

ARCHAEOLOGICAL MONITORING OF
GEO-TECHNICAL INVESTIGATIONS
FOR THE PROPOSED
MANITOBA THEATRE FOR YOUNG PEOPLE
AT THE FORKS

Prepared for

MANITOBA THEATRE FOR YOUNG PEOPLE
DS-LEA CONSULTANTS LTD

QUATERNARY
CONSULTANTS
LIMITED

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EXECUTIVE SUMMARY

In connection with the geo-technical investigation of the proposed location at the northeast corner of Pioneer Boulevard and Forks Market Road, archaeological monitoring of the drilling operations was conducted. All of the six holes were drilled with a small (15 cm) diameter auger. The operations consisted of visual inspection of the auger cuttings for the upper six metres of each hole. Through the examination of the auger cuttings, it was possible to determine the sub-surface stratigraphy at each location.

Numerous soil horizons were observed in the profiles. These horizons, pre-dating the railroad period, would have formed on riverine sediments deposited by various floods over the last several thousand years. Minimal evidence of cultural occupation was directly observed.

Earlier investigations have recorded archaeological strata in the vicinity of the proposed structure. That information, in addition to that obtained by the current study, suggests that there is a potential for archaeological resources within the impact zone, thereby necessitating the development of an archaeological resource management program.

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1.0 Introduction

In preparation for the development of the Manitoba Theatre for Young People, a good understanding of the underlying soil stability is required. Accordingly, a geo-technical examination was undertaken by DS-Lea Consultants Limited. Due to the potential for archaeological resources, Quaternary Consultants Limited was contracted to provide archaeological monitoring of the soil test drill holes. The operation was conducted under Heritage Permit A79-95 (Appendix A) issued by Historic Resources Branch, Department of Culture, Heritage and Citizenship.

The geo-technical study was conducted by AGRA Earth and Environmental, using the drilling services of Paddock Drilling. The study consisted of the drilling of six holes to various depths. All were located within the proposed footprint of the structure, located at the northeast corner of the intersection of Pioneer Boulevard and Forks Market Road. Four holes were drilled to a depth of twenty feet (six meters) and two holes were drilled into the underlying glacial till.

Archaeological monitoring of geo-technical drill holes cannot be considered as an archaeological impact assessment, *per se*. The potential for sub-surface examination is extremely limited—six small diameter holes spaced across a large area (Figure 1). This program can best be seen as an opportunity to gain a limited understanding of the soil stratigraphy and demarcate zones in which archaeological resources may occur.

1.1 Study Team

The soil test monitoring was conducted by Sid Kroker. Documentation and analysis has been undertaken by Sid Kroker and Pam Goundry.

2.0 Monitoring of Soil Test Drilling

Archaeological investigations consisted of visual inspection of the moderately disturbed upper soil column observed from the auger cuttings. The procedure for the upper 20 feet (six metres) of all holes was continuous coring, wherein the operator drills a five-foot (1.5 metre) section of the auger bit into the ground and then extracts it for observation of the soil column. Given the plasticity of the soil and the resultant deformation of the soil column by the 6" (15 cm) auger, only thick (more than 1 cm) soil layers are readily observable. Thin horizons tend to become 'smeared' and, if observable, cannot be accurately placed in vertical context. The skill of the drill operator is a factor, in that the speed of the auger and ceasing to rotate the auger at the end of the five-foot auger extension determine the degree of smearing and spiral deformation. After each drilling and extraction, another five-foot section of auger is added to the drill stem.

An alternative method of investigation, used for deeper holes or where continuous coring is not undertaken, is the use of hollow-core augers wherein a hollow auger is drilled into the ground and an inner sampling corer is used to retrieve undisturbed soil column samples by use of a split-spoon sampler. This technique was used for two holes. At Hole 2, it was used for depths below six metres, while at Hole 5, it was used for sampling the entire depth. The split-spoon sampler is a

