GEO-TECHNICAL MONITORING AND HERITAGE RESOURCE MANAGEMENT PROGRAM FOR THE WEST ROADS PROJECT

Submitted to

WARDROP ENGINEERING INC.

QUATERNARY
CONSULTANTS
LIMITED

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EXECUTIVE SUMMARY

The proposed reconfiguration of the West Roads connecting to the new Provencher Bridge, on the west bank of the Red River, has the potential to result in impact upon heritage resources. A geo-technical drilling program undertaken in April, 2001, was monitored by an archaeologist to ascertain presence/absence of heritage resources. Upper soil layers contained artifacts relating to residential occupation in the area from the late 19th century onward. Two test holes had evidence of an extensive Pre-Contact occupation site, while a third had a trace of a deeper (400 cm below surface) cultural horizon.

Based on previous investigations and the results of this monitoring, the extensive 665 year old cultural horizon will extend through the entire impact zone, except where it has been previously eradicated through basement excavations of the buildings that formerly existed along Water Avenue and Notre Dame East (Pioneer) Avenue. Archival research has shown that the area was densely developed at the beginning of the 20th century with a residential and limited commercial presence that diminished steadily until the present.

Given that sub-surface excavations for the roadbed are largely above the ascertained depth of the 665 year old cultural horizon, archaeological monitoring of the construction program will follow a standardized construction monitoring format. The deeper excavations—sub-drains, and especially vertical shafts for sub-surface services installation—will require intensive monitoring inasmuch as impact upon the Pre-Contact cultural horizons is a given.

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1.0 INTRODUCTION

Concomitant with the construction of the new Provencher Bridge, the City of Winnipeg is planning on reconfiguring the existing locations of Pioneer and Water Avenues. The construction of the new routes (Figure 1), currently designated as the West Roads Project, will consist of:

- a southward displacement of Pioneer Avenue beginning immediately east of the CNR embankment;
- a southward displacement of Water Avenue beginning halfway between the embankment and the Pioneer Boulevard intersection;
- a southward displacement of the intersection; and
- construction of a twinned, curved roadway from the new intersection to the foot of the new Provencher Bridge.

In addition, considerable realignment of existing sub-surface services (watermains and land drainage sewer lines) will occur.

As previous projects to the north and south of the proposed construction impact zone have encountered archaeological resources (Quaternary 1990a, 1990b, 1990c, 1999, 2000a), it was deemed necessary that the geo-technical drilling program be monitored by an archaeologist. Quaternary Consultants Ltd. was engaged by Wardrop Engineering to undertake the monitoring of the twelve holes under the terms of Heritage Permit A80-00, issued by Historic Resources Branch, Manitoba Culture, Heritage and Tourism (Appendix A). This monitoring and the subsequent observations, as well as prior knowledge, form the basis for the formulation of a Heritage Resource Management Program for the project.

1.1 Scope of the Project

A sequence of twelve holes were drilled by Dyregrov Consultants, using the services of Subterranean (Manitoba) Ltd., who provided a truck-mounted drill fitted with a 16" auger. Ten of the holes (Test Holes 1-6, 9-12) were drilled along the proposed right-of-way (Figure 1) with two holes being drilled on the east side of the Red River. The eastern holes were located immediately west of the sidewalk along Tache Avenue with one hole located north of Provencher Boulevard (Test Hole 13) and the other (Test Hole 14) south of the intersection. Test Holes 7 and 8 (Figure 1) were not monitored as they were to be only 2 metres deep and in an area which had had clay fill deposition for construction of Pioneer Boulevard in 1998, prior archaeological monitoring during land drainage sewer installation in 1997, and considerable fill deposition for the 1890 Winnipeg Transfer Railway construction.

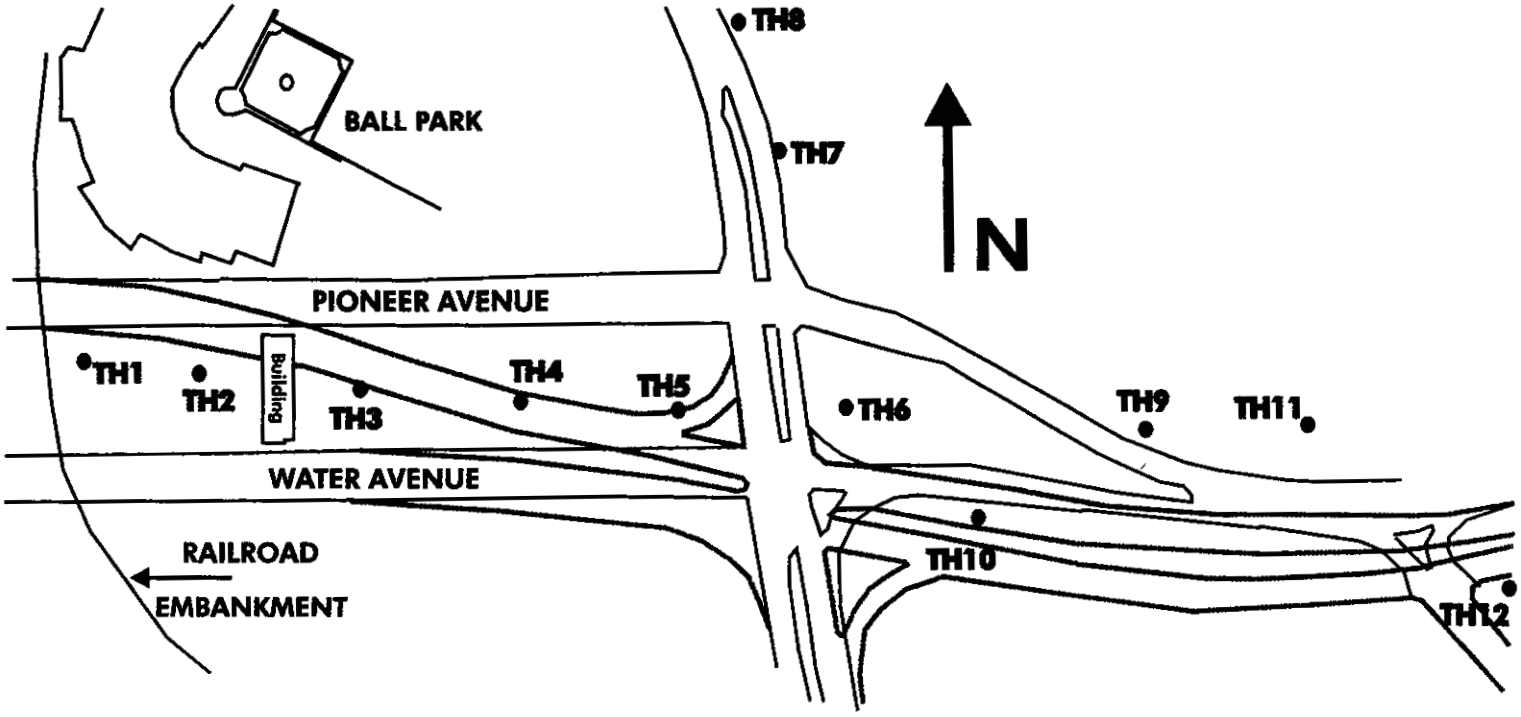

Figure 1: Project Location Map Showing Test Holes (Blue) and Proposed Road Reconfiguration (Red)

1.2 Study Team

The geo-technical monitoring project was directed by Sid Kroker, Senior Archaeologist. The field component was undertaken by Sid Kroker. Laboratory operations were conducted by Sid Kroker and Pam Goundry. Computer cataloguing of recovered artifacts was conducted by Pam Goundry. Archival investigation of early maps at the Provincial Archives of Manitoba (PAM) was undertaken by Sid Kroker, while detailed research of the City of Winnipeg Henderson Directories at the Winnipeg Centennial Library was conducted by Pam Goundry. Artifact analysis and report preparation was undertaken by Pam Goundry and Sid Kroker. The computer drawn image of the project was adapted from a photo-reduced work plan provided by Terry Hunter of Dyregrov Consultants.

1.3 Archaeological Monitoring Methods

The driller would auger downward until the bit length was filled. When the auger was brought to the surface, the monitoring archaeologist examined the soil on the auger and recorded changes in soil stratigraphy including the depths and thicknesses of different soil layers. Due to the rotary action of the auger, thin soil layers (less than 1 cm thick) may not always be discernable. In addition to recording the soil stratigraphy, the archaeologist recovered all artifacts present. In the upper levels, these artifacts were from the historic fill horizons and included some diagnostic artifacts, i.e., those which can provide evidence of time period, company of manufacture, and/or function.

The monitoring archaeologist watched for buried soil horizons and changes in soil texture which could indicate possible former ground surfaces. The indicators watched for are charcoal layers, ash lenses, and/or reddish stained soil. The colour change is usually indicative of oxidation of the iron particles in Red River silt by heat—the more intense the heat, the redder the soil. These features can indicate either a natural event such as a brush or prairie fire or a cultural event such as a campfire. When evidence of fire is observed, the layer is investigated to ascertain if the cause was natural or cultural. The presence of food remains, particularly mammal or fish bones, resting upon a buried soil is a positive indicator of an archaeological occupation horizon. Other positive indicators are fragments of earthenware containers and/or lithic tools or flakes resulting from tool manufacture.

A Pre-Contact cultural layer representing an occupation site was observed in the upper portion of two holes (Test Hole 4 and Test Hole 5). A deeper cultural layer was observed in Test Hole 10. The entire cultural layer was collected and taken to the Quaternary Consultants laboratory facilities. Field separation of the artifacts from the encapsulating soil would not have been practical as smaller artifacts would have been lost, especially from Test Hole 4 were the layer was within the frost zone.

1.4 Laboratory Procedures

During the project, all recovered artifacts were brought to Quaternary Consultants laboratory facilities, where they were washed and sorted by material class and identified by the lab personnel.

The Pre-Contact cultural layer was wet-screened through diminishing meshes. Larger artifacts were retrieved on the 4 mm mesh, while smaller artifacts and fragments of artifacts were recovered on the 2 mm and 1 mm meshes. Due to the high montmorillonitic clay content of the soil, considerable soaking and deflocculation with Calgon® was necessary.

Material of the same type (e.g., plain white dinnerware plate sherds, catfish dentaries) from the same test hole and same depth were combined under a single catalogue number. Identification was carried to the limit obtainable by available reference works and staff expertise. The unidentifiable fragments recovered on the smaller meshes were catalogued as a sample containing charcoal, shell, and bone fragments.

