ARCHAEOLOGICAL IMPACT ASSESSMENT OF THE LEGACY ESTATES PROJECT AT THE FORKS

Submitted to

THE FORKS NORTH PORTAGE PARTNERSHIP

QUATERNARY
CONSULTANTS
LIMITED

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EXECUTIVE SUMMARY

The proposed development of a condominium complex at the intersection of York Avenue and Pioneer Boulevard, in the northwest corner of The Forks North Portage Partnership gravel parking lot, is in a sensitive area for archaeological resources. Archaeological resources are known to the west, the northwest, and the north of the proposed building location. Prior to the detailed design by the architects, Quaternary Consultants Ltd. was contracted to undertake an archaeological impact within the footprint of the proposed structure to locate the presence of and to record the depth of the buried cultural horizons.

Eight assessment trenches were excavated within the building footprint. Cultural horizons, which can be correlated with those recorded on the periphery of the location, were recorded in five of the trenches. The highest cultural horizon occurred in Trench 8 at a depth of 195 cm below surface (228.77 metres above sea level).

The construction of the proposed facility will require archaeological monitoring of the augering of holes for pile seating and the excavations for pile caps. Depending upon the depth of the grade beams, different heritage resource management strategies would need to be employed. If the base of the grade beams are to be 150 cm below surface, minimal further archaeological monitoring during the construction would be required. If the grade beams are 200 cm or deeper, considerable construction monitoring and possibly mitigative excavation would be obligatory.

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1.0 INTRODUCTION

On December 10, 1999, Larry Kelly of Legacy Estates and Patrick Hamilton of Royal LePage, representing a project which proposes to construct a facility at the northwest corner of Parking Lot D (southeast corner of the intersection of York Avenue and Pioneer Boulevard), met with Sid Kroker of Quaternary Consultants Ltd. to obtain information concerning archaeological resources at this location. A subsequent meeting with David Stones (The Forks North Portage Partnership) and Darwin Kupskay (Reid Crowther & Partners) resulted in the determination that further information within the footprint of the proposed structure was required.

Quaternary Consultants Ltd. was contracted to undertake a preliminary impact assessment consisting of a series of test trenches (Figure 1) to record presence or absence of sub-surface cultural horizons. The project was conducted under the terms of Heritage Permit A62-99, issued by Historic Resources Branch, Manitoba Culture, Heritage and Citizenship (Appendix A).

1.1 Location and Scope of the Project

As depicted on Figure 1, the project was on the east side of Pioneer Boulevard, immediately south of the York Avenue intersection. A series of eight test trenches was laid out within the footprint of the proposed structure.The primary goal of the investigation was to ascertain if archaeological strata occurred in the upper two metres, although several test trenches were excavated to three metres below surface. The test trenches were situated to provide a general overview of the presence and depths of cultural horizons within the potential impact zone.

The proposed structure is H-shaped with projected sub-surface parking. The primary aim of this impact assessment was to determine the depth below grade at which impact upon cultural horizons would occur. The proponent is tentatively designing the structure with the base of grade beams at 150 cm below the surface of the parking lot (230.8 metres asl). The assessment provides information as to degree of impact at this depth and whether the structure would need to be raised to eliminate impact or if the structure could be lowered.

1.2 Existing Data

Four reports containing information concerning archaeological horizons are available:

- Provencher Bridge Project Archaeological Impact Assessment (Quaternary 1989a);
- Archaeological Monitoring of the Stage I Construction Program (Kroker and Goundry 1990);
- Impact Assessment and Archaeological Monitoring of The Forks Access Project: South of Water Avenue (DlLg-33:97A) (Quaternary 1999a); and
- Festival Park Archaeological Monitoring (Quaternary n.d.).

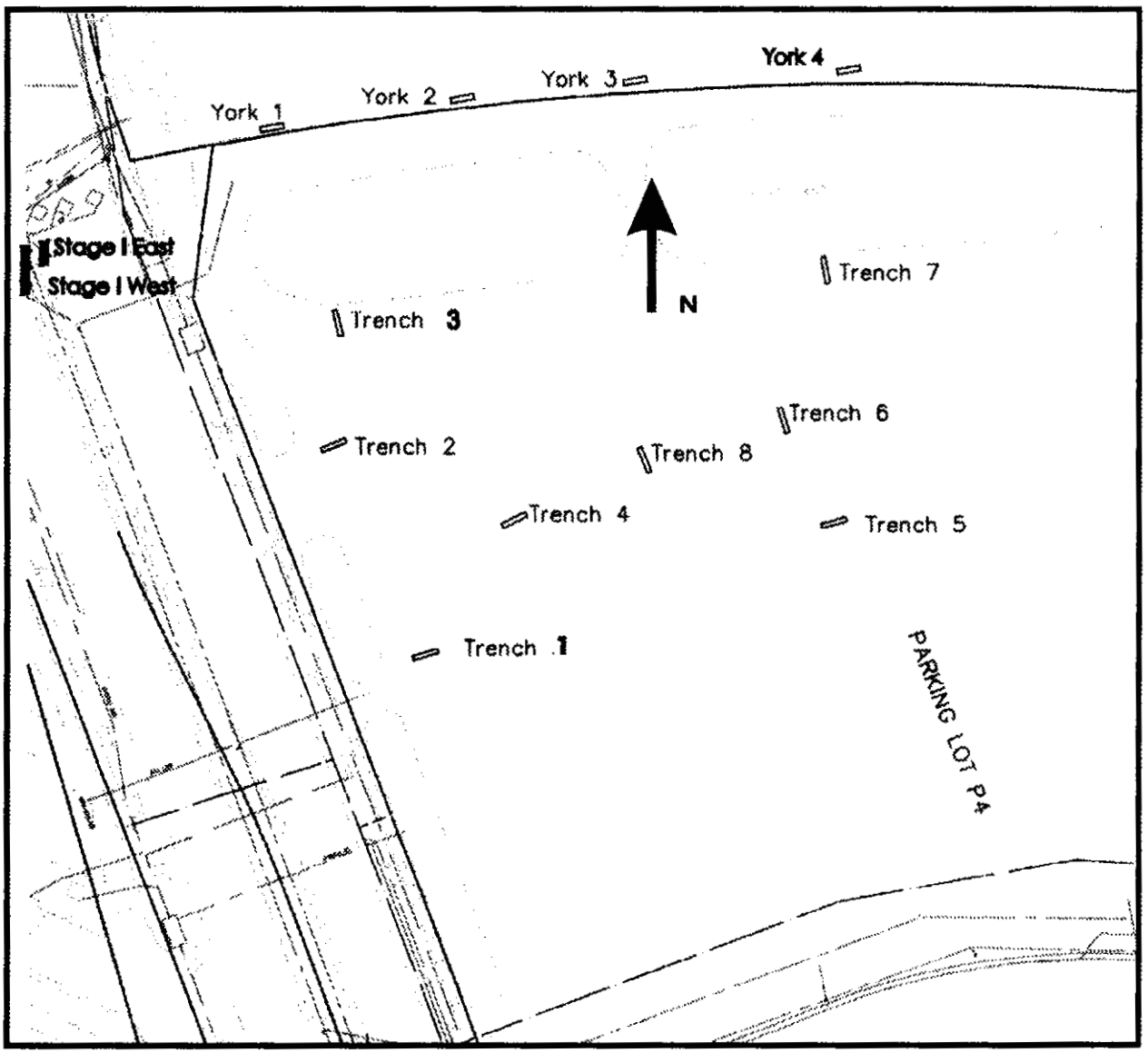

Figure 1: Location of Legacy Assessment Trenches and Other Project Data Locations

The Provencher Bridge assessment indicated that archaeological horizons are present along the York Avenue right-of-way, east of the intersection with Pioneer Boulevard (Figure 1). Archaeological deposits were recorded in Test Hole 1, Test Hole 2, Test Hole 3, and Test Hole 4, at depths below surface between 145 cm and 301 cm (Quaternary 1989a:25). The extent of the horizons to the south (into the projected footprint) is unknown. It is assumed that the elevation is equivalent to that recorded at the northern terminus (York Avenue and Pioneer Boulevard intersection) of Stage I construction which is 230.00 metres above sea level.

The Stage I project encountered archaeological horizons slightly south of the northern terminus of the project (Kroker and Goundry 1990:28-31). Two cultural horizons were recorded on the east side of the open-cut land drainage sewer trench at depths below surface of 220 cm and 228 cm. Radiocarbon dates of 675 $\pm$ 100 years and 630 $\pm$ 90 years before present were obtained from these two horizons. On the west side of the 4 metre wide trench, a single cultural horizon was present at 240 cm below surface. This would be a representation of one of the two horizons on the east side. The construction plans show the elevation at this location to be 229.95 metres above sea level.

The impact assessment component of The Forks Access Project recorded thirteen cultural horizons, with some of them being very extensive (Quaternary 1999a). Horizon B, which occurs at an elevation of 228.50 metres above sea level, extends throughout the area. Horizon E extends to the north and west and Horizon F, which occurs at the south end of the assessment trench, may be a disjunct continuation of Horizon E extending to the south and east (Quaternary 1999a:Figure 2). Several of these archaeological horizons can be correlated with the cultural layers recorded during the Provencher Bridge and Stage I projects.

The monitoring of the sub-surface services installations for Festival Park did not record any archaeological horizons in the western portion of the services corridor through Parking Lot D to the bandshell (Quaternary n.d.).

1.3 Study Team

The entire archaeological resources management program was directed by Sid Kroker (Senior Archaeologist). The impact assessment component employed Jordi Malasiuk, Ernie Reichert, Cameron Esslemont, and Catherine Flynn. The backhoe was operated by Steve Kafka of Cambrian Excavators.

Laboratory operations, resulting from artifact recovery, were supervised by Pam Goundry (Research Archaeologist). Primary artifact preparation was undertaken by Sid Kroker and Pam Goundry. Computer cataloguing was completed by Pam Goundry. Faunal remains were identified by Sid Kroker. Documentation and final analyses have been undertaken by Sid Kroker and Pam Goundry.

1.4 Investigation Methods

Based upon the projected footprint of the structure, the locations of eight test trenches were surveyed on December 15. Excavations began on December 16. Due to the thickness of frost penetration in the parking lot, some of the trenches were slightly relocated to move them out of areas of heavy vehicle traffic which had driven the frost down to depths of 75 cm. The final locations of the trenches are depicted on Figure 1. Also, due to the thickness of frost, it was necessary to engage a backhoe-mounted jackhammer to break the upper ground layer. The excavation of the trenches was done with a rubbermount backhoe with a 24″ bucket.

Each trench was 3.5 metres long and oriented either N/S or E/W with Pioneer Boulevard being used as the N/S axis. Vertical provenience was maintained by ensuring that the backhoe bucket took horizontal cuts within each trench. Each cut was generally 10 cm thick. The recorded stratigraphy (Appendix B) is based upon natural strata.

The excavated soil was brought to the surface by the backhoe and spread across the ground adjacent to the trench. The archaeological field crew, using garden rakes, spread and sorted through the excavated soil. Artifact recovery techniques included the use of trowels and hand-retrieval.

