The Stage 4 Salvage Excavation of the King's Forest Park Site (AhGw-1) Cultural Heritage Resource Assessment, Red Hill Creek Expressway (North-South Section) Impact Assessment, City of Hamilton, Ontario

License Report

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ACKNOWLEDGEMENTS

Thanks are due to many individuals who assisted or contributed to our work at the King's Forest Park site. These include, in particular, Mr. Chris Murray, the City of Hamilton's Director of Red Hill Valley Project, and Mr. Bill Annable of Water Regime Investigations and Simulations Inc., Mr. Peter Carruthers, then of the Ontario Ministry of Culture, Mr. Neal Ferris, also of the Ministry of Culture, as well as Ms, Cassandra Bach of the City of Hamilton and all those who took part in the public programming at the site. Our particular appreciation is extended to Mr. Bill Fox of Parks Canada, who first found the site so many years ago, and continued his interest in it through providing his advice and comments during our work there.

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1.0 INTRODUCTION & BACKGROUND TO THE SALVAGE EXCAVATION OF THE KING'S FOREST PARK SITE (AhGw-1)

David A. Robertson

1.1 Introduction

The construction of the Red Hill Creek Expressway in the City of Hamilton has entailed extensive archaeological assessment and mitigation activities that have been carried out intermittently over the past 25 years. The original Environmental Assessment conducted for the expressway was completed in 1980. This work involved archaeological survey of the majority of the lands to be disturbed by the project. Other portions of the valley were surveyed in the late 1980s and early 1990s as part of other projects directly or indirectly related to the expressway (e.g., Delcan 1980; Warrick 1990; MHCI 1996). Approval for the project to proceed was granted on the strength of the EA-related work in 1996, provided that the few significant sites that had been documented earlier were salvage excavated and some small areas that had not been part of the original design plan were assessed. The Region of Hamilton-Wentworth (now City of Hamilton) retained Archaeological Services Inc. (ASI) to carry out this work in 1996.

As this work proceeded, however, it became apparent that some of the previous assessment work did not meet current professional standards. Moreover, there was some confusion as to where some sites were located relative to the expressway, and uncertainty as to whether or not some of these sites still existed. Therefore, the City commissioned ASI to complete a new study that involved resurveying all lands within the expressway project area to ensure that all archaeological concerns were addressed prior to any construction. By the time this survey work was completed, the total number of archaeological sites within the actual construction impact area of the expressway had increased from nine to 22, and two sites that were thought to have been destroyed were rediscovered and found to be relatively intact (ASI et al. 2003). Ten of these sites, of which seven were First Nations in origin, were subject to test and salvage excavations between 1998 and 2004, including the King's Forest Park site (Figure 1). This document constitutes the final report on the Stage 4 excavation activities completed at the King's Forest Park site and the results of the subsequent analysis of the data recovered.

All activities related to the Stage 4 excavation of the King's Forest Park site were conducted under licences 2002-015 and P117 issued to Dr. MacDonald, pursuant to the *Ontario Heritage Act* (R.S.O. 1990). Permission to access the site and to carry out all activities necessary for the purpose of this project was granted by the City of Hamilton.

The post-2002 Stage 4 field work was monitored by Six Nations observers under the guidance of Dr. Gary Warrick, Assistant Professor of Contemporary Studies at Wilfred Laurier University's Brantford campus and a former Ontario Ministry of Transportation Regional Archaeologist, who served as Six Nations' archaeological advisor. This monitoring was a requirement of a protocol established between Six Nations and the City concerning archaeological resource concerns within the Red Hill Creek Expressway project area.

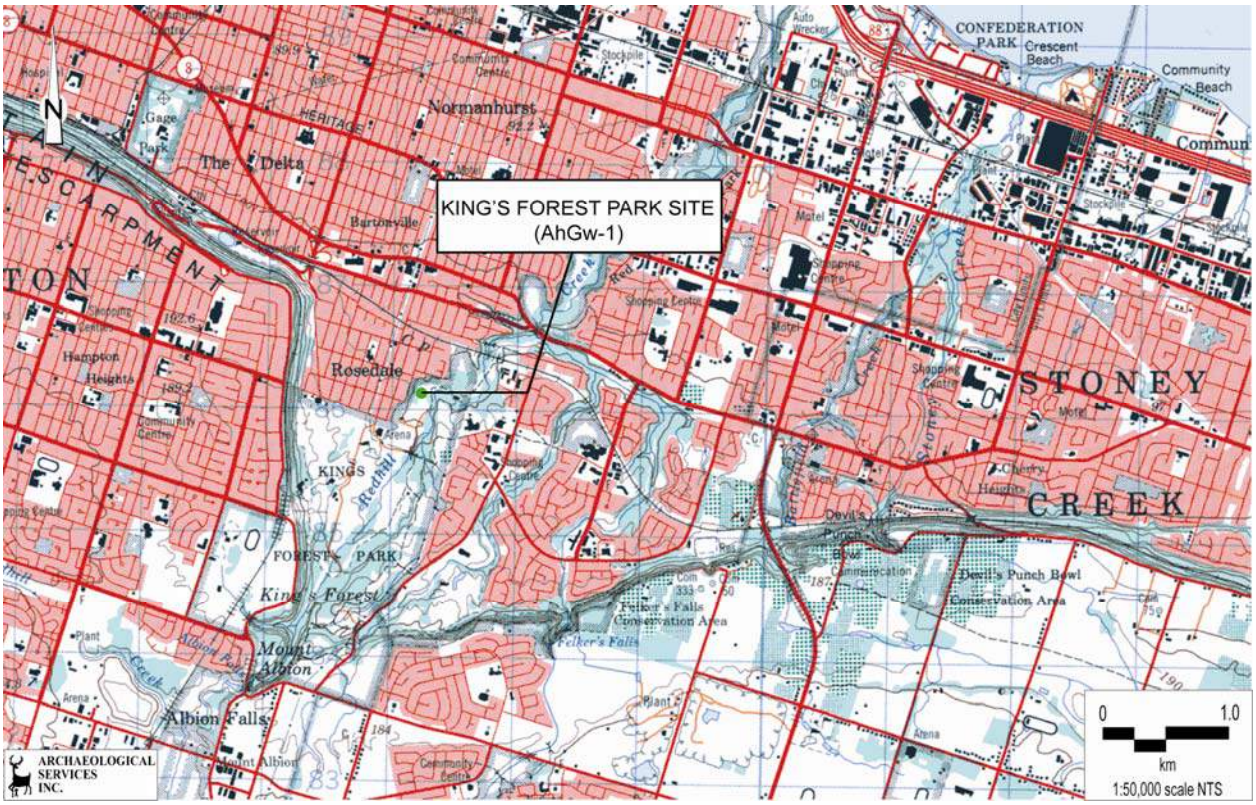


Figure 1: The location of the King's Forest Park site (AhGw-1) in the City of Hamilton

NTS sheet 30M/4 (ed. 7, 1996)

1.2 Previous Research at the King's Forest Park Site (AhGw-1)

The King's Forest Park site, located in what is now Rosedale Park (Figure 2), was encountered by Mr. Bill Fox in 1961. According to Fox, the spatial extent of the site included deposits on the western side of the creek, and a hillside midden on the eastern side of the creek. Although never throughly investigated, the site was the subject of sporadic test excavation over the next four years, which included investigations by the Ontario Archaeological Society in the summer of 1963. It was during this time that the City of Hamilton began construction of a storm sewer along the western edge of the Red Hill Creek, an exercise which heavily impacted the eastern edge of the site, although the OAS continued to carry out small scale excavations at the site until 1969. Fox also worked on the site between September 1965 and March 1966, excavating a midden on the edge of the woodlot adjacent to the northern

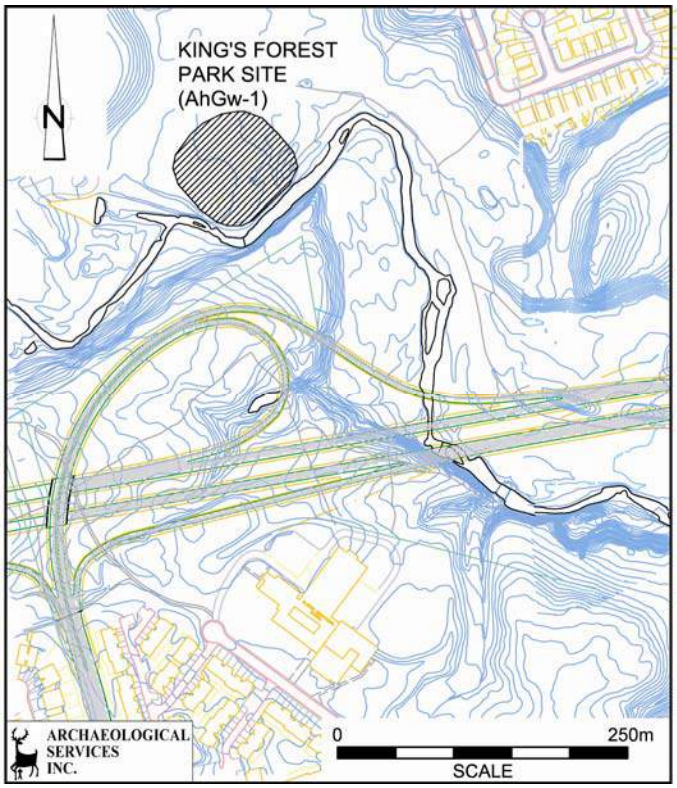


Figure 2: The King's Forest Park site (AhGw-1) within to the Red Hill Creek Expressway project area.

playing field (now Diamond 6). Based on these investigations, it was determined that the site dated to the later portion of the Early Ontario Iroquoian period, circa A.D. 1200. It was believed that the site represented a small camp or other special purpose "Glen Meyer" site rather than a village and that the site existed in relative isolation from any other "Glen Meyer" villages (e.g., Donaldson 1964; Fox 1967; Wright 1992:5), more or less on the frontier between the "Glen Meyer" and "Pickering" branches of the Early Iroquoian tradition of southern Ontario (Wright 1966).

The site was relocated (in part) by a survey crew from DelCan Corporation in 1980. In their report (DelCan 1980), they noted that pottery sherds were found eroding out of a path leading to a steep embankment on the eastern side of creek. Shovel test pits were placed by DelCan on top of the eastern bank, in the area of the pottery sherds, but no additional artifacts were recovered. DelCan did not test the integrity of the site on the western side of the creek as it was located outside the proposed Expressway corridor.

King's Forest Park received further mention in a report produced by Mayer Heritage Consultants Inc. on their survey work associated with the Red Hill Creek valley Restoration Project (MHCI 1996). Despite mention that the King's Forest Park site was within the study area (1995:38), MHCI were unable to relocate the site. Concomitantly, the material recovered from the site in the 1960s was analyzed as part of Daniel Robert's 1997 Masters thesis, wherein he concluded that the site represented a special purpose resource extraction site occupied during the fall, winter and perhaps spring (Roberts 1997:81).

In an effort to relocate the King's Forest Park site, ASI staff surveyed portions of Rosedale Park area the fall of 1998. Test pitting was conducted in the area of Diamonds 5, 6 and 7, on the northern playing field, at five to ten metre intervals (Figures 3 and 4). Positive test pits containing lithic flakes, ceramic and bone artifacts were encountered immediately. Efforts to delimit the site determined that it extends over more than a hectare. In addition to the playing field, test pitting was also conducted in the woodlot to the west of the baseball diamonds. Positive test pits were again encountered, particularly towards the southern end of the woodlot against an artificial berm constructed for a sanitary holding tank. Having documented the presence of the site on the western side of the creek, ASI also examined the eastern side of the creek in an attempt to locate the hillside midden reported by Fox, and DelCan. Indeed, artifacts were found eroding from the slope encompassing an area of approximately 15 metres by 10 metres. Test pits were placed at the top and bottom of the slope, yet no additional artifactual material was recovered from this locale.

In an effort to assess the integrity and distribution of subsurface settlement remains, additional investigations were carried out in the fall of 1998, wherein four candidate areas were selected, and the topsoil was removed by Gradall in an effort to expose the subsoil (Figure 4). In the first exposed area, a large ash-filled feature measuring approximately 1.2 metre in diameter was encountered, which yielded a sizable quantity of ceramic, bone and lithic fragments. This feature was not excavated, and instead was covered over in advance of full scale Stage 4 salvage excavations. The remaining three areas of topsoil removal did not reveal any subsurface features, or produce any artifacts (ASI et al. 2003:93).

1.3 The Salvage Excavation of the King's Forest Park Site

The King's Forest Park site was not directly affected by the construction of the Red Hill Creek Expressway, rather by complementary efforts to realign the course of the creek and to restore its viability. As noted above major portions of the site had been destroyed by previous landscape alterations and developments. These included past storm and sanitary sewer construction, as well as landscaping associated with the construction of the various baseball diamonds, which included grading within the intervening areas. The disturbance associated with the trunk sewer was 50 m wide, representing 30-50%

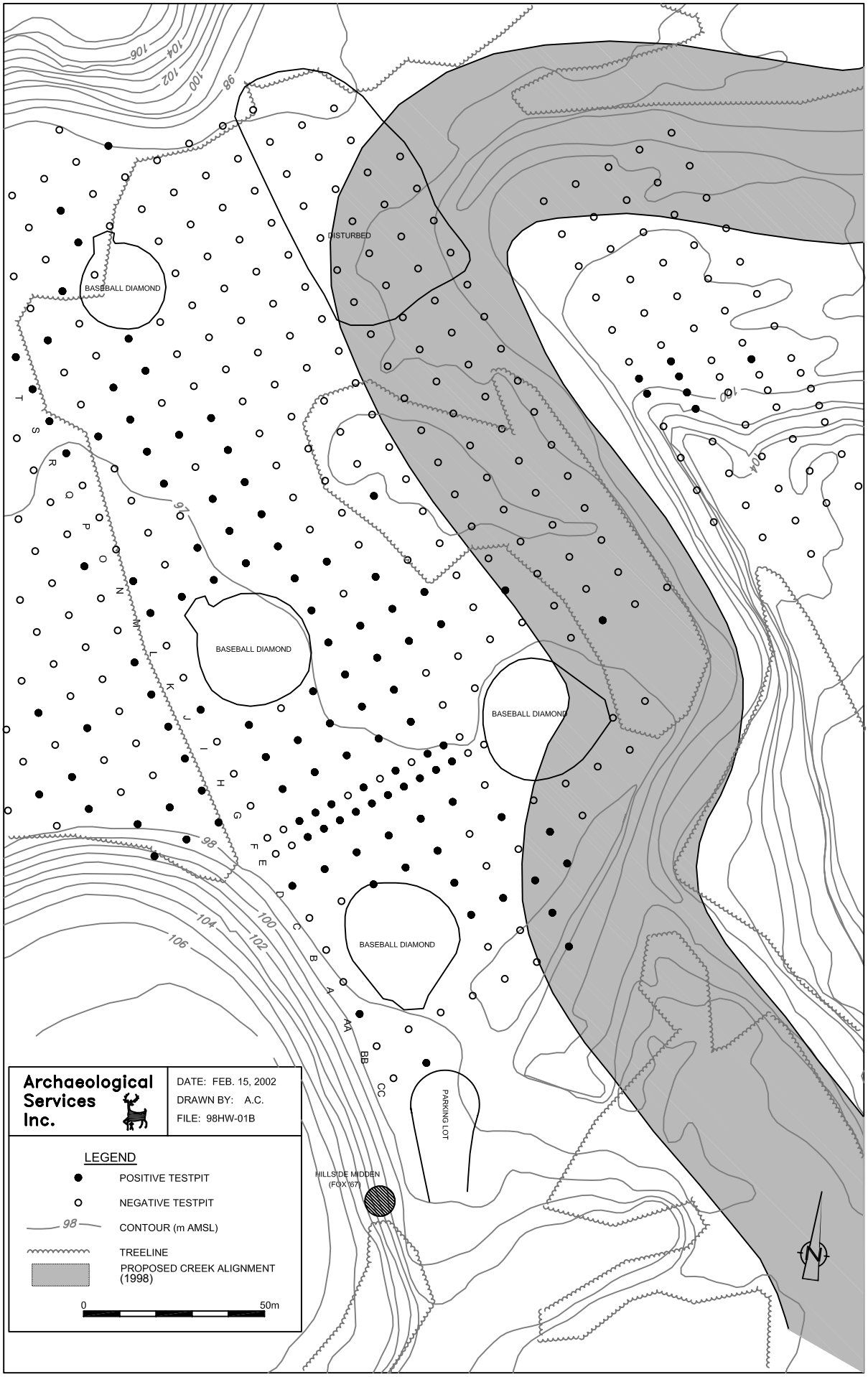


Figure 3: The Stage 3 Test Pit Survey of the King's Forest Park Site

Archaeological Services Inc.

DATE: JULY 12, 2004

DRAWN BY: A.C./D.R.

FILE: KFP stage 3-4.ai

LEGEND

- EARLY CREEK CHANNEL
- EARLY CREEK CHANNEL (ESTIMATED)
- 104 CONTOUR (m AMSL)
- TREELINE
- 1963-1969 EXCAVATION AREAS (APPROX. LOCATION)
- 1963-1969 "FEATURE" LOCATIONS (APPROX.)
- POSITIVE TEST PIT / NEGATIVE TEST PIT
- HAND EXCAVATION UNIT (INTACT DEPOSITS)
- HAND EXCAVATION UNIT (GRADED/FILLED)
- LONGHOUSE
- GRADALL EXCAVATION AREA
- GRADALL EXCAVATION AREA (GRADED/FILLED)

0 50m

CREEK CHANNELS INTERPRETED/MAPPED BY BILL ANNABLE, DEPT. OF EARTH SCIENCES, UNIVERSITY OF WATERLOO.

BASE MAPPING PROVIDED BY CARTOLOGIX, 1998.

SWMP

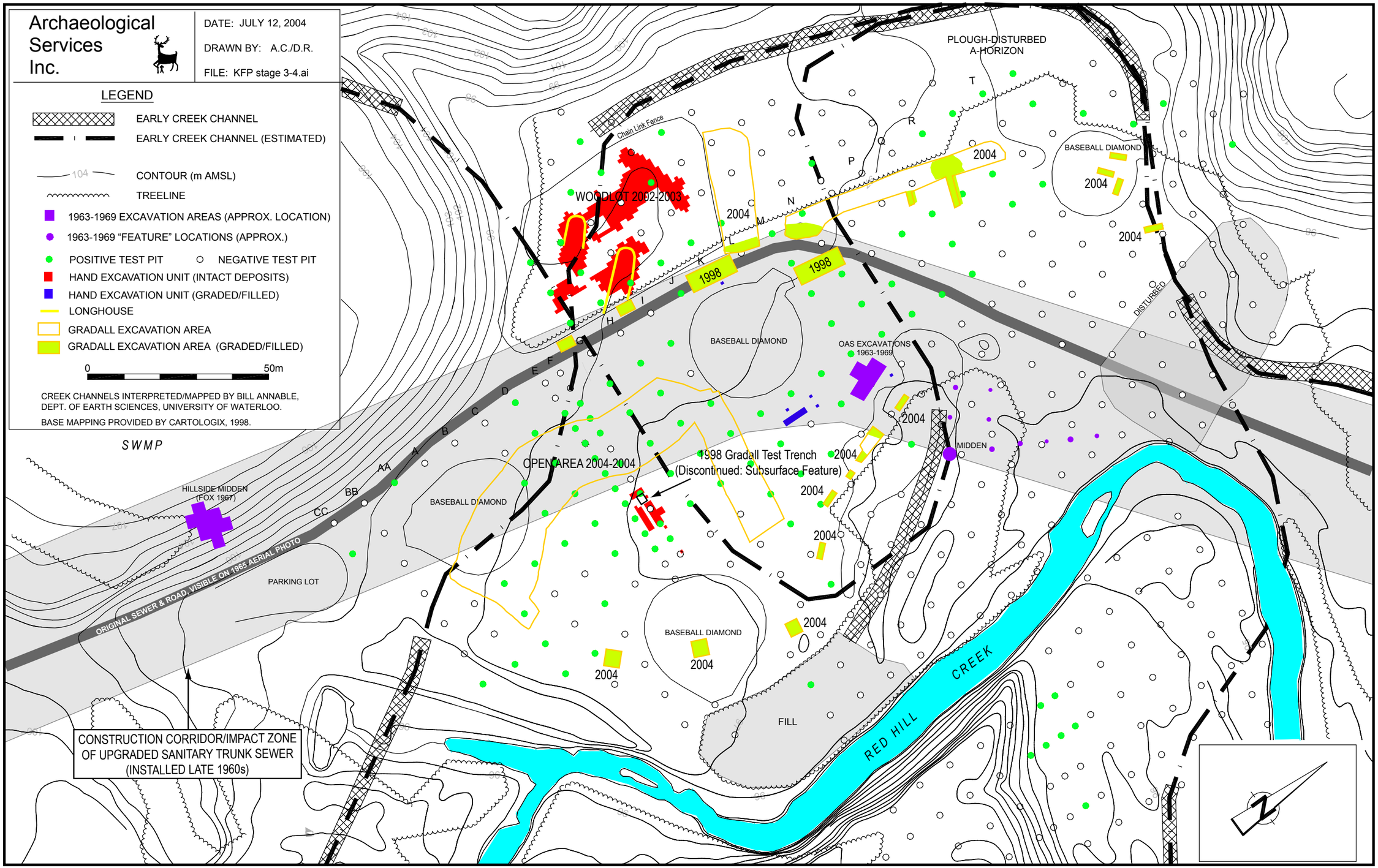


Figure 4: Existing Conditions and Archaeological Investigations of the King's Forest Park Site

of the open field area (Figure 4). Also, there was considerable evidence of the grading along the eastern edge of the wooded area as indicated by mounding and deep topsoil deposits (over 70 cm).

In the fall of 1999, limited public programming and Stage 4 salvage excavations were initiated at King's Forest Park (ASI et al. 2003:93). In addition, an ongoing fluvial research programme undertaken by Bill Annable that was intended to inform the planned creek realignment activities has yielded important data regarding the former course and structure of the creek in the site vicinity (Figure 5).

In the fall of 2000, a field crew returned to King's Forest Park to conduct additional systematic survey and limited test excavations in the treed areas of the site (ASI et al. 2003:93). This work resulted in hand-excavation of 30 one metre square units, and the recovery of 2,000-3,000 artifacts. The majority of the site within the woodlot proved to be comparatively undisturbed.

Work at the site was continued during the fall of 2002 and into the spring of 2003, entailing the hand excavation of 540 one metre square units throughout the wooded portions of the site and resulting in the recovery of approximately 56,000 artifacts from the woodlot area (Figures 4 and 6). It was ultimately determined that this portion of the site would not be affected by the realignment of the creek, at which point excavations in this area were discontinued.

The final campaign of work was carried out in 2003-2004 and involved the Gradall excavation of a series of test trenches within various peripheral areas of the site to be impacted by the realignment of the creek channel (Figure 4). For the most part these test trenches encountered highly disturbed soil profiles. Areas that were comparatively intact, however, were fully investigated using a combination of hand excavation and Gradall stripping (Figures 4 and 7).

For the most part, the salvage excavations were carried out only in areas that were to be impacted by restoration of the creek or related earthworks. While this approach minimized the scale of work at the site and has ensured that substantial areas remain intact (intact being a relative term given the considerable amount of previous disturbance that has occurred), it has hindered our ability to achieve a full understanding of the site, its history and the character of its occupation(s).

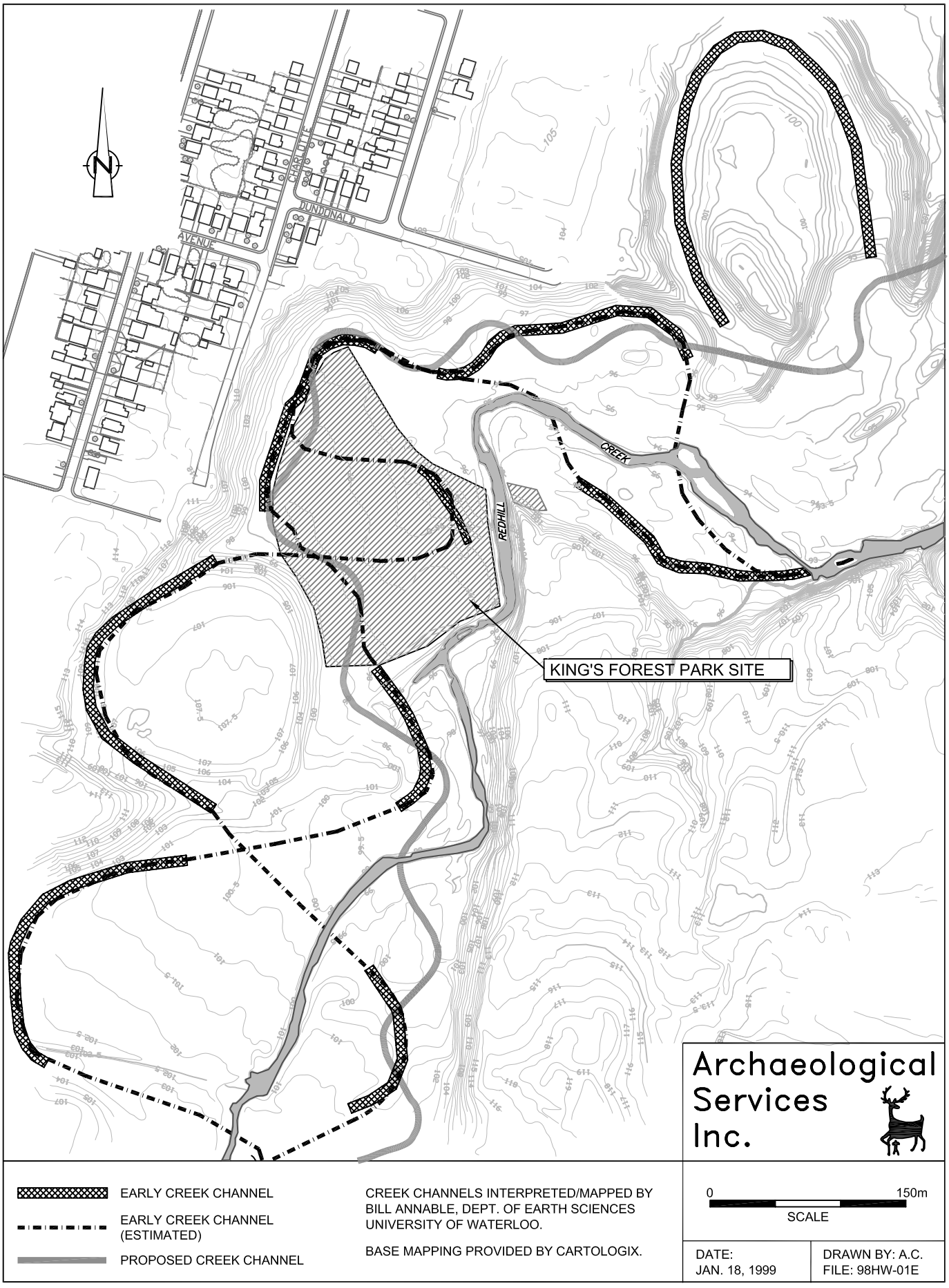


Figure 5: Reconstructed Creek Channel Patterns in the Vicinity of the King's Forest Park Site