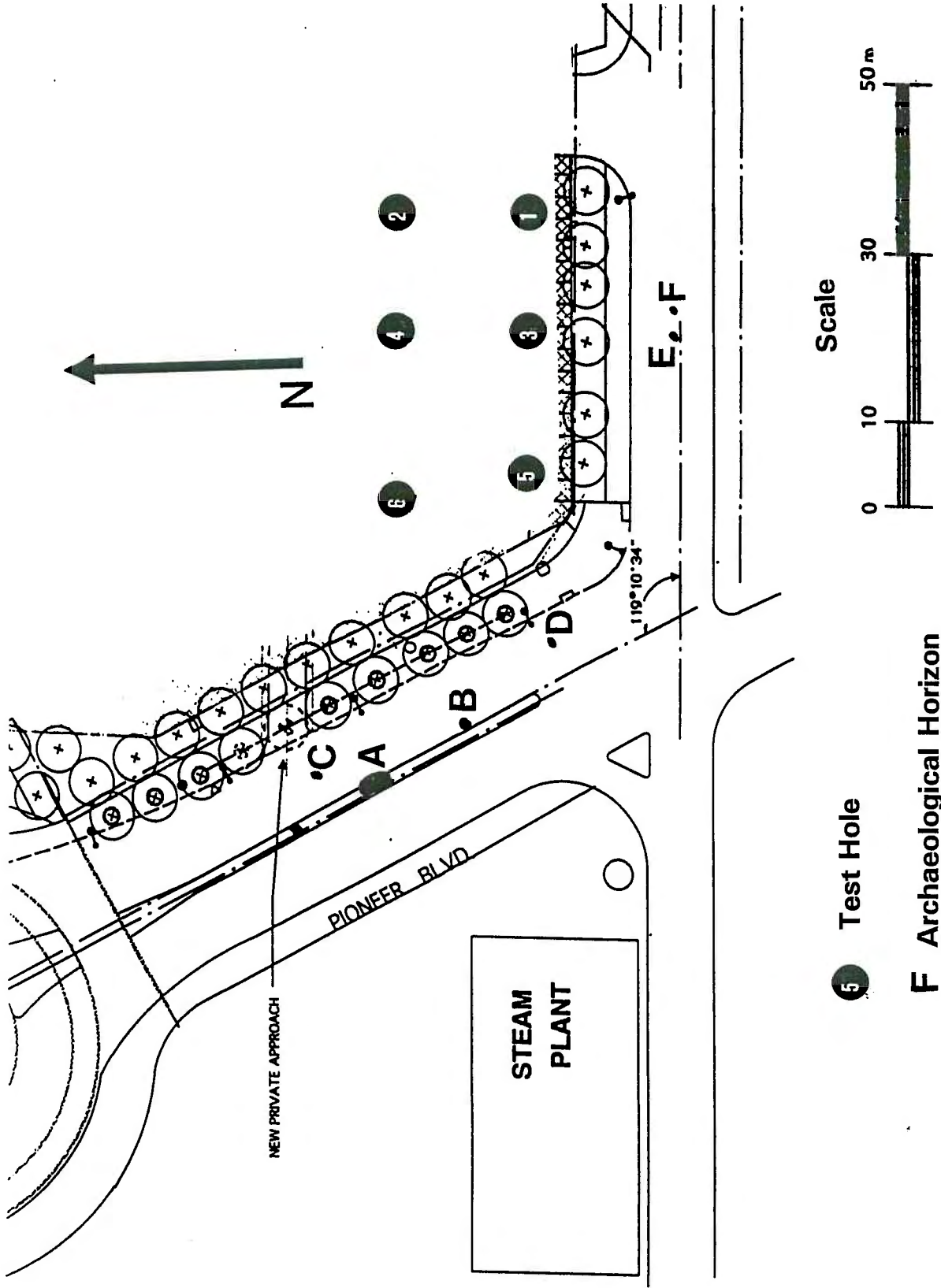


Figure 1: Map of Investigation Area

tubular coring device which is pushed into the undisturbed sediments at the base of the hole. The soil column is retrieved intact and can be examined when the tube is separated into the two vertical halves. The samples are taken at five foot (1.5 m) intervals and only provide intermittent data. Inasmuch as the soil strata within the investigation area consist of riverine sediments, there can be considerable variation in thickness and/or presence across short distances. A similar situation can occur with regard to archaeological deposits—occupational evidence may be localized or fairly widespread.

2.1 Observations

The visual inspection of the soil recoveries during the drilling program enabled the determination of the sub-surface stratigraphy of the upper six metres of all of the holes. Two holes (#2 and #5) provided limited data of soil horizons at lower depths. All depths are measured from the existing surface of the parking lot which is 230.5 metres above sea level.

There was a great degree of similarity between all holes. Many of the various soil strata appear to be represented in several of the profiles. However, accuracy of correlation is not assured, inasmuch as all sedimentation is the result of riverine deposition which can be extremely variable across short distances. The detailed profiles are presented in Table 1.