The primary focus during this impact assessment was the determination of the depths of the pre-European cultural horizons. Within the excavations, it is necessary to retrieve all artifacts in order to determine the density of a cultural horizon. The upper railroad fill horizon consisted mainly of cinders and gravel with very few artifacts present. Some diagnostic artifacts were recovered from this frozen layer. Within the pre-European cultural horizons, much of the archaeological layers were recovered *en bloc*, due to the inclement weather (-25° C with a windchill greater than 1800). Much of the normal summer artifact recovery procedure could not be implemented, meaning that all soil containing the cultural horizon was collected in pails for further screening and washing at the laboratory facilities of Quaternary Consultants Ltd. All recoveries were curated and bagged according to trench number and depth below surface. In total, more than two cubic metres of soil required wet-screening through a 2 mm screen.

Stratigraphic profiles were recorded for each test trench. The trench walls were visually examined to record the different soil types (clay, silty clay, silt, etc.) and the colours of each discrete soil layer. The vertical position of each cultural stratum was ascertained. By compiling the stratigraphic profiles, an overall chart of the depths and extent of each cultural horizon was obtained (Table 1).

The timeframe for completion of the assessment was quite tight as the weather was below -25° C and the length of the days meant that daylight faded quickly. The time and logistical requirements for the installation of extensive shoring for trench wall stabilization to enable safe personnel entry at depths below 2 metres precluded intensive visual examination of the lower portions of the profiles. Thus, most profiles are detailed to depths of 2 metres below surface with only the cultural and thick buried soil horizons being recorded below this depth. Due to safety concerns regarding public access and vehicle movement throughout the area, it was necessary to infill each trench upon completion of the excavation to the required depth.

1.5 Laboratory Procedures

During the project, a total of 5417 artifacts was recovered. These had been either hand-retrieved on site or, in the case of the majority of the Pre-Contact artifacts, were recovered from the bulk soil samples which had been brought to Quaternary laboratory facilities. The soil samples, with as many as five two-gallon pails deriving from a cultural horizon in a single trench, were washed through 4 mm and 2 mm screens to remove the encapsulating soil. The presence of large amounts of

montmorillonitic clay, which tends to clump into nodules, required soaking of the soil samples with Calgonite to deflocculate the sediments. The procedure involved soaking the soil in a 5% Calgonite solution for 24 hours, washing through the screens, and subjecting the residue to further soakings until the clay had been removed. Some samples required six procedures to eliminate the clay nodules.

The artifacts were sorted by material class and identified by the lab personnel. Material of the same type (e.g., Knife River Flint flakes) within the same location and depth were combined under a single catalogue number. Identification was carried to the limit obtainable by available reference works and staff expertise.

Each artifact received a catalogue number consisting of the Borden designation for the site and a sequential number for permanent identification, i.e., DlLg-33:99A/####. The Borden designation, consisting of a four-letter prefix and a numerical suffix, is a Canada-wide system of identifying archaeological sites based upon latitude and longitude (Borden 1954). The four letter identifier, DlLg, designates a geographical block between 49° 50' and 50° 00' North latitude and 97° 00' and 97° 10' West longitude. Within each block, archaeological sites are assigned sequential numbers upon discovery. This site, lying south of Water Avenue, west of the Red River, and east of the CNR Main Line Embankment, had been previously designated as DlLg-33. As numerous archaeological projects have occurred within the site boundaries over the past decade (Kroker 1989; Kroker and Goundry 1990, 1993a, 1993b, 1994; Quaternary 1988, 1989a, 1989b, 1990a, 1990b, 1990c, 1992, 1993a, 1993b, 1994a, 1994b, 1995a, 1995b, 1995c, 1996a, 1996b, 1996c, 1998a, 1998b, 1999a, 1999b, 1999c), the site designation has been expanded to include a sequential year/project identifier. The identifier for this project is 99A, denoting that this is the first project initiated at the site during 1999.

All pertinent data associated with the artifact was entered into the computer cataloguing system which is based on the Canadian Heritage Inventory Network (CHIN) system (Manitoba Museum of Man and Nature 1986; Kroker and Goundry 1993a:Appendix B). The computer cataloguing program is derived from **DBASE3®** and 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 is the repository designated by The Forks North Portage Partnership for artifacts recovered during development projects at The Forks.

2.0 STRATIGRAPHIC DATA

Stratigraphic data was recorded for each of the eight trenches (Appendix B). The upper stratum consisted of a thin layer of parking lot gravel overlying fill deposited by the railroads during the past century. Below the railroad fill layer, which often rested on a moderately well-developed soil horizon, sequences of river-deposited clays and silts were present. Different flood episodes could be distinguished on the basis of differing textures of the sediments and by the presence of buried soil horizons separating the different layers of sediments.

As the primary focus of the investigation was the determination of the depths and densities of cultural levels within the structure footprint, analysis of the sedimentological regimens portrayed by the profiles will be minimal. For a detailed analysis of flood episodes and riverine sedimentation, see Kroker (1999) and the report on The Forks Access Project (Quaternary 1999a:8-16).

Cultural horizons were encountered in five trenches with depths varying between 195 cm below surface to 280 cm below surface (Table 1). Two cultural horizons were recorded in Trench 5. Traces of a thin second cultural level occurred in Trench 8 at 250 cm below surface.

TRENCH	ELEVATION (metres asl)	DEPTH (cm)	BASE ELEVATION	CULTURAL LEVEL DEPTH (cm)	CULTURAL LEVEL ELEVATION
1	230.80	305	227.75	270	228.10
2	230.80	290	227.90	255	228.25
3	230.55	205	228.50	195	228.60
4	230.80	210	228.70	NONE	NONE
5	230.80	310	227.70	250	228.30
				280	228.00
6	230.80	205	228.75	NONE	NONE
7	230.40	200	228.40	NONE	NONE
8	230.80	270	228.10	195	228.85
				250	228.30

Table 1: Test Trench and Cultural Horizon Depth Data

The previously known data from the Provencher Bridge Assessment, the Stage I Construction Project, and The Forks Access Project are tabulated in Table 2.

LOCATION	ELEVATION (metres asl)	DEPTH (cm)	BASE ELEVATION	CULTURAL LEVEL DEPTH (cm)	CULTURAL LEVEL ELEVATION
York 1	230.00	328	226.72	148	228.52
				166	228.34
				232	227.68
York 2	230.00	306	226.94	148	228.52
				175	228.25
				195	228.05
				238	227.62
				303	226.97
York 3	230.00	301	226.99	144	228.56
				239	227.61
				300	227.00
York 4	230.00	319	226.81	240	227.60
				271	227.29
Stage I LDS East Side	229.95	N/A	N/A	220	227.75
				228	227.67
Stage I LDS West Side	229.95	N/A	N/A	240	227.55
Forks Access				Horizon A	228.70
				Horizon B	228.50
Horizons at South End of Assessment Trench				Horizon C	228.40
				Horizon D	228.25
				Horizon F	228.00
				Horizon G	227.80
				Horizon H	227.60

Table 2: Cultural Horizon Depth Data Obtained from Previous Projects

3.0 HISTORIC ARTIFACTS

Very few historic artifacts were recovered during this impact assessment. Firstly, the locations of the trenches appeared to be in areas where little secondary deposition occurred during the railroad era. Most of the upper strata consisted of sand and gravel fill layers. The clay fill layers contained few artifacts as did the two locations (Trench 6, Trench 7) which had cinder layers. Secondly, small artifacts, such as glass or ceramic sherds, were not retrievable as the upper layers were frozen and removed in large clumps after breaking with the jackhammer. The twenty-one historic artifacts have been analysed within functional categories based on the Canadian Heritage Inventory Network (CHIN) cataloguing format.

3.1 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. Two artifacts were assigned to this category, one in the sub-category of Oil Lighting and the other in the sub-category of Electric Lighting.

DlLg-33:99A/262, recovered from Trench 4, is the copper wick holder from an oil or kerosene lamp. The handle for raising the wick is still intact and can be rotated. A continuous pattern of inverted U-shapes encircles the bottom of the slightly flaring base of the top portion of the holder. The rectangular sheath which feeds the wick through the holder is also intact although it has been somewhat flattened and is bent to one side.

DlLg-33:99A/258 is a clear glass sherd consisting of a portion of the body and neck flange from a globe of a ceiling fixture. It was recovered from Trench 3. It measures 55.8 mm by 50.5 mm with a thickness of 3.4 mm. Numerous styles of shades and globes were prevalent in the early part of the 20th century (Ashdown 1909:1803-1832). This globe sherd could have derived from fixtures within the railroad buildings, street light globes, and/or material deposited in the area as fill.

3.2 Manufacturing Equipment

This category refers to tools and/or implements generally used to manufacture other artifacts. Two artifacts, in the sub-category of Industrial, were catalogued. DlLg-33:99A/267 is tentatively identified as a gasket. It is a part of a flat, circular, O-shaped object woven from strands of tightly coiled fibre, possibly asbestos. This object, found in Trench 5, could have been part of a machine or a seal in a heating/duct system.

DlLg-33:99A/266 is a complete, corroded, iron hook, also found in Trench 5. It measures 126.6 mm from the pointed end to the top of the curve. The diameter varies from 6.9 mm at the pointed end to 9.1 mm near the end of the hook and the width of the hook opening is 47.8 mm. The distal end

would have been inserted into a perpendicular, cylindrical handle (Ashdown 1909:167). It would have been used as a tool by warehousemen for moving and lifting boxes and bales.

3.3 Clothing

Two pieces of woven cloth, DlLg-33:99A/263, were curated. The exact identification is tenuous, but these two pieces of cloth could have been part of a coat. They were recovered from Trench 4.

3.4 Transportation

This area was a railroad yard from 1888 until 1988. Numerous spur lines ran through the east yard to loading docks and freight sheds. Maintenance and repair of these tracks would have required replacing ties and/or spikes and railroad spikes are a very common find in the area. DlLg-33:99A/265, recovered in Trench 5, is a complete, somewhat corroded, iron spike. It measures 154.7 mm in length and has an L-shaped head. This spikes is more recent in style as compared to longer ones with rose heads which were made by blacksmiths.

3.5 Unknown

The Unknown category is reserved for artifacts of all materials which are incomplete or not well enough preserved for a positive identification to be made but, for which, further in-depth research may elicit an identification. One artifact, recovered from Trench 6, was assigned to this category. DlLg-33:99A/253 is a small, grey, plastic sherd. The height measures 32.4 mm with a width of 19.0 mm and a thickness of 1.9 mm. The artifact is curved and appears to have a finished flat lip indicating that this may have been the top or bottom portion of a larger piece.

3.6 Containers

This category includes all artifacts, or portions of artifacts, which are used to contain products. As such, it tends to cross-cut other functional divisions, with assignment to the category based upon form, as much as function. The category contains several sub-categories (Manitoba Museum of Man and Nature 1986), two of which are applicable to the artifacts recovered from this project:

a. Storage - the purpose of the container is to hold material, e.g., bottles, jars, tin cans; and
b. Dinnerware - the artifact is used in the serving or eating of food.