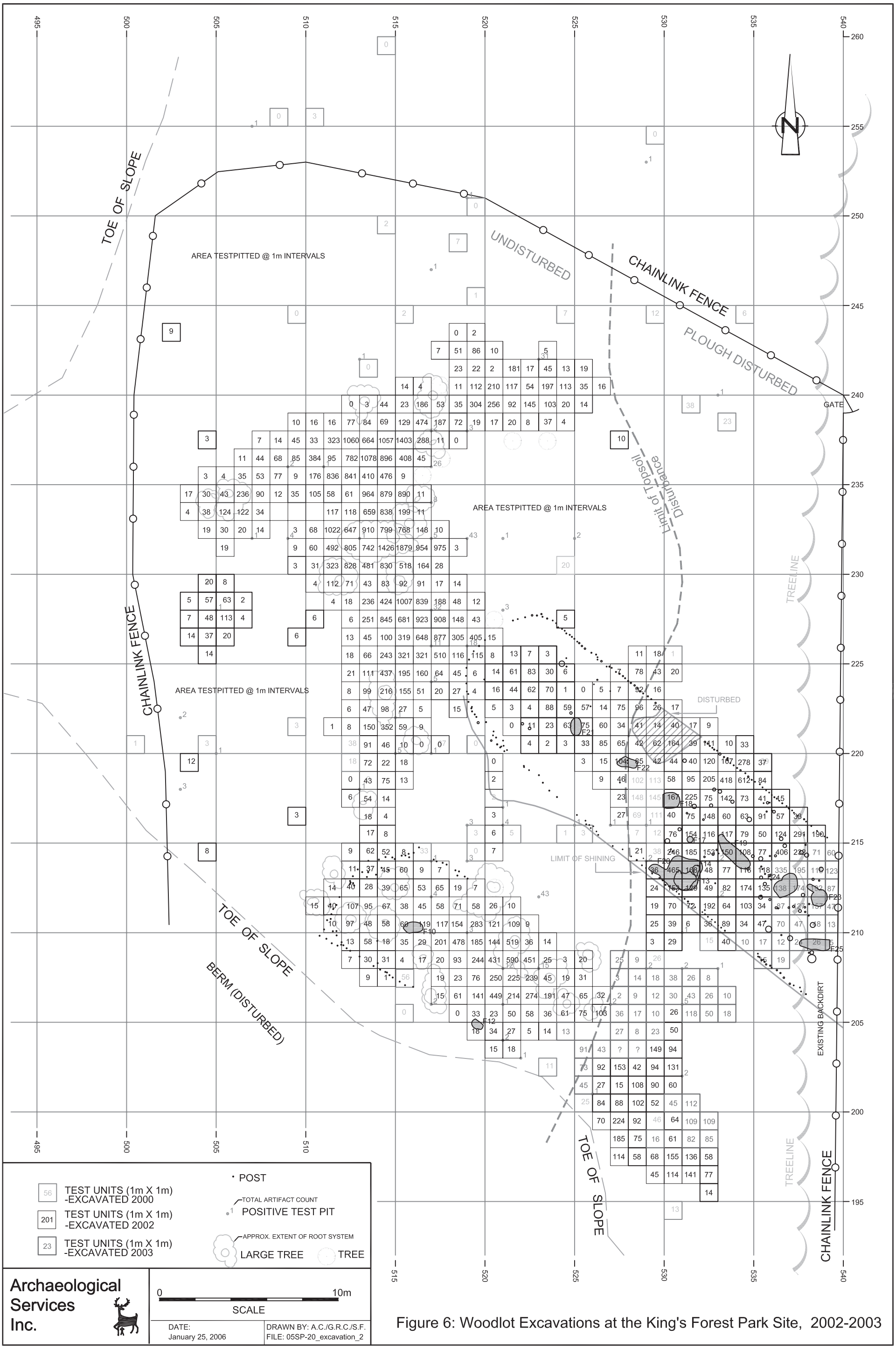


Figure 6: Woodlot Excavations at the King's Forest Park Site, 2002-2003

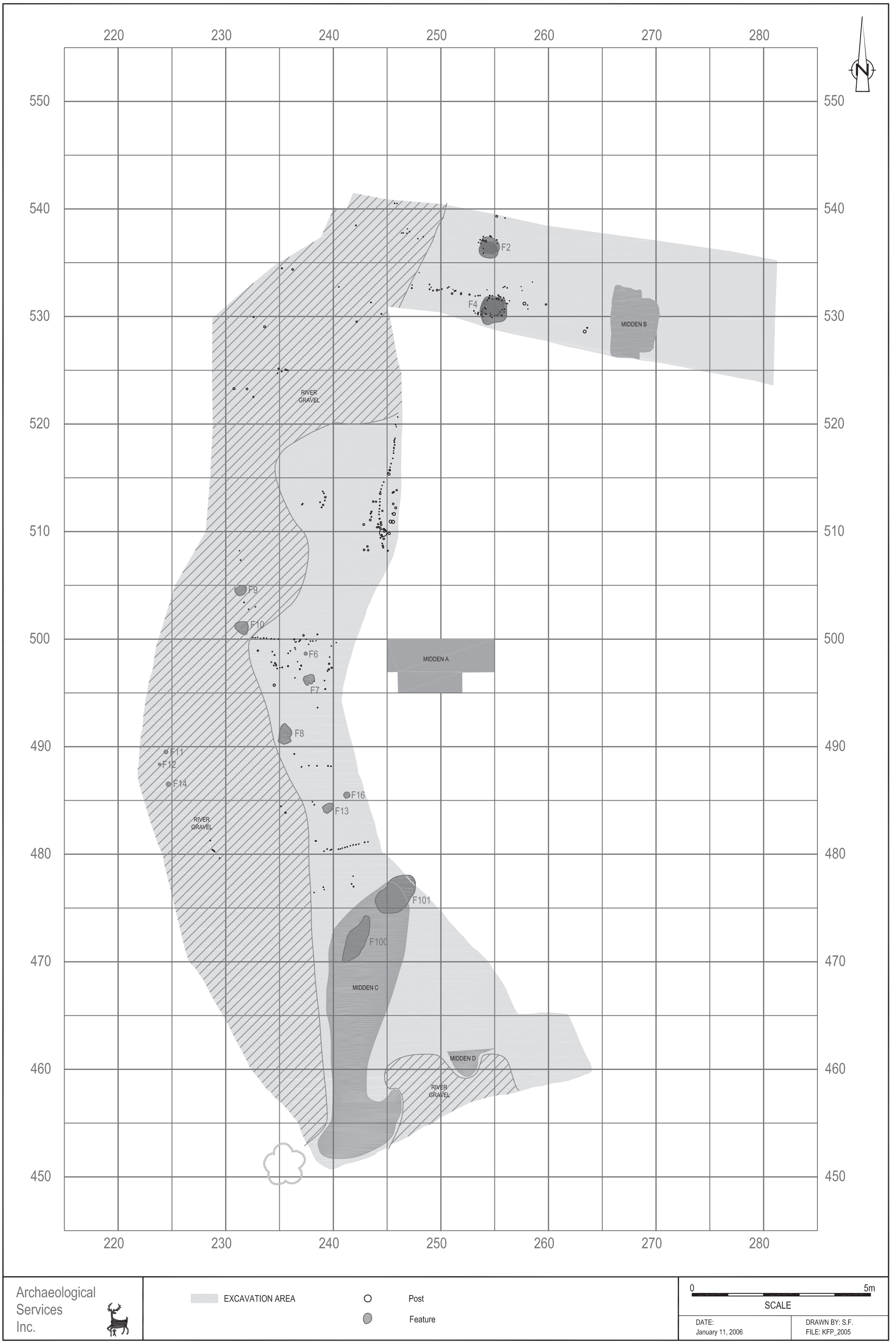


Figure 7: The Open Area Excavations at the King's Forest Park Site

2.0 ENVIRONMENTAL SETTING

Robert I. MacDonald

2.1 Geo-physical Context

The King's Forest Park site is situated in the Iroquois Plain physiographic region (Chapman and Putnam 1984) within the Red Hill Creek re-entrant valley, a former embayment of glacial Lake Iroquois (Feenstra 1975; Laing 1998:47-59). A large baymouth bar traverses the mouth of this re-entrant valley approximately 900 metres north of the site. King Street follows the crest of this landform. At its closest, the Niagara Escarpment lies approximately one kilometre west of the site, and Red Hill Creek flows over the brow of the escarpment at Albion Falls, roughly 2 kilometres to the south. The King's Forest Park site lies within the Red Hill Creek valley and is underlain by Holocene fluvial deposits. To the north, west, and south the surrounding table lands comprise deposits of Halton Till. To the east is an extensive deposit of glaciolacustrine sand approximately two kilometres north-south by 0.75 kilometres east-west (Feenstra 1975). The soil series which has developed on this sand deposit is Grimsby sandy loam. Grimsby is a well-drained Brunisolic Gray Brown Luvisol which has developed on deeper deposits of sand. It is rated Class 2 for agriculture with moderate limitations arising from low natural fertility and low moisture-holding capacity. The droughtiness of these soils is considered a major limitation to crop yields (Presant et al. 1965:40, 50). The soils of the surrounding till upland are primarily Oneida loam. Oneida well-drained Brunisolic Gray Brown Luvisol which has developed on calcareous clay loam till. Owing to relatively complex topography, the capability for agriculture ranges from Class 1 to 5, depending on the slope (Presant et al. 1965:31, 49-54).

The King's Forest Park site is located immediately adjacent to Red Hill Creek, with the major occupation situated to the west of the creek and a smaller archaeological component to the east. The site is approximately five kilometres south of Lake Ontario, and the Red Hill Creek flows into the Red Hill marsh roughly 4.75 kilometres downstream from the site. The Red Hill marsh, together with Van Wagner's Ponds and Marshes, comprises a provincially significant coastal wetland complex (Dougan and Associates 2003a; Heagy 1993:307-311).

The Van Wagner's wetland complex is contiguous with the Red Hill marsh, although each of these has formed through related though separate processes. The Red Hill marsh has developed primarily as a result of the on-going gradual rise in the level of Lake Ontario and the concomitant transgression of its basin due to post-glacial isostatic uplift of the Ontario outlet (Anderson and Lewis 1985; Laing 1998). This process has flooded the mouths of many watercourses around the Lake Ontario shore, producing extensive estuarine wetlands. The Van Wagner's ponds and marshes are the product of backwater formation arising from the on-going construction and re-modelling of the Lake Ontario strand—essentially the same process which has constructed the Hamilton/Burlington beach bar. As long-shore currents continuously transport and re-deposit sediment along the shore, streams flowing towards the lake are blocked by the creation of bar deposits at their mouths. Whereas larger watercourses may have enough flow to breach the bars which threaten to dam them up (e.g., Stoney Creek), smaller watercourses have been diverted laterally, producing chains of backwater ponds and wetlands before finally finding an outlet (Laing 1998:60-63). At least one early nineteenth century map suggests that Red Hill Creek itself may have originally alternated between an outlet flowing directly into Lake Ontario and the current backwater outlet into Burlington Bay (Dougan and Associates 2003a:12). It seems likely that this latter process began soon after Lake Ontario reached its current level at the end of the Nipissing transgression around 4,500 B.P.

Between the Red Hill marsh and Albion Falls, Red Hill Creek traverses the Iroquois Plain, where it has entrenched itself into the Quaternary deposits and the underlying Queenston Shale. Approximately one

kilometre downstream from the site the main channel is joined by Davis Creek, the easterly tributary of Red Hill Creek. Within the Red Hill Creek floodplain, Annable (2002:17) has identified two series of meander scars which he attributes to previous climatic regimes, one dating to circa 4,500 to 5,500 B.P. and another dating to circa 900 to 1,100 B.P. A meander scar associated with the later interval is situated along the base of the floodplain scarp immediately west of the site. Unfortunately, given the existing data, it is not possible to precisely determine the position of the creek within the valley at the time the site was occupied.

Aerial photographs of the Red Hill valley, taken at intervals throughout the latter half of the twentieth century, show that the reach containing the site, extending from roughly the King's Forest Golf Course to the railway south of King Street, has experienced modest channel migration on the order of one to three channel widths over that period (Annable 2002:25). At the site, physical evidence of channel migration over time was noted in various locations where excavations within and especially below the current topsoil revealed cross-bedded and imbricated gravels indicative of fluvial deposition. Since there was no significant archaeological evidence of fluvial erosion of cultural deposits within the site, it seems reasonable to conclude that the main channel had migrated to the vicinity of its current location on the east side of the valley sometime prior to settlement of the site. While there has undoubtedly been some migration of the channel since the site was occupied, and some periodic flooding and concomitant, short-term re-filling of paleo-channels, these would appear to have had only minor or localized effects on the archaeological deposits.

2.2 Bio-physical Context

The historical flora and fauna of the Red Hill Creek valley have been summarized by Duncan (1998). The original land survey of Saltfleet Township was initiated by Augustus Jones in 1788, with subsequent surveys in 1808, 1827 (by Black), and 1832 (by Rykert) (Gentilcore and Donkin 1973:75). Surveyors notes concerning the forest composition along the survey transects (concessions) have been transcribed onto cadastral base maps (Finlay 1978), and these indicate that Saltfleet Township was dominated by oak forest interspersed with pine. There seems to be a fairly strong correlation between this forest and the well- to imperfectly drained sandy loam and well-drained silt loam soils of the Iroquois Plain. In contrast, several isolated stands of black ash swamp seem to correspond to areas of poorly drained clay loam. There is also a patch of black ash swamp in the vicinity of the lower reaches of the Red Hill Creek, and to the west of that the oak forest also incorporates both pine and hickory. A small cedar swamp is mapped in a location which seems to correspond to Red Hill Bowl Park, an abandoned oxbow of Red Hill Creek.

On June 10th, 1796, while travelling on horseback from Niagara-on-the-Lake to York, Elizabeth Simcoe, wife of Lieutenant-Governor John Graves Simcoe, traversed the top of the Niagara Escarpment to a point approximately one mile west of Stoney Creek where her party descended the mountain on their way to the King's Head Inn at the mouth of Red Hill Creek. En route, Mrs. Simcoe made several observations which shed light on the historic vegetation of the area. She notes having "...stopped frequently on the edge of the bank [escarpment] to look over the extensive wooded plain below us, which is bounded at four miles distance by Lake Ontario, and the opposite north shore with Flamborough Head discernible" (Robertson 2001:319). On descending the mountain, Mrs. Simcoe's party travelled northward along three miles of rough road characterized by swampy ground flanked by tall trees. On reaching the edge of Lake Ontario they "...came into good galloping ground on fine turf by the side of the lake, till we came to the 'King's Head Inn,' at the 'Head of the Lake.'" Later she describes the Burlington beach as being "...like a park covered with large, spreading oaks." She similarly describes the area around trader Richard Beasley's home—near the current site of Dundurn Castle—as being on a hill that is "...quite like a park, with large oak trees dispersed, but no underwood." She goes on to say that, "We walked two miles on this park, which is quite natural, for there are no settlements near it…. The Governor says the country on the banks

of La Tranche [Thames River and Lake St. Clair] is like this, but the plains infinitely more extensive" (Robertson 2001: 323-324).

These descriptions demonstrate that Mrs. Simcoe took note of differences in forest cover and suggest that the majority of the Iroquois Plain within and adjacent to the Red Hill Creek valley was occupied by hardwood forest, while the Burlington Beach and vicinity of Dundurn Castle were areas of oak savanna. This conclusion is substantiated by a study of historical prairie and savanna vegetation in the Hamilton area undertaken by Goodban et al. (1997). This study also identifies the beach bar formed by glacial Lake Iroquois in the vicinity of King Street as a possible mosaic of savanna and woodland (Goodban et al. 1997 92).

The plant remains assemblage recovered from the King's Forest Park site (Monckton, this volume) includes wood charcoal dominated by beech (*Fagus grandifolia*), ash (*Fraxinus* sp.) and maple (*Acer* sp.), with notable quantities of red and white oak (*Quercus rubra* and *Q. alba*), ironwood (*Ostrya virginiana*), and elm (*Ulmus* sp.), and minor quantities of white pine (*Pinus strobus*). Monckton (1992:90) has suggested that wood charcoal assemblages from Huron villages likely represent good samples of the local forest composition, as dry deadfall was collected indiscriminately from the forest floor throughout site catchment areas. In the case of the King's Forest Park site, the dominance of beech, ash, and maple is suggestive of climax northern hardwood forest (Monckton 1992:90). In this ecological zone (Site Region 7E - Lake Erie), drier sites tend to support stands of red and white oak, hickory, white pine, and elm whereas fresher sites tend to support hard maple, beech, basswood as well as red and white oak and hickory (Burger 1993). Since the soils in the vicinity of the site include both the mesic soils of the Oneida series and more xeric soils of the Grimsby series, the presence in the charcoal assemblage of tree taxa with differing soil moisture preferences is not surprising. Oak dominated forest in association with hickory and pine is a common forest association of the well-drained soils of the Iroquois Plain (MacDonald 2002:200-201, 214), and the historic vegetation mapping suggests it was common throughout the well-drained uplands adjacent to the Red Hill Valley (Finlay 1978; see also Duncan 1998:75). This may have been especially true on the well drained Grimsby soils to the east of King's Forest Park, whereas the more loamy Oneida soils may have supported a higher proportion of beech, ash, and maple.

The mosaic of plant communities which seems to have characterized the environs of King's Forest Park would have supported an equally diverse variety of fauna, including riverine-based fish, amphibians, and molluscs, a variety of mammalian herbivores and carnivores, and many different waterfowl, upland game birds, raptors, and songbirds. Duncan (1998:73-80) has reviewed evidence of the pre-contact fauna of the Red Hill Creek valley, including zooarchaeological data from the Late Woodland period Pergentile site and earlier investigations of the King's Forest Park site (Robert 1997). Of these, the Pergentile faunal assemblage provided the most substantial glimpse of the original fauna of the valley prior to the recent excavations of the site. By frequency of elements, this assemblage yielded 40% fish, 37.5% mammals, 5.3% birds, 6.5% reptiles and amphibians, 1.6% molluscs, and 9% unidentified. The Pergentile avian assemblage included hawks (*Accipiter* sp.), waterfowl (hooded merganser and wood duck), cranes (Sandhill crane), pidgeons (passenger pidgeon), and upland game birds (ruffed grouse and wild turkey). The fish assemblage comprised primarily lacustrine species, including bullhead, bowfin, channel catfish, lake trout, lake whitefish, freshwater drum, northern pike, largemouth bass, smallmouth bass, and walleye (Robert 1997:71-72). Several of these taxa may also have used the marshy lower reaches of Red Hill Creek for spawning purposes, and walleye are known to ascend streams to spawn in the spring (Scott 1967). Notable in their absence from this assemblage are white suckers, which historically had significant spawning runs up Red Hill Creek (Portt and Associates 2003:8). Other aquatic fauna recovered included painted turtle, snapping turtle, and unidentified molluscs. The mammalian assemblage included carnivores/omnivores such as black bear, dog/wolf, muskrat, river otter, raccoon, as well as herbivores such as vole, woodchuck, gray squirrel, beaver, and white-tailed deer (Robert 1997:71-72).

The more extensive faunal assemblage which has now been recovered from the site (Needs-Howarth, this volume) displays a very similar range of species. By frequency of elements, the excavations yielded 56.9% fish, 27.3% mammals, 8.5% birds, 4.1% reptiles and amphibians, 0.7% molluscs and bivalves, and 2% unidentified. The fish assemblage comprised a predominance of lacustrine species, including lake sturgeon, gar, bowfin, lake trout, lake whitefish, northern pike or muskellunge, bullhead, smallmouth bass, largemouth bass, rock bass, bluegill or pumpkinseed, yellow perch, white and longnose sucker, and walleye or sauger. As noted by Needs-Howarth (this volume), several of these species, as well as the channel catfish identified, would have spent time in the shallow waters of the Red Hill marsh, and some, such as suckers and walleye, would have been seasonally available right at the site during their spring spawning runs. Lake whitefish may have been harvested during their on-shore spawning runs in the fall. The avian assemblage included a barred owl, a common raven, various ducks (common merganser and northern pintail), Canada goose, grebe, common loon, sandhill crane, passenger pidgeons, and upland game birds (ruffed grouse and wild turkey). The mammalian assemblage included carnivores/omnivores such as black bear, dog/wolf, red and grey fox, muskrat, raccoon, as well as herbivores such as vole, woodchuck, gray squirrel, red squirrel, chipmunk, snowshoe hare, porcupine, beaver, and white-tailed deer (Needs-Howarth, this volume).

The King's Forest Park faunal assemblage is consistent with broadly based exploitation of fish, birds, and mammals, including both seasonal scheduling of specific harvests as well as opportunistic harvesting of both principal and incidental species. For example, fall hunting may have focussed on deer—given their relatively large return of meat, hide, and bone/antler for time invested—together with opportunistic hunting of other fur-bearers. Several of these prey species, including deer, bear, and raccoon, would have been especially attracted to the mast-producing beech (with ash and maple) and oak-hickory (with pine) forests in the fall, especially near the lakeshore, around the Van Wagner's wetland complex and Red Hill marsh, along Red Hill Creek, or in other forest openings where sufficient understorey browse and cover would have been available. Passenger pigeons, which migrated seasonally in large flocks, are also known to have been attracted to beech mast. Similarly, in the spring, spawning runs of suckers, perch, and walleye may have drawn site fishers to the lower reaches of Red Hill Creek, where they may have coincidently encountered various waterfowl, muskrats, beavers, and turtles in and around the Red Hill marsh. Occasional forays to the marsh and lakeshore throughout the summer may have also yielded a variety of animal prey.

Given the preceding observations concerning the site's environmental context, it is concluded that this locality is consistent with land-use trends observed elsewhere in the Lake Ontario watershed throughout the Late Woodland period (MacDonald 2002)and with subsistence strategies noted for other Early Iroquoian communities in southern Ontario (Williamson 1990). Agricultural settlements are typically situated inland and up-stream along significant waterways in order to provide good access to arable land within the settlement catchment, while maintaining easy access to long-established fisheries and other plant and animal resources located within rich coastal wetlands. At the same time, the middle reaches of such watersheds provide easy upstream access to interior hunting territories, thereby optimizing utilization of the widest range of ecological communities.

3.0 SETTLMENT PATTERNS

David A. Robertson

3.1 Stage 4 Excavation Methods

The Stage 4 salvage excavation process within the various portions of the site area proceeded using a five metre grid that served as the basis of the provenience and recording system.

Within the woodlot and in certain portions of the open area, the excavations were carried out through the hand excavation of one metre square units. All excavation unit topsoil horizon soils were screened through 6mm mesh to facilitate artifact recovery. The limits of the excavation area were established when yields of 20 or fewer artifacts per one-metre unit were encountered, although this threshold was not achieved in every instance due to the suspension of work in the woodlot when it became apparent that this portion of the site was no longer threatened. Subsurface settlement features were exposed more precisely by shovel shining and by trowelling. In some areas this necessitated removal of overburden in low artifact density areas in order to fully expose the walls of the two longhouse structures.

The locations and diameters of all post moulds were recorded on pre-printed forms. Comments on fill and contents were made and recovered artifacts were bagged separately. Features were recorded by triangulation to a centre point and were then drawn on pre-printed forms; dimensions and other attributes were recorded as well. These features were then excavated by trowel and shovel, and their fills screened through six-millimetre mesh in order to facilitate artifact recovery, although the exact manner in which this was carried out depended upon the size and complexity of the feature in question. In all cases, they were sectioned along their central long axes, their profiles recorded and the remaining fill removed. Where necessary, photographs were taken to document feature plans and profiles. In the case of larger or more complex features, sections were excavated in a manner as to provide the most useful vertical profiles for analysis and interpretation. Flotation samples were taken from a variety of contexts. Multiple samples were taken from separate strata within complex features. The location and diameter of post moulds were recorded on pre-printed forms. All post moulds exceeding 15cm in diameter were sectioned to obtain depth and orientation data and their fills were screened through six millimetre mesh in order to recover their constituent artifacts.

Within the open portion of the site, the majority of the investigations entailed the use of a Gradall to remove the disturbed overburden to reveal the subsoil and all potential features and post moulds, which were further examined through shovel-shining and trowelling and recorded and excavated in the same manner as in the woodlot.

3.2 Settlement Patterns

Portions of two longhouses, which form an aligned pair, were documented within the wooded part of the site (Figures 6 and 8). Only one of the structures was represented by reasonably complete subsurface settlement pattern data in the form of features or post moulds.

House 1 was the better preserved of the structures. The documented portion included the northwest end. The house had a minimum length of 26.1 metres, a width of 7.8 metres and was oriented 275 degrees east of north (Table 1). The house walls were formed by sections of single row and paired posts, suggesting some degree of repair of parts of the wall. The northwest end wall was rounded with short tapers. There were five noticeable gaps in the house's walls, one in the end wall (although post visibility was

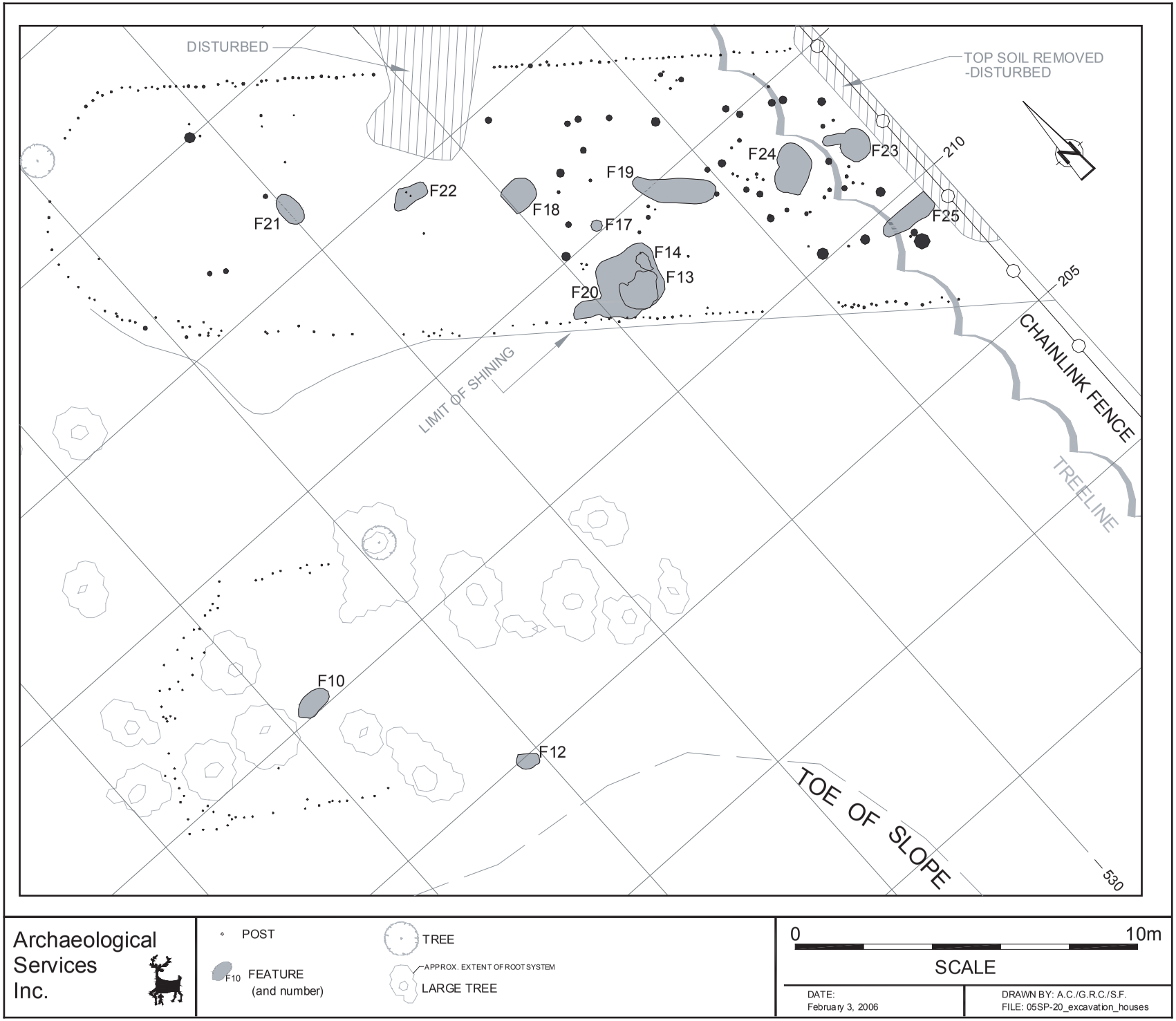


Figure 8: The Woodlot Longhouse Structures at the King's Forest Park Site

compromised in this area due to tree roots) and four along the south side wall, which from west to east measured 1.25, 1.5, 1.0 and 2.25 metres wide, respectively. These gaps may have acted as doorways or entrances, although some are likely a reflection of poor preservation.

Table 1: Longhouse Attributes

	House 1	House 2
Length (m)	+26.1m	+6.2m
Width (m)	7.8m	6.9m
Orientation (°East of North)	275	275
Area (m^2)	+183.7 m^2	+35m^2
No. of features	11	2

House 1 contained five centrally aligned hearths (Features 18, 19, 21, 22 and 24) separated from one another by distances of between 3.5 and 4.9 metres, five pits (Features 13, 14, 17, 23, and 25) and a semi-subterranean sweat lodge (Feature 20) interior (Table 2). Most of the feature and post activity throughout the house was confined to the central corridor. The sweat lodge, which predated Features 13 and 14, was located adjacent to the south wall with its entrance facing to the west. A series of 12 posts along its perimeter represent vestiges of its superstructure.

Table 2: House 1 Summary Description of Features

Feat.	Feat. Type	Dimensions (cm)			Plan/Profile Shape	Contents	Fill Composition
		L	W	D			
13	Pit	126	107	20	Irregular/Irregular	Ceramic, Chert	Dark Greyish Brown Soil Mottled With Charcoal and Subsoil
14	Pit	61	36	19	Irregular/Shallow Basin	Ceramic, Chert	Dark Greyish Brown Soil Mottled with Charcoal
17	Pit	34	29	9	Circular/Shallow Basin	Ceramic	Light Yellowish Brown Soil Mottled With Subsoil
18	Hearth	94	90	8	Ovate/Shallow Basin	Nil	Fired Soil
19	Hearth	240	70	3	Ovate/Irregular	Nil	Fired Soil
20	Sweat Lodge	200	188	7	Key Hole/Shallow Basin	Nil	Dark Greyish Brown Soil Mottled With Charcoal and Subsoil
21	Hearth	100	62	6	Ovate/ Shallow Basin	Nil	Fired Soil
22	Hearth	115	55	10	Ovate/ Shallow Basin	Nil	Fired Soil
23	Pit	135	40	22	Irregular/Irregular	Ceramic, Chert, Bone	Light Yellowish Brown Soil Mottled with Subsoil
24	Hearth Complex	140	134	7	Irregular/Shallow Basins	Chert, Bone	Fired Soil
25	Pit	+170	65	22	Ovate/ Shallow Basin	Chert, FCR	Very Dark Greyish Brown Soil Mottled with Subsoil and Charcoal

House 2 was also represented by its northwest end wall, however little else of the structure could be found. The house consisted of a 23 metre long, curved alignment of single, paired and clustered posts that enclosed an area of approximately 35 square metres (Table 1). The degree of rebuilding along substantial stretches of the alignment suggests that it was indeed a formal longhouse structure rather than a large, partially sheltered activity area.

The remains of two features that were likely associated with this structure were documented. These include a hearth (Feature 10) that appears to have been located along the central axis of the house, and a pit (Feature 12) that would have been located near the south side wall.

Table 3:House 2 Summary Description of Features

Feat.	Feat. Type	Dimensions (cm)			Plan/Profile Shape	Contents	Fill Composition
		L	W	D			
10	Hearth	110	60	11	Ovate/Irregular	Nil	Fired Soil Mottled with Charcoal
12	Pit	69	47	16	Ovate/Deep Basin	Ceramic, Chert	Dark Reddish Brown Soil

The settlement patterns encountered in open area excavations between the baseball diamonds (Figure 7) were more problematic even then those found in the woodlot.It is clear that this zone corresponded with a former occupation area within the site, although the surviving settlement patterns were slight due to minor post-occupation shifts of the creek channel, which may have resulted in the removal of subsoils

throughout portions of the area investigated and the exposure of river gravel below the modern overburden. Previous developments within the park also contributed to these landscape alterations.

