of the Frederick Street slip for another decade. Oblique aerial views of Toronto Harbour taken by McCarthy Aero Services circa 1921 clearly showed the Tubular Boat moored opposite the Polson Iron Works. It was situated off the end of the Frederick Street slip, approximately two-thirds of the way along the length of the Polson's wharf (McCarthy 1921). A plan of the harbour, taken in April 1923, showed the vessel lying in water which varied from between 7 to 14.8 feet in depth at the bow, and 15.7 to 15.9 feet at the stern.

The Final Resting Place of Knapp's Vessel

The final resting place for the Roller Boat has been debated for a number of years. Most people who have looked into the question agree that she lies somewhere along the harbour front, but the location has varied between as many sites as those to which she drifted during her years of abandonment. Some have placed the location at or near the ends of either the Frederick or Sherbourne Street slips, while others have argued that she was deeply buried beneath the railway viaduct which was constructed during the late 1920s and early 1930s. Still others have stated that the Harbour Commissioners considered the roller boat a "serious impediment to harbour traffic" (Filey 1981) and paid to have her hull dragged to the foot of Parliament Street where she was buried in the lakefill.

In August 1981, Toronto Sun columnist Mike Filey surmised that she was buried close to or beneath the Gardiner Expressway: "Rumor has it that when the Gardiner Expressway was being built it was necessary to make a slight detour in the routing when one of the footings being sunk for the overhead roadway struck the old hulk, forcing a repositioning of the support" (Filey 1981). Filey, however, did not disclose the specific location of the remains if it was known to him.

Evidence shows that when the Toronto Harbor Commissioners began to extend the lands along the lakeshore beyond the Windmill Line during the 1920s, the Tubular Boat remained in situ and was gradually buried in the sand which was dredged up from the lake bottom. Photographs taken on May 28th (Figure A 9) and August 11, 1927 (Figure A 10) clearly show the beached remains of the ship in shallow water with an ever-encroaching shoreline (PC1/1/7375, PC1/1/7455). By April 18, 1928, a final photograph (Figure A 11) shows the remains of the boat nearly completely buried in the dredged fill material. The appearance of the boat in this photograph seems to indicate that some of her exterior plating and superstructure may have been stripped from her before she finally disappeared from view in the fill (PC1/1/7810). The evidence provided on the Toronto Harbour Commissioners survey map of April 1923 (Figure A 12), provides scaled measurements, which are consistent with the views in the final photographs of the ship. This makes it possible to pinpoint the present location of the centre point of "Knapp's Folly" with some accuracy. The remains of this unusual ship lie buried 356 feet (108.5m) south of the Frederick Street slip and 140 feet (42.7m) west of the Polson Iron Works dock (wharfs 35 and 36) as they existed in 1923. Today, this location corresponds to the area between Lakeshore Boulevard and the Gardiner Expressway, between Richardson and Lower Sherbourne Streets and north of the property currently known as 215 Lakeshore Boulevard East (Figure A 13). Placement of the vessel under these roads is generally consistent with that proposed earlier by Stinson and Moir (1991:112). According to City of Toronto records, this area is traversed by a large number of service lines including a 300mm



sanitary sewer, a 1050mm storm sewer, a 2100mm filtered water main, and two 500mm gas mains, one of which is abandoned (David Spittal, City of Toronto, personal communication, 2007). This suggests that the integrity of the vessel, assuming it has survived construction of the Gardiner Expressway and Lakeshore Boulevard, is highly compromised.

The potential depth at which any remains may be located is also an important consideration. Historic documentation from the late nineteenth-early twentieth century indicates that Lake Ontario's water levels varied from a low annual mean level of 74.1 metres ASL in 1895 to a high annual mean of 75.8 metres ASL in 1870 (HHI 1994:75). The present mean annual lake level is 75.2 metres ASL (HRL 1989:4), approximately mid-way between these extremes, suggesting that there has been little overall change during the intervening period. The April 1923 Toronto Harbour Commission plan showed the vessel lying in water which varied from between 7 to 14.8 feet (2.1-4.5 metres) in depth at the bow, and 15.7 to 15.9 feet (4.8 metres) at the stern. The current grade in the vicinity of the boat has an average elevation of approximately 77 metres ASL, suggesting that the lakebed surface on which the boat rests is buried by approximately 13 to 23 feet (3.9-7.0 metres) of fill.



Figure A 9: The view west from Sherbourne Street, May 1927.



Figure A 10: The view west from Sherbourne Street, August 1927.



