P039-120-2007 Revised

A STAGE 3 ARCHAEOLOGICAL ASSESSMENT OF BeGu-23, BeGu-24, BeGu-25, BeGu-26, & BeGu-28 LOCATED IN A PROPOSED QUARRY ON THE W½ OF LOTS 12, 13 & 14 CONCESSION 11 ORILLIA NORTH TWP. (GEO), SIMCOE COUNTY

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A STAGE 3 ARCHAEOLOGICAL ASSESSMENT OF BeGu-23, BeGu-24, BeGu-25, BeGu-26, & BeGu-28, LOCATED IN A PROPOSED QUARRY ON THE W½ OF LOTS 12, 13, & 14 CONCESSION 11 ORILLIA NORTH TWP. (GEO), SIMCOE COUNTY

In June 2007 Severn Aggregates Ltd. engaged Kinickinick Heritage Consultants to carry out Stage 3 excavations at 5 archaeological sites in a proposed quarry near Orillia. The purpose of a site-specific Stage 3 assessment is to obtain a representative artifact collection and determine the nature and cultural affiliation of the archaeological deposits. The fieldwork was carried out according to the Ministry of Culture technical Guidelines.

The study area is located 12 km north of Orillia about 3 km west of Lake Couchiching. The property can be divided into four physiographic zones: 1) shallow lacustrine deposits over limestone plains, from 220 to 231 m a.s.l.; 2) exposed limestone plains above 233 m a.s.l.; 3) organic terrain, between 231 and 233 m a.s.l; and 4) an environmentally sensitive and protected wetland, below 220 m a.sl. The upper limestone tablelands would have emerged from Lake Algonquin as a wave-washed bedrock island, in the Late Palaeo-Indian period. The sand plains would have been the shoreline in the Early Archaic cultural period. In later cultural periods, although habitable, the proposed quarry would have been at a removed elevation from major shorelines and therefore less attractive in terms of occupation.

Permission to enter the property to carry out the Stage 3 assessment was obtained from Severn Aggregates Ltd. Ian Badgley (P101) directed the fieldwork, sorted, and catalogued the pre-contact collections and prepared the site plans. John Ratcliffe catalogued the historical artifacts from BeGu-26 and BeGu-28.

The Stage 3 excavation procedure was to establish a 1 x 1 m grid and to excavate a test unit where Stage 2 test pits had produced artifacts. These units were located in formerly cultivated soils and the plough zone was excavated with a shovel and trowel. The subsoil was scraped clean with a trowel and was inspected for evidence of cultural features. The back dirt from all units and sub-operations was passed through a 6 mm mesh and examined for artifacts. The units were back-filled after excavation. The weather did not inhibit the excavations. The artifact collections are in storage at the consultant's facility at the *Diefenbunker Museum* in Carp.

The pre-contact sites BeGu-23 to 26 are affiliated with a hunter-gatherer culture of undetermined age. Flake scatters are commonly reported in the archaeological site database, because the artifacts are made from a durable material and derive from an expedient technology. Artifacts from the pre-contact component occurred in low frequency and density and no cultural features or organic material were observed. The depositional integrity has been affected in recent times by cultivation and forest clearance. The historical sites BeGu-26 & 28 are representative of early 20th century rural subsistence homestead. Except for nails and windowpane sherds, the historical artifacts are not particularly numerous or densely distributed. Only a few mammal bone fragments were collected from the historical sites. Iron and ferrous material has not preserved well in the deposits and the glass and ceramic samples are fragmentary. Human remains or evidence of graves were not observed.

Stage 3 excavations have been carried out at five archaeological sites and there is sufficient information about the nature of the artifact deposits to permit the evaluations of site significance. Hunter-gatherer settlement-subsistence studies are of interest to the scientific and educational community and to First Nations. However, scientific potential for both cultural periods is low, because they have poor depositional integrity, low artifact density, and a paucity of cultural features, diagnostic artifacts, or organic material. These factors limit the empirical data that could be derived through further excavation.

The consultant concludes that the archaeological deposits in the proposed quarry have been adequately recorded by the Stage 2&3 excavations. The consultant has no further heritage concerns regarding the quarry development and recommends that the Ministry of Culture issue a letter of clearance to Severn Aggregates Ltd. However, given the nature of archaeological phenomena, it is possible that deeply buried archaeological deposits, or human remains may yet be disturbed during operation. If the former are discovered the Heritage Operations Unit should be notified immediately (416-314-7123); if human remains are disturbed, the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations should be notified (416-326-8404).

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A STAGE 3 ARCHAEOLOGICAL ASSESSMENT OF BeGu-23, BeGu-24, BeGu-25, BeGu-26, & BeGu-28, LOCATED IN A PROPOSED QUARRY ON THE W½ OF LOTS 12, 13, & 14 CONCESSION 11 ORILLIA NORTH TWP. (GEO), SIMCOE COUNTY

Introduction

In June 2007 Severn Aggregates, of Innisfil, engaged Kinickinick Heritage Consultants to carry out a Stage 3 archaeological excavations at BeGu-23, BeGu-24, BeGu-25, BeGu-26, & BeGu-28, which are located in a proposed quarry near Orillia (Figure 1). This assessment stems from Stage 2 fieldwork completed by Kinickinick Heritage Consultants in May 2007 (CIF 2007-P039-114). Because a Stage 3 excavation report cannot "stand alone", the Stage 1 report is presented below to provide the reader with background information.

A Stage 1 archaeological assessment is a background review of surficial geology, post-glacial landscape evolution, historical land use, and the present condition of the property. It also reviews the Ministry of Culture data file on archaeological sites and previous archaeological studies in the study area. The Stage 1 assessment uses geographic terrain analysis to estimate the potential for pre-contact archaeological sites, while the potential for Euro-Canadian archaeological sites was determined by a consideration of land tenure records, historical maps, and aerial photograph interpretation. The purpose of a site-specific Stage 3 assessment is to obtain a representative artifact collection and determine the nature, extent, and cultural affiliation of the archaeological deposits. These data permit an evaluation of site significance and determine if Stage 4 mitigation is warranted.

STAGE 1

1.0 Description of the Property and Land Use History

The study area is located about 12 km north of Orillia about 3 km west of the north end of Lake Couchiching (Figure 1) and about 3 km southeast of the first rapids on the Severn River (Figure 3). A public forest is adjacent the property on the north and on the southeast it borders an environmentally sensitive wetland of the Grass Lake drainage. There are operating quarries immediately to the west and east of the proposed Severn Quarry.

Figure 2 is a work map provided by Severn Aggregates for the purposes of the Stage 2 field test. According to the work map, each half-lot is approximately 650 x 650 m; however the Ontario base map (Figure 4) indicates that the boundary of the three half-lots extends further east and not as far north as Figure 2 illustrates. When the study area dimensions that are shown in Figure 2 are plotted on NTS 31 D/11 and 31 D/14 the property includes part of a recreational trail in the northeast corner (Figure 3 and 10).

The property has about 28 m relief, from 215 m a.s.l. in the southeast corner, to 243 m a.s.l. on the exposed limestone bedrock in the northwest corner. For the purposes of this study, the property can be divided into four physiographic zones (Figure 8): 1) shallow lacustrine deposits over limestone plains, from 220 to 231 m a.s.l.; 2) exposed limestone plains above 233 m a.s.l.; 3) organic terrain, between 231 and 233 m a.s.l; and 4) an environmentally sensitive and protected littoral of the Grass Lake wetland, below 220 m a.sl. The tablelands are located in the northwest and southwest and have extensive areas of exposed bedrock and patches of stunted shrubs (Figure 9). The organic terrain supports swampy patches of water-tolerant trees as well as fens and marshy areas. The organic terrain may have been cleared and drained land in the 19th century. The area of lacustrine deposits, from 220 to 233 m a.s.l., was cleared farmland (cultivated fields, pasture, and ranch-land) in the 19th century but it was not utilized for agriculture in the late 20th century and now supports second growth deciduous forest with a few patches of pasture, overgrown with juniper, hawthorn and red cedar.

An unopened road allowance separates the property from the quarry on the west, although it has been improved to make an entrance in the southwest corner of lot 12. An unimproved access road runs obliquely through lot 12, parallel to the environmentally protected zone, and then north to the northeast corner, where it joins a recreational trail from Sparrow Lake Road to the public forest. Through lots 13 and 14 the access road runs along the fence that separates the study area from the Beamish Quarry.

The W½ of lot 12, the southern third of the study area, was divided into two parts early in the 1870s and the title of each changed hands frequently into the 20th century. According to the abstract pages in the Land Registry office, lot 12 concession 11 was patented to Thomas Harris, of Thorah, in 1856, who took out a mortgage on it from the "Canada Permanent B&S Society", for consideration of £350. In 1867 Peter Phillips, of Markham, assumed tenure of the lot (200 acres) "under power of sale in Harris mortgage", for $370. In 1870, Phillips bargained and sold the west 60 acres of the south half of lot 12 to James Mahoney, of Vaughn, for $240. In 1877 Phillips sold the north half (100 acres) to Abel Marshall of N. Orillia for $500 and another 40 acres to William Bridgeman, of North Orillia, for $200. In 1882 Bridgeman sold "That part of lot at SE corner=40 acres" to Andrew Tait of Orillia, for $150. In 1882 Mahoney sold his 60 acres in the southeast corner to Abail Marshall, for $600. In 1904 Tait sold his part to Joseph James of N. Orillia, for $525. In 1919 James sold the N½ of his part to William Matts, of N. Orillia.

According to the abstract pages at the Land Registry office, lot 13 concession 11 (200 acres) was patented in 1872 to Daniel Dick, who bargained and sold it to Henry B. Beecher and James R. Silliman, both of Allegheny New York, trading under the name of Beecher and Silliman. In 1874 Beecher sold his share to Silliman for $1. In 1885, the lot passed into the trusteeship of Robert H. Bethune and James Austin, who bargained and sold all 200 acres to Andrew Tait, for $546 in the same year. In 1897, Tait bargained and sold the W½ of lot 13 (100 acres) to Charles W.A. Brailey, of

N.Orillia, for $255.43. In 1937, tenure of the parcel passed to Charles H.G. Brailey. In 1950 Brailley's widow, Sara Brailey, conveyed tenure of the W½ to Leslie Hawkins of Orillia, for $2,000.

According to the abstract pages in the Land Registry office, lot 14 concession 11 (200 acres) was patented to William Roi and Andrew Borland in 1821. In 1841 the lot was divided into parts A and B. Part A consisted of 70 acres in southwest corner of lot 14 Part B consists of 100 acres of the E ½ of the lot and 30 acres in the north part of the W½. A Sherriff's deed in 1841 gave tenure of part A to John Ridout, of Toronto, for £3. In 1854 Ridout quit claim and tenure passed to Howard Spanner Short and Eliza McNulty, both of Toronto. In 1855 Eliza McNulty (Spinster) quit claim, for a consideration of £8, and Thomas Spanner Short assumed tenure of part A.

Figure 6 is an aerial photograph of the property taken about 1930. At that time there were clearings in each half-lot. The southeast corner of lot 12 appears to be divided into three separate fields, which appear to have been recently cultivated. A building, which probably corresponds to BeGu-28, is visible about 150 m from the south boundary of the lot on the edge of the lacustrine deposits, near the bedrock escarpment. William Matts may have been occupied the house at that time. The tableland above the house shows bedrock exposure similar to existing conditions. There is a small clearing in the northeast corner of lot 12, south of the creek and mostly within the environmentally protected zone (zone 4). Lot 13 was mostly treed in the 1930s although there appear to be several overgrown clearings. Two clearings near the center of the lot are more overgrown and may have been cleared by Tait who bought the land associated with BeGu-28 in 1882. The small clearing in the southeast corner of lot 13 is more open and there appears to be a small building (BeGu-29) at the corner. At the time the photograph was taken, Charles W.A. Brailey may have been occupied BeGu-29, but the homestead and the other clearings in lot 13 may have been the work of Andrew Tait. In the 1930s, lot 14 was mostly cleared land east of the organic terrain. Two buildings (BeGu-26) are visible beside the organic terrain. The field does not appear cultivated and may have been only used for pasture, although former field divisions are evident in some areas, by the alignment of shrubs. The organic terrain is thick growth of shrubs. The tableland on the west side of the organic terrain is exposed and eroded as it is today.

2.0 Previous Archaeological Research and Known Sites in the Vicinity

Charles Borden (1952) designed a site registration system that is used throughout Canada. A "Borden Block" is ten degrees latitude long and ten degrees longitude wide. It uses a co-ordinate system of upper and lower case letters. Canadian archaeologists refer to "Borden Blocks" and "Borden Numbers" and "Bordenize" sites when they register them. Sites within a Borden Block are numbered sequentially. The proposed Severn Aggregates quarry is in the BeGu Borden Block on the boundary of NTS maps 31 D/11 and 31 D/14 (Figure 10). Two sites are registered in the BeGu block within a 5 km radius of the study area. BeGu-6 is located in

concession 9 about 1.5 km to the west of the study area and BeGu-17 is located 4-5 km southwest near Ardtrea.

3.0 Post-Glacial Landscape Evolution and Surficial Geology

After deglaciation, beginning over 12,000 years ago, a large great lake called *Lake Algonquin*, which persisted until about 10,100 BP occupied the Lake Huron/Georgian Bay Basin. Because of inconsistent isostatic rebound in the great lakes region, Lake Algonquin had several different outlets, and its relic strandlines are now found at different elevations in various places around the basin (Lewis and Anderson 1989). From the *Kirkfield Algonquin* stage about 12,500 B.P. to the *Main Algonquin* stage 11,500 B.P., (during the Palaeo-Indian period) the water plane rose steadily and the great lake drained through the Kirkfield outlet, near Fenelon Falls, and down the Trent River into the Lake Ontario Basin. Lake Algonquin remained high until about 10,100 BP when the North Bay gap opened and *Marquette-Ottawa* Low Stand water poured into the Champlain Sea in the Ottawa Valley (Karrow 2004). High water levels returned during the Early Archaic period (Early Mattawa Flood, Mattawa Flood, and Mattawa Base Flow). Archaeological site visibility is affected for this period because, although the relic shorelines of the northern half of the Huron/Georgian Basin are uplifted continually, those in the southern half are submerged below the modern waterline.

In terms of terrain evolution at the proposed Severn Quarry, the upper limestone tablelands, above 233 m a.s.l., would have emerged from Lake Algonquin as a wave-washed bedrock island, in the Late Palaeo-Indian period. During the *Marquette-Ottawa* Low Stand, after 10,100 BP in the Early Archaic cultural period, the sand plains in southeast corner of the proposed Severn Quarry, below 220 m a.s.l., would have been the shoreline of an ancestral version of the Severn River. However, during the subsequent Early Mattawa Flood (9600 BP), Early Mattawa Base Flow (9,500 BP), and Mattawa Base Flow (8500 BP) periods—still in the Early Archaic cultural period—former shorelines, or littoral environmental zones, of the ancient great lakes must have migrated across the proposed Severn Quarry terrain, from the 233 m contour line to the 220 m contour line. As the land rebounded isostatically, through the Middle Archaic cultural period, the proposed Severn Quarry would have been at a removed elevation from the ancestral Severn River shore. which is now marked by the Grass Lake and St. George Lake. During this time the study area would have bordered a minor water body, which is now organic terrain but would have been a shallow pond, marsh, fen, and swamp from then until the historical period.

Figure 7 illustrates the physiography of the study area vicinity, according to Chapman (1975). The study area is primarily classified as limestone plains, although the environmentally sensitive southeastern corner is categorized as sand plains. Relic beaches and escarpments are indicated about 6 to 8 km southwest of the property, just west of Ardtrea, at elevations from 285 to 245 m a.s.l. By extrapolation, the lower relic shoreline must cross the northwest part of the proposed Severn quarry. This indicates that glacial Lake Algonquin washed the thin till from the upper limestone

tableland, above 232 m a.s.l., onto the lower terrace where it has been reworked by wave action. This till would have included fine grained silt, sand, pebbles and cobbles, which derived ultimately from the Canadian Shield, which begins north of the Severn River.

Schnurrenberger and Bryan (1985) have discussed geological forces that may produce natural fractures that might be mistaken for cultural artifacts. Natural fractures are factors of the energy available (high or low) at a specific location and manner of force application. These include: 1) high energy, static loading (such as thick overlying beds and glacial transport); 2) high energy, dynamic loading (such as mudflows); 3) low energy, static loading (such as cryoturbation and solifluction; 4) low energy, dynamic loading (such as a fluvial environment). The only condition that might apply to the proposed Severn Quarry, in early postglacial period, would be number 4, low-energy fluvial environment. In such an environment the limestone plain became scoured and fissured and the surface of the bedrock would be altered by wave action and freeze-thaw into flags and flag fragments. Igneous or metamorphic rock however is much more resistant to such fractures, so any natural occurring pebbles and cobbles of quartz, quartzite, gneiss, or granite, would become water-rolled and rounded. Although natural causes might crack a small fraction of such stones, they would break along cleavage plains and, since the fresh edges so produced would also be subjected to wave action, the edges would become rounded and polished.

4.0 Archaeological Potential

Figure 8 illustrates the archaeological potential of the physiographic zones of the proposed Severn Quarry and the areas that were tested by Stage 2 assessment.

Area 1 is well-drained terrain between elevations 220 m to 231 m a.s.l. Area 1 has high archaeological potential for early Holocene hunter-gatherer sites, because it was part of a littoral zone during the Early Mattawa Flood (9600 BP) to the Mattawa Base Flow (8500 BP) stages of the Great Lakes. The pre-contact archaeological potential of Area 1 would have diminished over time, as the study area became further removed from major littoral zones. The terrain that borders the study area wetlands would have been moderately attractive to later Archaic and Woodland period hunter-gatherers, because the littoral zone was then associated with a minor water body. Area 1 has potential for historical archaeological deposits associated with the late 19th century farmsteads. The recommended Stage 2 field assessment method for Area 1 is test pit survey at 5 m intervals.

Area 2 consists of exposed bedrock limestone tablelands above 233 m a.s.l. Area 2 has low archaeological potential because, although habitable since the *Marquette-Ottawa* low stand stage of the Great Lakes (10,100 BP), it has little or no soil and would have been unattractive for habitation. The recommended Stage 2 field assessment method for Area 2 is visual inspection and judgmental test pit survey where soil may be found.

Areas 3 and 4 are areas of organic terrain with low pre-contact archaeological potential. These areas may be omitted from the Stage 2 field assessment because of poor drainage.

STAGE 3

5.0 Objective of Stage 3 Assessments

Stage 3 is a site-specific archaeological assessment to obtain a representative artifact sample; determine the nature of the deposit; and evaluate the scientific and perceived significance of the site. These data permit an evaluation of site significance and determine if Stage 4 mitigation is warranted.

6.0 Method and Procedure

Permission to enter the property to carry out the Stage 3 assessment was obtained from Mr. Doug Reid of Severn Aggregates Ltd. Ian Badgley, a licensed archaeological consultant (P101), directed the fieldwork from June 19 to June 27 2007. Field and laboratory assistants included: Charmaine Gallagher, Ron Bernard, John Ratcliffe, France Brind'Amour, Collin Potter-Bonar, Monica Maika, and Carrie Herzog. Ian Badgley sorted and catalogued the pre-contact collections and prepared the site plans. John Ratcliffe prepared the catalogues of historical artifacts for BeGu-26 and BeGu-28.

The Stage 3 assessment procedure at each site was to established a datum and superimpose a grid of 1 x 1 m squares and to excavate a test unit where positive Stage 2 test pits had produced artifacts. These units were located in formerly cultivated soils and the plough zone was excavated with a shovel and trowel. The subsoil was scraped clean with a trowel and was inspected for evidence of cultural features. At BeGu-26, a historical homestead, seven sub-operation units were also excavated in, and around, the house foundation depression. The back dirt from all units and sub-operations was passed through a 6 mm mesh and the screen was examined for artifacts. The units were back-filled after excavation. The weather was normal for the duration of the fieldwork and did not inhibit the excavations. Poison Ivy infections affected several crewmembers. The artifact collections are in storage at the consultant's facility at the *Diefenbunker Museum* in Carp.

7.0 Observation and Description

BeGu-23

The eleven 1 x 1 m squares were excavated at the locations of Stage 2 artifact discovery because it was though a representative artifact sample would most likely be acquired in those locations.(Figures 11 and 12). The soil that forms the depositional matrix at BeGu-23 is *Farmington* loam, which is a thin soil that has developed on shallow lacustrine parent material, which overlies the limestone bedrock. Although it

lies today in a second growth deciduous forest, the soil was cultivated in the past. The plough zone is about 20 to 25 cm thick and consists of a thin layer of duff and humus over fine sandy loam. Below the plough zone is the truncated base of the B soil horizon and the upper surface of the silty parent material (Figure 12). A total of 38 stone artifacts were found in the plough zone (see the artifact catalogue, below). In terms of raw materials, the collection divides equally into quartz or gneiss specimens. Most of the detritus consists of quartz, while most of the tools are made from gneiss (Figure 13). This raw material was readily available to pre-contact hunter-gatherers from the surrounding parent material in the form of water-rolled pebbles and cobbles, which ultimately derived from glacial outwash. The density of recovered artifacts was low, as most units produced only a few specimens. The frequency of artifacts, of any kind, ranged from 0 to 7, about three or four artifacts from each unit (Figure 11).

Table 1. BeGu-23 and 24 Artifact Collections

Category		BeGu-23 Material			BeGu-24 Material		
		Quartz	Gneiss	Total	Quartz	Gneiss	Total
• **Detritus**							
Shatter		15	1	16	29	-	35
Waste flakes		1	2	3	10	1	11
Split pebbles		-	-	-	1	1	2
Pebble fragment		1	-	1	-	-	-
Sub-total		17	3	20	40	2	42
• **Tools**							
Scrapers		-	4	4	2	-	2
Perforators		-	4	4	2	-	2
Core-scrapers		-	3	3	-	2	2
Cores		-	3	3	-	-	-
Retouched flakes		1	-	1	1	-	1
Retouched fragment		-	1	1	-	-	-
Backed knife		-	1	1	-	-	-
Micro-gravers		1	-	1	1	-	1
Micro-perforator		-	-	-	1	-	1
Micro-scraper		-	-	-	1	-	1
Projectile point fragment		-	-	-	-	1	1
Fire-lighter		-	-	-	1	-	1
Sub-total		2	16	18	9	3	12
Total	**n**	19	19	38	49	5	54
	%	50.0	50.0	100.0	90.75	9.25	100.0

Over half of the collection (53%) consists of detritus, including shatter, waste flakes, split pebbles and pebble fragments, while the remainder are tools, such as scrapers, perforators, cores, core fragments, and retouched flakes and fragments (Table 1). A

backed knife, of gneiss, was also recovered as well as a micro-graver and a retouched flake—both made from quartz. No cultural features were observed and no artifacts were found in the subsoil.