The predominate component of the matrix is a medium brown silty clay, which occasionally grades coarser (sandy silt or silt) or finer (clayey silt). Occasionally, small concentrations of marl are observed in the matrix, especially in clayey silt strata below a sand horizon. The sand strata represent flood/high water episodes with rapidly moving water which could carry a heavier particle load. In addition to carrying a greater sediment load, fast moving water has a higher potential for erosion of previously deposited layers. In all probability, many more flood episodes occurred than are represented in the stratigraphic columns. Due to possible erosion and differential deposition within the same flood event, not all strata can be accurately correlated. During other archaeological monitoring projects at The Forks which entailed linear excavations, it was found that even major strata would gradually pinch out over distance and reappear at another location (Kroker and Goundry 1990).

This non-continuity of strata adds an element of uncertainty in ascribing A Horizons of the same depth to the same event. This is especially true when the relict A Horizons are thin (less than 2 centimetres in thickness). The formation of a humic soil zone on hummocky terrain can result in a variation of 15 to 20 centimetres between the top and the bottom elevations. If the upper and lower elevations are encountered within the profiles from two different drill holes, it would not be apparent that they represent the same event. With this caveat noted, it would appear that there are several buried soil horizons which can be tentatively correlated and interpreted as stable ground surfaces upon which soil formation occurred. A different problem occurs with the correlation of strata in Test Hole 5—the sampling was not continuous. Thus, spaces in the recorded column, as a result of split-spoon sampling, can result in minimal or inaccurate correlations.

STRATUM	TEST HOLE	# 1	# 2	# 3	# 4	# 5	# 6
Asphalt		8	10	10	10	11	10
Gravel		25	30	30	46	30	30
Disturbed Clay/Silt		50			65		
Dark Silt Soil Zone		73	45	45	85	45	45
Light B Horizon		90	61	61	107	60	60
A Horizon - 1			91				99
A Horizon - 2			107	142	122		
A Horizon - 3		180		183		188	183
A Horizon - 4			198	198	198		198
A Horizon - 5			213		213		213
A Horizon - 6					236	251	
Sand		213		229	238		244
Sand		259					
Sand		274	274	290			274
A Horizon - 7		320	305	320	305	312	
Sand			335		335	335	335
Sand			365			348	396
A Horizon - 8				374			399
Sand		365	381	381	381		
Sand			411				
Sand		426	426	442	457		442
Sand		503	472	488	488		
Sand		518					
Sand		533					
Grey clay		564		518	549		488
Sand					564	564	518
A Horizon - 9			504			579	
Sand			533		594	617	549
Oxidized Sand			838			929	
Agassiz Clay			883			963	

Table 1: Stratigraphic Elements of Test Hole Profiles

During the land modification activities of the Stage I Construction Project (Kroker and Goundry 1990), most of the railroad cinder level was removed from the parking lot area. Originally, the elevation of this area ranged between 230.2 and 230.7 metres above sea level. The installation of gravel and asphalt during the parking lot construction resulted in a final elevation of 230.5 metres a.s.l. In the six geo-technical holes, no evidence of the cinder horizon was encountered below the surface layers of asphalt and gravel. In two holes (#1 and #4), a layer of disturbed clay fill occurs immediately below the gravel. The placement of this stratum would have occurred during the parking lot construction. The only soil horizon represented in all holes is the uppermost horizon which represents the ground surface prior to and during the beginning of the railroad period in the East Yard (1888-1988). The thickness of the A Horizon (Dark Silt Soil Zone) and the presence of a moderate B Horizon below it indicate both a long period of soil formation and the incorporation of minor flood deposits into the upper portion of the active soil zone. Notably, there is no evidence of sand deposition by the 1826 flood at this location. Such deposits have been recorded at the North Point Node in The Forks National Historic Site (Adams *et al.* 1990) and at the location of Fort Gibraltar I, near the Children's Museum (Kroker *et al.* 1990, 1991, 1992). Another widespread historic horizon—the Plow Zone—resulting from agricultural activities of the Hudson's Bay Company Experimental Farm (1836-1848) was not present. This horizon has been recorded at the Fort Gibraltar I location (Kroker *et al.* 1990, 1991, 1992), the Heritage Plaza location (Quaternary 1993), and several locations during the Stage I Construction Project (Kroker and Goundry 1990).

A minimum of nine A Horizons were recorded in the six holes. Those of similar depths below surface have been correlated in Table 1. Horizon 1 is noted in two profiles. Although listed together in the table, Horizon 2 may actually consist of more than one discrete horizon. Horizon 3 is represented in four profiles, as is Horizon 4. Horizon 5 occurs in three profiles and Horizon 6 in only two profiles. However, as Horizons 4, 5, and 6 occur in sequence in Hole 4, there is no correlation problem. Horizon 7 appears to be the most extensive, occurring in five profiles. Given the similarity of the bounding sand strata, it would appear that this is the same relict soil horizon, occurring across a wide area. Correlation of Horizon 8 is very tentative and that of Horizon 9 is probably inaccurate. The basal A Horizons in Hole 2 and Hole 5 are not likely from the same event and are only listed together due to their depth.