Figure A 11: The view west from Sherbourne Street, April 1928. It appears that many elements of the upper hull have been stripped.



REFERENCES

Anonymous

- n.d. Untitled and undated photographs of the interior and exterior of Knapp's Roller Boat, Archives of Ontario, C130-3-0-22-1, C130-3-0-22-2 and C130-3-0-22-3, accessions 6899-667 and 6899-681 (B116803, container A1831).
- n.d. "Knapp's Roller Boat, Built to Banish Sea-Sickness by Utilizing the 'Inertia of Motion,' Now Lies Buried Under Railway Tracks," undated newspaper clipping held by the Toronto Harbour Commission Archives.
- 1897 "Novelties in Navigation," *Canadian Engineer* volume 3 (July 1897) p. 73.
- 1897 "Knapp's Roller Boat," *Canadian Engineer* volume 7 (November 1897) p. 192.
- 1898 "The Knapp Roller Boat," *Canadian Engineer* volume 10 (February 1898) p. 307-308.
- 1899 "Knapp and his Barrel Boat," *Daily Mail and Empire*, January 16, 1899, p. 6 (Toronto Public Library microfilm reel 14/Canadian Library Association reel 2710).
- 1899 "The Roller Boat Will Be a Ferry," *Daily Mail and Empire*, June 8, 1899, p. 5 (Toronto Public Library microfilm reel 15).
- 1899 "Knapp Boat Has Left Toronto," *Daily Mail and Empire*, June 10, 1899, p. 9 (Toronto Public Library microfilm reel 15).
- 1899 "Roller Boat Rolls Ashore," *Daily Mail and Empire*, June 13, 1899, p. 5 (Toronto Public Library microfilm reel 15).
- 1902 "News of the Great Lakes," *Daily Mail and Empire*, September 26, 1902, p. 10 (Toronto Public Library microfilm reel 28).
- 1904 "Knapp Roller Boat Back in Toronto," *Toronto Daily Star*, August 10, 1904, p. 1 (Toronto Public Library microfilm reel 41).
- 1904? "Victory—Out and Under," undated newspaper clipping held by the Toronto Harbour Commission Archives.
- 1907 "The Remodeled Roller Boat," *Evening Telegram*, July 6, 1907, p. 22 (Toronto Public Library microfilm reel 91).
- 1908 "Tis 365 for Roller Boat," *Evening Telegram*, November 25, 1908, p. 13 (Toronto Public Library microfilm reel 99).
- 1922 "\$60,000 Worth of Invention," undated newspaper clipping, held by the Toronto Harbour Commission Archives.

Baillairge, C.

- 1897 Baillairge's Marine Revolving Steam Express. *Canadian Engineer* volume 5.6 (October 1897) pp. 166-167.

Filey, M.

- 1981 "Dream Sunk in the harbor" (The Way We Were), *Sunday Sun*, August 30, 1981

McCarthy Aero Services

- 1921 *Oblique Aerial views of Toronto Harbour*. Archives of Ontario, C285-1-0-0-960 (S5974) container A1118 and C285-1-0-0-1018 (S6055) container A1119 (379451 and 379452).

Peacock, S.

- 1995a *The Great Farini. The High-Wire Life of William Hunt*. Viking (Penguin Books), Toronto.
- 1995b "Rolling Over the Waves: Mr. Knapp's Remarkable Boat," *The Beaver* December 1995-January 1996 pp. 32-36.

Polson Iron Works Ltd.

- 1915 Letters from the Polson Iron Works to the Toronto Harbor Commissioners, January 27, 29 and 30, 1915.

Salmon, J.

- 1914 *Photographic views of the Polson Iron Works*, October 5, 1914. City of Toronto Archives Fonds 1231 (formerly SC231) negatives 914, 916.
- 1914 "Knapp's roller boat mired in mud at the foot of Polson Iron Works Frederick Street Slip," October 23, 1914. City of Toronto Archives Fonds 1231 (formerly SC231) negative 316.
- 1915 "Ontario beside Knapp Roller Boat," September 22, 1915. City of Toronto Archives Fonds 1231 (formerly SC231) negative 992a.

Shaver, D.

- 2007 The Knapp Roller Boat (with its inventor, Frederick Knapp) October 27th, 1897.
www.ripnet.com/sites/colonel_edward_jessup/UEL_Col_J/knapp_roller_boat.html



Taws, C.

1991 "Knapp's Folly," *The Belvedere, Quarterly Journal of the Bowmanville Museum: Port Darlington Memories*, 1991 No. 2.