BeGu-24 site limits are constrained by the boundary and access road and there are no positive test pits below the terrace edge.

BeGu-24

Fourteen 1 x 1 m squares were excavated at BeGu-24 where Stage 2 test pit survey recorded artifacts (Figures 14 and 15). The rationale for this placement was the expectation that it would be the best way to acquire a representative sample.The soil that forms the depositional matrix at BeGu-24 is *Farmington* loam, similar to that described above. A total of 54 stone artifacts were recovered from the plough zone (see the artifact catalogue, below). Quartz is the predominant raw material at BeGu-24; only 9% of the artifacts were made from gneiss. This raw material was readily available in the parent material as water-rolled pebbles and cobbles. Artifact density was low, as most units produced only a few specimens. The frequency of artifacts, of any kind, ranged from 1 to 9, an average of five from each unit (Figure 14).

Table 2. BeGu-25 Artifact Collection

Category		Material				Total
		Quartz	Gneiss	Chert	Syenite	
• **Detritus**						
Shatter		28	-	1	-	29
Waste flakes		25	-	1	-	26
Split pebbles		4	-	-	-	4
Split cobble		1	-	-	-	1
Pebble spall		-	1	-	-	1
Sub-total		58	1	2	-	61
• **Tools**						
Perforators		8	1	-	-	9
Scrapers		-	3	-	1	4
Retouched flakes		1	2	1	-	4
Micro-perforators		2	-	-	-	2
Micro-scrapers		2	-	-	-	2
Micro-graver		1	-	-	-	1
Biface fragment		1	-	-	-	1
Notched split pebble		1	-	-	-	1
Sub-total		16	6	1	1	24
Total	**n**	74	7	3	1	85
	%	87.06	8.24	3.52	1.18	100.00

The majority of the collection (78%) consists of detritus, which includes shatter, waste flakes, split pebbles and pebble fragments, while the remainder are tools, such

as scrapers, perforators, cores, core fragments, and retouched flakes or fragments (Table 1). A fragment of a projectile point made of gneiss was also recovered (Figure 16). As well, several micro-gravers and micro-scrapers, all made from quartz, were collected (Figures 16 and 17). No cultural features were observed and no artifacts were found in the subsoil.

Given that the original positive test pits were largely clustered at 5 m intervals, the site deposit does not extend outside the area of Stage 3 assessment.

BeGu-25

Sixteen 1 x 1 m squares were excavated where Stage 2 test pits had contained artifacts (Figures 18 and 19). Most of the test units were placed two aside, or in one case three were grouped together. The rationale for this test unit placement was because positive test pits clusters clustered there. The soil that forms the depositional matrix is *Farmington* loam, as described above, however, the parent material is sandier. A total of 85 stone artifacts were recovered from the plough zone (see the artifact catalogue, below). Quartz (87%) is the predominant raw material at BeGu-25; the remaining artifacts were made from gneiss, chert, and syenite. With the exception of the chert flakes, these raw materials were readily available in the parent material as water-rolled pebbles and cobbles, which ultimately derived from glacial outwash. Artifact density was low, as most units produced only a few specimens and one unit none. The frequency of artifacts, of any kind, ranged from 0 to 9, an average of four or five specimens from each unit (Figure 18). Most of the BeGu-25 collection (72%) consists of detritus, which includes shatter, waste flakes, split pebbles and pebble fragments, while the remainder are tools, such as scrapers, perforators, cores, core fragments, and retouched flakes and fragments (Table 2). Also recovered were a number of micro-gravers and micro scrapers—all made from quartz (Figure 20). No cultural features were observed and no artifacts were found below the plough zone.

Stage 2 and 3 excavations indicate there are two areas of deposition, the main one on the south side of the ATVtrail, while there is a smaller area on the north side.

BeGu-26

This site has a pre-contact and a historical component. Four 1 x 1 m grid units were excavated near the wetland 20 m southwest of the house foundation, where the Stage 2 test pits contained pre-contact period stone artifacts. Since Stage 2 test pit survey indicated the pre-contact deposit was confined to the edge of the wetland, this provided the rationale for Stage 3 test unit placement. It was thought that excavation beside or over the original positive test pit would be most likely to provide a representative collection of artifacts. These four Stage 3 units produced eight more artifacts including a retouched flake and a worked fragment. No subsoil cultural features were observed and no artifacts were found below the plough zone.

The house foundation depression was divided into 4 quadrants, with the northeast quadrant numbered Sub-operation 1 and progressed clockwise to Sub-operation 4 in the northwest (Figure 21). Excavation began with sub-operation 2A, which was a 4 x 1 m trench extending north from the interior of the wall foundation into the center of the depression. The rationale here was to profile the house feature and compare the nature of the inside and outside deposition. The deposit was 60 cm thick at the foundation wall and tapered to just 20 cm over bedrock in the centre of the depression (Figure 21B). A layer of sod and humus covered the house depression and overlaid a layer of dark brown clay, which included a limestone slab in a lens of light brown sandy soil. On the south side of the house depression, below layer 2, was another layer of orange-red clay, which lay upon the limestone bedrock. At the west end of the trench, near the center of the depression, the dark brown clay (layer 2), capped by humus and sod, lay directly upon the bedrock.

Sub-operation 2A produced 754 glass (67%, ceramic (%), and metal (%) artifacts, as well as a few made from other material. Windowpane sherds (n=479) were the most common (85%) glass artifacts from Sub-operation 2A, although bottle and vessel sherds were also recovered. Ceramic artifacts from this trench included refined white earthenware (RWE) sherds, and some porcelain and earthenware fragments. Iron artifacts consisted mostly of round wire nails, screws, and bolts, while other ferrous artifacts included can and strap fragments. A plastic comb and a button were also found, as well as a fragment of a canvas and rubber boot and two mammal bone fragments. Mortar and brick fragments were encountered and a sample of each was obtained.

Sub-operation 3 did not produce any artifacts. Two amber glass bottle sherds were collected from the surface of Sub-operation 4. Sub-operation 5 was a 4 x 1 m trench oriented east-west at the entrance to the house. This trench revealed a flagstone path (Figure 22B) and produced 105 artifacts, mostly windowpane sherds and wire nails, although a small steel file and a coin were also found. The coin is a “Lincoln Head” USA penny, which was made from 1909 to 1952.

Sub-operation 6 was 1 x 2 m trench, an extension of Sub-operation 2A, which was oriented south from the exterior of the foundation. This trench did not contain any artifacts and consisted of a thin sod and humus layer over shallow dark gray clay, over bedrock. The stone wall consists of limestone flags set with clay. It was not built upon the bedrock and served as a façade below a sill (Figure 22A).

Four 1x1 m grid units were excavated around the outside of the house foundation depression. S50E80 and S50E81 contained 15 artifacts between them, including part of a buggy spring, pieces of ferrous metal, and several bottle sherds. S60E66, on the west side of the depression, produced 735 artifacts, most of them (68%) made up of wire nails, spikes, tacks, etc., however 64 ceramic sherds (44 RWE, also earthenware and highly vitrified) and 66 glass sherds (lamp chimney and bottle sherds) were also found. S63E70 produced 85 artifacts in similar proportion of material and category as described above.

BeGu-28

Nine 1 x 1 m grid units were excavated at BeGu-28 where Stage 2 field tests had indicated the presence of 20th century artifacts. Two of these lie at some distance from the house where isolated positive test pits had been recorded. Neither produced any archaeological material. Artifacts were also collected from a midden, or garbage dump, about 10 m elevation above and 60 m north of the former farmhouse (Figure 25). The midden is situated in a fence corner, on the exposed bedrock, near the concession road. The midden produced 55% of the 869 artifacts collected from BeGu-28, as well as most of the glass and ceramic specimens (see Artifact Catalogue, below). Most of the glass consisted of bottle or container sherds—mostly clear, brown, or green; although a variety of other colours (blue, white, mauve, pink and yellow) are represented. The midden also produced 217 ceramic sherds, mostly refined white earthenware (RWE) tableware and sherds of earthenware crocks and pots.

Seven grid units were excavated in and near the house foundation. The rationale for placing the units here was that Stage 2 test pit survey indicated a concentration of artifacts on the north side of the house while there were few positive test pits elsewhere. In this way it was thought a representative sample of artifacts would most likely be acquired. One grid unit was excavated in the house foundation and six others were located within 10 m of the north and west side of the depression. Two units were excavated at 12 and 21 m distance from the house (Figure 26). The soil profile in proximity to the house foundation was thin dark gray clay loam, over shallow parent material of dark brown gray clay, on limestone bedrock (Figure 28). S67E58, located in the foundation, produced 279 artifacts, mostly of iron, largely wire nails, spikes, as well as some refined white earthenware (RWE) sherds. The grid units near the house produced another 125 artifacts, made up of 55 glass fragments and 35 ceramic sherds. Also collected were various ferrous, and other metal artifacts, as well as some specimens made of plastic (Figure 29). Two units excavated at a distance from the house foundation did not contain artifacts.

8.0 Results

Stage 3 excavations have been carried out at five archaeological sites in the proposed quarry and there is now sufficient information about the nature of the artifact deposits to permit the evaluations of site significance.

BeGu-23 Evaluation of Site Significance

- *Site Type & Function* – This pre-contact site was a campsite or workshop, or a resource gathering station. The artifact collection consists of stone tools-of-expediency made from locally available raw material
- *Cultural Affiliation & Age* – This pre-contact site is affiliated with a hunter-gatherer culture of undetermined age, possibly from early

postglacial times, because the site is at, or about, the elevation of known relic shoreline features in the vicinity.

- *Rarity & Representation* – Diffuse lithic scatters are commonly reported in the archaeological site database, because the artifacts are made from a durable material and derive from an expedient technology.
- *Artifact & Feature Density* – Artifacts occur in low density and frequency. No pre-contact cultural features were observed.
- *Integrity & Preservation* – The deposits have been affected in recent times by cultivation and forest clearance. The soil is shallow and erosional, rather than depositional. No bones or other organic material were observed.
- *Human Remains* – Human remains were not observed.
- *Community Interest* – Hunter-gatherer settlement studies and artifact collections are of interest to the scientific and educational community and to First Nations.
- *Scientific Potential* – is low because poor depositional integrity, low artifact density, and the lack of cultural features, diagnostic artifacts, or organic material, limit the empirical data available through excavation.

BeGu-24 Evaluation of Site Significance

- *Site Type & Function* – This pre-contact site is a diffuse lithic scatter. The artifact collection consists of stone tools-of-expediency made from locally available raw material.
- *Cultural Affiliation & Age* – This pre-contact site is affiliated with a hunter-gatherer culture of undetermined age, possibly from early postglacial times, because the site is at, or about, the elevation of known relic shoreline features nearby.
- *Rarity & Representation* – Diffuse lithic scatters are commonly reported in the archaeological site database, because the artifacts are made from a durable material and derive from an expedient technology.
- *Artifact & Feature Density* – Artifacts occur with a low density and frequency. No pre-contact features were observed.
- *Integrity & Preservation* – The deposits have been affected in recent times by cultivation and forest clearance. The soil is shallow and eroded, rather than depositional. No bones or other organic material were observed.
- *Human Remains* – Human remains were not observed.
- *Community Interest* – Hunter-gatherer settlement-subsistence studies are of interest to the scientific and educational community and to First Nations.
- *Scientific Potential* – is low because poor depositional integrity, low artifact density, and the lack of cultural features, diagnostic artifacts, or organic material, which limit the empirical data available through excavation.

BeGu-25 Evaluation of Site Significance

- *Site Type & Function* – This pre-contact site is a diffuse lithic scatter. The artifact collection consists of stone tools-of-expediency made almost entirely from locally available raw material.
- *Cultural Affiliation & Age* – This pre-contact site is affiliated with a hunter-gatherer culture of undetermined age, possibly from early postglacial times, because the site is at, or about, the elevation of known relic shoreline features nearby.
- *Rarity & Representation* – Diffuse lithic scatters are commonly reported in the archaeological site database, because the artifacts are made from a durable material and derive from an expedient technology.
- *Artifact & Feature Density* – Artifacts occur with a low density and frequency. No pre-contact features were observed.
- *Integrity & Preservation* – The deposits have been affected in recent times by cultivation and forest clearance. The soil is shallow and erosional, rather than depositional. No bones or other organic material were observed.
- *Human Remains* – Human remains were not observed.
- *Community Interest* – Hunter-gatherer settlement-subsistence studies are of interest to the scientific and educational community and to First Nations.
- *Scientific Potential* – is low because poor depositional integrity, low artifact density, and the lack of cultural features, diagnostic artifacts, or organic material, which limit the empirical data available through excavation.

BeGu-26 Evaluation of Site Significance

- *Site Type & Function* – The historical component is a homestead.
- *Cultural Affiliation & Age* – The pre-contact sites are affiliated with a hunter-gatherer culture of undetermined age, while the historical component is 20th century Euro-Canadian.
- *Rarity & Representation* – Hunter-gatherer sites of undetermined age (flake scatters) are commonly reported in the archaeological site database, because the artifacts are made from a durable material and derive from an expedient technology. The sites are representative of seasonal resource harvesting and processing by hunter-gatherer people who made intermittent visits to the property in the early postglacial, or later, periods. The historical homestead component is representative of early 20th century rural subsistence homestead.
- *Artifact & Feature Density* – Artifacts from the pre-contact component occurred in low frequency and density. No pre-contact features were observed. Except for nails and windowpane sherds, the 20th century artifacts are not particularly numerous or densely distributed.

- *Integrity & Preservation* – The deposits have been affected in recent times by cultivation and forest clearance. The interior of the house depression has been disturbed. No bones or other organic material were observed in the pre-contact components and only a few mammal bone fragments were collected from the historical component. Iron and ferrous material has not preserved well and the glass and ceramics are fragmentary.
- *Human Remains* – Human remains were not observed.
- *Community Interest* – Hunter-gatherer settlement-subsistence studies are of interest to the scientific and educational community and to First Nations.
- *Scientific Potential* – is low for both cultural components, because the poor depositional integrity, low artifact density, and a paucity of cultural features, diagnostic artifacts, or organic material, limit the empirical data available through excavation.

BeGu-28 Evaluation of Site Significance

- *Site Type & Function* – This historical site is a farmhouse.
- *Cultural Affiliation & Age* – 20th century Euro-Canadian, based on catalogue of artifacts.
- *Rarity & Representation* – The historical farmhouse site is representative of 20th century rural settlement.
- *Artifact & Feature Density* – Except for a small midden, the artifacts have a low density and frequency.
- *Integrity & Preservation* – The deposits have been affected in recent times by cultivation and forest clearance. The house was demolished and removed after occupation. Few bones or other organic material were observed.
- *Human Remains* – Human remains were not observed.
- *Community Interest* – low because of lack of historical association
- *Scientific Potential* – is low.

9.0 Conclusion and Recommendation

The consultant concludes that the archaeological deposits in the proposed quarry are of low significance because of poor depositional integrity, low artifact density, and low scientific potential. Stage 2 test pits and Stage 3 excavations have adequately recorded five and no further work is warranted The consultant has no further heritage concerns concerning the development property and he recommends that the Ministry of Culture issue a letter of clearance to Severn Aggregates Ltd.

However, given the nature of archaeological phenomena, it is possible that deeply buried archaeological deposits, or human remains may yet be disturbed during construction. If the former are discovered the Heritage Operations Unit should be notified immediately (416-314-7123); if human remains are disturbed, the Registrar

or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations should be notified (416-326-8404).

10.0 Discussion

Readers of this report may not be familiar with the use of granite, gneiss, and quartz for stone tools in Ontario in the Pre-contact Period and may wonder if such raw materials are suitable for tools, given that chert, and other microcrystalline stones, are more commonly reported. Also, readers are probably unfamiliar with bipolar and anvil percussion as a lithic reduction techniques. These methods can be used to make stone tools instead of, or in conjunction with, direct percussion and pressure flaking, which are the techniques used in bifacial reduction to shape a formal tool. Formal tools, particularly when found in a statigraphic depositional context, have been instrumental in establishing the framework of prehistory in Ontario because they are chronologically diagnostic. However, life in the Stone Age was profane and, generally speaking, man/land relationships did not significantly change from the Oldawan to the Neolithic. In fact, all cultures that relied on lithic technology to survive, performed most mundane tasks by means of the simplest tools made from cores and flakes. Even though debitage and waste products from stone reduction dominate the lithic assemblages of most Pre-contact archaeological sites, the emphasis in the published literature (especially in the early postglacial period) has mostly been focused on formal tools and exotic material. A few observant archaeologists have remarked upon the bias but the problem was and is rarely addressed.

“The most common tool encountered, as in all stone tool-using cultures, is the stone flake that upon being detached from a core is razor sharp and capable of performing a wide range of cutting, scraping, slotting, and puncturing functions with no or little further modification” (Wright 1995:30).

The discussion below describes and compares different methods of percussion (direct, bipolar, and anvil); discusses the suitability of igneous and metamorphic rock for stone tool use; archaeological invisibility and bias in the archaeological record; and the theory of Archaic and Mesolithic stone tool adaptations. The discussion also includes annotated references from peer-reviewed literature that describe anvil and bipolar percussion and the use of non-chert stone to make tools of expediency. The references discussed first are from international contexts (Chile and Sweden), followed by examples from Western Canada, Northeastern United States, and lastly, from Ontario. Figures 26 and 27 presents diagrams from the literature that explain methods of percussion and some of the types of flakes that result.

10.1 A Comparison of Percussion Methods

With direct, freehand, percussion and bifacial reduction, the mechanic follows a sequence of flake detachments and attempts to predict how each flake will detach in order to shape the biface into a preconceived form. The ability to shape a biface into a

formal projectile point type requires practice and skill and is easier to accomplish when the raw material is a tractable stone like chert. Bipolar percussion, on the other hand, requires no skill or practice and works well with any raw material. While it is impossible with bipolar percussion for the mechanic to predict how the flakes will be detached, the technique is certain to produce a multitude of useful edges and points that can be used to work organic substances with minimal modification—or none at all. While in bipolar percussion the force is delivered straight down into the centre of the core, anvil percussion allows a degree of flake prediction because the blow is directed at an angle to the core towards the outside of the core (see Figure 26c).

The bipolar technique is simple: place a core—a quartz or quartzite pebble, or cobble, or tabular piece of quartz or chert—on a large hard stone (called an anvil) and strike it straight down at the anvil with a hard hammerstone. Typically the core will exhibit crushed poles and, if battered repeatedly, may become bi-pointed. Bipolar percussion results in a variety of flakes but, typically, negative and positive bulbs of percussion are not readily apparent. After a pebble core is shattered on an anvil, the mechanic selects pieces with appropriate edges to use as tools-of-expediency for the task at hand. These are not curated but are disposed of when the task is complete.

Regardless of the type of the type of percussion used, the Cone Principal of physics governs the process of stone breakage—whether the material has good conchoidal properties or poor (see Figure 26b). The hallmarks of a flake detached by direct percussion include: prepared, or distinct, platforms, a pronounced bulb of percussion (some times with an eraillure flake scar), and ripple marks and flakes detached in the course of bifacial reduction will include primary and secondary flakes, as well as characteristic types such as “thinning” and “bifacial retouch” flakes. Bipolar and anvil percussion, on the other hand (while capable of producing a flake with “classic” hallmarks) produces a wide variety of flakes, fragments, chunks, and blocks. While anvil percussion includes some degree of “flake prediction” in the detachment of primary and secondary flakes, the result of bipolar percussion, in particular, cannot be predicted. Nevertheless, the mechanic can expect certain useful forms to recur, namely: “citrus wedge” shapes, “triangular flakes”, and “multiple flakes” (see Figure 27b). Citrus-wedge shapes (see Figure 27c) especially result from bipolar percussion of cobbles and pebbles and can be used unmodified as backed knives, or minimally modified for other tasks. Triangular flakes are long and thin with parallel sides and a triangular cross section (see Callahan 1987)). Multiple flakes are long wide thin flakes, with no apparent dorsal face, produced as multiples. Multiple flakes are sometimes the largest, thinnest, flake possible from small cores and they make excellent biface performs (see Boksenbaum 1980). Hallmarks of bipolar percussion cores include: multi-facetted surfaces, with one or more crushed, battered, and pointed poles. Anvil percussion cores may have prepared platforms and many small circular cone scars (sometimes with concentric rings, sometimes overlapping) are common (in addition to the cone scar that initiated the flake detachment) while a battered and pointed, pole may develop at the opposite end. The cores may be used to detach one or two flakes, or many flakes may be detached from multiple faces. Anvil cores will sometimes show negative bulbs of percussion and anvil-struck flakes may

have pronounced or diffused bulbs of percussion, depending upon the raw material. Since the source of raw materials such as granite and gneiss are often boulders, rocks, ledges and cliffs, primary and secondary flakes are often very large, they are usually broken up into smaller pieces by means of "compression breaks"—a hallmark of bipolar percussion—induced by bipolar percussion, to make useful shapes and edges.

Crabtree (1972; 1973) and Cotterell and Kamminga (1987) describe how flakes can be shaped by compression breaks (induced by bipolar percussion) that produce flake fragments with edges with a straight, right-angled, edge profile, if there is direct contact between the hammerstone and the anvil. If the anvil has a depressed surface the break profiles will be concave/convex (see Figure 27a). Compression breaks are a common way to split pebbles and cobbles and reduce the size of large flakes and spalls struck from cobbles and boulders. They also serve to make the "back" of an edge used as a knife.

10.2 Suitability of Igneous and Metamorphic Rock For Stone Tools

Granite and gneiss are of similar chemistry, since both are predominantly made up of grains of quartz and feldspar, with other minerals, such as biotite, in smaller proportion. Chert, quartz, and felspar are all forms of silica and are similarly hard, all at least 6 in Moh's scale of hardness. The biotite grains often found in granite and gneiss are soft in comparison but, overall, a freshly detached flake of granite or gneiss can be very sharp indeed—sufficient, in any case, for short-term expedient uses, such as to: cut, scrape, saw, or perforate organic materials like fish, flesh, skin, bone, ivory, bark, or wood. However, once percussion has taken a flake of granite or gneiss from the lithosphere into the biosphere, the material begins to degrade from the effects of sunlight, chemical weathering, and frost. While a chert flake struck from a biface, for instance, may develop a surface patina; a flake of granite or gneiss will be affected by surface particle attrition caused by the erosion of the softer mineral grains (such as biotite) so that, over time, the flake edges and ridges between flake scars are increasingly rounded and indistinct. Collins (1997:385) notes that, over time, chemical weathering alters the "freshness" or appearance of stone facets, resulting in changes in colouration, surface pitting, and the gradual rounding of working edges and flake scar arrises. This process occurs widely and contributes to the archaeological (in)visibility problem discussed below.

