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25-Archaeological Investigations in the Ross Field Industrial Park, Benton Charter Township, Berrien County, Michigan (ER-900557)

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DEPARTMENT OF ANTHROPOLOGY

WESTERN MICHIGAN UNIVERSITY

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ARCHAEOLOGICAL INVESTIGATIONS IN THE ROSS FIELD INDUSTRIAL PARK, BENTON CHARTER TOWNSHIP, BERRIEN COUNTY, MICHIGAN

(ER-900557)

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A report of research
undertaken at the request of:

Mr. Jim Howard
Southwestern Michigan
Commission
Benton Harbor, MI 49022

On behalf of:

Community Economic
Development Corporation

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INTRODUCTION TO THE PROJECT

With the execution of two contracts between the Community Economic Development Corporation and Western Michigan University, authorizing archaeological investigation of the Ross Field Industrial Park in Sections 8-9, Benton Charter Township, Berrien County, Michigan, archaeologists from the Department of Anthropology undertook a literature, documents, and site file search and on 3 Apr and 5 Apr 91 surveyed the study area in order to determine whether proposed construction activities would have an adverse impact on cultural resources. This Phase I program of research was, in turn, followed by Phase II survey and testing of identified resources in selected portions of the project; fieldwork that involved preparation of the field lying in the western part of the study area for intensive surface collecting, monitoring the movement of heavy equipment during establishment of an access road into this same area of the project, and limited test excavation of those three sites (20BE414, 20BE415, and 20BE416) regarded by us as the most promising resources present in the industrial park between 6 May-27 Jun 91. The latter phase of our research program was undertaken in an effort to ascertain whether any of the sites recorded might be eligible for listing in the National Register of Historic Places.

There follows a report of our program of research, detailing aspects of both the Phase I survey to locate archaeological sites and the Phase II intensive survey and testing strategy employed to evaluate three of 11 sites present in the industrial park. The

report concludes with recommendations based upon our findings.

PROJECT PERSONNEL:

The following individuals comprised the research teams responsible for the two-phase examination of the project area:

Phase I study

Principal Investigator - Dr. William M. Cremin, Professor of Anthropology, Western Michigan University

Field Supervisor - Mr. Gregory R. Walz, M.A., Department of Anthropology, WMU

Field Assistants - Mr. Daniel B. Goatley, M.A. Candidate in Anthropology, WMU
- Mr. Timothy D. Knapp, M.A. Candidate in Anthropology, WMU

Phase II investigation

Principal Investigator - Dr. William M. Cremin, Professor of Anthropology, WMU

Field Supervisor - Mr. Gregory R. Walz, M.A., Department of Anthropology, WMU

Field Assistants - Mr. Robert Hull, M.A., Instructor, Department of Anthropology, WMU
- Mr. Timothy D. Knapp, M.A. Candidate in Anthropology, WMU
- Mr. David McBride, M.A. Candidate in Anthropology, WMU
- Mr. John Hirsch, M.A. Candidate in Anthropology, WMU

- Mr. Marc Custer, Graduate Student in History and Anthropology, WMU
- Ms. Stephanie Hull, B.A. in Anthropology, WMU

DESCRIPTION OF THE PROJECT AREA:

The research area of this study is a rectangular parcel of approximately 100 acres (40.5 ha) occupying the E 1/2 of the SE 1/4 of Section 8 and the W 1/2, W 1/2 of the SW 1/4 of Section 9 in Benton Charter Township (T4S R18W), Berrien County, Michigan (Fig. 1). Within the total area delineated above, there are 20 acres (8.1 ha) at the southern end which have been excluded from our study. This acreage comprises the small stream valley occupied by Sand Creek, which flows from east to west across the area. By prior agreement, our investigation was to commence at bluff's edge and include only the area lying between the valley and the quarter-section line to the north.

Sand Creek is a small stream that is tributary to the Paw Paw River. After passing through the area under consideration, this stream joins the river in the center of the NW 1/4, SW 1/4 of Section 8 about one kilometer west of the Ross Field Industrial Park. Elevation along the creek is 179 m ASL, with the valley margin rising about 8 m above the stream. To the north of the valley, the land is level to very gently rolling. Maximum elevation within the study area is 190 m ASL; this elevation conforms to a sandy ridge paralleling the course of Sand Creek at a distance of 80-100 m north of the stream valley.

The study area is bisected by Crystal Avenue, which runs north-south through the development. Approximately 80% of the acreage

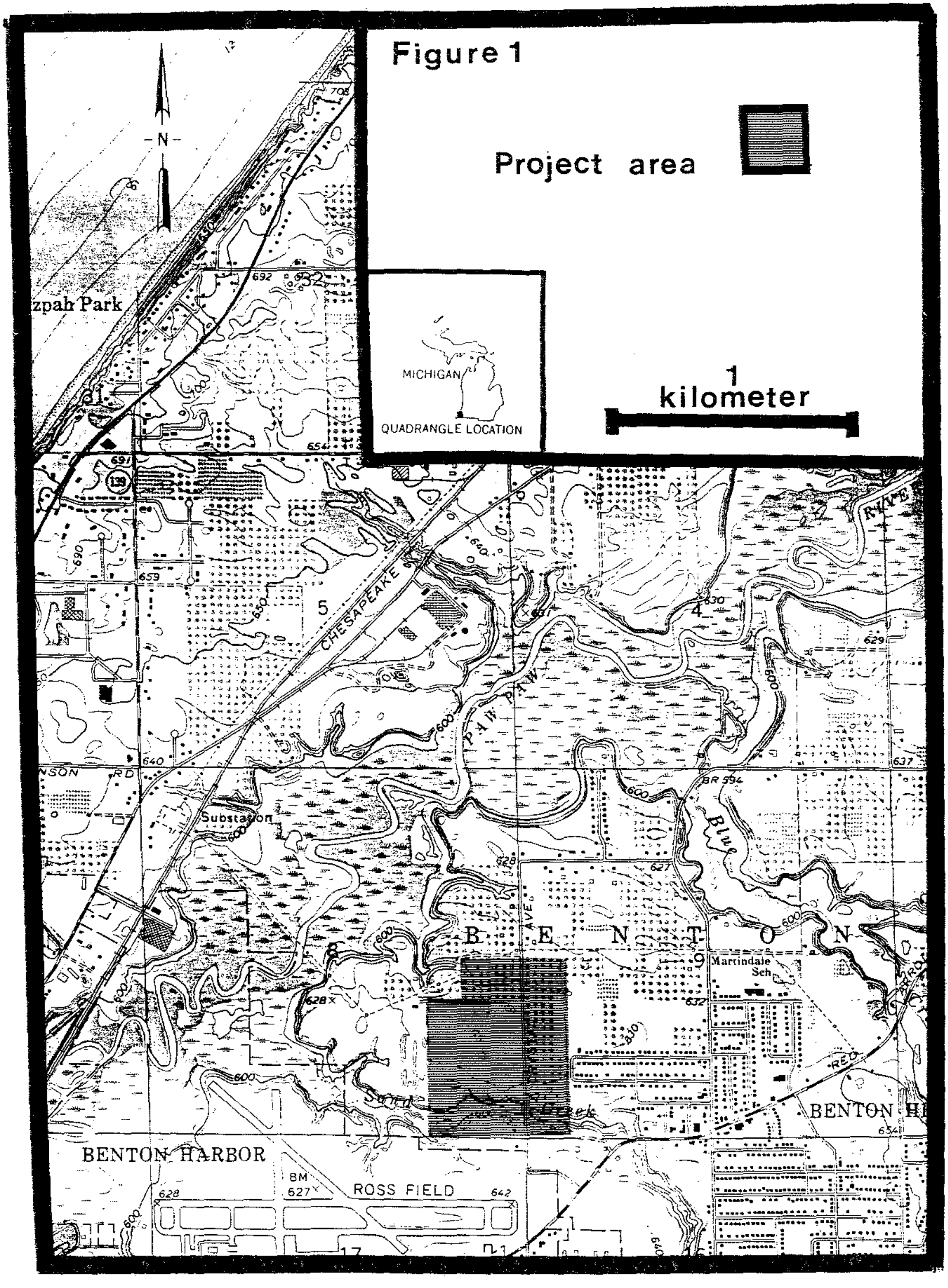

N
Project area
1 kilometer
MICHIGAN
QUADRANGLE LOCATION
zpah Park
CHESAPEAKE
PAW PAW
Substation
Blue
B E N T O N
Martindale Sch
Sand Creek
BENTON HARBOR
BM 627
ROSS FIELD
BR 594
NSON RD

Figure 1

under investigation lies to the west of this road. Here, fallow field defined the former land use, while the strip of land to the east of the road had previously been devoted to orchard and vineyard.

Bordering the valley on both sides of the road is a forested strip of no more than 50 m width. Within this strip of woods there are several neatly planted rows of maple trees that appear to have been planted as nursery stock. Most of these trees are less than 30 cm in diameter. At several points within the tree rows there occur vacant spots which appear to mark the former locations of maples removed for replanting elsewhere. On the bluff margin and slope, tree cover consists of mature maples, red oaks, and occasional beech trees. Understory species include stems of canopy dominants and sassafras, greenbriar, and wild rose thickets. Finally, in a small low corner just above the creek on the east side of Crystal Avenue, but separated from the road by an intervening ravine which joins the stream valley from the north, is an old asparagus field that appears not to have been harvested for a number of years.

Currently under construction in the extreme northeast corner of the study area is a Ford-Dunlop Automotive Composites facility. This development prohibited effective examination for the presence of archaeological resources, but the client informed us that this lot within the industrial park had been granted an exclusion prior to the commencement of our research program. In addition to the disturbance in and around this construction site, a strip of land bordering a small drainage ditch to the west of Crystal Avenue had already been partially cleared in preparation for construction at the time of our initial visit to the project area in early April.

As was the case with the aforementioned construction site, our examination here was limited to visual inspection of the landscape previously stripped of all vegetative cover and topsoil.

Soil profiles have been found to be quite variable across the study area. In the northern portion of the parcel, in the vicinity of the small channelized drainage ditch, soils were observed to be heavy and organic, dark brown to black in color, and underlain by a greyish clayey sand. Both the topsoil and underlying sand were observed to be moist to wet. This same profile was encountered in depressional areas elsewhere on the property. In addition to these small depressions, an area of ponded water, approximately 10 m X 60 m, was observed in the orchard occupying the northern portion of the project east of Crystal Avenue. Generally, as the survey team proceeded southward toward the creek, we found soils to be progressively drier and characterized by a thin brown topsoil overlying an orange to yellow sandy subsoil. And it is perhaps noteworthy that throughout the study area soils were found to be nearly devoid of rocks and gravel.