Each artifact received a catalogue number consisting of the Borden designation (Borden 1954) for the site and a sequential number for permanent identification. This area, north of Water Avenue, had been previously designated as DlLg-69 (Quaternary 1996). As this was the latest of several projects to be conducted at the site, it was decided to add a year identifier (01) to the Borden number to produce a catalogue number (DlLg-69:01/####). All pertinent data associated with the artifact was entered into a computer cataloguing system, based upon the Canadian Heritage Inventory Network (CHIN) system (Manitoba Museum of Man and Nature 1986; Kroker and Goundry 1993a:Appendix B). The cataloguing program, derived from **DBASE3®**, generates individual artifact catalogue cards.

Processed artifacts were prepared for storage by inserting the specimens and the catalogue card into standard plastic storage bags, then stapling the bags closed. At the end of the project, all recovered artifacts will be delivered to the Manitoba Museum of Man and Nature which has been the repository designated by the City of Winnipeg for artifacts recovered during projects near The Forks.

2.0 STRATIGRAPHY

A total of twelve test holes were drilled, two of which—Test Holes 13 and 14—were east of the Red River on Tache Avenue. The Tache holes did not contain any cultural material although Test Hole 13 produced hydrocarbon stained silty clay which correlates with the Tourist Hotel Garage period (1929 - 1934). This layer was recorded as Stratum G during the monitoring of the redevelopment of the Tourist Hotel site (Quaternary 1988:34).

The stratigraphic profiles recorded in the test holes west of the Red River showed varying depths of fill overlying undisturbed riverine sediments (Appendix B). West of Test Hole 6, the depth of fill is directly related to impact caused by the construction of buildings over the last 130 years. The fill layers in Test Holes 9, 10, 11, and 12 are the effect of land modifications undertaken during the construction of the Winnipeg Transfer Railway in 1890.

Generally, the undisturbed riverine sediments are a brown silty clay. The texture tends towards a higher clay content in the deeper portions of the holes. Occasional sand and/or sandy silt layers indicate fast moving waters from a massive flood episode. All of the riverine sediments overlay the lacustrine clays deposited in Glacial Lake Agassiz, which drained circa 8500 years ago.

The existence of an extensive Pre-Contact cultural horizon had already been determined during prior projects. It had been recorded, immediately adjacent to this project, during the watermain installation in conjunction with the CanWest Global Park Baseball Facility (Quaternary 2000a:98-102). The absence of this extensive horizon which extends south of Water Avenue (Quaternary 1990a, 1990b, 1990c, 1999) and north of Pioneer Avenue (Quaternary 2000a) at Test Hole 2 and Test Hole 3 is a result of impact caused by basements of buildings erected after 1870. The presence of former excavations can be readily observed when the different soil strata are compared:

Test Hole 1 - fill to 160 cm (Table B1);
Test Hole 2 - fill to 210 cm (Table B1);
Test Hole 3 - fill to 160 cm (Table B2);
Test Hole 4 - fill to 40 cm (Table B2);
Test Hole 5 - fill to 120 cm (Table B3);
Test Hole 6 - fill to 120 cm (Table B3);
Test Hole 9 - fill to 220 cm (Table B4);
Test Hole 10 - fill to 180 cm (Table B5); and
Test Hole 11 - fill to 200 cm (Table B4).

Obviously, there was no basement at Test Hole 4. Full basements existed at Test Holes 2, 9, and 11. The intermediate depths could represent partially sunk basements or crawl space excavations.

A sparse cultural horizon was recorded at a depth of 400 cm in Test Hole 10. Due to the downsloping of strata from west to east (Quaternary 1990b:17) as well as from south to north (Quaternary 1999), this horizon may correlate with one of the deeper horizons recorded during The Forks Access Project (Quaternary 1999:9).

3.0 HISTORIC ARTIFACTS

The historic artifacts were recovered from the upper fill layers of the geo-technical drill holes. Rather than combine all recoveries, it was decided to detail the recoveries at each location, as archival data may also provide some information as to the occupants of the location and the activities that occurred there. The minimally diagnostic nature of the recoveries limited the degree of activity correlation with the residences and/or businesses that are noted on the maps in Section 5.0.

3.1 Test Hole 1

Nine artifacts were recovered from Test Hole 1.

3.1.1 Architectural Objects

Architectural objects include all artifacts which are used for the construction, the maintenance, and the furnishing of structures. Due to corrosion and fragmentation, many of these objects are seldom identifiable to manufacturer or time period.

Two artifacts were assigned to the sub-category of accoutrements which is defined as those items that pertain to the finishing touches of a structure. DlLg-69:01/1 and 2 are single pieces of windowpane. DlLg-69:01/1 is an aqua, standard-thickness (2.1 mm), while DlLg-69:01/2 is an aqua, plate glass sherd measuring 4.2 mm in thickness.

3.1.2 Containers

This category includes all artifacts, or portions of artifacts, which are used to contain products. The category contains several sub-categories (Manitoba Museum of Man and Nature 1986), only one of which—storage—is applicable to the artifacts recovered from Test Hole 1.

Storage containers include most of the commonly used artifacts in today's material culture. Products are sold, transported, carried, or stored in a container of some type—bag, box, jar, bottle. These come in a variety of material types—metal, plastic, paper, ceramic, and glass.

Only glass storage containers were recovered. Indications of the method of manufacture, which provide information about time period and technology, are often present on these types of artifacts. Where possible, the specimens have been identified to type of container, i.e., bottle, sealer, jar. Jars are defined as having a generally cylindrical body and a mouth which is greater than ⅔ of the diameter of the widest part of the base or body, while bottles have a constricted mouth and neck. Further identification to a functional sub-type, such as beverage, has been done.

3.1.2.1 Beverage Bottle

Breweries bottled both soft drinks and beer and often used the same type of bottle for both products. It is usually impossible to ascribe a specific product to an archaeologically recovered bottle, without a paper label still adhering to the bottle.

DlLg-69:01/6 is a body,base sherd from an aqua bottle. The letters "TH..." are embossed on the body, near the base. Early, straight-walled Coca Cola bottles are a similar shade and have "PROPERTY OF THE COCA COLA COMPANY CANADA" around the body, at the base (Kroker and Goundry 1993a:34). Brewery Products Limited also produced bottles with the following text: "THIS BOTTLE BELONGING TO BREWERY PRODUCTS LIMITED MAY NOT BE SOLD" (Kroker and Goundry 1993a:60). The artifact is too incomplete to ascribe to either company.

3.1.2.2 Unassigned Bottles

Artifacts in this grouping have some identifying characteristics, such as shape or manufacturer's marks, however, the data is insufficient to ascertain the function of the container. Occasionally, the style of the neck and lip of the bottle may suggest the possible contents. Also, the type of closure and evidence of manufacturing technique can provide approximate dates. The length of the mold seam can indicate a general age, if the seam extends to the lip of the bottle it was produced after 1920.

Six artifacts were curated. DlLg-69:01/3 consists of three, small, clear body sherds, probably from a cylindrical bottle. There are no distinguishing marks on these specimens. DlLg-69:01/4 is a single, aqua body sherd from a cylindrical bottle. It is fairly thick-walled, measuring 6.7 mm. DlLg-69:01/5 is a clear shoulder sherd from a larger, cylindrical bottle. It has a slight ridge at the junction of the body and shoulder. DlLg-69:01/7 is the lip,neck,shoulder portion of a blue bottle. The short neck is finished with an applied, wide, rounded lip and it would have been closed with a cork.

3.2 Test Hole 2

Eight artifacts, all architectural objects, were recovered from Test Hole 2.

3.2.1 Architectural Objects

Three subcategories are applicable: hardware, accoutrements, and structural elements.

3.2.1.1 Hardware

Hardware consists of those items which are used for the construction of a structure. One round, wire-cut, rusted nail, DlLg-69:01/9, was curated. Wire-cut nails were produced about 1850, became prevalent about 1900, and are the common variety found today (Nelson 1968:10). Steel is extruded to form a wire, which is then cut to the appropriate length and the flat, circular head is added by another machine operation. DlLg-69:01/9 is truncated and severely corroded.

3.2.1.2 Accoutrements

DlLg-69:01/8 consists of three pieces of aqua windowpane. These specimens are the standard-thickness variety, measuring 2.0 mm.

3.2.1.3 Structural Elements

This category consists of elements of the structure, e.g., brick, lumber, or tile. As most structural artifacts are incomplete or broken, they are minimally diagnostic. DlLg-69:01/10 is a single fragment of a red brick made of bole. There are no identifying marks on this artifact. DlLg-69:01/11 consists of three, white porcelain tile fragments. These pieces all have one flat side and a flat edge, but appear to be spalls from thicker tiles. Two fragments are stained on the exterior surface, while the third is crazed. These tiles could have been used in a bathroom or kitchen as wall surfacing or floor tiles.

3.3 Test Hole 3

Fifteen artifacts were recovered from Test Hole 3—a wood fragment and 14 container specimens.

3.3.1 Floral Remains

DlLg-69:01/45 is a small fragment of charred wood. It is from a deciduous tree.

3.3.2 Containers

The fourteen container artifacts could be divided into storage containers and dinnerware pieces.

3.3.2.1 Storage

Eight glass artifacts (Table 1) are portions of bottles, none of which could be assigned to a particular function. DlLg-69:01/49 has an applied, square ring lip which would have been closed with a cork. It may have contained medicine, food extract, or a chemical compound.

CAT. #	QTY	COLOUR	PORTION	SHAPE	COMMENTS
46	1	clear	body	cylindrical	thin-walled 1.3 mm
47	2	clear	body	cylindrical	thick-walled 2.8 mm
48	1	clear	neck	cylindrical	-
49	1	clear	lip,neck	-	applied lip
50	1	green	shoulder	cylindrical	may go with #51
51	2	green	body	cylindrical	may go with #50
TOTAL	8				

Table 1: Unassigned Glass Sherds from Test Hole 3

3.3.2.2 Dinnerware

Items in this sub-category are those which are used in the serving of food or those items which are considered to be tableware. They can be made of metal, glass, synthetic, or ceramic. Six dinnerware sherds were recovered.

DlLg-69:01/42 is a lip,body,base sherd from a white plate or saucer. This piece has the typical scallop design, at the junction of the body and the base, of the Wheat pattern. This pattern, consisting of embossed heads of wheat and entwined leaves, was patented in 1848, became most popular in the 1870s and 1880s, and is still produced in limited quantities by a few firms (Sussman 1985). There is a faint embossed leaf just below the lip, on the interior surface but it is too obscure to assign to one of several manufacturers of this particular pattern (Sussman 1985) and there is no maker's mark on this piece. The sherd is fairly heavily crazed and has brown stains on both sides. It could be from a small plate, perhaps a bread and butter size, or it could be a portion of a saucer.