The different A Horizons presented different appearances. In some cases, they consisted of minor humic staining of thin strata. In others, they consisted of small charcoal fragments resting upon a stained humic stratum. In still other representations, the horizon consisted of grey ash and charcoal fragments forming a discrete layer separate from riverine deposition strata. Cultural evidence was present in only one of the A Horizons. A small quantity of decomposed fish bone (too decayed for curation) was observed in Horizon 4 in Hole 6 (bolded in Table 1). None of the other occurrences of this horizon contained faunal material and the presence of ash or charcoal does not necessarily indicate a cultural occupation upon that particular stratum. A natural fire burning the prairie and/or the gallery forest can produce a similar result.

3.0 Discussion

As noted above, minimal cultural evidence was present. During the earlier Stage I Construction Project, the installation of sub-surface services along Pioneer Boulevard and Forks Market Road was archaeologically monitored. Cultural resources were recorded at several locations in the vicinity of the proposed structure. These locations are depicted on Figure 1.

The depths of the archaeological deposits recorded during the Stage I Construction Project (Kroker and Goundry 1990) were taken from the existing ground level. At these locations, the elevation was very similar to that of the finished surface of the parking lot. The following chart (Table 2) lists the six relevant discoveries and their recorded and corrected depths. The corrected depths are the equivalent depth below the parking lot surface. Tentative correlation with the horizons recorded during the geo-technical augering are provided.

STRATUM	Figure 1	Original Depth	Corrected Depth	Recoveries	Correlation
Long Trench - 391/395	A	190	200	Faunal	Horizon 4/5
Long Trench - 404	B	230	240	Cultural?	
Long Water - 385	C	190	210	Faunal;FCR	Horizon 4/5
Long Water - 418	D	435	435	Lithics	Horizon 8
Johnston Storm - 228	E	250	270	Lithics;Faunal	Horizon 6?
Johnston Storm - 231	F	450	480	Cultural?	

Table 2: Correlation of Previous Recoveries

Two of the recovery loci in the Stage I report (Long Trench - 404 and Johnston Storm - 231) may not represent cultural horizons. As noted by Kroker and Goundry (1990:36, 39), the charcoal and modified soils observed at each of these locations could be the result of natural fires. Similar occurrences could have resulted in the formation of several of the horizons identified during the geo-technical study. Unless cultural material such as lithic flakes, ceramic sherds, fire-cracked rock (FCR), or faunal remains are present, the ash, charcoal, and heat-discoloured soil can arise due to natural rather than cultural events.

4.0 Potential Impacts

Potential impact within the footprint of the proposed structure can occur from three sources:

- load-bearing beams which underlie the slab floor,
- pre-boring for the placement of pilings, and
- the installation of sub-surface services (water, sewer, gas).

The thickness (and therefore the depth of impact of the bearing beam) has yet to be determined. Similarly, the number of pilings, their placement, and the depth of pre-boring is still being calculated. The location for tie-in from existing services which run along Pioneer Boulevard and Forks Market Road has not been decided, although it will probably be the shortest distance.

5.0 Recommendations

While only one horizon in Hole 6 provided limited evidence of Pre-Contact occupations within the site area, it must be assumed that the potential for encountering extensions of the previously recorded occupations exists. In addition, a small localized occupation site could exist at any of the A Horizons recorded during the archaeological monitoring of the geo-technical program.

Accordingly, **it is recommended** that any sub-surface construction activity should be monitored by an archaeologist.

Specifically, **it is recommended** that

- a: the trench excavations for services installations be archaeologically monitored. If pre-railroad resources are encountered, mitigative strategies may need to be implemented.
- b: pre-boring for piling seating be monitored. Given the identified strata on the periphery (Figure 1:A, C, D, E) and the presence of faunal material in Horizon 4 at Test Hole 6, augering at all piling pre-boring locations should be monitored.
- c: excavations below the gravel and clay fill layers for components of the facility construction be monitored.

6.0 Bibliography

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Kroker, Sid, Barry B. Greco and Kate Peach

1992 *1991 Investigations at Fort Gibraltar I: The Forks Public Archaeology Project*. Canadian Parks Service, The Forks Renewal Corporation, Manitoba Culture, Heritage and Citizenship, Historic Resources Branch, Winnipeg.