PREVIOUS RESEARCH AND/OR RESOURCES IN THE GENERAL AREA:

There is nothing in the literature, documents, or state site files to suggest that any archaeological research (at least of a professional nature) has previously been undertaken in the project area, and no sites have been recorded for this parcel. Be that as it may, the state site files maintained by the Bureau of History, Department of State do contain references to a number of sites recorded for the general area. These include seven sites in the UMMA site files, one Hinsdale listing, and two sites recorded during the WMU program of research associated with the US-31

Freeway Corridor project a decade ago. Six are identified only as prehistoric sites, including a prehistoric village recorded in the Archaeological Atlas of Michigan (Hinsdale 1931), two are campsites of Woodland and/or Middle Woodland affiliation, one is notable for including both Early and Late Archaic diagnostics in a small surface collection (Garland and Mangold 1980), and the last, based upon an unconfirmed amateur report, is identified as a Woodland period mound (Ms. Barbara Mead, personal communication).

Given that this general area had produced no fewer than 10 prehistoric archaeological sites, and yet had received absolutely minimal attention from the professional community of archaeologists, seemed to us reason enough to create and undertake a program of research that would subject this parcel of land on Sand Creek to intensive and systematic study.

PHASE I SURVEY OF THE ROSS FIELD INDUSTRIAL PARK

The Phase I survey of the project area was undertaken by a survey team of three on 3 Apr and 5 Apr 91. Because the area to be investigated supported often dense vegetative cover, the surveyors relied upon shovel testing with some application of surface reconnaissance procedures where ground visibility seemed to warrant it. Typically, transects or lines of survey were spaced 20 m apart, with individual shovel tests being excavated through the topsoil and into the subsoil at intervals of 20 m along parallel transects. Spacing between transects and shovel tests was reduced to 10 m as the survey team approached the bluff margin above the creek, but this was the only exception to the 20/20 m spacing standard employed in our program of research.

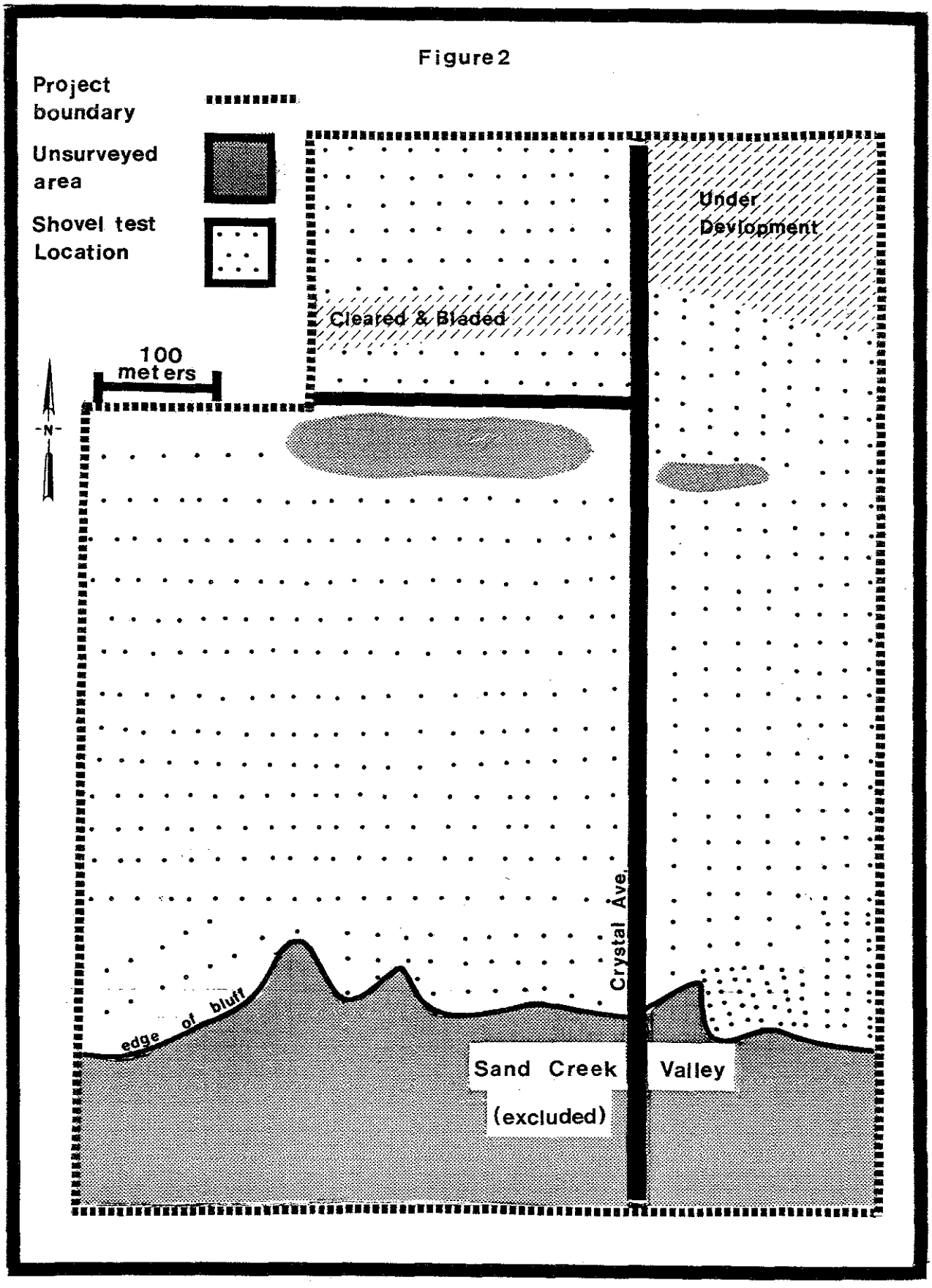
Soil removed from the approximately 25 cm diameter excavations was carefully examined for the presence of cultural material or any indication of disturbance that the soil profile might reveal (e.g. midden deposit or subsurface feature representing an anomaly that could indicate the presence of cultural resources). Following the above methodology, a total of 496 shovel tests were excavated across the parcel. In the instance of a positive shovel test, one that produced evidence of prehistoric occupation, additional tests were placed about the initial findspot. A total of 50 tests were excavated in response to positive shovel tests, mostly in the vicinity of the site recorded as 20BE414. The approximate locations of all shovel tests excavated on the occasion of the survey of the Ross Field Industrial Park are shown in Figure 2.

As previously noted, some visual inspection of the ground surface was undertaken by surveyors. This was especially the case in the general vicinity of positive shovel tests, but also proved useful as a supplement to shovel testing along the sand ridge that parallels the creek west of Crystal Avenue. Here, surveyors found the plant cover to be sparser than was typical of the project area as a whole. That the number of cultural items recovered from the two site loci (20BE415 and 416) occupying this ridge is comparatively great when all site inventories are considered is a direct reflection of the better opportunity afforded surveyors to surface collect this portion of the study area.

RESULTS OF THE PHASE I FIELDWORK:

Upon completion of the Phase I survey, enough information has been collected to record the presence of five new archaeological sites in the study area. Four are located in the fallow field to

Figure 2


Project boundary
Unsurveyed area
Shovel test Location
Under Development
Cleared & Bladed
100 meters
N
Crystal Ave.
edge of bluff
Sand Creek
Valley
(excluded)

the west of Crystal Avenue; the fifth site occupies a bluff's edge location in the vineyard and asparagus patch in the southeast corner of the project. Site locations are illustrated in Figure 3, and a brief description of each site follows:

Asparagus (20BE414)

This site is estimated to occupy 800 m^2 of area in the center of the N 1/2, SW 1/4, SW 1/4, SW 1/4 of Section 9, Benton Charter Township (T4S R18W), Berrien County, Michigan. Here, surveyors observed a very light scatter of lithic debris and FCR occupying a peninsula-like extension of land between the creek to the south and a steep-sided ravine that forms the western limits of the site. Vegetative cover was especially dense over the site area, and only three cultural items, none of which is diagnostic, were recovered. These items include a primary flake and two secondary flakes of an unidentified raw material. Given the proximity of this site to the valley margin and its placement between the creek and a ravine with a spring fed(?) intermittent stream, this site begs for some additional study.

Methane (20BE415)

This site is a lithic scatter occupying perhaps 1000 m^2 in the center of the E 1/2, SE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. The site extends along the crest and foreslope of a slight sand ridge that parallels the course of Sand Creek and has produced a total of 14 cultural items (none of which is diagnostic), including: a utilized flake of Burlington chert; two primary flakes, one of Yellow/White chert and one of an unidentified material; five secondary flakes, three of Deerlick Creek chert, one of Wyandotte