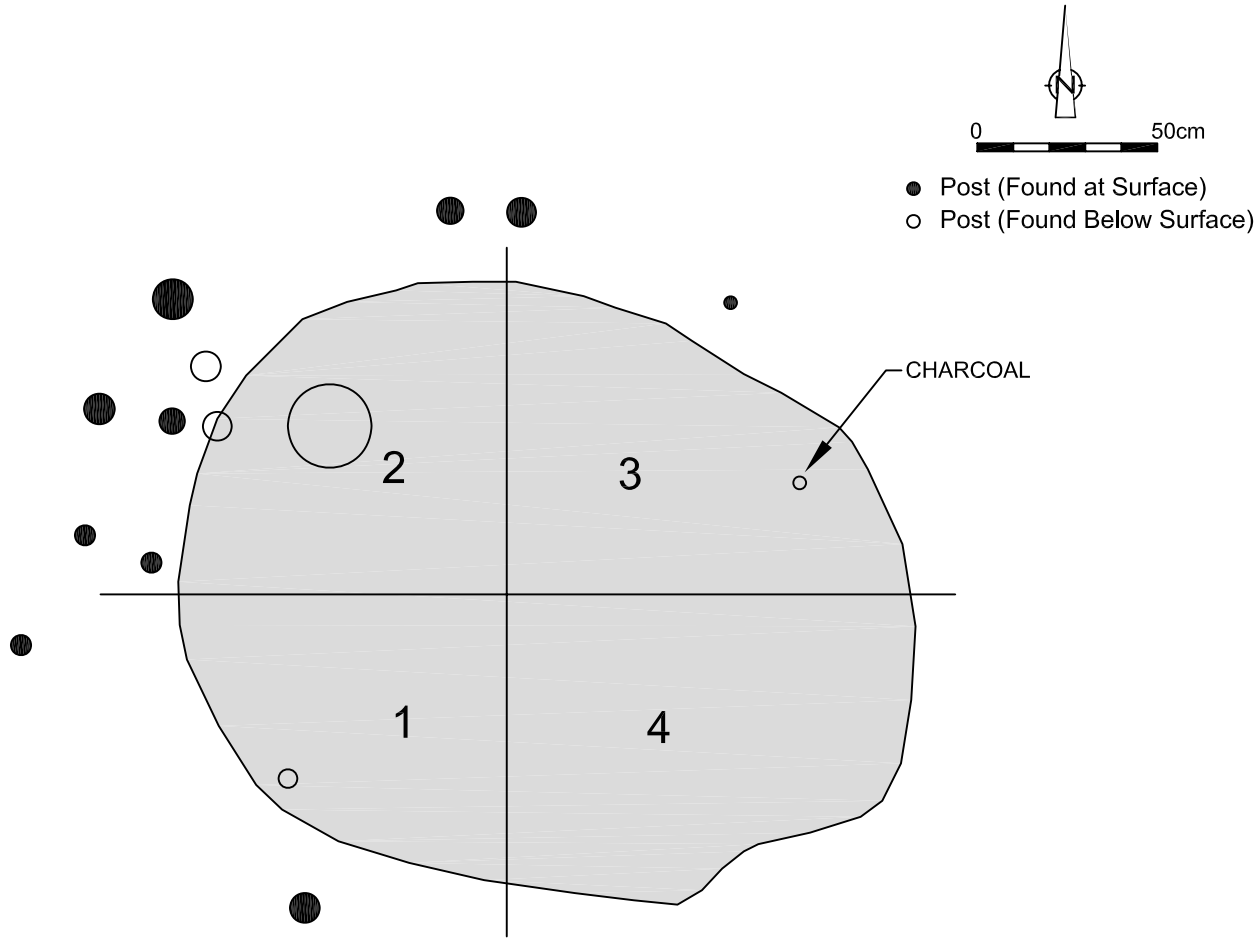
Four areas of relatively deep, artifact-rich, organic soils were defined as middens during the field work. The largest of these (Middens A, B and C) occurred in a linear arrangement, running north-south, through the excavation area. The smaller Midden D was located to the east of Midden C. It is likely that these features represent the meander scar of an earlier creek channel that had survived as a prominent topographical feature within the settlement area and which served as a convenient place for the disposal of refuse during the occupation of the site.

To the west of these refuse features were numerous clusters and discontinuous alignments of posts and associated features (Table 4) were encountered. It is likely that at least four of the alignments, which were of various orientations and ranged from approximately 4.0 to 12.0 metres in length, represent the vestiges of longhouse walls.

Table 4: Open Area Summary Description of Features

Feat.	Feat. Type	Dimensions (cm)			Plan/Profile Shape	Contents	Fill Composition
		L	W	D			
2	Sweat Lodge	180	144	18	Rectanguloid/Bathtub	Ceramic, Chert, Bone	Very Dark Greyish Brown Soil Mottled with Medium Brown Soil
4	Sweat Lodge	217	170	25	Rectanguloid/Bathtub	Ceramic, Chert, Bone	Fill: Dark Yellowish Brown Subsoil Mottled with Dark Greyish Brown Soil and Charcoal. Living Floor: Very Dark Greyish Brown Soil Mottled with Charcoal and Subsoil
6	Pit	30	24	19	Ovate/Deep Basin	Nil	Homogeneous Brown Soil
7	Hearth	109	92	10	Irregular/Shallow Basin	Nil	Yellowish Red Soil
8	Sweat Lodge	195	112	19	Ovate-Acuminate/Shallow Basin	Nil	Fill: Brown Soil Mottled with Subsoil. Living Floor: Dark Greyish Brown Soil
9	Pit	190	90	55	Ovate/Deep Basin	Nil	Homogeneous Dark Brown Soil
10	Remnant Feature	123	115	1	Irregular/—	Ceramic, Chert	Dark Greyish Brown Soil Mottled with Gravel
11	Remnant Feature	34	24	1	Ovate/—	Nil	Dark Yellowish Brown Soil Mottled with Gravel
12	Remnant Feature	23	23	1	Circular?—	Ceramic	Dark Yellowish Brown Soil Mottled with Gravel
13	Pit	99	74	15	Ovate-Acuminate/Shallow Basin	Ceramic	Dark Greyish Brown Soil Mottled with Subsoil
14	Remnant Feature	40	35	1	Ovate/—	Ceramic	Dark Yellowish Brown Soil Mottled with Gravel
16	Pit	56	56	20	Circular/Shallow Basin	Ceramic/Chert	Homogeneous Dark Brown Soil
100	Refuse-Filled Depression	485	180	10	Irregular/Shallow Basin	Ceramic, Chert, Bone	Dark Yellowish Brown Soil Mottled with Subsoil and Charcoal
101	Refuse-Filled Depression	450	273	50	Irregular/Deep Basin	Ceramic, Chert, Bone	Homogeneous Very Dark Greyish Brown Soil

A 7.6 metre long line of posts that ran east-west was located in the northern portion of the excavation area. It was associated with two semi-subterranean sweat lodges, one of which (Feature 2 [Figure 9]) was located approximately 4.0 metres to the north of the post row, while the other (Feature 4 [Figure 10]) was located to the immediate south. Semi-subterranean sweat lodges have only rarely been identified as exposed features that are not directly associated with a formal house structure, suggesting that a longhouse stood in this area.



PLAN VIEW

PROFILES

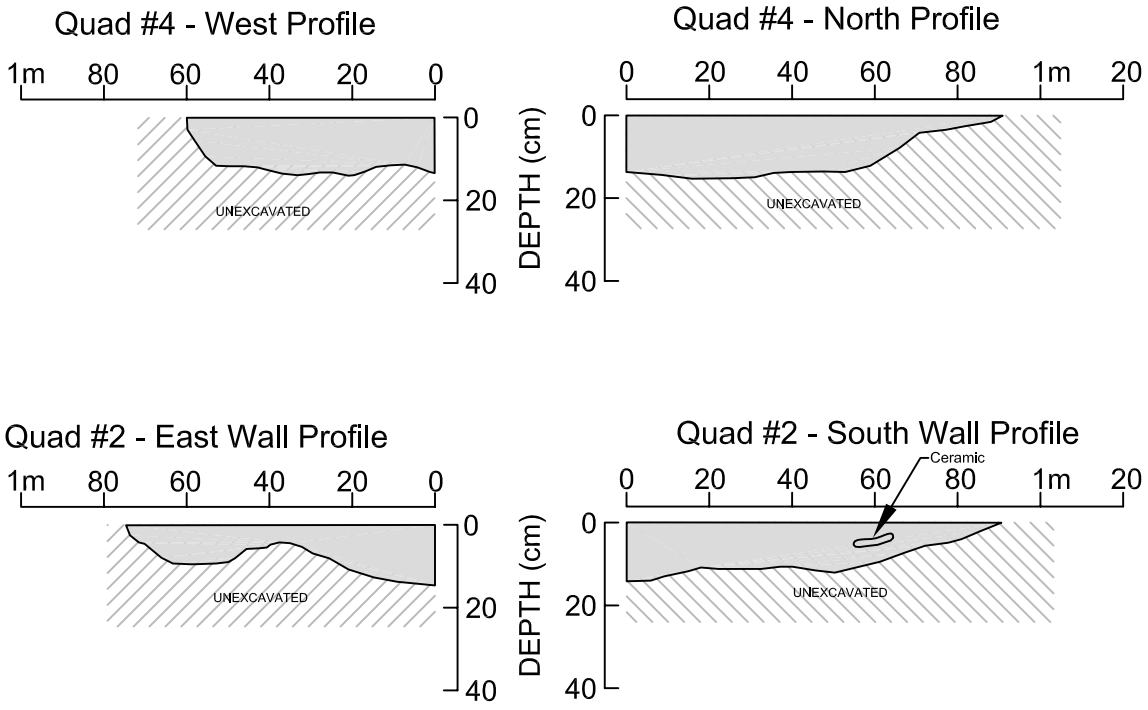
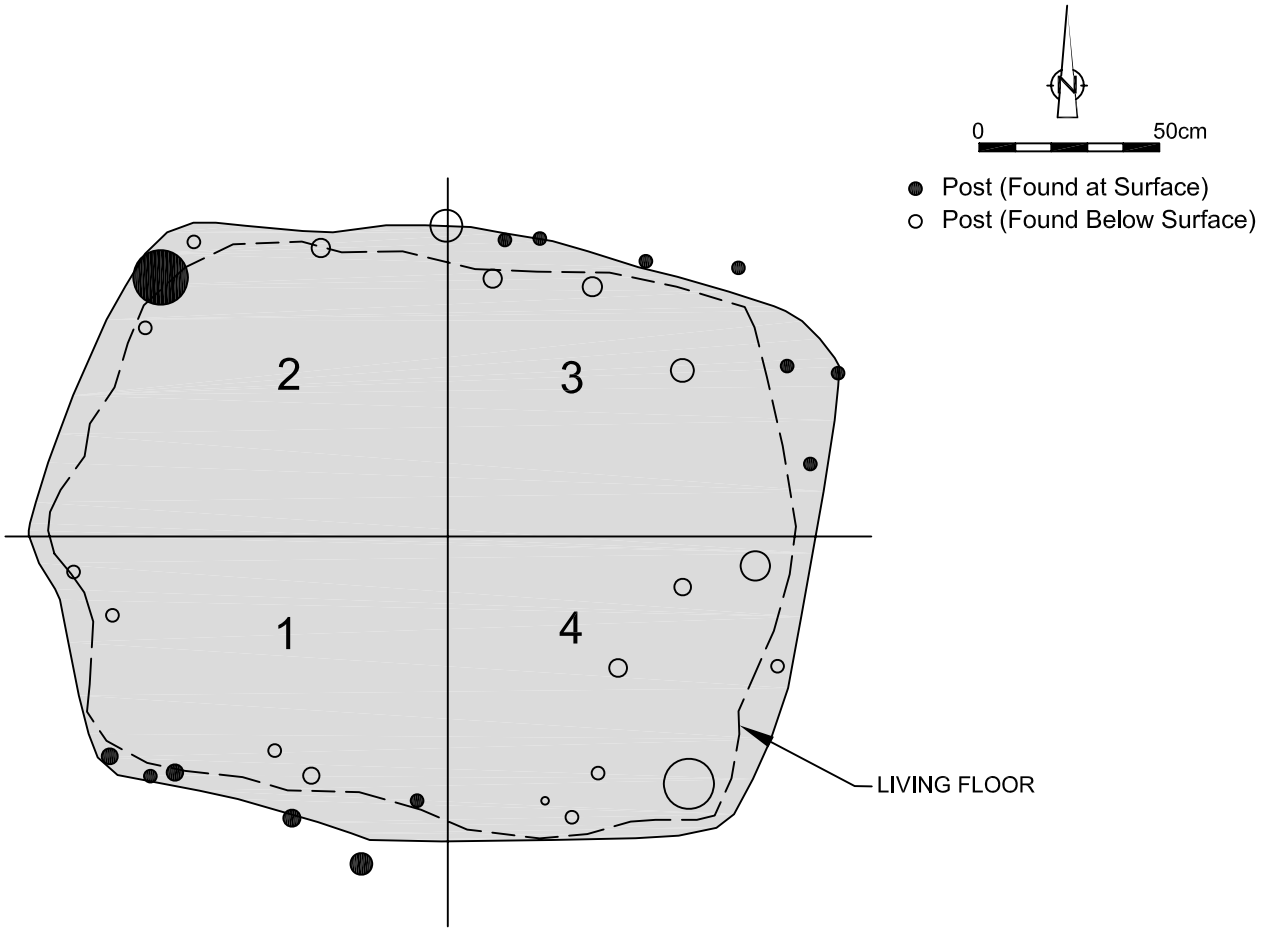


Figure 9 Kings Forest Park Site: Feature 2 Plan and Profiles



PLAN VIEW

PROFILES

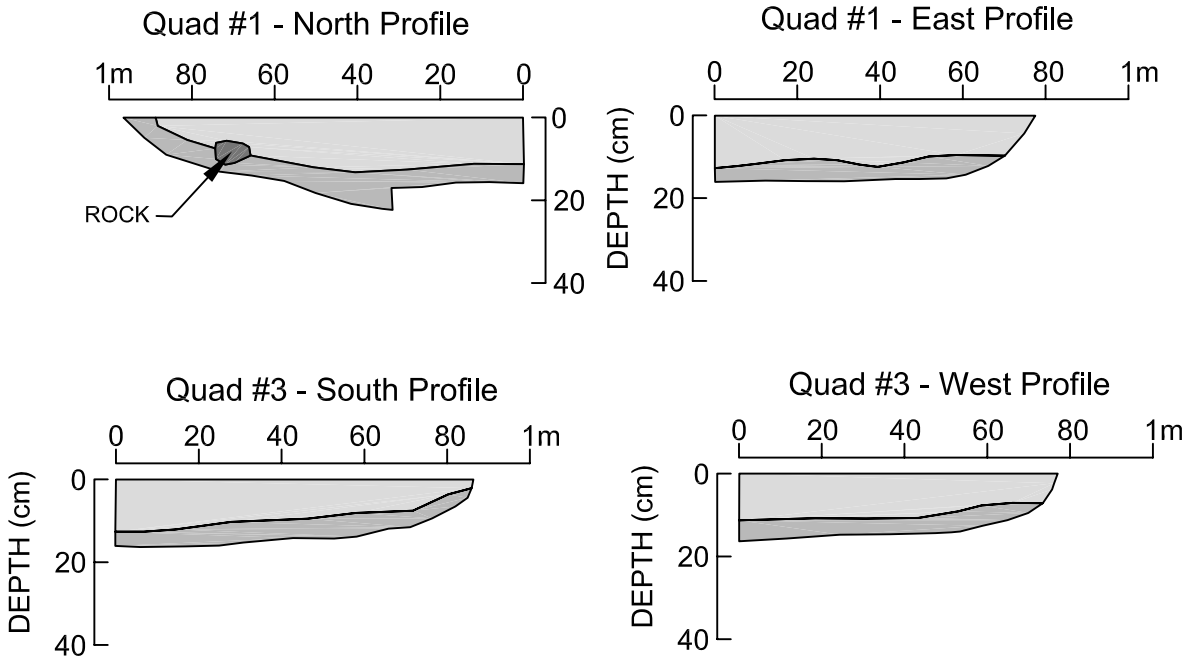
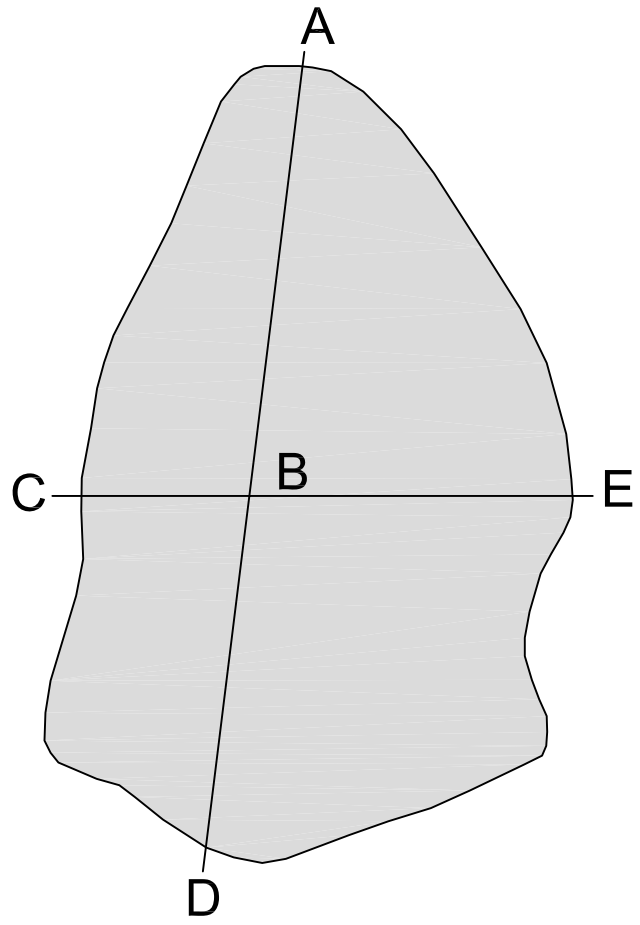
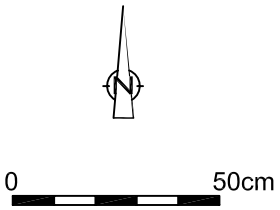


Figure 10 Kings Forest Park Site: Feature 4 Plan and Profiles





PLAN VIEW

PROFILES

A - B

B - C

D - B

B - C

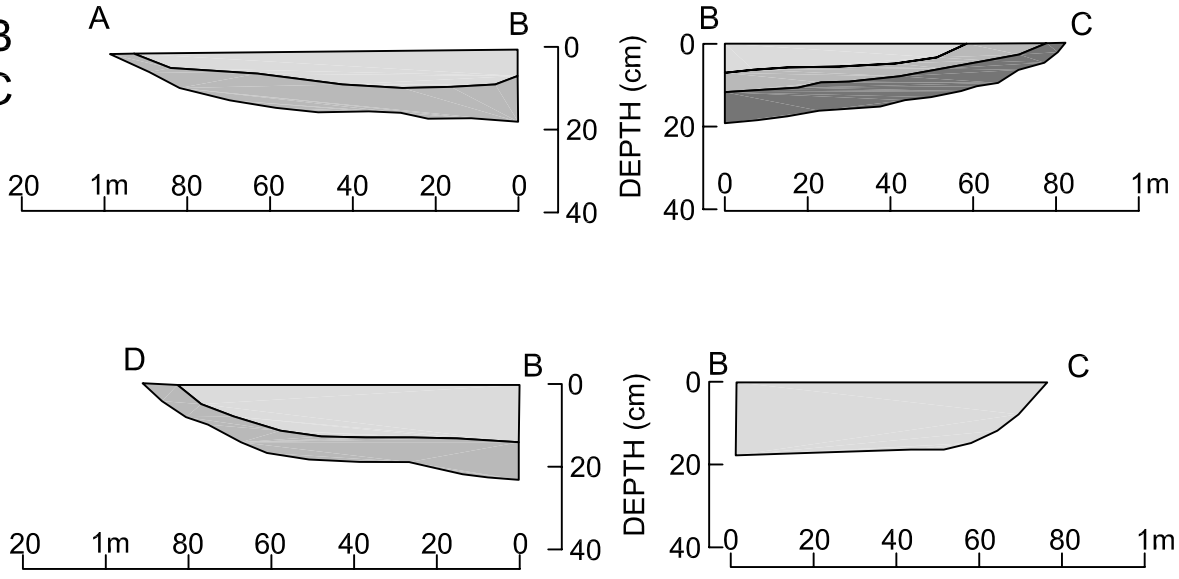


Figure 11 Kings Forest Park Site: Feature 8 Plan and Profiles

Approximately 12.5 metres to the south of this putative house, an 11.8 metre long line of posts, oriented north-south was documented. It was flanked by numerous posts, including a series of large posts approximately 1.5 metres to the east that may demarcate roof support elements along the bunkline of a house interior.

A further 12 metres to the south there was a diffuse cluster of posts and features bounded by two poorly defined post alignments that may correspond to another structure. The features included a hearth (Feature 7) and a pit (Feature 6). To other pits (Features 9 and 10) were located to the immediate northwest.

Five metres to the south of the Feature 7 hearth, another semi-subterranean sweat lodge (Feature 8 [Figure 11]) was encountered, together with a few posts and two other pits (Features 13 and 16). Approximately 10 metres to the east of the sweat lodge, three small deposits of soil and artifacts were found within the river gravels. These features (Features 11, 12, and 14) may be the basal remnants of refuse pits.

Finally, two refuse-filled depressions (Features 100 and 101) were encountered at the base of Midden C.

4.0 CERAMIC ARTIFACTS

Robert Wojtowicz

4.1 Introduction

In total, 85, 390 ceramic artifacts (Table 5) were recovered during the 1998-2004 excavations at the King's Forest Park site. Whenever possible, all ceramic artifacts were mended prior to analysis to the minimum number by provenience.

Of these ceramic artifacts, 85,045 sherds form portions of vessel rims, necks, shoulders, and bodies individually or in various combinations. Eighty smoking pipe fragments and 192 juvenile manufactured ceramic vessel and pipe fragments were recovered, as well as an additional 73 miscellaneous ceramic objects. Catalogues of the assemblage and supplementary data are provided in Appendices 1-10.

Table 5: Ceramic Artifacts

Type	n	%
Unanalyzable Fragments	57,123	66.90
Body Fragments	19,880	23.28
Neck Fragments	5054	5.92
Identified Vessels	1059	1.24
Rim Fragments	957	1.12
Neck and Shoulder Fragments	744	0.87
Shoulder Fragments	211	0.25
Juvenile Ceramics	192	0.22
Pipe Fragments	80	0.09
Misc. Ceramic Artifacts	73	0.09
Neck-Shoulder and Body Fragments	11	0.01
Shoulder and Body Fragments	6	0.01
Total	**85,390**	**100.00**

4.2 Ceramic Vessels and Miscellaneous Ceramic Objects

The ceramic vessel assemblage consists of 1,059 identified vessels, 957 rim fragments, 5,054 neck fragments, 744 neck and shoulder fragments, 11 neck-shoulder and body fragments, 211 shoulder fragments, 6 shoulder and body fragments and 19,880 body fragments.

Ceramic fragments that are smaller than 24 mm or which are characterized by excessive exterior exfoliation were classified as unanalyzable and account for 57,123 fragments, 66.9% of the total ceramic assemblage (Table 5).

Vessel Rims

Rims were considered analyzable if they exhibit interior and exterior surfaces, a lip, and a sufficient portion of the exterior collar-neck area to ascertain decorative motif and associated attributes. The vessel rims were analyzed using only attributes. All rims were sorted and mended into 1,059 individual vessels of which 61 are represented only by castellation fragments and are not included in the following discussion.

Summary descriptive statistics of individual attributes are presented in Tables 6 through 11. Due to the sheer number of vessels, descriptions of the collar and neck motif with associated rim form are included in Appendix 9 only.

Incipient collar forms dominate (72.24%), while collared rim forms constitute less than 2.81% of the assemblage. Rounded collar bases occur on 74.25% of the vessels, where as only eight vessels have angular collar bases. Two hundred and forty-nine vessels are collarless (Table 6).

Most of the vessels display either a flat (56.61%) or rounded (32.97%) lip form. The remainder of the vessels have concave (n=103) or irregular (n=1) lips (Table 6).

The angles of the lip to the interior, are 90 degrees or right (60.12%), acute (27.05%), obtuse (12.73%) or irregular (n=1). The vessels display outflaring (88.88%), vertical (6.11%) and insloping (5.01%) rim orientations (Table 6).

The proportions of concave, convex and straight interior collar profiles are 85.97%, 11.82% and 1.5% respectively. Seven vessels have interior profiles of concave over convex (n=4), convex over concave (n=2) and irregular (n=1). The exterior profiles of the vessel collars are convex (70.94%), concave (25.65%) and straight (2.2%). The remaining twelve vessels have concave over convex (n=6), convex over concave (n=3), irregular (n=2) and concave over concave (n=1) profiles (Table 6).

The collar heights in this assemblage range between 3.21 mm and 29.61 mm with a mean height of 7.58 mm, and a standard deviation of 3.71. Lip widths range between 2.33 mm and 11.75 mm with a mean width of 6.59 mm and a standard deviation of 1.39. Basal collar widths range between 4.41 mm and 12.31 mm with a mean of 7.58 mm and a standard deviation of 1.39 (Table 6).

Table 6: Ceramic Vessel Descriptive Attributes

Rim Form	**n**	**%**
Incipient	721	72.24
Collarless	249	24.95
Collared	28	2.81
Total	998	100.00

Collar Base Shape	**n**	**%**
Rounded	741	74.25
Not Applicable	249	24.95
Angular	8	0.80
Total	996	100.00

Rim Orientation	**n**	**%**
Outflaring	887	88.88
Vertical	61	6.11
Insloping	50	5.01
Total	998	100.00

Lip Form	**n**	**%**
Flat	565	56.61
Rounded	329	32.97
Concave	103	10.32
Irregular	1	0.10
Total	998	100.00

Angle of the Lip to the Interior	**n**	**%**
Right	600	60.12
Acute	270	27.05
Obtuse	127	12.73
Irregular	1	0.10
Total	998	100.00

Collar Height (n=749)	
Mean	7.58
Range	3.21-29.61
Standard Deviation	3.71

Interior Profile	**n**	**%**
Concave	858	85.97
Convex	118	11.82
Straight	15	1.50
Concave over Convex	4	0.40
Convex over Concave	2	0.20
Irregular	1	0.10
Total	998	99.99

Exterior Profile	**n**	**%**
Convex	708	70.94
Concave	256	25.65
Straight	22	2.20
Concave over Convex	6	0.60
Convex over Concave	3	0.30
Irregular	2	0.20
Concave over Concave	1	0.10
Total	998	99.99

Lip Width (n=998)	
Mean	6.59
Range	2.33-11.75
Standard Deviation	1.39

Basel Collar Width (n=749)	
Mean	7.58
Range	4.41 - 12.31
Standard Deviation	1.39

The most common decorative motifs identified on the interior of the vessels are punctates (21.74%), obliques (11.62%) and obliques over punctates (10.62%) An additional 28 different interior motifs are present on the remaining vessels (Table 7).

The techniques of punctates, linear stamping over punctates and linear stamping are used for 78.36% of the vessel interiors. Thirty-one different techniques were used on the remaining vessels. Plain interiors occur on less than half the vessels (44.59%). One collared vessel (501-249: 5729) exhibits a band of interior bosses that were produced by exterior punctates (Table 7).

Table 7: Ceramic Vessel Interior Attributes

Interior Motif	n	%	Interior Technique	n	%
Plain	445	44.59	Plain	445	44.59
Punctate	221	22.14	Punctate	228	22.85
Oblique	116	11.62	Linear Stamp over Punctate	109	10.92
Oblique over Punctate	106	10.62	Linear Stamp	94	9.42
Oblique over Oblique	24	2.40	Linear Stamp over Linear Stamp	20	2.00
Oblique over Oblique over Punctate	15	1.50	Dentate Stamp	18	1.80
Vertical	12	1.20	Linear Stamp over Linear Stamp over Punctate	14	1.40
Vertical over Punctate	11	1.10	Dentate Stamp over Punctate	11	1.10
Plain over Oblique	6	0.60	Punctate over Punctate	7	0.70
Oblique over Vertical	6	0.60	Plain over Linear Stamp	6	0.60
Horizontal over Punctate	4	0.40	Linear Stamp and Punctate	6	0.60
Punctate over Punctate	3	0.30	Linear Punctate	5	0.50
Oblique and Punctate	3	0.30	Incised	5	0.50
Horizontal	3	0.30	Linear Stamp over Punctate over Punctate	4	0.40
Hatched over Punctate	3	0.30	Cord-Impressed	4	0.40
Oblique over Oblique over Oblique over Punctate	2	0.20	Incised over Punctate	2	0.20
Horizontal over Vertical	2	0.20	Crescent Stamp over Punctate	2	0.20
Hatched	2	0.20	Suture Stamp over Punctate	1	0.10
Random over Vertical	1	0.10	Suture Stamp	1	0.10
Plain over Oblique over Punctate	1	0.10	Plain over Linear Stamp over Punctate	1	0.10
Oblique over Punctate over Punctate	1	0.10	Linear Stamp over Plain over Linear Stamp	1	0.10
Oblique over Plain over Oblique	1	0.10	Linear Punctate over Linear Punctate	1	0.10
Oblique over Oblique and Vertical	1	0.10	Linear Stamp over Linear Stamp and Punctate	1	0.10
Oblique over Horizontal over Punctate	1	0.10	Linear Stamp crossed by Incised over Punctate	1	0.10
Oblique crossed by Horizontal over Punctate	1	0.10	Linear Punctate over Punctate	1	0.10
Oblique crossed by Horizontal over Horizontal over Punctate	1	0.10	Linear Stamp over Linear Stamp over Linear Stamp over Punctate	1	0.10
Oblique crossed by Horizontal	1	0.10	Dentate Stamp over Dentate Stamp over Dentate Stamp over Punctate	1	0.10
Oblique and Vertical	1	0.10	Dentate Stamp over Dentate Stamp	1	0.10
Interrupted Oblique and Punctate	1	0.10	Dentate Stamp crossed by Incised over Incised over Punctate	1	0.10
Hatched over Oblique	1	0.10	Dentate Stamp crossed by Incised	1	0.10
Boss	1	0.10	Dentate Stamp and Punctate	1	0.10
Vertical over Punctate over Punctate	1	0.10	Cord-Impressed over Punctate	1	0.10
Total	**998**	**99.97**	Cord-Impressed over Cord-Impressed	1	0.10
			Cord Impressed over Punctate	1	0.10
			Boss	1	0.10
			Total	**998**	**99.98**

Plain (71.74%), obliques (18.14%) and horizontals (5.21%) are the most common motifs appearing on vessel lips. The remaining bear 10 different lip motifs. Linear stamping, punctates, dentate stamping, push-pull, incising, linear punctates, cord impressions, crescent stamping and fingernail impressions were all used in the creation of these motifs (Table 8).

Table 8: Ceramic Vessel Lip Attributes

Lip Motif	n	%	Lip Technique	n	%
Plain	716	71.74	Plain	716	71.74
Oblique	181	18.14	Linear Stamp	191	19.14
Horizontal	52	5.21	Punctate	24	2.40
Vertical	23	2.30	Dentate Stamp	23	2.30
Hatched	14	1.40	Push-Pull	12	1.20
Interrupted Oblique	3	0.30	Incised	11	1.10
Chevron	2	0.20	Linear Punctate	8	0.80
Interrupted Horizontal	2	0.20	Cord-Impressed	5	0.50
Horizontal crossed by Oblique	1	0.10	Crescent Stamp	2	0.20
Horizontal over Horizontal	1	0.10	Fingernail Impressed	2	0.20
Oblique crossed by Horizontal over Horizontal	1	0.10	Cord-Impressed crossed by Cord-Impressed	1	0.10
Interrupted Vertical	1	0.10	Dentate Stamp crossed by Incised over Incised	1	0.10
Oblique over Oblique	1	0.10	Linear Stamp over Linear Stamp	1	0.10
Total	**998**	**99.99**	Punctate over Punctate	1	0.10
			Total	**998**	**99.98**

The most common techniques used in creating the collar decorative motifs are: linear stamping (43.69%), plain (9.82%), linear stamping over linear stamping (5.31%) and dentate stamping (4.71%). The remaining 115 vessels have 48 different collar techniques (Table 9).