3.6.1 Storage

Storage containers include most of the commonly used artifacts in today's material culture. Many products are sold, transported, carried, or stored in a container of some type: bag, box, barrel, jar, sealer, can, bottle, pail. Containers come in a variety of material types such as metal, plastic, paper, ceramic, and glass. Only ceramic artifacts were recovered from this project.

Eight sherds, all recovered from Trench 3, are portions of grey stoneware crocks (Table 3). Crocks of various sizes, from one quart to twenty gallons, were a standard feature in most homes during the latter part of the 19th century and up to the mid-20th century. They were used for storing bulk staples like flour, preserving meats in salt brine or eggs in isinglass, or preparing other foods like sauerkraut. In the prairie region, several suppliers dominated the market, particularly those of the stoneware companies of Red Wing, Minnesota and, after 1909, the various pottery firms from Medicine Hat, Alberta. Other firms in eastern Canada and the United States contributed to the steady market.

CAT. #	QTY	PORTION	COLOUR	COMMENTS
254	1	lip,body	grey	? Butter jar
255	1	base	grey	5.6 mm thick
256	4	body	grey	-
257	1	body	grey, blue	2 birchleaves; Red Wing, Minnesota
268	1	base	grey	8.8 mm thick
TOTAL	8			

Table 3: Stoneware Sherds from the Legacy Estates Impact Assessment

DlLg-33:99A/254 is a lip,body sherd of a thin-walled crock. The braced lip is 11.4 mm thick and 9.0 mm wide with the body measuring 7.2 mm in thickness. This sherd could derive from a smaller butter jar (cf. DePasquale *et al.* 1990:122-127). When comparing the circumference to crock sizes, DlLg-33:99A/254 could be either a 3 pound butter crock or a ½ gallon crock.

The four body sherds in DlLg-33:99A/256 are similar in thickness to DlLg-33:99A/254, i.e., 6.1 mm, 7.7 mm, 7.9 mm, and 8.0 mm, and could be from the same specimen. DlLg-33:99A/255 is a thin basal sherd, while DlLg-33:99A/268 is a much thicker basal sherd. In all likelihood, DlLg-33:99A/268 could have come from the same crock as DlLg-33:99A/254.

DlLg-33:99A/257 is the only sherd that has any markings. It is 7.7 mm thick and could also be part of DlLg-33:99A/254. The markings consist of two blue leaves, identifiable as birchleaves. Birchleaves were a common decoration found on the products that derive from the various stoneware companies in Red Wing, Minnesota. The earliest company, Red Wing Stoneware Company, began in 1878. The second firm, Minnesota Stoneware Company, was formed in 1883. In the 1890s, these two companies, plus the North Star Stoneware Company, formed a single selling consortium known as Union Stoneware Company, with each company retaining its own corporate integrity. In 1896, the North Star Company ceased production and, in 1906, the two remaining firms were amalgamated to form the Red Wing Union Stoneware Company. The Red Wing Union Stoneware Company produced a variety of products. In 1936, the name of the company was changed to Red Wing Potteries. This company ceased operation in 1967, however the actual production of stoneware items had ceased in 1947 (DePasquale *et al.* 1990:4, 143). DePasquale illustrates birchleaf designs on all types of stoneware—jugs, churns, coolers, crocks—from the various companies, but does note that

in a 1906 Red Wing Union Stoneware Company catalogue, "birchleaves were the only designs shown on crocks...they were...phased out sometime before 1909" (DePasquale *et al.* 1990:52).

3.6.2 Dinnerware

Ceramic dinnerware includes place settings—plates, small bowls, cups and saucers—and serving pieces—platters, large bowls, creamers. Archaeological recoveries are often too fragmented to allow exact identification. This is reflected in the use of object types such as plate?/saucer? and bowl?/cup?. Because dinnerware is usually manufactured in sets of the same pattern, the decorative features of a set cross-cut the types of objects. Five ceramic dinnerware artifacts were recovered (Table 4).

CAT.#	QTY	TRENCH	PORTION	COLOUR	OBJECT	COMMENTS
259	1	4	base	white	plate	logo;ALFRE...;EN...
260	1	4	base	white	plate?/saucer?	? black logo
261	2	4	lip,body	white,green	plate	floral;geometric
264	1	5	lip,body,base	white	saucer	-
TOTAL	5					

Table 4: Ceramic Dinnerware from the Legacy Estates Impact Assessment

Three sherds are white. As white sherds are often only fragments of complete objects, there may be patterns with other colours that fit onto these sherds. DlLg-33:99A/264 is a plain saucer. DlLg-33:99A/260 is either a plate or a saucer. It has a black line on the exterior surface which may be part of a maker's mark.

DlLg-33:99A/259 is an undecorated portion of a plate with part of a black maker's mark, consisting of the middle section of a wreath with "ALFRE..." printed, in a semi-circle, under it and "EN..." printed below that. This mark is from Alfred Meakin Ltd. of Tunstall, Staffordshire, a firm which has been producing pottery since 1875. The country of origin, England, being added to their marks after 1891. This particular mark was used after 1914 (Godden 1964:425-426).

DlLg-33:99A/261 consists of two sherds from a plate with a complex green pattern. There is a thin, beaded line just below the lip on the interior surface. The portion between the lip and the body,base junction is decorated with a repetitive stylized floral pattern which includes a central flower and a branching stem with a single flower on the left side as well as a leaf and another stem with a flower and leaves on the right side. The sloping junction between the body and the base has a 7.7 mm wide band of herringbone patterns with white dots regularly spaced along it. Below this band is a line of small dots. As colours are very subjective, the dark green on DlLg-33:99A/261 may almost appear black to some individuals.

4.0 PRE-CONTACT ARTIFACTS

The analysis of the Pre-Contact cultural resources will be presented for each of the trenches that encountered cultural horizons. Five of the eight investigation trenches yielded evidence of cultural occupation with two horizons recorded in Trench 5.

4.1 Trench 1

Trench 1 is located in the southwest corner of the building footprint (Figure 1), 15.5 metres east of the sidewalk curb. The upper level is railroad ballast overlying clay fill (Appendix B). The cultural level was encountered at 270 cm below surface. A total of 188 artifacts was recovered from this trench: 36 lithic artifacts, 121 faunal remains, and 31 floral remains.

4.1.1 Lithic Artifacts

The lithic component of pre-European 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. One flake and 35 fire-cracked rock were curated from Trench 1.

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 fragments of copper and, in proto/post-Contact times, iron. This category also includes waste products from the manufacture of bone or wooden tools.

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 source cobble with flakes removed is known as a core. The flakes which have been removed 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. At this time, 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.

DlLg-33:99A/1 is a Knife River Flint flake weighing 0.1 grams. Knife River Flint tends to be ubiquitous in Manitoba archaeological sites. The source area is considerably south of the Winnipeg

region (Burns 1995:33-34). The presence of Knife River Flint flakes suggests that the occupants may have traveled from the quarry locations in North Dakota or, given the river junction location of the site, an individual trader or trading group from the south may have arrived recently and augmented the local supply of Knife River Flint for tool-making.

4.1.1.2 Fire-cracked Rock

Fire-cracked rocks are those specimens which have evidence of being subjected to intense heat. Depending upon the structure of the rock, extreme temperature variations 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 will tend to decompose into smaller granular fragments of the different parent materials, i.e., granite, diorite, schist, etc.

In this location, only coarse-grained specimens were recovered. Thirty-four granite fragments of fire-cracked rock (DlLg-33:99A/2), weighing 33.3 grams, and one specimen of schist (DlLg-33:99A/3), weighing 11.7 grams, were curated.

The granitic rock has fragmented into small pieces. There are two possible explanations for this. Firstly, granitic rock may have been subjected to numerous instances of heat, thereby increasing the degree of decomposition. This would be the case if the stones were used as hearth stones. Secondly, and more probably, the degree of fragmentation is a reflection of the internal structure of the rock. A fine-grained homogenous stone would be more cohesive than one which is coarse-grained and composed of several types of distinct crystals.

There are a limited number of purposes which granitic rocks can fulfill. 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.

Stones could have been used as boiling stones. 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. Intuitively, one would suspect that hot stones which would produce small granular spalls upon suffering thermal shock, when submerged in cold liquid, would not be the optimum choice. Thus, it is probable that the granite and schist would have served as hearth stones rather than boiling stones.

4.1.2 Faunal Remains

The largest number of artifacts in Trench 1 consist of faunal remains. These include butchering remains, a sample, and natural faunal deposits. 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 was 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, broken, chewed, or gnawed.

4.1.2.1 Butchering Remains

As is usually the case, food residue, in the form of butchering remains, is the highest percentage of recovery. A total of 116 artifacts, with a weight of 104.2 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 so as not to 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.

The identified taxa are listed in Table 5.The frequencies of each taxon are calculated on the weights and quantities to give a picture of the relative frequency within the entire faunal food assemblage.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Fish	110	94.8	8.4	8.1
Catfish (*Ictalurus* sp.)	2	1.7	2.0	1.9
Sucker family (Catostomidae)	1	0.9	0.1	0.1
TOTAL FISH	113	97.4	10.5	10.1
Deer/Cow Family (Artiodactyla)				
Cow Family (Bovidae)	3	2.6	93.7	89.9
Bison (*Bison bison*)				
TOTAL MAMMAL	3	2.6	93.7	89.9

Table 5: Fish and Mammal Remains from Trench 1

The faunal assemblage is relatively small in comparison with recoveries from other locations (cf. Quaternary 1999a). Within the fish sample, catfish and sucker were identified. The single bison tibia (consisting of three fragments) exhibits spiral fracture indicating breakage while fresh. The massiveness of this bone, in comparison with small, less dense fish bone, results in a considerable skewing in the weight frequency. However, the frequency of the sample is skewed in favour of fish when quantities only are considered.

4.1.2.2 Samples

Samples are an expeditious mechanism for the cataloguing of myriads of minuscule recoveries. These consist of specimens recovered from a 2 millimetre screen and contain diverse artifacts, i.e., charcoal

fragments, shell fragments, and small fragmented bone elements. Intensive detailed study of the material catalogued as samples may result in the identification of various plant or animal species, but most of the dominant taxa are already represented by larger recoveries. The additional information obtained through a comprehensive analysis of samples is usually that of degree and further confirmation of specific taxa rather than the identification of previously unrecorded species. The single sample (DlLg-33:99A/17) weighs 14.1 grams.

4.1.2.3 Naturally Deposited Fauna

Four specimens of non-food faunal remains have been curated (Table 6). Representations of these types of faunal specimens are often incorporated into cultural deposits. Frogs burrow into the soil for hibernation. The aquatic taxa, freshwater snails and pea clams, 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 with the upper portion of the soil, these taxa are incorporated into the cultural matrix.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Amphibia	1	25.0	0.1	33.3
TOTAL AMPHIBIAN	1	25.0	0.1	33.3
Freshwater Snails (Gastropod) Pond Snails (Lymnaeidae)	2	50.0	0.1	33.3
TOTAL GASTROPODS	2	50.0	0.1	33.3
Freshwater Clam (Eulamellibranchia) Pea Clams (Sphaeriidae)	1	25.0	0.1	33.3
TOTAL CLAM	1	25.0	0.1	33.3
TOTAL	4	100.0	0.3	99.9

Table 6: Natural Faunal Remains from Trench 1

4.1.3 Floral Remains

DlLg-33:99A/4 consists of 31 charcoal recoveries. An intensive analysis to determine the representative species is beyond the scope of an assessment report, however, it can be assumed that most of the charcoal would derive from locally available trees. These would include oak, maple, willow, poplar, and birch. Many of the charcoal specimens are large enough for species determination at a macro-analysis level.