DlLg-69:01/43 consists of four, thick, white body sherds, possibly from a bowl. The largest sherd measures 6.6 mm in thickness and all of the specimens are moderately crazed. In cross-section, the exterior of this bowl would present a scalloped appearance as it was molded with wide, vertical excurvate ribs. Judging by the thickness of the sherds, this may have been a serving dish.

DlLg-69:01/44 is a single, small white sherd that has spalled off a larger fragment. The flatness of the one side may indicate that it came from the base of either a plate or a saucer.

3.4 Test Hole 4

Two artifacts were recovered from Test Hole 4.

3.4.1 Faunal Remains

DlLg-69:01/13 is a scapula from an adult pig (*Sus scrofa*). This specimen is broken and has three small cut marks on the ventral surface indicative of butchering techniques.

3.4.2 Containers

DlLg-69:01/12 is a single, aqua base sherd from an unassigned glass storage container. There are no markings on this sherd to indicate either a manufacturer or the contents. Some degree of weathering is evident through the iridescent patina on both sides of this sherd.

3.5 Test Hole 6

Seven artifacts were recovered from Test Hole 6.

3.5.1 Architectural Objects

DlLg-69:01/18 is a bent, round, wire-cut nail. This specimen is somewhat corroded but the flat, circular head is intact.

3.5.2 Faunal Remains

DlLg-69:01/19 is a section of femur from a cow (*Bos taurus*). Evidence of sawing is obvious at the distal end.

3.5.3 Containers

The remaining five artifacts are all containers—storage, dinnerware, and ornamental.

3.5.3.1 Storage

DlLg-69:01/14 is a single, clear body sherd from an unassigned cylindrical bottle. There are no markings whatsoever on this specimen. The bottle was produced prior to 1914. This age determination can be made due to the faint amethyst tint of the glass which indicates the presence of manganese. Manganese was used as a clearing agent in glass manufacture and, as Germany controlled the majority of the world's resources, the onset of WWI resulted in the cessation of this practise.

3.5.3.2 Dinnerware

DlLg-69:01/17 consists of two white body sherds from either a bowl or a cup. These are thick, 4.0 mm, specimens. One is heavily crazed.

DlLg-69:01/16 is a small base sherd, probably from a plate, with a pattern on it. The design consists of a white background with either a black and white leaf or wing-like image next to a black stippled object. These two images are edging a green background that has black lines overlaying it. This sherd is too small to be able to assign a pattern name.

3.5.3.3 Ornamental

Artifacts assigned to this sub-category were primarily used for their decorative features rather than any utilitarian functions. DlLg-69:01/15 is a small, white, porcelain lip,body sherd. There is a very faded gold line painted along one side of the flat lip. This sherd may have been part of a decorative vase or bowl.

3.6 Test Hole 9

The largest number of recovered historic artifacts, 26, came from Test Hole 9.

3.6.1 Architectural Objects

Six artifacts were assigned to this category.

3.6.1.1 Hardware

A single piece of thick (6.8 mm) copper wire was recovered. DlLg-69:01/37 measures 58.1 mm in length and has a moderately heavy patination. Wire is manufactured by the extrusion technique.

DlLg-69:01/38 consists of two pieces of severely bent, heavily corroded iron strap which have been rivetted together with a degree of overlap. The functional category of this type of object is still open to debate. Some strap could have been used as a structural component, i.e., a wall brace, while other strap could have been part of a machine or used as packing strap.

3.6.1.2 Accoutrements

DlLg-69:01/31 is a single fragment of clear windowpane. It is 2.9 mm thick.

3.6.1.3 Detached Structure

This sub-category contains those artifacts which are not part of the basic structure, *per se*, but are attached to it in some form. DlLg-69:01/33 is three fragments of red sewer tile made of bole.

3.6.2 Communication

One artifact was curated in this category, in the sub-category of Telecommunication. DlLg-69:01/32 is a small, thick, blue glass fragment from an insulator. Although it has no threads visible, this fragment probably came from a threaded, domed, pony-style of insulator. The threaded design was patented in 1865 and has been used into the 20th century (Kottman 1979:18). According to Kottman (1979:19), the pony-style of insulator was named due to the "use of [insulators] on telegraph lines, which made the pony express obsolete".

3.6.3 Unknown

This category is reserved for artifacts of all materials which are incomplete or not well enough preserved for a positive identification to be made, but further in-depth research may elicit an identification. DlLg-69:01/36 is a thin, arc-shaped piece of somewhat corroded lead. It measures 60.6 mm by 6.9 mm and is 1.1 mm thick.

3.6.4 Floral Remains

DlLg-69:01/34 is a piece of husk from a coconut (*Cocos nucifera*). This would have been garbage from either a restaurant, residence, or a train dining car.

DlLg-69:01/35 is a twig. It measures 14.0 mm in length and tapers from 7.8 mm to 9.5 mm in width, with the thickness tapering from 11.2 mm to 7.4 mm. The specimen appears to be a naturally deposited fragment of maple (*Acer negundo*).

3.6.5 Containers

The remainder of the artifacts are containers, either storage or dinnerware.

3.6.5.1 Storage

Eight specimens are portions of glass storage containers.

3.6.5.1.1 Canning Sealer

The introduction of the glass canning sealer (fruit jar) in the latter part of the 19th century resulted in a major shift in food preservation. Food products could now be preserved, in large quantities, on a household basis. The competition in the sealer industry was strong and all manufacturers attempted to engender customer loyalty by naming their products. Most sealers have a trade name embossed on the side of the container. Names like Crown, Gem, and Perfect Seal are familiar to many people.

DlLg-69:01/25 consists of three, thin body sherds from a sealer. The largest sherd has a portion of an embossed crown, permitting identification as a Ground Lip, Series B, Type b Crown Sealer, made pre-1905 (Bird *et al.* 1971:29-31). This mark occurs on American Pint, American Quart, and American Half-gallon jars. Based on the sherd curvature, DlLg-69:01/25 is probably a quart size.

3.6.5.1.2 Unassigned Bottles

Five sherds (Table 2) were curated. None provided evidence of manufacturer or function.

CAT. #	QTY	COLOUR	PORTION	TYPE	SHAPE	COMMENTS
26	1	clear	lip	jar	cylindrical	screw-cap
27	1	aqua	body,shoulder	bottle	cylindrical	-
28	1	aqua	body	bottle	cylindrical	-
29	1	aqua	body,base	bottle	cylindrical	concave base
30	1	green	body,base	bottle	cylindrical	concave base
TOTAL	5					

Table 2: Unassigned Glass Storage Sherds from Test Hole 9

3.6.5.2 Dinnerware

Eight sherds were assigned to the dinnerware category. Five have coloured patterns on them, with the remainder being plain white.

3.6.5.2.1 White Ceramics

White sherds are only fragments of complete objects—there may have been patterns with other colours that fit onto these sherds.

DlLg-69:01/21 is the body,base portion of a saucer. It has molded, wide horizontal bands as a decorative feature. DlLg-69:01/22 is a base sherd from a bowl, possibly a larger serving dish. DlLg-69:01/24 is a portion of a lid from a circular serving dish. The sherd has an overhanging lip and an inner, downward projecting flange which would have fitted into the bowl portion of this dish, providing a seal. It is a fairly heavy, thick-walled stoneware piece, as opposed to a thinner finer-walled china, and would have been from a very utilitarian set of dishes.

3.6.5.2.2 Brown-on-White Ceramics

DlLg-69:01/23 consists of three sherds from a bowl. One sherd is a lip,body portion, while the other two are body sherds. The two larger sherds fit together. The lip is out-flaring and the size (105.5 mm high) and relative straightness of the sides would indicate that this bowl was probably a serving piece. The decoration consists of large, stylized, full-blown brown flowers with attendant leaves.

3.6.5.2.3 Green-on-White Ceramics

DlLg-69:01/20 consists of two sherds—a lip,body,base and a body,base which fit together—from a plate. It is an ornately decorated specimen with a scalloped lip and a transfer-print pattern of green floral vines interspersed with hanging cartouches covering the entire surface of the body from the lip down onto the upper portion of the base. An embossed pattern of a curlicue underlays the floral pattern, 4.5 mm below the lip. There is a manufacturer's mark on the external body, consisting of a circle mark with "...OTTERY, "STOKE", and "ENGLAND" printed in it. This is the mark of F. Winkle & Co. (Ltd.), Colonial Pottery, Stoke, England. The firm was in business from 1890 to 1931 and used this particular printed mark from 1890 to 1925 (Godden 1964:678; Kovel 1986:70).

3.7 Test Hole 11

Seven artifacts were recovered from Test Hole 11.

3.7.1 Architectural Objects

DlLg-69:01/39 consists of two clear windowpane sherds. These are standard thickness, measuring 1.6 mm.

3.7.2 Lighting Equipment

At the beginning of the 20th century, a rapid evolution in lighting techniques took place. Formerly oil lighting and candlelight had been prevalent, but electric lighting became much more available. DlLg-69:01/40 is a thick, opaque, white glass sherd. It measures 60.7 mm by 27.0 mm and is 4.6 mm thick. It is curved and may have come from a corner light fixture, possibly on a train or in a restaurant.

3.7.3 Floral Remains

DlLg-69:01/41 consists of four fragments of a twig from a poplar (*Populus tremuloides*) tree.

4.0 PRE-CONTACT ARTIFACTS

During the monitoring of the drilling of the geo-technical holes, Pre-Contact cultural resources were recorded at three locations—Test Hole 4, Test Hole 5, and Test Hole 10. Pre-Contact is the general term encompassing all archaeological periods pre-dating the arrival of Europeans in Manitoba in A.D. 1737. Different cultural groups of different temporal periods are defined on the basis of diagnostic artifacts such as ceramics, projectile points, etc. During the monitoring, all soil pertaining to the cultural horizon was collected from the auger bit. The material was subsequently screened and the recovered artifacts are described, by type, for each of the three locations.

4.1 Test Hole 4

The cultural horizon was present at a depth of 140 to 160 cm below surface. Due to sediment fracturing because of frost, the exact depth of this 5 mm thick layer was not able to be determined. A total of 1038 artifacts were recovered from Test Hole 4. These consist of 68 lithic artifacts, 19 ceramic artifacts, 814 faunal remains, and 137 floral remains.