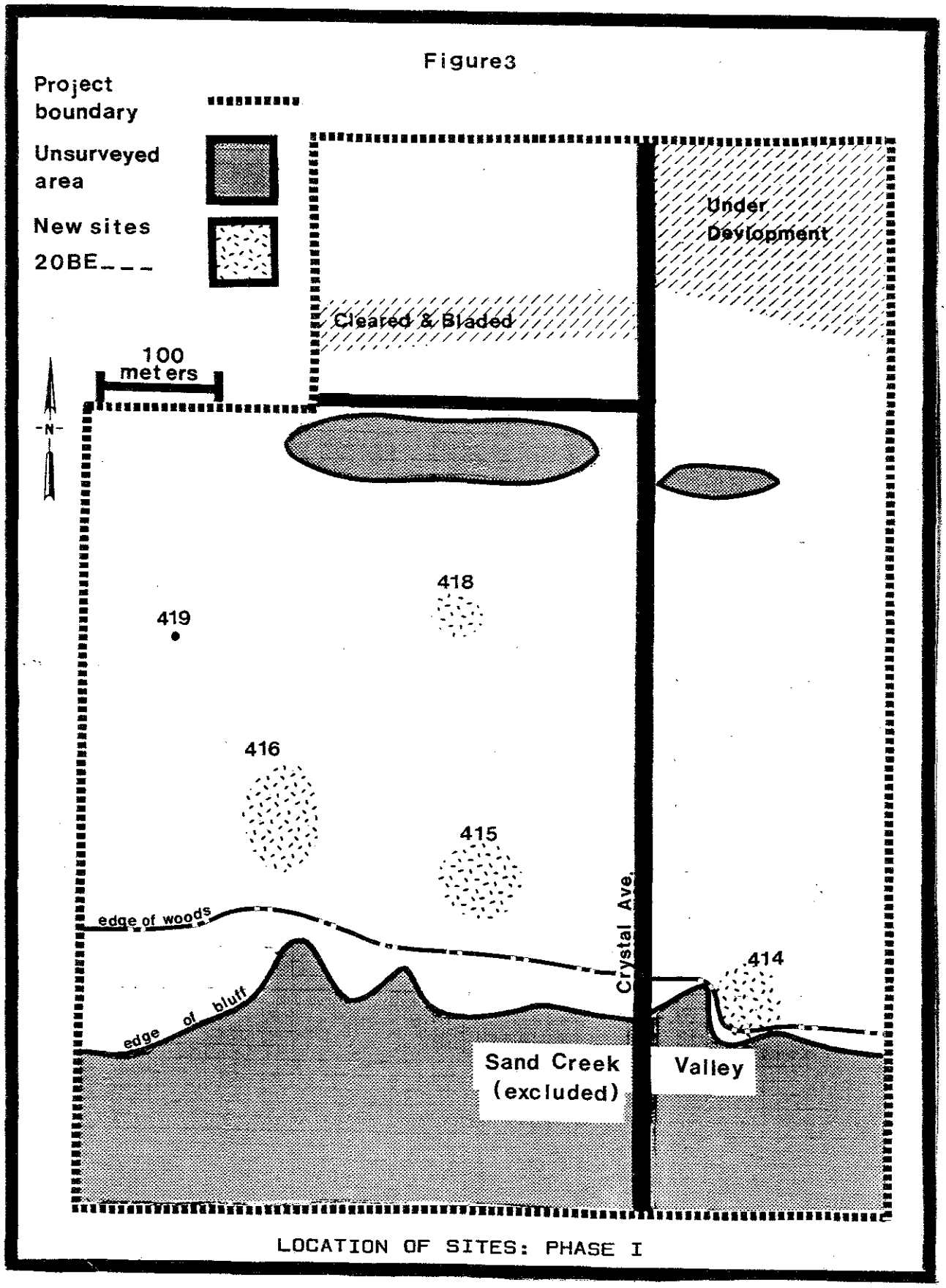


Figure3
Project boundary
Unsurveyed area
New sites 20BE___
Under Development
Cleared & Bladed
100 meters
N
418
419
416
415
414
edge of woods
edge of bluff
Crystal Ave.
Sand Creek (excluded)
Valley
LOCATION OF SITES: PHASE I

chert, and one of an unknown raw material; four tertiary flakes, one of heat-treated Burlington chert, one of Purple chert, and two unidentified specimens; and two fragments, one of Wyandotte and the second of Yellow/White chert. The comparative density of lithic debris recovered on this occasion agrues for additional study of this site.

Steve's Site (20BE416)

This extensive lithic debris scatter covers an area of 2000 m^2 in the SE 1/4, NW 1/4, SE 1/4, SE 1/4 of Benton Charter Township (T4S R18W), Berrien County, Michigan. This site lies to the west of Methane and occupies the crest and foreslope of the same sand ridge paralleling Sand Creek to the south. Identified items include: three decortication flakes, with one specimen each of Deerlick Creek and Purple chert; two secondary flakes, one of Deerlick chert and the other of an unidentified raw material; a block of Deerlick Creek chert; three fragments, with one being Wyandotte chert; and a core of an unidentified chert. Again, while nothing in the collection is diagnostic, the density of debris argues strongly for some additional investigation of this resource.

Sand Creek (20BE418)

A light lithic scatter encompassing perhaps 400 m^2 in the SW 1/4, SE 1/4, NE 1/4, SE 1/4 of Benton Charter Township (T4S R18W), Berrien County, Michigan bears considerable resemblance to aforementioned sites in the composition of its lithic assemblage. Seven cultural items include: a decortication flake of Purple chert; four secondary flakes, including two specimens of Deerlick Creek chert and one of Purple chert; and two tertiary flakes, one of which is Deerlick Creek chert. Once again, nothing in the collection is indicative

of the site's age or cultural affiliation. When compared with the other two sites from the field west of Crystal Avenue, we would opt not to conduct Phase II investigations of this site loci.

Industrial Park 1 (20BE419)

The last site recorded during the Phase I survey represents the findspot of a Madison point of heat-treated Burlington chert and a preform of Purple chert. These two items were located within a meter of one another in the center of the E 1/2, SW 1/4, SW 1/4, NE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. Careful examination of the surface and cluster testing about the findspot did not reveal any additional cultural debris. The diagnostic point dates this findspot to the Late Woodland period, but we are not proposing additional testing of this locus. This artifact is illustrated in Figure 6 (A).

RECOMMENDATIONS:

Although ground surface visibility throughout the study area was minimal at best, systematic and intensive application of the aforementioned data recovery procedures has enabled the survey team to locate and record five previously unknown archaeological sites. These include four lithic scatters, ranging in estimated area from 400-2000 m^2, and the findspot of a Late Woodland projectile point and associated preform. Given the frequency with which sites occur in the project area and the quantities of lithic items collected, under less than ideal conditions, and the fact that very little is presently known regarding the prehistoric occupation of the Paw Paw River drainage in Berrien County, we concluded that some Phase II testing was justified. And with this recommendation, the Staff of the Bureau of History concurred.

PHASE II ARCHAEOLOGICAL INVESTIGATIONS IN THE ROSS FIELD INDUSTRIAL PARK

Upon acceptance of our Phase I recommendation by the Bureau of History and the client, we proposed some additional investigation of 20BE414 in the southeast corner of the project and intensification of our evaluation of resources located in the fallow field to the west of Crystal Avenue. In order to maximize access to the desired information, while at the same time minimizing the costs associated with the proposed Phase II study, we requested of the client that the field be plowed prior to initiating the fieldwork.

During the second week of May, the fallow field was turned by several area farmers with some minimal monitoring by us. Thereafter, we awaited seasonal rains to wash the freshly plowed field and enhance ground visibility for surface collection. On 29 May, the authors traveled to the project area for the purpose of intensively surveying a field that now afforded us generally excellent visibility in order that we might augment the collections made almost two months earlier.

RESULTS OF THE INTENSIVE SURFACE COLLECTION:

The entire field was carefully walked by us along transect spaced 5 m apart. Whenever one of us observed a cultural item on the surface, the findspot was flagged and the general area about it carefully scanned for more debris. We easily relocated 20BE415 and 416 near the southern limits of the field and, in addition, were successful in recording six more prehistoric sites. However, each of these proved to be nothing more than a findspot! And, regardless of the effort expended, we were unsuccessful in relocating the other two sites (20BE418 and 419) we had recorded during our first survey of

the project area. The new sites recorded during the initial stage of our Phase II study are shown in Figure 4 and briefly described below:

A Couple of Flakes (20BE417)

This location in the SE 1/4, NE 1/4, NW 1/4, SE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan produced a primary flake of Deerlick Creek chert and a secondary flake of heat-treated Burlington chert within less than a meter of one another. Nothing else was observed in the general area on this occasion. Subsequently, however, during our monitoring of road ROW construction (see the discussion of this activity below), a third specimen, identified as a secondary flake of argillite, was recovered from the location of the flag placed here upon discovery of the first two specimens. No additional work has been contemplated on 20BE417.

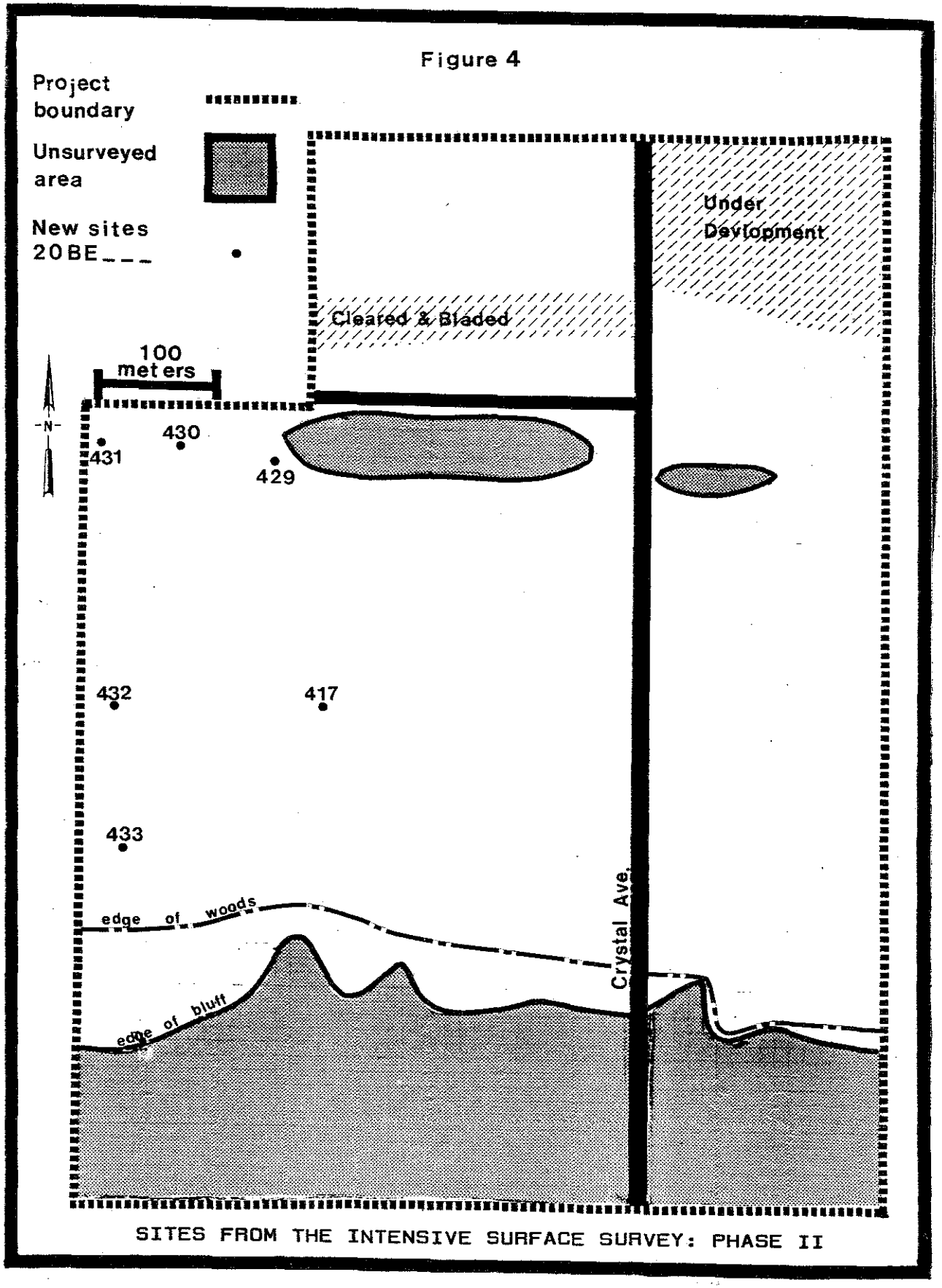
Industrial Park 2 (20BE429)

This site is the findspot of a primary flake of unidentified chert in the SE 1/4, NE 1/4, SW 1/4, NE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. This findspot warrants no further consideration.