Table 9: Ceramic Vessel Collar Decorative Attributes

Collar Technique	n	%
Linear Stamp	436	43.69
Collarless	249	24.95
Plain	98	9.82
Linear Stamp over Linear Stamp	53	5.31
Dentate Stamp	47	4.71
Cord-Impressed	12	1.20
Crescent Stamp	10	1.00
Linear Stamp over Plain	10	1.00
Punctate	8	0.80
Incised	7	0.70
Linear Stamp over Incised	6	0.60
Linear Stamp crossed by Linear Stamp	5	0.50
Plain over Linear Stamp	5	0.50
Dentate Stamp over Plain	3	0.30
Fingernail Impressed	3	0.30
Dentate Stamp crossed by Incised over Incised	2	0.20
Dentate Stamp over Incised	2	0.20
Incised crossed by Incised	2	0.20
Linear Stamp and Boss	2	0.20
Linear Stamp crossed by Incised	2	0.20

Table 9: Ceramic Vessel Collar Decorative Attributes

Collar Technique	n	%
Plain over Boss	2	0.20
Punctate over Punctate and Boss	2	0.20
Suture Stamp	2	0.20
Boss	1	0.10
Cord-Impressed over Linear Stamp	1	0.10
Cord-Impressed crossed by Incised	1	0.10
Cord-Impressed over Cord-Impressed over Linear Stamp	1	0.10
Crescent Stamp and Punctate	1	0.10
Crescent Stamp over Plain	1	0.10
Dentate Stamp and Boss	1	0.10
Dentate Stamp crossed by Incised	1	0.10
Dentate Stamp over Boss	1	0.10
Dentate Stamp over Linear Stamp	1	0.10
Dentate Stamp over Linear Stamp and Boss	1	0.10
Incised crossed by Linear Stamp	1	0.10
Incised over Plain	1	0.10
Incised over Punctate over Incised over Linear Punctate over Incised	1	0.10
Incised over Punctate over Incised over Punctate over Incised over Punctate	1	0.10
Linear Punctate	1	0.10
Linear Punctate over Linear Punctate	1	0.10
Linear Punctate over Linear Stamp	1	0.10
Linear Stamp crossed by Linear Stamp over Dentate Stamp	1	0.10
Linear Stamp over Boss	1	0.10
Linear Stamp over Fingernail Impressed	1	0.10
Linear Stamp over Linear Punctate	1	0.10
Linear Stamp over Linear Stamp and Boss	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp and Boss	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp and Boss	1	0.10
Linear Stamp over Punctate over Plain	1	0.10
Plain and Linear Stamp over Plain	1	0.10
Plain over Dentate Stamp	1	0.10
Plain over Incised	1	0.10
Total	**998**	**99.98**

Plain (17.13%), linear stamping (9.52%), linear stamping over unknown (8.72%) and linear stamping over bosses (5.91%) are the most commonly occurring techniques used in creating neck decoration. The remaining 586 vessels (58.72%), display 176 different techniques, or combinations of techniques (Table 10).

Table 10: Ceramic Vessel Neck Decorative Attributes

Neck Technique	n	%
Plain	171	17.13
Linear Stamp	95	9.52
Linear Stamp over Unknown	87	8.72
Linear Stamp over Boss	59	5.91
Plain over Unknown	46	4.61
Boss	46	4.61

Table 10: Ceramic Vessel Neck Decorative Attributes

Neck Technique	n	%
Linear Stamp over Linear Stamp over Unknown	43	4.31
Linear Stamp over Linear Stamp	42	4.21
Linear Stamp over Linear Stamp and Boss	24	2.40
Linear Stamp over Linear Stamp over Boss	22	2.20
Linear Stamp and Boss	20	2.00
Incised	15	1.50
Linear Stamp over Linear Stamp over Linear Stamp	14	1.40
Linear Stamp and Boss over Linear Stamp	14	1.40
Linear Stamp over Linear Stamp and Boss over Linear Stamp	12	1.20
Linear Stamp over Linear Stamp and Boss over Unknown	10	1.00
Linear Stamp over Boss over Unknown	10	1.00
Dentate Stamp over Unknown	9	0.90
Boss over Unknown	9	0.90
Dentate Stamp	8	0.80
Linear Stamp over Boss over Linear Stamp	7	0.70
Linear Stamp and Boss over Unknown	7	0.70
Linear Stamp over Linear Stamp over Linear Stamp and Boss	6	0.60
Linear Stamp over Linear Stamp over Linear Stamp over Unknown	5	0.50
Dentate Stamp over Dentate Stamp over Unknown	5	0.50
Dentate Stamp over Boss	5	0.50
Plain over Linear Stamp over Unknown	4	0.40
Linear Stamp over Incised	4	0.40
Linear Stamp and Boss over Linear Stamp over Unknown	4	0.40
Incised over Unknown	4	0.40
Cord-Impressed over Boss	4	0.40
Cord-Impressed	4	0.40
Punctate	3	0.30
Plain over Linear Stamp over Boss	3	0.30
Plain over Linear Stamp	3	0.30
Linear Stamp over Linear Stamp over Linear Stamp over Boss	3	0.30
Linear Stamp over Incised over Unknown	3	0.30
Linear Stamp over Boss over Linear Stamp over Linear Stamp	3	0.30
Incised over Linear Stamp over Incised over Unknown	3	0.30
Dentate Stamp and Boss over Dentate Stamp	3	0.30
Crescent Stamp	3	0.30
Boss over Linear Stamp over Unknown	3	0.30
Plain over Linear Stamp and Boss	2	0.20
Plain over Incised over Unknown	2	0.20
Linear Stamp over Plain over Linear Stamp	2	0.20
Linear Stamp over Linear Stamp over Incised over Unknown	2	0.20
Linear Stamp over Linear Stamp over Boss over Unknown	2	0.20
Linear Stamp over Linear Punctate and Boss	2	0.20
Linear Stamp over Boss over Incised	2	0.20
Linear Stamp and Boss over Linear Stamp over Incised over Unknown	2	0.20
Linear Punctate over Unknown	2	0.20
Linear Punctate over Linear Punctate over Boss	2	0.20
Linear Punctate over Linear Punctate	2	0.20
Incised over Incised	2	0.20

Table 10: Ceramic Vessel Neck Decorative Attributes

Neck Technique	n	%
Dentate Stamp over Plain over Dentate Stamp	2	0.20
Boss over Linear Stamp	2	0.20
Boss over Incised	2	0.20
Punctate over Unknown	1	0.10
Punctate over Punctate	1	0.10
Punctate over Incised over Punctate over Incised over Punctate over Incised over Punctate and Boss	1	0.10
Punctate over Fingernail Impressed	1	0.10
Punctate over Dentate Stamp over Dentate Stamp	1	0.10
Punctate and Boss over Punctate	1	0.10
Punctate and Boss over Linear Stamp over Unknown	1	0.10
Punctate and Boss over Dentate Stamp over Incised over Unknown	1	0.10
Punctate and Boss over Boss over Unknown	1	0.10
Plain over Linear Stamp over Boss over Stamp	1	0.10
Plain over Linear Stamp over Boss over Plain over Linear Stamp	1	0.10
Plain over Linear Stamp and Boss over Unknown	1	0.10
Plain over Dentate Stamp	1	0.10
Plain over Boss over Linear Stamp over Incised crossed by Incised	1	0.10
Plain over Boss	1	0.10
Linear Stamp over Punctate over Linear Stamp	1	0.10
Linear Stamp over Punctate and Boss over Linear Stamp over Linear Punctate over Linear Stamp	1	0.10
Linear Stamp over Punctate and Boss	1	0.10
Linear Stamp over Plain over Linear Stamp over Unknown	1	0.10
Linear Stamp over Plain over Linear Stamp and Boss	1	0.10
Linear Stamp over Pain over Linear Stamp	1	0.10
Linear Stamp over Linear Stamp over Punctate and Boss over Crescent Stamp	1	0.10
Linear Stamp over Linear Stamp over Punctate	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp over Unknown	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp over Boss	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp and Boss	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp and Boss over Plain over Linear Stamp	1	0.10
Linear Stamp over Linear Stamp over Linear Stamp and Boss over Linear Stamp	1	0.10
Linear Stamp over Linear Stamp over Incised over Linear Stamp over Unknown	1	0.10
Linear Stamp over Linear Stamp over Incised over Incised	1	0.10
Linear Stamp over Linear Stamp over Incised and Boss over Linear Stamp	1	0.10
Linear Stamp over Linear Stamp over Incised and Boss over Cord Impressed over Cord Impressed	1	0.10
Linear Stamp over Linear Stamp over Boss over Linear Punctate over Linear Punctate	1	0.10
Linear Stamp over Linear Stamp over Boss over Incised over Unknown	1	0.10
Linear Stamp over Linear Stamp and Boss over Linear Stamp over Unknown	1	0.10
Linear Stamp over Linear Stamp and Boss over Linear Stamp over Linear Stamp over Unknown	1	0.10
Linear Stamp over Linear Stamp and Boss over Linear Stamp over Incised	1	0.10
Linear Stamp over Linear Stamp and Boss over Incised	1	0.10
Linear Stamp over Linear Punctate over Boss over Linear Stamp	1	0.10
Linear Stamp over Incised over Linear Stamp over Incised over Unknown	1	0.10
Linear Stamp over Incised over Boss over Incised over Linear Stamp	1	0.10
Linear Stamp over Incised over Boss	1	0.10
Linear Stamp over Incised and Boss over Linear Stamp over Linear Stamp	1	0.10
Linear Stamp over Incised and Boss over Linear Stamp	1	0.10

Table 10: Ceramic Vessel Neck Decorative Attributes

Neck Technique	n	%
Linear Stamp over Dentate Stamp over Boss	1	0.10
Linear Stamp over Crescent Stamp	1	0.10
Linear Stamp over Cord-Impressed	1	0.10
Linear Stamp over Boss over Linear Stamp and Boss	1	0.10
Linear Stamp over Boss over Crescent Stamp	1	0.10
Linear Stamp crossed by Linear Stamp over Linear Stamp and Boss over Linear Stamp	1	0.10
Linear Stamp crossed by Linear Stamp over Boss	1	0.10
Linear Stamp crossed by Incised over Incised over Linear Stamp crossed by Incised over Boss	1	0.10
Linear Stamp and Incised and Boss over Unknown	1	0.10
Linear Stamp and Boss over Punctate over Incised	1	0.10
Linear Stamp and Boss over Linear Stamp over Linear Stamp	1	0.10
Linear Stamp and Boss over Incised over Unknown	1	0.10
Linear Stamp and Boss over Incised	1	0.10
Linear Stamp over Unknown	1	0.10
Linear Stamp over Linear Punctate over Unknown	1	0.10
Linear Punctate over Punctate	1	0.10
Linear Punctate over Linear Stamp over Unknown	1	0.10
Linear Punctate over Linear Stamp over Linear Stamp over Linear Stamp	1	0.10
Linear Punctate over Linear Stamp	1	0.10
Linear Punctate over Linear Punctate over Incised over Unknown	1	0.10
Linear Punctate over Boss over Linear Punctate	1	0.10
Linear Punctate and Boss over Linear Stamp	1	0.10
Linear Punctate and Boss over Crescent Stamp over Linear Stamp	1	0.10
Linear Punctate and Boss	1	0.10
Linear Punctate	1	0.10
Incised over Punctate over Boss	1	0.10
Incised over Incised over Unknown	1	0.10
Incised over Incised and Linear Stamp over Unknown	1	0.10
Incised over Dentate Stamp crossed by Incised over Boss	1	0.10
Incised over Dentate Stamp	1	0.10
Incised over Boss over Unknown	1	0.10
Incised over Boss over Incised	1	0.10
Incised over Boss	1	0.10
Incised crossed by Incised	1	0.10
Incised and Plain over Unknown	1	0.10
Incised and Plain	1	0.10
Incised and Boss over Punctate	1	0.10
Incised and Boss over Linear Punctate	1	0.10
Fingernail Impressed	1	0.10
Dentate Stamp over Punctate over Dentate Stamp over Incised	1	0.10
Dentate Stamp over Plain over Unknown	1	0.10
Dentate Stamp over Linear Stamp	1	0.10
Dentate Stamp over Incised over Linear Stamp	1	0.10
Dentate Stamp over Dentate Stamp over Linear Stamp over Unknown	1	0.10
Dentate Stamp over Dentate Stamp over Linear Stamp	1	0.10
Dentate Stamp over Dentate Stamp over Dentate Stamp over Incised over Unknown	1	0.10
Dentate Stamp over Dentate Stamp over Dentate Stamp and Boss	1	0.10
Dentate Stamp over Dentate Stamp over Dentate Stamp	1	0.10

Table 10: Ceramic Vessel Neck Decorative Attributes

Neck Technique	n	%
Dentate Stamp over Dentate Stamp over Boss	1	0.10
Dentate Stamp over Dentate Stamp and Boss over Unknown	1	0.10
Dentate Stamp over Dentate Stamp and Boss over Dentate Stamp	1	0.10
Dentate Stamp over Dentate Stamp and Boss	1	0.10
Dentate Stamp over Boss over Linear Stamp over Unknown	1	0.10
Dentate Stamp crossed by Incised over Incised over Linear Stamp crossed by Incised	1	0.10
Dentate Stamp and Boss over Unknown	1	0.10
Dentate Stamp and Boss over Linear Stamp over Dentate Stamp over Linear Stamp	1	0.10
Dentate Stamp and Boss over Incised over Incised	1	0.10
Dentate Stamp and Boss over Dentate Stamp over Unknown	1	0.10
Crescent Stamp over Linear Stamp over Boss	1	0.10
Crescent Stamp over Linear Stamp and Boss over Crescent Stamp over Linear Stamp over Plain over Linear Stamp over Unknown	1	0.10
Crescent Stamp over Linear Stamp	1	0.10
Crescent Stamp over Crescent Stamp over Boss over Punctate over Unknown	1	0.10
Crescent Stamp over Crescent Stamp	1	0.10
Crescent Stamp and Boss	1	0.10
Crescent Shaped Stamp	1	0.10
Cord-Impressed over Cord-Impressed	1	0.10
Cord-Impressed over Boss over Cord-Impressed over Cord-Impressed	1	0.10
Cord-Impressed crossed by Incised over Boss	1	0.10
Cord-Impressed and Boss over Linear Stamp	1	0.10
Cord-Impressed and Boss	1	0.10
Boss over Plain over Incised over Unknown	1	0.10
Boss over Linear Stamp over Plain over Linear Stamp	1	0.10
Boss over Linear Stamp over Linear Stamp	1	0.10
Boss over Linear Stamp over Incised	1	0.10
Boss over Incised over Unknown	1	0.10
Boss over Dentate Stamp	1	0.10
Boss over Cord-Impressed	1	0.10
Boss and Linear Stamp over Linear Stamp over Unknown	1	0.10
Total	**998**	**99.92**

Table 11 displays the frequencies of collar and neck motif combinations. Detailed descriptions of each attribute group are provided in Appendix 9.

The highest frequencies of vessels are those with simple motifs made up of either vertical or oblique elements, which may or may not be opposed. These are followed by plain (vessels classified as a plain include those with only bossing) and vessels that exhibit hatched or crossed oblique motifs.

Samples of the vessels with this basic suite of attributes are illustrated in Plates 1- 5.

Table 11: Ceramic Vessel Collar, Neck Attributes

Attribute	n	Total	%
Simple Motif, Single Decorative Band	*90*		
Simple Motif, Two Decorative Bands	*179*		
Simple Motif, Three or More Decorative Bands	*94*		
Simple Total		363	36.37

Table 11: Ceramic Vessel Collar, Neck Attributes

Attribute	n	Total	%
Simple Motif, Two Decorative Bands Opposed	*129*		
Simple Motif, Three or More Decorative Bands Opposed	*94*		
Simple Opposed Total		223	22.34
Plain		190	19.04
Simple Crossed by Simple	*10*		
Hatched	*25*		
Hatched over Simple	*60*		
Hatched over Simple Opposed	*13*		
Hatched Mixed	*16*		
Hatched/Crossed Variations Total		124	12.42
Horizontal	*9*		
Simple crossed by Horizontal	*7*		
Simple over Horizontal	*31*		
Simple mixed with Horizontal	*22*		
Horizontal/Horizontal Variations Total		69	6.91
Miscellaneous		29	2.91
Total		**998**	**99.99**

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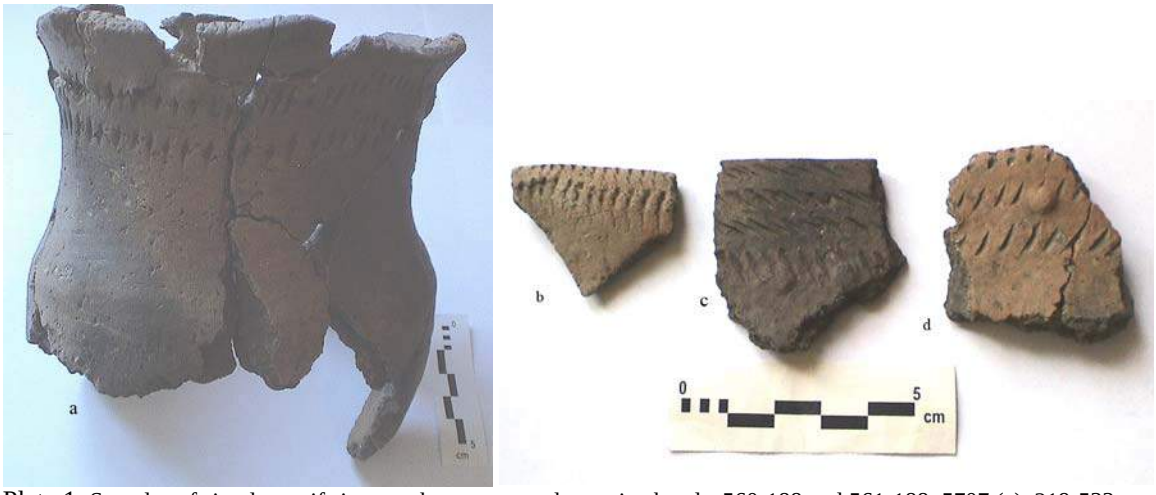

Plate 1: Samples of simple motifs in two, three or more decorative bands. 560-188 and 561-188: 5707 (a), 219-533: 6367 (b), 463-240, 464-240: 6347 (c) and 498-248: 6360 (d). Not all fragments of (c) and (d) are shown**.**

Plate 2: An example of a simple motif used in three or more opposed decorative bands (467-241, 468-241 and 467-240: 5711). (Not all fragments shown)

Plate 3: Examples of hatched over simple and mixed hatched decorative motifs. 202-526, 204-523, 210-515, 210-519 and 211-517: 6241 (a), 465-240: 6248 (b), and 215-533: 6232 (c). Not all fragments of (a) are shown.

Plate 4: Examples of horizontal, simple crossed by horizontal and simple over horizontal decorative motifs. 495-244, 495-244: 5713 (a), 210-512: 5722 (b) and 530-268: 5730 (c).

Plate 5: An example of a miscellaneous decorative motif made up of multiple decorative bands (202-527, 227-514, 227-515, 228-515: 5723 [not all fragments shown]).

In addition to the various decorative techniques outlined above, numerous vessels are characterized by corded, ribbed or scarified surface treatments. Smoothed over cord roughened surface treatments are present on vessel necks (n=219), lips (n=66), lips and necks (n=66), collars and necks (n=39), lips, collars and necks (n=28), collars (n=14) and lips and collars (n=3).

Smoothed over ribbed paddling was found on collars and necks (n=4) or necks (n=2). Two vessels have mixed surface treatments: one vessel has a cord roughened collar and a ribbed pattern on the neck, the other has a cord roughened lip while the collar and neck display a ribbed impression.

Only one vessel displays a scratched surface on the collar and neck, which may be the by-product of aggressive wiping.

Castellations

One hundred and seventy-seven castellations are present in the assemblage. Sixty-one are isolated fragments, while the remaining 116 are associated with analyzed vessels.

Table 12 provides the frequencies of lip forms that characterize the castellations. Rounded lips are present on 125 of the castellations (70.62%), followed by pointed forms (12.99%), multiple rounded forms (12.99%) and multiple pointed forms (n=6).

Table 12: Castellation Lip Forms

Lip Form	n	%
Rounded	125	70.62
Pointed	23	12.99
Rounded (Multiple)	23	12.99
Pointed (Multiple)	6	3.39
Total	177	99.99

Castellation lip and interior decorative motifs are fairly consistent with those found in the rest of the vessel assemblage, with the exception that in some instances the motif appears to slightly interrupted.

The castellation base forms also generally mirror that of the remainder of the vessel assemblage with the exception of 14 vessels. Thirteen of these display an increase in basal development at the castellation in the form of transformations from incipient to collared (n=4), incipient to incipient with exaggerated basal development (n=2) and collarless to incipient (n=7). One vessel with an incipient rim form became collarless at the castellation.

One hundred and twenty-nine different combinations of lip form, collar and neck motif were identified on the castellated vessels (Table 13). A change in motif at the collar and/or neck of the castellation is found on 17 of 116 of the identified vessels. Of the 17 vessels with a motif change 11 represent a shifting of the motif to compensate for the increase space at castellation.

The remaining six vessels display minor changes such as the overlapping of motifs, the addition of a band of obliques, removal of a band of obliques or change of the angle of simple motif elements such that a band of obliques may become a limited plat motif.

Table 13: Castellation Lip Form and Collar and Neck Motif Combinations

Lip Form	Collar Motif	Neck Motif	n	%
Rounded	Plain	Plain	12	6.78
Rounded	Collarless	Plain	7	3.95
Rounded	Oblique	Oblique	5	2.82
Rounded	Oblique	Oblique	4	2.26
Rounded	Oblique	Oblique over Boss	4	2.26
Rounded	Oblique	Oblique over Oblique over Unknown	4	2.26
Rounded	Oblique	Oblique over Unknown	4	2.26
Rounded	Oblique	Plain	4	2.26
Rounded	Oblique	Oblique over Oblique and Boss	3	1.69
Rounded	Collarless	Boss	3	1.69
Pointed	Collarless	Boss	3	1.69
Rounded (Multiple)	Oblique	Boss	2	1.13
Rounded (Multiple)	Collarless	Plain	2	1.13

Table 13: Castellation Lip Form and Collar and Neck Motif Combinations

Lip Form	Collar Motif	Neck Motif	n	%
Rounded	Oblique	Oblique over Oblique over Boss	2	1.13
Rounded	Hatched	Oblique and Boss over Oblique over Unknown	2	1.13
Pointed	Plain	Plain	2	1.13
Pointed	Collarless	Plain	2	1.13
Rounded (Multiple)	Vertical	Horizontal over Interrupted Vertical	1	0.56
Rounded (Multiple)	Plain over Horizontal	Horizontal over Opposed (Left and Right Oblique and Horizontal and Plat) over Unknown	1	0.56
Rounded (Multiple)	Oblique over Plain	Oblique and Boss over Horizontal over Oblique over Horizontal	1	0.56
Rounded (Multiple)	Oblique	Oblique	1	0.56
Rounded (Multiple)	Oblique over Oblique	Oblique	1	0.56
Rounded (Multiple)	Oblique crossed by Horizontal over Horizontal	Horizontal over Oblique over Oblique	1	0.56
Rounded (Multiple)	Oblique	Oblique over Oblique	1	0.56
Rounded (Multiple)	Oblique	Oblique over Oblique and Boss	1	0.56
Rounded (Multiple)	Oblique	Oblique over Oblique and Boss over Oblique over Opposed (Left and Right Oblique and Horizontal)	1	0.56
Rounded (Multiple)	Oblique	Oblique	1	0.56
Rounded (Multiple)	Oblique	Oblique and Boss	1	0.56
Rounded (Multiple)	Oblique	Oblique over Oblique over Boss	1	0.56
Rounded (Multiple)	Oblique	Oblique over Oblique and Boss over Oblique	1	0.56
Rounded (Multiple)	Hatched	Hatched over Boss	1	0.56
Rounded (Multiple)	Hatched	Oblique over Oblique over Boss	1	0.56
Rounded (Multiple)	Collarless	Oblique over Oblique and Boss over Vertical	1	0.56
Rounded (Multiple)	Collarless	Oblique over Oblique over Oblique over Oblique	1	0.56
Rounded (Multiple)	Collarless	Oblique over Oblique over Boss	1	0.56
Rounded (Multiple)	Collarless	Plain over Vertical over Boss over Vertical	1	0.56
Rounded	Vertical over Vertical	Vertical and Boss	1	0.56
Rounded	Vertical over Plain	Horizontal over Boss	1	0.56
Rounded	Plain over Vertical	Vertical over Vertical over Vertical	1	0.56
Rounded	Plain over Oblique	Oblique and Boss	1	0.56
Rounded	Plain over Oblique	Horizontal over Oblique	1	0.56
Rounded	Plain over Oblique	Plain over Oblique over Boss	1	0.56
Rounded	Plain	Boss	1	0.56
Rounded	Plain	Oblique over Oblique over Boss	1	0.56
Rounded	Plain	Oblique over Vertical over Unknown	1	0.56
Rounded	Oblique over Plain	Oblique	1	0.56
Rounded	Oblique over Oblique over Oblique over Boss	Plain	1	0.56
Rounded	Oblique	Oblique	1	0.56
Rounded	Oblique	Oblique over Oblique over Unknown	1	0.56
Rounded	Oblique	Oblique over Unknown	1	0.56
Rounded	Oblique	Plain	1	0.56
Rounded	Oblique	Random and Boss	1	0.56
Rounded	Oblique over Plain	Oblique over Oblique	1	0.56
Rounded	Oblique over Plain	Oblique over Plain	1	0.56
Rounded	Oblique over Plain	Plain	1	0.56
Rounded	Oblique over Oblique (wiped)	Oblique over Oblique over Boss	1	0.56
Rounded	Oblique over Oblique over Oblique over Oblique	Boss	1	0.56
Rounded	Oblique over Oblique over Oblique	Unknown	1	0.56

Table 13: Castellation Lip Form and Collar and Neck Motif Combinations

Lip Form	Collar Motif	Neck Motif	n	%
	over Boss			
Rounded	Oblique over Oblique	Boss	1	0.56
Rounded	Oblique over Oblique	Oblique and Boss over Oblique	1	0.56
Rounded	Oblique over Oblique	Oblique over Punctate	1	0.56
Rounded	Oblique over Oblique/	Oblique over Vertical	1	0.56
Rounded	Oblique over Horizontal and Boss	Horizontal over Oblique	1	0.56
Rounded	Oblique crossed by Oblique	Oblique over Oblique	1	0.56
Rounded	Oblique crossed by Oblique (short)*	Oblique and Boss	1	0.56
Rounded	Oblique	Boss	1	0.56
Rounded	Oblique	Boss over Unknown	1	0.56
Rounded	Oblique	Hatched over Oblique and Boss	1	0.56
Rounded	Oblique	Oblique and Boss over Oblique	1	0.56
Rounded	Oblique	Oblique over Oblique	1	0.56
Rounded	Oblique	Oblique over Oblique over Unknown	1	0.56
Rounded	Oblique	Oblique over Unknown	1	0.56
Rounded	Oblique	Oblique over Vertical and Boss	1	0.56
Rounded	Oblique	Oblique and Boss	1	0.56
Rounded	Oblique	Oblique and Boss over Oblique	1	0.56
Rounded	Oblique	Oblique over Hatched and Boss	1	0.56
Rounded	Oblique	Oblique over Horizontal	1	0.56
Rounded	Oblique	Oblique over Oblique	1	0.56
Rounded	Oblique	Oblique over Oblique and Boss over Oblique	1	0.56
Rounded	Oblique	Oblique over Oblique and Boss over Opposed (Left and Right Oblique)	1	0.56
Rounded	Oblique	Oblique over Oblique over Hatched and Boss	1	0.56
Rounded	Oblique	Oblique over Oblique over Oblique	1	0.56
Rounded	Oblique	Oblique over Oblique over Oblique and Boss	1	0.56
Rounded	Oblique	Opposed (Left and Right Oblique)	1	0.56
Rounded	Oblique	Plain over Oblique	1	0.56
Rounded	Oblique	Plain over Oblique over Unknown	1	0.56
Rounded	Horizontal	Horizontal	1	0.56
Rounded	Hatched over Boss	Oblique	1	0.56
Rounded	Hatched and Boss	Plat	1	0.56
Rounded	Hatched	Oblique over Oblique and Boss	1	0.56
Rounded	Hatched	Oblique over Oblique and Boss over Unknown	1	0.56
Rounded	Hatched	Oblique and Boss over Oblique over Oblique over Unknown	1	0.56
Rounded	Hatched	Oblique over Boss	1	0.56
Rounded	Hatched	Oblique over Oblique	1	0.56
Rounded	Hatched	Oblique over Oblique over Boss	1	0.56
Rounded	Hatched	Oblique over Unknown	1	0.56
Rounded	Hatched	Plain	1	0.56
Rounded	Hatched	Punctate and Boss over Unknown	1	0.56
Rounded	Collarless	Hatched over Boss	1	0.56
Rounded	Collarless	Hatched over Boss over Interrupted Plat	1	0.56
Rounded	Collarless	Hatched over Punctate and Boss over Oblique over Oblique over Oblique	1	0.56
Rounded	Collarless	Oblique over Oblique	1	0.56
Rounded	Collarless	Oblique over Oblique over Unknown	1	0.56

Table 13: Castellation Lip Form and Collar and Neck Motif Combinations

Lip Form	Collar Motif	Neck Motif	n	%
Rounded	Collarless	Oblique over Oblique over Boss	1	0.56
Rounded	Collarless	Oblique	1	0.56
Rounded	Collarless	Vertical	1	0.56
Rounded	Chevron	Oblique over Boss	1	0.56
Pointed (Multiple)	Vertical	Boss	1	0.56
Pointed (Multiple)	Plain	Plain	1	0.56
Pointed (Multiple)	Oblique over Oblique	Oblique over Oblique	1	0.56
Pointed (Multiple)	Oblique over Plain	Plain	1	0.56
Pointed (Multiple)	Oblique	Oblique	1	0.56
Pointed (Multiple)	Oblique	Oblique over Boss	1	0.56
Pointed	Vertical	Vertical over Plain over Oblique	1	0.56
Pointed	Random over Plain	Oblique over Random and Boss over Oblique	1	0.56
Pointed	Plain	Oblique over Oblique over Horizontal	1	0.56
Pointed	Oblique	Oblique over Oblique and Boss	1	0.56
Pointed	Oblique	Oblique over Oblique over Unknown	1	0.56
Pointed	Oblique over Oblique	Oblique over Boss over Oblique	1	0.56
Pointed	Oblique over Oblique	Oblique over Oblique and Boss	1	0.56
Pointed	Oblique over Oblique	Isoclines Triangles filled with Horizontal and Plain	1	0.56
Pointed	Oblique over Interrupted Horizontal	Oblique over Interrupted Horizontal	1	0.56
Pointed	Oblique	Boss over Oblique	1	0.56
Pointed	Oblique	Oblique over Boss	1	0.56
Pointed	Oblique	Oblique over Oblique	1	0.56
Pointed	Hatched	Hatched	1	0.56
Pointed	Hatched	Oblique over Boss over Unknown	1	0.56
Pointed	Collarless	Oblique over Oblique over Boss	1	0.56
Pointed	Collarless	Oblique over Oblique and Boss	1	0.56
Total			**177**	**99.42**

* Motif change at the axis of the castellation

Neck Sherds

Five thousand, eight hundred and nine isolated neck fragments are present in the assemblage. Decorative motifs appear on 16.3% of these sherds (bossing is treated as a decorative motif). Most necks have cord roughened (41.78%) or plain (39.42%) surfaces (Table 14).