4.1.1 Lithic Artifacts

The lithic component of Pre-Contact tool kits is the portion that tends to preserve the best. Bone and wooden tools, as well as clothing and other organic artifacts, decay or burn during prairie/forest fires. Due to the indestructibility of stone artifacts, they have become one of the standard diagnostic tools for assessing cultural affiliations. This assessment is predicated upon the assumption that there were standardized forms for each type of artifact within each cultural group at a specific time period. However, considerable variation can occur due to the degree of skill of the individual tool maker, the quality of the lithic material from which the tool is being made, and the borrowing of ideas from other cultural groups. No diagnostic lithic artifacts were recovered, only the residue from tool manufacture as well as fire-cracked rock and ochre.

4.1.1.1 Detritus

Detritus is the category under which the byproducts and waste elements of the tool manufacturing process are catalogued. This category refers to lithic material and includes flakes and cores. It can also include the waste product from the manufacture of bone or wooden tools as well as fragments of copper and, in Proto/Post-Contact times, iron.

The manufacture of stone tools is a complex process. Cobbles and pebbles of the desired raw material are struck with a hammerstone to remove flakes. A cobble with flakes removed is known as a core. The removed flakes are further shaped, using a stone or antler billet to strike off smaller flakes to thin the original object and to produce the desired shape. Then, a pointed implement called a flaker, usually made of antler, is used to press small flakes from the edge to produce a sharp, straight cutting

edge. During this process, many flakes are produced—some are further modified as retouched flakes, others are used '*as is*' as expedient cutting tools, but most are discarded at the place of manufacture.

Thirty-four lithic flakes (Table 3) were recovered. Within the 34 flakes, eight lithic material types are represented, the predominant ones being Brown Chert (8 flakes = 23.5%), White Chert (7 flakes = 20.6%), and Knife River Flint (6 flakes = 17.6%).

MATERIAL	GROUP	QUANTITY	FREQUENCY	WEIGHT	FREQUENCY
Chalcedony	I	2	5.9	0.1	7.7
Chert (White)	IV	7	20.6	0.4	30.8
Chert (Brown)	IV	8	23.5	0.1	7.7
Chert (Grey)	IV	2	5.9	0.1	7.7
Knife River Flint	II	6	17.6	0.1	7.7
Quartz	III	3	8.8	0.1	7.7
Quartzite	IV	4	11.8	0.1	7.7
Swan River Chert	I	2	5.9	0.3	23.1
TOTAL		34	100.0	1.3	100.1

Table 3: Flake Recoveries from Test Hole 4 by Material Type

If the probable source areas for the materials are considered, four groupings occur:

Group I: Materials found throughout the western portion of Manitoba. This group includes Swan River Chert from the Swan River Valley region near the Saskatchewan border and St. Ambrose Chert from Lake Manitoba. Other materials, i.e., chalcedony and jasper, are found in deposits such as the Souris Gravel Pits.

Group II: Materials found to the south. The primary example of this group is Knife River Flint which occurs at quarry locations in North Dakota (Burns 1995:33-34).

Group III: Materials associated with the Canadian Shield, found to the east and to the north of the Red River. This group consists of quartz, rhyolite, and diorite.

Group IV: Materials whose distribution is a result of glacial transportation and can be found throughout the province. This group is represented by quartzite, siltstone, silicified sediment, and the various types of undifferentiated chert.

The most frequent group is Group IV, representing 61.8% of the total. Group II provides 17.6% of the total, followed by Group I which provides 11.8%, then Group III which provides 8.8%. Inasmuch as lithic materials are not available at the site, all material would have been transported to the location by the occupants. Some materials, such as Group IV, could have been obtained at creek mouths and riffle areas to the west along the Assiniboine River. Most of the other lithic types are the result of long-distance transport. Knife River Flint tends to be ubiquitous in Manitoba archaeological sites even though the source area is considerably south.

The most predominant groupings of lithic materials would represent source areas recently visited by the occupants. An assemblage such as this one, which shows a very strong reliance on locally obtained material, indicates a knowledge of regional lithic source areas and suggests the practise of gathering tool-quality material when the opportunity arises. As certain types of material are favoured for specific tools, often that type of material is carried until needed. Thus, material from previously visited areas or material obtained by trade can occur as components of the current lithic assemblage.

4.1.1.2 Fire-cracked Rock

A total of 33 fire-cracked rocks, with a combined weight of 3.0 grams, was recovered from Test Hole 4. Concentrations of fire-cracked rock tend to indicate hearths and cooking activities areas.

Fire-cracked rocks are those specimens which have evidence of being subjected to intense heat. Depending upon the structure of the rock, extreme temperature variation causes different results. Fine-grained homogenous lithic cobbles, such as limestone, quartzite, and rhyolite, will spall and shatter into angular fragments, while coarse-grained granitic rocks tend to decompose into smaller granular fragments of the different parent materials, i.e., granite, granodiorite, diorite, etc.

There are a limited number of purposes which granitic rocks can fulfill, one of which is as a raw material for tool manufacture. Granitic cobbles can be shaped, by pecking and grinding, into hammerstones. The granular nature of the stone precludes the manufacture of cutting implements, although tabular granitic spalls can be shaped into chithos (large hide-scraping tools).

Ethnographic literature records the use of heated stones to cook soups and stews. The liquid food, in a hide, basket, or ceramic container, is gradually raised to boiling point by the addition of stones which have been heated in the adjacent fire. The documentation does not record if certain types of stones were preferred or if it was a case of using what was available.

4.1.1.3 Unmodified Lithic Material

A type of unmodified lithic material, which has a cultural use, was recovered. DlLg-69:01/64 is a very small, reddish ochre fragment weighing 0.1 grams. Ochre is a naturally occurring deposit of iron oxide found in two forms. Hematite is reddish, while limonite has a yellow or yellow-brown colour. Ochre was used for decorative purposes with the mineral being pulverized and mixed with bear grease, fish oil, or goose fat. The resultant pigment was used as a personal cosmetic or general purpose paint for teepees, ceramics, parfleches, etc. In addition, powdered ochre was frequently added to dye mixes as the iron content would assist in setting the dye (Densmore 1974:370-373).

4.1.2 Ceramics

A total of 19 ceramic sherds was recovered—DlLg-69:01/52, 53, 54, and 55. This quantity consists of five body sherds and fourteen body sherdlets, weighing a total of 8.0 grams. Sherdlets are small (less than 20 mm in diameter) fragments which possess minimal diagnostic attributes. The separation

is primarily for the convenience of researchers who wish to reexamine the assemblage so that they can focus their efforts on artifacts which will provide the greatest scientific return.

In most ceramic assemblages, the bulk of the sherds are from the body of the pot. Mathematically, this makes sense since the decorated portions of the vessel usually account for less (generally much less) than 20% of the total vessel surface. Body sherds have traditionally been considered less diagnostic than the rims, necks, and shoulders that comprise the decorated portion of the vessel. Until a systematic method of analyzing the variation in the surface appearance of body sherds is developed, the level of description tends to be relatively coarse. Eight sherds have the impression of a textile pattern on the exterior surface and eleven have a smooth exterior surface.

4.1.3 Faunal Remains

The largest number of artifacts from Test Hole 4 consists of faunal objects. These include butchering remains and samples. The faunal material was identified using the standard references: Casteel (1976), Clarke (1981), Gilbert (1973), Mundell (1975), Olsen (1960, 1964, 1968, 1971), Schmid (1972). All of the faunal remains were examined and identified as specifically as possible: body part, age of individual, and species. Evidence of butchering techniques, such as cut marks, was recorded as was the condition of the specimen, i.e., charred, calcined, broken, chewed, or gnawed.

4.1.3.1 Butchering Remains

As is usually the case, food residue in the form of butchering remains is the highest percentage of recovery. A total of 812 artifacts, with a combined weight of 13.9 grams, was recovered. While samples could be construed as butchering remains, in that they are the result of cluster cataloguing of minute residue obtained during the wet screening process, they are not included in the quantities or weights of butchering remains. This is done to not skew the percentages inordinately in favour of undetermined or unidentifiable fragments. As such, the quantities that can be identified to specific taxa more closely reflect the actual food procurement practices of the peoples that camped here.

For comparative purposes, the identified taxa are listed in Table 4. The frequencies of each taxon are calculated on the combined weight and quantities to give a picture of the relative frequency within the entire faunal food assemblage. It should be noted that even though these are considered as butchering remains, some taxa may have been harvested solely for their fur rather than food. However, this cannot be readily ascertained given our current 20th century biases.

Evidence of butchering is occasionally preserved on the bone elements in the form of cut marks where the joints were separated and/or the flesh was stripped from the bone for further preparation. None of these specimens displayed any marks.

Some post-depositional trauma occurs during or immediately after the food preparation process when bone fragments are placed into the fire. The result is bone which is either charred or calcined (so

thoroughly burned that only the inorganic white calcium carbonate remains). Two mammal fragments display evidence of charring, while eleven are calcined. Three clam shell fragments are calcined.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Mammal				
Undifferentiated Mammal	20	2.5	0.7	5.0
Large Mammal	1	0.1	0.4	2.9
TOTAL MAMMAL	21	2.6	1.1	7.9
Fish				
Undifferentiated Fish	784	96.6	11.5	82.7
Catfish (*Ictalurus* sp.)	1	0.1	0.6	4.3
Drum (*Aplodinotus grunniens*)	1	0.1	0.5	3.6
TOTAL FISH	786	96.8	12.6	90.6
Freshwater Clam				
Undifferentiated Clam (Unionidae)	5	0.6	0.2	1.4
TOTAL SHELLFISH	5	0.6	0.2	1.4
TOTAL	812	100.0	13.9	99.9

Table 4: Butchering Remains From Test Hole 4

Archaeologists have many techniques to analyse the protein component of Pre-Contact diets. The most common method is to determine the minimum number of individuals of each species represented at the site. This is done by selecting the most frequent element, e.g., left dentary of a catfish, right femur of a bison, etc., and using that number as the minimum number of animals that would have been harvested. A rigorous analysis uses these minimum numbers and an average body weight of the particular species to determine the amount of usable meat that is represented by the bones in the faunal assemblage. This can be further refined by using base line measurements of the specific element and calculating percentage size ratios of the recovered specimens and then applying that corrected value to the usable meat formula. As an example, a dentary from a 20 pound catfish measures a certain length and the archaeological specimens may range from 50% to 150% of that size. The usable meat would be a compilation of the combined ratios times 20 pounds. A study of this magnitude would fall within academic parameters and is beyond the scope of a mitigative project.