Industrial Park 3 (20BE430)

This is the findspot of a large hafted scraper fabricated on Burlington chert in the center of the N 1/2, SW 1/4, NE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. No other cultural material was observed in the vicinity of this nondiagnostic tool, and additional work is not being proposed. This artifact is illustrated in Figure 6 (B).

Figure 4



SITES FROM THE INTENSIVE SURFACE SURVEY: PHASE II

Industrial Park 4 (20BE431)

This is the location of a tertiary flake of an unidentified raw material in the NW corner of the NW 1/4, SW 1/4, NE 1/4, NE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. No further study of this findspot is warranted.

Industrial Park 5 (20BE432)

This state site number has been assigned to the locus of an isolated secondary flake of an unidentified raw material in the SW corner of the SW 1/4, SW 1/4, NE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. We have not proposed additional fieldwork in this area of the project.

Industrial Park 6 (20BE433)

This is yet another isolated occurrence of a nondiagnostic cultural item on the surface of the freshly plowed field. The lithic piece is a secondary flake of an unidentified chert in the SW corner of the SW 1/4, NW 1/4, SE 1/4, SE 1/4 of Section 8, Benton Charter Township (T4S R18W), Berrien County, Michigan. As with all other findspots, no additional study can be justified.

Having completed this aspect of our Phase II research program with only minimal results, we were forced to "retreat" to our original assumption following conclusion of the Phase I survey; namely, that only sites 20BE414, 415, and 416 warranted the implementation of a testing strategy.

One additional aspect of the Phase II study requires comment before we address our program of test excavation on the afore-mentioned three sites. On 5 Jun, two of us visited the project area to meet with Mr. Howard, the representative of the client,

and the engineers responsible for establishing the infrastructure in the industrial park. They had previously agreed not to extend their excavation activity into the field beyond the Crystal Avenue ROW until we had completed our work. However, due to delays in moving our equipment to the project area for purposes of test excavation, they were concerned that they would not be able to establish the access road and sewer system as far west as the middle of the field in time to meet their contractual obligations. They desired only that they be permitted to remove topsoil in the access road ROW at this time.

An agreement was reached (and also accepted by the Bureau of History) whereby heavy equipment would be permitted to strip the ROW while we monitored removal of the topsoil for possible exposure of subsurface archaeological remains. Although several of us traveled to the area to work with the equipment operator on 12 and 13 Jun, miscommunications and equipment failure delayed stripping of the ROW until 18 Jun. On this date, we spent the day observing a pan scraper removing topsoil from approximately 7000 m^2 of area immediately north of 20BE415 and into the area where we had defined 20BE417. The operator carefully stripped the plowzone from the ROW, permitting us to carefully examine the point of contact with sterile subsoil before proceeding. While we did observe hundreds of pieces of recent cultural debris throughout the stripped area, nowhere did we observe subsurface staining signaling the presence of cultural features or midden deposits extending below the depth to which the plow had penetrated during years of cultivation. In fact, only a single flake of argillite, found near the flag that marked the location of our site 20BE417, served to establish a

prehistoric presence in the area of field stripped by heavy equipment. The relationship of the road ROW stripped under our watchful eyes to the sites we subsequently tested is shown in Figure 5.

THE PHASE TWO TESTING PROGRAM:

On Friday 21 Jun the authors again visited the project area to lay out the grid that would be used to control the movement of excavators during fieldwork. The project datum was established in the Crystal Avenue ROW at a known elevation ASL of 190 m. From this location, surveying equipment was used to place a reference point in the area of each of the three sites (20BE414, 415, and 416) where we planned to conduct excavations. These reference points in turn served as the base for a mini-grid placed over each site with an eye toward those locations where surveyors had found cultural debris densities to be greatest. Figure 5 shows each grid and the locations of test squares subsequently opened on the sites in question. Table 1 in the Appendix lists each unit by grid coordinates and inventories all cultural items recovered by excavators.

Hand excavation was initiated on 20BE415 and 416 with the opening of 1 X 1 m units on 24 Jun. These units were excavated to the point of encountering sterile subsoil; a depth that was found to vary from 23-38 cm below the surface across the sites. As the area of the sites had been previously plowed for an unknown number of years, the disturbed zone was removed as a single unit (i.e. one lacking archaeological context). All soil was then passed through 6 mm hardware cloth so as to maximize the recovery of data. This technique resulted in the recovery of the vast majority of cultural items from each of the three sites tested.

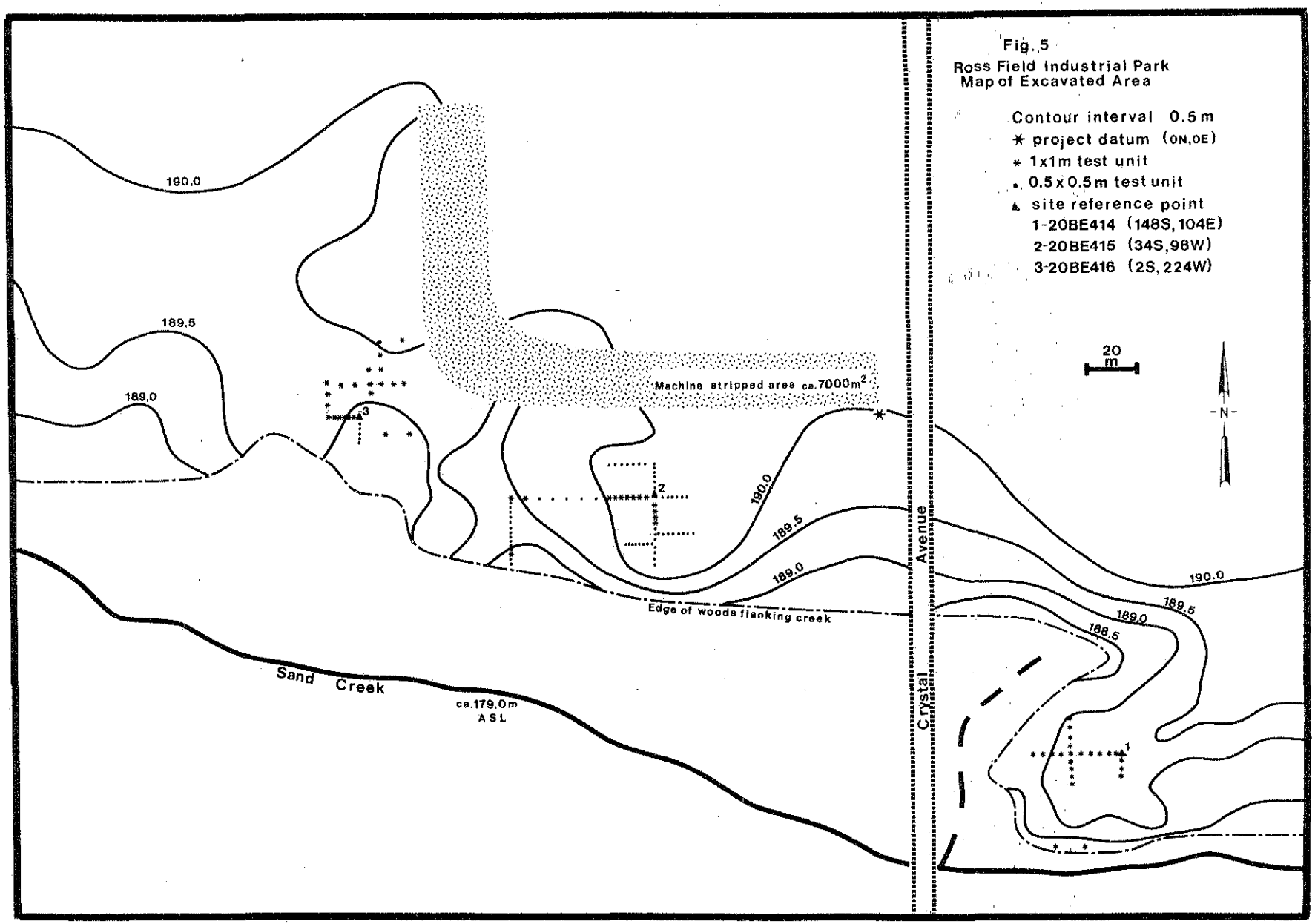


Fig. 5
Ross Field Industrial Park
Map of Excavated Area
Contour interval 0.5 m
* project datum (0N,0E)
* 1x1m test unit
. 0.5x0.5m test unit
▲ site reference point
1-20BE414 (148S,104E)
2-20BE415 (34S,98W)
3-20BE416 (2S,224W)
20 m
-N-
190.0
189.5
189.0
188.5
Machine stripped area ca.7000m²
Edge of woods flanking creek
Sand Creek
ca.179.0m
A S L
Crystal Avenue
1
2
3

The rate of data recovery, however, proved to be very disappointing. And given the paucity of cultural material collected by screening the plowzone, it was decided to augment the number of "windows" into the sites in search of context preserved below the depth to which the plow had penetrated by excavating a number of smaller test squares 0.5 m on a side without benefit of screening plowzone sediments. These units were quickly excavated to sterile subsoil and all walls and the floor carefully checked for any indication of subsurface staining. In aggregate, a total of 77 units, including those of both sizes, were opened on 20BE415, and 32 more were excavated on 20BE416.