4.2 Trench 2

Trench 2 is located in the central west section of the building footprint (Figure 1), 10.5 metres east of the sidewalk curb. The upper level consists of concrete and gravel fill overlying clay fill (Appendix B). The cultural level was encountered at 255 cm below surface. A total of 815 artifacts were recovered from Trench 2. These consist of eight lithic artifacts, ten ceramic artifacts, 783 faunal remains, and 14 floral remains.

4.2.1 Lithic Artifacts

Six flakes and two fire-cracked rock were curated.

4.2.1.1 Detritus

DlLg-33:99A/50 is three Knife River Flint flakes, weighing 0.2 grams. DlLg-33:99A/51 is three chert flakes, weighing 0.1 grams. As noted in Trench 1, Knife River Flint comes from quarries in North Dakota. Chert can be obtained at creek mouths and riffle areas to the west along the Assiniboine River. The use of local 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, representations of previously visited areas can occur as components of the lithic assemblage.

4.2.1.2 Fire-cracked Rock

Two small granitic specimens of fire-cracked rock (DlLg-33:99A/52), weighing 1.2 grams, were recovered from Trench 2.

4.2.2 Ceramics

Ten ceramic body sherds were recovered from Trench 2. Surface treatment was the only attribute, other than weight, that was systematically examined for every item in this assemblage. DlLg-33:99A/53 consists of two body sherds with textile-impressed surface finish, while DlLg-33:99A/54 consists of eight body sherds with obliterated textile-impressed surface finish.

With every ceramic assemblage, the bulk of the sherds are usually from the body of the pot. Mathematically, this makes sense since the decorated portion of the vessel usually accounts 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. However, it is the experience of archaeologists who replicate pottery that decorations are normally easier to reproduce than surface impressions. Until a systematic method of analysing and describing the visible variation in the body sherds is developed, the level of description tends to be relatively coarse.

4.2.3 Faunal Remains

Again, the largest number of artifacts consist of faunal objects. These include butchering remains, a sample, and natural faunal deposits.

4.2.3.1 Butchering Remains

A total of 779 artifacts, with a combined weight of 144.4 grams, was recovered. The identified taxa are listed in Table 7.The frequencies of each taxon are calculated on the weights and quantities to provide a picture of the proportions within the entire faunal food assemblage.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Fish	696	89.3	53.2	36.8
Catfish (*Ictalurus* sp.)	45	5.8	74.4	51.5
Drum (*Aplodinotus grunniens*)	5	0.6	1.2	0.8
Sturgeon (*Acipenser fulvescens*)	5	0.6	0.5	0.3
Sucker family (Catostomidae)	5	0.6	0.4	0.3
TOTAL FISH	756	97.0	129.7	89.8
Undifferentiated Aves				
Medium/Large Aves	1	0.1	0.3	0.2
TOTAL AVES	1	0.1	0.3	0.2
Freshwater Clam (Unionidae)	7	0.9	1.9	1.3
Black Sand-shell (*Ligumia recta*)	2	0.3	3.7	2.6
TOTAL SHELLFISH	9	1.2	5.6	3.9
Undifferentiated Mammal	-	-	-	-
Large Mammal	9	1.2	7.3	5.1
Medium Mammal	1	0.1	0.9	0.6
Rabbit Family (Leporidae)	-	-	-	-
Jack Rabbit (*Lepus* sp.)	3	0.4	0.6	0.4
TOTAL MAMMAL	13	1.7	8.8	6.1

Table 7: Fish, Aves, Shellfish, and Mammal Remains from Trench 2

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 falls within academic parameters and is beyond the scope of an assessment project.

The frequency of the butchering remains are illustrated by both quantity and weight (Figure 2). In both graphs, the fish remains overwhelm the other taxa. Even though fish bone is small and light in comparison to larger and denser mammal bone, the small fragments of mammal bone do not tend to weigh much. In addition, nearly a third of the mammal bone is identified as jackrabbit. 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.

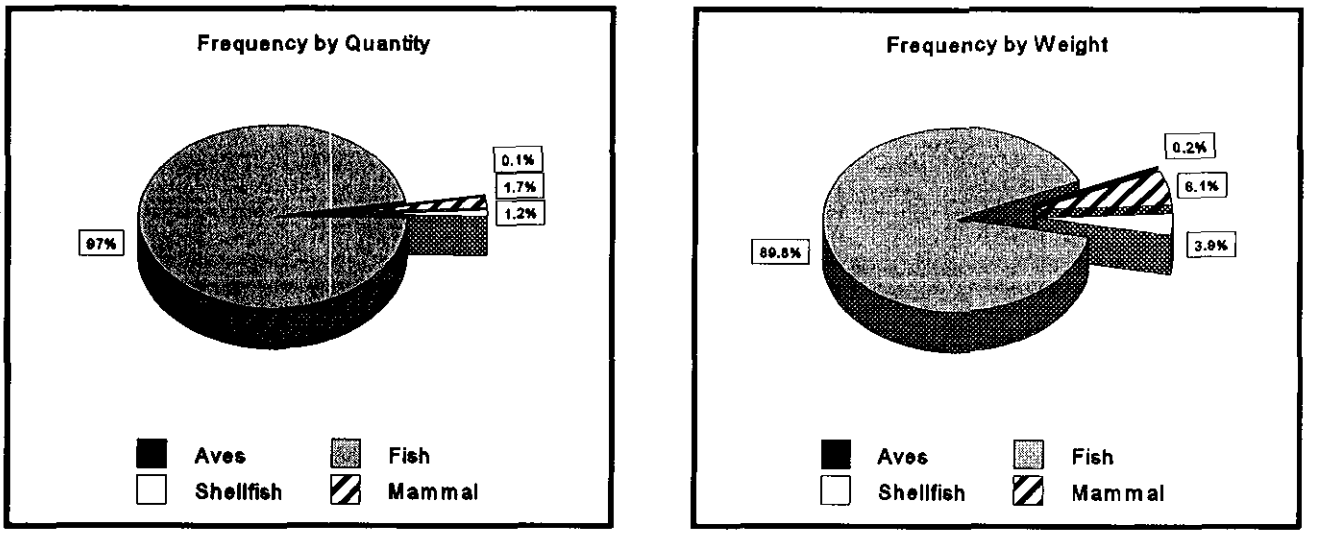

Figure 2: Butchering Remains from Trench 2

Within the fish, catfish was dominant (Table 7), with representation of drum, sturgeon, and sucker. Seasonality is not a factor as all species identified in the assemblage spawn in the spring. There does not appear to be a selectiveness of the harvest, suggesting that bulk fishing techniques, such as netting, were utilized. Thus, the mix of species may be representative of the aquatic biotic assemblage at the fishing location. 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.

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. It would seem that shellfish were actively gathered—perhaps an activity for children, along with plant and berry harvesting.

4.2.3.2 Samples

One sample was catalogued. DlLg-33:99A/100 weighs 47.5 grams.

4.2.3.3 Naturally Deposited Fauna

Three specimens of freshwater snails were catalogued. DlLg-33:99A/55 consists of three pond snails (Lymnaeidae) weighing 0.2 grams.

4.2.4 Floral Remains

DlLg-33:99A/99 consists of 14 charcoal recoveries, weighing 0.4 grams. Some of the charcoal specimens are large enough for species determination at a macro-analysis level.

4.3 Trench 3

The original location of Trench 3 was 12.5 metres east of the sidewalk at the north edge of the parking lot. The backhoe encountered a concrete grade beam within the lower portion of the railroad fill horizon. Accordingly, the trench was relocated seven metres east (Figure 1). It is located in the northwest corner of the building footprint. The upper level consists of alternating layers of gravel and clay fill (Appendix B). A faint buried soil horizon was recorded at 132 cm below surface and a cultural level, containing ash, charcoal, and artifacts, was encountered at 195 cm below surface. A total of 242 artifacts was recovered. These consist of ten lithic specimens and 232 faunal remains.

4.3.1 Lithic Artifacts

Nine flakes and one fire-cracked rock were curated.

4.3.1.1 Detritus

DlLg-33:99A/20 consists of eight Knife River Flint flakes, weighing 0.2 grams. DlLg-33:99A/19 is one chert flake which weighs 0.1 grams.

4.3.1.2 Fire-cracked Rock

One minute fragment of granite (DlLg-33:99A/21) was recovered. It weighs 0.1 grams.

4.3.2 Faunal Remains

The faunal artifacts, from Trench 3, consist of butchering remains, a sample, and natural faunal deposits.

4.3.2.1 Butchering Remains

A total of 222 artifacts, with a combined weight of 54.5 grams, was recovered. The identified taxa are listed in Table 8.The frequencies of each taxon are calculated on the weights and quantities to give a picture of the relative frequency within the entire faunal food assemblage.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Fish	176	79.3	10.2	18.7
Catfish (*Ictalurus* sp.)	16	7.2	11.0	20.2
Drum (*Aplodinotus grunniens*)	9	4.1	1.1	2.0
Perch (*Perca flavescens*)	1	0.5	0.2	0.4
Sturgeon (*Acipenser fulvescens*)	8	3.6	0.9	1.7
Sucker family (Catostomidae)	2	0.9	0.1	0.2
TOTAL FISH	212	95.5	23.5	43.1
Undifferentiated Aves				
Medium/Large Aves	2	0.9	0.2	0.4
TOTAL AVES	2	0.9	0.2	0.4
Freshwater Clam (Unionidae)	4	1.8	0.3	0.6
TOTAL SHELLFISH	4	1.8	0.3	0.6
Undifferentiated Mammal	-	-	-	
Large Mammal	3	1.4	30.4	55.8
Small Mammal	1	0.5	0.1	0.2
TOTAL MAMMAL	4	1.8	30.5	56.0

Table 8: Fish, Aves, Shellfish, and Mammal Remains from Trench 3

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. However, as fish bone is small and light in comparison to mammal bone, the proportions tend to be reversed when weight is considered.

Within the fish, five different species were identified (Table 8), with a slight majority of catfish. This frequency may be due to the robustness and large size of catfish elements which means they preserve better and are more readily identified when compared to similar elements from smaller fish.