The frequency of the butchering remains are illustrated by both quantity and weight (Figure 2). In the quantity graph, the fish remains overwhelm the other taxa. However, as fish bone is small and light in comparison to the larger and denser mammal bone, the proportions are lessened when weight is considered. In this rather simplistic type of analysis, the amount of available meat is deemed to be relatively proportional to the weight of the residue, although in the case of shellfish, the weight of the discarded shell is considerably greater than that of the available meat.

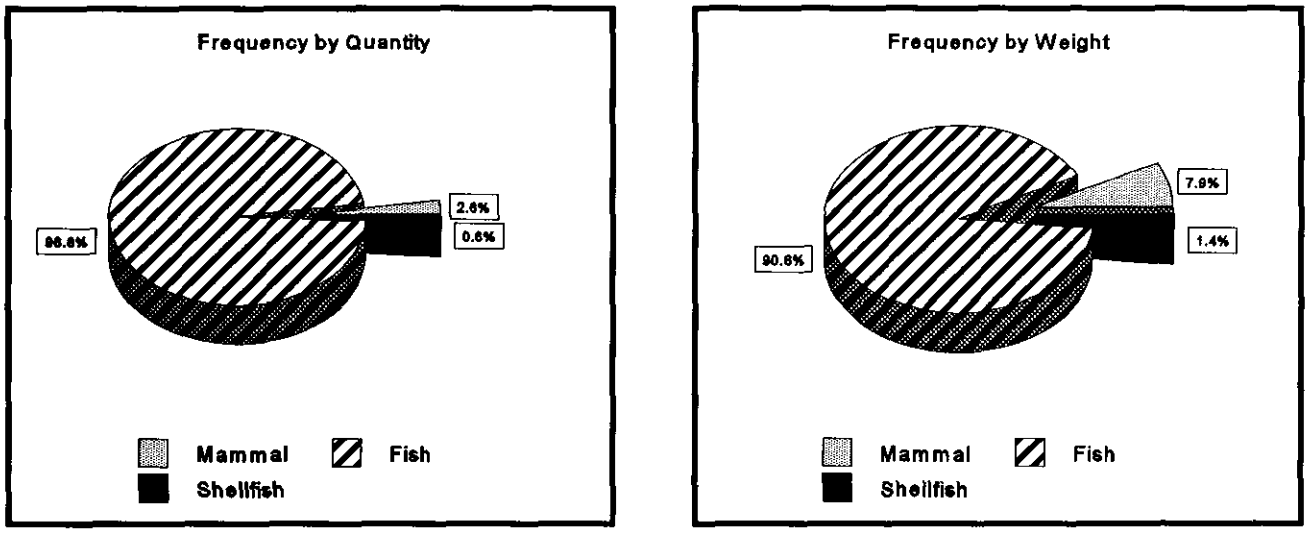

Figure 2: Butchering Remains from Test Hole 4

With the above caveats, it can be seen that the majority of the protein component of the occupants' diet was fulfilled by meat from fish. The extremely fragmented mammal bone could not be identified even to size range. Within the fish, two species were identified—catfish and drum. Further analysis of vertebra and scales, which can often be identified to specific taxa within a rigorous analysis, could produce data which would determine the season of harvest, as annular growth rings (like tree rings) occur in both elements. Shellfish were a small component of the diet.

4.1.3.2 Samples

Samples are an expeditious mechanism for the cataloguing of myriads of minuscule recoveries during the screening soil removal process. They contain diverse artifacts such as small charcoal, shell, and bone fragments. Intensive study may result in the identification of various plant or animal species, but most of the dominant taxa are already represented by larger recoveries. Additional information obtained through comprehensive analysis is usually that of degree and further confirmation of specific taxa rather than the identification of previously unrecorded species. Two samples—one from a 2 mm screen (3.5 gms) and one from a 1 mm screen (11.4 gms)—were catalogued.

4.1.4 Floral Remains

The 137 floral recoveries encompass charcoal and nuts. Some of the charcoal specimens are large enough for species determination at a macro-analysis level. Intensive analysis to determine the species is beyond the scope of a mitigative report, but cursory examination of random specimens indicates they derive from deciduous trees. It can be assumed that most of the 133 charcoal fragments (DlLg-69:01/67) would come from locally available trees—oak, maple, willow, poplar, and birch.

DlLg-69:01/66 consists of four fragments from the shell of a hazelnut (*Corylus* sp.). Both species of hazelnut could have been present in the gallery forest along the river (Looman and Best 1979:301).

The nuts would have been harvested for food, while other portions of the plant were used for dyes (Densmore 1974:372), lung hemorrhagic medicine (Densmore 1974:340), and basic utility items.

4.2 Test Hole 5

The cultural horizon was present at a depth of 260.0 cm below surface. This was a relatively thick (2 cm) layer containing significant quantities of artifacts embedded in a heavily charcoal stained matrix. It would appear that there had been some degree of soil formation, although the charcoal staining obscures the degree. A total of 1586 artifacts were recovered from Test Hole 5. These consist of 9 lithic artifacts, 12 ceramic artifacts, 1519 faunal remains, and 46 floral remains.

4.2.1 Lithic Artifacts

No diagnostic lithic artifacts were recovered from Test Hole 5, only detritus (the residue from tool manufacture) and fire-cracked rock.

4.2.1.1 Detritus

Eight lithic flakes (Table 5) were recovered. Five lithic material types are represented with the predominant ones being Swan River Chert (3 flakes = 37.5%) and Brown Chert (2 flakes = 25.0%). Group IV represents 50% of the total, Group I represents 37.5%, and Group III represents 12.5%.

MATERIAL	GROUP	QUANTITY	FREQUENCY	WEIGHT	FREQUENCY
Chert (White)	IV	1	12.5	0.1	7.1
Chert (Brown)	IV	2	25.0	0.1	7.1
Chert (Black)	IV	1	12.5	0.1	7.1
Diorite	III	1	12.5	1.0	71.4
Swan River Chert	I	3	37.5	0.1	7.1
TOTAL		8	100.0	1.4	99.8

Table 5: Flake Recoveries from Test Hole 5 by Material Type

4.2.1.2 Fire-cracked Rock

One small fragment of granitic fire-cracked rock, weighing 0.1 grams, was recovered.

4.2.2 Ceramics

Twelve ceramic sherds—DlLg-69:01/85, 86, 87, 88, and 89—were recovered. This quantity consists of six body sherds and six body sherdlets, weighing a total of 6.7 grams. All of the body sherdlets

are textile impressed, while four of the body sherds have obliterated textile impressions, one has a smooth exterior surface, and the surface of one is too exfoliated to determine the surface finish.

4.2.3 Faunal Remains

As with Test Hole 4, the largest number of artifacts from Test Hole 5 also consist of faunal objects. These include butchering remains, natural faunal deposits, and samples.

4.2.3.1 Butchering Remains

Again, food residue in the form of butchering remains is the highest percentage of recovery with a total of 1515 artifacts, having a combined weight of 147.0 grams. The identified taxa are listed in Table 6. The frequencies of each taxon are calculated on the combined weight and quantities to give a picture of the relative frequency.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Aves				
Large Aves	3	0.2	0.6	0.4
Medium Aves	1	0.1	0.3	0.2
TOTAL AVES	4	0.3	0.9	0.6
Mammal				
Undifferentiated Mammal	2	0.1	0.3	0.2
Large Mammal	62	4.1	39.6	26.9
Bison (*Bison bison*)	2	0.1	2.5	1.7
Dog/Wolf (*Canis* sp.)	1	0.1	1.4	1.0
TOTAL MAMMAL	67	4.4	43.8	29.8
Fish				
Undifferentiated Fish	1335	88.1	45.1	30.7
Catfish (*Ictalurus* sp.)	98	6.5	55.9	38.0
Sturgeon (*Acipenser fulvescens*)	1	0.1	0.2	0.1
Sucker (Catostomidae)	8	0.5	0.8	0.5
TOTAL FISH	1442	95.2	102.0	69.3
Freshwater Clam				
Undifferentiated Clam (Unionidae)	2	0.1	0.3	0.2
TOTAL SHELLFISH	2	0.1	0.3	0.2
TOTAL	1515	100.0	147.0	99.9

Table 6: Butchering Remains From Test Hole 5

Evidence of butchering occurs on only one specimen. DlLg-69:01/108, a large mammal rib, has cut marks. Occasionally, evidence of pathologies can be observed on the faunal remains. DlLg-69:01/111 is a sesamoid from a large mammal that has evidence of a severe case of arthritis. Some post-depositional trauma occurs on two unidentifiable mammal fragments. One is charred, while the other is calcined.

The low proportion of bird remains suggests that the occupation did not take place during either the spring or fall migration periods. Alternatively, the option of bird hunting was not as economically productive as that of fishing or big game hunting and birds were only obtained when the opportunity arose during other activities.

Some of the mammalian bone exhibits spiral fracture indicating breakage while fresh. This breakage was probably for the production of bone grease during which the bones are broken into small fragments (Zeirhut 1967:35) and then boiled to extract the fat (Paget 1909:78). The resulting bone grease, variously termed marrow fat, soft fat, and grease (Hurlburt 1977:19-21), was consumed directly or used for making pemmican. The product has been described as "...quite hard like tallow, and has the appearance and very nearly the flavour of the richest yellow butter" (Catlin 1926:131).

The frequency of the butchering remains are illustrated by both quantity and weight (Figure 3). In the quantity graph, the fish remains overwhelm the other taxa. The proportions are lessened when weight is considered.