After two days in the field west of Crystal Avenue, the crew removed to 20BE414 in the asparagus patch occupying the edge of the bluff over Sand Creek in the southeast corner of the project area. Here, they were faced with far less desirable conditions in which to excavate. Plant growth standing as high as 1.5 m had to be removed to lay out the excavation units, and plant root systems made excavation much more difficult than had been the case on the sandy ridge in the recently plowed field west of the road. Be that as it may, excavation moved forward, with a total of 23 units 1 m on a side being opened and all plowzone sediments being passed through hardware mesh to augment recovery of cultural items. But as was the case with the other two sites, cultural material was found to be sparsely represented in this disturbed zone.

RESULTS OF THE PHASE II TESTING PROGRAM:

Each of the three sites tested lacks integrity! Although we excavated a total of 132 units through the plowzone and into the underlying subsoil, we observed not a single instance of soil

staining suggestive of preserved archaeological context in the form of either midden deposits or cultural features. And every piece of cultural debris collected either by hand or from the screens was retrieved from the disturbed zone on each of the three sites. In other words, the results of our Phase II program of test excavation indicate that these prehistoric debris scatters represent nothing more than plowzone sites; and they certainly do not warrant additional study in view of their limited potential to clarify or further eludicate the prehistoric occupation of this region.

ANALYSIS OF THE CULTURAL MATERIAL FROM 20BE414, 415, AND 416

All cultural items recovered during the Phase II testing of 20BE414, 415, and 416 were returned to the Archaeological Laboratory in the Department of Anthropology, Western Michigan University for processing preparatory to study and subsequent curation. Each site assemblage is presented separately below.

With the exception of four small potsherds retrieved from 20BE414 (N=1) and 20BE416 (N=3), each assemblage consisted entirely of lithic material. And a three-step approach to lithic items was employed in the analysis. First, an effort was made to identify the source of the raw material represented. This was accomplished through macroscopic comparison of each item against a type collection of raw materials known to have been utilized in the Midwest and, in particular, southwest Michigan.

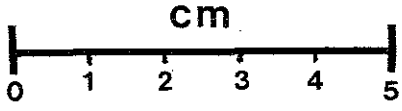
The second step involved classification of all pieces of lithic debitage with respect to a specific stage in the reduction process. The production of stone tools is a "subtractive" or reductive process which generates waste product, namely debitage. The

LITHIC ARTIFACTS FROM ROSS FIELD

A

B

C



D

E

Fig.6

process of tool manufacture can be visualized as a trajectory moving along a continuum from unmodified nodule, block, or cobble to finished tool. By artificially segregating the debitage that is generated during reduction into stages of this process, the reduction sequence can be modeled as a series of discrete steps (Rabb et al. 1979). And by classifying debitage according to stages in the tool fabrication process, it is possible for the analyst to better understand the activities involved in creating the lithic assemblage.

In keeping with the classification scheme previously used during WMU investigations, debitage was assigned to the following stages of reduction: decortication; block; primary; secondary; tertiary; or fragment (see Cremin et al. 1991 for specific definitions). With the exception of the category "fragment" (which by definition is not assignable to a stage in the reduction process), the order presented above is assumed to reflect the sequence of flake removal during tool manufacture. For our purposes, then, the categories of decortication, block, and primary flake are regarded as evidence of early stage reduction activity. Secondary and tertiary flakes are interpreted to represent late stage reduction activity.

The third and final step in our examination of lithic material involves analysis of both formal and informal tools in greater detail.

20BE414 LITHIC ASSEMBLAGE:

A total of 75 flakes were recovered during the course of Phase I and Phase II work on this site. The excavated material, numbering 71 specimens, is summarized in Table 1 of the Appendix. Table

2 of the Appendix inventories all 75 items by stage in the reduction sequence. Of the total, 69.3% are identifiable to a known source; the remaining 30.7% do not compare favorably to known raw material in our type set. It is most likely that the majority of unidentified specimens were derived from locally available glacial till material. Those unidentifiable flakes which retain a portion of cortex on their dorsal surface tend to confirm this assumption, given the well rounded and weathered appearance of the cortical material.

Known local sources account for 56.0% of the identified lithic specimens. The most numerous (N=17) of these locally derived materials is Yellow/White chert, a common constituent of glacial till in southwest Michigan (Cremin et al. 1991:16-17). Also prominent among local sources represented are Deerlick Creek chert (N=12), Lambrix chert (N=3) and Purple chert (N=7), each of which is available in local tills and/or might have been quarried from western Michigan creek beds. It has been suggested that these three cherts might actually be variants of a single type (Cremin et al. 1991:16). Finally, three pieces of Melrose chert from a source in the northwestern corner of Ohio have been identified in the assemblage.

Exotic raw materials, those which are believed to have originated at significant distances from this site, are represented by 10 flakes and constitute 13.3% of all debitage recovered. Only two sources are recognized, Burlington chert from west-central Illinois and Wyandotte chert from extreme southern Indiana. These constitute six and four specimens, respectively.

Of the 75 pieces of debitage found here, 66 (88.0%) have been assigned to a specific stage in the reduction sequence. The

remaining 9 flakes represent fragments. There is only slightly more late stage reduction debitage (57.6%) than early stage, strongly suggesting that all stages of lithic reduction were undertaken by knappers occupying this site. But late stage reduction reaches 100.0% when only the exotic material is considered. This latter observation would suggest that nonlocal raw material reached the site in semiprocessed (i.e. preform or blank) form, with primary knapping activity being confined to locally derived cherts.

The density of debris, as reflected in 1 X 1 m excavation units for which extracted sediments were passed through hardware mesh, was typically very light across the site (see Table 1). The average recovery rate per m^2 excavated was only 3.1 flakes. While it is difficult to discern any definitive pattern in the distribution of the debitage, it is most interesting to note the relatively higher density observed in excavation units lying in the northwest area of our dig. As the excavators moved to the east and to the south of this area, debris densities dropped off markedly.

No formal or informal tools were recovered from 20BE414, but the presence of a single exterior cord-marked grit-tempered sherd of probable Late Woodland affiliation allows at least tentative temporal placement of the occupation. It is perhaps noteworthy that this small body sherd was recovered from Test Square 15, the excavation unit producing the highest debitage count recorded for the site.

20BE415 LITHIC ASSEMBLAGE:

Our investigation of this site resulted in the recovery of a paultry 63 pieces of lithic debitage. Remarkably, only 25 pieces were collected during excavation (Table 1). The remainder were

collected from the surface during either the Phase I survey or during our recollecting of the site area after the field had been plowed and during the Phase II excavation (Table 3). All 63 pieces are included in the breakdown of debitage by reduction stage and raw material provided in Table 2. Of the total from 20BE415, 68.2% have been identified as to source; 31.8% do not compare favorably with materials in our type set and are presumed to be primarily derived from locally available glacial tills.

Local materials recognized in the assemblage include: Deerlick Creek chert; Purple chert; Lambrix chert; and Yellow/White chert. These types comprise 44.4% of the total lithic inventory. The presumed source(s) for each has previously been identified in the discussion of the 20BE414 lithic material.

Exotic raw materials are represented by 15 pieces of debitage, accounting for 23.8% of the entire assemblage. As was the case with 20BE414, only two exotic sources have been identified. These are Burlington chert and Wyandotte chert. They are almost equally represented. One of the Burlington specimens, a tertiary flake, is the only specimen from this site which evidences thermal pre-treatment of raw material to enhance its knapping qualities.

Of the 63 specimens recovered, only 52 (82.5%) were complete enough to be assigned to a specific stage in the reduction trajectory; the remaining pieces are classified as flake fragments. Among the pieces comprising this assemblage, there is a marked dominance of late stage debitage relative to those specimens assigned to early stage reduction. Fully 80.0% can be classified as either secondary or tertiary flakes, demonstrating that knapping activity on this site focused on the finishing of bifaces which

had been transported to the site in semiprocessed form. As was the case with 20BE414, all (100.0%) of the exotic debitage falls into the late stage of lithic reduction. This should not be especially surprising inasmuch as the material came to 20BE415 from a considerable distance and it would have been reasonable for those transporting the material to have initially trimmed the raw form to reduce its weight prior to removal from the general vicinity of the sources. What is even more interesting is the fact that, contrary to the observations made on 20BE414, almost 80.0% of the locally available raw materials are likewise the result of late stage reduction. Primary knapping activity is only minimally represented in this lithic assemblage.

Although the debris count has certainly been influenced by our decision to excavate many small units (0.5 X 0.5 m^2) without benefit of screening the soil removed (in an attempt to increase the number of "windows" into the site in search of preserved contexts), it is still noteworthy that 17 screened units one meter on a side produced only 25 pieces of debitage in total! This translates into an average density per screened unit of only 1.5 flakes. Yields for individual units range from three with no flakes to one square with an unimpressive total of four lithic pieces. Nothing can be said regarding the area(s) of maximum activity within the estimated site limits previously presented, for we have observed absolutely no clustering or concentrations of any material culture remains across the general area of our excavations on 20BE415.

Two formal tools have been recovered the site, a triangular projectile point and a "thumbnail" scraper. The latter artifact,

illustrated in Figure 6 (C), is a nondiagnostic unifacially worked tool that was recovered from the surface following preparation of the field for intensive surface collecting. Made from a secondary flake of Deerlick Creek chert, this broken tool would presumably have had a triangular outline were it intact/complete. It is of a type that has been well discussed in the literature (e.g Bettarel and Smith 1973:41). The ventral surface of this specimen is very flat and completely unmodified, and the dorsal surface has been modified by steep retouch along the distal margin and the distal portions of both lateral margins. The angle formed between the dorsal and ventral surface where retouched is approximately 60^{o}, strengthening our interpretation that this tool functioned as a scraper. Along the distal margin there is also extensive use-wear damage which is evidenced by many small flake scars. The tool's dimensions are as follows: length-23.2 mm; width-17.2 mm; and maximum thickness-3.7 mm.

The triangular point (Fig. 6, E) is an incomplete specimen that was recovered from Test Square 7. It is missing the distal end and a portion of one lateral margin. The outline of this point is projected to be an isoceles triangle. The lateral margins of this artifact have been bifacially worked and are very irregular, giving the appearance of serration. The base is straight and has been bifacially thinned. One corner of the base still retains the original striking platform of the flake from which this point was made. The point is plano-convex in cross-section. The recorded dimensions of this specimen are as follows: base width-20.3 mm; maximum thickness-4.6 mm; and axial length to the point of breakage-25.4 mm. This point can clearly be assigned to the

Madison type, a style indicating a temporal placement of ca. A.D. 1200-1600 for southwest Michigan (Clark 1984:161). This artifact was manufactured on a flake of locally available Deerlick Creek chert.