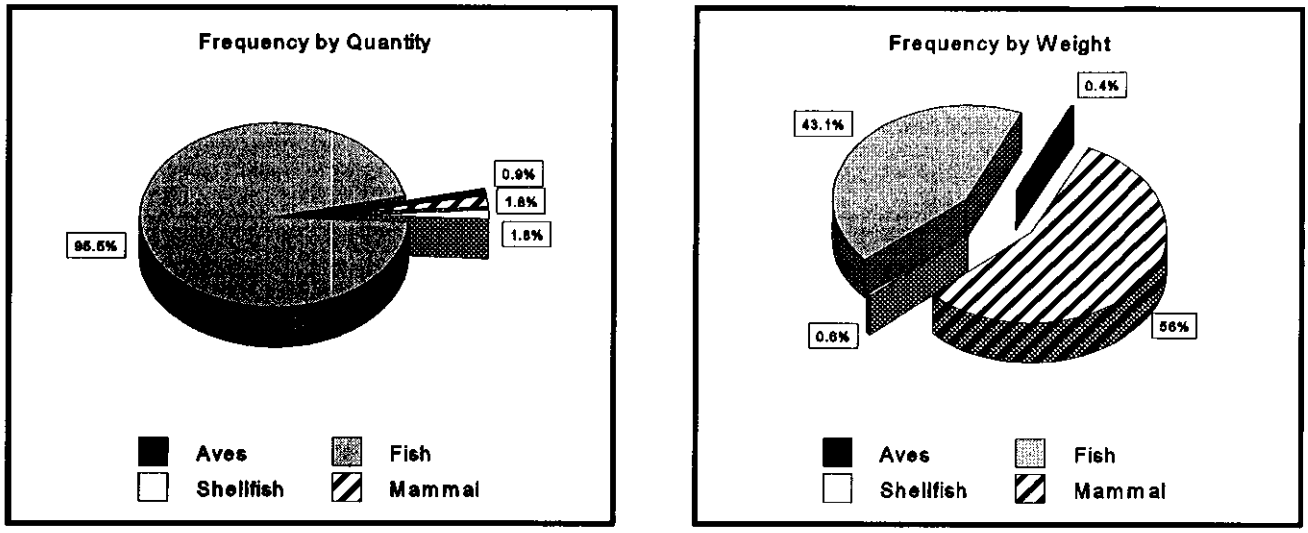

Figure 3: Butchering Remains from Trench 3

4.3.2.2 Samples

One sample was catalogued. DlLg-33:99A/49 weighs 7.9 grams.

4.3.2.3 Naturally Deposited Fauna

Nine specimens of freshwater snails were catalogued. DlLg-33:99A/26 is five ramshorn snails (Planorbidae), weighing 0.1 grams, while DlLg-33:99A/27 consists of four pond snails (Lymnaeidae), weighing 0.1 grams.

4.4 Trench 5

Trench 5 is located in the southeast corner of the building footprint (Figure 1). The upper level consists of cinder fill overlying a sand layer (Appendix B). Buried soil horizons were recorded at 131 cm and 156 cm below surface with two cultural horizons at 250 cm and 280 cm below surface. Artifacts were recovered from both levels: 155 from 250 cm DBS and 260 from 280 cm DBS.

4.4.1 Trench 5 - 250 cm DBS

The 155 artifacts, recovered from this upper cultural level, consist of two lithic artifacts, 140 faunal remains, and 13 floral specimens.

4.4.1.1 Lithic Artifacts

DlLg-33:99A/141 is two granite fire-cracked rocks, weighing 1774.5 grams. One is a large cobble, while the other is a small fragment.

4.4.1.2 Faunal Remains

The faunal artifacts consist of butchering remains and one sample.

4.4.1.2.1 Butchering Remains

A total of 139 artifacts, with a combined weight of 30.7 grams, was recovered from this depth. The identified taxa are listed in Table 9.The frequencies of each taxon are calculated on the weights and quantities to give a picture of the relative frequency within the entire faunal food assemblage.

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). One mammal specimen is calcined. The remaining four mammal artifacts have evidence of weathering suggesting surface exposure prior to incorporation into the soil matrix by the deposition of sediments during a flood.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Fish	120	86.3	9.5	30.9
Catfish (*Ictalurus* sp.)	10	7.2	11.2	36.5
Sturgeon (*Acipenser fulvescens*)	2	1.4	0.1	0.3
Sucker family (Catostomidae)	2	1.4	0.2	0.7
TOTAL FISH	134	96.4	21.0	68.4
Undifferentiated Mammal	-	-	-	-
Large Mammal	5	3.6	9.7	31.6
TOTAL MAMMAL	5	3.6	9.7	31.6

Table 9: Fish and Mammal Remains from Trench 5 - 250 cm DBS

Within the assemblage, less taxa are recorded than in Trench 3 with only catfish, sturgeon, and sucker as identified fish taxa. No bird or shellfish remains are present and the mammal bone could not be identified beyond large mammal.

4.4.1.2.2 Samples

One sample was catalogued from Trench 5 - 250 cm DBS. DlLg-33:99A/140 weighs 9.5 grams.

4.4.1.3 Floral Remains

DlLg-33:99A/119 consists of 13 charcoal recoveries which weigh 6.0 grams. The fragments appear to derive from a large element, i.e., a branch rather than a twig, and cursory examination identifies them as coniferous.

4.4.2 Trench 5 - 280 cm DBS

A total of 260 artifacts was recovered from 280 cm DBS. These consist of 248 faunal remains and twelve floral specimens.

4.4.2.1 Faunal Remains

The faunal artifacts consist of butchering remains, a sample, and a single natural faunal specimen.

4.4.2.1.1 Butchering Remains

A total of 246 artifacts, with a combined weight of 22.7 grams, was recovered from this depth. The identified taxa are listed in Table 10, with the calculated frequencies for weight and quantity.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Fish	229	93.1	12.6	55.5
Catfish (*Ictalurus* sp.)	6	2.4	8.3	36.6
Perch family (Percidae)	1	0.4	0.1	0.4
Sturgeon (*Acipenser fulvescens*)	6	2.4	1.0	4.4
Sucker family (Catostomidae)	3	1.2	0.6	2.6
TOTAL FISH	245	99.6	22.6	99.6
Undifferentiated Mammal	1	0.4	0.1	0.4
TOTAL MAMMAL	1	0.4	0.1	0.4

Table 10: Fish and Mammal Remains from Trench 5 - 280 cm DBS

The mammal specimen and some of the fish elements have evidence of weathering. A variety of fish species were identified, suggesting bulk harvesting techniques.

4.4.2.1.2 Samples

One sample was catalogued. DlLg-33:99A/118 weighs 9.3 grams.

4.4.2.1.3 Naturally Deposited Fauna

One freshwater clam, a pea clam (Sphaeriidae), was catalogued. It weighs 0.1 grams.

4.4.2.2 Floral Remains

DlLg-33:99A/101 consists of 12 charcoal recoveries which weigh 0.3 grams. Some of these small fragments may be identifiable.

4.5 Trench 8

Trench 8 is located in the central portion of the building footprint (Figure 1). The upper layers consist of gravel and sand overlying a buried topsoil layer (Appendix B) which probably dates to 1885, prior to the onset of railroad activities at this location. A thin buried soil horizon was observed at 138 cm below surface and a dense cultural horizon was encountered at 195 cm below surface. Faint traces of decomposed bone were observed at 250 cm below surface, probably correlating with the layer recorded in Trench 5. A total of 3736 artifacts was recovered from Trench 8. These consist of 97 lithic artifacts, 129 ceramic artifacts, 3257 faunal remains, and 253 floral remains.

4.5.1 Lithic Artifacts

The 97 lithic artifacts are analysed within the following categories: tools (2 = 2.1%), detritus (84 = 86.6%), and fire-cracked rock (11 = 11.3%).

4.5.1.1 Lithic Tools

Two lithic tools were recovered from Trench 8: one scraper and one retouched flake. Archaeologists record a sequence of measurements on various aspects of different tools. These measurements can be used to perform statistical comparisons with other tools within the site and between sites. The measurements focus on the working edge: the width of the working edge; the length of the working edge (the distance off-linear which is positive for convex edges like scrapers and negative for concave edges like spokeshaves); and the edge angle.

DlLg-33:99A/152 is a rectangular end scraper made from a flake of St. Ambrose Chert (Plate 1). Scrapers are a functional tool type where the lithic material is flaked to produce a steep sloping edge which allows the use of considerable pressure in a lateral movement to remove tissue (fat, meat, etc.) from a hide without cutting the material. The steepness of the slope is usually a result of the type of material, although rarely do scraping tools have an edge angle of less than 45°. In addition to hide processing for clothing manufacture, scrapers can be used for woodworking or for scaling fish. The overall dimensions of DlLg-33:99A/152 are: 25.4 mm long, 20.9 mm wide, 9.1 mm thick. It weighs 4.8 grams. The working edge measures 17.4 mm wide and 2.4 mm long and has a working edge angle of 57°.

DlLg-33:99A/153 is a retouched flake made from a truncated, triangular flake of St. Ambrose Chert (Plate 1). A retouched flake is a by-product of stone tool manufacture which is subsequently modified for use as a tool itself. Retouched flakes are seen as expedient tools with minimal effort applied to produce a functional cutting edge. This usually consists of unifacial or bifacial retouch to straighten or to sharpen the natural edge produced during the initial phases of stone tool manufacture. DlLg-33:99A/153 measures 40.6 mm in length, 21.9 mm in width, 6.7 mm in thickness with a weight of 6.7 grams. Irregular bifacial retouch has occurred on one edge producing a slightly curved working edge which measures 28.2 mm in width and 1.6 mm in length. The working edge angle is 26°.