Table 14: Neck Attributes

Decoration	n	%
Cord-wrapped Paddle	2427	41.78
Plain	2290	39.42
Decorated	754	12.98
Decorated and Cord-wrapped Paddle	153	2.63
Ribbed Paddle	86	1.48
Decorated over Cord-wrapped Paddle	33	0.57
Scarified	20	0.34
Check-Stamped	17	0.29
Cord-wrapped Paddle and Ribbed Paddle	11	0.19
Cord-wrapped Paddle and Scarification	10	0.17
Decorated and Ribbed Paddle	3	0.05

Table 14: Neck Attributes

Decoration	n	%
Decorated over Ribbed Paddle	2	0.03
Decorated over Cord-wrapped Paddle and Scarification	2	0.03
Indeterminate	1	0.02
Total	**5809**	**99.98**

Shoulder Sherds

Table 15 summarizes data for all of the shoulder sherds that are sufficiently large to provide reliable characterization of their form and decoration. It should be noted that plain or other surface treated rounded shoulders are most likely under represented, due to difficulty of differentiating rounded shoulders from vessel body sherds.

Table 15: Shoulder Attributes

Shoulder Type	Decoration	n	%
Rounded	Cord-wrapped Paddle	613	63.07
Rounded	Plain	300	30.86
Rounded	Ribbed Paddle	33	3.40
Rounded	Check-Stamped	10	1.03
Rounded	Cord-wrapped Paddle and Ribbed Paddle	5	0.51
Rounded	Scarification	2	0.21
Rounded	Cord-wrapped Paddle and Scarification	2	0.21
Rounded	Incised Oblique	1	0.10
Rounded	Incised Horizontal and Cord-wrapped Paddle	1	0.10
Rounded	Incised Opposed (Left and Right Oblique)	1	0.10
Rounded	Incised Zig-Zag and Cord-wrapped Paddle	1	0.10
Carinated	Punctate Horizontal and Scarification	1	0.10
Rounded	Linear Stamp Oblique and Cord-wrapped Paddle	1	0.10
Rounded	Linear Stamp Oblique	1	0.10
Total		**972**	**99.99**

Body Sherds

Cord-wrapped paddling was identified on more than three-quarters of the body sherds (78.84%), followed by plain (9.74%) and ribbed paddled (6.9%) surface treatments (Table 16).

Table 16: King's Forest Park Site Ceramic Body Fragment Treatment

Decoration	n	%
Cord-wrapped Paddle	15,577	78.84
Plain	1925	9.74
Ribbed Paddle	1364	6.90
Check-Stamped	479	2.42
Cord-wrapped Paddle and Ribbed Paddle	215	1.09
Cord-wrapped Paddle and Scarification	180	0.91
Indeterminate Decorated	7	0.04
Indeterminate Decorated and Cord-wrapped Paddle	6	0.03

Table 16: King's Forest Park Site Ceramic Body Fragment Treatment

Decoration	n	%
Incised Horizontal over Linear Stamp Oblique and Cord-wrapped Paddle	1	0.01
Incised Horizontal	1	0.01
Incised Opposed (Left and Right Oblique) and Cord-wrapped Paddle	1	0.01
Indeterminate Decorated over Cord-wrapped Paddle	1	0.01
Total	**19,757**	**100.01**

For the purposes of this analysis, "cord-wrapped paddle" includes all types of corded surfaces, whether or not the surface was smoothed over. The cord-wrapped paddle/ribbed paddle and scarified surface treatment categories include sherds that display a scarring of the surface with fine corded lines generally perpendicular to the original surface treatment. Alternately some of the surfaces identified as scarified may be a by-product of aggressive wiping.

Miscellaneous Ceramic Objects

The miscellaneous ceramic objects recovered from the King's Forest Park Site consist of 64 pieces of manufacturing waste or fired clay and nine ceramic artifacts.

The fragments identified as manufacturing waste or fired clay generally display irregular, untreated surfaces that do not have any apparent form or function in and of themselves.

Miniature Vessel Sherds

Five miniature vessels sherds were identified in the assemblage. Three represent collarless vessels, while the remaining two are a cord roughened neck-shoulder-plain body sherd and a body sherd.

Miniature vessel 466-241, 467-241:7204 has a decorated lip consisting linear stamped vertical, while the remainder of vessel is corded roughened (Plate 6a). Miniature vessel 233-513:7203 is a plain collarless vessel with a lip that is 4.36 mm thick and a rounded shoulder that is cord roughened (Plate 6b).

Collarless miniature vessel (221-523: 7205) has a plain smoothed exterior and a lip that is 3.21 mm thick.

Other

Ceramic artifact 530-255, F4 Q3:7208 is one of the most unusual artifacts recovered from the site. The object is smoothed and approximately 20 mm square, with six pinched barbs, resembling a jumping jack.

Artifact 468-242: 7209 is a plaque-like item that may represent a fragment of an effigy, possibly that of a fish, viewed in profile (Plate 6c). Its decorated convex surface bears moulded elements and a punctate surrounded by a built up ring. The reverse surface is plain and somewhat roughly smoothed. There is also a punctate on the edge of the piece, opposite the punctate on the obverse face. Assuming it is a representation of a fish, this hole would correspond to the mouth. The object measures 48 mm by 30 mm to the break. It may represent the uppermost portion of a pipe bowl.

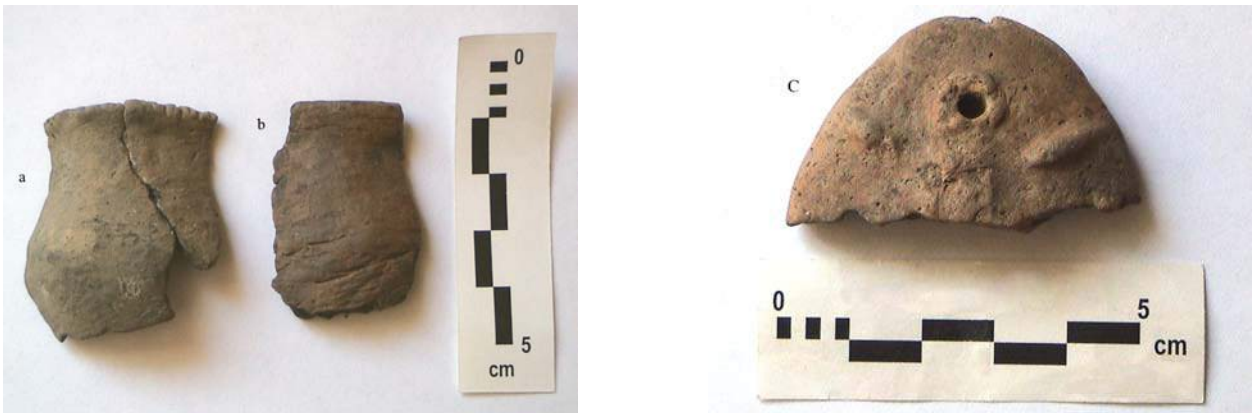

Plate 6: Miniature Vessels 466-241, 467-241: 7204 (a) and 233-513:7203 (b) and possible fish effigy 468-242: 7209 (c).

Recycling

Fourteen vessels and 27 isolated sherds display evidence of recycling in the form of mend holes. Mend holes were found on the necks of ten vessels (five are collarless) and on two collars. Two castellations also bear mend holes, one with a mend hole through the neck, the other with a hole drilled through the collar. In the case of seven vessels, the hole had been drilled through a boss.

Among the isolated sherds, mend holes were found on one rim fragment, nine neck sherds of which two were drilled through the boss, one shoulder, 15 body sherds and one unanalyzable fragment.

Painted or Slipped Ceramic Vessel Sherds

A total of 49 sherds display some form of staining as a result of either being painted, slipped or as a result of use.

Red ochre staining is present on an almost equal number of exterior (n=25) and interior (n=21) surfaces, while only two sherds are stained on both surfaces. Red ochre staining is also present on the interior of one of the reconstructed collarless vessels (561-185, 561-187, 561-188 and 561-189: 6459).

Fingerprints

Fingerprints were identified on four isolated ceramic sherds and on 11 of the identified vessels. In all but one case, these were found on bosses.

4.3 Ceramic Smoking Pipes Analysis

Introduction

The ceramic smoking pipe assemblage consists of 80 fragments (Table 17), of which little more than half are bowl portions (65%). The remaining 35% represent portions of stems, elbows and mouthpieces, individually or in various combinations.

Table 17: Ceramic Smoking Pipe Assemblage

Condition	n	%
Identifiable Bowl Fragments	34	42.50
Stem Fragments	18	22.50
Unidentifiable Bowl Fragments	14	17.50
Stem and Mouthpiece Fragments	6	7.50
Elbow Fragments	5	6.25
Mouthpiece to Elbow Stem Fragments	2	2.50
Mouthpiece Fragments	1	1.25
Total	**80**	**100.00**

Sixty percent of the pipe fragments display a smoothed exterior, whereas 33.75% of the fragments preserved evidence of varying degrees of burnishing. An additional five fragments display either an untreated or rough exterior (n=3) or indeterminate surface treatments due to extensive weathering or damage (n=2).

Bowl Shapes/Orientation

The smoking pipe shape and orientation categories used in this analysis are those identified by David Smith (1997:337, Appendix B), with the addition of "vasiform." The majority of the specimens are insloping (44.12%), followed by vasiform (29.41%) outflaring (20.59%) and bulbous (5.88%).

Insloping Bowls

Fifteen bowl fragments have an insloping bowl shape/orientation similar to barrel forms. Decorative motifs appear on less than half (46.67%) of these. Decoration was executed through incising, punctates and dentate stamping. Table 18 summarizes the motifs applied to these pipes, while several examples are illustrated in Plate 7.

Table 18: Decorative Motifs on Insloping Pipes

Motif	n
Plain	7
Horizontal(1)	4
Horizontal(2)	1
Horizontal(2) over Vertical	1
Vertical over Horizontal(1)	1
Cord Roughened	1

Plate 7: Examples of insloping pipes. 230-509: 6977 (a), 322-516:6978 (b), 231-512:6986 (c) and 547-200:7002 (d).

Pipe bowl fragment 566-185:7008 exhibits trace elements of red ochre staining on the exterior, and complete bowl 547-200:7002 displays a decorative motif consisting of linear stamped verticals on the lateral edges of the stem (Plate 7c).

Lip thickness of the bowls ranged from 2.33 to 6.8 mm with an average thickness of 4.53 mm and a standard deviation of 1.31 mm. Bowl heights were obtained from two fragments, one measured 42.53, while the other was 42.52 mm with a diameter of 26.09 mm. In additional, one bowl fragment has a diameter of 19.92 mm.

Vasiform Bowls

Ten pipe bowls are classified as having a quasi vasiform shape/orientation (Plate 8). Collars are present on half of the bowl rims, of which one is incipient in profile. The collar heights range from 3.33 to 7.92 mm with an average height of 5.18 and a standard deviation of 1.71.

Decoration occurs on two pipe bowls: Pipe 496-251: 6993 has a single incised horizontal and bowl 454-240: 6991 has an incised horizontal over two rows of linear stamped verticals.

Lip thickness ranges from 1.63 to 5.52 mm with an average thickness of 4.08 mm and a standard deviation of 1.12. Bowl height was obtained from one fragment and measures 29.95 mm with a diameter of 16 mm. A second bowl has an estimated diameter of 22.75 mm.

Plate 8: Examples of vasiform pipes. 238-523:6979 (a), 496-251: 6993 (b).

Outflaring Bowls

Pipe bowls with an outflaring shape/orientation are represented by seven fragments, of which four are plain. Decoration on the remainder consists of a single incised line on two specimens (e.g., Plate 8) and two incised lines on the third. The latter specimen has a 4.37 mm high collar and a single incised line on its lip.

Lip thickness of the bowls with an outflaring shaped/orientation ranged from 3.45 to 6.37 mm with an average width of 4.57 and standard deviation of 1.01.

Plate 9: An example of an outflaring pipe bowl (230-514: 6985).

Bulbous Bowls

Only two bowls have bulbous form. Both have plain exteriors, while one has a cord roughened lip measuring 6.31 mm. The other has a lip thickness 5.34 mm.

Elbows and Stems

Decorative motifs were identified on three of the 31 stem fragments. One elbow fragment has an appliqué/moulded ridge and two stem fragments have notched lateral edges. Stem fragment 550-195:6957 bears traces of red ochre staining.

Only eight stem fragments are sufficiently complete to determine their profile: six have a D-shaped form while the remaining two are oval and triangular, respectively.

Mouthpieces

Mouthpieces are primarily of the squared/flat (n=6) or tapered (n=3) form. Seven of the mouthpieces are sufficiently complete enough to obtain data on borehole diameters (Table 19).

Table 19: Mouthpiece Borehole Diameters (n=7)

Mean	3.63
Range	3.2-4.29
Standard Deviation	0.38

4.4 Juvenile-Manufactured Ceramics Vessels and Pipes

Introduction

Two hundred and six sherds are identified as being derived from ceramic vessels and pipes manufactured by juveniles. The criteria utilized to distinguish between adult and child-manufactured vessels and pipes are based on the belief that children's products would lack the qualitative characteristics generally associated with adult vessels in terms of their overall construction and decorative execution.

The juvenile ceramic vessel assemblage consists of 79 identified vessels, 25 unanalyzable rim fragments, 6 neck sherds, 17 neck and shoulder sherds, 2 neck-shoulder-body sherds and 65 body sherds. In addition, six otherwise unidentifiable fragments have been classified as being of juvenile origin. Juvenile-manufactured pipes were restricted to two bowl fragments and a stem-mouthpiece (Table 20).

Whenever possible all ceramic artifacts were mended prior to analysis to the minimum number by provenience unit.

Table 20: Juvenile Ceramic Artifacts

Type	n	%
Identified Vessels	79	38.35
Body Fragments	65	31.55
Rim Fragments	25	12.14
Neck and Shoulder Fragments	17	8.25
Neck Fragments	6	2.91
Unanalyzable	6	2.91
Pipe Fragments	3	1.46
Indeterminate Fragments	3	1.46
Neck and Shoulder and Body Fragments	2	0.97
Total	**206**	**100.00**

Juvenile Vessel Rims

Juvenile rims were analyzed utilizing the same methodology as the adult vessels, in that they must exhibit interior and exterior surfaces, a lip, and a sufficient portion of the exterior collar-neck area to identify useful analytical attributes. The rims were sorted and mended into 79 individual vessels of which four are represented only by castellation fragments and are not included in the following discussion.

Summary descriptive statistics of individual attributes are presented in Tables 21-25.

Table 21: Juvenile Ceramic Vessel Descriptive Attributes

Rim Form	**n**	**%**
Collarless	40	53.33
Incipient	32	42.67
Indeterminate	2	2.67
Irregular	1	1.33
Total	75	100.00

Lip Form	**n**	**%**
Rounded	38	50.67
Flat	21	28.00
Irregular	10	13.33
Pointed	4	5.33
Concave	2	2.67
Total	75	100.00

Interior Profile	**n**	**%**
Concave	32	42.67
Convex	27	36.00
Irregular	16	21.33
Total	75	100.00

Interior Motif	**n**	**%**
Plain	59	78.67
Punctate	15	20.00
Horizontal	1	1.33
Total	75	100.00

Collar Base Shape	**n**	**%**
Not Applicable	40	53.33
Round	32	42.67
Irregular	3	4.00
Total	75	100.00

Angle of the Lip to the Interior	**n**	**%**
Right	46	61.33
Acute	22	29.33
Obtuse	3	4.00
Irregular	4	5.33
Total	75	99.99

Exterior Profile	**n**	**%**
Convex	29	38.67
Concave	23	30.67
Irregular	22	29.33
Concave over Convex	1	1.33
Total	75	100.00

Interior Tech	**n**	**%**
Plain	59	78.67
Punctate	16	21.33
Total	75	100.00

Rim Orientation	**n**	**%**
Outflaring	61	81.33
Vertical	11	14.67
Insloping	2	2.67
Irregular	1	1.33
Total	75	100.00

Collar Height n=31	
Mean	9.1
Range	4.34-17.91
Standard Deviation	3.63

Lip Width n=67	
Mean	5.13
Range	2.25-10.62
Standard Deviation	1.64

Basel Collar Width n=33	
Mean	6.57
Range	4.01-11.62
Standard Deviation	1.52

Collarless (53.33%) and incipient collared (42.67%) forms predominate among the vessels. The remainder are classified as either irregular or indeterminate. Among the collared forms, almost all have rounded bases (n=32).

Juvenile vessels lips are predominantly rounded (50.67%) and flat (28%), followed by pointed (n=4) and concave (n=2) forms. The remaining 10 vessels have irregular lips.

The angles of the lip to the interior are 90 degrees or right (61.33%), acute (29.33%) and obtuse (n=3). The remaining four vessels have irregular angles.

Juvenile vessels predominantly display an outflaring rim orientation (81.33%), while the remainder are vertical (n=11), insloping (n=2), and irregular (n=1).

Concave interior profiles are identified on 42.67% of the vessels, while 36% of the vessels have a convex interior profiles. The remaining vessels have irregular interior profiles.

The exterior profile of the vessel collars or upper rims are convex (38.67%), concave (30.67%) and concave over convex (1.33%). The remainder have irregular exterior profiles.

Collar heights range between 4.34 mm and 17.91 mm, with a mean height of 9.1 mm, and a standard deviation of 3.63. Three vessels have indeterminate or irregular collar heights.

Lip widths range between 2.25 mm and 10.62 mm, with a mean width of 5.13 mm, and a standard deviation of 1.64. Lip widths are not available for eight vessels, as three have pointed forms and five have an irregular form.

Basal collar widths range between 4.01 mm and 11.62 mm, with a mean of 6.57 mm, and a standard deviation of 1.52. One vessel has an indeterminate collar width.

Interior decoration was limited to 15 vessels. Motifs consist of punctates (n=15) of which 11 correspond with an exterior boss or a horizontal band of punctates (n=1).

Most lips are plain. Five vessels bear lip decoration of linear stamped verticals and horizontal, incised obliques and horizontal and a single horizontal band of punctates (Table 22).

Table 22: Juvenile Ceramic Vessel Lip Attributes

Lip Motif	n	%	Lip Technique	n	%
Plain	70	93.33	Plain	70	93.33
Horizontal	3	4.00	Linear Stamp	2	2.67
Oblique	1	1.33	Incised	2	2.67
Vertical	1	1.33	Punctate	1	1.33
Total	**75**	**99.99**	**Total**	**75**	**100.00**

More than half of the juvenile vessels with an incipient collar display a plain motif (29.33%). The thirteen remaining vessels have 10 different motifs, accounting for 17.33% of the juvenile vessel assemblage. The following techniques were utilized on the creation of collar decoration: fingernail impressions, linear stamping, bossing, incising, and punctates (Table 23).

Table 23: Juvenile Ceramic Vessel Collar Attributes

Collar Motifs	n	%	Collar Technique	n	%
Collarless	40	53.33	Collarless	40	53.33
Plain	22	29.33	Plain	22	29.33
Vertical	3	4.00	Fingernail Impressed	4	5.33
Oblique	2	2.67	Linear Stamp	2	2.67
Hatched over Horizontal	1	1.33	Indeterminate	1	1.33
Horizontal	1	1.33	Linear Stamp over Boss	1	1.33
Indeterminate	1	1.33	Plain over Boss	1	1.33
Oblique over Boss	1	1.33	Linear Stamp over Linear Stamp	1	1.33
Oblique over Interrupted Horizontal over Interrupted Horizontal crossed by Interrupted Oblique	1	1.33	Linear Stamp over Incised over Incised crossed by Incised	1	1.33
Plain over Boss	1	1.33	Punctate	1	1.33
Plat	1	1.33	Punctate over Incised	1	1.33
Punctate over Horizontal	1	1.33	Total	75	99.97
Total	75	99.97			

Most of the necks (53.33%) are plain (Table 24). Among the remaining 35 vessels, 16 different neck motifs were created using 14 different techniques or combination of techniques.

Table 24: King's Forest Park Site Ceramic Vessel Descriptive Attributes

Neck Motif	n	%	Neck Technique	n	%
Plain	40	53.33	Plain	40	53.33
Boss	6	8.00	Boss	6	8.00
Horizontal	6	8.00	Incised	6	8.00
Oblique	4	5.33	Fingernail Impressed	4	5.33
Plain over Unknown	4	5.33	Plain over Unknown	4	5.33
Punctate	3	4.00	Punctate	4	5.33
Scarified	2	2.67	Linear Stamp over Incised	2	2.67
Interrupted Oblique	1	1.33	Scarified	2	2.67
Interrupted Oblique over Oblique	1	1.33	Fingernail Impressed over Fingernail Impressed	1	1.33
Oblique over Interrupted Opposed (Left and Right Oblique)	1	1.33	Linear Stamp	1	1.33
Oblique over Oblique over Oblique over Oblique	1	1.33	Linear Stamp over Linear Stamp over Linear Stamp over Linear Stamp	1	1.33
Opposed(Left and Right Oblique) and Boss over Opposed(Left and Right Oblique)	1	1.33	Plain over Horizontal over Oblique and Boss	1	1.33
Plain over Oblique	1	1.33	Plain over Linear Stamp	1	1.33
Plain over Punctate over Fingernail Impressed and Boss	1	1.33	Punctate or Boss over Fingernail Impressed	1	1.33
Punctate or Boss over Vertical	1	1.33	Punctate over Fingernail Impressed	1	1.33
Punctate Random over Oblique	1	1.33	Total	75	99.97
Vertical	1	1.33			
Total	75	99.96			

In addition to the above mentioned attributes, thirteen vessels exhibit a cord roughened exterior, irregular surface treatment (n=1) and scarified necks (n=2).

Examples of plain and decorated juvenile vessels are illustrated in Plates 10 and 11.

Plate 10: Examples of plain juvenile vessels. 557-187:7152 (a) and 217-533/233-513:7198 (b).

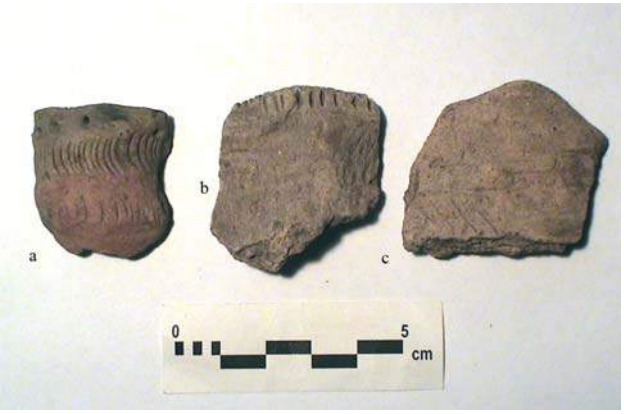

Plate 11: Examples of decorated juvenile vessels. 499-248:7189 (a), 218-531/224-550:7188 (b), and 565-186:7165 (c).

Castellations

Castellations are present on six juvenile vessels. Rounded lip forms occur on four vessels, of which three are collarless and only one is plain. The remaining two are plain vessels with incipient collars and pointed lip forms.

Neck Sherds

The juvenile sample includes 25 isolated neck sherds. Just over half (60%) of these are plain, while cord-wrapped paddling occurs on six sherds. The remaining isolated sherds display some form of formal decorative motif (n=3) or are scarified (n=1).

Shoulder Sherds

There is a total of 19 isolated shoulder sherds, most of which are rounded and plain (57.89%). Other treatments include cord-wrapped paddling (n=5), ribbed paddling (n=1), indeterminate decoration (n=1) and incised obliques and cord-wrapped paddling (n=1). These too are all rounded forms.

Body Sherds

Table 25 summarizes the surface treatments or decorative motifs found on the 67 isolated body sherds that make up the balance of the vessel assemblage. Cord-wrapped paddling predominates (50.75%), followed by plain treatments (28.36%) and scarification (13.43%). An additional three different surface treatments and decorative motifs are present on the remaining five body fragments.

Table 25: Juvenile Body Sherd Surface Treatment/Decoration

Surface Treatment/Decoration	n	%
Cord-Wrapped Paddle	34	50.75
Plain	19	28.36
Scarified	9	13.43
Indeterminate Surface Treatment	2	2.99
Ribbed Paddle	2	2.99
Cord-Wrapped Paddle and Scarified	1	1.49
Total	**67**	**100.01**

Juvenile Ceramic Pipes

The juvenile pipe assemblage consists of one stem and mouthpiece fragment and two identifiable bowl fragments. The stem and mouthpiece displays a plain exterior with an indeterminate mouthpiece.

The two juvenile pipe bowl fragments are both plain. One (214-533:7199) displays a slightly burnished exterior with an outflaring orientation and indeterminate lip decoration. The other bowl fragment (567-184: 7201) has a smoothed exterior with an insloping orientation.

4.5 Inter-Site Ceramic Analysis

Several attributes, such as vessel collar or upper rim form, motif and technique, body surface treatment and miscellaneous ceramic artifacts such as gaming disks and pipes have be utilized to seriate Early Ontario Iroquoian sites (Williamson 1990:298).

Collar Development and Motifs

The King's Forest Park assemblage is dominated by vessels with incipient collars (72.24%) followed by those that are collarless (24.95%). Concave or channeled interiors are identified on 85.97% of the vessels and 88.88% of the vessels have an outflaring rim orientation.

Simple and simple opposed decorative motifs represent slightly more than half of the assemblage, followed by vessels with a hatched motif (Table 11). Though generally, obliques over obliques constitute the most frequently encountered motif, a total of 408 variations of collar-neck motifs were identified. Table 26 further details the motif frequencies for the vessels, through quantifying the interior and exterior decoration.

Table 26: Ceramic Vessel Comparative Attributes

	n	%
Decorated Interior/Decorated Exterior	547	54.81
Plain Interior/Decorated Exterior	385	38.58
Plain Interior/Plain Exterior	63	6.31
Decorated Interior/Plain Exterior	3	0.30
Total	998	100.00
Collar and Neck Techniques		
*Dentate Stamped Motifs**	81	
*Cresent Stamped Motifs**	18	
*Cord-Impressed Motifs**	23	
*Incised Motifs**	82	
Push-Pull	0	
Boss Absent	619	62.02
Boss on the Exterior	375	37.58
Two rows of Boss on the Exterior	3	0.30
Boss on the Interior	1	0.10
Total	**998**	**100.00**

* Several of the techniques occur on the same vessel and not treated as isolated techniques

Techniques other than linear stamping were identified on only a small fraction of the vessels (Table 26). In very few cases is it the only technique used. Most vessels bear linear stamps on the collar or neck (Tables 9 and 10). Push-pull techniques were not used in decorating the collar and neck zones, although one vessel exhibits push-pull lip decoration. Bossing may not be a reliable chronological indicator, it occurs on slightly more than a third of the vessels (Table 26).

Castellations were identified on 11.6% of the vessels. Twenty-nine vessels had multiple castellations (Table 12).

Vessel Bodies

More then three quarters of the body sherds are cord roughened (78.84%), followed by plain (9.74%) and ribbed paddle (6.9%) surface treatments (Table 16).

Pipes

The pipe sample is consistent with other Early Ontario Iroquoian assemblages in that barrel and outflaring forms that are plain or decorated with a single horizontal line predominate.

Summary

In summary, the ceramic assemblage reflects an occupation during the thirteenth century, that is, the latter portion of the Early Ontario Iroquoian period. The material recovered from the site in the 1960s, consisting of 1463 sherds sorted into176 vessels, nine juvenile or miniature vessels and 11 smoking pipe fragments, was examined by Daniel Robert (1997), and while there are a number of differences in attribute frequencies between the two samples (due to both sample size and inter-observer discrepancies), both analyses are consistent in their general conclusions concerning the date of the site. In consequence, no attempt was made during this study to seriate the 1998-2004 assemblage with the other local or regional sites used by Roberts for comparative purposes.

5.0 FLAKED LITHIC ARTIFACTS

Andrea Carnevale

5.1 Flaked Stone Artifact Analysis

In 1998, 204 artifacts were recovered from the Stage 2-3 test pit survey, 18 of which were recovered from Test Trench A. No formal or informal tools were recovered at this time. The majority of the lithic artifacts were Onondaga chert (97.1% of total collection), one shatter fragment was Lockport chert (0.49%; TP#U2:L89), and five shatter fragments were unidentifiable (2.5%; TP#A2:L4, TP#A6:L6, TP#A7:L7, TP#C3:L14 and TP#I6:L49). Retouch was evident on two pieces of shatter (TP#J4:L55 and TP#L5:L64) and thermal alteration was present on one piece of shatter (TP#V1:L90).

A total of 37,088 chert artifacts, consisting of formal and informal flaked tools as well as by-products of stone tool manufacture, were recovered during the Stage 4 excavations conducted between 1999-2004. The flaked stone artifacts include 214 formal tools (0.6% of the total lithic assemblage) and 36,874 pieces of debitage (99.4%) (Table 27). Raw materials included: Onondaga (98.9% of the collection), Lockport (1.0%), Blois Blanc (0.01%), Quartz (0.003%), Dundee Formation (selkirk) (0.003%), and indeterminate (0.05%). A complete catalogue of all flaked lithic artifacts from the Kings Forest Park site is presented in Appendix 10 (also Table 27).

Of the 214 formal flaked lithic tools, 22 could be attributed to known temporal/cultural periods.