Three informal tools, i.e. flakes that either show edge damage indicative of use or minimal intentional modification without deliberate formal shaping, were also found on 20BE415. One of these, a flake fragment of Burlington chert, was retrieved from the surface during the Phase I survey. One entire lateral margin of this broken flake shows edge damage. This straight margin is 12.9 mm in length, but had the flake been complete this would surely have been longer. The angle formed between the dorsal and ventral surfaces at this margin is very acute, approximately 20^{o}, suggesting that this tool may have functioned as a cutting implement.

Also recovered from the surface was a secondary flake of an undetermined material which evidenced unifacial modification along one lateral margin of the ventral surface. The modified portion is about 19.0 mm in length and subconcave in outline. The angle formed between the modified portion and the dorsal surface is approximately 60^{o}. This steep concave working surface could have been utilized in a scraping activity as a spokeshave.

The final informal tool, fabricated on a secondary flake of an unknown material, was retrieved from Test Square 10. The proximal portion of the left lateral margin of the dorsal surface has been intentionally modified to form a concave section 9.0 mm in length. The modification resulted in a very steep edge, forming an angle of approximately 80^{o} between the retouched surface

and the ventral surface. This specimen may also have functioned as a spokeshave.

Four cores, all found on the surface and including one which appears to have been modified into a tool, were also found on the surface of 20BE415. All are of the free-hand multidirectional type, as each has one or more flakes removed from at least two different directions. The cores are all of locally available raw materials, including one each of Deerlick Creek, Lambrix, Purple, and an as yet unidentified chert. Respectively, the core weights are: 29.7 g; 26.5; 14.2 g; and 40.0 g. The Lambrix chert core has been bifacially retouched along one lateral margin, with the length of this modification being 47.5 mm. This margin includes one subconcave segment situated between two subconvex segments. The function of this particular tool is presently unclear, but it could have been used in either cutting or scraping activities.

20BE416 LITHIC ASSEMBLAGE:

The final site to be presented, 20BE416, was the most productive in terms of artifact recovery, with a total of 144 items being recovered. A total of 121 specimens were retrieved from 26 screened 1 X 1 m excavation units (Table 1), 16 lithic pieces were collected from the surface during the Phase II study (Table 3), and seven were found when this site was initially recorded. Of this total, 59.0% have proven to be identifiable as to raw material source (Table 2). As noted for the previous assemblages, it can be presumed that the remaining 41.0% of the lithic debitage represents locally procured raw material.

Of the 85 flakes identified as to source, 63.5% are of locally available raw materials, including the dominant triad of Deerlick

Creek chert, Purple chert, and Lambrix chert. Also represented are flakes of Yellow/White chert, Melrose chert, and a single specimen of quartzite.

Exotics account for 31 specimens, or 36.5% of identified pieces and 21.5% of all lithic debris. Once again, Burlington chert (N=14) and Wyandotte chert (N=8) predominate, but on this occasion they are joined by trace quantities of Attica chert (N=1) from west-central Indiana; Flint Ridge chert (N=3) from central Ohio; Kettle Point chert (N=1) from Ontario; Moline chert (N=2) from northwest Illinois; and Upper Mercer chert (N=1) from central Ohio. Four of the Burlington chert flakes show signs of having been heat-treated. That the greater variety of exotic cherts represented in this assemblage is a reflection of larger sample size, is possible.

Of the entire assemblage, 120 lithic items were complete enough to be assigned to a specific reduction stage. As was the case with 20BE414, 60% of the classifiable pieces can be assigned to the late rather than early stage in this trajectory. Decortication, blocky, and primary flakes comprise the remaining 40.0%. These observations again suggest that the full range of knapping activities occurred on this site. But this was more typical of the working of locally derived raw materials, as exotic cherts assigned to the secondary and tertiary stages of the reduction trajectory total 92.0% (Table 2).

The density of debitage from the screened excavation units is clearly highest for this site, with an average of 4.7 flakes per test square. Individual units produced debris counts ranging from zero to 25 pieces per unit. Here, however, a very marked pattern of concentration was observed. The area of maximum concentration

of lithic debris corresponds to three test squares running east-west for 10 m along the crest of the sand ridge about 14 m north of the site datum (Fig. 5, AP # 3). Movement in any direction from this small area showed lithic debris densities dropping off in very dramatic fashion.

Two formal tools were recovered during investigation of this site, a projectile point base and a very small bifacial blade mid-section. The base (Fig. 6, D) was found on the surface, following plowing of the field, while the blade mid-section was retrieved from a test square. The point is made on a flake of Burlington chert which evidences thermal pretreatment of the raw material. It is an expanding stemmed point that has been broken across the hafting region perpendicular to the longitudinal axis of the tool. It features a relatively thick hafting element, with a maximum thickness of 8.3 mm, and the maximum width of the base is 26.3 mm. Width at the neck is 19.9 mm. The straight base has been bifacially thinned and moderately ground, and while the point's fragmentary condition makes positive identification impossible, it would appear to be representative of Archaic period production techniques and style.

The second artifact is a fragmentary biface, representing a blade mid-section. Blade mid-section thickness is 6.5 mm, and this tool is made of Deerlick Creek chert.

Five informal tools have been identified, including one that was made on a large decortication flake of Deerlick Creek chert. This specimen has been retouched along one margin of the dorsal surface. The retouch is such that a 60^{o} angle is formed between the worked surface and the ventral surface. This piece was most

likely used as a scraper.

Two flake tools bearing evidence of use-wear damage were found in Test Square 20, located in the aforementioned area of relatively high lithic debris density. One piece was made on a primary flake of Yellow/White chert, and the other was created from a tertiary flake of Burlington chert. In both cases, only one margin shows evidence of damage due to use. Moreover, both show an angle of about 60° formed between the dorsal and ventral surfaces at the point of use.

One primary flake of Purple chert, again from excavated context, features very regular damage along one long margin. The angle formed between the dorsal and ventral surface along this edge is extremely acute, strongly suggesting that this was a cutting implement.

The final flake tool, also from the area of greatest lithic debris concentration, was made on a secondary flake of Lambrix chert. Three or possibly four large flakes have been removed from one lateral margin of the ventral surface, forming a sharp edge. This edge further shows evidence of damage due to use.

Also recovered from this site was a core of an unidentified raw material. This large freehand core weighs 41.1 g and has at least four large flakes driven from it-all originating from different directions.

To this point, all of the lithics addressed have been produced by either percussion or pressure flaking techniques. Another way of producing stone tools is by bipolar percussion. This technique of manufacture involves "resting core, or lithic implement, on anvil and striking the core with a percussor" (Crabtree 1982:16).

One specimen from this site shows damage indicative of the use of the bipolar technique. This piece, collected from the surface during the Phase I survey, is fabricated on Deerlick Creek chert. It is of the opposed ridge type, with bipolar damage on the two ridge-like margins opposite one another (Binford and Quimby 1963). This tool appears to have functioned as a wedge. It is very thick (10.5 mm) and has a prominent ridge which runs perpendicularly from one ridged margin to the other. The force of a blow delivered to one margin would be transferred to the other margin via the ridge (Clark 1984).

Finally, we were fortunate to recover three sherds during the Phase II excavations. The largest, smaller than a nickel, was found in Test Square 20; this unit is located in the center of the area notable for its high lithic debris density. The other two sherds, found in distant areas of the site, were very small and highly eroded. While the former appears to be grit-tempered and the latter sand-tempered, the condition of all three sherds precludes a statement that is more definitive than noting the presence of a Woodland period component(s).

COMMENTS:

The artifactual material recovered from each of the three sites tested during the Phase II investigations is remarkably unimpressive! In total, 66 test squares one meter on a side were excavated and the sediments passed through 6 mm hardware cloth, yielding a paultry 217 pieces of debi age, several tools, and four small potsherds. It appears clear to us that for whatever reason(s) these site were occupied, or however they articulated with the overall subsistence-settlement system of the sites' prehistoric occupants,

they were nothing more than the loci of temporary and, presumably, seasonal encampments.

That the occupation of each site was lacking in intensity is strongly suggested by the density of debris generated. The mean flake count per meter^2 excavated and screened ranges from 1.5 for 20BE414 to an unimpressive high of 4.7 on 20BE416. Each of the sites shows similar relative quantities of nonlocal or exotic raw materials in their debitage assemblages, ranging from 13.3% at 20BE414 to 23.8% at 20BE415. For these two sites the only exotic cherts recognized are Burlington and Wyandotte, revealing some form of interaction to the south and southwest. Site 20BE416, however, with its somewhat larger assemblage, included trace quantities of six other cherts in addition to Burlington and Wyandotte; cherts which suggest interaction to the east and southeast as well. The qualitative differences noted above may, however, reflect on differences in sample size.

The one area in which these three sites differ in rather striking fashion is the quantities of late stage debitage relative to early stage debitage. Two sites, 20BE414 and 20BE416, have a very similar range of reduction activities represented in their debitage. Both have slightly more late stage debitage than early stage pieces, 57.6% in the former and 60.0% in the latter collection, indicating that the full range of lithic reduction activities quite typically occurred on these sites. In contrast, 20BE415 shows a marked emphasis on the finishing stages of tool production, with fully 80.8% of the debitage resulting from the final shaping and trimming of stone tools. It is also possibly noteworthy that this site has a slightly higher percentage of exotic debitage in the lithic assemblage. Likewise, it is also this site that has yielded

the least amount of information regarding tool production activity, with a meager 25 pieces being retrieved from a total of 17 screened 1 X 1 m excavation units.

One possible explanation for this site's apparent diversion from the pattern exhibited by the other two is that 20BE415 represents an occupation of shorter duration. If each of these sites had been occupied for a short period of time in order to focus on a specific, as yet undetermined, activity, tools would likely have been brought to the site in either finished or semiprocessed form. As the length of occupation increased or the intensity of activity became greater, it might have become necessary to increasingly process tools from locally available raw materials. If this scenario is accepted as plausible, then it is possible to suggest that the occupants of 20BE415 (which unquestionably has the lightest debris density) may have remained here for only a very short period of time during which they maintained their already or nearly completed tools. At the other sites it is equally plausible that the residents stayed long enough to necessitate more processing of unmodified locally available materials into usable tools.