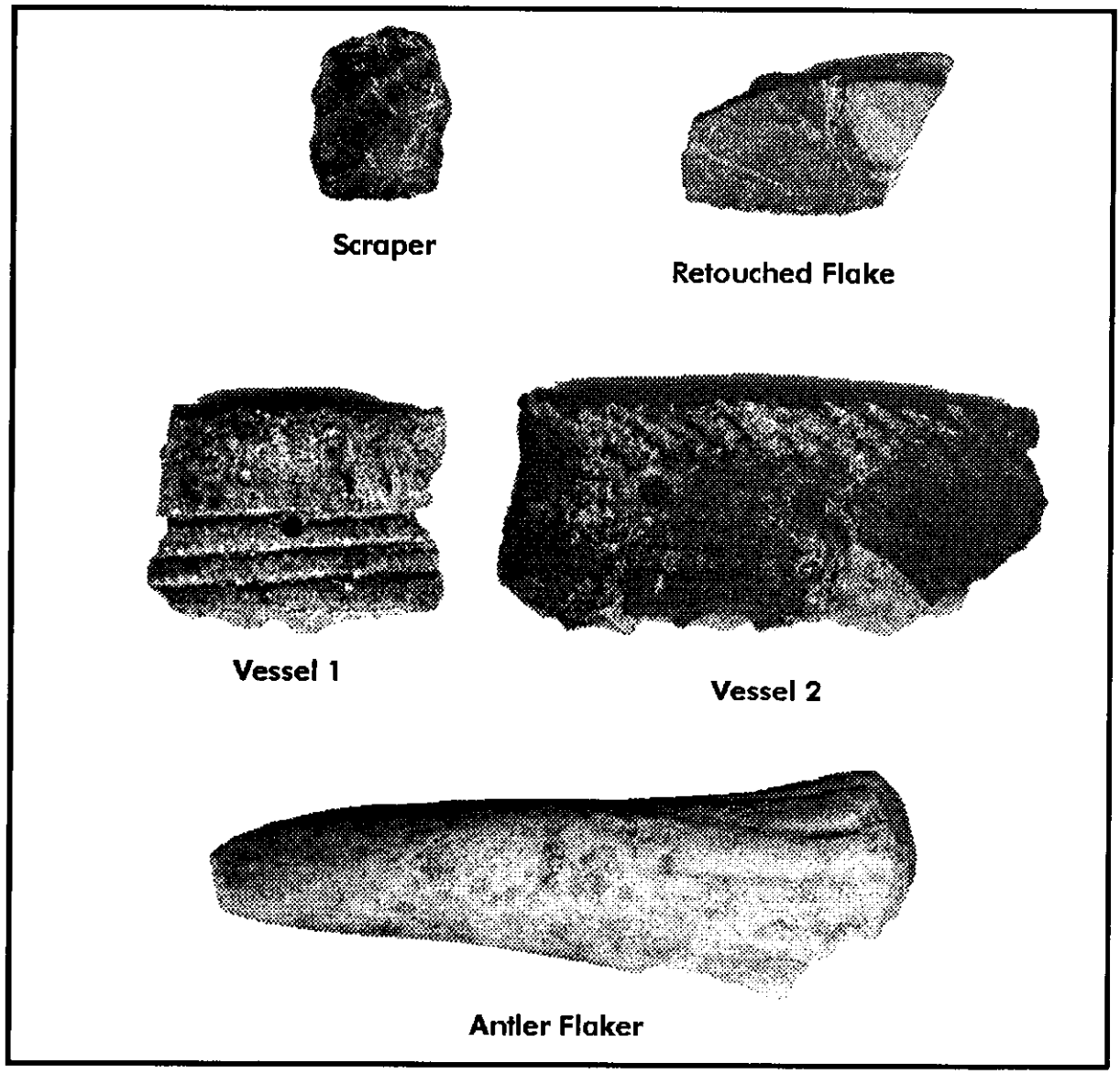

Plate 1: Artifacts Recovered from Trench 8 (actual size)

4.5.1.2 Detritus

Eighty-four lithic flakes were recovered from Trench 8 (Table 11). Within the flakes, six lithic material types are represented, the predominant one being Knife River Flint (56 flakes = 66.7%). The next most frequent material is St. Ambrose Chert.

MATERIAL	GROUP	QUANTITY	FREQUENCY	WEIGHT	FREQUENCY
Knife River Flint	II	56	66.7	7.5	34.4
Quartz	III	4	4.8	5.4	24.8
Quartzite	IV	5	6.0	0.3	1.4
St. Ambrose Chert	I	13	15.5	0.8	3.7
Silicified Sediment	IV	5	6.0	3.7	17.0
Swan River Chert	I	1	1.2	4.1	18.8
TOTAL		84	100.2	21.8	100.1

Table 11: Flake Recoveries from Trench 8 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.

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.

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 and rhyolite.

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

The most frequent group is Group II, representing 66.7% of the total. Group I provides 16.7% followed by Group IV with 12.0% and Group III with 4.8%. Inasmuch as lithic materials are not available at the site, all material would have been transported to the location by the occupants. The dominant groupings of lithic materials tend to represent source areas recently visited by the occupants. They can also indicate the practice of gathering tool-quality material when the opportunity arises. As certain types of stone are favoured for specific tools, often that type is carried until needed. Thus, material deriving from previously visited source areas or from source areas which had been accessed by traders occur as components of the lithic assemblage.

Some materials, such as Group IV, could have been obtained at creek mouths and riffle areas to the west along the Assiniboine River. The other lithic types are the result of long-distance transport. Trade or travel is seen as the mechanism by which the Group I materials (Swan River Chert and St. Ambrose Chert) which would have been brought from the west. The frequency of Knife River Flint is high (66.7%), suggesting a large supply of this extra-local material. An assemblage such as this one, which shows a very strong reliance on two different source areas, suggests that two different groups were camped at this location.

4.5.1.3 Fire-cracked Rock

A total of eleven fire-cracked rocks were recovered from Trench 8. DlLg-33:99A/160 consists of nine granite fire-cracked rock weighing 84.9 grams. DlLg-33:99A/161 consists of two fragments of fire-cracked limestone, weighing 102.7 grams.

4.5.2 Ceramics

A total of 129 ceramic sherds was recovered from Trench 8. This quantity consists of 111 body sherds and 18 rim sherds, which could be allocated to two discrete vessels.

4.5.2.1 Body Sherds

As noted earlier, the bulk of ceramic recoveries are usually body sherds. In this case, 111 body sherds were curated. Surface treatment was the only attribute, apart from weight, that was recorded.

The surface impressions (or lack thereof) for 47.7% of the assemblage (53 sherds) could not be determined, due to the small size of the sherds. For those sherds whose surface impressions could be identified, textile-impressed was the largest category with 40.5% (45 sherds), followed by obliterated textile which was 9.9% or 11 sherds. Evidence of the use of a cord-wrapped paddle was observed on two sherds (1.8%). The manufacturing technique was obvious due to the differing orientation of the cord-wrapped impressions on the same sherds. This technique may have been employed on the other vessels represented by the textile-impressed surface treatment, but, due to smallness of sherds and/or size of paddle, could not be ascertained.

4.5.2.2 Rim Sherds

The eighteen rim sherds have been allocated to two discrete vessels and a possible third. Five lip,neck sherds (DlLg-33:99A/142) were designated as Vessel 1. The decoration consists of several elements on both the flat lip and the exterior neck (Plate 1). The flat lip is decorated with oblique cord-wrapped object impressions (CWOI). The vertical neck has three distinct features: a band of parallel vertically-oriented CWOI; four rows of twisted cord impressions parallel to the lip; and a row of small punctates (3.2 mm diameter) impressed into the gap between the uppermost and second parallel cord impressions. The surface treatment below the decoration is fabric impressed. The neck juncture occurs approximately 1.0 cm below the lowermost cord row. This vessel is identified as Blackduck.

Vessel 2 consists of four lip,neck sherds (DlLg-33:99A/143). The flat, slightly outflaring lip is decorated with oblique CWOI. The exterior of the vessel is decorated with a band of oblique CWOI immediately below the lip, followed by a row of circular punctates (4.5 mm in diameter) on a smoothed exterior surface (Plate 1). The neck is vertical and all sherds have been truncated before the neck,shoulder junction. This vessel is tentatively identified as Rainy River.

The third group of sherds bearing decorative elements, DlLg-33:99A/144 (nine sherds), consist mainly of textile-impressed body sherds with traces of the neck,shoulder junction. Many of the sherds

have partial imprints of oblique CWOI immediately above the junction. None of the sherds fit with either Vessel 1 or 2, but the configuration of Vessel 1 is such that these sherds would not be part of that vessel. The missing space between the extant portion of the sherds of Vessel 2 and those of DlLg-33:99A/144 may mean that these sherds could be associated with Vessel 2, albeit from a lower portion of the vessel than those identified in DlLg-33:99A/143.

4.5.3 Faunal Remains

Faunal objects are the largest category of artifacts recovered from this trench. These 3257 specimens include a single bone tool and one sample with the remainder of the faunal material being either butchering remains or natural faunal deposits.

4.5.3.1 Faunal Tool

DlLg-33:99A/186 is a flaker made from the antler tine of a cervid, either moose or elk (Plate 1). The specimen measures 102.8 mm long, 34.3 mm wide, 26.2 mm thick and weighs 37.7 grams. The proximal end of the tool shows some evidence of cutting where it was removed from the antler although much of this surface has been smoothed by use wear and subsequent erosion. The distal end has been carved and ground into a flat working end which displays considerable wear polish. The distal tip has been broken away and the weathering on the exposed cortical surface indicates that this is an old break, probably the reason that the tool was discarded. As noted before, flakers are a primary tool used in the manufacture of lithic tools such as projectile point and scrapers.

4.5.3.2 Butchering Remains

Food residue in the form of butchering remains is the highest percentage of recovery. A total of 3223 artifacts, with a combined weight of 1479.9 grams, was catalogued. For comparative purposes, the identified taxa are listed in the following tables—non-mammal classes (Table 12) and mammal (Table 13). The frequencies of each taxon are calculated on the combined weight and quantities of both tables 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, i.e., carnivores which include wolf, dog, bear, and mink. However, this cannot be readily ascertained given our current 20th century biases.

Evidence of butchering is 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. Cut marks were observed on some of the large mammal vertebra fragments, rib fragments, and long bone fragments. A large percentage of mammalian bone, especially long bones, 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).

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Fish	1531	47.5	75.0	5.1
Catfish (*Ictalurus* sp.)	56	1.7	40.8	2.8
Drum (*Aplodinotus grunniens*)	5	0.2	3.3	0.2
Perch family (Percidae)	9	0.3	0.6	<0.1
Pike (*Esox lucius*)	1	<0.1	0.1	<0.1
Sturgeon (*Acipenser fulvescens*)	33	1.0	4.4	0.3
Sucker family (Catostomidae)	28	0.9	2.1	0.1
TOTAL FISH	1663	51.6	126.3	8.5
Undifferentiated Aves				
Medium/Large Aves	6	0.2	1.0	0.1
TOTAL AVES	6	0.2	1.0	0.1
Freshwater Clam (Unionidae)	56	1.7	10.8	0.7
Fat Mucket (*Lampsilis radiata*)	4	0.1	23.8	1.6
White Heel-Splitter (*Lasmigona complanata*)	2	0.1	7.8	0.5
Pink Heel-Splitter (*Proptera alata*)	1	<0.1	5.1	0.3
TOTAL SHELLFISH	63	2.0	47.5	3.2

Table 12: Fish, Aves, and Shellfish Remains from Trench 8

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Mammal	927	28.8	109.0	7.4
Large Mammal	479	14.9	923.9	62.4
Medium Mammal	7	0.2	2.6	0.2
Small Mammal	32	1.0	3.6	0.2
Deer/Cow Family (Artiodactyla)	20	0.6	162.9	11.0
Cow Family (Bovidae)	-	-	-	-
Bison (*Bison bison*)	1	<0.1	95.8	6.5
Carnivore Family (Carnivora)	2	0.1	0.3	<0.1
Rabbit Family (Leporidae)	-	-	-	-
Jack Rabbit (*Lepus* sp.)	23	0.7	7.0	0.5
TOTAL	1491	46.3	1305.1	88.2

Table 13: Mammal Remains from Trench 8

Some post-depositional trauma, occurring during or immediately after the food preparation process, was observed. Charred bones account for 2.4% of the total mammal quantity, while calcined bones are 1.3%. As the modified fragments are small, the proportion, when calculated by weight, is considerably less—0.6% and 0.4% respectively. A small portion of the mammal bones has evidence of weathering suggesting surface exposure prior to burial by flood-deposited sediments.

The frequency of the butchering remains are illustrated by both quantity and weight (Figure 4). In the quantity graph, fish and mammal remains are relatively equal. However, as fish bone is small and light in comparison to the larger and denser mammal bone, the mammal overwhelms the other taxa when weight is considered.