Table 27: Listing of all recovered flaked artifacts

Artifact Class	Quantity	Percentage
Flaked Stone Formal Tools		
Projectile Point – complete	10	0.03
Projectile Point – fragment	26	0.07
Scraper	22	0.06
Drill – complete	4	0.01
Drill – fragment	1	0.003
Drill-Perforator	1	0.003
Borer	1	0.003
Perforator – complete	2	0.005
Perforator – fragment	2	0.005
Graver	1	0.003
Graver-Spokeshave	1	0.003
Spokeshave	1	0.003
Knives	3	0.008
Preform – complete	4	0.02
Preform – fragment	7	0.02
Biface – complete	25	0.07
Biface – fragment	67	0.18
Core	35	0.09
Flaked Stone Debitage		
Primary Reduction Flake (analyzed sample)	0	0
Primary Thinning Flake (analyzed sample)	47	0.13
Secondary Knapping Flake (analyzed sample)	1759	4.7
Secondary Retouched Flake (analyzed sample)	241	0.66
Shatter (analyzed sample)	4594	12.3
Chert Chunk (analyzed sample)	3	0.008
Debitage (unanalyzed sample)	30,434	81.6
Total	37,292	100%

Projectile points

The oldest recovered specimen is an incomplete Lamoka projectile point (ca 2,500-2,000 BC), recovered from Unit 561-188 during the 1999 field season (Plate 12b: 561-188:L254). It is made of Onondaga chert and is missing a portion of its base. The point has the following dimensions: total point length, 70.3 mm; blade length, 53.7 mm; blade width, 15.5 mm; and blade thickness, 7.9 mm. The blade's edges have been retouched to a slightly serrated edge.

An incomplete Normanskill projectile point (ca 2,500-2,000 BC) was recovered from Unit 560-187 during the 1999 field season (Plate12a: 560-187:L232). It is made of Onondaga chert and is missing its tip and a portion of one of its tangs. The point has the following dimensions: total point length, 30.3 mm; blade length, 17.3 mm; blade width, 16.2 mm; blade thickness, 5.0 mm; stem length, 15.3 mm; stem width, 16.0 mm; stem thickness, 5.0 mm; internotch width, 10.0 mm; and tang height, 3.6 mm.

Two Late Archaic Crawford Knoll-like projectile points (ca 1,300-900 BC) were recovered from the site. The first (Plate 12e: 198-528:L426), a side-notched Onondaga chert specimen, was recovered during the 2002 season from Unit 198-528. The point has the following dimensions: total point length, 36.5 mm; blade length, 29.4 mm; blade width, 15.3 mm; blade thickness, 5.2 mm; stem length, 7.6 mm; stem width, 13.5 mm; stem thickness, 2.2 mm; internotch width, 11 mm; and tang height, 3.1 mm. There is a hinge fracture along one lateral edge that continues down onto the side notch.

The second shallow side-notched to stemmed point (Plate12i: 471-246:L1518), which is manufactured from Onondaga chert, was recovered during the 2004 season from Unit 471-246 in Midden C. It has the following dimensions: total point length, 40.6 mm; blade length, 33.6 mm; blade width, 13.2 mm; blade thickness, 5.5 mm; stem length, 7.0 mm; stem width, 12.2 mm; stem thickness, 2.3 mm; internotch width, 11.5 mm; and tang height, 2.2 mm. The blade's edges have been retouched to a serrated edge.

A Late Archaic projectile point (Plate 12c: 565-182:L340) was recovered from the 2000 excavation season from Unit 565-182. The point has the following dimensions: total point length, 45.6 mm; blade length, 32.7 mm; blade width, 24.5 mm; blade thickness, 6.9 mm; stem length, 13.5 mm; stem width, 19.0 mm; stem thickness, 5.8 mm; internotch width, 13.6 mm; and tang height, 7.1 mm. The point is heavily thermally altered as evidenced by the potliding.

Four Glen Meyer Spurred projectile points (AD 800-1,200), one complete and three missing their tips were found. All are of Onondaga chert. The first (557-187: L326), which is missing its tip, was recovered from Unit 557-187 during the 2000 season. It has the following dimensions: length, 30.6 mm; width, 16.4 mm; and thickness, 5.4 mm. The point is heavily thermally altered.

The second specimen (228-515:L411), which is also missing its tip, was recovered from a rock cluster feature (Unit 228-515) during the 2002 season. It has the following dimensions: length, 40.2 mm; width, 17.2 mm; and thickness, 4.1mm. The point exhibits step fracturing along one lateral edge.

The third specimen (201-526:L466), which is complete, was recovered during the 2002 season from unit 201-526 and has the following dimensions: length, 41.8 mm; width, 14.2 mm; and thickness, 5.1mm.

The fourth specimen (213-530:L610) is missing its tip and was recovered during the 2002 season from Unit 213-530. The point has the following dimensions: length, 38.8 mm; width, 6.2 mm; and thickness 4.8 mm. There is step fracturing along both lateral edges. A small "pig" is evident at the proximal end of one face and a hinge fracture is clearly visible on the surface abutting the pig.

Plate 12: Selected projectile points. 560-187:L232 (a), 561-188:L254 (b), 565-182:L340 (c), 566-183:L347 (d), 198-528:L426 (e), 222-513:L752 (f), 210-535:L1016 (g), 467-241:L1458 (h), 471-246:L1518 (i)

Plate 13: Selected preforms. 567-184:L365 (a), 201-528:L449 (b), 200-528:L439 (c), 239-516:L975 (d), F101Q1:L1164 (e), 497-248:L1231 (f), 499-249:L1267 (g), 468-243:L1482 (h), 470-242:L1505 (i)

Four complete Nanticoke Triangular projectile points (AD 1,300-1,600) were recovered. All are of Onondaga chert. The first point was recovered during the 1999 season from Unit 500-249 (500-249:L168). It has the following dimensions: total point length, 37.7 mm; width, 14.5 mm; and thickness, 4.1 mm. This point exhibits direct retouch along one lateral edge with alternating retouch along the other edge.

The second point (Plate 12f: 222-513:L752), which was recovered during the 2002 season from Unit 222-513, has the following dimensions: total point length, 50.8 mm; width, 14.7 mm; and thickness 5.6 mm.

The third point (Plate 12g: 210-535:L1016) was recovered during the 2003 season while shovel shinning House 1. It has the following dimensions: total point length, 47.3 mm; width, 15.3 mm; and thickness 5.7 mm. Its base has been thinned and there is bifacial retouch along both lateral edges.

The fourth point (475-244:L1544), which was recovered from Unit 475-244 in Midden C during the 2004 season, has the following dimensions: total point length, 33.2 mm; width, 12.9 mm; and thickness, 5.1 mm.

A finely made complete Late Woodland projectile point (400 BC – AD 500, Plate 12d: 566-183:L347) was recovered from the 2000 excavation season from Unit 566-183. The point has the following dimensions: total point length, 35.9 mm; blade length, 26.8 mm; blade width, 11.2 mm; blade thickness, 5.0 mm; stem length, 7.5 mm; stem width, 16.9 mm; stem thickness, 2.1 mm; internotch width, 10.2 mm; and tang height, 2.4 mm.

One complete small triangular projectile point (ca AD 1,300-1,600) and fragments of two other triangular points were also recovered. The first complete point (Plate 12h; 467-241:L1458) was recovered during the 2004 season from Unit 467-241 in Midden C and is made of Onondaga chert. Its dimensions are as follows: total length, 30.5 mm; width, 15.2 mm; and thickness, 5.1 mm. The base of the point is concave.

The second point is missing its tip and was recovered during the 2000 season from Unit 557-187 (557-187:L525). It has the following dimensions: total length, 26.1 mm; width, 17.7 mm; and thickness, 6.1 mm. The base of this point has been thinned.

The third point, which is also missing a portion of its base, was recovered during the 2003 season from Unit 198-532 (198-532:L1021). It has the following dimensions: total length, 33.4 mm; width, 12.0 mm; and thickness, 3.5 mm

Also recovered were 26 incomplete projectile point fragments: four mid-sections, nine tips, five tips with mid-sections, and eight bases with midsections.

Preforms

Four complete preforms and seven partial specimens were recovered. These range in length from 31.5 to 54.9 mm (mean=38.9 mm), in width from 15 to 22.1 mm (mean=17.7 mm), and in thickness from 4.7 to 10.0 mm (mean =6.5 mm) (Plate 13). Details and metrics on each of the artifacts can be found in Appendix 10.

Drills

Five drills (four complete and one missing a portion of its base) and one drill/perforator were recovered. All are of Onondaga chert. Specimens range in length from 27.5 to 47.8 mm (mean= 37.0 mm), in width from 9.6 to 34.8 mm (mean=17.1 mm), and in thickness from 5.7 to 12.5 mm (mean=8.2 mm). Of the recovered specimens only two could be attributed to a known temporal/cultural period.

The first specimen is a Nanticoke Triangular drill (AD 1,300-1,600) (232-513:L899) recovered during the 2002 season from Unit 232-513, and missing a portion of its base. It has the following dimensions: total tool length, 43.4mm; width, 14.2mm; and thickness, 5.4mm. Both lateral edges have been retouched. The bit of the drill is rounded.

The second specimen, also a Nanticoke Triangular drill (Plate 14f: 473-242:L1528), was recovered during the 2004 season from Unit 473-242 in Midden C. It has the following dimensions: total tool length, 34.0 mm; width, 12.8 mm; and thickness, 5.4 mm. The bit of the drill is rounded and smooth.

One conical shaped drill (Plate 14e: 239-518:L978) exhibits wear patterns that are suggestive of prolonged exposure to water.

Details and metrics on the other artifacts can be found in Appendix 10.

Plate 14: Selected spokeshaves, knife and drills. 210-519:L545 (a), 565-186:L345 (b), 216-537:L676 (c), 210-518:L543 (d), 239-518:L978 (e), 473-242:L1528 (f)

Knives

Two complete late Woodland knives made of Onondaga chert were recovered. The first was recovered during the 2002 season from Unit 216-537 (Plate 14c: 216-537:L676). The knife's dimensions are as follows: total length, 57.6 mm; width, 15.2 mm; and thickness, 7.4 mm. The blade's edges have been retouched to a serrated edge.

The second knife (497-248:L1232) was recovered during the 2004 season from Unit 497-248). The knife has the following dimensions: total length, 30.9 mm; blade width, 13.5 mm and blade thickness, 6.2 mm.

It has a prominent medial ridge. The wear patterns on this artifact are suggestive of prolonged exposure to water.

A third knife, made of Dundee Formation (Selkirk) chert was recovered from Unit 469-239 in Midden C (469-239:L1487). This tool shows evidence of being resharpened.

Scrapers

In addition to temporally diagnostic tools, a variety of formal tools were recovered which could not be attributed to specific periods. Twenty-two miscellaneous scrapers were recovered, ranging in length from 22 to 54.3 mm (mean=38.7 mm), in width from 20 to 31.2 mm (mean=25.1 mm), and in thickness 4.9 to 14.1 mm (mean=9.3) (Plate 15). Of these, seven endscrapers were fashioned on primary thinning flakes, another four endscrapers were fashioned on secondary knapping flakes, one sidescraper was fashioned on a secondary knapping flake, two combination side-endscrapers were fashioned on primary thinning flakes, and another two combination side-endscrapers were formed on secondary knapping flakes. One transverse scraper was also identified in the assemblage – an endscraper fashioned on a secondary knapping flake that is wider than it is longer. Details and metrics on each artifact can be found in Appendix 10.

Plate 15: Selected scrapers. 543-201:L184 (a), 566-186:L358 (b), 215-537:L658 (c), 212-532:L590 (d), 212-535:L597 (e), 227-514:L838 (f), 454-241:L1334 (g), 468-242:L1480 (h)

Perforators/Borers/ Gravers /Spokeshave

Two complete perforators and two partial specimens were recovered, ranging in length from 28.5 to 36.9 mm (mean=32.7 mm), in width from 14.1 to 16.5 mm (mean=15.3 mm), and in thickness 3.4 to 5.0 mm (mean=4.2 mm). All were of Onondaga chert.

One complete Onondaga borer (546-200:L197), fashioned on a secondary knapping flake, was recovered

from Unit 546-200. The borer has the following dimensions: total length, 19.7 mm; width, 10 mm; and thickness, 5.0 mm.

Two complete Onondaga chert gravers (one a combination graver-spokeshave; Plate 14b) were recovered, ranging in length from 24.8 to 56.2 mm (mean=40.5 mm), in width from 13.0 to 23.2 mm (mean=18.1 mm), and in thickness 2.4 to 10.0 mm (mean=6.2 mm).

One complete Onondaga spokeshave (Plate 14a: 210-519:L545) was recovered from Unit 210-519. It has the following dimension: total length 41.7 mm, width 11.2 mm, and thickness 14.2 mm. The wear pattern on this artifact is suggestive of prolonged exposure to water.

Biface Analysis

A total of 92 bifaces (25 complete and 67 partial) was recovered from the site, distributed as follows: 27 from Midden C; 9 from Midden A; 14 from House 1; one from a post mould not associated with a house; three from features; and 38 from one-metre square hand excavated units (Plates 16-17). The vast majority of the bifaces recovered (96.8%) were manufactured from Onondaga chert (n=90); however, three were of Lockport chert.

Biface tips constitute 13.2% of the assemblage (n=9). Of these, three were noted as being either refined and/or probable point tips. Thermal alteration was noted on one specimen (468-241:L1476), and another (205-523:L477) appears to be waterworn.

Seven biface mid-sections were identified, comprising approximately 11.8% of the assemblage. Three of these are fragments of refined bifaces or possible points. No thermal alteration was noted on these specimens.

Biface bases comprised around 8.8% of the assemblage (n=6). All were classified as refined. Thermal alteration was not noted on any of the specimens.

Plate 16: Selected bifaces. 496-254:L138 (a), 574-199:L386 (b), 202-526:L453 (c), 211-531:L570 (d), 212-535:L596 (e), 214-532:L637 (f), 216-534:L671 (g), and 226-514:L823 (h)

Plate 17: Selected bifaces. 235-513:L936 (a), 498-248:L1248 (b), 498-248:L1249 (c), 499-248:L1265 (d), 464-239:L1413 (e), 464-241:L1423 (f), 466-241:L1448 (g), 469-240:L1489 (h), 469-240:L1488 (i), and 473-243:L1530 (j)

Nine biface base + mid-sections were identified, comprising approximately 13.2% of the assemblage (n=9). All of these are fragments of refined bifaces or possible points. Thermal alteration was not noted on these specimens.

Six biface tip + mid-sections were identified, comprising around 8.8% of the assemblage. Two were classified as refined. Thermal alteration was noted on one specimen (498-254: L1259).

Biface fragments, which could not be attributed to bases, mid-sections, tips or a combination, comprise about 44.1% of the assemblage (n=30). Of these, seven were recovered from Midden C, two from features and 21 were recovered from non-feature contexts, primarily from the topsoil.

Complete bifaces comprise 27.7% of the assemblage (n=25). Of these, six were recovered from Midden C; three from Midden A; six from House 1, while 10 were recovered from non-feature contexts, primarily from the topsoil. The bifaces averaged 42.7 mm in length with a range of 22.8 to 81.0 mm. Their average width is 27.7 mm with a range of 13.5 to 61.1 mm. They range in thickness from 3.7 to 24.8mm with an average of 11.7 mm. Twelve of the complete bifaces are classified as refined and 10 as crude. Six have cortex (574-199:L386; 238-516:L963; 468-240:L1469; 469-239:L1488; 469-241:L1492; 473-243:L1530), three triangular shaped bifaces have large "pigs" at the medial portion of one face with steep retouch and a single hinged fracture abutting the pig (496-254:L138, 495-248:L1571, and 235-513:L936), and six (496-254:L138; 200-528:L439; 475-244:L1543; 495-248:L1571; 235-513:L936; 466-241:L1448) display fine edge retouch. There was no thermal alteration noted on any of the bifaces.

The bifaces observed in the assemblage can be divided into five refined shapes: rectangular (one complete, ten partial); oval (four complete, six partial); circular (one complete, one partial); lanceolate (four complete); and triangular (three complete, eight partial).

Of particular interest, is the concentration of refined bifaces in parts of Midden A (between 498-499 – 248-249) and Midden C (between 464-469 – 239-242). It is possible that these sections represent flake reduction activity areas, where the refinement of formal and informal tools was undertaken.

Debitage Analysis

The wealth of debitage at the Kings Forest Park site necessitated the use of sampling procedures in the selection of units for further analysis. Units were selected based on 1) the presence of tools, 2) total number of lithic artifacts in each unit, and 3) clustering of units based on tool distribution patterns and spatial distribution of units with high artifact counts across the entire site. All debitage in these selected units were further categorized into flake and artifact type. As such, the following section is not a comprehensive analysis of all of the debitage material recovered but an analysis of a sample of the debitage. However, thermal alteration, the presence of retouch, wear pattern, and chert type was recorded for the entire debitage assemblage.

Prior to sampling, a total of 37,078 pieces of chert debitage was analysed from the site representing 99.4% of the total debitage. Of the material that was recovered 69.8% was recovered from the topsoil (n=25,878), 4.4% from features (n=1,635), 0.3% from Midden B (n=114), and 25.5% from Midden C (n=9,451). Thermal alteration was noted on 2,907 debitage fragments and retouch was evident on 61 pieces of debitage. Onondaga chert accounts for 36,692 debitage fragments, the balance is of Lockport (n=363), Bois Blanc (n=5), Quartz (n=1) and 19 indeterminate. The wear pattern exhibited on 77 debitage fragments is suggestive of prolonged exposure to water. Thirty-five cores were recovered from the site, 30 manufactured from Onondaga chert, three from Lockport, and two from Bois Blanc. Thermal

alteration was not evident on any of the cores. Cortex was noted on three specimens (562-188:L335, 215-536:L654, and 469-241:L1491).

The sampled debitage consists of 47 primary thinning flakes (0.7% of sampled assemblage), 1,759 secondary knapping flakes (26.5%), 241 secondary retouched flakes (3.6%), 4,594 pieces of shatter fragments (69.1%), and 3 chert chunks (0.05%) (Appendix 10).

A number of trends are evident in the proportions of various types of primary and secondary flakes (n=2,047). Overall, primary reductions flakes are not present in the collection while primary thinning flakes are weakly represented (2.3%). Secondary knapping flakes are clearly the most common form (85.9%), followed by secondary retouch flakes (11.8%). In general, this pattern suggests that the early stages of reduction and stone tool manufacture were undertaken elsewhere and the manufacture of bifacial preforms from prepared blanks and the production and refinement of finished bifacial tools took place at the site.

6.0 GROUND STONE, ROUGH STONE AND METAL ARTIFACTS

Martin S. Cooper

6.1 Ground and Rough Stone

In total, 15 ground stone artifacts were recovered from the site (Appendix 11). These include one celt, one netsinker, one hammer, one steatite bead, one steatite pipe, one sandstone effigy, four anvils, and five unidentifiable ground stone fragments (Table 28).

Table 28: Ground and Rough Stone Artifacts

Artifact	n	%
Celts	1	6.67
Netsinkers	1	6.67
Hammers	1	6.67
Bead	1	6.67
Anvils	4	26.67
Pipe	1	6.67
Effigy	1	6.67
Misc. Ground Stone	5	33.33
Total	**15**	**100.02**

Celt

A single celt comprising a chisel (G1) was recovered from the King's Forest Park site (Plate 18a). The chisel is finely made and polished with a sharp symmetrical bit. The lateral edges are also extremely thin, but have not been honed. It has a transverse break at the distal end but the question remains whether these small tools are broken at the haft or were hand held. Given the nature of the transverse break with no edge polish, it is likely a broken tool

In addition to this item, five chloride schist spall flakes, likely derived from celts, were also recovered.

Plate 18: Selected ground stone artifacts: chisel (a) and pipe bowl (b).

Anvil Stones

Pitted anvil stones were likely used in the manufacture of chert tools. They contain a central depression on one or both sides where a chert core could be secured for flake removal.

Four anvil stones, all complete, were recovered from the site. Two anvils were bi-pitted, while two exhibited centrally placed pitting on one side only. All four anvils were made on sandstone cobbles. As with anvils from other sites, all the King's Forest Park anvils possess secondary hammer facets.

The first of these anvils (G2) is made on an ovoid sandstone cobble with shallow pitting on both sides and numerous hammer facets along the lateral margins (Plate 19c). The second anvil (G3) is a flat ovoid sandstone cobble with shallow central depression on one side and a very slight depression on the other (Plate 19d). Hammer facets are located on the ends of the cobble. The third anvil (G6) is made on a round sandstone cobble (Plate 19e). It is centrally pitted on both sides and has multiple hammer facets on its lateral margins. The fourth anvil (G7) was made on a sandstone cobble with and possesses very slight central depressions on both surfaces and multiple hammer facets on its lateral margins (Plate 19f). A polished area on one surface suggests secondary use as a whetstone.

Hammers

Hammers consist of pebbles or cobbles with at least one working facet, which usually exhibit pecking and/or grinding. These tools were likely brought to the site to be used in chert tool manufacture. Hammers may have used in the initial reduction stages of biface manufacture.

A single small hammer or pebble hammer (G4) was made on an ovoid sandstone pebble (Plate 19:a). It has a hammer facet at one end and a remnant facet and large flake scar at the other.

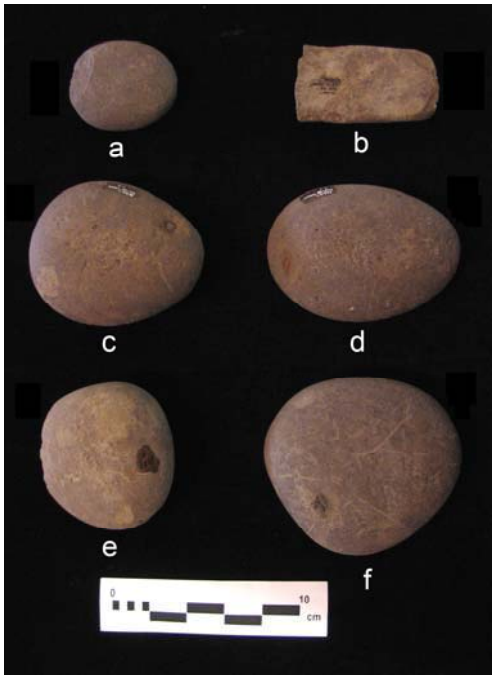

Plate 19: Selected rough stone artifacts: hammer (a), possible net sinker (b), and anvils (d-f).

Effigy

A small human effigy (G8) head made of sandstone was recovered (Plate 20). It is crudely executed with rudimentary eyes and mouth consisting of simple punctates. Incised lines above and below the eyes may have been placed to define the forehead and a nose that appears to have broken off. There are also several incised lines on the back and side of the head. The incised lines on the side of the head may represent ears. It also appears that a chin was present but had broken off. The neck is also outlined by incised line. Perforations were begun on the top of the head and in the neck.

Plate 20: Sandstone human effigy.

Pipe

A portion of a black steatite pipe bowl (G9), derived from a small pipe, was recovered (Plate 18b). It is polished on the exterior and smooth on the interior. The lip of bowl is rounded. It is probably from a small obtuse angle stone pipe.

Whetstone

A single sandstone whetstone (G10) was recovered (Plate 21) It is a very large stone with a smooth, abraded surface on one side. The item is somewhat square to rectanguloid in cross section and tapers towards one end.

Bead

A single small discoidal black steatite bead (G16) was recovered. It is highly polished and has a biconically drilled perforation. It appears to be the same material that was used in the manufacture of the pipe discussed above.

Plate 21: Sandstone whetstone.

Possible Netsinker

A possible netsinker (G5), consisting of a tabular piece of sandstone with pecked notches was identified in the ground stone assemblage (Plate19b). It has a transverse break just beyond the notching.

6.2 Copper Artifacts

Two rolled copper beads were recovered, both of which were manufactured from native copper (Table 29). Native copper was either mined from massive deposits found in the Lake Superior basin or from pure nuggets or float copper found in glacial deposits and stream beds. The copper was heated to anneal or soften it and then cold hammered to the desired shape. There is no evidence that copper was smelted or poured into molds in precontact North America. Copper beads occur in limited frequency on Early to Late Iroquoian sites in Ontario.

The first of the beads is a large cylindrical rolled copper specimen (M1). The copper, having been heated and flattened, appears to have been rolled several times around an object, possibly a piece of wood 4.5 mm in diameter. In comparison, contact period rolled beads, made from European derived sheet copper and brass, are typically rolled so that that the overlap is minimal at the seam. The bead measures 20.0 mm in length and approximately 8.0 mm in diameter.

The second native copper bead (M2) is considerably smaller and is somewhat round in shape. As with the cylindrical bead, the copper has been wrapped several times around a core. However, this bead has a triangular cross section.

Table 29: Copper Bead Metrics

Cat. Number	Artifact Type	Length (mm)	Diameter (mm)	Comments
M1	Bead	20.0	8.0	cylindrical
M2	Bead	7.0	7.2	round

7.0 WORKED BONE ARTIFACTS

Martin S. Cooper and Suzanne Needs-Howarth

A total of 58 bone specimens exhibiting evidence of working. This material includes 22 awls, two needles, a modified deer phalange, 11 beads, four items that likely served as pottery decorating tools, two pieces of turtle carapace and a variety of other fragments that exhibit evidence of deliberate working.

Awls

A wide variety of awls or perforators of various types and forms were recovered during the excavations.

Item B2 was made from the distal end of a turkey tarsometatarsal. The distal end was left intact while the working end was ground to a point striations related to the shaping of the point can be observed on the surface of the awl. Cut marks on the distal articular surface may relate to disarticulation during butchering. Use wear polish is evident on the majority of the tool, however, there is no use wear or polish in the area of the distal articulation which would suggest that the awl may have had a handle.

Awl B3 (Plate 22a) is made from a large bird long bone and is highly polished from use, including the fracture edge and interior. The tip has been honed to a fine needle and is still extremely sharp. Fine strations run parallel to the long axes in the area of the working end and probably relate to shaping. The proximal end has teeth marks resulting from the practice of holding the tool in the mouth while working.

Five other awls have also been honed to a very fine point. Item 5992 (Plate 22b), found in Midden C, is a long slender awl made from the left radius of a common loon (*Gavia immer*). The tip has been ground to a fine needle like point. The opposite end of the tool has four fine parallel incisions encircling what would be the handle. Item 7475 is made from a long bone splinter of a goose or turkey. It has been honed to a very fine point and exhibits considerable surface polish related to use wear. There are tooth marks at the opposite end of the tool. Artifact 9528 was manufactured from a large mammal long bone splinter. The tip has been ground to a fine needle like point and exhibits use polish. Bone awl B10 (Plate 21c) was manufactured from a medium to large mammal long bone and exhibits much surface use-wear polish. It tapers to a fine needle like point. The opposite end or handle is formed from the articular joint of the element. There is black staining on the surface of the tool, possibly post depositional. Item B19 is a small awl made from a bird long bone splinter that has been sharpened to a fine needle like point.

Other items that likely served as perforating tools for use in a variety of media. Artifact B4 (Plate 22d) was made from a small mammal long bone and exhibits use wear polish towards the working end. Item B5, which was made from a splinter of long bone derived from a small to medium sized mammal. There appear to be teeth marks at the proximal end of this tool. A short robust awl (B7) that was manufactured from a large mammal long bone splinter tapers to a point, the very tip of which has broken off. There is use polish on the entire surface of the tool and small scratches in the tip area oriented perpendicular to the tool's long axis. Fine striations running parallel to the tools long axis probably relate to grinding and shaping during manufacture. Item B11 (Plate 22e) is the left ulna of raccoon (*Procoyon lotor*), the distal articular area of which is intact and was used as a handle, while the proximal end of the element has been ground to a point. There is moderate use wear on the surface of the tool. B14 is a bone splinter awl exhibits extreme use polish producing and ivory like patina. It was manufactured from a large mammal longbone and has been honed to a fine point. There are tooth marks at the opposite end of the tool where it was held in the mouth. B18 is a small a bone awl that has been ground to a point. The distal end bears three parallel oblique incised lines that may have been related to a handle wrapping.

Plate 22: Selected worked bone tools.

A series of awls are characterized by more blunt, rounded or other forms of specialized working tips. Item B15 is the working end of a bone splinter awl. The tip has been flattened on one side and there is considerable use wear polish on the surface. Another (9571) was manufactured from the long bone splinter of a turkey or goose. It is flat with a tapered point reminiscent of a netting needle. There is a fine incised line running parallel to the tool's long axis on both the interior and exterior surface of the tool. The surface of the tool exhibits an ivory-like polish. Items 5061 and B20 were also manufactured from goose or turkey long bone splinters. Awl B21 was made from a long bone splinter and has been ground to a point resembling a stylus. The pointed end of the tool has a triangular cross section. The surface exhibits moderate use-wear polish.

Finally, there are a number of incomplete awls, represented by tip portions only (B8, B16, B17, 9774).

Needles

Item 9918 is a portion of a netting needle that has been broken below the characteristic central perforation. It is thin and flat, tapering to a point. Similar to other bone netting needles, it has a curved profile.

A second needle or very fine perforator (5885) is made from the dorsal spine of a fish. It is extremely thin and has been sharpened to a fine point.

Modified Deer Phalange

A modified white-tailed deer (*Odocoileus virginianus*) phalange (B12) was recovered from Unit 498-248. It has been drilled through the proximal and distal ends and is of the type that either functioned as an element of the celebrated "cup and pin" game or was worn around the neck or sewn onto clothing. There is little in the way of use wear or polish.

Beads

Three bone bead fragments were recovered. The first (9949) is a longitudinal section made from a goose or turkey longbone. It is scored and polished at one end and has been broken at the other. It exhibits surface polish and appears to be slightly burnt. The second (5991) is also a longitudinal section of a bead made from large bird long bone shaft. The third (5281) is a portion of a bead made from a medium-sized bird long bone shaft. Several cut marks remain visible on this specimen.

Seven shells (were recovered from Unit 498-248 in Midden A of the open area excavations. All but one of the shells has been perforated and may have been derived from a necklace or may have been embroidered on a garment. An eighth drilled bead was recovered from Midden C. All are *Pleurocera acuta*.

Pottery Decorating Tools

At least four items may have been used in the decoration of ceramic vessels. B6 is a robust tool manufactured from a bone splinter of a large mammal long bone. It has an ivory-like appearance from extensive use. There are characteristic scratches running parallel to the tools axis located at the working end. These are likely related to shaping and possibly use. Like many perforating tools this awl has light tooth marks at the proximal end where the tool was held in the mouth. The opposite end of the tool has a blunt bulbous tip which may have been used for bossing which occurs on the King's Forest Park ceramics.