In terms of suitability for bifacial reduction and to shape projectile points, microcrystalline materials like chert are ideal—if a large enough flake can be struck to make the preform—but quartzite and other cryptocrystalline rock can suffice. Even rather coarse-grained igneous and metamorphic rock can be worked into bifaces and points—by skilled and determined mechanics. For the most part however, these materials lend themselves to bipolar and anvil percussion and the manufacture of expedient or informal tools. For such purposes, the "schistocity" and natural cleavage of such materials can be used to advantage in the reduction process. (This too contributes the invisibility of non-chert material.)

10.3 Archaeological Visibility and Invisibility

Stone tool assemblages made from igneous and metamorphic rock by means of bipolar and anvil percussion have low "archaeological visibility" because archaeologists are, in general, are most familiar with the bifacial reduction of raw materials like chert by means of direct percussion and pressure flaking while unfamiliar with bipolar and anvil percussion. This has skewed artifact collections in favour of chert artifacts with aspects of direct percussion or bifacial reduction; while the other artifacts are ignored or overlooked and become archaeologically invisible. In this way, a site can be "invisible", because all or most of the artifacts are of igneous or metamorphic material worked by bipolar or anvil percussion. These kinds of sites only become visible when diggers have learned not to discriminate against non-chert materials and to look for hallmarks other than those more common to direct percussion. Even then, samples of non-chert stone should be routinely collected during test pit survey and examined in the laboratory after they have been washed.

By way of example, consider the a joke that has been common in archaeological social circles for decades: where a neophyte digger shows a stone to a field director and asks "Is this anything?" only to be told it is a "dog-stone", while it is thrown at an imaginary scavenger.

Other factors that have contributed to the archaeological invisibility of minimally modified tools (especially those made from igneous and metamorphic rock by bipolar and anvil percussion) has more to do with surficial geology and demographics. One of the reasons it is difficult to locate early postglacial sites in Eastern North America is that the sea coast and lower river valleys in the early postglacial were submerged over the millennia by rising sea levels. The situation was similar in peninsular Ontario through the Early and Middle Archaic periods, because the water level of the Great Lake basins were well below today's level for millennia. Given that proximity-to-water is the principal assumption of archaeological site prediction models, the highest areas of archaeological potential for Early and Middle Archaic sites in peninsular Ontario is now underwater and unavailable to normal methods of archaeological discovery. Obviously, this situation has biased the archaeological record of this period towards "inland" sites.

The great rift valley of the Nipissing-Mattawa-Ottawa-St Lawrence drainage, however, stand in contrast to peninsular Ontario, for this ancient channel contained huge volumes of water for thousands of years. Because the floor of the rift valley experienced rapid and extreme isostatic rebound, a sequence of relic shorelines formed as the water level gradually receded. These relic shorelines ring the valley walls from Quebec City to the north shore of Lake Nipissing.

The demography of Ontario has contributed to the invisibility problem because most archaeological research, past and present, has mainly taken place in peninsular Ontario, where most of the population lives and where igneous and metamorphic materials are relatively scarce and micro-crystalline materials, like chert, are readily

available. Eastern and northern Ontario on the other hand, where chert is rare and granite or gneiss are common, has received very little attention.

10.4 Theory of Lithic Technology in the Archaic

Brian Hayden and William Andrefsky Jr., are two well-known lithic experts who have developed theories of lithic use that are appropriate in the current context.

In a paper published in *Current Anthropology* Brian Hayden (1981) discussed technological adaptation among hunter-gatherers during the transition from Palaeo-Indian to Archaic, in the New World, and from the Palaeolithic to the Mesolithic in the Old World. The Palaeo cultures are characterized by nonpermanent habitation, high mobility over a large land base, and the exploitation of large to medium-sized game animals in areas of high carrying capacity, which led to a wide geographic distribution of technological and stylistic stone artifacts. Archaic and Mesolithic cultures, on the other hand, are "…characterized by two major trends: general diversification of resources exploited in areas of poor-to-moderate resource richness and a tendency toward specialization in habitually exploited resources in resource-rich areas." Diversification resulted in the exploitation of smaller animals and gave new economical importance to plant foods and fishing. The use of a few simple tools became a hallmark of the Mesolithic/Archaic adaptation. Groundstone tools (such as edge-ground wood-cutting tools like axes, adzes, gouges, ground-slate knives) and the use of copper first occur with any regularity in the archaeological record of this period. In particular, Hayden points out the use of local raw materials, often poor in quality, as opposed to very high-grade exotics. This change in technological adaptation in the Archaic was often called a "degeneration" when compared with the projectile points characteristic of the Clovis-Folsom-Dalton tradition. According to Hayden, the technological adaptations of the postglacial period were a result of environmental stress brought on by climatic change and landscape evolution.

Hayden notes that current anthropological theory holds that highly mobile hunter-gatherer cultures—like Palaeo-Indians—tend to make use of very high quality material, often obtained through trade, to make formally shaped tools, like projectile points or endscrapers; while more sedentary groups—such as Archaic cultures—often relied on informal and expedient tools made from poorer quality, locally available raw materials.

William Andrefsky Jr. has developed and tested a theory of lithic organization (*American Antiquity* 1994 v.5 (1):21-34), based on the relative abundance and quality of lithic resources of any given region. He examined three large, widely separated, study areas in western USA, which contract archaeologists had systematically assessed. Each area had very different characteristics in terms of lithic abundance and quality and both mobile hunter-gatherers and sedentary agricultural cultures had occupied each area.

In the first area, where high (chert) and low quality (sandstone, quartzite, limestone, basalt) raw materials were available but not abundant, the expected association between tool design and mobility did not hold, since both formal and informal tools were made by both sedentary and mobile hunter-gatherer cultures. Moreover, even though very high quality material was available through trade from nearby sources, local lithic materials were used to make over 90% of all tools. The second area did not contain any good quality materials and only a few poor materials (quartzite and schist) were available. The stone artifacts recovered were largely made from high quality materials (chert, obsidian, and quartz crystal) obtained through trade from sources a considerable distance away. This material was used predominantly to make formal tools (projectile points, unifaces, scrapers, perforators, gravers) rather than informal ones. The poor quality coarse-grained material accounted for only 13% of the artifacts—all of them informal. In area third case, relatively poor quality lithic material was available throughout the area and formal tools were made from a variety of high quality lithics obtained through trade; while poor quality local material was used for informal ones. Andrefsky concluded that lithic raw material availability is a significant factor in the organization of lithic technology. His observations are summarized in a four-cell contingency table with lithic abundance (high or low) on one axis and lithic quality (high or low) on the other (see Figure 26a). According to Andrefsky's model, archaeological lithic assemblages like the one from Severn Quarry would characterize situations where lithic quality was either: low with low abundance, or low with high abundance. The Severn Quarry technology falls into the latter category.

10.5 Annotated References from Peer-Reviewed Literature

Below are annotated references from peer-reviewed archaeological literature that address in more detail the questions raised by raw material, suitability, and tool category and provide interested readers with additional references to refer to for study purposes.

Although there are no pertinent peer-reviewed publications that refer specifically to Simcoe County archaeological discoveries, there are many examples from international settings and from other regions of North America, including western Canada, Northeastern North America, and Ontario.

10.5.1 International References

Chile

At the world-renowned Monte Verde site in Chile a peat bog has preserved example of a Pleistocene culture with excellent cultural deposition. The deposit included traditionally recognized kinds of stone artifacts and others that are less clearly modified or used and do not constitute artifact classes or types in the usual sense. The assemblage includes a few curated tools of formal design and a large number of expedient tools. In the 1980s, the excavator, Tom Dillehay, realized that the assemblage of stone tools from Monte Verde were invisible to many North American

archaeologists and needed to be assessed in an objective manner to learn how they were made and their suitability for stone tools.

Michael Collins (1997) addressed this invisibility problem through a descriptive and morphological analysis of formal and informal stone artifacts in volume 2 of "Monte Verde a Late Pleistocene Settlement in Chile" a case study of the *Smithsonian Series in Archaeological Enquiry* that addresses important research problems and demonstrates useful methodological approaches to analysis. To this end, Collins (and Tom Dillehay) carried out use-wear analysis and experiments using replicas of the expedient tools. Their general conclusion was that "expedient use of minimally modified stones was an important aspect of the lithic technology at Monte Verde and that many specimens lacking macromorphological evidence for cultural modification or use were, in fact, probably part of the tool kit."

In total, 752 stones were analysed with an almost entirely inductive approach due to a lack of a paradigm. In particular he found the Palaeo-Indian model for interpreting chipped stone artifacts applied to less than 5% of the sample. A fundamental aspect of the study was to distinguish human from natural processes that affect stone and so he compared the 752 specimens—found in excellent depositional context on the floor of well-preserved dwellings—to a representative sample of stones from gravel beds in the surrounding environment. The null hypothesis of his comparison was that the stones recovered from archaeological contexts were a result of natural processes. The form of the cultural example proved to be significantly different from the natural one. Experimental replication indicated that the cultural sample had functional utility and microscopic analysis indicated, through visible use wear and the presence of organic residues, that artifacts in the archaeological sample were used as tools.

Collins, who has a background in Palaeo-Indian lithic analysis, initially saw nothing unquestionably cultural about the stones and, with the exception of one or two specimens, he suspected that most would not prove to be demonstrably cultural. However, after 12 years of study to develop the criteria that could discriminate cultural breakage from natural fracture, he learned "…to view the Monte Verde stones as part of a sophisticated prehistoric culture that efficiently tapped the local geologic environment…and he had "no longer any doubt that the assemblages…are cultural and represent effective sophisticated use of available lithic resources. These assemblages simply look clumsy and ineffective."

The most common raw materials at Monte Verde were igneous rocks like basalt, tonalite, andesite, tuffs, gabbro, and diorite, and metamorphic rocks, such as quartzite, and gneiss. Quartz is another raw material that was selected for use. Some examples of informal or expedient tool categories broadly similar to those at Severn Quarry are: notches; choppers; cores; flakes; edge-battered stones; single-faceted split stones with macroscopic evidence for use; single faceted stones without macroscopic evidence of use; multifaceted stone with macroscopic evidence of use; multifaceted stones without macroscopic evidence of use; single-facetted battered stones; faceted stones with one right angle; and hammerstones.

Sweden

Errett Callahan (1987), a Palaeo-Indian lithic specialist from the USA, published the results of an intensive study of the lithic technology called "An Evaluation of the Lithic Technology in Middle Sweden during the Mesolithic and Neolithic", which was funded by the Swedish Council for Research in the Humanities and Social Studies and published in *Aun 8* by Societas Archaeologica Upsaliensis. The stone tool technology he described, replicated, and tested in such detail is similar to the assemblages found at the Severn Quarry.

According to Callahan, the problem addressed is "both unique and universal" since, on one hand, "it is totally different from the well-known technology of southern Sweden and Denmark" yet "it is relevant to many cultures throughout the world where coarse materials such as quartz and quartzite predominate and where tool typology is vague". He notes, too, that part of the problem (which contributes to its archaeological invisibility) is this lithic technology (although recognized by earlier generations of archaeologists) "…has been either ignored or given superficial treatment in the literature until now."

Bipolar percussion is used to make pebble and cobble tools. It is an elegant method of deriving useful lithic edges from ubiquitous raw materials that are too small to permit bifacial reduction of long flakes or blades struck from cores. Hunter-gatherers globally have used variations of this lithic reduction strategy from the time of our earliest ancestors to the ethno-historic present. It is a deceptively simple technique but part of an essential strategy of the early Holocene pioneers of those parts of Ontario characterized by the Canadian Shield or the rocky till that flanks it.

"This model allowed virtual freedom of movement across the landscape, with any size and kind of lithic material being suitable for use. The evolution of a system dependent upon rather small flakes of predominantly local material and an informal, fluid, tool typology may have been a master stroke of wisdom…" (Callahan 1987:61)

According to Callahan, many researchers have not recognized "…that bipolar reduction is a process, not just a fracture type…there is no such thing as a true bipolar fracture…wherein cracks are simultaneously produced at both poles of the core…it makes no difference whether one or two cracks are produced. What is important is that the process involves a core being struck straight downward from above, perpendicular to both the core top and the anvil" (ibid:13). Calahan's diagrams of direct, bipolar, and anvil percussion are replicated in Figure 26c.

The assemblages studied in 1984 came from four sites in Middle Sweden, two excavated in the late 1930s, 1977 and 1981 with a total of 63 "drawers" of stone artifacts made from quartz, quartzite, halleflinta, and porphyry. (Callahan notes that the informal and expedient artifacts were largely "invisible" to the excavators, who were unfamiliar with these kinds of artifacts, and so a good deal of non-artifacts and fire-cracked-rocks were included in the assemblage.)

The classification system devised by Callahan includes: cores (freehand platform, anvil platform, and bipolar); chopper-like cores (freehand and anvil); unmodified/unretouched flakes (freehand/anvil, bipolar, triangular splinter); modified/retouched flakes (scraper-like, denticulate-like, spokeshave-like, borer-like, bifacial-like, transverse point, oblique point, retouched flake); core scrapers; microblades; thick pieces/blocks; hammerstones; anvil stones; stone axes; abrading stones.

Callahan carried out over a hundred structured experiments using replicas of the cores and flakes made from same raw lithic materials available locally. The result was an invaluable lithic reference collection stored at Upsala University. In one test, Callahan butchered sheep using flint, quartz, and porphyry separately. He found the quartz be the superior material for this task but, to his surprise the porphyry flake proved to be more than adequate and even coarse quartzite was "suitable enough for certain common tasks".

10.5.2 Western Canada

The expedient use of pebbles and cobbles as tools by pre-contact cultures is a lithic technology that was first recognized in Canada by Carl Borden (1960) at the Milliken site in the Fraser Valley, British Columbia (published in *Contributions to Anthropology 1957*, National Museum of Canada, Bulletin 162:101-118, Ottawa). His later research (Borden 1975) demonstrated that cobble tools in various forms were a common adaptation of hunter-gatherers in a littoral, riverine, or marine environment. Some prominent researchers see the common, systematic, use of pebble and cobble tools as a technological hallmark of early cultures in the Northwest Coast (Carlson 1979; Fladmark 1990). Others have observed that in more recent contexts (such as

shell midden deposits in the Lower Mainland of the Fraser Valley) pebble tools continued to be used for special purposes (Grabert 1979).

10.5.3 Northeastern North America

Robinson (1992: 95-97) defined a Gulf of Maine Archaic Tradition as a technological pattern (not a substitute for a whole cultural tradition) spanning the Early and Middle Archaic periods in northern New England, between approximately 9,500 and 6,000 BP. Like the Severn Quarry assemblages, it is characterized by "a flaked stone industry dominated by core, uniface and flake technology;" together with low frequencies of bifaces and a paucity or absence of projectile points, and ground stone tools. Ground stone artifacts are represented at frequencies of between 0 and 11% of the lithic tool assemblages at several early Archaic sites (Robinson 1992:102).

Victoria Bunker (2002: 25) states in *The Indian Heritage of New Hampshire and Northern New England*: "A nonbifacial toolkit has recently been recognized throughout northern New England during the Early Archaic period. Quartz is the primary stone tool material in this tool kit, which consists of a variety of steep and beaked unifacial edge tools, cores and flakes." Dincauze (1993:12) reports Early Archaic assemblages from central and northern New England sites that consist almost entirely of quartz uniface tools. Bourque (2001: 41) notes that the Early Archaic occupants of Maine flaked occasional tools from chert and rhyolite, but that "They also made many scrapers and minimally modified unifacial tools from quartz. In fact, an abundance of quartz flaking debris is one of the hallmarks of Early Archaic sites."

Quartz is a primary raw material for flaked stone tools in the Gulf of Maine Archaic tradition technological pattern, although a variety of igneous and metamorphic rocks are commonly used when quartz is not present, as is the case at Severn Quarry. Robinson (1992:96) characterizes these artifacts as "steep-edged quartz unifaces, irregular cores, flake tools, blocky fragments and flakes." Sanger (2005: 19) describes the Early Archaic from Maine as characterized by a variety of crude tools made from quartz and metamorphic rock, with forms that are "more functional than elegant." Robinson (1992:97) notes that thick-bitted uniface "scraper" intergrades continuously with cores.

David Sanger published an article in 1996 in the *Canadian Journal of Archaeology* (v.20:7-28) in which he noted that prior to 1980 interpretation of the archaeological record in New England from the early and mid-Holoceneperiod "depended almost entirely on extension of culture types defined outside the region"; however, since then, considerable new data about the Early and Middle Archaic in Maine has appeared that demonstrated the inadequacy of the imported models.

At the Gilman Falls site on the Stillwater River in Maine Sanger excavated a Middle Archaic quarry and workshop site, where poor quality, metamorphic rock (phyllite and granofels) had been reduced by bipolar/anvil percussion and used to fashion both

formal and informal/expedient tools. Some of the phyllite choppers he illustrates resemble artifacts from the Severn Quarry. In reference to such tools, he notes:

"Tempting though it may be to dump all of these unprepossessing tools into the catch-all category "expediency tools", closer examination reveals variability, some of which may be significant…Despite the tendancy to over-differentiate, a substantial number of pieces is relegated to "flaked phyllite", defined as artifacts that exhibit minimal shaping. If found in later contexts, many specimens in this class might well be discarded as non-artifactual." (Sanger 1996:14; emphasis has been added to highlight archaeological visibility).

The stone artifact categories at Gilman Falls include: groundstone rods, rod preforms gouges, and celts; choppers; phyllite "slate" points; battered nodules. Choppers are "large heavy, crudely-worked pieces affecting a steep edge angle, often unifacial, sometimes bifacial". "Battered nodules" is a term Sanger applies to "flaked felsite cobbles" with battered ridges between flake scars. Sanger speculates that the rods may have been used to sharpen the gouges. Sanger notes that "Gilman Falls joins with other central Maine sites in the apparent paucity, or even absence, of a chipped projectile point tradition during part of the Middle Archaic" and he suggests that the projectile points may have been made from organic substances

Sanger notes that the material (quartz-muscovite granofels and/or phyllite) is difficult to flake bifacially, "however, this rock can be shaped by unifacially flaking along one edge. The blank is then turned over and reduced unifacially along the second long edge, a technique which produces a beveled cross section." (ibid:19).

The retouched and notched tools in the Severn Quarry assemblages resemble the steep-bitted "scrapers" and "edge tools" reported from the lower levels of the Eddy site in Manchester NH, dated to approximately 8000–7500 BP (Bunker 1992:141). The range of artifacts in the Severn sample is similar to those of the quartz and rhyolite assemblages from the Early Archaic levels of the Brigham and Sharrow sites in the Maine interior, dated to between about 9500 and 7500 BP (Petersen and Putnam 1992: 32, 34).

10.5. 4 Ontario

In 1939, Kenneth Kidd (Curator of Ontario Archaeology at the ROM, later a professor at Trent University) and Norman Emerson (a professor at the U. of T.) carried out one of the first professional excavations on a pre-contact site in northern Ontario at Rock Lake in Algonquin Park. In 1948, Kidd published an account of this excavation in the *Southwestern Journal of Anthropology* (Vol.4:98-106). "Two superimposed cultures of simple content" were revealed in an excavation of 375 square feet, which contained about 1,000 bone fragments, 392 Late Woodland potsherds, and 253 stone artifacts (excluding fire-cracked rock), including 64 pieces of exotic chert. The exotic chert was used to make formally shaped scrapers, while "The slate culture, from the lower portions…" may have been older, possibly from

the Archaic period. Most of the artifacts, however, were of granite, quartz, and slate and included numerous granite pebbles and other stones. Kidd notes that: "By far the greater number of these showed no evidence of human workmanship" (ibid:101). One of the formal artifacts recovered was a crude edge-ground axe made from "finely consolidated granite" (like felsite). Kidd classified a large proportion of the stone artifacts as "problematical tools" that he defined as: "…extremely crudely made, so crudely that their purpose can only be guessed at. There are four pieces which may conceivably have been used as scrapers…" (ibid:102). One of the artifacts Kidd illustrates in the report (ibid:Fig 1c) is an irregularly-shaped, step-flaked, slate piece that he calls a scraper—it is similar to an artifact from Severn Quarry that was also called a "scraper". Such artifacts might more accurately be termed simply "retouched flakes". Kidd was a prescient archaeologist who understood that some artifacts were "archaeologically invisible" (he did not use that term however), so obviously many stone artifacts in his collection—like those from Monte Verde or Middle Sweden—were collected because of their depositional context and association with demonstrable artifacts: "Many of the other twenty slate pieces have edges which could have rendered them useful as scrapers, show no conclusive evidence of having been so employed." (ibid:103).

In "Some Distinctive Palaeo-Indian Tool Types from the Lower Great Lakes" Chris Ellis and Brian Deller (1988 *Midcontinental Journal of Archaeology* Vol. 13(2):111-158) describe seven chert artifact types from Palaeo-Indian sites in Ontario. Although focused on that period, the discussion is relevant to the early postglacial period and Archaic cultures as well. The function of the stone artifact types described in the article is defined by form, not by use wear. The seven types are: large alternately beveled bifaces; "backed" bifaces; proximal end and side scrapers; asymmetrical end scrapers; narrow end scrapers; hafted perforators; backed and snapped unifaces.

With 25 years hind sight, the consultant considers that the site sample employed would fall with cell 1 of the quality/abundance contingency table presented by Andrefsky (1994—see above), where the sites are in a region with abundant high quality raw material and so both formal and informal artifacts are made from high grade material obtained locally or from nearby sources (see Figure 26a). In fact some of the techniques described here with high-grade material are the only effective methods of working poor quality material, which is ubiquitous in northern and eastern Ontario. These techniques are: "alternate edge beveling" and "backed and snapped" artifacts.

The alternate edge beveling technique was described, replicated, and tested by Callahan (1987—see above), who notes that it is the best way to shape poor quality coarse-grained material. Backed flakes, whether they are retouched or not, were commonly used tools in the Stone Age. The "back" is a wide, blunt, side of the flake opposed to a sharp, acute, edge, so the mechanic can apply force without injury to the hand. The back can be natural or cortex edge (as in case of "citrus-wedge" shaped cobble fragments), or an edge made blunt by steep retouch; or by a compression break—called "snapped" by Ellis and Deller (1988). (The consultant follows the

terminology used by Crabtree 1972, 1973 and Cotterel and Kaminga 1987.) Ellis and Deller (1988:119-120) describe backed and snapped tools as: " very distinctive..rectangular in plan…and roughly wedge-shaped in transverse section". One of the working edges of such pieces is the thin lateral edge opposite the thick back has a unifacially sharpened edge and an acute angle of 40-75 degrees. "Another distinctive aspect of these tools is the presence of a bend or snap break at one or both ends of the tool…[and]…the retouch is superimposed over the snaps." This technique works well with poor quality material. Compression-broken edges with steep shallow unifacial retouch are found on Gulf of Maine Archaic tradition sites in New England (Bunker 1992).