The tools from all three sites indicate the performance of a variety of cutting and scraping tasks. Bifacial implements are notably rare on these sites, with only three being recovered: one Madison point from 20BE415; and a proximal fragment of an expanding stemmed point and a bifacial blade mid-section from 20BE416. It is interesting to note that all three bifaces are broken. This, combined with their rarity, lends support to the notion that the occupation of the sites was of a short term nature. In a short term occupation it is probably safe to assume that relatively fewer

bifaces would have been exhausted or broken and then discarded.

Fortunately, each site, despite the meager artifact recovery, did yield at least one temportally distinctive artifact. The only diagnostic projectile point recovered during our program of research was the Madison point from 20BE415. At 20BE416, the proximal portion of an expanding stemmed point was retrieved from the surface. This point can be assigned to the Archaic period. Four sherds, one from 20BE414 and three from 20BE416, suggest the presence of a Woodland component on these sites. The sherd from 20BE414 and one of three sherds from 20BE416 bear exterior cord-markings and are grit-tempered. These are tentatively suggestive of a Late Woodland temporal placement, as is the Madison point from the other site. Thus, if "pushed", and considering that the only other diagnostic artifact from the project area is another Madison point from 20BE419, located a short distance to the north and west of 20BE415 and 416, we are tempted to suggest that Late Woodland occupation of our sites and this tributary stream drainage agrees best with the data now available to us (and this despite the point base of possible Archaic affiliation recovered from the surface of 20BE416).

CONCLUSIONS AND RECOMMENDATIONS

Our Phase I and Phase II studies of the Ross Field Industrial Park in Sections 8 and 9 of Benton Charter Township (T4S R18W), Berrien County, Michigan have resulted in the discovery and recording of 11 new archaeological sites and testing of those three sites which seemed to us to be most promising with respect to clarify and elucidating the prehistoric occupation of a small stream drainage lying within the Paw Paw River watershed. Throughout our investigation of these archaeological resources, we have

received excellent cooperation from all those people involved in this development. While we have acquired a data set where none previously existed, our experience while in the field and while working with the data in the laboratory has been disappointing. The bottom line is that our efforts have resulted in little in the way of information permitting us to make robust statements about the area's prehistory.

Although four lithic scatters were included among the 11 sites recorded for the study area, testing of the three most promising locations has failed to establish site integrity. All are quite clearly plowzone sites, lacking the context necessary to establish them as potentially significant archaeological resources. While we have "milked" the scant lithic data for all the information possible, the quality and quantity of these data have allowed us to say very little about lithic resource procurement and technology and absolutely nothing that seems to us to be meaningful with respect to subsistence-settlement behavior in the past. The most meaningful observation is perhaps that this area seems to have been most attractive to Late Woodland people, but even these groups did not establish intensive occupation of the area. Rather, these sites suggest that their use was ephemeral at best, resulting in the establishment of short term encampments for as yet undetermined reasons.

Given the limited value of the data set recovered and the absence of preserved archaeological context on the sites in question, we can only conclude that additional research would not prove beneficial. We have probably recovered a good sample of the sorts of information that the sites have to offer. Therefore, in light

of the fact that the sites in question do not represent National Register quality resources, it is our recommendation that this development be permitted to proceed as planned.

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APPENDIX

TABLE 1: INVENTORY OF CULTURAL MATERIAL FROM EXCAVATION UNITS ON 20BE414, 415, AND 416

Test Unit No./ Coordinates	Material Recovered	Screen Used (?)	Unit Size (m^2)
	20BE414		
1-148S, 101E	-no items recovered	Yes	1 X 1
2-148S, 98E	1-secondary flake of Deerlick Creek chert 1-unidentified decortication flake	Yes	1 X 1
3-148S, 95E	1-secondary flake of Deerlick Creek chert 1-unidentified flake fragment	Yes	1 X 1
4-148S, 92E	1-decortication flake of Yellow/White chert 1-secondary flake of Yellow/White chert 2-unidentified primary flakes 2-unidentified secondary flakes	Yes	1 X 1
5-148S, 89E	1-primary flake of Yellow/White chert	Yes	1 X 1
6-148S,86E	1-secondary flake of Yellow/White chert 1-tertiary flake of Yellow/White chert 1-decortication flake of Lambrix chert 1-unidentified decortication flake 1-unidentified flake fragment	Yes	1 X 1
7-148S, 83E	1-tertiary flake of Wyandotte chert 1-secondary flake of Purple chert 2-secondary flakes of Yellow/White chert 1-flake fragment of Yellow/White chert 1-unidentified tertiary flake	Yes	1 X 1

8-148S, 80E	1-primary flake of Deerlick Creek chert 1-secondary flake of Deerlick Creek chert 1-tertiary flake of Purple chert	Yes	1 X 1
9-148S, 77E	1-secondary flake of Purple chert 1-secondary flake of Wyandotte chert 1-tertiary flake of Wyandotte chert 1-Lambrix chert flake fragment 1-tertiary flake of Burlington chert 1-unidentified decortication flake 1-unidentified primary flake	Yes	1 X 1
10/148S, 74E	2-decortication flakes of Yellow/Shite chert 1-primary flake of Yellow/White chert 1-primary flake of Lambrix chert 1-Wyandotte flake fragment	Yes	1 X 1
11/151S, 104E	-no material recovered	Yes	1 X 1
12/154S, 104E	1-tertiary flake of Burlington chert	Yes	1 X 1
13/157S, 104E	1-tertiary flake of Yellow/White chert 1-unidentified secondary flake	Yes	1 X 1
14/145S, 86E	1-decortication flake of Yellow/White chert 1-tertiary flake of Yellow/White chert 1-decortication flake of Deerlick Creek chert 1-primary flake of Deerlick Creek chert 1-unidentified flake fragment	Yes	1 X 1
15/142S, 86E	1-secondary flake of Purple chert 2-primary flakes of Deerlick Creek chert 1-secondary flake of Deerlick Creek chert 1-primary flake of Melrose chert 1-secondary flake of Melrose chert 1-Burlington chert fragment	Yes	1 X 1

	1-unidentified decortication flake 1-unidentified secondary flake 1-cord-marked grit-tempered body sherd		
16/139S, 86E	1-flake fragment of Deerlick Creek chert 1-tertiary flake of Purple chert 2-secondary flakes of Yellow/White chert	Yes	1 X 1
17/136S, 86E	1-primary flake of Deerlick Creek chert 1-unidentified primary flake 1-unidentified flake fragment	Yes	1 X 1
18/151S, 86E	1-unidentified decortication flake	Yes	1 X 1
19/154S, 86E	-no cultural material found	Yes	1 X 1
20/157S, 86E	1-flake fragment of Melrose chert 2-tertiary flakes of Burlington chert 1-unidentified decortication flake 1-unidentified primary flake	Yes	1 X 1
21/160S, 86E	1-secondary flake of Purple chert	Yes	1 X 1
22/184S, 91E	-no material recovered	Yes	1 X 1
23/184S, 81E	1-tertiary flake of Purple chert 1-tertiary flake of heat-treated Burlington chert 1-unidentified decortication flake	Yes	1 X 1

20BE415

1/34S, 99W	-unit not excavated(?)/no records		
2/34S, 101W	1-secondary flake of Deerlick Creek chert 1-secondary flake of Wyandotte chert	Yes	1 X 1
3/34S, 103W	1-tertiary flake of Wyandotte chert 1-unidentified flake fragment	Yes	1 X 1
4/34S, 105W	1-secondary flake of Wyandotte chert	Yes	1 X 1

5/34S, 107W	-no cultural material	Yes	1 X 1
6/34S, 109W	-no cultural material	Yes	1 X 1
7/34S, 111W	1-primary flake of Deerlick Creek chert 1-unidentified decortication flake 1-triangular preform of Deerlick Creek chert	Yes	1 X 1
8/34S, 89W	1-secondary flake of Deerlick chert 1-secondary flake of Purple chert	Yes	1 X 1
9/37S, 98W	1-secondary flake of Burlington chert	Yes	1 X 1
10/39S, 98W	1-Flake tool made on a primary flake of an unidentified raw material	Yes	1 X 1
11/41S, 98W	2-tertiary flakes of Wyandotte chert 1-decortication flake of Deerlick Creek chert	Yes	1 X 1
12/43S, 98W	1-secondary flake of Deerlick Creek chert	Yes	1 X 1
13/34S, 113W	1-tertiary flake of Lambrix chert	Yes	1 X 1
14/34S, 98W	-no cultural items reported	Yes	1 X 1
15/59S, 98W	1-unidentified primary flake	Yes	1 X 1
16/57S, 98W	-no cultural items recovered	No	0.5 X 0.5
17/53S, 98W	-no cultural items recovered	No	0.5 X 0.5
18/51S, 98W	-no cultural items recovered	No	0.5 X 0.5
19/49S, 98W	-no cultural items recovered	No	0.5 X 0.5
20/45S, 98W	-no cultural items recovered	No	0.5 X 0.5
21/34S, 91W	-no cultural items recovered	No	0.5 X 0.5
22/34S, 93W	-no cultural items recovered	No	0.5 X 0.5
23/34S, 95W	-no cultural material found	No	0.5 X 0.5
24/61S, 98W	-no cultural items recovered	No	0.5 X 0.5
25/47S, 98W	-no cultural items found	No	0.5 X 0.5
26/55S, 98W	-no cultural items recovered	No	0.5 X 0.5
27/31S, 98W	1-secondary flake of Lambrix chert	No	0.5 X 0.5
28/33S, 98W	-no cultural material found	No	0.5 X 0.5
29/41S, 113W	-no cultural items recovered	No	0.5 X 0.5
30/41S, 99W	-no cultural items recovered	No	0.5 X 0.5