Item B1 (Plate 21f) is manufactured from a large mammal long bone and exhibits considerable polish related to use-wear. It is flat in cross section and has a slight curve. One end tapers to a point that likely functioned to incise lines on ceramic vessels. The other end has small teeth that were used for producing the distinctive dentate stamp found on some of the ceramics from the site. The tool was found in the Feature 4 sweat lodge and was reconstructed from seven fragments. In addition to the use-wear polish, there is some light incising or scratching. These consist of fine equally spaced parallel scratches perpendicular to the tool's long axis. These cover approximately half the tool encompassing the toothed end and the entire circumference of the mid-section of the shaft. These scratches may be decorative or

may have been caused by something wound around the tool possibly a handle or cording used for pottery decoration.

B9 is made from a long bone fragment and exhibits much surface polish. One end of the tool is somewhat square in cross section and may have been used for making a check stamp pattern on ceramics or as a bossing tool. The opposite end of the tool may have been used to produce a linear or dentate stamp.

Finally B13 is a large pottery marking tool manufactured from a piece of white-tailed deer antler. It was recovered from Midden C. One end of this tool has been beveled to a point that may have been used for trailing or stamping while the opposite end may have been used to produce a large linear stamp. The surface of the tool exhibits considerable use wear polish.

Modified Turtle Remains

One fragment of painted turtle shell (6521) from Midden C appears to have been painted with red lines to accentuate the natural markings on the carapace. Another from Midden A may bear traces of white pigment (9926). There are also several other fragments of carapace that appear to have been worked and curated.

Miscellaneous

The 18 miscellaneous fragments include a variety of shaft fragments from long bones or mid-sections of other skeletal elements that bear evidence of working in the form of polish, striations or scoring. Finally, a concentration of 49 Pelecypoda shell fragments from 539-190 (possibly all from a single clam) appear much more abraded than is usual for presumed food refuse.

8.0 PLANT REMAINS

Stephen G. Monckton

8.1 Introduction

Twenty-six soil samples were recovered from the site representing 132 litres. These come from a variety of contexts. The following is a review of analytical procedures, results of analysis, and a discussion of the findings.

8.2 Collection and Analytical Procedures

Bucket flotation provided an efficient means of plant remains extraction using a 300 micrometer screen for light fractions, and a 2.00 mm screen for the collection of heavy fractions. Both components were dried in cloth material. In the laboratory, light fractions were weighed and passed through a series of screens to facilitate the sorting of material. Objects larger than 2.00 mm were separated into sample components such as wood charcoal, nut remains, maize kernel fragments and other plant parts in addition to unidentifiable material (see Pearsal [1989] for a discussion of various analytical procedures). Material smaller than 2.00 mm was sorted for seeds only. Uncharred seeds were assumed to be recent intrusive objects. In precontact assemblages, charred material alone is recovered, and anything that is not charred is considered modern and intrusive unless there are special conditions of preservation at the site. Breaking wood charcoal fragments in half provided a clear transverse view of tissue for identification. For consistency, objects smaller than 2.00mm across the transverse section were deemed unidentifiable. Several specimens smaller than this do provide good identifications, but not consistently enough to prevent bias in favour of some genera over others. Modern charred comparative material aided identifications where necessary.

Larger seeds such as maize, acorn fragments, or other nuts were counted and their fragments were weighed. Maize kernel number for each sample was estimated on the basis of the weight of fragments and converted to whole kernels based on the known weight of 100 whole kernels. This was to prevent a bias in favour of maize fragments.

8.3 Results

Tables 30-32 illustrate the botanical contents of the samples. These have been attributed to longhouse and external longhouse features to enhance our view of plant remains spatial distributions. These will be discussed in the sections to follow.

The site reveals three of the five known Iroquoian cultigens: maize (*Zea mays*), sunflower (*Helianthus annuus*), and tobacco (*Nicotiana rustica*). Maize is the most abundant, followed by tobacco. Other cultigens, such as beans and cucurbit, are comparatively rare at most archaeological assemblages, and their absence here is no surprise. The relative contributions of these cultigens to most Iroquoian assemblages is very small. Sunflower, because of its distinctive shell micro-morphology, can be readily identified even when recovered as tiny fragments. It is thus probably over-represented in the archaeological record.

Table 30: Plant Remains from King's Forest Park - Sample Components

																							Comments
480-235	13		3	3.58	1.42		0													2	0.01	2	0.01	
208-519		Longhouse Area	5	21.65	5.67		0	1	0.01													1	0.01	
208-520		Longhouse Area	5	11.21	4.79	2	0.16															2	0.16	
210-515	10		2	1.84	0.16	2	0.01													1	0.01	3	0.02	
228-515	Rock Cluster		2	6.96	1.38	9	0.22	15	0.15											2	0.01	26	0.38	
232-511	Midden?	Longhouse Area	5	7.3	2.78		0	1	0.01													1	0.01	
350-255	4	4	5	2.36	1.56	2	0.01	1	0.01											2	0.01	5	0.03	
457-241	Midden C		7	5.99	3.57	6	0.01	1	0.01	1	0.2											8	0.22	
463-240	Midden C		5	3.51	17.01	3	0.06	5	0.06											3	0.01	11	0.13	
465-240	Midden C		4	3.26	2.45	1	0.01															1	0.01	
466-240	Midden C		11	51.31	34.42	17	0.16	4	0.01	4	0.12			4	0.01	2	0.01			4	0.06	35	0.37	
468-242	Midden C	Pottery Level	7	7.01	5.29		0							1	0.01							1	0.01	
468-242	Midden C		7	87.76	34.56	27	0.34	7	0.01	1	0.01	1	0.01	4	0.01					11	0.01	51	0.39	
469-241	Midden C		6	10.33	7.42	1	0.01	9	0.01											2	0.01	12	0.03	
470-242	Midden C	Topsoil	5	2.18	2.18	1	0.01													5	0.01	6	0.02	
475-244	Midden C	Sub-layer	6	9.41	7.61	6	0.03	1	0.01					1	0.01							8	0.05	
490-235	8	3	5	10.04	2.73	9	0.06	2	0.01									1	0.01			12	0.08	
490-235	8	1	5	4.48	5.13	5	0.01	3	0.01					5	0.01			4	0.01			17	0.04	
490-235	8	Living Floor	6	4.36	2.47	1	0.01													2	0.01	3	0.02	
500-230	9		2	0.74	0.41		0															0	0	
505-240	3		3	3.04	0.88		0													3	0.01	3	0.01	
530-255	4	Living Floor	3	1.63	0.69	2	0.01															2	0.01	
530-255	4	2	4	3.01	1.09	1	0.01															1	0.01	
530-255	4		3	3.28	2.29	2	0.01															2	0.01	
531-268	Midden B		5	0.55	0.2		0															0	0	
535-250	3	1	4	3.96	2.6	1	0.01	5	0.01											4	0.01	10	0.03	Small frag of Maize stalk present
535-250	2	3	7	8.56	3.8	6	0.01	8	0.01			4	0.18							1	0.01	19	0.21	
		Sums	132	279.3	154.56	104	1.16	63	0.33	6	0.33	5	0.19	15	0.05	2	0.01	5	0.02	42	0.18	242	2.27	
					%	42.98	51.10	26.03	14.54	2.48	14.54	2.07	8.37	6.20	2.20	0.83	0.44	2.07	0.88	17.36	7.93	100.00	100.00	
Summary of non-midden C Samples			74	98.55	40.05	42	0.53	36	0.22	0	0	4	0.18	5	0.01	0	0	5	0.02	17	0.08	109	1.04	Summary of non-midden samples
					%	38.53	50.96	33.03	21.15	0.00	0.00	3.67	17.31	4.59	0.96	0.00	0.00	4.59	1.92	15.60	7.69	100.00	100.00	
Summary of Midden C content			58	180.8	114.51	62	0.63	27	0.11	6	0.33	1	0.01	10	0.04	2	0.01	0	0	25	0.1	133	1.23	Summary of Midden C samples
					%	46.62	51.22	20.30	8.94	4.51	26.83	0.75	0.81	7.52	3.25	1.50	0.81	0.00	0.00	18.80	8.13	100.00	100.00	

Table 31: Plant Remains from King's Forest Park - Seeds

Square	Feature	Quad	Estimated* Maize Kernels	Sunflower?	Tobacco?	Bramble	Strawberry	Hawthorn	Chenopod	Knotweed	Sumac	Small Grass	Unident. Legume	Cat-tail	Unident.	Seeds
480-235	13															0
208-519		Longhouse Area	1													1
208-520		Longhouse Area	2													2
210-515	10		1												1	2
228-515	Rock Cluster		2				1						1		2	6
232-511		Longhouse Area														0
350-255	4	4	1							1	1			2	2	7
457-241	Midden C		1			1			1		1				12	16
463-240	Midden C		1			3			3					1		8
465-240	Midden C		1					2							2	5
466-240	Midden C		2			2			1		3			1	17	26
468-242	Midden C	Pottery Level													4	4
468-242	Midden C		4	1	1	2					6				1	15
469-241	Midden C		1											3	2	6
470-242	Midden C	Topsoil	1			1									1	3
475-244	Midden C	Sub-layer	1													1
490-235	8	3	1												2	3
490-235	8	1	1		1									2		4
490-235	8	Living Floor	1						1					4		6
500-230	9															0
505-240	3														3	3
530-255	4	Living Floor	1											1		2
530-255	4	2	1											2	4	7
530-255	4		1			1					2	1		13	7	25
531-268	Midden B														2	2
535-250	3	1	1			2										3
535-250	2	3	1			1			1		1				2	6
			27	1	2	13	1	2	7	1	14	1	1	29	64	163
			16.56	0.61	1.23	7.98	0.61	1.23	4.29	0.61	8.59	0.61	0.61	17.79	39.26	100.00
Summary of non-midden samples			15	0	1	4	1	0	2	1	4	1	1	24	25	79
		%	18.99	0.00	1.27	5.06	1.27	0.00	2.53	1.27	5.06	1.27	1.27	30.38	31.65	100.00
Summary of Midden C samples			12	1	1	9	0	2	5	0	10	0	0	5	39	84
		%	14.29	1.19	1.19	10.71	0.00	2.38	5.95	0.00	11.90	0.00	0.00	5.95	46.43	100.00

* Estimated on the basis of the weight of 100 whole charred kernels (10.86g)

Table 32: Plant Remains from King's Forest Park - Wood Charcoal

Square	Feature	Quad	Maple	Beech	Ash	White Oak	Red Oak	Oak Species	Elm	Ironwood	Unident. Deciduous	White Pine	Unident. Conifer	Unident.	Total
480-235	13			3	2	2		4		1	2		1	3	18
208-519		Longhouse Area	1	1	2				5	2	15			4	30
208-520		Longhouse Area	6	9	5				2	1	2	3		2	30
210-515	10			1								3		3	7
228-515	Rock Cluster			8	10			1	1	1	2	1		4	28
232-511		Longhouse Area	1	5							5	6		2	19
350-255	4	4	3	7	3	6		1			3			2	25
457-241	Midden C		3	9	1	1	2		6	2	5			1	30
463-240	Midden C		3	9	5	6			2		5			1	31
465-240	Midden C		2	6	4				1	1	7			2	23
466-240	Midden C		2	4	16	2			2	1	3			1	31
468-242	Midden C	Pottery Level	7	2	1		5			13	6	1		2	37
468-242	Midden C		7	4	2		6		4	4	7			1	35
469-241	Midden C		2	16	3	1			1	1	2	1	1	2	30
470-242	Midden C	Topsoil	11	6	6				3	2	2	1		1	32
475-244	Midden C	Sub-layer	10	1	5	2	2		1	5	2				28
490-235	8	3	2	6	3	6	1	1	5	1	5				30
490-235	8	1	3	1	3	5	3	2	2	3	8			2	32
490-235	8	Living Floor	2	5	4	9		3		5	2				30
500-230	9										8				8
505-240	3		1						7	2	8				18
530-255	4	Living Floor	3	3			1		1		3			3	14
530-255	4	2		6	3	3		1	1	1	5		1	3	24
530-255	4		5	9	6	1				4	2				27
531-268	Midden B					4					3				7
535-250	3	1		3	3			1	1	15	5			4	32
535-250	2	3	1	11	12	1			7					1	33
		Sum	75	135	99	49	20	14	52	65	117	16	3	44	689
		%	10.89	19.59	14.37	7.11	2.90	2.03	7.55	9.43	16.98	2.32	0.44	6.39	100.00
Summary of non-midden samples			28	78	56	37	5	14	32	36	78	13	2	33	412
		%	6.80	18.93	13.59	8.98	1.21	3.40	7.77	8.74	18.93	3.16	0.49	8.01	100.00
Summary of Midden C samples			47	57	43	12	15	0	20	29	39	3	1	11	277
		%	16.97	20.58	15.52	4.33	5.42	0.00	7.22	10.47	14.08	1.08	0.36	3.97	100.00

Collected plants include: the common fruits of bramble (*Rubus sp.*), strawberry (*Fragaria sp.*), and hawthorn (Crataegus sp.), the seeds of sumac (*Rhus typhina*), spikenard (*Aralia sp.*), knotweed (*Polygonum sp.*), a small grass (cf. *Echinochloa*), and cat-tail (*Typha latifolia*). Remains of butternut (*Juglans cinerea*), hickory (*Carya cordiformis*), and acorn (*Quercus* sp.) were also recovered.

Wood charcoal was dominated by beech (*Fagus grandifolia*) and maple (*Acer saccharum*), followed by ash (*Fraxinus sp.*), elm (*Ulmus americana*), red and white oak (*Quercus rubra* and *Q. alba*), ironwood (*Ostrya virginiana*), and white pine (*Pinus strobus*). Maple is second only to beech in the midden samples, but is much less well represented elsewhere (Table 32, Figure 12). This strong contribution of beech and the remains of nut foods reflects King's Forest Park's location at the northern edge of the Carolinian forest. A significant quantity of the unidentifiable fragments that were designated as deciduous tree wood are diffuse porous – typical of the maple, but possessing insignificant rays, or in cases of some very small fragments, possibly semi-diffuse porous ironwood. Other unspecified fine diffuse porous specimens in this analysis could also include basswood (*Tilia americana*), willow (*Salix sp.*), and poplar (*Populus sp.*), but the fragments are too small to be certain.

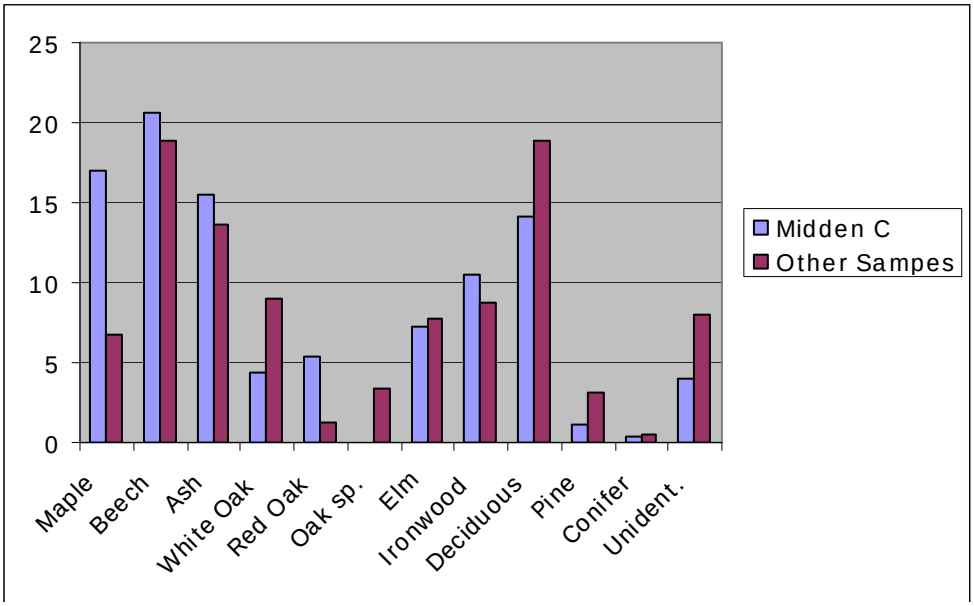

Figure 12: Relative contributions of wood charcoal in midden and non-midden contexts.

8.4 Discussion

The economic importance of maize is well attested by early visitors to the lower Great Lakes region, whose references to the plant and contexts of its use abound in their writings (e.g., Thwaites 1896-1901). Researchers have since considered maize and the two other most commonly mentioned cultigens (beans and "squash") to be the mainstay of peoples' existence here. The importance of maize has been supported, in part, by the consistency of some of the early historical records, but also a growing body of paleoethnobotanical evidence (for a wider perspective the reader is directed to Crawford and Smith [2003]) and chemical and morphological analyses of human bone (e.g., contributions in Williamson and Pfeiffer [2003]). While there is recent evidence of maize in the Northeast as early as 2000 BP (Thompson et al. 2004), most researchers agree that maize was an established food staple early in the Iroquoian tradition a thousand years later.

Maize occurs in the form of cob fragments, stems, and maize kernels. These are usually quite fragmentary depending on the context. Kernels are the most delicate of maize remains and usually present themselves as small fragments with an identifiable thin epidermal/seed coat surface and obverse mass of endosperm tissue. These kinds of kernel fragments are clearly not grouts resulting from seed grinding, but fragmented kernels that were initially dry enough to be charred without exploding. It is quite uncommon to find large quantities of intact, measurable kernels. The latter situation may arise where substantial quantities of maize kernels have been spoiled (i.e., burned) and left in a deposit that remained undisturbed. The key factor here is that large quantities were deposited over a short period of time, increasing the probabilities of some kernels remaining intact. Contexts in which such a scenario appears to have occurred are the fill of support post features, basal midden deposits, and deep refuse filled pits.

The majority of assemblages appear to have sparsely distributed cultigens in virtually every feature excavated. These are usually comminuted, and their numbers must be estimated by their weight. Bean and cucurbit by contrast are much less common in most deposits. Bean, for example is mentioned frequently in the reports of the Jesuits in the seventeenth century (Thwaites 1896-1901; 2:21; 2:165, 207, 298;5: 282; 10:103; 13:41, 75, 189; 15:153; 17:17; 21:195; 38:245; 40:255; 42: 197; 43:183; 50:145; 54:207; 59:129; 67:213; 68:137), but its preparation for food appears to all but eliminate it from the record at many archaeological sites. Unusual preservation, such as the accidental burning of food in areas unrelated to cooking, appears to have occurred at the early contact period Huron Auger site (Latta 1985). This may have been responsible for the charring of one of the largest measureable samples of bean in eastern North America (Monckton 1992:37; Blake and Cutler 1982). Similarly, cucurbit is archaeologically elusive, but is frequently mentioned in ethnohistoric reports (Thwaites 1896-1901: 2:21; 2:165, 207, 298; 15:153; 21:195; 38:245; 43:183; 50:145; 54:207; 59:129; 67: 213; 68:137). Preparation for consumption often involved cooking them whole in ashes (Thwaites 1896-1901; 10:103; 15:161-162), or cutting them into small pieces for adding to the *sagamité* (Wrong 1939: 107). Interestingly, most remains recovered are in the form of seeds rather than rind. Exceptions include the Auger (Monckton 1992: 36, Plate 6) and Mantle sites near Stouffville (Monckton, in preparation) where peduncles were recovered frequently. It is important to note, however, that these instances may have involved special conditions of preservation and deposition. The absence of bean and cucurbit here is not surprising given their low rate of preservation in most Iroquoian settlements.

Remains of sunflower, on the other hand, are fairly common in Iroquoian deposits, while mentioned rarely by early historic observers in the *Relations* (Thwaites 1896-1901; 37: 105; 65: 129), or by Champlain (Biggar 1922-1936; 3: 50). Most remains consist of small fragments of achenes (sunflower shell). It is likely that this cultigen is better represented in the archaeological record because of its distinctive micro-morphology and durability. Beans, in contrast, are easily recognized whole, but tiny fragments of its tissue are less easily distinguished from the meats of nuts for example.

Unlike the other cultigens, tobacco is represented by extremely small and delicate seeds. When considering the prodigious quantities of seeds this plant produces (up to a million per plant) and the frequency of ceremonial activity surrounding it (Thwaites 1896-1901; 3: 117; 5: 113; 7: 137, 139; 17: 81-83, 127; 18: 187; 20: 187; 32: 229; 38: 253), it is surprising that more are not found in the archaeological deposits. As just stated, however, they are very delicate and, when discovered, hollow. Of course, given that much ceremonialism involving tobacco required 'cakes' of it to be thrown onto the fire (Thwaites 1896-1901; 10: 159; 13: 209; 23: 55), the direct flame would have incinerated most of them. Charring without complete destruction requires indirect heat by fire. Quantification and assessment of tobacco's importance in a community is therefore compromised by these factors.

8.5 Collected Plants

The greatest contributor of fruit seeds at King's Forest Park is bramble, or raspberry (Table 31), and raspberries are present at higher frequencies in the midden. This is similar to what has been noticed at most settlements in southern Ontario. An excellent example is the Middle Iroquoian Myers Road site, which yields high figures for fruit (40%), rivaling that of maize (39.6 %) (Monckton 1998). Also, it has long been apparent that fleshy fruits are the greatest contributors to midden deposits on the perimeter of settlements (Monckton 1992).

Other plant taxa found at King's Forest Park are also widespread in Iroquoian settlements, though in smaller numbers. The most common ones are sumac and cat-tail. Sumac commonly grows in disturbed areas. Ojibwa, Menomini, and Potawatomi are known to have used this in beverages, medicines, and for smoking (Smith 1933:38). The majority of sumac seeds at King's Forest Park were recovered from midden contexts. Cat-tail is not mentioned in historical accounts but may represent what the Jesuits referred to as rushes used to cover the longhouse floors and roofs (Thwaites 1896-1901; 42:205; 58:209; 59:129, 133, 155).

Greens/grains are difficult to interpret as economically important at King's Forest Park, given their small numbers, though large quantities of chenopod and erect knotweed have been found elsewhere (e.g., the Auger site [Monckton 1992:48]). These are often better represented in the midden samples than in the longhouse features.

9.0 ZOOARCHAEOLOGICAL REMAINS

Suzanne Needs-Howarth

9.1 Method

All bones recovered during the salvage excavations at the King's Forest Park site were identified to lowest possible taxonomic level. Element and portion present are noted for bones that are identified below class. Evidence of heat alteration (whether charred, burned, or calcined), cuts, and spiral fractures were also noted, as were indicators of age. The data are summarized by context in Appendix 12.

The sample consists of 5,376 specimens, of which 18 appear to be non-zooarchaeological in nature (Appendix 12). Of the 5,358 zooarchaeological specimens (Table 33), 5,196 derive from ¼" dry screening, 162 from the floatation heavy fractions.

The sample includes all 11 features from the open area excavations with zooarchaeological remains, all nine of the one-metre units of Midden B, and 55 non-randomly chosen one-metre squares mostly from the southern part of Midden C. It also includes a random sample of one metre units from the 1999, 2000 and 2002 seasons, including an ash pit in test trench A. Floatation heavy fractions were obtained from two squares of the centre of the midden (467-241 and 468-241). These were also examined, as was the screened material from 467-241(this unit accounts for about 40% of the assemblage).

It should be noted that the ¼" screen diameter may bias against smaller fish, smaller elements, and smaller bone fragments. The soil volume subjected to flotation was only a small percentage of the total soil volume excavated, so the screened and floated sub-assemblages are not entirely comparable. Within this small sample size, however, the bone material from the floatation appears very similar to that from the screens. However, some very small cyprinid and other fish elements that would probably not have been retained in the ¼" mesh were noted. On the other hand, many of the elements that were retained were in fact small enough to have fallen through (squirrel metacarpals, for example), or to have fallen through if oriented on the long axis (squirrel metatarsals, for example, or fish spines).

9.2 General Observations

The taxa identified are consistent with the location of the site close to the mouth of Red Hill Creek and to Lake Ontario. They are also consistent with historic inventories. About 2% of the specimens had been subjected to sufficient heat to cause alteration to the bone structure. The fish scales found in Midden C suggest that part of the sample at least is extremely well preserved. There was no evidence of rodent gnawing or carnivore chewing on the bones.

Molluscs

The bivalve shell fragments are likely from freshwater bivalve, which could have been obtained near the site. One was identified to the genus *Elliptio*, members of which would have been locally available.

Fragments of Gastropoda (probable intrusive land snails), found in two contexts, are excluded from the database. Two modified gastropoda specimens were identified as *Pleurocera acuta* (flat-sided horn snail), which lives locally in large streams and lakes. The other is a fragment of a fairly large, thick-walled taxon that could not be identified.

Table 33: Summary of Zooarchaeological Findings

Binomial	Common Name	NISP	# of Vertebrae	% of class	% of below-class	% of total
Pelecypoda	bivalves	84		98%		1.7%
Elliptio sp.	genus of bivalves with representatives in Ontario	2		2%		0.0%
		86		**100%**		**1.7%**
Gastropoda	molluscs	1		33%		0.0%
Pleurocera acuta	flat-sided horn snail	2		67%		0.0%
		3		**100%**		**0.1%**
Osteichthyes	class bony fish	2075	141	70%		41.6%
Accipenser fulvescens	lake sturgeon	2		0%	0%	0.0%
Lepisosteus sp.	gar	1		0%	0%	0.0%
Amia calva	bowfin	23		1%	3%	0.5%
Salmoniformes	order salmons and pikes	2	2	0%	0%	0.0%
Salvelinus namaycush	lake trout	93	93	3%	10%	1.9%
Coregonus sp.	lake whitefish or cisco	105	93	4%	12%	2.1%
Esox lucius or E. masquinongy	northern pike or muskellunge	37	22	1%	4%	0.7%
Cypriniformes	order cyprinids	15	15	1%	2%	0.3%
Cyprinidae	family cyprinids	2		0%	0%	0.0%
Catostomidae	family suckers	64	62	2%	7%	1.3%
Catostomus sp.	white or longnose sucker	12		0%	1%	0.2%
catostomus catostomus	longnose sucker	1		0%	0%	0.0%
Catostomus commersoni	white sucker	4		0%	0%	0.1%
Ictaluridae	family catfish and bullheads	132	59	4%	15%	2.6%
Ameiurus sp.	black or brown bullhead	221	1	7%	25%	4.4%
Ictalurus punctatus	channel catfish	3		0%	0%	0.1%
Perciformes	order perches and sunfishes	22	9	1%	2%	0.4%
Centrarchidae	family sunfishes	28		1%	3%	0.6%
Ambloplites rupestris	rock bass	3		0%	0%	0.1%
Lepomis sp.	bluegill or pumpkinseed	56		2%	6%	1.1%
Micropterus sp.	small- or largemouth bass	12		0%	1%	0.2%
Micropterus dolomieu	smallmouth bass	5		0%	1%	0.1%
Micropterus salmoides	largemouth bass	1		0%	0%	0.0%
Percidae	family perches	8	6	0%	1%	0.2%
Perca flavescens	yellow perch	10		0%	1%	0.2%
Stizostedion sp.	walleye or sauger	29	22	1%	3%	0.6%
Stizostedion canadense	sauger	3		0%	0%	0.1%
stizostedion vitreum	walleye	2		0%	0%	0.0%
		2971		**100%**		**59.5%**
	to class only	*2075*		*70%*		*41.6%*
	below-class	*896*		*30%*		*17.9%*
Anura	order toads & frogs	20		71%		0.4%
Bufo sp.	toad sp.	5		18%		0.1%
Rana catesbeiana	bullfrog	3		11%		0.1%
		28		**100%**		**0.6%**
Reptilia	class reptiles	1		0%		0.0%
snake		5		2%		0.1%
Chelonia	turtles	120		52%		2.4%
Chelydra serpentina	snapping turtle	9		4%		0.2%
Chrysemys picta	painted turtle	96		41%		1.9%

Table 33: Summary of Zooarchaeological Findings

Binomial	Common Name	NISP	# of Vertebrae	% of class	% of below-class	% of total
Graptemys geographica	map turtle	1		0%		0.0%
		232		**100%**		**4.6%**
Aves	class birds	12		3%		0.2%
Aves - chicken/duck size		77		17%		1.5%
Aves - goose/turkey size		41		9%		0.8%
Aves - pigeon size		116		25%		2.3%
Aves - very small		9		2%		0.2%
Gavia immer	common loon	4		1%	2%	0.1%
Podidipedidae	family grebes	4		1%	2%	0.1%
Branta canadensis	Canada goose	3		1%	1%	0.1%
Anatidae - duck size	duck family	9		2%	4%	0.2%
Anas sp.	paddling duck species	7		2%	3%	0.1%
Anas cf. acuta	northern pintail	1		0%	0%	0.0%
Mergus merganser	common merganser	5		1%	2%	0.1%
Bonasa umbellus	ruffed grouse	12		3%	6%	0.2%
Meleagris gallopavo	wild turkey	12		3%	6%	0.2%
Grus canadensis	sandhill crane	1		0%	0%	0.0%
Ectopistes migratorius	passenger pigeon	140		30%	67%	2.8%
Strigidae	family owls	1		0%	0%	0.0%
Strix varia	barred owl	5		1%	2%	0.1%
Corvus corax	common raven	3		1%	1%	0.1%
		463		**100%**		**9.3%**
	to class only	*255*		*55%*		*5.1%*
	below-class	*208*		*45%*		*4.2%*
Mammalia	class mammals	38		3%		0.8%
extra-small mammal		17		1%		0.3%
small mammal		303		21%		6.1%
small-medium mammal		60		4%		1.2%
medium mammal		76		5%		1.5%
medium-large mammal		273		19%		5.5%
large mammal		82		6%		1.6%
Lagomorpha	order hares and rabbits	1		0%	0%	0.0%
Lepus americanus	snowshoe hare	5		0%	1%	0.1%
Rodentia	order rodents	1		0%	0%	0.0%
Marmota monax	woodchuck	8		1%	1%	0.2%
Tamias striatus	chipmunk	33		2%	5%	0.7%
Sciurus carolinensis	eastern grey squirrel	412		28%	66%	8.3%
Tamiasciurus hudsonicus	red squirrel	2		0%	0%	0.0%
Castor canadensis	beaver	17		1%	3%	0.3%
Erethizon dorsatum	porcupine	6		0%	1%	0.1%
Ondatra zibethicus	muskrat	25		2%	4%	0.5%
Carnivora - medium	carnivores	1		0%	0%	0.0%
Canidae	family dog, wolf, fox	1		0%	0%	0.0%
Canis sp.	dog or wolf	1		0%	0%	0.0%
dog or fox		2		0%	0%	0.0%
Canis familiaris	domestic dog	22		1%	4%	0.4%
V. vulpes/U. cinereoargenteus	fox	7		0%	1%	0.1%
Vulpes vulpes	red fox	1		0%	0%	0.0%

Table 33: Summary of Zooarchaeological Findings

Binomial	Common Name	NISP	# of Vertebrae	% of class	% of below-class	% of total
Urocyon cinereoargenteus	grey fox	1		0%	0%	0.0%
Ursus americanus	black bear	9		1%	1%	0.2%
Procyon lotor	raccoon	31		2%	5%	0.6%
Artiodactyla	order even-toed ungulates	2		0%	0%	0.0%
Cervidae	family cervids	1		0%	0%	0.0%
Cervidae - deer/wapiti size		1		0%	0%	0.0%
Odocoileus virginianus	white-tailed deer	32		2%	5%	0.6%
		1471		**100%**		**29.5%**
	to class only	*849*		*58%*		*17.0%*
	below-class	*622*		*42%*		*12.5%*
class unknown		80				
Aves or Mammalia		24				
		104				
	total	**5358**				

Fish

Around 42% of the sample, or 2,075 specimens, consist of fish remains that were not identified below class. These unidentified bones include 524 cranial bones; 933 ribs, fins, spines, and rays; 141 vertebrae; and 477 scales (Table 34). Fish vertebrae were identified below class where possible (most are probable rather than certain identifications). The number of vertebrae for each taxon is indicated in Table 34. Fish scales were not routinely identified below class.