In "An Early Palaeoindian Cache of Informal Tools at the Udora Site, Ontario" (*Research in Economic Anthropology: a Research Annual*, Supplement 5, pp 45-93) Peter Storck and John Tomenchuk (1990) describe a sample of informal and expedient tools from a Palaeo-Indian site associated with the relic shoreline of Glacial Lake Algonquin. The material was found in several discreet cultural features and although no unquestionably diagnostic Palaeo-Indian artifacts were found in the features there were several "backed and snapped" artifacts found. The material is high quality Fossil Hill and Onandaga chert that would have been readily available through trade or by journey to the source. Storck and Tomenchuk classified the 78 informal tools according to Ellis and Deller's (1988) terminology. Use wear analysis indicated that the edges of 34 tools had been used for longitudinal cutting, while others were used for orthogonal cutting and direct penetration. The used tools exhibited bright polished surfaces. Storck and Tomenchuk (1990:77) speculate that some of the tools may have been used to split spruce roots. Replication and tool use experiments carried out by the authors suggested that "…the work performed with the tools in the Udora feature represent a substantial investment of time and effort".

In "Iroquoian Archaeology: It's the Pits" (Essays in St. Lawrence Iroquoian Archaeology, *Occasional Papers in Northeastern Archaeology* No.8 pp 1-7) Jim and Dawn Wright summarize the results of screening 27 tons of feature material salvaged from the St. Lawrence Iroquois Maynard/McKeown site. They report:

"A utilized flake industry, hithertofore unrecognized in St Lawrence Iroquois culture, was represented by 97 chert, quartzite, and quartz speciments from 65 samples for an average of 1.5 per feature. These flakes, which include small split pebbles, were used and then discarded. Presumably, the abundant and elaborate bone tools and ornaments of St. Lawrence Iroquoian culture were fashioned with these simple expedient tools." (Wright and Wright 1993:4).

In "The Heritage Hills Site and Early Postglacial Occupation of the Ottawa Valley" (*Archaeology of Eastern North America* 2011 Vol. 39:131-152) Ken Swayze and Robert McGhee report an early postglacial period site in Ottawa on relic shorelines dated to 11,000 and 9,000 radiocarbon years ago. The assemblage of lithic tool is based on locally quarried vein quartz, and other poor quality coarse materials, primarily using a bipolar/anvil percussion technique. An experimental study of use

wear on quartz tools was undertaken as the basis for recognizing used artifacts in the collection These unifacial tools, with crushing and use polish on steep edges and points, resemble those characteristic of Gulf of Maine Archaic Tradition assemblages in New England and the St. Lawrence Valley.

The Heritage Hills site and other recently discovered sites suggest the existence of a previously unrecognized Early Archaic occupation of the Ottawa Valley and eastern Ontario. Over a period of 15 years from, 1991 to 2006, the consultant carried out 111 archaeological assessments in the Ottawa Valley that covered 1,493 ha (3,689 acres) of land slated for development. Given that many modern shorelines are already developed or protected from environmental disturbance, it is not surprising that these CRM study areas tended to occur on lands that are now high above, and at some distance from, modern shorelines.

The systematic survey of these study areas involved a sample of over 250,000 test pits, of which only about 1% produced stone artifacts and resulted in the identification of archaeological sites at 44 of the 111 locations tested. These positive test pits and find spots are clearly associated with relic shorelines and early postglacial landforms. On average about 100 stone artifacts were collected at each location. Initial surveys at these locations—excluding Heritage Hills, which produced a disproportionately high number of artifacts—yielded 4,666 stone artifacts. Further excavation at 22 of the 44 site locations produced an additional 10,163 artifacts.

The lithic technology practiced on the relic shorelines of the Ottawa Valley is characterized by the expedient use of whatever common stone material was available. Given that the region is located in the Metasedimentary Belt of the Canadian Shield there is a wide variety of raw materials available at any given location. Chert and other cryptocrystalline materials are scarce and present only in the form of small pebbles or thin lenses. Materials selected for use were, in order of apparent preference: chert; quartz (preferably clear “hyaline” quartz); quartzite; felsitic granite and gneiss; schist, and even sandstone. Techniques of reduction include the bipolar/anvil percussioin as well as flakes struck directly from cores or blocks extracted from veins and bedrock exposures. Core tools and cobble tools are present but most tools are made from minimally retouched flakes and spalls. In rare cases the retouched edges suggest a function, such as a chopper; scraper; perforator; or engraver, diagnoses which are widely accepted when applied to similarly shaped cryptocrystalline specimens (Swayze and McGhee 2011:148).

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12.0 Statement of Qualifications

Education and Experience – Mr. Swayze holds Ontario archaeological consulting licence P039 (Professional category Stages 1 to 4, Province-wide). He has a B.A. (1983) in Archaeology and a M.A. (1987) in Geography, both from Simon Fraser University, Burnaby B.C. His archaeological experience—relevant to this report—includes: the lithic technology of hunter-gatherers; pre-ceramic settlement patterns in the Ottawa Valley; and historical archaeology in the Ottawa Valley. His relevant geographical specialties include: early Holocene post-glacial landscape evolution, surficial geology, and soil (environmental) development in the Ottawa Valley; aerial photograph interpretation; and historical geography.

Previous Assignments –

- 1995- present – as an Archaeological Consultant he has completed over 200 compliance archaeological assessments in eastern and central Ontario and recorded, sampled, conserved or salvaged numerous archaeological sites. Nine of his recent projects in the City of Ottawa have resulted in prehistoric archaeological site discoveries, many of them significant. Other projects during this period have included: field courses and assessments in Nunavut for the Inuit Heritage Trust; preparation of an archaeological protocol for the Algonquins of Pikwàkanagàn; directing a Public Archaeology Programme for Bonnechere Provincial Park.
- 1991-1994 – as Project Archaeologist for the Northern Oil and Gas Action Plan (NOGAP) administered by Canadian Museum of Civilization he conducted field work and research in the Mackenzie River Delta region.
- 1988-1990 – as Project Archaeologist, Canadian Parks Service, Western Region (Calgary), Archaeology Unit he undertook prehistoric and historic archaeological research in Banff, Jasper, Elk Island, and Pacific Rim National Parks.
- 1977-1990 – as Archaeological Field Assistant, Canadian Museum of Civilization, he provided field assistance for 14 seasons of archaeological survey and excavation in the central and western Canadian arctic.
- 1972-1977 - Eastern Regional Archaeologist, Ontario Ministry of Culture and Recreation (now OMCL): Archaeological inventories and master plans of various provincial parks and counties in eastern Ontario.

References

- Dr. Jean-Luc Pilon, Curator of Ontario Archaeology, Canadian Museum of Civilization (819) 776-8192. jean-luc.pilon@civilization.ca Project: Stages 1&2 and 4 assessment and excavation of BiFs-1 Muldoon a Lamoka Archaic site on the South Nation River Assignment Period: June 2003 to March 2004.
- Lynn Peplinski, Heritage Manager, Inuit Heritage Trust Inc. Box 2080 Iqaluit NU X0A 0H0 Tel. (867) 979-0731 Fax. (867) 979-6700 lpeplinski@ihti.ca Projects: Field course Kugluktuk, 2002 and Tree River Estuary, 2003 Assignment Periods: August 2002 and August 2003.
- Jim Fraser, Park Superintendent, Ontario Parks, Ministry of Natural Resources 31 Riverside Drive, Pembroke, Ontario K8A 8R6 Tel.: (613) 757-2103 Fax.: (613) 757-0039 Project: Bonnechere Park Public Archaeology Programme, 2003 Assignment Period: June-October 2003.

This report prepared by Ken Swayze.