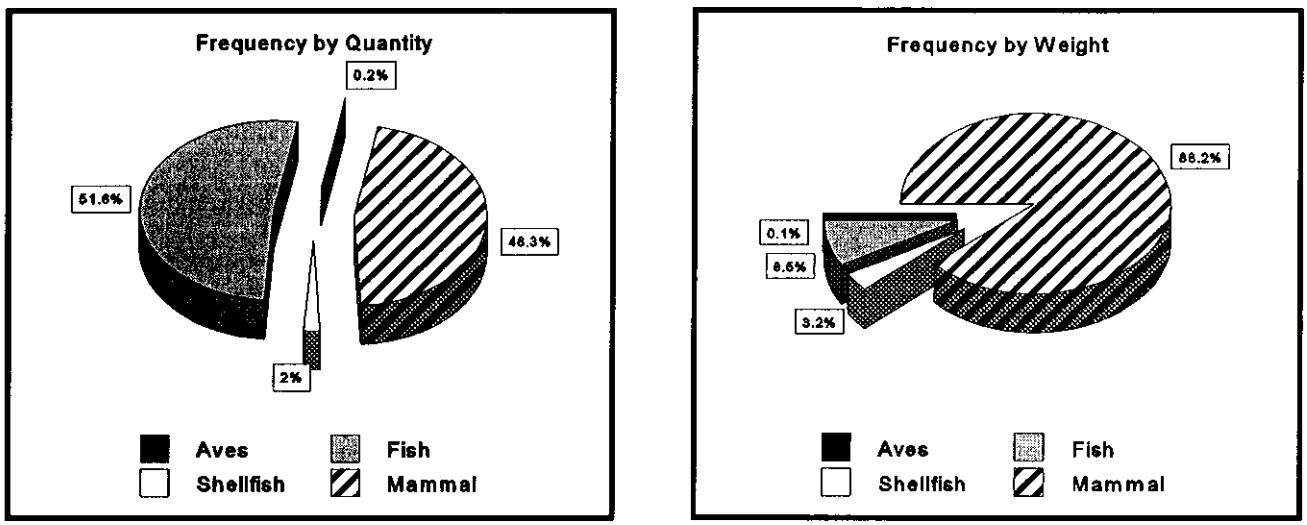

Figure 4: Butchering Remains from Trench 8

With the above caveats, it can be seen that approximately three-quarters of the protein component of the occupants' diet was fulfilled by meat from mammals. Much of the bone could not be identified beyond large, medium, or small mammal (Table 13). The identified species—bison, carnivores, and rabbit—supplied minor amounts of the diet.

Within the fish, catfish was dominant (Table 12). Sucker and sturgeon are more prevalent than drum, perch, or pike. The variety of species suggests that bulk fishing techniques, such as netting, were employed.

The very low proportion of bird remains suggests that the occupation did not take place during either migration period. Alternatively, the option of bird hunting was not as economically productive as that of fishing or big game hunting. It would seem that shellfish were gathered, without any specific focus on a single species.

4.5.3.3 Samples

One sample, DlLg-33:99A/252, was catalogued from Trench 8. It weighs 238.8 grams. The mix contains numerous scales, small fish and mammal bone fragments (some of which are calcined), and charcoal fragments.

4.5.3.4 Naturally Deposited Fauna

Thirty-two specimens of non-food faunal remains have been curated (Table 14). Representations of these types of faunal specimens are often incorporated into cultural deposits. The aquatic taxa would have been deposited during the flood episode prior to the cultural occupation. The femur from a ground squirrel could represent food remains or natural deposition.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Freshwater Snails (Gastropod)				
Ramshorn Snails (Planorbidae)	23	71.9	0.1	20.0
Pond Snails (Lymnaeidae)	7	21.9	0.1	20.0
TOTAL GASTROPODS	30	93.8	0.2	40.0
Freshwater Clam (Eulamellibranchia)				
Pea Clams (Sphaeriidae)	1	3.1	0.1	20.0
TOTAL CLAM	1	3.1	0.1	20.0
Mammal				
Ground Squirrel (*Spermophilus* sp.)	1	3.1	0.2	40.0
TOTAL MAMMAL	1	3.1	0.2	40.0
TOTAL	32	100.0	0.5	100.0

Table 14: Natural Faunal Remains from Trench 8

4.5.4 Floral Remains

The 253 floral recoveries are solely charcoal specimens. DlLg-33:99A/162 weighs 7.1 grams. It can be assumed that most of the charcoal would derive from locally available trees. Some of the charcoal specimens are large enough for species determination at a macro-analysis level.

5.0 DISCUSSION

The data from the earlier projects provided information for the north property line and the eastern edge of Pioneer Boulevard. The monitoring of sub-surface installations for Festival Park did not record any archaeological horizons to the south of the proposed footprint (Quaternary n.d.). The test trenches excavated during this assessment were spaced to obtain data throughout the footprint area. Most of the horizons can be correlated across the various projects (Table 15, Figure 5).

CULTURAL HORIZON	LOCATION	ELEVATION
HORIZON A	Forks Access	228.70
	York 1	228.52
	York 2	228.52
	York 3	228.56
HORIZON B	Forks Access	228.50
	York 1	228.34
	York 2	228.25
	Trench 3	228.60
	Trench 8	228.85
HORIZON C	Forks Access	228.40
HORIZON D	Forks Access	228.25
	York 2	228.05
	Trench 1	228.10
	Trench 2	228.25
	Trench 5	228.30
	Trench 8	228.30
HORIZON F	Forks Access	228.00
	York 1	227.68
	York 2	227.62
	York 3	227.61
	York 4	227.60
	Stage I East	227.75
	Stage I West	227.55
	Trench 5	228.00
HORIZON G	Forks Access	227.80
	Stage I East	227.67
HORIZON H	Forks Access	227.60
	York 2	226.97
	York 3	227.00
	York 4	227.29

Table 15: Correlation of Cultural Levels Throughout the Proposed Impact Area

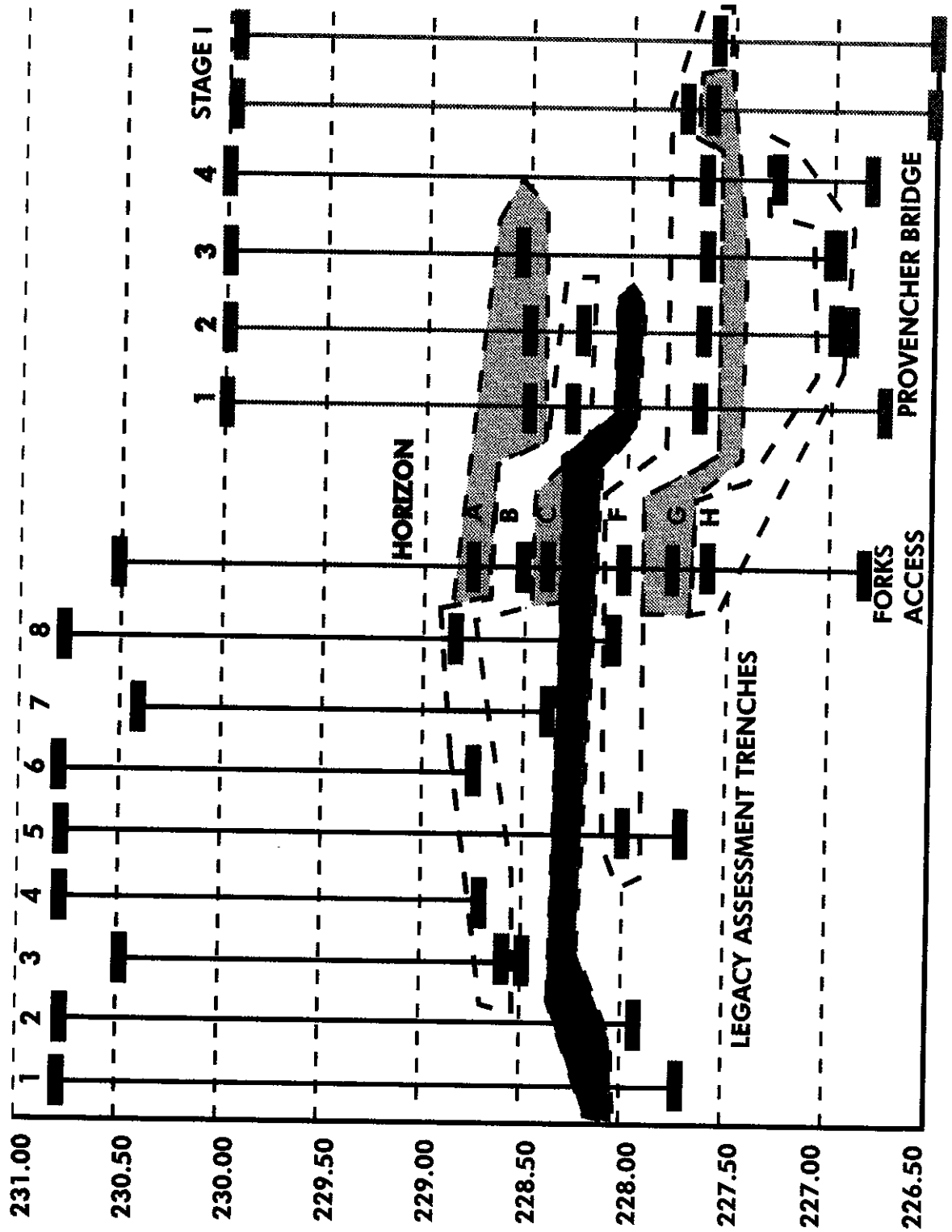

Figure 5: Correlation of Cultural Horizons across Projects

Although it is tempting to propose straight-line correlations between the cultural strata, the ground level at the times of the various occupations tended to be undulatory rather than uniformly flat (Quaternary 1999a:Figure 2). The correlations in Table 15 are based upon similarity of cultural resources as much as stratigraphic position.

A sparse upper cultural layer was encountered at 228.70 in The Forks Access Assessment Trench, with similar types of deposits in York Holes 1, 2, and 3. This correlation is based primarily on the density of artifacts within the horizon inasmuch as no diagnostic artifacts were recovered during either The Forks Access (Horizon A) or the Provencher Bridge projects (Cultural Zone I).

It would appear that Horizon B, an extensive cultural deposit which correlates with the Peace Meeting recorded in Aboriginal oral history, extends into the proposed footprint area. It was encountered in Trench 3 and Trench 8. This horizon tends to be quite dense, containing large quantities of artifacts representing several cultural groups. During The Forks Access Project, 43,999 artifacts were recovered from Horizon B (Quaternary 1999a:103-135).

It must be noted that within any campsite location there are areas which did not have activities and, therefore, cultural deposits may be lacking within these small areas. A short assessment trench may be excavated within one of these blank areas, so that the absence of material at an expected depth does not necessarily preclude the presence of artifacts immediately adjacent. It also appears that Trench 4 and trench 6 were terminated prior to encountering cultural deposits (Figure 5). As well, given the flood zone situation of The Forks, it is possible that the cultural deposits at specific locations were eroded away by flood episodes while left untouched at nearby locations, as was the case in the mitigative excavations at the CanWest Global Park baseball facility (Quaternary 2000).

Based upon the data recovered during the impact assessment of the proposed structure at the northwest corner of Parking Lot D, it is obvious that considerable heritage resources, representing different cultural horizons, are present at differing depths.