Table 34: Fish Elements by Body Area

	Vertebrae		Cranial		Scales/Scutes		Ribs, Fins, Spines*		Total within Class	
Osteichthyes	131	27%	475	56%	472	100%	1405	96%	2531	78%
gar			1	0%					1	0%
sturgeon or bowfin			1	0%	2	0%			3	0%
bowfin			21	2%					21	1%
lake trout	82	17%							82	3%
lake herring or cisco	90	19%	10	1%					100	3%
northern pike/muskellunge	21	4%	14	2%					35	1%
Cypriniformes	15	3%	3	0%					18	1%
sucker family	49	10%	18	2%					19	1%
catfish family	57	12%	174	21%			58	4%	289	9%
Perciformes	1	0%	6	1%					7	0%
sunfish family	7	1%	98	12%					105	3%
perch family	5	1%	4	0%					9	0%
sauger or walleye	21	4%	20	2%					41	1%
Total	479	100%	845	100%	474	100%	1463	100%	3261	100%

Fish in the family Salmonidae were identified mostly, or, in the case of lake trout, exclusively, from their vertebrae, which were found in many contexts. The lack of salmonid cranial bone probably relates to the fragile and oily nature of the cranial bones, which makes them less likely to be recovered archaeologically (Lubinski 1996).

Catfish family fish, with their highly distinctive, durable, and useful pectoral and dorsal spines can be over-represented. The 58 dorsal and pectoral spines of catfish family (probably mostly brown bullhead) represent a significant portion of the ribs, fins and spinal components, and an even more significant portion of the below-class identifications for Ictaluridae. The pectoral spines in Midden C alone represent at least 24 individual fish, of a wide range of sizes. Metrics allow matching of left-right pairs (Table 35), although the sample size of the reference collection does not allow for an assessment of how much intra-individual variation to expect in the measurements.

Table 35: *Ameiurus* sp. Pectoral Spine Metrics in mm

Measurements (mm)	Left-Right Pairs
20.5	r
22.1	l
26.7	l
27.4	l
30.4	l
33.0	r
33.1	l
35.1	r
35.6	r
37.1	l

Overall, it appears the occupants of the site obtained their fish from a variety of habitats. The presence of many taxa that live in shallow, warm, vegetated waters, combined with the presence of turtle and beaver, suggests that the occupants targeted the marsh at the mouth of Red Hill Creek for fishing. Whether all the *taxa* present were targeted as such is another matter; some may have been caught incidentally, or as a by-product of exploitation of other fish. See Table 36 for a summary of fish habitat and behaviour.

Table 36: Fish Habitat and Behaviour (From Needs-Howarth 1999)

		Mature cm	Max. cm	Spawning season*	Spawning habitat	Normal habitat	Behaviour	Comments	Vert.
Acipenseridae (Sturgeons)									
Acipenser fulvescens	lake sturgeon	90	200	MSM	river or lake over rocks at up to 5 m and 14-15 C	deep, cool lake or river	bottom feeder; moves into deeper water in summer; active all winter; migratory; caught with spear or gill net	osteology extremely distinctive	
Salmonidae (Trouts)									
Salvelinus namaycush	lake trout	40	50	OOOO	open shoreline or promontory of lake over angular cobble and rubble at up to 36 m and 14-9 C	deep, cold lake	dispersed in winter; at lake margin at ice breakup; moves into deeper water in summer; caught by gill or seine net, spearing, angling; spawns at night during 9-16 day period		61-69
Coregonus artedi	lake herring	21	30	MS	lake shallows over gravel or stone at up to 12 m and 5-3 C	deep, cold lake	schooling; moves into deeper water in summer; caught by gill or seine net; spawns at night	hybridizes with *C. clupeaformis*; great variability in morphometry	50-63
Coregonus clupeaformis	lake whitefish	40?	59	MMM	lake shallows over stone or sand at up to 8 m and 8-3 C	deep, cold lake	bottom feeder; schooling; moves into deep water in summer; caught by gill or seine net, spearing and angling; spawns at night	hybridizes with *C. artedi*; dwarf form exists sympatrically	55-64
Esocidae (Pikes)									
Esox americanus	grass pickerel	14	33	AAAAA	stream or marsh over vegetation at <1 m and 7-12 C	shallow, very warm stream or pond	low oxygen tolerant	hybridizes with *E. lucius*; status in area uncertain	42-51
Esox lucius	northern pike	46	114	AAA	floodplain or marsh over vegetation at <1 m and 4-11 C	shallow, warm, clear, slow, vegetated river or weedy bay	some fall spawning; moves into cooler water in summer; caught by angling, wedging in gill net or spear (large individuals)	hybridizes with other *Esox*; status in pre-1920 Lake Simcoe uncertain	57-65
Esox masquinongy	muskellunge	59	183	ASM	floodplain over vegetation at <1 m and 9-15 C	shallow, warm, vegetated lake, bay or slow river	solitary and sedentary; caught by spear, angling or gill net	hybridizes with *E. lucius*	64-66
Catostomidae (Suckers)									
Catostomus catostomus	longnose sucker	33?	52	AAAAAA	stream or lake margin over gravel at <1 m and 5-10 C	shallow, cool lake or tributary stream	bottom feeder; caught by spear, dip net, gill net; active all day		45-47
Catostomus commersoni	white sucker	34	54	AAAAAA	stream, lake margin or rapids at shallow depths and 5-10 C	shallow, cool bay or tributary river	bottom feeder; caught by gillnet; active all day	currently 2 distinct populations in Lake Simcoe (Beamish 1973)	45-48

		Mature cm	Max. cm	Spawning season*	Spawning habitat	Normal habitat	Behaviour	Comments	Vert.
Ictaluridae (Bullhead catfishes)									
Ameiurus melas	black bullhead	137	317	MMMMMM	bay or creek mouth? over moderate to heavy vegetation at shallow depths and 21 C	shallow, very warm, slow stream, backwaters of river, silty area of lake	nocturnal	status in area uncertain; rare	34-36
Ameiurus natalis	yellow bullhead	19	30	MMM	stream	shallow, warm, clear bay, small lake, pond or slow stream	bottom feeder; nocturnal; caught by angling and trapping		38
Ameiurus nebulosus	brown bullhead	19	43	MMMMMM	bay or creek mouth over mud, sand or vegetation at <1 m and up to 21 C	shallow, warm, vegetated pond, small lake, bay or slow stream <10m	bottom feeder; nocturnal; easily caught by angling		34-39
Ictalurus punctatus	channel catfish	27	74	JJJJAAAAA	turbid river over log jams or rocks at 24-30 C	moderate depth, warm, clear, deeper lake or river	bottom feeder; feeds at night and during day; caught by angling		42-44
Centrarchidae (Sunfishes)									
Ambloplites rupestris	rock bass	8	25	MMM	swamp or gravel shoal over gravel or mud at <1 m and 16-21 C	shallow, warm lake or lower reaches of stream	adults school with other Centrarchidae; caught by angling		29-30
Lepomis cyanellus	green sunfish	8	20	JJJJMMMMAAAA	sunlit, sheltered area over vegetation at <1 m and 20-27 C	shallow, warm lake shallows or stream	adults school with other Centrarchidae; caught by angling	hybridizes with other *Lepomis*; status in area uncertain; rare	28-29
Lepomis gibbosus	pumpkin-seed	10	29	JJJJJJMMAAAA	submerged aquatic vegetation over clay, sand, gravel or rock at <1 m and 20-27 C	shallow, warm small lake, weedy bay of larger lake, slow stream	surface and bottom feeder; caught in hoop nets and by angling; adults school with other Centrarchidae	hybridizes with other *Lepomis*	28-29
Lepomis macrochirus	bluegill	11	20	JJJJJJMMAAAA	stream? over gravel, sand or mud at <1 m m and 20-27 C	shallow, warm, weedy parts of lake, slow, small river or large creek	adults school with other Centrarchidae; hybridises with other *Lepomis*; caught by angling	hybridizes with other *Lepomis*	28-29
Lepomis megalotus	longear sunfish	7	15	JJJJJJMMAAAA	protected area of stream or shoreline over gravel, sand or mud at <1 m and 20-27 C	shallow, warm, slow river, pond or small lake	mostly surface feeder; status in area uncertain; caught by angling	hybridizes with other *Lepomis*	28-30
Micropterus dolomieui	smal-mouth bass	21	48	MMMM	protected area of lake or river over sand, gravel or rock at up to 5 m and 17-18 C	shallow, warm lake or river	habitat seldom overlaps with *M. salmoides*; caught by angling or spearing		31-32
Micropterus salmoides	large-mouth bass	25	54	MM	quiet bay over gravel, mud or vegetation at <1 m and 17-18 C	shallow, warm, small vegetated lake or bay of larger lake	feeds in schools near shore; bottom and surface feeder; habitat seldom overlaps with *M. dolomieui*; caught by angling		30-32

		Mature cm	Max. cm	Spawning season*	Spawning habitat	Normal habitat	Behaviour	Comments	Vert.
Percidae (Perches)									
Perca flavescens	yellow perch	17	32	AAM	lake shallows or tributary river over vegetation, sand or gravel at shallow depths and 7-12 C	moderate depth, cooler, clear lake, pond or quiet river	sight predator; adults and young school, segregated by size; caught by angling or (gill) netting	osteology of many elements species distinctive	38-41
Stizostedion canadense	sauger	26	53	AAM	large, turbid lake shoals or turbid river over gravel or rubble at up to 4 m and 6-12 C	shallow, cooler, large, turbid lake or river	sight predator	hybridizes with *S. vitreum*; status in area uncertain	43-45
Stizostedion vitreum	walleye	32	76	AA	large, turbid lake shoals, turbid river or rapids over gravel or rubble at <1 m and 7-9 C	moderate depth, cooler, large, turbid lake, large stream or river	sight predator; schools, sometimes with *C. commersoni*; caught by angling and netting	hybridizes with *S. canadense*	44-48

Note: Data from MacCrimmon and Skobe (1970) and Scott and Crossman (1973), with supplemental local information provided by McMurtry (personal communication 1997) and Dobbs (personal communication 1997). In part from Needs-Howarth (1997a).
* Capital letters indicate range of spawning season in calendar months, spaced proportionately to facilitate visual comparison.

Seasonal variation in fishing strategies can be explained in part by spawning behaviour (Needs-Howarth and Thomas 1998). Taxa that prefer vegetated and/or warmer waters tend not to congregate to spawn, and could have been obtained throughout the warm weather. Taxa such as suckers and perch, which prefer cooler waters and could be very effectively targeted during their spring spawning run, are present in smaller numbers at Kings Forest Park, which may suggest some of them at least were also caught throughout the warm weather, rather than exclusively at spawning time.

The salmonidae and the larger perch-family fish were most likely obtained during their spawning runs. Fall lake fishing is suggested by the presence of lake trout and lake whitefish or cisco. Spring lake or river fishing is suggested by the presence of sauger and walleye.

Brook trout vertebrae are morphologically similar to those of the two local species of *Coregonus*, but there are more of them in the vertebral column, and the brook trout's head is larger in relation to its total length. So while brook trout and cisco are similar in size (245-305 and 203-305 mm, resp.,) (Scott and

Crossman 1973: 208, 236) the brook trout's vertebrae may be smaller (so small, in fact, that they may pass through 1/4" mesh).

The average size of lake whitefish is 381 mm (Scott and Crossman 1973: 208, 236, 269), and some of the vertebrae at Kings Forest Park are similar in size to an individual with a total length of 456 mm, suggesting at least some of the *Coregonus* vertebrae are lake whitefish.

Cisco and lake herring would have been available in very large numbers in shallow waters in late November. A fisheries overseer visiting Burlington Beach in 1868 observed millions of lake herring spawning (Scott and Crossman 1973:236-243; 269-277).

Amphibians

Both frog and toad were identified. Toad, with its burrowing habit, may be intrusive to the archaeological deposits, as may the elements identified only to order Anura. These do not appear to have been a major resource.

Reptiles

Turtle remains, in particular painted turtle, were present in most analyzed Midden C squares and in many other contexts throughout the site. The presence of vertebrae and limb bones and burnt fragments in Midden C suggests these turtle remains were part of the dietary component, rather than curated carapace and plastron rattles (although some fragments appear to have been intentionally modified – see Cooper and Needs-Howarth [Worked Bone], this volume). Units 459-240 and 464-240 contained remains of a snapping turtle that must have been about twice as long as the reference specimen of 54 cm long (MNI 1).

The turtle remains in unit 232-512, in contrast, appear worn from handling or rubbing. One of the elements in this square was tentatively identified as map turtle, and the unidentified carapace and plastron fragments could also the same species, for an MNI of 1.

Birds

Bird remains are dominated by passenger pigeon, which was found in seven of the 11 features and in most of the units in Midden C. A conservative estimate suggests at least thirteen individuals are present at the site. These include at least two skeletally immature, but almost adult-size individuals. The palaeobiology collections at the ROM include several similarly immature individuals of mourning dove (*Zenaida macroura*), which is the most comparable species, but unfortunately none have a known date of death. Mourning doves fledge at 4-6 weeks, at which point their longbones have not yet attained adult stature or skeletal maturity (Mark Peck, personal communication, October 2005). Assuming that the biology of *Ectopistes* is comparable, it is likely that the immature bones at Kings Forest Park belong to fledged birds that were caught in the summer or during the fall migration. The hunt for adult birds could have occurred during the spring or fall migration, or in a nesting colony in a mast forest.

As one might expect, given the location of the site, many of the other birds are water-birds, but there is also some grouse, turkey, barred owl (which prefers mixed forest near lakes or swamps), and raven (which prefers mixed and boreal forest). The unidentified bird remains are mostly pigeon- and duck-sized. Merganser, which are diving birds, may have been a by-product of gillnet fishing (Studer 1992:81). The

yellow-bellied sapsucker is a robin-sized black and white woodpecker with a red forehead (and red throat in male) and a light yellow breast. It may have been valued for its colourful plumage.

Mammals

Remains of grey squirrel are present in most of the Midden B and C units and throughout the site (28% of mammals and 8% of the entire collection). Midden C alone contains 276 elements, representing at least 13 individuals. But neither bone counts nor MNI give a good indication of dietary abundance: The meat of a single deer would probably provide more nutrition than all the squirrels combined. It is therefore possible that squirrels were obtained at least in part for their pelts.

All other mammals identified below class represent 2% or less of the mammal total. Half of the beaver elements are incisors or fragments thereof, one of which, in any event, had been curated. Porcupine is represented by cranial elements only, so may not have been a food resource.

Most of the raccoon identifications come from unit 231-517 in the 2002/2003 excavations, representing a partial skeleton of what looks like a single individual. These may not be food refuse; the skeleton appears to be too complete for it to be food refuse, and too incomplete for it to be a burial.

The bear and dog remains are all of the distal extremities, and could have been part of pelts. Consumption of the meat may not have been contemporaneous with discard of the bones.

Thirty-two deer elements were identified (2% of the mammals, 5% of the identified mammals). Midden B has one individual estimated to be about 3-4 years old, based on dental wear. Midden C has one deer of about 17-20 months (i.e., likely a fall death), and a second one younger than 11-17 months, for a site-wide MNI of 3. The unidentified mammal bone includes 82 elements that are likely deer or bear (the only two candidates for "large mammal"), perhaps representing further individuals.

9.3 Inter-site comparison

No evidence of original feature function was found in the zooarchaeological remains. The proportion of bird is similar between the features and the two middens (Table 37). The fish and mammals, however, reveal some differences between the three main provenience groups. Some of these differences may be a function of sample size. However, Midden B does look quite different from Midden C. It has only 6% fish, and a lot of medium-to-large and large mammal, including 18 deer bones, for an MNI of 1 (total mammal is 83%). It also lacks the passenger pigeon prevalent elsewhere on the site, and it has no turtle. The bear and dog remains from Midden B could all be part of curated skins, with the bones of the hand and feet attached.

Table 37: Identifications by Context (Selected Contexts)

	Features		**Midden B**		**Midden C**		**2002/2003 Test Pits**		**Other Test Pits**	
Taxon	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**
Pelecypoda	2	1%			32	1%			49	35%
Elliptio sp.					2	0%				
						0%				
Mollusca					1	0%				
Pleurocera acuta					1	0%			1	1%
	2	**1%**			**36**	**1%**			**50**	**35%**

Table 37: Identifications by Context (Selected Contexts)

	Features		Midden B		Midden C		2002/2003 Test Pits		Other Test Pits	
Taxon	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**
Osteichthyes	33	14%	3	4%	1976	42%	31	16%	13	9%
Accipenser sp.					2	0%				
Lepisosteus sp.					1	0%				
Accipenser or Amia					1	0%				
Amia calva					21	0%				
salmoniformes									2	1%
Salvelinus namaycush	11	5%			71	2%	4	2%	7	5%
Coregonus sp.	6	3%			94	2%	4	2%	1	1%
Esox lucius or masquinongy	4	2%			31	1%	1	1%		
Cypriniformes					15	0%				
Cyprinidae					2	0%				
Catostomidae					51	1%	7	4%	5	4%
Catostomus sp.					11	0%	1	1%		
catostomus cf. catostomus					1	0%				
Catostomus cf. commersoni					4	0%				
Ictaluridae	3	1%	2	3%	117	3%	4	2%	5	4%
Ameiurus sp.	3	1%			207	4%	2	1%	2	1%
Ictalurus punctatus					3	0%				
Perciformes	1	0%			6	0%	6	3%	2	1%
Centrarchidae	2	1%			32	1%				
Ambloplites or Lepomis sp.					1	0%				
Ambloplites rupestris	1	0%			2	0%				
Lepomis sp.	3	1%			51	1%			1	1%
Micropterus sp.					12	0%				
Micropterus cf. dolomieu					5	0%				
Micropterus cf. salmoides					1	0%				
Percidae					7	0%				
Perca flavescens	5	2%			5	0%				
Stizostedion sp.	2	1%			26	1%	1	1%		
Stizostedion cf. canadense	1	0%			2	0%				
stizostedion cf. vitreum					2	0%				
	75	**32%**	**5**	**6%**	**2760**	**59%**	**61**	**31%**	**38**	**27%**
Anura					20	0%				
Bufo sp.					5	0%				
Rana catesbeiana					3	0%				
					28	**1%**				
Reptilia					5	0%				
snake					1	0%				
Chelonia	4	2%			71	2%	37	19%	3	2%
Chelydra serpentina					9	0%				
Chrysemys picta	1	0%			86	2%	7	4%	2	1%
Graptemys geographica							1	1%		
	5	**2%**			**172**	**4%**	**44**	**22%**	**5**	**4%**
Aves					7	0%	1	1%	1	1%
Aves - chicken/duck size	11	5%			66	1%				
Aves - goose/turkey size	1	0%	4	5%	35	1%			1	1%

Table 37: Identifications by Context (Selected Contexts)

	Features		Midden B		Midden C		2002/2003 Test Pits		Other Test Pits	
Taxon	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**
Aves - pigeon size	1	0%	3	4%	101	2%	3	2%	9	6%
Aves - very small					9	0%				
Gavia immer					4	0%				
Podicipedidae					4	0%				
Branta canadensis	2	1%			1	0%				
Anatidae - duck size					7	0%	2	1%		
Anas sp.					7	0%				
Anas cf. acuta					1	0%				
Mergus merganser	2	1%			3	0%				
Bonasa umbellus	1	0%	1	1%	9	0%	1	1%		
Meleagris gallopavo			1	1%	10	0%			1	1%
Grus canadensis					1	0%				
Ectopistes migratorius	9	4%			113	2%	10	5%	7	5%
strigidae									1	1%
Strix varia					5	0%				
Corvus corax					3	0%				
	27	**12%**	**9**	**11%**	**386**	**8%**	**17**	**9%**	**20**	**14%**
Mammalia			1	1%	21	0%	2	1%	1	1%
extra-small mammal	11	5%			17	0%				
small mammal	14	6%	3	4%	282	6%	2	1%	2	1%
small-medium mammal	9	4%			7	0%	44	22%		
medium mammal	3	1%	1	1%	66	1%			7	5%
medium-large mammal	24	10%	23	29%	210	5%	4	2%	11	8%
large mammal	15	6%	10	13%	57	1%				
Lagomorpha					1	0%				
Lepus americanus					5	0%				
Rodentia					1	0%				
Marmota monax					7	0%	1	1%		
Tamias striatus					33	1%				
Sciurus carolinensis	22	10%	1	1%	384	8%			3	2%
Tamiasciurus hudsonicus			1	1%	1	0%				
Castor canadensis	5	2%			11	0%	1	1%		
Erethizon dorsatum					6	0%				
Ondatra zibethicus			2	3%	23	0%				
Carnivora - medium			1	1%						
Canidae					1	0%				
C. familiaris/V. vulpes/U. cinereoargent	1	0%			2	0%				
Canis familiaris	1	0%	4	5%	16	0%			1	1%
Vulpes vulpes/Urocyon cinereoargenteus					7	0%				
Vulpes vulpes					1	0%				
Urocyon cinereoargenteus					1	0%				
Ursus americanus			1	1%	8	0%				
Procyon lotor	4	2%			5	0%	22	11%		
Artiodactyla					1	0%	1	1%		
Cervidae					1	0%				

Table 37: Identifications by Context (Selected Contexts)

	Features		Midden B		Midden C		2002/2003 Test Pits		Other Test Pits	
Taxon	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**	**NISP**	**%**
Cervidae deer/wapiti size					1	0%				
Odocoileus virginianus	1	0%	18	23%	13	0%				
	110	**48%**	**66**	**83%**	**1189**	**26%**	**77**	**39%**	**25**	**18%**
Aves or Mammalia					21	0%			3	2%
class unknown	12	5%			65	1%	1	1%	1	1%
Total	**231**	**100%**	**80**	**100%**	**4657**	**100%**	**200**	**100%**	**142**	**100%**

9.4 Comparison with Previous Zooarchaeological Analysis at Kings Forest Park

Daniel Robert's MA thesis describes all 164 faunal remains recovered from the 1960 excavations. Dominant taxa are white-tailed deer at 26%, painted turtle at 11%, grey squirrel at 7%, and beaver at 5%. All fish combined are only 12% of the sample. All but one of the taxa identified in the earlier analysis were identified here: freshwater drum was not noted in the present sample.

The differences between the earlier analysis, which had far fewer species identifications, and this analysis are undoubtedly related to both sample size and sampling strategy.

9.5 Summary

The animal bone from Kings Forest Park suggests the occupants relied on small-unit resources such as fish, passenger pigeon and squirrel, and less so on large-unit resources such as deer.

It is likely that many of the fish were obtained around the mouth of Redhill Creek, throughout the warmer weather. Perch and walleye/sauger may have been caught during their spring spawning run in rivers or lake Ontario, although their numbers are small enough to support more incidental fishing throughout the warm weather. Lake trout and cisco/lake whitefish were likely caught during their fall spawning in Lake Ontario. Some of the salmonids may have been processed at the lakeshore, with bone-less fillets coming back to the site, and brook trout vertebrae may have fallen through the screens, leading us to underestimate the importance of these taxa in the diet. Passenger pigeon were probably caught during their spring and fall migration, but the presence of very young birds may suggest some hunting activity in the nesting areas. Squirrel could have been obtained at any time, probably very close to the site. Animals hunted primarily for their pelts may have been caught just before winter, when the pelt is in prime condition. At least one of the three deer represented was obtained in fall.

The small-unit resources account for many individual animals, whereas the deer account for only three animals, but a lot of meat – and raw material for bone tool manufacture and clothing. So many taphonomic factors intervene between what was caught/hunted originally and what is ultimately recovered archaeologically that MNIs or NISPs cannot really be translated in terms of dietary percentages or how much time the site's occupants spent on each type of subsistence activity – other than in comparison with other assemblages. Iroquoian assemblages with high percentages of fish are by no means unusual, and Iroquoian assemblages with a lot of squirrel are also not unusual, at least in the Niagara peninsula (Cooper 2005).

10.0 RADIOCARBON

David A. Robertson

Two samples of plant material recovered from the site were submitted to Beta Analytic for Accelerator Mass Spectometry radiocarbon dating. These consisted of 401 mg of carbonized maize kernels recovered from Midden C (Unit 469-240) and 1017 mg of carbonized maize kernels from Midden A (Unit 500-248) in the open area excavations.

The Midden C sample yielded a return of 860±40 B.P. (Beta-217155), which calibrates to A.D. 1190, with a 2δ range of A.D. 1140-1260, using the calibration dataset INTCAL98.

The Midden A sample yielded a return of 680±40 B.P. (Beta-217157), which calibrates to A.D. 1290 with 2δ ranges of A.D. 1270-1320 and 1340-1390, using the calibration dataset INTCAL98.

These results are comparable to two radiocarbon dates of 610±60 B.P (TO-4321) and 800±60 B.P (TO-4322) obtained for material (maize and hickory shell respectively) recovered from the site in the 1960s (Robert 1997:131). At 2δ, these span the period cal. A.D. 1280-1420 and 1050-1290, respectively.

On balance, these results, pointing to a primary occupation of the site in the thirteenth century A.D. are consistent with the ceramic assemblage recovered from the site during the 1998-2004 excavations, as well as the much smaller sample recovered in the 1960s (Robert 1997).

11.0 SUMMARY AND CONCLUSIONS

David A. Robertson

The 1998-2004 investigations that culminated in the Stage 4 excavation of portions of the late Early Iroquoian King's Forest Park site (AhGw-1) resulted in exposure of one relatively intact longhouse, and portions of several others that had been more severely impacted by previous disturbances, together with indications of extensive exterior activity and refuse disposal areas. Although this work was limited largely to areas of proposed disturbance, and was constrained by the scale of previous natural and development related landscape alterations (e.g., grading, sewer construction, etc.), it has provided important insights into the character of the occupation of the site. For instance, it is now clear that site supported formal longhouse structures, suggesting some degree of occupational permanence or continuity, although the overall layout of the settlement remains unknown, and it is not clear whether the site represents a formal village or a site that was reoccupied on a yearly basis over a much longer period of time. Notwithstanding the difficulties encountered in attempting to apply the prevalent settlement typology of "camp", "cabin", "hamlet" and "village", which is derived from early ethnohistoric accounts, to many earlier settlements encountered in the archaeological record, the volume of material recovered from the sizable midden areas at King's Forest Park, would suggest that the site likely was a "village" on a scale comparable with other contemporary regional sites. If the site was only seasonally occupied, however, it would appear that these occupations took place primarily during warm-weather seasons and were likely oriented on the fish resources of the creek and the marshes downstream at the shore of Lake Ontario. These resources would have been an attractive feature regardless of the duration and scale of the occupation.

The artifacts recovered from the site indicate that it was primarily occupied during the thirteenth century A.D., a conclusion which is supported by a suite of radiocarbon dates on material recovered in the 1960s and during the most recent excavations. The site is one of many that make up the record of early Late Woodland settlement in the Red Hill Creek area, a record that is marked by a gradual movement away from the lakeshore zone in favour of sites further inland—a trend that is consistent with the pattern seen throughout much of southern Ontario in the later thirteenth-early fourteenth centuries.

These local sites include the vaguely dated Transitional Woodland-Early Iroquoian Gnarly Willow site (AhGw-78) and the similarly poorly understood Early Iroquoian Black Shark (AhGw-79) and Mint Julip (AhGw-77) sites (Warrick 1990) located on the shore of Lake Ontario near the mouth of the creek, the late twelfth to early thirteenth century Pergentile (AhGw-2) site located at the foot of the Niagara Escarpment just under two kilometres to the east of King's Forest Park (Robert 1997), as well as the roughly contemporary Clish (AhGx-95), Wade (AhGx-19) and Springbrook (AhGx-110) sites, all of which date to between A.D. 1250 and 1300, followed by the slightly later Chedoke Falls (AhGx-265), Olmstead (AhGx-32), Serena (AhGx 274), and Redeemer College (AhGx-114) sites, which may date to as late as circa A.D. 1350 (ASI 1989, 1994, 1996, 2004) and appear to represent the culmination of a permanent Iroquoian presence within the lower and middle reaches of the Red Hill Creek watershed.

The relationships between these terminal sites are unclear. Olmstead and Serena were located only 650 metres from one another. Based on ceramic seriations, Olmstead likely preceded Serena, but it seems unlikely that they were immediately sequential. Olmstead was a 2.6 hectare settlement, whereas Serena was less than half that size. This runs counter to the general belief that community size increased during the Middle Iroquoian period, although it may even be a mistake to attribute a village function to Serena given that at its maximum, the site seems to have consisted of only four houses. Moreover, given the minimal distance between these two sites, it is doubtful if Serena would even have been sustainable if it was occupied immediately after Olmstead. If, however, the population of Olmstead moved to one or two more distant villages before a portion of them returned to the Serena area, there would have been adequate time for soil regeneration and the replenishment of wild plant and faunal resources. The

Redeemer College site, located six kilometres west of Olmstead and Serena, may represent this intermediate settlement. Even at Redeemer College, however, only a few houses may have been occupied simultaneously, suggesting that the site, at least initially, may not have functioned as a village, but as a satellite settlement of some sort, perhaps during the late Olmstead through Serena occupations.

Either way, these mid-fourteenth century sites do not appear to have been succeeded by any later, substantial occupations within the Red Hill Creek drainage. This community, therefore, may have joined with populations in adjacent areas, abandoning Red Hill Creek as a permanent settlement locale, although people undoubtedly returned on an intermittent or seasonal basis.

Despite the many questions that remain concerning the King's Forest Park site and its place within the overall Early-Middle Iroquoian settlement sequence within the Red Hill Creek drainage, the 1998-2004 investigations at the site have produced important new data that will ultimately serve to enhance our understanding of the Late Woodland period at the head of the lake.

This final report constitutes fulfilment of licensing commitments (2002-015-010, P117-016) pursuant to the Ontario Heritage Act.

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

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APPENDICES