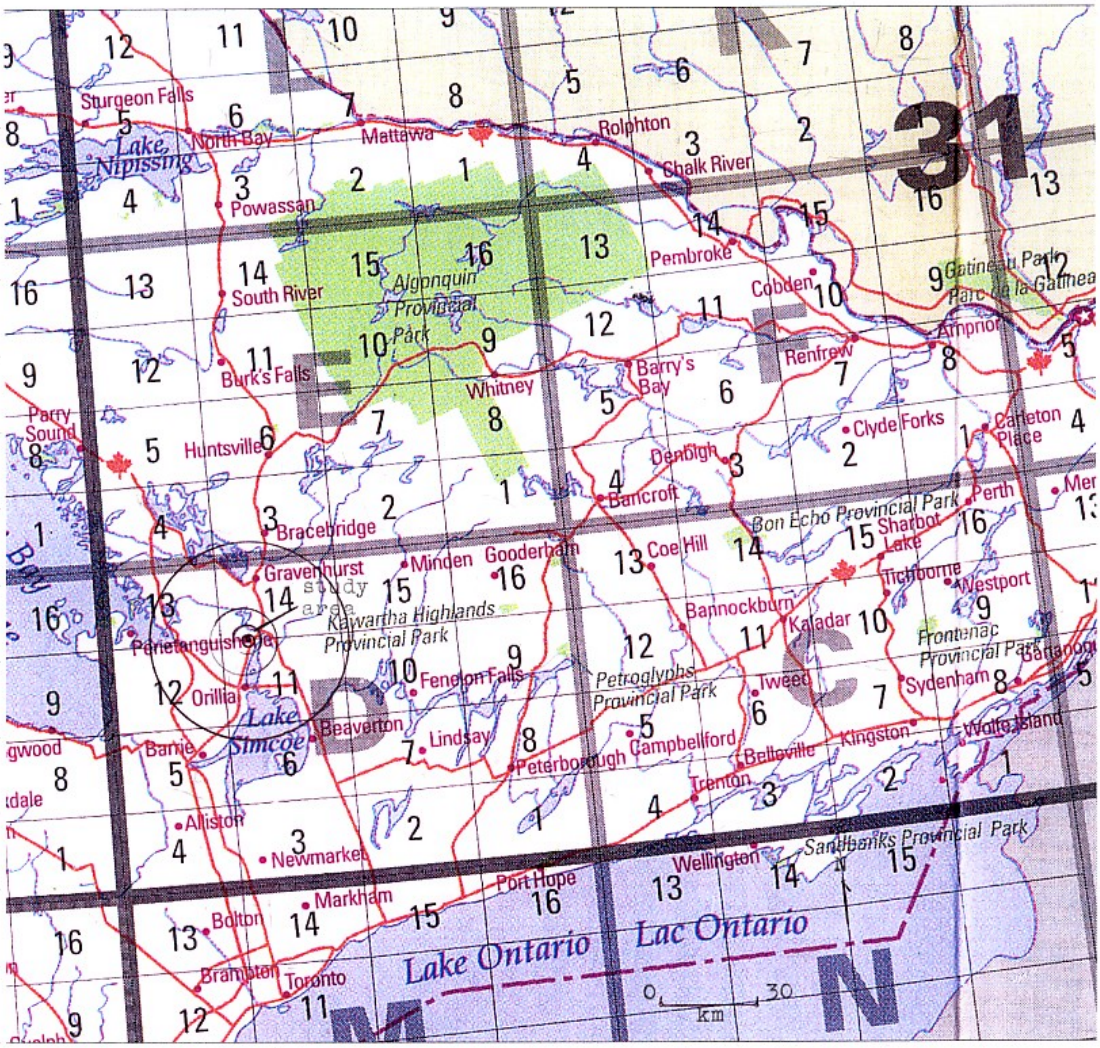

Figure 1: Regional location of the study area

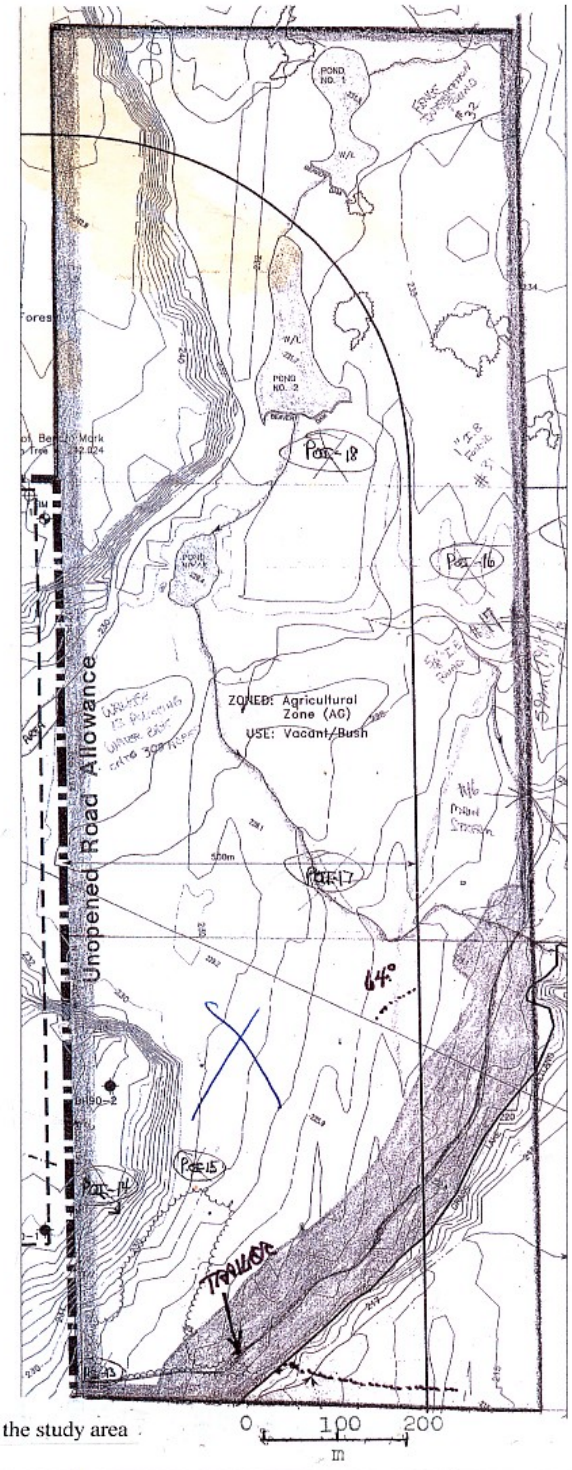

Figure 2: plan of the study area

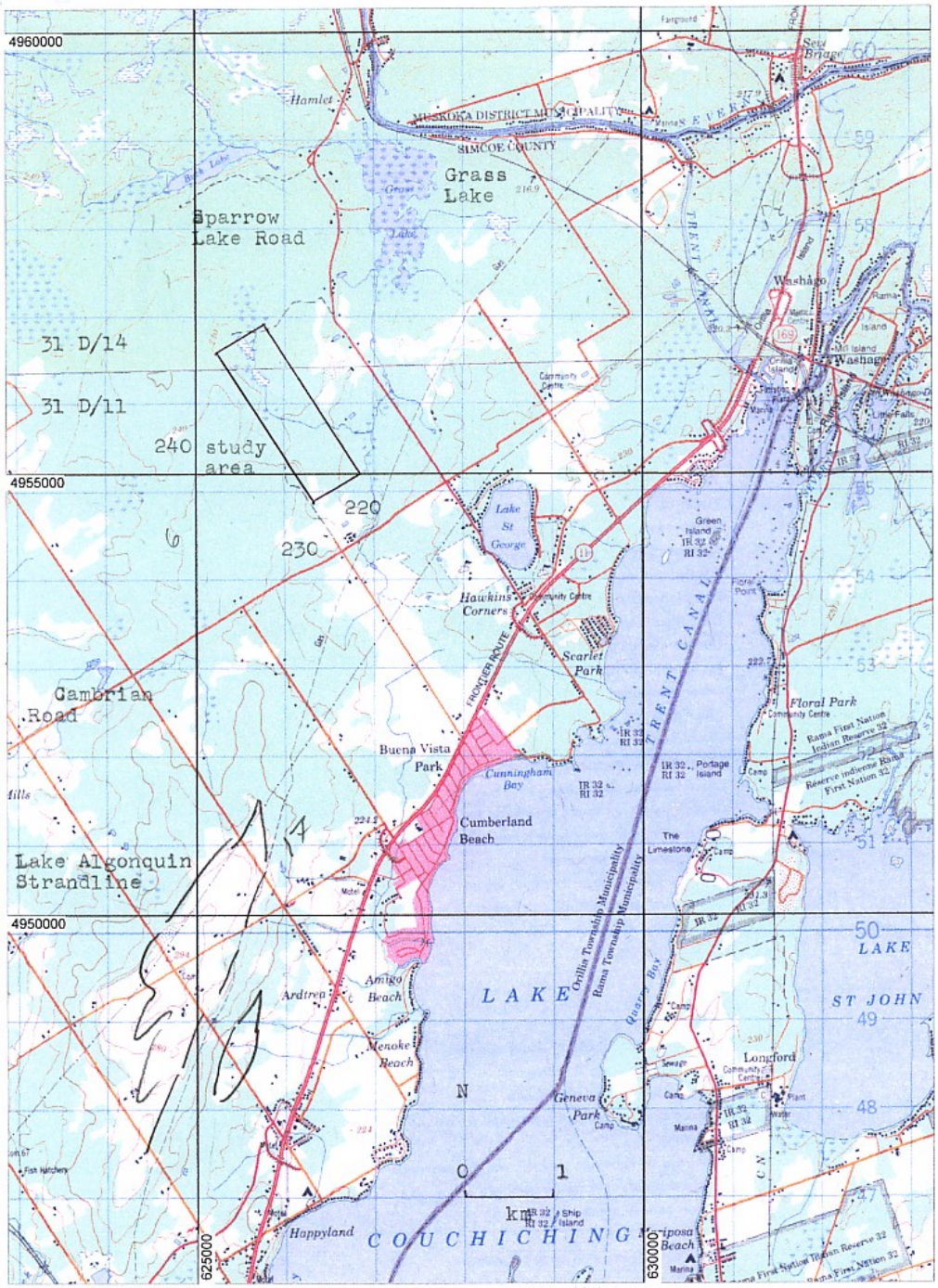

Figure 3: Topography, drainage, & infrastructure of the vicinity

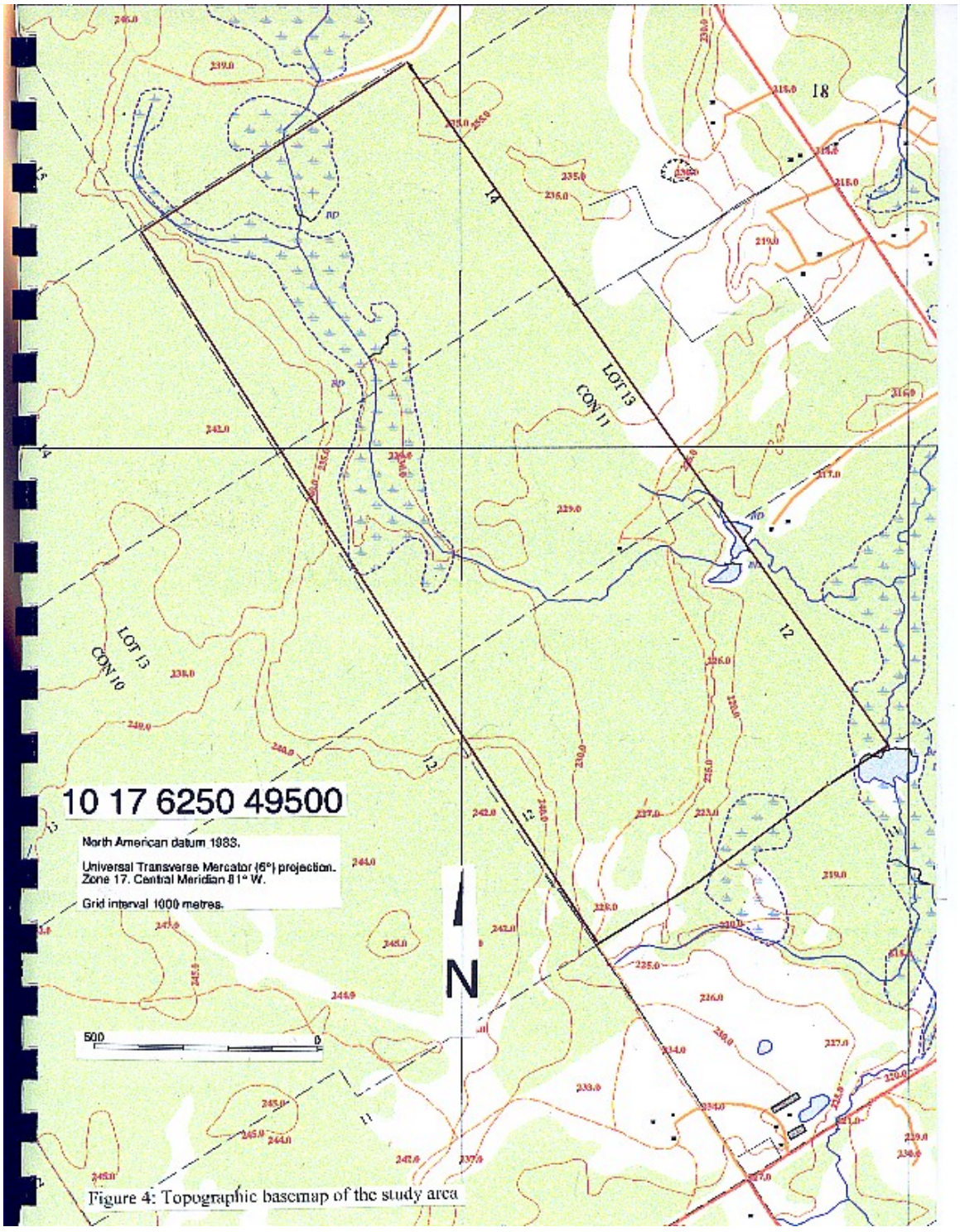

Figure 4: Topographic basemap of the study area

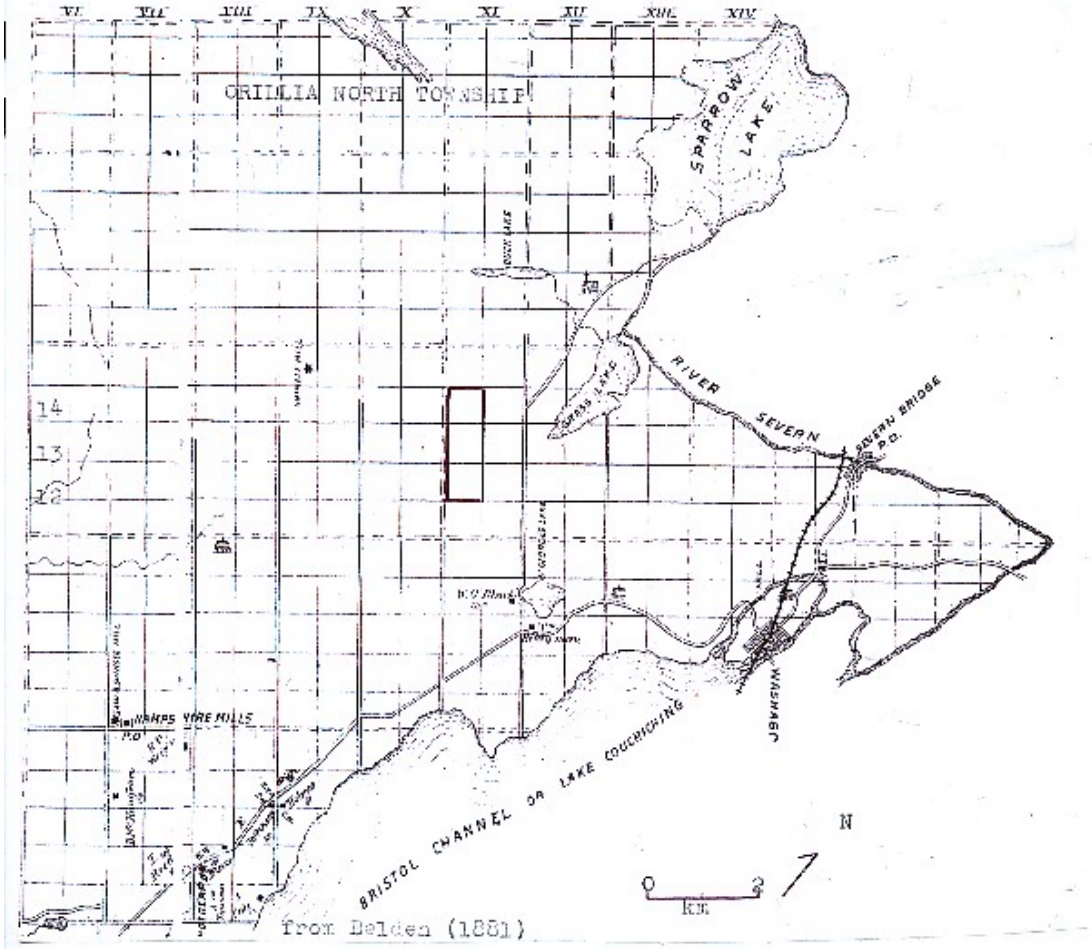

Figure 5: Historical atlas of Simcoe County 1881

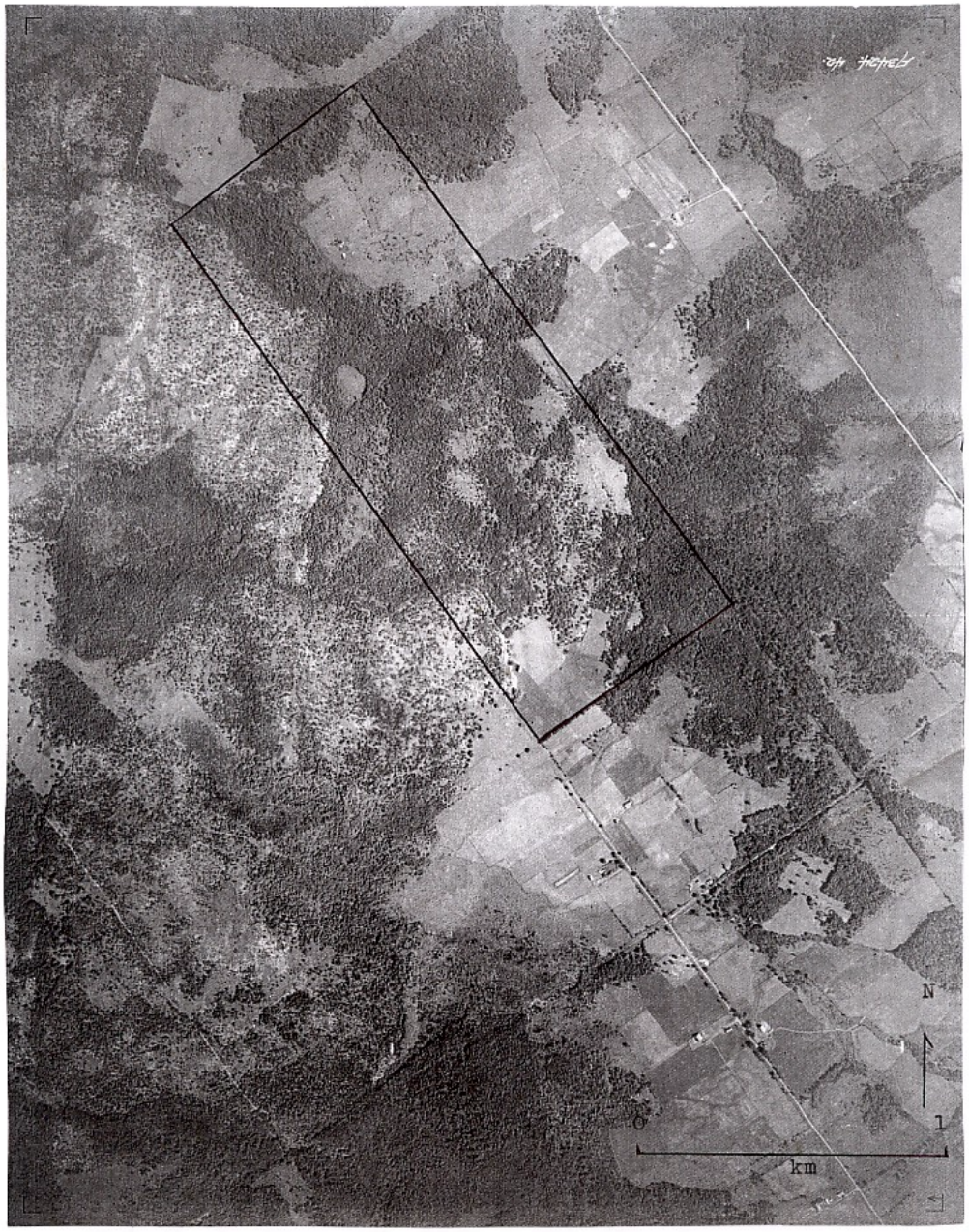

Figure 6: Historical aerial photograph A3424-42

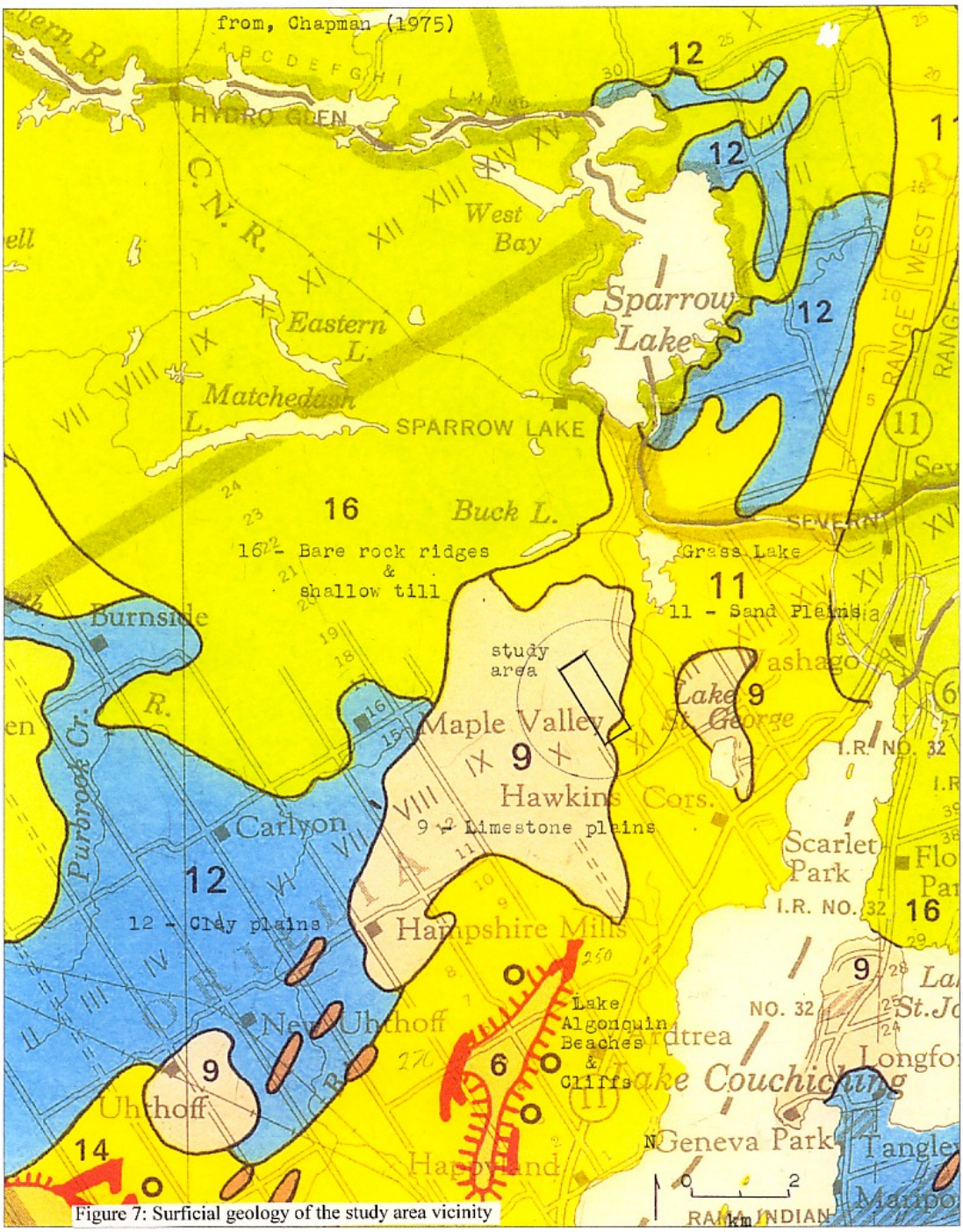

Figure 7: Surficial geology of the study area vicinity

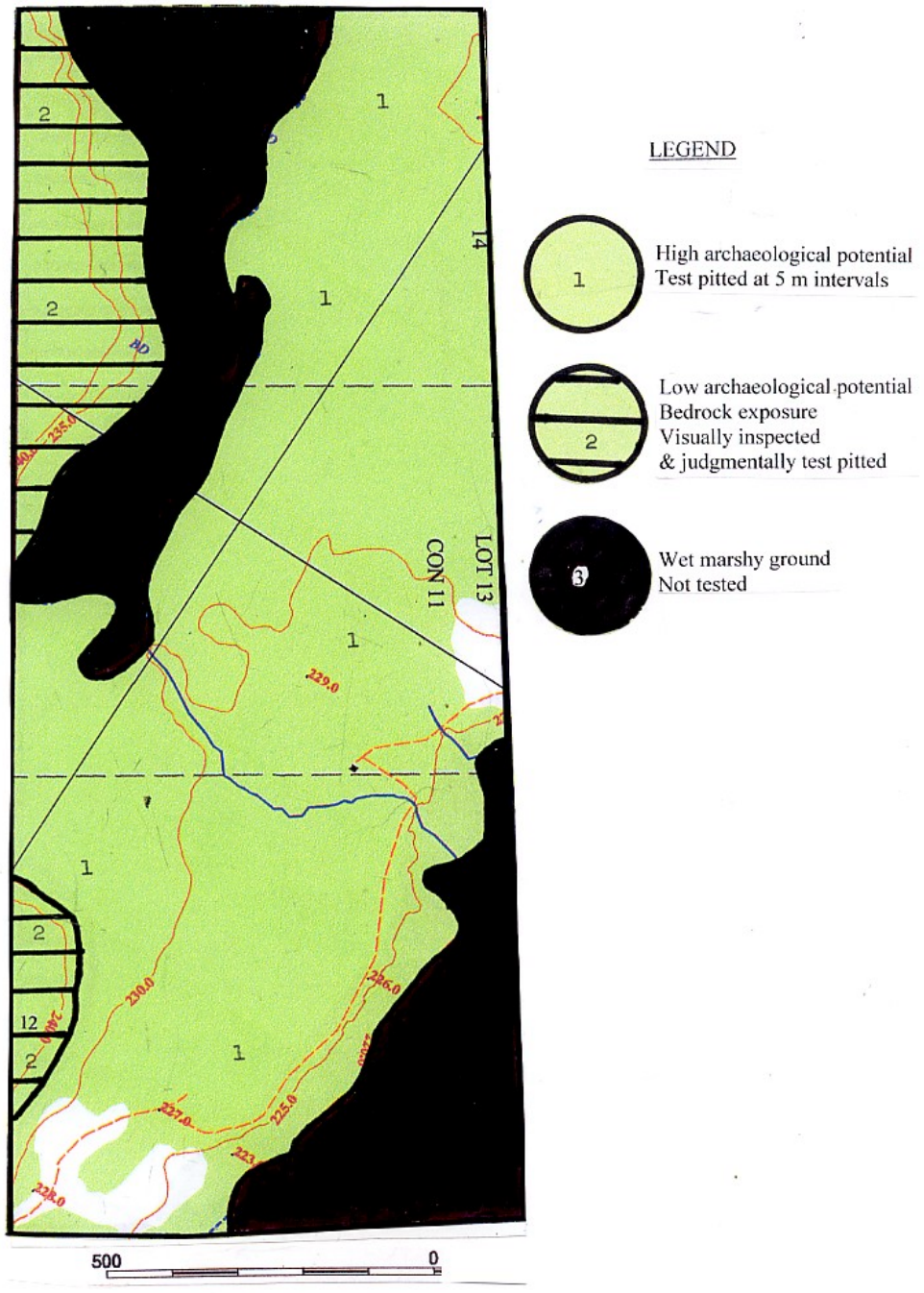

Figure 8: Archaeological potential of the study area

Figure 9A: Limestone bedrock exposure at the southern plateau, looking W

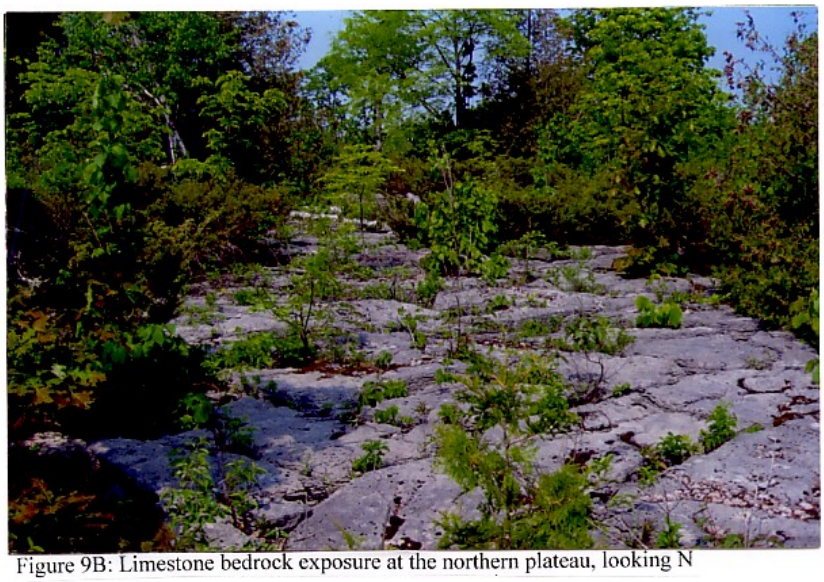

Figure 9B: Limestone bedrock exposure at the northern plateau, looking N

Figure 9: Visually inspected & judgementally tested areas

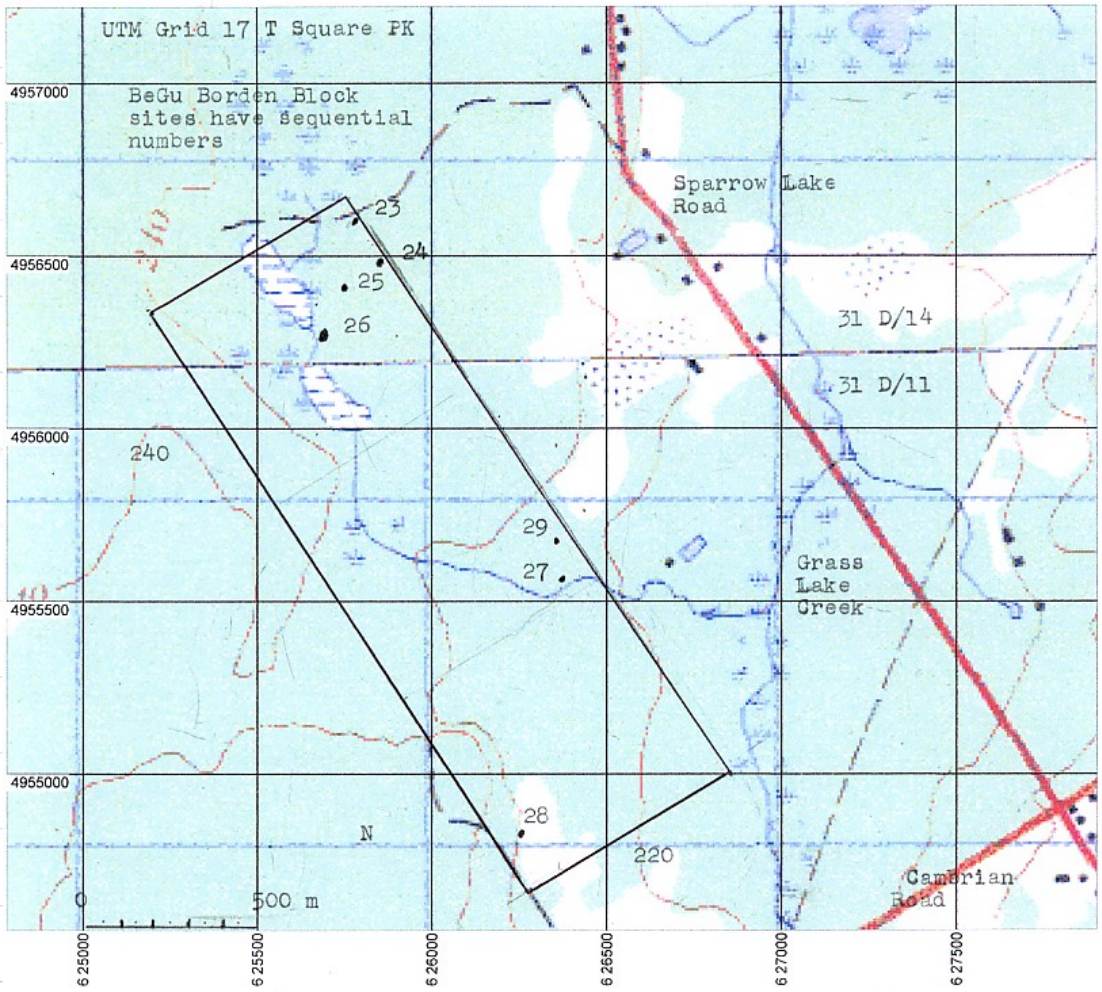

Figure 10: Results of Stage 2 survey, BeGu-23 to 29

Grid: UTM (NAD27)