Kroker, Sid, Barry B. Greco and Sharon Thomson

1991 *1990 Investigations at Fort Gibraltar I: The Forks Public Archaeology Project*. Canadian Parks Service, The Forks Renewal Corporation, Manitoba Culture, Heritage and Citizenship, Historic Resources Branch, Winnipeg.

Quaternary Consultants Ltd.

1993 *Archaeological Monitoring and Impact Assessment of The Forks Heritage Plaza Project*. On file with The Forks Renewal Corporation and Manitoba Culture, Heritage and Citizenship, Historic Resources Branch, Winnipeg.

APPENDIX A
HERITAGE PERMIT



Heritage Permit No. A79-95

FORM 11

PURSUANT to Section/~~Subsection~~ 53 of *The Heritage Resources Act*:

Name: Quaternary Consultants
Address: 130 Fort Street
Winnipeg MB R3C 1C7

ATTENTION Mr. Sid Kroker

(hereinafter referred to as "the Permittee"),

is hereby granted permission to:

monitor the drilling for a proposed facility at the northeast corner of Pioneer Boulevard and Forks Market Road, at The Forks, D1Lg-33, to record the presence or absence of heritage resources and assess their importance;

during the period:

October 10 to 30, 1995

This permit is issued subject to the following conditions:

- (1) That the information provided in the application for this permit dated the 10th day of October 19 95, is true in substance and in fact;
- (2) That the Permittee shall comply with all the provisions of *The Heritage Resources Act* and any regulations or orders thereunder; PLEASE NOTE ATTACHMENT RE CUSTODY AND OWNERSHIP OF HERITAGE OBJECTS
- (3) That the Permittee shall provide to the Minister a written report or reports with respect to the Permittee's activities pursuant to this permit, the form and content of which shall be satisfactory to the Minister and which shall be provided on the following dates:
December 31, 1995
- (4) That this permit is not transferable;
- (5) This permit may be revoked by the Minister where, in the opinion of the Minister, there has been a breach of any of the terms or conditions herein or of any provision of *The Heritage Resources Act* or any regulations thereunder;

(6) Special Conditions:

- a. All surface collections, excavations, etc. are to be carried out using the provenience system established for use at The Forks and this project will be designated 95E;
- b. All heritage objects (artifacts) recovered from The Forks are to be catalogued according to the CHIN system and the relevant Borden designation will be D1Lg-33/95E;
- c. All heritage objects from The Forks are to be deposited with the Manitoba Museum of Man and Nature by March 31, 1996, for permanent curation and storage, unless appropriate loan requirements are arranged with the Curator of Archaeology prior to that date;
- d. A complete set of archaeological field records, catalogue sheets, laboratory analysis records, photographs, reports, etc. are to be deposited with the Manitoba Museum of Man and Nature upon completion of the archaeological research, or sooner if required; and any subsequent revisions or additions to these records are to be filed as soon as possible thereafter;
- e. All computer systems and programs employed in archaeological research should be compatible with the computer system established for The Forks;
- f. Appropriate arrangements and funds should be made available for the conservation of perishable heritage objects collected from The Forks;
- g. In the event that any human remains are encountered during the excavations, all activity in that particular locus will cease immediately, and the Historic Resources Branch notified immediately so that appropriate action can be determined and taken;
- h. The Permittee will be on-site supervising all aspects of the field work, including the removal of the railroad overburden during site preparation, at least 75% of the time, but when the Permittee must be absent, a qualified designate acceptable to Historic Resources Branch (copy of vita to be filed prior to commencement of field work) shall be present;
- i. The Permittee shall be responsible for the conduct of the laboratory analysis of recovered heritage objects and information to be included in the permit report;
- j. The report identified in #3 above shall conform at a minimum to "The Contents and Format of a Heritage Resource Impact Assessment" (copy attached);
- k. Neither the Government of Manitoba nor the party issuing this permit be liable for any damages resulting from any activities carried out pursuant to this permit, and the Permittee specifically agrees, in consideration for receiving this permit, to indemnify and hold harmless the Minister and the Government of Manitoba, the Minister and any employees and officials of the Government, against any and all action, liens, demands, loss, liability, cost, damage and expense including, without limitation, reasonable legal fees, which the Government, Minister or any employee or official of the Government may suffer or incur by reason of any of the activities pursuant to or related to this permit.

8280h

Dated at the City of Winnipeg, in Manitoba, this 10th. day of October 1995.



Minister of Culture, Heritage and Citizenship