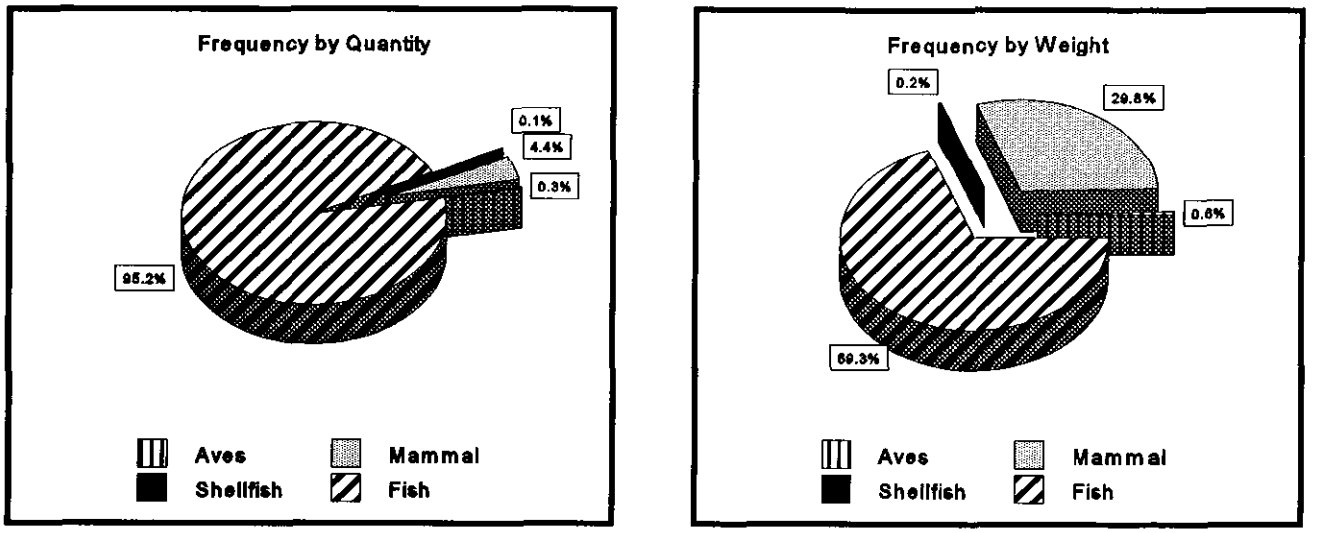

Figure 3: Butchering Remains from Test Hole 5

It can be seen that the majority of the diet consisted of fish. Most of the extremely fragmented mammal bone could not be identified, although two bison tooth fragments (DlLg-69:01/103) and a phalanx (DlLg-69:01/102) from a dog/wolf were recorded. Within the fish, three species were identified—catfish, sucker, and sturgeon. Shellfish were gathered, either as food or as raw material for the manufacture of tools and ornaments.

4.2.3.2 Naturally Deposited Fauna

Representations of naturally occurring faunal specimens are often incorporated into cultural deposits. They include frogs, which burrow into the soil for hibernation, and natural residents such as small rodents who tend to scavenge occupation sites. Naturally deposited fauna can also include aquatic taxa—freshwater snails and pea clams—which are deposited as part of the sediment load during flood episodes and are part of the soil substrate below the cultural level. As the cultural material mixes slightly with the upper portion of the original soil, these taxa are incorporated within the cultural matrix. Two specimens of non-food faunal remains were curated from Test Hole 5. DlLg-69:01/98 is a vertebra from a frog/toad (Anura). DlLg-69:01/106 is a phalanx from a very small mammal, possibly a mouse or a shrew.

4.2.3.3 Samples

Two samples weighing 72.8 grams were catalogued, one from a 2 mm screen (35.9 gms) and one from a 1 mm screen (36.9 gms).

4.2.4 Floral Remains

Forty-six floral specimens were recovered from Test Hole 5—45 charcoal fragments and one seed. Some of the charcoal specimens (DlLg-69:01/97) are large enough for species determination at a macro-analysis level. Preliminary examination of random specimens indicates that the charcoal derives from local deciduous trees rather than coniferous trees.

DlLg-69:01/96 is a single, complete seed. Using the comparative reference by Montgomery (1977), it was identified as *Smilacina* sp. (Solomon's-seal). This plant is present in moist woods throughout the Parkland areas and would have been present in the gallery forest along the Red and Assiniboine Rivers. Among the Gitxan of British Columbia, one species of *Smilacina* was used as a food source. The berries were cooked and preserved in oil. The seeds were also edible and were mixed with the berries (SchoolNet 1998).

4.3 Test Hole 10

This thin, sparse cultural horizon was present at a depth of 400 cm below surface. A total of 34 artifacts, weighing 0.3 grams, were recovered, all butchering remains. Twenty-eight specimens are fish scale, with the remainder including five unidentifiable fish fragments and one unidentifiable mammal fragment. There are no discernible marks, charring, or calcining on any of these specimens.

4.4 Discussion and Correlations

The upper Pre-Contact cultural horizon is known to be an extensive occupation site which has been recorded at the following locations:

- the southern dugout of the CanWest Global Park Baseball Facility (Quaternary 1996:85-103, 2000a:51-98);
- along the north side of Water Avenue (Quaternary 2000a:98-102);
- south of Water Avenue on the once-proposed route of St. Mary Avenue (Quaternary 1990a, 1990b, 1990c);
- south along Pioneer Boulevard (Quaternary 1999:103-135);
- east along the once-proposed York Avenue Extension (Quaternary 1989); and
- south into The Forks gravel parking lot (Quaternary 2000b).

These locations must be considered the minimum dimensions of this site. It probably extends beyond these locations which reflect the extent of investigation rather than the extent of the horizon.

This cultural horizon, radiocarbon dated at 665 years ago [A.D. 1285] (Quaternary 1999:12-14), has considerable significance in the history of Manitoba. The artifacts contain representations of "Algonkian peoples from central and southern Manitoba, northwestern Ontario, northwestern Minnesota, and possibly parts of Minnesota and North Dakota along the Red River Valley" (Quaternary 1999:215). The Aboriginal oral history, recorded by the Elders, contains stories about a major "Peace Meeting" that occurred at The Forks approximately 500 years ago. This information, shared by the Elders, notes that this meeting was attended by several different groups (seven in one version, nine in another). Given the wide range of culturally diagnostic artifacts recovered from this horizon, it is considered to be physical evidence of this meeting.

The artifacts recovered during the monitoring of the geo-technical drilling for the West Roads reconfiguration do not encompass any new types of artifacts and/or cultural representations. However, the presence of the horizon in undisturbed portions of the impact zone confirm that this is a continuous horizon between the already known outer limits.

The lower cultural horizon is exceedingly sparse and does not contain any culturally diagnostic artifacts. Thus, it is not possible to correlate it with a specific archaeological horizon identified in a previous project. Given the location—east of Pioneer Boulevard—and the fact that soil strata tend to slope downward to the east, it is possible that this horizon correlates with one of the deeper horizons recorded during The Forks Access Project (Quaternary 1999:8-16). The deepest horizon recorded at The Forks Access Project, Horizon K, was radiocarbon dated at A.D. 1040. Archaic (1000 B.C.) cultural horizons have been recorded on the north bank of the Assiniboine River (Kroker 1989; Kroker and Goundry 1990, 1993a, 1993b, 1994). This deep cultural horizon at Test Hole 10 probably falls between the Archaic Period and the early Late Woodland Period represented by Horizon K.

5.0 ARCHIVAL DATA

The present Water Avenue was the northern boundary of the Hudson's Bay Reserve (Warkentin and Ruggles 1970:191, 387). Early in the immigration period, the west bank of the Red River and the northern edge of the Reserve became the sites of a shanty town when short term buildings were thrown up for winter occupancy by homesteaders who then returned to their farmlands each spring (Dafoe 1998:88). These temporary structures of the early 1870s soon gave way to more permanent residences for working class people. Research in the City of Winnipeg Henderson Directories (1874 - 1999) indicates a pattern of dense residential use at the turn of the century and diminishing residential use from then on. Limited commercial establishments replaced some of the houses with considerable vacant land occurring in the latter half of the 20th century. This pattern is illustrated on the Fire Insurance Atlases available at the Provincial Archives of Manitoba (PAM).

In 1895, the north side of Water Avenue and the south side of Notre Dame East (which became Pioneer Avenue in 1960) were solely residential west of the Winnipeg Transfer Railway (Figure 4). At this time, the south side of Water Avenue was occupied by freight sheds and the Northern Pacific and Manitoba Railroad had its depot and main office at Water Avenue and Main Street. To the east of the Winnipeg Transfer Railway, the Northwest Electric Company had a large building on the north side of Water Avenue. This structure, eventually designated as #33 Water Avenue, became the premises of Sterling Engine Works, in 1917 (Figure 5). Beginning around 1910 and continuing into the 1920s, some businesses started occupying existing structures or demolishing and constructing new buildings for their premises on Water Avenue (Figure 6). Notre Dame East retained its residential character until after World War II. The majority of the change for both avenues occurred after 1960, by which time only one or two houses remained (Figure 7).

By superimposing the locations of the test holes over the earliest map (Figure 4), some correlation of recoveries with the adjacent structures can be seen. Test Hole 1 would be near #110 Notre Dame East, while Test Hole 2 appears to be within the basement of #96 Notre Dame East. Test Hole 3 is adjacent to the north edge of #97 Water Avenue, while Test Hole 4 is in an undisturbed area between, or north of, #75 and #77 Water Avenue. Test Hole 5 appears to fall within the footprint of #55 Water Avenue. Test Hole 6 could be adjacent to #43 or #41, while Test Hole 9 and Test Hole 11 fall within the footprint of the large Northwest Electric Company building between the two railroad tracks.

All structures adjacent to the western test holes were residences in 1905. The situation was similar in 1918 (Figure 5), although the structures at Test Hole 1 had been demolished and a differently configured building had been built at #90 Notre Dame East (Test Hole 2). By 1927 (Figure 6), the structures at Test Hole 3 had been demolished but the residences still occurred at Test Holes 4, 5, and 6. As of 1973, no structures remained at any of the test hole locations except for the large building at #33 Water Avenue which contains Test Holes 9 and 11 (Figure 7).