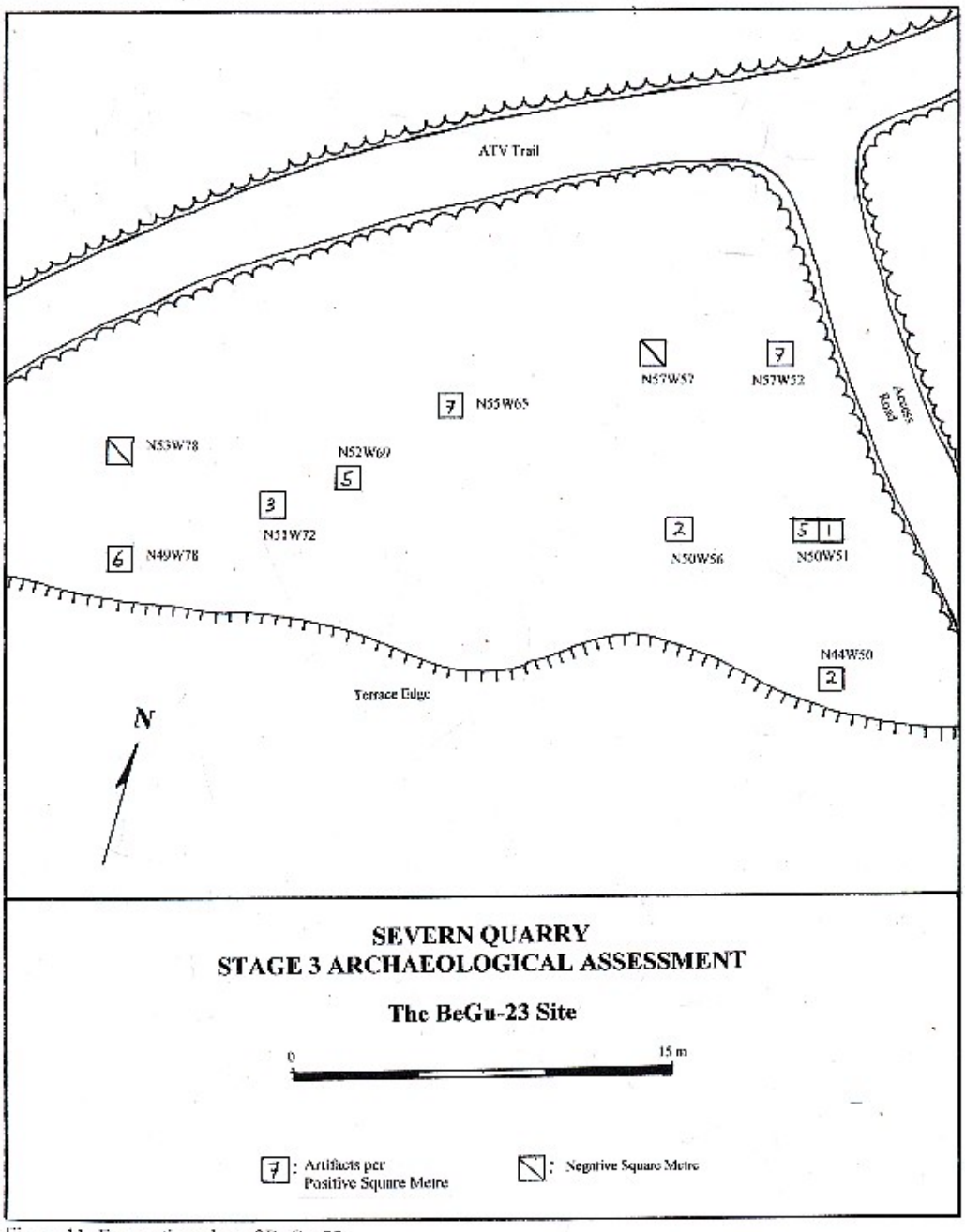

Figure 11: Excavation plan of BeGu-23

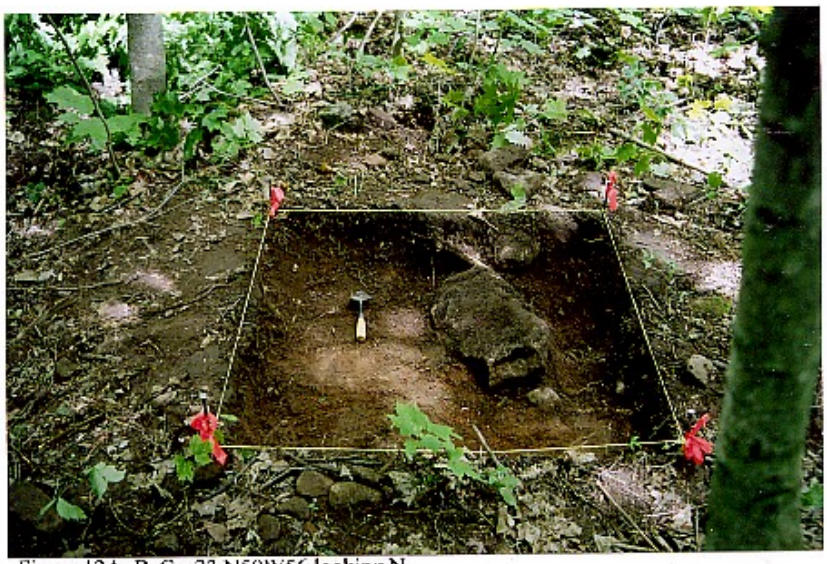

Figure 12A: BeGu-23 N50W56 looking N

Figure 12B: BeGu-23 N52W69, looking N

Figure 12: Photographs of representative BeGu-23 grid units

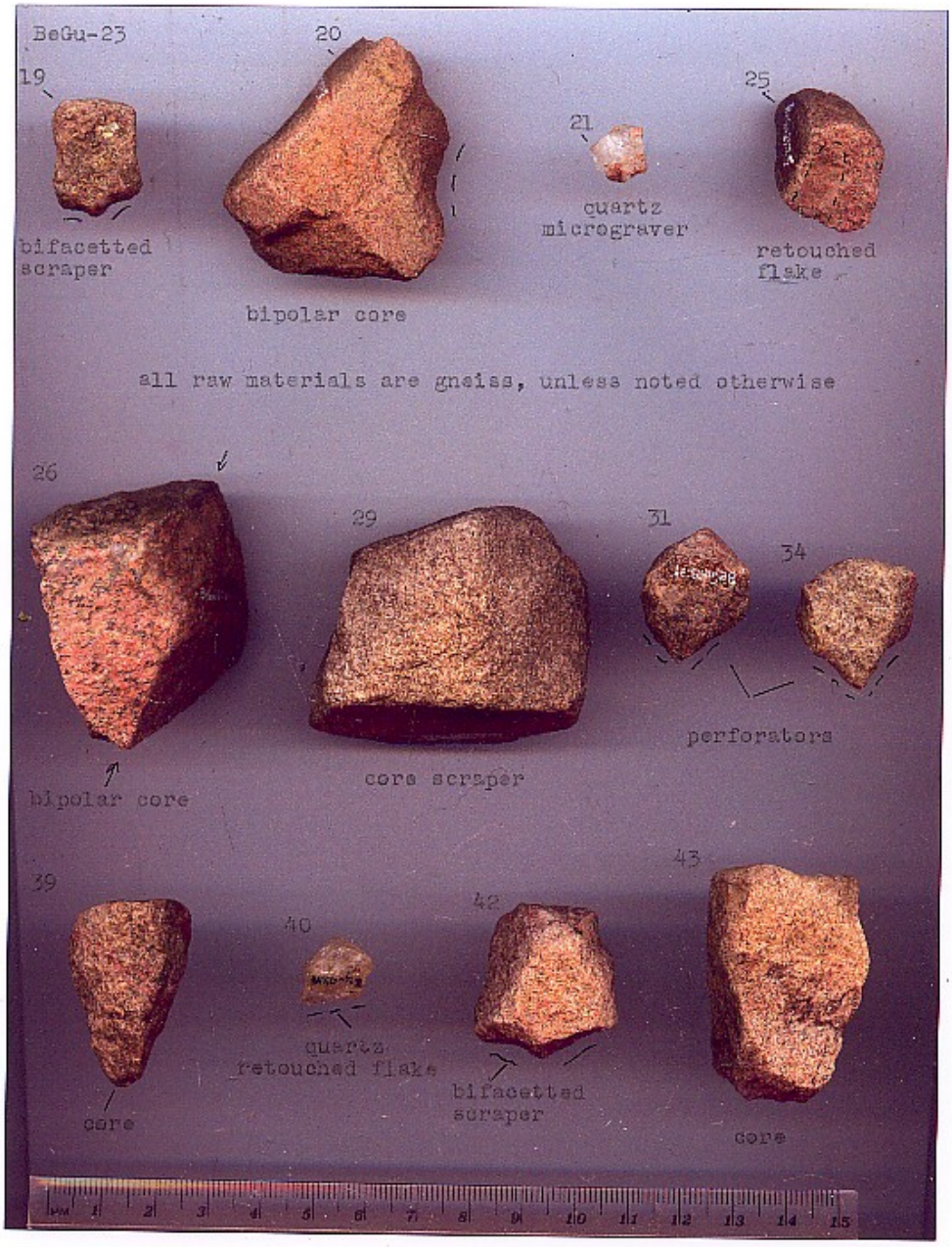

Figure 13: Artifact Plate 1 BeGu-23

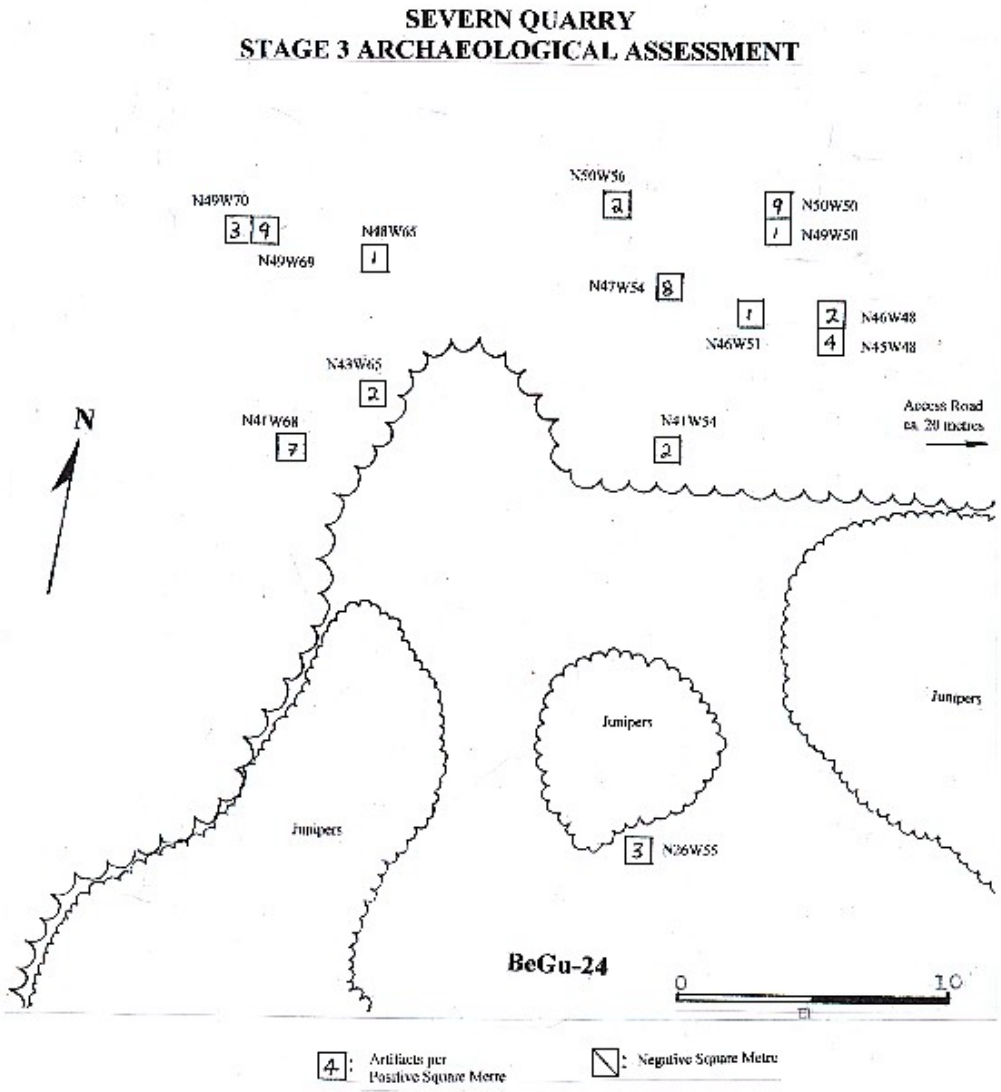

Figure 14: Excavation plan of BeGu-24

Figure 15A: BeGu-24 N50W50

Figure 15B: BeGu-24 N45W48

Figure 15C: BeGu-24 N47W54

Figure 15: Photographs of representative BeGu-24 grid units

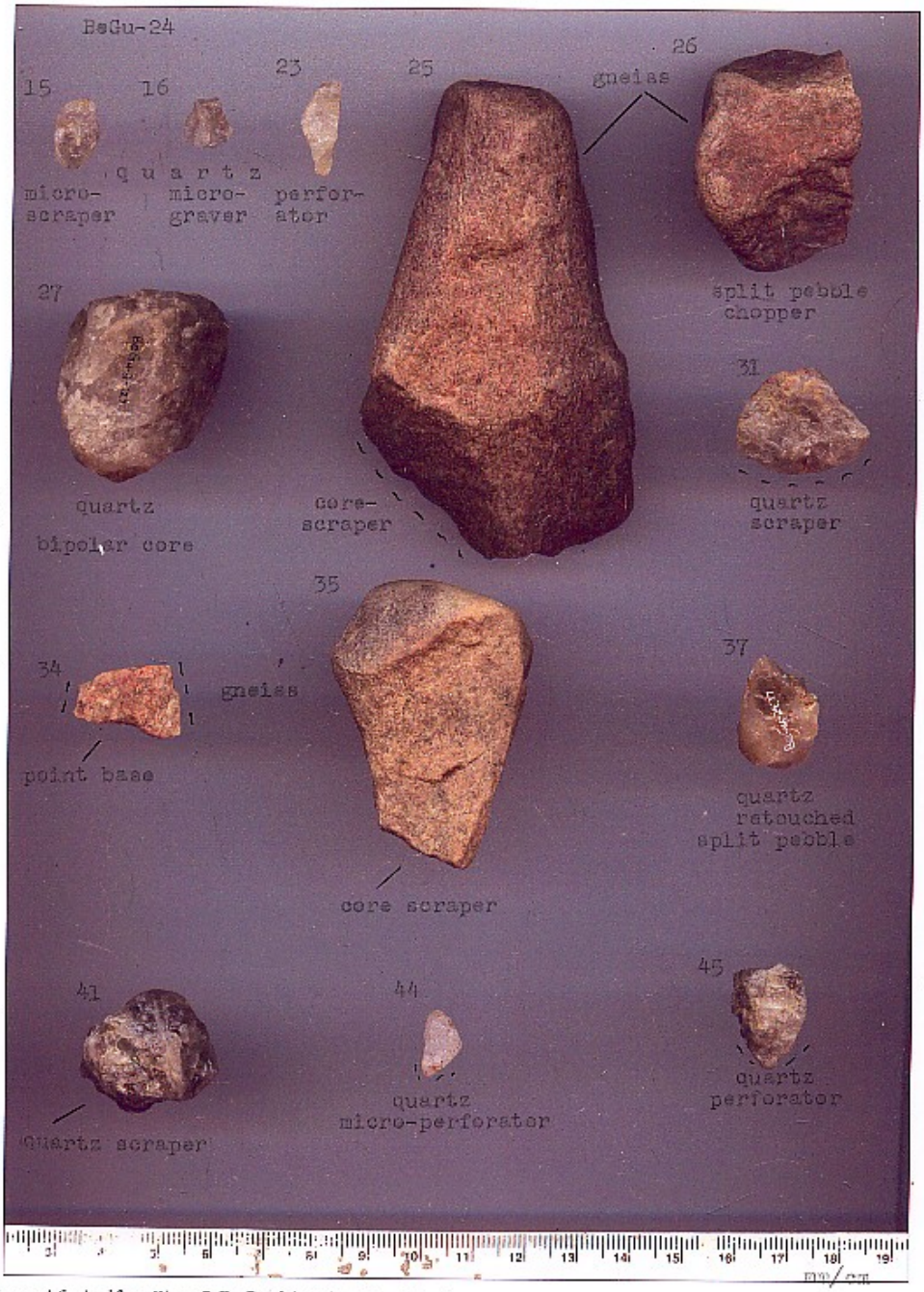

Figure 16: Artifact Plate 2 BeGu-24, selected artifacts

Figure 17: Artifact Plate 3 BeGu-24, selected microtools

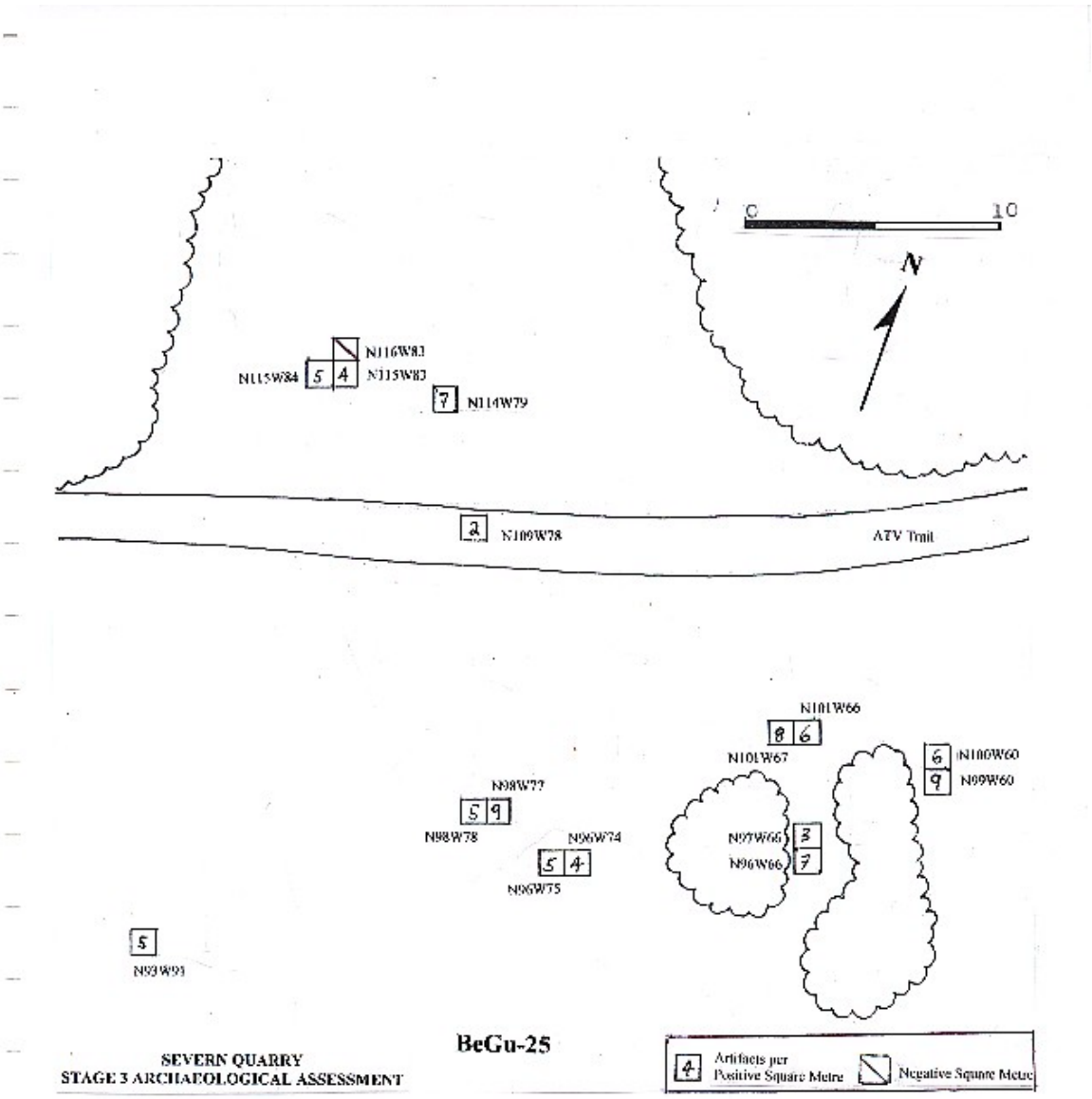

Figure 18: Excavation plan of BeGu-25

Figure 19A: BeGu-25 N101W66-67 looking W

Figure 19B: BeGu-25 N98W77-78 looking W

Figure 19: Photographs of representative BeGu-25 grid units

Figure 20: Artifact Plate 4 BeGu-25 selected artifacts

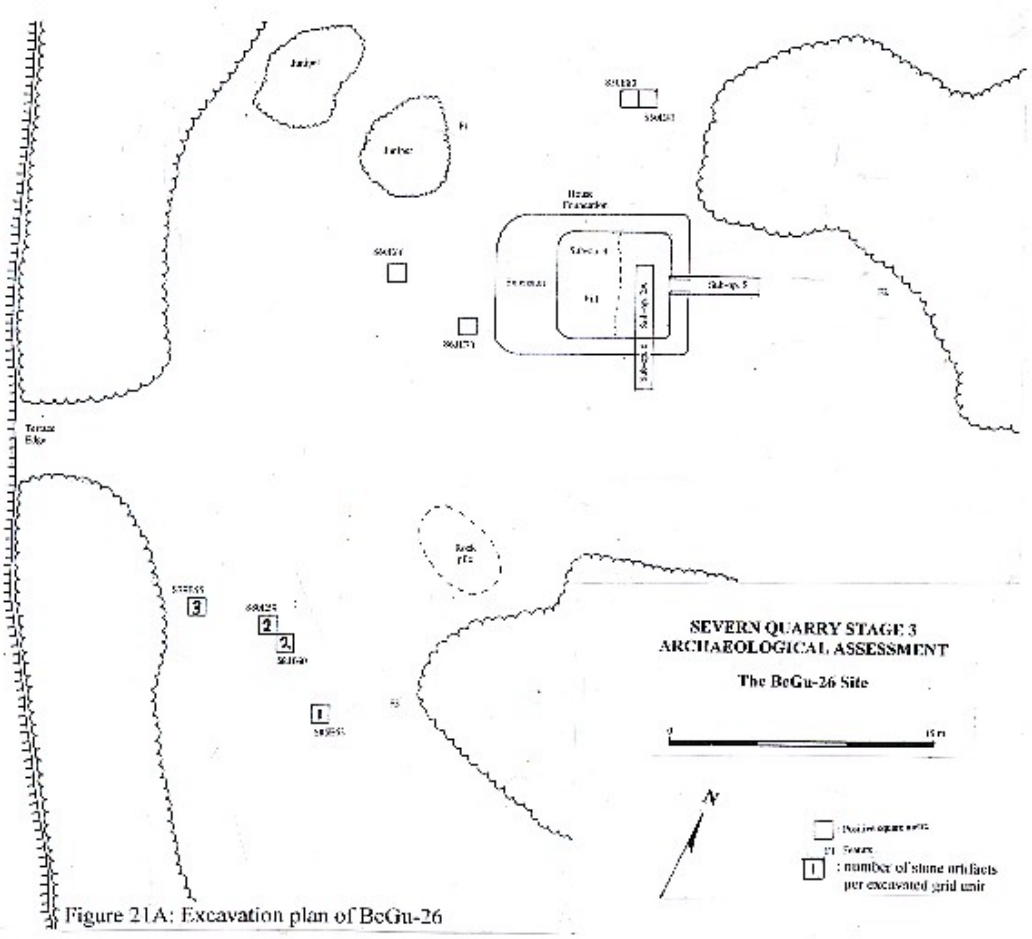

Figure 21A: Excavation plan of BeGu-26

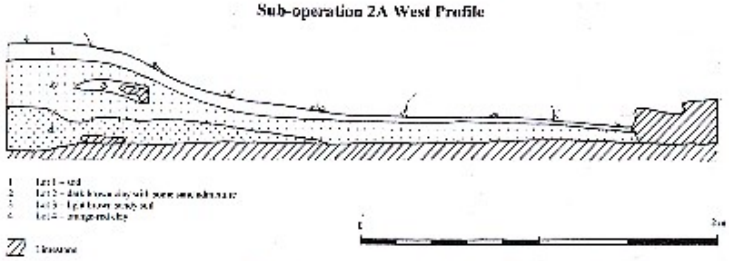

Figure 21B: West profile of Sub-operation 2A

Figure 21: Excavation plan of BeGu-26

Figure 22A: BeGu-26 Sub-operation 6 looking N

Figure 22B: Begu-26 Sub-operation 5 looking W

Figure 22C: BeGu-26 S63E70 looking E

Figure 22: Photographs of representative BeGu-26 grid units

Figure 23A: BeGu-26 Feature 1, flower garden edge

Figure 23B: BeGu-26 Feature 2, well head footings

Figure 23C: BeGu-26 S60E66 ash layer in latrine

Figure 23: Photographs of BeGu-26 cultural features

Figure 24: Artifact Plate 5 BeGu-26 selected artifacts

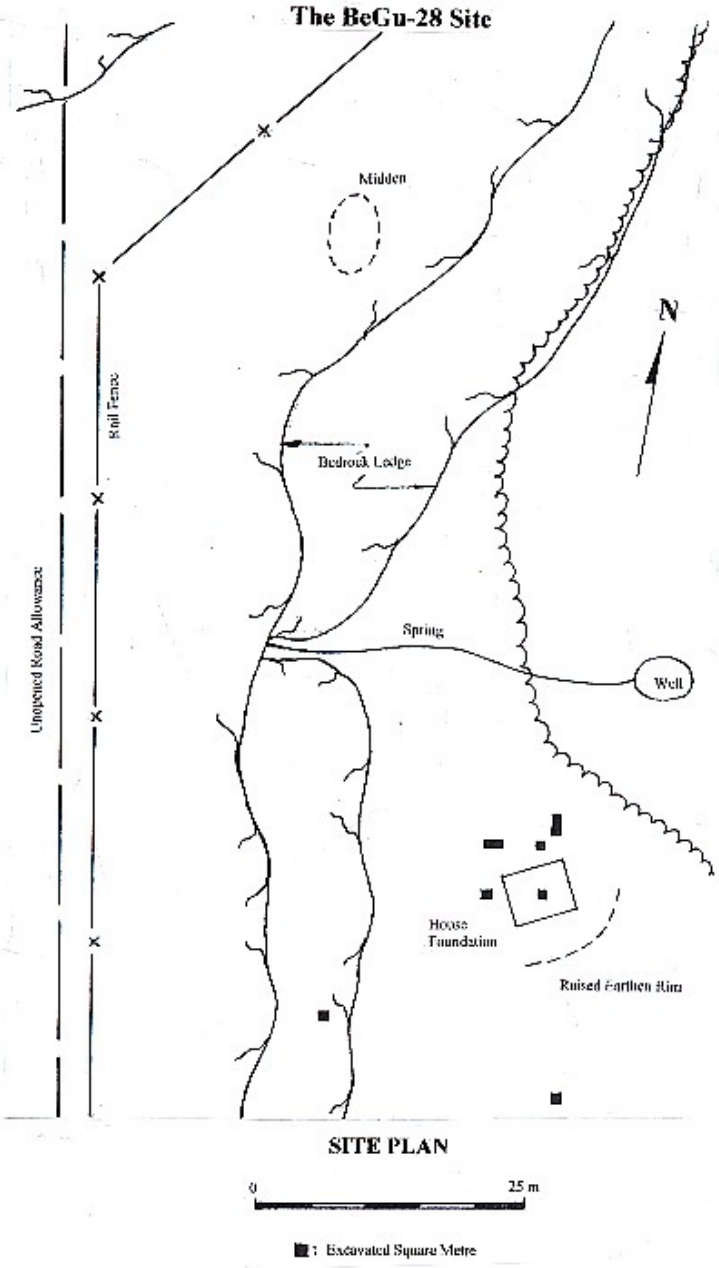

Figure 25: BeGu-28 site plan

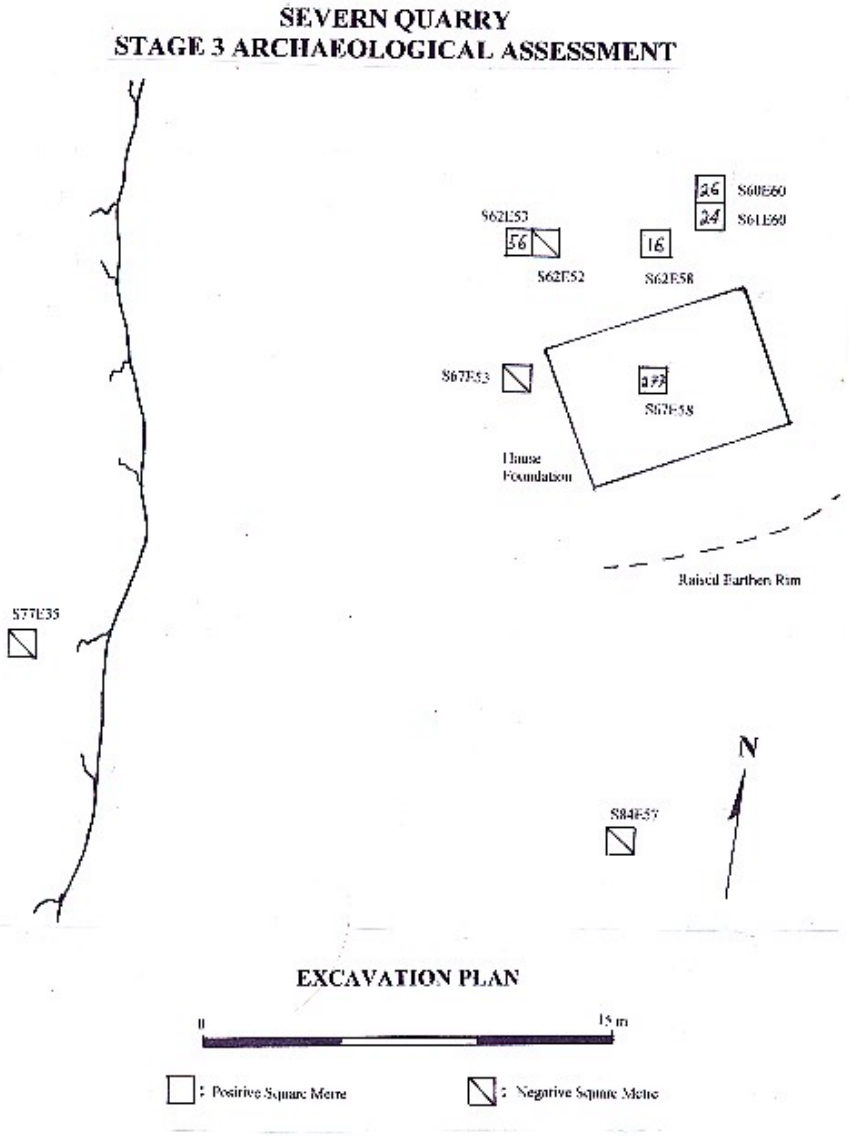

Figure 26: Excavation plan of BcGu-28

Figure 27A: Monica Maika, John Ratcliffe, Colin Potter-Bonar

Figure 27B: France Brind'Amour, Ron Bernard, John Ratcliffe, Monica Maika

Figure 27: Photographs of excavations at BcGu-28

Figure 28A: S60-61W60, looking N at clay loam on bedrock and rock pile, a possible fencepost footing.

Figure 28B: S62E53 looking W at soil profile, clay loam, clay parent material, bedrock.

Figure 28: Photographs of representative BeCu-28 grid units

Figure 29: Artifact Plate 6 BeGu-28

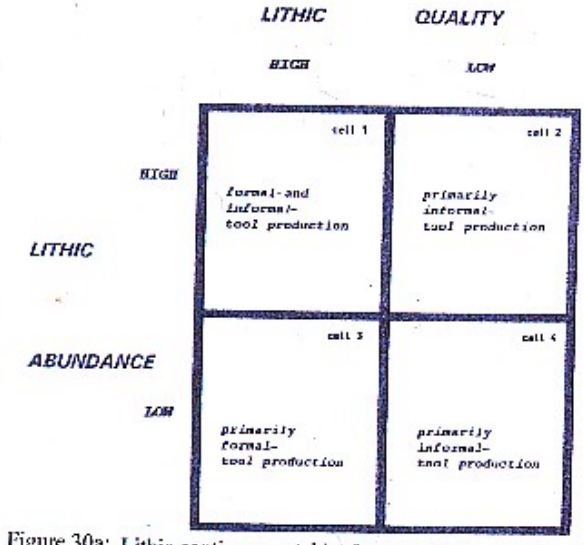

Figure 30a: Lithic contingency table, from Andrefsky 1994

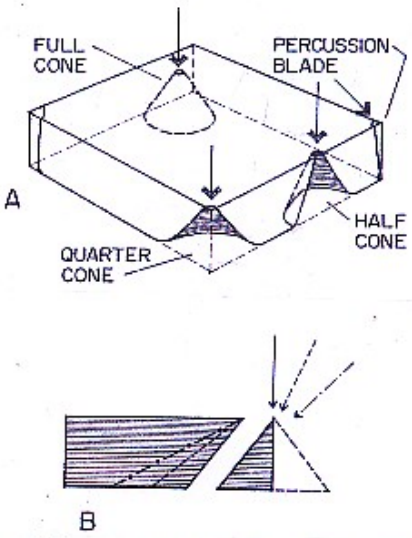

Figure 30b: Cone principal of breakage (A & B above) From Crabtree 1973

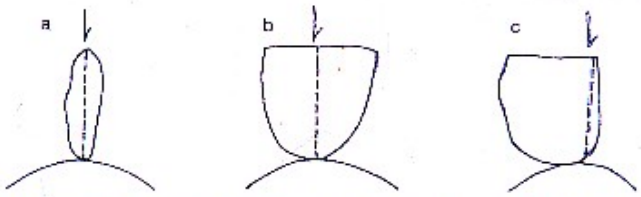

Fig. 3 Schematic representation of bipolar percussion: a + b = splitting from center out (a = thin core, b = thick core); c = spalling from outside in.

Fig. 1 Schematic representation of freehand percussion. Unless otherwise indicated, this and following figures [...]

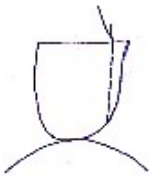

Fig. 2 Schematic representation of anvil percussion.

Figure 30c: Types of percussion (Figs 1, 2, & 3 above), from Callahan 1987

Figure 30: Diagrams to accompany the Discussion

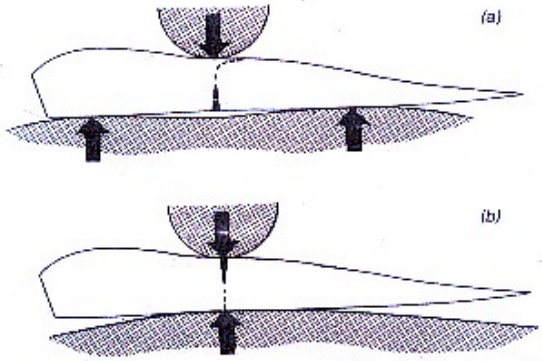

Figure 15. (a) A flake broken into two pieces by bending; (b) a flake broken into two pieces by compression.

Figure 31a: Compression & Bending Breaks, from Crabtree 1973

Figure 2. Symmetric Multiple Flaking.

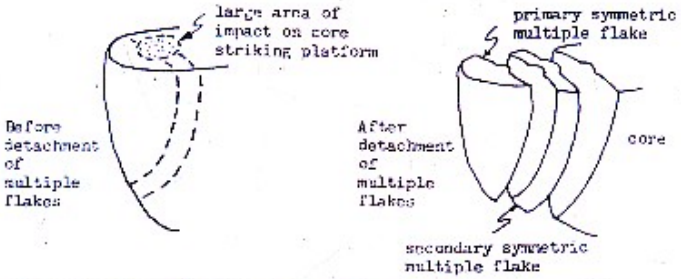

Figure 31b: Formation of multiple flakes, from Boksenbaum 1980

Figure 1. Asymmetric Multiple Flaking.

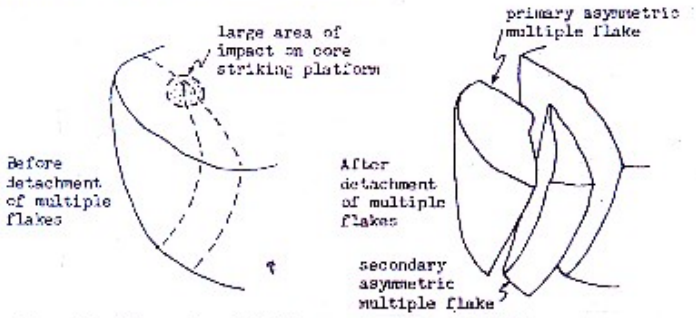

Figure 31c: Formation of a "citrus-wedge" shaped flake

Figure 31 Diagrams to accompany the Discussion

BeGu-23 Stage 3
Artifact Catalogue

No.	Square Metre	Quantity	Material	Category	Comments
16	N44W50	1	gneiss	core-scraper	large; wedge-shaped with prepared platform and 2 large blade-like facets; long abrupt retouch on margin of 1 facet and short retouch on concave margin of proximal end with large corner spur possibly used as a drill; notch-like retouch (33 mm) on opposite part of proximal end; weathered; 107 x 89 x 16 mm
17	N44W50	1	quartz	shatter	
18	N49W78	1	gneiss	scraper	short abrupt retouch on convex margin of cobble; 1 lateral corner shaped; possible plane; 100 x 66 x 58 x mm
19	N49W78	1	gneiss	scraper	dual facets with central spur on flake; also possibly used as perforator; 19 x 16 x 9 mm
20	N49W78	1	gneiss	core-scraper	bipolar; wedge-shaped; retouched notch (14 mm) on 1 thin edge 45x 42 x 22 mm
21	N49W78	1	quartz	micro-graver	retouched spur on small fragment; 9 x 8 x 5 mm
22	N49W78	2	quartz	shatter	small
23	N50W50	1	quartz	shatter	
24	N50W52	1	gneiss	scraper	large dual facets on convex end of large triangular cobble with subrectangular cross-section; 94 x 66 x 45 mm
25	N50W52	1	gneiss	retouched fragment	retouch on sharp edge of bevelled face; 29 x 16 x 15 mm
26	N50W52	1	gneiss	bipolar core	52 x 48 x 34 mm
27	N50W52	1	quartz	pebble fragment	22 x 13 x 9 mm
28	N50W52	1	quartz	shatter	
29	N50W56	1	gneiss	core-scraper	2 linear facets on side of thick fragment; retouched straight margin of 1 abrupt edge, 42 x 50 x 43 mm
30	N50W56	1	quartz	shatter	various sizes; one blue-tinted
31	N51W72	1	gneiss	perforator	pointed extremity produced by burin blow and thick worked edge of flake; 25 x 20 x 10 mm
32	N51W72	2	quartz	shatter	1 large
33	N52W69	1	gneiss	backed knife	large ventral retouch on 1 convex lateral edge and part of opposite edge of very large flake with prepared platform; may also have been used as scraper; 125 x 70 x 44 mm
34	N52W69	1	gneiss	perforator	pointed distal extremity with triangular cross-section produced by bilateral retouched concave edges of flake; weathered; 25 x 25 x 12 mm
35	N52W69	1	gneiss	perforator	pointed projection with triangular cross-section on lateral edge of thick flake; 31 x 29 x 12 mm
36	N52W69	1	gneiss	flake	incomplete
37	N52W69	1	quartz	flake	small
38	N55W65	1	gneiss	perforator	pointed extremity with rectangular cross-section on large thick bifacially-worked flake; 1 convex lateral edge may also have been used as scraper; 56 x 49 x 32 mm