6.0 HERITAGE RESOURCE MANAGEMENT OPTIONS

Given the presence of archaeological resources throughout the projected impact zone, an archaeologist **will be required to monitor the augering for pile seating**, regardless of the depth of the impact of the structure itself. In addition, excavations around piles for shearing the piles and pouring of the pile caps may need to be monitored, depending upon the data obtained during the monitoring of the augering. The cost of this component will be dependant upon the number of piles and the depth of pile cap excavations.

In addition, the installation of services (water, waste sewer, land drainage sewer) will require the excavation of vertical shafts for horizontal boring. The excavation of the **vertical shafts will need to be monitored** with the contractor being alerted to the possibility that limited mitigative activity may be required.

After this construction phase, the necessary heritage resource mitigative activities will be dependant upon which of the following two options the developers choose to implement. These options are differentiated by the base of the impact zone, with Option 1 having grade beams at 150 cm below surface and Option 2 having grade beams at 200 or more cm below surface.

6.1 Option 1

Current plans are to design the structure with the base of the grade beams at 150 cm below surface. Given that the surface of the parking lot is at 230.80 metres above sea level, the base of the grade beams would be at 229.30 metres. The thickness of the pile caps and the necessary excavation for shearing the piles would mean that most impact should occur above 228.90 metres. This provides a thin margin of protection of 5 cm above the highest occurrence of Horizon B, which is in Trench 8 at 228.85 metres. At this depth of impact, the excavations for the grade beams may not impact any of the cultural horizons. The data (Table 15) suggests that, although the previous ground level upon which the cultural deposits rest is slightly undulatory, the manifestation in Trench 8 is the highest known to date (Figure 5).

This option would require limited construction monitoring by an archaeologist beyond those mandatory activities previously delineated. The monitoring would be primarily for the excavations for the grade beams, in locations where the cultural deposits may rise into the impact zone.

6.2 Option 2

A second option would be to design the structure to sit lower within the ground. If the base of the grade beams are planned at 200 cm below surface, their base would be at 228.80 metres. The thickness of the pile caps and the necessary excavation for shearing the piles would mean that impact could occur at depths down to 228.40 metres. This results in an impact to Horizon B in the area between Trench 3 and Trench 8 and extending northward towards the property line along the York

Avenue right-of-way. This impact would be primarily at the pile cap excavations and the grade beam excavations. The data (Table 15) suggests that Horizon B slopes downward to the north, perhaps resulting in less mitigative requirements to the north of Trench 8.

This option would require considerable construction monitoring by an archaeological team, beyond the mandatory activities. The monitoring would be for the excavations for the pile caps and the grade beams. Mitigative recovery of impacted archaeological horizons would be necessary, resulting in some degree of slowed operation and/or down time for the contractor at the locations where cultural horizons are encountered. These mitigative actions for localized areas can be implemented by having the excavated soil containing the cultural resources set to the side for subsequent recovery by the archaeological team, enabling the contractor to continue excavations. However, if it appears that an area of the cultural horizon is high enough to be included in the excavations for the base of the parking floor, extensive mitigative archaeological excavation would be required. At the depth of impact (200 cm) discussed in this option, it is deemed unlikely that this will be the case.

Finally, any impacts deeper than 200 cm would result in large block areas of Horizon B requiring mitigative archaeological excavation. This leads to considerable downtime and also raises the cost of heritage resource management that would be required under the terms of the Heritage Permit required from Historic Resources Branch, Manitoba Culture, Heritage and Citizenship. In addition, given the density of Horizon B, considerable laboratory time would be required for cataloguing and analysing the recovered artifacts.

6.3 Management Suggestions

While the recovery of additional archaeological information concerning the lifeways of peoples of the past is always a scientific benefit, it must be weighed against the cost of the recovery of this information. This information is to the benefit of all Manitobans but the cost of recovery, within a development project, is borne solely by the developer.

The Legacy Estates Project has the opportunity of adding to the scientific knowledge of the past, but it also has the option of undertaking an equally valid heritage management process by avoiding extensive impact upon the cultural horizons that lie within the footprint of the proposed structure. If **Option 1** is selected, the heritage resources will be minimally impacted and remain *in situ* for future generations, protected by the building over top of them. If **Option 2** is selected, mitigative archaeological procedures will recover new data, thereby enhancing our knowledge of the past.

The selection of which option to implement rests with the developer as either option would comply with heritage resource management parameters as delineated under the Heritage Resources Act.

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APPENDIX A

HERITAGE PERMIT

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

Manitoba
Culture, Heritage
And Citizenship

Heritage Permit No. A62-99

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 Permitee"),

is hereby granted permission to:

conduct a heritage resource impact of the proposed development at The Forks by excavating a series of trenches at the northwest corner of Parking Lot D near the southeast corner of York Avenue and Pioneer Boulevard to determine elevation of Pre-contact heritage resources;

during the period:

December 16 to 24, 1999

This permit is issued subject to the following conditions:

(1) That the information provided in the application for this permit dated the 14th day of December 1999, is true in substance and in fact;

(2) That the Permitee 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 Permitee shall provide to the Minister a written report or reports with respect to the Permitee'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:
March 31, 2000

(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. 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;
b. The Permitee will be on-site supervising all aspects of the field work;
c. The Permitee shall be responsible for the conduct of the laboratory analysis of recovered heritage objects and information to be included in the permit report;
d. The report identified in #3 above shall conform at a minimum to "The Contents and Format of a Heritage Resource Impact Assessment";
e. 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 Permitee 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 14th day of December 1999

Minister of Culture, Heritage and Citizenship

APPENDIX B

STRATIGRAPHIC PROFILES

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.80		
0 - 160	229.20	rock ballast	drainage channel - railroad era
160 - 195	228.85	greasy clay fill	-
195 - 270	228.10	silty clay	diesel stained
270 - 275	228.05	**CULTURAL LEVEL**	charcoal, bone
275 - 305	227.75	silty clay	diesel stained
		base of excavation	

Table B-1: Stratigraphic Profile at Trench 1

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.80		
0 - 80	230.00	concrete, gravel, cobblestones	-
80 - 132	229.48	clay fill	-
132 - 195	228.85	grey-brown silty clay	-
195 - 195	228.85	relict soil horizon	3 mm thick
195 - 255	228.25	grey-brown silty clay	-
255 - 258	228.22	**CULTURAL LEVEL**	charcoal, bone
258 - 290	227.90	grey-brown silty clay	-
		base of excavation	

Table B-2: Stratigraphic Profile at Trench 2

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.50		
0 - 53	229.97	gravel	-
53 - 76	229.74	clay, gravel	-
76 - 93	229.57	gravel	-
93 - 108	229.42	clay fill	-
108 - 110	229.40	mixed clay/top soil	1885 soil horizon
110 - 132	229.18	grey-brown silty clay	-
132 - 132	229.18	relict soil horizon	3 mm thick, organic stain
132 - 155	228.95	grey-brown silty clay	-
155 - 173	228.77	hematite stained silty clay	-
173 - 192	228.58	grey-brown silty clay	-
192 - 195	228.56	**CULTURAL LEVEL**	ash, charcoal, bone
195 - 200	228.50	grey-brown silty clay	-
		base of excavation	

Table B-3: Stratigraphic Profile at Trench 3

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.80		
0 - 33	229.47	cobblestones	-
33 - 47	229.33	concrete	-
47 - 52	229.28	sand	-
52 - 108	229.72	clay fill, gravel	-
108 - 132	229.48	mixed clay/organic	1885 soil horizon
132 - 138	229.42	dark grey-brown clay	lower section of 1885 soil
138 - 146	229.34	red-brown silty clay	-
146 - 146	229.34	relict soil horizon	3 mm thick
146 - 169	229.11	greyish red-brown silty clay	-
169 - 171	229.09	hematite stained silty clay	-
171 - 171	229.09	relict soil horizon	5 mm thick
171 - 183	228.97	hematite stained silty clay	-
183 - 210	228.70	grey-brown silty clay	-
		base of excavation	

Table B-4: Stratigraphic Profile at Trench 4

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.80		
0 - 72	230.08	cinder fill	-
72 - 86	229.94	sand	-
86 - 88	229.92	disturbed top soil	1885 soil horizon
88 - 100	229.80	dark red-brown clayey silt	-
100 - 131	229.49	dark grey-brown silty clay	-
131 - 131	229.49	relict soil horizon	3 mm thick, charcoal
131 - 156	229.24	grey-brown silty clay	-
156 - 156	229.24	relict soil horizon	2 to 5 mm thick, charcoal
156 - 250	228.30	grey-brown silty clay	-
250 - 255	228.25	**CULTURAL LEVEL**	ash, charcoal, bone
255 - 280	228.00	grey-brown silty clay	-
280 - 285	227.95	**CULTURAL LEVEL**	charcoal, bone
285 - 310	227.70	grey-brown silty clay base of excavation	-

Table B-5: Stratigraphic Profile at Trench 5

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.80		
0 - 93	229.87	gravel, cinder fill	-
93 - 95	229.85	top soil	1885 soil horizon
95 - 122	229.58	grey-brown silty clay	some organic stains
122 - 122	229.58	relict soil horizon	2 mm thick
122 - 146	229.34	grey-brown silty clay	-
146 - 146	229.34	relict soil horizon	2 mm thick, charcoal
146 - 155	229.25	grey-brown silty clay	-
155 - 156	229.24	relict soil horizon	10 mm thick, charcoal
156 - 198	228.82	grey-brown silty clay base of excavation	-

Table B-6: Stratigraphic Profile at Trench 6

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.40		
0 - 57	229.83	cinder fill	-
57 - 60	229.80	disturbed top soil	1885 soil horizon
60 - 73	229.67	greyish silty clay	-
73 - 73	229.67	relict soil horizon	3 mm thick
73 - 77	229.63	grey-brown silty clay	-
77 - 78	229.62	relict soil horizon	10 mm thick, charcoal
78 - 81	229.59	grey-brown silty clay	-
81 - 81	229.59	relict soil horizon	3 mm thick
81 - 99	228.41	grey-brown silty clay	-
99 - 99	228.41	relict soil horizon	3 mm thick, charcoal
99 - 135	229.05	grey-brown silty clay	-
135 - 155	228.85	marly grey-brown silty clay	-
155 - 194	228.46	grey-brown silty clay	-
		base of excavation	

Table B-7: Stratigraphic Profile at Trench 7

DEPTH	ELEVATION	DESCRIPTION	COMMENTS
SURFACE	230.80		
0 - 62	229.38	gravel	-
62 - 97	229.83	sand, gravel	-
97 - 98	229.82	disturbed top soil	1885 soil horizon
98 - 117	229.63	dark brown clay	-
117 - 138	229.42	dark grey-brown silty clay	-
138 - 138	229.42	relict soil horizon	3 mm thick
138 - 195	228.84	brown silty clay	-
195 - 203	228.77	**CULTURAL LEVEL**	ceramics, bone, charcoal
203 - 250	228.30	grey-brown silty clay	-
250 - 251	228.29	**CULTURAL LEVEL?**	thin, charcoal
251 - 270	228.10	grey-brown silty clay	-
		base of excavation	

Table B-8: Stratigraphic Profile at Trench 8