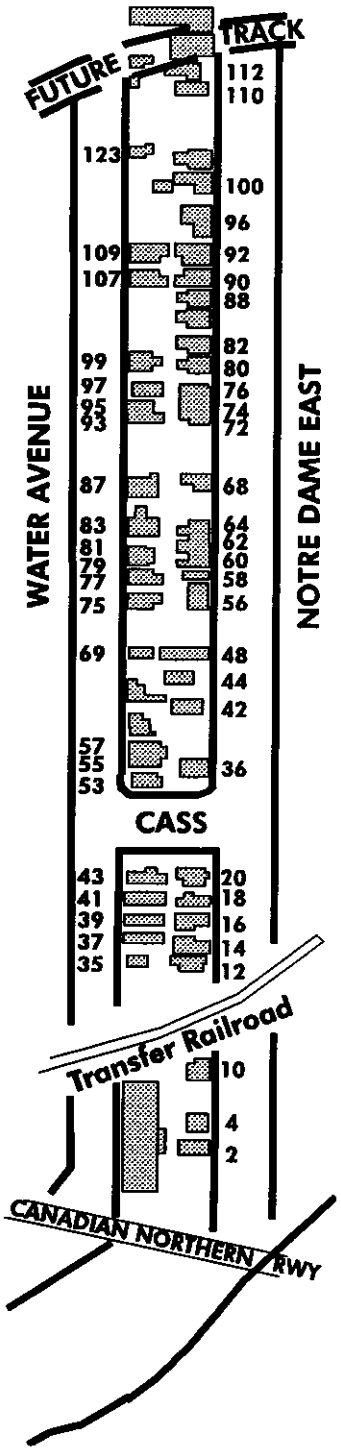

Figure 4: Computer Drafted Map Based on the 1895 - 1905 Goad's Fire Insurance Atlas (PAM)

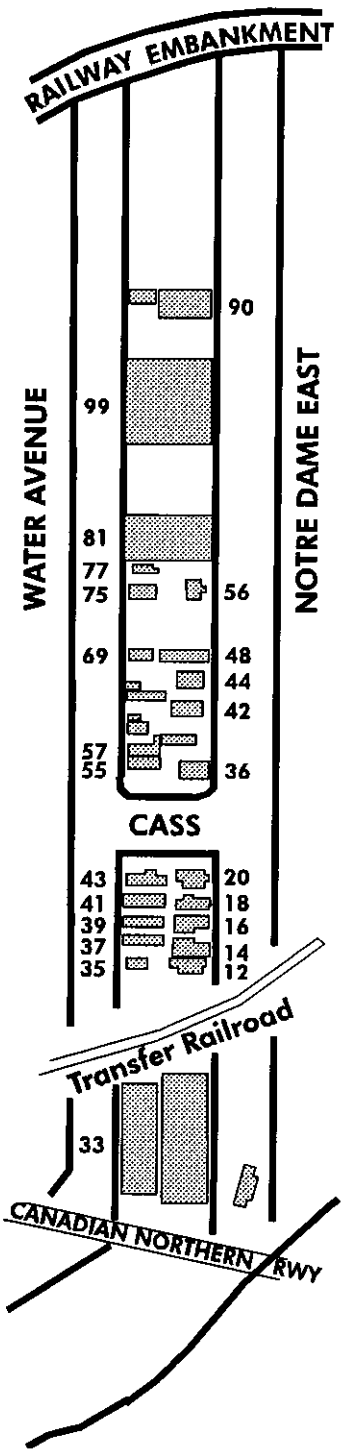

Figure 5: Computer Drafted Map Based on the 1918 Fire Insurance Atlas (PAM)

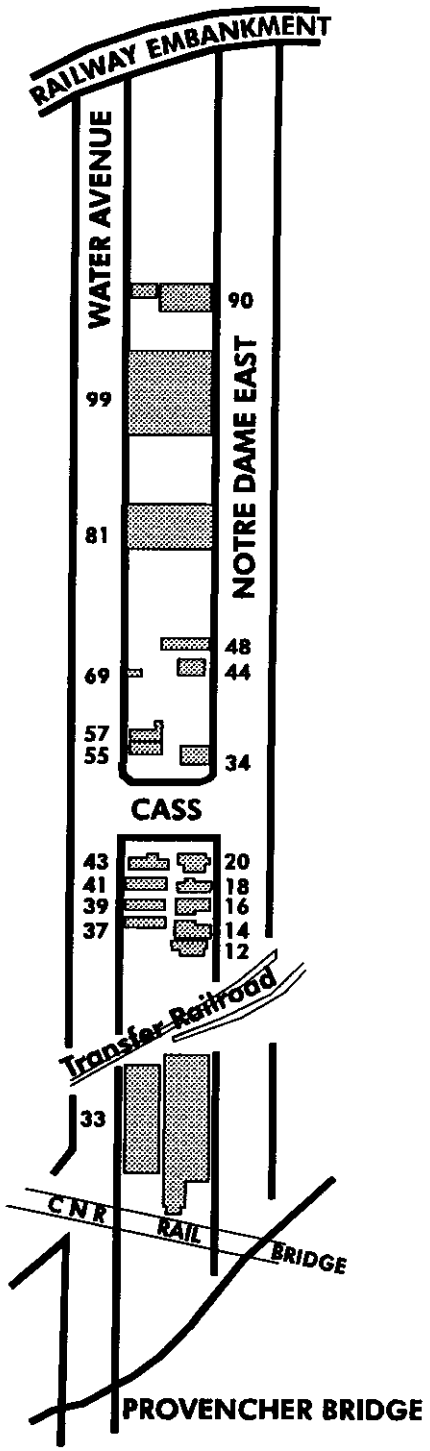

Figure 6: Computer Drafted Map Based on the 1927 Fire Insurance Atlas (PAM)

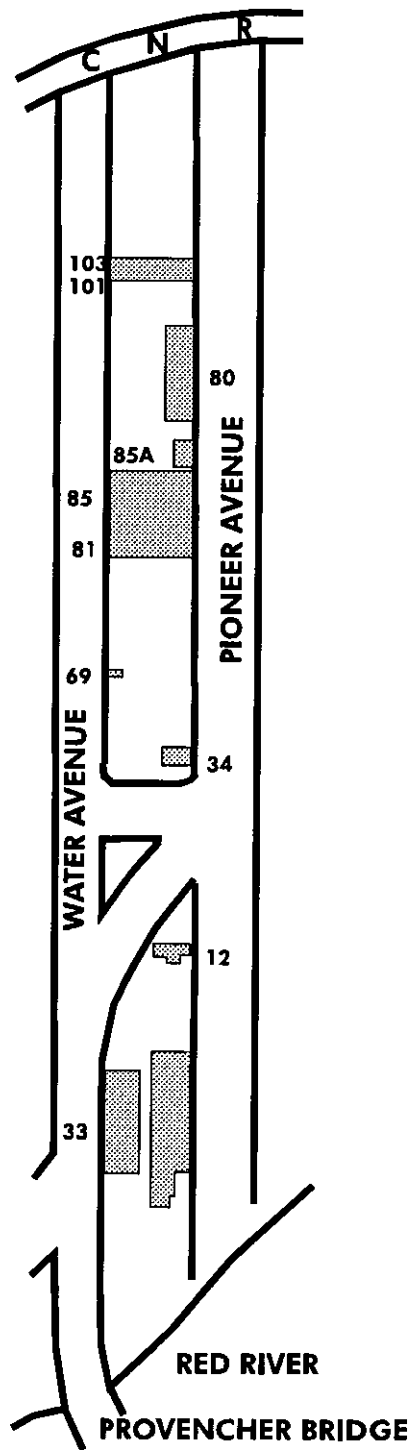

Figure 7: Computer Drafted Map Based on the 1973 Fire Insurance Atlas (PAM)

Prior to 1890, the buildings were numbered starting from Main Street, with the largest numbers at the Red River ends of the streets. The premises of Jarvis & Berridge, lumber merchants, are listed at #78 Notre Dame East which was renumbered to #34 in 1882. This firm, and its successor (Winnipeg Lumber Company), also maintained premises across the street at #41 Notre Dame East (Quaternary 1996:116). The presence of the organic layer containing wood chips and straw in Test Hole 3 (Table B2) suggests that this hole was near or within the lumberyard. Between the demise of the lumber companies in 1884 and the first fire atlas (Figure 4), considerable construction and building replacement had occurred. Tracing the ephemeral occupants of rental housing and boardinghouses does not permit exact identifications of buildings through the Henderson Directories, especially as occasionally structures are missed for a year or more. However, it appears that the lumber premises had been at or near the location of #82 Notre Dame East in 1895. A second business of note was the existence of the Royal Hotel, originally listed at #87 Notre Dame East (this address had been listed as a boarding house in 1880) and renumbered as #36 in 1882. It disappears by 1887 to be replaced by a residence. One of the long-term residents of the area was the Hazel family (John and Emily) who resided at #44 Notre Dame East. They took up residence in 1889, John Hazel died in 1895/96, and Emily Hazel continued living at #44 until 1935 (Henderson Directories).

6.0 RESOURCE MANAGEMENT PLAN

The potential of Pre-Contact and urban period heritage resources requires the implementation of a construction monitoring program. All potential heritage resource impact can be mitigated by an archaeological team working in conjunction with the contractor during any periods of excavation. There will be two primary types of excavation—large-scale block excavations to depths of approximately 1.5 metres below grade for the roadbed and intermittent vertical shafts excavated by backhoe and/or drilled by a truck-mounted auger for the installation of sub-surface services.

It is recommended that all excavations for the roadbed and the installation of the sub-surface services be monitored by an archaeological team. Urban development will have caused some degree of impact upon the Pre-Contact cultural horizon which is known to occur at depths ranging between 140 cm in Test Hole 4 (Table B2) and 260 cm in Test Hole 5 (Table B3) and the Pioneer Boulevard intersection (Quaternary 2000a:101).

Standard roadbed excavations will have a potential of impacting slightly on the higher elevated portion of the cultural horizon. In lieu of mitigative archaeological excavations of the cultural horizon, it may be valid to consider raising the depth of the base of the roadbed as occurred during The Forks Access Project (Quaternary 1999:5). Additional impact will result from excavations for the sub-drains as they are slightly deeper than the roadbed. Localized impact will occur through the excavation of vertical shafts for the installation of sub-surface services.

6.1 Construction Monitoring Methods

During excavations for the roadbed, the monitoring archaeologist will watch the face of the excavation for cultural evidence. The primary focus for recoveries from the historic fill horizons will be diagnostic artifacts, i.e., those which can provide evidence of time period, company of manufacture, and/or function. Accordingly, glass and ceramic containers which often have diagnostic markings will be curated, if present. Also, metallic objects which can be identified to function will be recovered, while non-diagnostic structural items, such as generic bricks, eavestrough, iron pipes, wire-cut nails, etc., are not generally curated.

The upper levels will encompass the urban period and evidence of structures may occur. These will be indicated by the presence of milled lumber, brick, and/or concrete. Given that considerable fill containing structural material may occur in the impact zone, the monitoring archaeologist will ascertain if the structural remnants are *in situ* features representing an actual structure rather than a fill deposit.

The monitoring of the roadbed excavation will be as intensive as required. Evidence of urban structures will be recorded and the location mapped but only diagnostic artifacts will be curated. Given that considerable fill containing structural material may occur in the impact zone, the monitoring archaeologist will ascertain if the structural remnants are *in situ* features representing an

actual habitation rather than a fill deposit. In addition, the excavation of a sub-drain channel within the roadbed excavation will be monitored where necessary. Where the sub-drain encounters the Pre-Contact cultural horizon, the excavated soil will be deposited at the side of the active construction zone for processing by the archaeological team.

Archaeological monitoring of the excavations for vertical shafts for the sub-surface services will consist of continual visual observation of the excavation. Inasmuch as much of the excavation will be into undisturbed soils containing the known cultural horizon, the archaeologist will monitor all excavation. When sub-surface cultural resources are encountered, the horizon will be removed *en bloc* and placed to the side of the active working area for further investigation by the archaeological team, thus allowing the contractor to continue working. Once the excavation of a vertical shaft is completed and the sewer cages installed, the monitoring archaeologist will enter the excavation to record the soil profile in the walls.