39	N55W65	1	gneiss	core	bipolar; conical shape; 35 x 23 x 15 mm
40	N55W65	1	quartz	retouched flake	short retouch on part of 1 edge of small flake; 15 x 12 x 6 mm
41	N55W65	4	quartz	shatter	small
42	N57W52	1	gneiss	scraper	dual facets with central arris on tabular fragment; 30 x 28 x 17 mm

BeGu-23 Stage 3
Artifact Catalogue

No.	Square Metre	Quantity	Material	Category	Comments
43	N57W52	1	gneiss	core	bipolar, wedge-shaped; 45 x 51 x 23 mm
44	N57W52	1	gneiss	flake	complete
45	N57W52	4	quartz	shatter	3 small
	Total	38			

BeGu-24 Stage 3
Artifact Catalogue

No.	Square Metre	Quantity	Material	Category	Comments
15	N26 W55	1	quartz	micro-scraper	small denticulate retouch on convex distal end and 1 lateral edge of subtriangular flake; partial crushing on opposite lateral edge; compares well with BeGu-25:65; 14 x 9 x 6 mm
16	N26W55	1	quartz	micro-graver	spur on distal end of small flake produced by finely retouched lateral edges; 10 x 10 x 6 mm
17	N26W55	1	quartz	shatter	
18	N41W54	1	quartz	flake	possible micro-perforator; 11 x 6 x 3 mm
19	N41W54	1	quartz	shatter	weathered
20	N41W68	7	quartz	shatter	generally small
21	N43W65	2	quartz	shatter	
22	N45W48	4	quartz	shatter	small
23	N46W48	1	quartz	perforator	triangular fragment with square cross-section and rounded tip produced by 4 broken sides; 19 x 7 x 7 mm
24	N46W48	1	quartz	flake	fragment; weathered
25	N46W51	1	gneiss	core-scraper	cobble with multiple facets and denticulate retouch along 1 margin; possibly used as plane; weathered; 93 x 57 x 44 mm
26	N47W54	1	gneiss	split pebble	possibly used as core; 45 x 32 x 26 mm
27	N47W54	1	quartz	fire-lighter	pebble with battering over complete surface; 37 x 31 x 29 mm
28	N47W54	2	quartz	flakes	1 weathered
29	N47W54	4	quartz	shatter	small
30	N48W65	1	gneiss	flake	possibly retouched; weathered
31	N49W50	1	quartz	scraper	bevelled retouch on convex distal edge of subtriangular flake; weathered; 21 x 25 x 11 mm
32	N50W50	1	quartz	flake	spur on partly fractured lateral edge possibly used as perforator; 30 x 22 x 12 mm
33	N50W50	2	quartz	shatter	weathered
34	N50W50	1	gneiss	projectile point	bifacial base fragment with biconvex cross-section, concave basal edge with rounded corner ears with crushing on lateral edges; 14 x 21 x 8 mm
35	N50W50	1	gneiss	core-scraper	several large facets on wedge-shaped cobble fragment with large retouch on abrupt distal end; possibly used as plane; 51 x 39 x 32 mm
36	N50W50	1	quartz	retouched flake	fine retouch on one lateral edge of flake fragment; strongly weathered; 12 x 10 x 6 mm
37	N50W50	1	quartz	split pebble	possibly partly retouched; 22 x 15 x 14 mm
38	N50W50	2	quartz	shatter	
39	N50W56	1	quartz	flake	weathered
40	N50W56	1	quartz	shatter	weathered
41	N49W69	1	quartz	scraper	long shallow denticulate retouch on steep edge of fragment; corner spur possibly used as perforator; 25 x 23 x 15 mm
42	N49W69	3	quartz	flakes	2 trimming flakes
43	N49W69	5	quartz	shatter	various sizes
44	N49W70	1	quartz	micro-perforator	small triangular fragment with triangular cross-section, rounded tip and retouched lateral edges; weathered; 12 x 9 x 7 mm
45	N49W70	1	quartz	perforator	triangular flake with dorsal thinning on pointed distal end with rounded tip; weathered; 21 x 15 x 8 mm

No.	Square Metre	Quantity	Material	Category	Comments
46	N49W70	1	quartz	flake	thick; possibly retouched; 21 x 13 x 11 mm
	Total	54			

BeGu-25 Stage 3
Artifact Catalogue

No.	Square Meter	Quantity	Material	Category	Comments
17	N93W91	1	quartz	perforater	small elongated fragment with triangular cross-section, pointed extremity with rounded tip and small lateral spur produced by retouch on 1 edge; 16 x 8 x 7 mm
18	N93W91	2	quartz	flakes	1 possibly used as perforator; 1 weathered
19	N93W91	2	quartz	shatter	1 small
20	N96W66	1	quartz	perforater	small fragment with spur on 1 extremity formed by 2 broken edges; 12 x 10 x 7 mm
21	N96W66	1	quartz	perforater	small bipointed flake fragment with 2 partly retouched edges; 16 x 10 x 5 mm
22	N96W66	1	quartz	split pebble	2 broken faces; 25 x 18 x 16 mm
23	N96W66	1	quartz	flake	small
24	N96W66	3	quartz	shatter	
25	N96W74	1	quartz	perforater	sharp spur formed by 2 broken edges of small fragment; 11 x 9 x 6 mm
26	N96W74	1	quartz	split pebble	22 x 15 x 10 mm
27	N96W74	1	quartz	flake	possible burin blow on 1 extremity
28	N96W74	1	quartz	shatter	small
29	N96W75	1	quartz	perforater	sharp projection with triangular cross-section on 1 extremity of small fragment and shorter spur on opposite end; 14 x 6 x 6 mm
30	N96W75	2	quartz	flakes	small, weathered
31	N96W75	1	quartz	shatter	small
32	N96W75	1	gneiss	retouched flake	ventral retouch on concavo-convex lateral edge; corner of oblique broken distal end possibly used as perforator; 46 x 29 x 16 mm
33	N97W66	1	quartz	biface fragment	small corner fragment with pointed extremity possibly used as perforator; 11 x 11 x 7 mm
34	N97W66	1	quartz	flake	small
35	N97W66	1	grey chert	shatter	cortex
36	N98W77	1	grey chert	flake	cortex; weathered
37	N98W77	1	gneiss	split cobble	possibly used as scraper or core; 77 x 56 x 46 mm
38	N98W77	7	quartz	flakes	small
39	N98W78	1	gneiss	retouched flake	retouch on 1 straight lateral edge; distal end slightly fractured, with ventral hinge-fractures; possibly used as wedge; weathered; 24 x 17 x 10 mm
40	N98W78	1	quartz	split pebble	2 broken faces; 21 x 12 x 9 mm
41	N98W78	2	quartz	shatter	small
42	N99W60	1	gneiss	scraper	large denticulate retouch on convex lateral edge of subtriangular fragment with triangular cross-section; 34 x 22 x 25 mm
43	N99W60	1	quartz	micro-graver	retouched spur on edge of small fragment; 11 x 11 x 6 mm
44	N99W60	1	quartz	micro-perforator	thinned ventral face and tip with triangular cross-section of triangular flake; 12 x 8 x 3 mm
45	N99W60	1	quartz	micro-perforator	small triangular flake fragment with triangular cross-section and retouch on 1 lateral edge; 10 x 8 x 6 mm
46	N99W60	1	quartz	perforator	small fragment with pointed tip with burin blow and triangular cross-section; 16 x 9 x 8 mm