6.2 Laboratory Methods

Laboratory procedures will be the same as those already described in Section 1.4. The only difference will be in quantity as both historic and Pre-Contact cultural material was recovered during the geo-technical monitoring program.

6.3 Sensitive Zones

Based on the geo-technical program data, as well as prior projects, the area which contains the 665 year old cultural horizon extends from at least Test Hole 2 to Test Hole 6. A very deep cultural horizon was observed in Test Hole 10 which is below roadbed impact but would still require monitoring of vertical shafts in this vicinity and as far east as Test Hole 12.

The known extent of the upper cultural horizon is described in Section 4.4 and will occur in any location which has not experienced prior impact. The location around Test Hole 3 may be the most sensitive as the depth of the horizon was recorded at 140 cm below surface. While the exactitude of the recorded depth is slightly problematic due to frozen ground, the horizon may well be at this minimal depth which will result in impact by roadbed excavations. **Contingency plans** for raising the base of the roadbed excavations **should be determined prior to the onset of construction** if this is the case.

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APPENDIX A

HERITAGE PERMIT

The Heritage Resources Act (Subsection 14(2) and Sections 52 and 53)

Manitoba
Culture, Heritage
And Tourism

Heritage Permit No. A80-00

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

Name: Quaternary Consultants Ltd.
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 of 10 (ten) 16" (sixteen inch) holes between the Provencher Bridge and the CN main line on the west side of the Red River at The Forks, in conjunction with realignment of the road system, in order to record the depth and density of cultural materials to aid in developing a heritage resources management strategy for the construction phase of the project,

during the period:

March 19 – April 30, 2001.

This permit is issued subject to the following conditions:

(1) That the information provided in the application for this permit dated the 16th day of March 2001, 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: July 1, 2001;

(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 heritage objects are to be deposited with the Manitoba Museum by July 31, 2001, for permanent curation and storage, unless appropriate loan requirements are arranged with the Curator of Archaeology prior to that date;
b. 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;
c. Neither the Government of Manitoba nor the party issuing this permit shall 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.

Dated at the City of Winnipeg, in Manitoba, this 16th day of March 2001.

Minister of Culture, Heritage and Tourism

APPENDIX B

STRATIGRAPHIC PROFILES

HOLE 1	SOIL LAYERS	HOLE 2	SOIL LAYERS
0 - 10	Gravel	0 - 10	Gravel
10 - 40	Cinder, ash	10 - 95	Silty clay, gravel, structural fill
40 - 160	Brown silty clay fill	95 - 110	Brown silty clay fill
160 - 220	Brown silty clay (natural)	110 - 210	Silty clay, clay, structural fill
220 - 220	**Charcoal layer** (3 mm)	210 - 290	Brown silty clay (natural)
220 - 325	Brown silty clay	290 - 292	Light brown sand
		292 - 305	Brown silty clay
325 - 330	Hematite stained silty clay	305 - 310	Hematite stained silty clay
330 - 410	Brown silty clay	310 - 410	Brown silty clay
410 - 420	Brown sandy silt	410 - 415	Brown sandy silt
420 - 425	Brown silty clay	415 - 420	Brown silty clay
425 - 430	Brown sandy silt	420 - 425	Brown sandy silt
430 - 450	Brown silty clay		
450 - 460	Brown sandy silt		
460 - 630	Brown silty clay *	425 - 560	Brown silty clay *
630 -	Lake Agassiz clay	560 -	Lake Agassiz clay

* - thin bands of sandy silt within the silty clay matrix which darkens in colour with depth

Table B1: Stratigraphic Profiles of Test Holes 1 and 2 in Parking Lot East of CNR Embankment

HOLE 3	SOIL LAYERS	HOLE 4	SOIL LAYERS
0 - 15	Gravel	0 - 10	Gravel
15 - 20	Brick	10 - 40	Clay, gravel fill
20 - 25	Cinder, ash	40 - 140	Brown silty clay (natural)
25 - 120	Brown clay fill	140 - 145	**CULTURAL HORIZON** *
120 - 160	Organic - wood, straw	145 - 215	Brown silty clay
160 - 175	Brown silty clay (natural)	215 - 218	Light brown sand
175 - 175	**Charcoal layer** (3 mm)	218 - 235	Brown silty clay
175 - 190	Brown silty clay	235 - 235	Buried organic horizon
190 - 195	Hydrocarbon stain, silty clay	235 - 275	Brown silty clay
		275 - 276	Brown sand
195 - 290	Brown silty clay	276 - 330	Brown silty clay
290 - 340	Hydrocarbon stain, silty clay	330 - 333	Brown sandy silt
		333 - 340	Brown silty clay
340 - 345	Brown sandy silt	340 - 345	Brown sandy silt
345 - 410	Brown silty clay **	345 - 460	Brown silty clay **
410 -	Lake Agassiz clay	460 -	Lake Agassiz clay

* - Cultural Level could be +10 to -30 cm (depth determination problematic due to frost)
** - thin bands of sandy silt within the silty clay matrix which darkens in colour with depth

Table B2: Stratigraphic Profiles of Test Holes 3 and 4 in Parking Lot East of Existing Building

HOLE 5	SOIL LAYERS	HOLE 6	SOIL LAYERS
0 - 8	Gravel	0 - 100	Clay fill
8 - 90	Cinder, ash	100 - 120	Cinder
90 - 120	Clay fill		
120 - 260	Brown silty clay (natural)	120 - 160	Brown silty clay (natural)
260 - 262	**CULTURAL HORIZON**	160 - 160	Buried soil horizon (5 mm)
262 - 290	Brown silty clay	160 - 250	Brown silty clay
		250 - 290	Brown silty clay ***
		290 - 310	Dark brown clayey silt
		310 - 380	Grey brown silty clay
290 - 410	Dark brown silty clay *	380 - 450	Brown silt ****
410 - 430	Brown sandy silt	450 - 490	Brown clayey silt (grey clay bands)
430 - 610	Dark brown silty clay **	490 - 530	Brown sandy silt
610 -	Base of hole	530 - 560	Grey brown clayey silt
		560 - 610	Grey brown sandy silt
		610 -	Lake Agassiz clay

* - layered with thin sandy silt, clayey silt, and hematite stained silty clay
** - thin bands of sandy silt and grey clay within the silty clay matrix which darkens in colour with depth
*** - zones of hematite staining and traces of decayed roots
**** - zones of hematite staining

Table B3: Stratigraphic Profiles of Test Hole 5 (East End of Parking Lot) and Test Hole 6 (East of Intersection)

HOLE 9	SOIL LAYERS	HOLE 11	SOIL LAYERS
0 - 150	Clay fill	0 - 200	Gravel, brick, clay fill
150 - 220	Cinder, ash, brick, clay fill		
220 - 300	Brown silty clay (natural)	200 - 210	Brown silty clay (natural)
		210 - 210	Buried soil horizon (5 mm)
		210 - 220	Brown silty clay
		220 - 221	**Charcoal layer** (10 mm)
		221 - 235	Brown silty clay
		235 - 245	Light brown sand
		245 - 260	Brown sandy silt
		260 - 280	Brown silty clay
		280 - 300	Brown sand
300 - 380	Grey brown silty clay *	300 - 370	Brown silty clay
380 - 500	Dark grey brown silty clay	370 - 380	Brown silty clay - hematite staining
500 - 505	Dark grey brown sandy silt	380 - 400	Brown silty clay **
		400 - 400	**CULTURAL HORIZON ? ***
		400 - 570	Brown silty clay ****
505 - 508	Blue grey clay	570 - 590	Blue grey clay
508 - 710	Dark grey brown silty clay	590 - 600	Dark grey brown clay
710 - 715	Dark grey brown sand		
715 -	Blue grey clay (Agassiz)	600 -	Lake Agassiz clay

* - hematite staining at 320, 340 cm dbs
** - thin bands of dark brown clay
*** - traces of decomposed fish bone
**** - thin bands of silty sand

Table B4: Stratigraphic Profiles of Test Holes 9 and 11 (North of Water Avenue)

HOLE 10	SOIL LAYERS	HOLE 12	SOIL LAYERS
0 - 100	Recent silty clay fill	0 - 90	Gravel
100 - 180	Cinder, gravel, clay fill	90 - 140	Silty clay, wood fill
180 - 230	Diesel stained silty clay	140 - 160	Yellow brown silt
230 - 250	Medium brown silty clay	160 - 160	Buried soil layer (5 mm)
250 - 260	Brown sandy silt	160 - 250	Yellow brown silty clay *
260 - 290	Medium brown silty clay	250 - 300	Grey brown silty clay
290 - 370	Brown clayey silt	300 - 320	Brown sandy silt
370 - 380	Brown silty clay, hematite	320 - 450	Brown silty clay
380 - 400	Brown sandy silt	450 - 470	Dark brown silty clay **
400 - 400	**CULTURAL HORIZON** (1 mm)	470 - 550	Lake Agassiz clay
400 - 450	Brown clayey silt		
450 - 450	**Charcoal layer** (5 mm)		
450 - 480	Brown silty clay		
480 - 490	Brown sandy silt		
490 - 540	Brown silty clay		
540 - 640	Brown clay - hematite bands		
640 - 645	Blue grey clay		
645 - 690	Brown clay - hematite, grey clay		

* - thin bands of grey brown clay
** - thin bands of blue grey clay

Table B5: Stratigraphic Profiles of Test Holes 10 and 12 (South of Water Avenue)

HOLE 13	SOIL LAYERS	HOLE 14	SOIL LAYERS
0 - 40	Gravel, clay fill	0 - 40	Recent clay fill
40 - 150	Diesel stained silty clay	40 - 240	Light brown silty clay
150 - 230	Brown silty clay *	240 - 270	Dark brown clayey silt with marl
230 - 230	**Charcoal layer** (5 mm)	270 - 290	Light brown clay
230 - 310	Brown clay with marl	290 - 300	Dark brown clay with marl
310 - 320	Brown silty clay	300 - 303	Hematite band
320 - 430	Light brown clay	303 - 320	Dark brown clay
430 - 550	Redeposited Agassiz clay **	320 - 600	Redeposited Agassiz clay **
550 -	Lake Agassiz clay		

* - some marl and decomposed roots
** - thin bands of weathered brown clay interspersed

Table B6: Stratigraphic Profiles of Test Hole 13 (North of Tache/Provencher) and Test Hole 14 (South of Tache/Provencher)