BeGu-25 Stage 3
Artifact Catalogue

No.	Square Meter	Quantity	Material	Category	Comments
47	N99W60	1	quartz	perforator	worn tip with burin blow and triangular cross-section on subtriangular flake with retouched concave edge; 15 x 10 x 6 mm
48	N99W60	1	quartz	retouched flake	bifacial retouch on convex distal edge of thick, square flake; possible widge; 16 x 17 x 9 mm
49	N99W60	1	quartz	shatter	small
50	N99W60	1	quartz	flake	small
51	N100W60	1	gneiss	scraper	large denticulate retouch on convex edge of steep face of subtriangular cobble; 85 x 48 x 47 mm
52	N100W60	1	gneiss	perforator	sharp corner produced by snapped lateral and distal edges of thick flake; weathered; 31 x 22 x 12 mm
53	N100W60	2	quartz	flakes	small
54	N100W60	2	quartz	shatter	small
55	N101W66	1	white chert	retouched flake	fime retouch on 2 edges of small flake fragment; 11 x 8 x 3 mm
56	N101W66	1	quartz	pebble spall	small; 18 x 8 x 4 mm
57	N101W66	4	quartz	shatter	small
58	N101W67	1	quartz	notched split pebble	shallow notch (5 mm) on steep lateral edge; 28 x 10 x 10 mm
59	N101W67	5	quartz	flakes	4 small
60	N101W67	2	quartz	shatter	small
61	N109W78	1	syenite	scraper	3 abrupt facets with intervening spurs on thick pebble fragment; 20 x 19 x 15 mm
62	N109W78	1	quartz	flake	small thick subtriangular flake; possibly used as perforator; 11 x 14 x 7 mm
63	N98W78	1	quartz	split pebble	possibly used as scraper; 16 x 15 x 10 mm
64	N114W79	1	gneiss	scraper	2 broad shallow facets with central spur on steep lateral edge of split pebble; 2 smaller flake scars on narrower end; sharp corner possibly used as perforator; 36 x 20 x 17 mm
65	N114W79	1	quartz	micro-scraper	small, shallow denticulate retouch on convex distal end and fine retouch on both lateral margins; compares well with BeGu-24:15; 12 x 9 x 5 mm
66	N114W79	1	quartz	perforator	pointed spur with triangular cross-section on distal end of thick flake; 19 x 21 x 11 mm
67	N114W79	1	quartz	flake	small fragment
68	N114W79	3	quartz	shatter	small
69	N115W83	1	quartz	micro-scraper	fine denticulate retouch on convex edge of small fragment; 9 x 7 x 6 mm
70	N115W83	3	quartz	shatter	1 small
71	N115W84	1	quartz	flake	weathered
72	N115W84	4	quartz	shatter	small
	Total	85			

BeGu-26 Stage 3
Artifact Catalogue

No.	Unit	Lot	Quantity	Material	Category	Comments
40	S79E55	-	1	chert	retouched flake	short steep retouch on slightly convex edge; 2 other edges snapped; possibly used as backed knife; heavily patinated; 46 x 26 x 7 mm
41	S79E55	-	1	gneiss	worked flake	large flake removed from dorsal face creating concave lateral edge; weathered; 39 x 29 x 15 mm
42	S79E55	-	1	gneiss	flake	49 x 26 x 19 mm
43	S80E59	-	1	quartz	shatter	small
44	N80E59	-	1	quartz	graver	small worked spur on broken end of flake fragment; 12 x 11 x 5 mm
45	S81E60	-	1	quartz	flake	small
46	S81E60	-	3	quartz	shatter	small
47	S85E62	-	1	gneiss	flake	large, thick
48	Sub-op 2A	2	354	clear glass	fragments	window pane
49	Sub-op 2A	1	87	clear glass	fragments	window pane
50	Sub-op 2A	1	11	clear glass	vessel fragments	drinking glass w/ indentations around lower half; modern appearance; base 6.0cm d.
51	Sub-op 2A	2	4	clear glass	vessel fragments	drinking glass w/ design of vertical raised bands; modern appearance; base approx 5.0cm d.
52	Sub-op 2A	2	1	clear glass	bottle	rectangular pharmaceutical bottle w/ quantity indicated by raised measurement lines; 10.0cm h. x 3.5cm w.
53	Sub-op 2A	2	1	clear glass	bottle fragment	base of bottle similar to 2A 2 52, but larger; 4.2cm w.
54	Sub-op 2A	2	3	clear glass	bottle fragments	body fragments of bottle similar to nos. 52 and 53
55	Sub-op 2A	2	2	clear glass	vessel fragments	body fragments of unknown vessel
56	Sub-op 2A	2	2	clear glass	bottle fragments	body fragments
57	Sub-op 2A	2	1	pale green glass	bottle fragment	body fragment
58	Sub-op 2A	2	1	pink glass	bottle fragment	body fragment
59	Sub-op 2A	3	32	clear glass	fragments	window pane
60	Sub-op 2A	4	6	clear glass	fragments	window pane
61	Sub-op 4	Surf.	1	pale green glass	bottle	2-piece moulded cylindrical bottle; 16.0cm h., 5.6cm d.
62	Sub-op 5	-	59	clear glass	fragments	window pane
63	Sub-op 5		1	clear glass	bottle fragment	body fragment
64	S60E66	-	1	clear glass	bottle fragment	neck of large 2-piece moulded vessel of unknown type; 4.3cm d.
65	S60E66	-	3	clear glass	vessel fragments	1 rim and 2 body fragments of vessel decorated w/ raised circles and splayed lines
66	S60E66	-	5	clear glass	lantern chimney fragments	fragments of top of lantern chimney
67	S60E66	-	1	blue glass	bottle fragment	finish and part of shoulder of 2-piece moulded pharmaceutical or cosmetic bottle
68	S60E66	-	1	clear glass	bottle fragment	body fragment of panel bottle w/ raised circle in centre
69	S60E66	-	2	clear glass	bottle fragments	
70	S60E66	-	1	clear glass	vessel fragment	decorated w/ design of small raised lines
71	S60E66	-	1	clear glass	fragment	window pane
72	S60E66	-	7	clear glass	bottle fragments	body fragments
73	S60E66	-	1	clear glass	fragment	melted glass

BeGu-26 Stage 3
Artifact Catalogue

No.	Unit	Lot	Quantity	Material	Category	Comments
74	S60E66	-	43	clear glass	lantern chimney fragments	body fragments of lantern chimeny
75	S50E81	-	4	amber glass	bottle fragments	body fragments, probably of beer bottle
76	S50E81	-	1	clear glass	bottle fragment	body fragment
77	S63E70	-	1	light olive glass	bottle fragment	body fragment
78	S63E70	-	2	clear glass	fragments	melted glass
79	S63E70	-	1	clear glass	lantern chimney fragment	body fragment
80	S63E70	-	2	clear glass	bottle fragments	body fragments
81	S63E70	-	3	milky glass	vessel fragments	body fragments
82	S63E70	-	15	clear glass	fragments	window pane
83	Sub-op 2A	1	1	fine white earthenware	bowl fragment	base sherd of cream-coloured vessel
84	Sub-op 2A	1	4	fine white earthenware	bowl fragments	rim sherds; same as 2A 1 83
85	Sub-op 2A	1	1	porcelain	vessel fragments	base sherd; faded floral design on interior; clear glaze
86	Sub-op 2A	1	3	fine white earthenware	vessel fragments	rim sherds; raised band near edge; clear glaze
87	Sub-op 2A	1	3	porcelain	vessel fragments	body sherds; floral design same as 2A 1 85
88	Sub-op 2A	2	7	fine white earthenware	bowl fragments	rim sherds; same as no. 83
89	Sub-op 2A	2	9	fine white earthenware	bowl fragments	body sherds; same as no. 83
90	Sub-op 2A	2	4	fine white earthenware	bowl fragments	rim sherds; same as no. 86
91	Sub-op 2A	2	6	porcelain	vessel fragments	base sherds; same as no. 85
92	Sub-op 2A	2	12	porcelain	vessel fragments	body sherds; same as no. 87
93	Sub-op 2A	3	1	fine white earthenware	vessel fragment	base sherd, same as no. 86
94	S60E66	-	4	fine white earthenware	bowl fragments	rim sherds; everted lip; 1 thin horizontal gold band on interior
95	S60E66	-	4	fine white earthenware	bowl fragments	base sherds
96	S60E66	-	2	fine white earthenware	vessel fragments	rim sherds; thin horizontal gold band on exterior
97	S60E66	-	3	ironstone	vessel fragments	base sherds; makers mark "Royal Ironstone China Wood & Son England"
98	S60E66	-	2	fine white earthenware	bowl fragments	rim sherds; thin gold band along everted lip
99	S60E66	-	3	fine white earthenware	bowl fragments	1 rim, 1 base, 1 body sherd; simple polychrome painted design on exterior; single horizontal red band on interior near lip
100	S60E66	-	2	porcelain	tea cup fragments	1 base sherd and 1 rim sherd; pink floral design on exterior
101	S60E66	-	8	fine brown earthenware	vessel fragments	1 spout fragment, 7 body sherds; blue, gold, and black exterior w/ white interior
102	S60E66	-	11	ironstone	vessel fragments	3 base sherds; 3 rim sherds w/ wheat sheaf design design; 5 body sherds
103	S60E66	-	1	fine white earthenware	plate fragment	blue glaze on both sides, but darker on interior surface
104	S60E66	-	7	fine white earthenware	vessel fragments	misc. sherds from different vessels; 3 rim, 4 body; one w/ gold maple leaf design
105	S60E66	-	21	fine white earthenware	vessel fragments	misc. plain sherds; 4 rim, 17 body
106	S60E66	-	4	buff earthenware	crock fragments	1 base and 3 body fragments of cream-coloured crock

BeGu-26 Stage 3
Artifact Catalogue

No.	Unit	Lot	Quantity	Material	Category	Comments
107	S63E70	-	3	fine white earthenware	vessel fragments	body sherds w/ blue print
108	S50E80	-	1	buff earthenware	crock fragment	rim sherd; brown speckled glaze
109	S50E81	-	3	buff earthenware	crock fragments	1 rim sherd cross-mends w/ S50 E81 108; 2 body sherds; brown speckled glaze
110	S50E81	-	1	red brick	fragment	
111	S50E81	-	1	steel	buggy spring	one end broken off
112	Sub-op 2A	1	32	iron	round nails	various lengths
113	Sub-op 2A	1	3	iron	wire-cut nails	various lengths
114	Sub-op 2A	1	1	iron	staple	
115	Sub-op 2A	1	1	iron	strapping	3/4" wide
116	Sub-op 2A	1	1	iron	ring	3.5cm d.; possibly from horse harness
117	Sub-op 2A	2	85	iron	round nails	various lengths
118	Sub-op 2A	2	13	iron	wire-cut nails	various lengths
119	Sub-op 2A	2	3	steel	screws	slotted head; two 1 1/4", one 1/2" long
120	Sub-op 2A	2	4	iron	tacks	
121	Sub-op 2A	2	1	iron	staple	
122	Sub-op 2A	3	6	iron	round nails	various lengths
123	Sub-op 5	-	1	iron	round spike	6" length
124	Sub-op 5	-	35	iron	round nails	various lengths
125	Sub-op 5	-	4	iron	wire-cut nails	various lengths
126	Sub-op 5	-	1	steel	screw	slotted head; 3/4" length
127	Sub-op 5	-	2	iron	nuts and bolts	1bolt with 3 attached nuts and 1 washer; 1 possible nut
128	S60E66	-	252	iron	round nails	various lengths
129	S60E66	-	246	iron	wire-cut nails	various lengths
130	S60E66	-	5	iron	staples	2 large, 3 small
131	S60E66	-	6	iron	tacks	
132	S60E66	-	3	steel	screws and bolts	1 screw 1" length; 2 bolts 3/4" length
133	S60E66	-	1	steel	pin	2 1/2" length
134	S60E66	-	1	iron	wire	wire wrapped around a tack
135	S63E70	-	1	iron	round spike	6" length
136	S63E70	-	18	iron	round nails	various lengths
137	S63E70	-	5	iron	wire-cut nails	various lengths
138	S63E70	-	1	iron	staple	
139	S63E70	-	1	iron	tack	
140	S63E70	-	1	steel	screws and bolts	slotted head; 1 bolt 1/4" length, 1 screw 3/4" length
141	Sub-op 2A	1	19	ferrous metal	can fragments	

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Artifact Catalogue

No.	Unit	Lot	Quantity	Material	Category	Comments
142	Sub-op 2A	2	12	ferrous metal	can fragments	
143	Sub-op 2A	2	1	tin alloy	can lid	threaded; crushed in half
144	Sub-op 5		2	ferrous metal	flat metal	fragments
145	S60E66	-	60	steel	strapping	fragments, some w/ attached round nails; 1/2" wide
146	S60E66	-	9	ferrous metal	can fragments	
147	S60E66	-	2	iron	barbed wire	early variety comprised of narrow strap with large triangular teeth at regular intervals
148	S60E66	-	1	ferrous metal	electrical hardware	horseshoe-shaped piece about 3cm long; function uncertain
149	S63E70	-	9	steel	strapping	fragments, some w/ attached round nails; 1/2" wide
150	S63E70	-	1	aluminum or tin	foil	
151	S50E81	-	1	iron	wire	twisted fragment
152	S50E81	-	2	ferrous metal	can fragments	
153	S50E81	-	1	steel	clasp	possibly from a small box or chest
154	S50E81	-	1	iron	toothed wheel	fragment; function unknown; possibly some sort of geared wheel
155	S60E66	-	7	steel	wire	various fragments
156	Sub-op 5	-	2	iron	bolt 'shields'	2 pieces used to increase holding power when bolt is inserted into stone
157	Sub-op 5	-	1	steel	file	blade 5" length, 5/8" wide
158	Sub-op 5	-	1	copper	coin	American Lincoln Head penny, of type produced 1909-1952; obverse extremely worn
159	Sub-op 2A	2	6	copper	.22 cartridges	
160	Sub-op 5		2	zinc alloy	.22 cartridges	shiny appearance, not like copper or brass
161	S63E70	-	5	copper	.22 cartridges	
162	S60E66	-	1	copper	.44 cartridge	
163	S60E66	-	1	silver	fork	4 tines; makers mark on reverse "WB"; 7" length
164	S63E70	-	1	ferrous metal	ornamental heart	flat metal openwork heart w/ attached eye screw to hang
165	S60E66	-	2	tin alloy	sardine can keys	
166	S60E66	-	2	steel	paper clip fragments	
167	S60E66	-	4	ferrous metal	tobacco box ornaments	1 heart, 2 discs, 1 ovoid
168	S60E66	-	1	steel	corrugated strapping	
169	S60E66	-	1	steel	garment fastener	riveted fastener of type used on waistband of jeans or other denim clothing; 5/8" diameter
170	S60E66	-	6	copper	boot grommets	various sizes
171	S60E66	-	3	ferrous metal	overall buckles	"Samson" brand
172	S60E66	-	5	ferrous metal	clothing buckles	assorted shapes and sizes
173	Sub-op 2A	2	6	mother-of-pearl	buttons	various sizes; largest 1/2" d.
174	S63E70	-	2	plastic	buttons	1 whole, 1 fragmentary; white; 4 holes; 1/2" d.
175	S63E70	-	4	mother-of-pearl	buttons	various sizes; largest 1/2" d.

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Artifact Catalogue

No.	Unit	Lot	Quantity	Material	Category	Comments
176	Sub-op 5	-	3	resin	unknown	pieces of resin or early plastic; possibly some type of handle
177	Sub-op 2A	2	1	plastic	comb	man's hair comb; "Collegiate" brand; 1 1/2" wide; approx a third missing
178	Sub-op 2A	2	1	canvas and rubber	boot	sole of right boot w/ fragile remains of canvas upper
179	S60E66	-	1	bone	mammal	end of long bone from small animal
180	Sub-op 2A	2	1	bone	mammal	fragment of long bone from large animal
181	Sub-op 2A	2	1	bone	avian	chicken radius
182	S60E66	-	1	putty	window putty	
183	Sub-op 2A	2	2	red brick	fragments	blackened
184	Sub-op 2A	2	2	lime mortar	fragments	
185	Sub-op 2A	3	2	lime mortar	fragments	sample of many fragments in Sub-op 2A Lot 3
186	Sub-op 5	-	1	red brick	fragment	blackened
		Total	1737			

BeGu-28 Stage 3
Artifact Catalogue

No.	Location	Quantity	Material	Category	Comments
18	midden	2	clear glass	bottle fragments	1 marked "Rawleigh's"
19	midden	6	clear glass	oil lamp fragment	mostly small
20	midden	1	clear glass	washboard fragment	
21	midden	2	clear glass	round body fragments	70 and 7.5 cm dia.
22	midden	1	green glass	round body fragment	4.5 cm dia.
23	midden	7	blue glass	bottle fragments	various sizes
24	midden	5	clear glass	bottle fragments	various sizes
25	midden	2	clear glass	bottle fragments	marked "5 w…"
26	midden	2	yellow glass	round fragments	carnaval glass style; various sizes
27	midden	4	yellow glass	bowl fragments	various sizes
28	midden	5	clear glass	fragments	various sizes
29	midden	5	clear glass	container fragments	various sizes
30	midden	2	clear glass	container fragments	
31	midden	1	clear glass	bottle	24.5 cm in height and 6 cm dia.
32	midden	2	clear glass	bottle fragments	various sizes ; marked "Dr.El…waves f…waving f…"
33	midden	2	clear glass	fragments	various sizes
34	midden	1	clear glass	fragment	design with "bc dc"
35	midden	1	blue glass	fragment	
36	midden	1	clear glass	spice bottle	
37	midden	1	clear glass	ink bottle	
38	midden	6	mauve glass	fruit jar	various sizes
39	midden	1	clear glass	bottle	17.5 cm in height x 5 cm in dia.
40	midden	5	clear glass	jar	various sizes
41	midden	1	pink glass	fragment	
42	midden	3	clear glass	drinking glass fragments	square decorations
43	midden	6	clear glass	bottles fragments	various sizes differents styles bottles
44	midden	8	clear glass	container fragments	bottom fragments
45	midden	1	clear glass	bottle	small; marked "1933 des. rec'd"
46	midden	1	clear glass	fragment bottle	"Made in USA"
47	midden	1	clear glass	container fragment	bottom fragment marked "HD…"
48	midden	3	clear glass	container fragments	bottom fragments
49	midden	2	clear glass	bottle fragments	
50	midden	15	clear glass	bottles fragments	
51	midden	1	clear glass	bottle fragments	"D" in diamond-shaped design
52	midden	3	pink glass	plate fragments	various sizes; possibly dessert plate

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Artifact Catalogue

No.	Location	Quantity	Material	Category	Comments
53	midden	1	clear glass	bottle fragment	"...ED"
54	midden	9	clear glass	fragments	various containers
55	midden	12	pale green glass	fragments	various sizes
56	midden	1	clear glass	bottle	4.5 cm dia.; "contents 8 fluid ounces"
57	midden	1	clear glass	jar	13.5 x 5 cm dia.
58	midden	1	clear glass	bottle	12.5 cm in height x 3.5 cm dia.
59	midden	1	clear glass	bottle	11 x 5,5 cm dia.
60	midden	3	clear glass	bottle fragments	
61	midden	1	clear glass	bottle fragment	
62	midden	7	clear glass	fragments	various sizes
63	midden	2	pink glass	fragments	various sizes
64	midden	5	vert pâle glass	fragments	design on some pieces
65	midden	63	clear glass	fragments	various sizes
66	midden	2	clear glass	drinking glass fragments	
67	midden	1	pink glass	plate fragments	large pieces, possibly cake platter
68	midden	72	fine white earthenware	dish fragments	
69	midden	2	fine white earthenware	dish fragments	green glaze
70	midden	5	fine white earthenware	plate fragments	with design
71	midden	2	fine white earthenware	plate fragments	with gold line decoration
72	midden	2	fine white earthenware	plate fragments	decorated
73	midden	18	fine white earthenware	plate fragments	various sizes
74	midden	6	fine white earthenware	plate fragments	green decoration
75	midden	4	fine white earthenware	bowl fragments	brown line decoration
76	midden	6	fine white earthenware	fragments pot	many lines and colors (green, yellow,black) various sizes
77	midden	1	white glass	drinking glass fragment	
78	midden	4	fine white earthenware	fragments	possibly soup tureen
79	midden	4	fine white earthenware	plate fragments	various sizes
80	midden	4	pottery	fragments	various sizes
81	midden	16	brown glass	fragments	various sizes
82	midden	10	brown glass	bottle fragments	one 5 cm dia. marked "kruschen salts"
83	midden	3	brown glass	bottle fragments	from below "kruschen salts" inscription
84	midden	2	brown glass	bottle fragments	bottom fragment marked "design rec'd 6 1933"
85	midden	3	brown glass	bottle fragments	mouth fragments
86	midden	1	brown glass	bottle	16,5 possibly beer bottle
87	midden	2	brown glass	fragments	various sizes

BeGu-28 Stage 3
Artifact Catalogue

No.	Location	Quantity	Material	Category	Comments
88	midden	1	brown glass	bottle	18,5 x 7 cm dia.
89	midden	1	brown glass	bottle	13 x 4,5 cm dia.
90	midden	31	green glass	fragments	various sizes
91	midden	3	green glass	juicer fragments	
92	midden	3	green glass	bottle fragments	
93	midden	1	green glass	bottle	
94	midden	7	buff earthenware	pot	various sizes
95	midden	4	buff earthenware	pot	various sizes
96	midden	9	black earthenware	pot	various sizes
97	midden	2	brown earthenware	pot	
98	midden	3	brown earthenware	pot	small pot 12 x 8 cm dia. and round piece 6 dia.
99	midden	1	metal	bell	8 cm dia.
100	midden	1	green glass	wine bottle	
101	midden	1	green glass	wine bottle	
102	midden	4	brown earthenware	teapot fragments	possibly fragments than teapot
103	midden	1	fine white earthenware	teapot	green glaze
104	midden	1	metal	pot	7.5 dia., marked "Colgate & Co, New York USA"
105	midden	1	brass	oil lamp wick holder	
106	midden	6	metal	container rim fragments	
107	S62E58	8	iron	washer	small
108	S62E58	6	buff earthenware	fragments	various sizes
109	S62E58	1	beige potery	fragments	
110	S62E58	1	rubber	bike tire	
111	S60E60	13	metal	fragments	unidentified flat pieces
112	S60E60	1	grey earthenware	fragment	
113	S60E60	1	white glass	bottle	
114	S60E60	3	white glass	fragments	decorated
115	S60E60	7	fine white earthenware	fragments	some cup fragments
116	S61E60	3	metal	fragments	unidentified flat pieces
117	S60E60	1	aluminun	key to open can	
118	S61E60	1	aluminum	round piece	unidentified
119	S61E60	1	plastic	button	white, 4 holes
120	S61E60	19	fine white earthenware	plate fragments	green decoration
121	S62E58	1	white glass	drinking glass fragments	
122	S62E58	1	green glass	fragments	various sizes

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Artifact Catalogue

No.	Location	Quantity	Material	Category	Comments
123	S62E53	51	white glass	fragments	various sizes
124	S62E53	1	platic	man's hair comb	
125	S62E53	4	iron	fragments	hinge, hard ware, etc.
126	S67E58	8	fine white earthenware	fragments	fragments of cup
127	S67E58	4	fine white earthenware	fragments	fragments of plate with design
128	S67E58	16	fine white earthenware	fragments	various sizes
129	S67E58	4	iron	fragments	various sizes
130	S67E58	1	iron	caster	for table or other furniture
131	S67E58	242	iron	round nails	various sizes
132	S67E58	2	clay	red brick	
	Total	869			