31/41S, 101W	-no cultural items recovered	No	0.5 X 0.5
32/41S, 103W	-no cultural items recovered	No	0.5 X 0.5
33/41S, 105W	-no cultural items recovered	No	0.5 X 0.5
34/41S, 107W	-no cultural items recovered	No	0.5 X 0.5
35/41S, 109W	-no cultural material found	No	0.5 X 0.5
36/25S, 98W	-no cultural material found	No	0.5 X 0.5
37/27S, 98W	-no cultural debris recovered	No	0.5 X 0.5
38/29S, 98W	-no cultural items recovered	No	0.5 X 0.5
39/41S, 111W	-no cultural items found	No	0.5 X 0.5
40/63S, 98W	-nothing observed	No	0.5 X 0.5
41/25S, 99W	-nothing observed	No	0.5 X 0.5
42/25S, 101W	-no cultural material found	No	0.5 X 0.5
43/25S, 103W	-no cultural observations	No	0.5 X 0.5
44/25S, 105W	-no cultural items collected	No	0.5 X 0.5
45/25S, 107W	-no cultural material found	No	0.5 X 0.5
46/25S, 109W	-no cultural material found	No	0.5 X 0.5
47/25S, 111W	-no cultural items recovered	No	0.5 X 0.5
48/25S, 113W	-no cultural material found	No	0.5 X 0.5
49/34S, 118W	-no cultural material found	No	0.5 X 0.5
50/34S, 123W	-nothing observed	No	0.5 X 0.5
51/34S, 128W	-nothing found	No	0.5 X 0.5
52/34S, 133W	-nothing observed	No	0.5 X 0.5
53/34S, 138W	-no cultural items recovered	No	0.5 X 0.5
54/34S, 143W	1-primary flake of Deerlick Creek chert	Yes	1 X 1
55/34S, 148W	1-unidentified tertiary flake 1-unidentified flake fragment	Yes	1 X 1
56/35S, 148W	-no cultural items recovered	No	0.5 X 0.5
57/37S, 148W	-nothing found	No	0.5 X 0.5
58/39S, 148W	-nothing recovered	No	0.5 X 0.5
59/41S, 148W	-nothing recovered	No	0.5 X 0.5
60/43S, 148W	-no cultural material found	No	0.5 X 0.5
61/45S, 148W	-no cultural items found	No	0.5 X 0.5
62/47S, 148W	-no cultural items found	No	0.5 X 0.5
63/49S, 148W	-no cultural items found	No	0.5 X 0.5
64/51S, 148W	-no cultural items recovered	No	0.5 X 0.5
65/53S, 148W	-nothing found	No	0.5 X 0.5
66/55S, 148W	-nothing recovered	No	0.5 X 0.5

67/57S, 148W	2-secondary flakes of Purple chert 1-secondary flake of Lambrix chert	Yes	1 X 1
68/59S, 148W	-no cultural items recovered	No	0.5 X 0.5
69/61S, 148W	-no cultural items found	No	0.5 X 0.5
70/49S, 83W	-no cultural items found	No	0.5 X 0.5
71/49S, 85W	-no cultural items found	No	0.5 X 0.5
72/49S, 87W	-no cultural items found	No	0.5 X 0.5
73/49S, 89W	-no cultural material found	No	0.5 X 0.5
74/49S, 91W	-no cultural items recovered	No	0.5 X 0.5
75/49S, 93W	-nothing recorded	No	0.5 X 0.5
76/49S, 95W	-no cultural items recovered	No	0.5 X 0.5
77/49S, 97W	-no cultural observations	No	0.5 X 0.5

20BE416

1/2S, 225W	-no indication that this unit was excavated		
2/2S, 227W	-no cultural material found	Yes	1 X 1
3/2S, 229W	1-tertiary flake of Moline chert	Yes	1 X 1
	1-biface mid-section fragment of Deerlick Creek chert	Yes	1 X 1
4/2S, 231W	1-unidentified tertiary flake 1-badly eroded sherdlet	Yes	1 X 1
5/2S, 233W	1-unidentified primary flake	Yes	1 X 1
6/2S, 235W	1-secondary flake of Burlington chert 1-tertiary flake of Burlington chert 1-unidentified secondary flake	Yes	1 X 1
7/3S, 224W	-no cultural material found	No	0.5 X 0.5
8/5S, 224W	-no observations made	No	0.5 X 0.5
9/7S, 224W	-no observations made	No	0.5 X 0.5
10/9S, 224W	-nothing recovered	No	0.5 X 0.5
11/11S, 224W	-nothing reported for this unit	No	0.5 X 0.5
12/2N, 235W	1-secondary flake of Burlington chert 1-tertiary flake of Burlington chert	Yes	1 X 1
13/5N, 235W	-no cultural items recovered	Yes	1 X 1

14/7N, 235W	1-secondary flake of Deerlick Creek chert 1-secondary flake of heat-treated Burlington chert 1-flake fragment of Flint Ridge chert	Yes	1 X 1
15/11N, 235W	1-flake tool made on a secondary flake of Wyandotte chert 1-tertiary flake of Wyandotte chert 2-secondary flakes of Yellow/White chert 1-unidentified decortication flake 1-unidentified primary flake 2-unidentified secondary flakes	Yes	1 X 1
16/40N, 224W	1-tertiary flake of Deerlick Creek chert 1-decortication flake of Purple chert 1-primary flake of Purple chert	Yes	1 X 1
17/35N, 224W	1-secondary flake of Burlington chert 1-tertiary flake of Purple chert 1-primary flake of Purple chert	Yes	1 X 1
18/30N, 224W	1-tertiary flake of Purple chert 1-unidentified prehistoric sherd	Yes	1 X 1
19/12N, 230W	1-decortication flake of Lambrix chert 1-primary flake of Lambrix chert 1-primary flake of Deerlick Creek chert 2-secondary flakes of Deerlick Creek chert 1-secondary flake of Wyandotte chert 1-tertiary flake of Wyandotte chert 1-flake fragment of Wyandotte chert 1-secondary flake of heat-treated Burlington chert 3-decortication flakes of Yellow/White chert 3-primary flakes of Yellow/White chert 1-unidentified decortication flake 3-unidentified primary flakes 1-unidentified secondary flake 2-unidentified tertiary flakes 2-unidentified flake fragments 1-cord-marked grit-tempered sherd	Yes	1 X 1

20/12N, 225W	1-tertiary flake of Flint Ridge chert 1-primary flake of Purple chert 1-secondary flake of Purple chert 1-tertiary flake of Purple chert 1-secondary flake of heat-treated Burlington chert 1-primary flake of Yellow/White chert 1-tertiary flake of Yellow/White chert 2-unidentified primary flakes 2-unidentified secondary flakes 1-unidentified tertiary flake 4-unidentified flake fragments 1-flake tool made on a primary flake of Yellow/White chert 1-flake tool made on a tertiary flake of Burlington chert 1-unidentified core 1-small potsherd	Yes	1 X 1
21/12N, 220W	1-secondary flake of Burlington chert 2-primary flakes of Lambrix chert 1-secondary flake of Lambrix chert 1-primary flake of Deerlick Creek chert 1-secondary flake of Deerlick Creek chert 1-decortication flake of Yellow/White chert 1-secondary flake of Yellow/White chert 1-tertiary flake of Yellow/White chert 1-block fragment of Yellow/White chert 1-primary flake of Flint Ridge chert 1-flake fragment of Upper Mercer chert 2-unidentified decortication flakes 4-unidentified primary flakes 2-unidentified secondary flakes 1-unidentified tertiary flake 3-unidentified flake fragments 1-flake tool made on a secondary flake of Lambrix chert	Yes	1 X 1
22/12N, 215W	1-Flake fragment of Deerlick Creek chert 1-unidentified secondary flake	Yes	1 X 1

23/12N, 210 W	1-flake tool made on a primary flake of Purple chert	Yes	1 X 1
24/12N, 205W	1-tertiary flake of Burlington chert 1-flake fragment of heat-treated Burlington chert 1-unidentified primary flake	Yes	1 X 1
25/17N, 215W	1-secondary flake of Melrose chert 1-secondary flake of Purple chert 1-unidentified tertiary flake 1-unidentified flake fragment	Yes	1 X 1
26/22N, 215W	1-unidentified tertiary flake	Yes	1 X 1
27/27N, 215W	-no cultural material found	Yes	1 X 1
28/27N, 205W	1-primary flake of Attica chert 1-secondary flake of Kettle Point chert 1-unidentified secondary flake	Yes	1 X 1
29/7S, 214W	2-unidentified secondary flakes	Yes	1 X 1
30/7S, 204W	1-tertiary flake of Burlington chert 1-unidentified secondary flake	Yes	1 X 1
31/17N, 220W	1-secondary flake of Purple chert 2-unidentified decortication flakes 2-unidentified flake fragments	Yes	1 X 1
32/7N, 220W	1-secondary flake of Wyandotte chert 1-tertiary flake of Wyandotte chert 1-unidentified primary flake 1-unidentified tertiary flake	Yes	1 X 1

TABLE 2: DEBITAGE BY REDUCTION STAGE AND RAW MATERIAL

MATERIAL TYPE	Decort	Blk	Pri	Sec	Tert	Frag	Total	Weight (g)
			20BE414					
Burlington					4	1	5	1.0
Burlington (heated)					1		1	0.2
Wyandotte				1	2	1	4	0.9
Total Exotic				1	7	2	10	2.1
Deerlick Creek	1		5	5		1	12	10.1
Lambrix	1		1			1	3	1.9
Melrose			1	1		1	3	1.4
Purple				4	3		7	1.1
Yellow/White	4		2	7	3	1	17	11.2
Total Local	6		9	17	6	4	42	25.7
Unidentified	7		6	5	2	3	23	12.2
Site Total	13		15	23	15	9	75	40.0
			20BE415					
Burlington				4	1	2	7	3.2
Burlington (heated)					1		1	0.1
Wyandotte				3	3	1	7	3.2
Total Exotic				7	5	3	15	6.5
Deerlick Creek	1		2	8		1	12	11.6
Lambrix				2	1		3	2.3
Purple			2	6	2	1	11	9.2
Yellow/White				1		1	2	0.3
Total Local	1		4	17	3	3	28	23.4
Unidentified	2		3	4	6	5	20	27.6
Site Total	3		7	28	14	11	63	57.5
			20BE416					
Attica			1				1	1.7
Burlington				5	5	1	11	4.5
Burlington (heated)				3		1	4	0.9
Flint Ridge			1		1	1	3	2.9
Kettle Point				1			1	0.2
Moline				1	1		2	0.6
Upper Mercer						1	1	0.3
Wyandotte				3	3	2	8	5.5
Total Exotic			2	13	10	6	31	16.6
Deerlick Creek	2	2	2	8	1	2	17	58.3
Lambrix	1		3	3	1	1	9	17.2
Melrose				1			1	0.1
Purple	2		3	3	3		11	19.6

MATERIAL TYPE	Decort	Blk	Pri	Sec	Tert	Frag	Total	Weight (g)
Quartzite				1			1	0.1
Yellow/White	4	1	5	3	2		15	11.5
Total Local	9	3	13	19	7	3	54	107.3
Unidentified	7		14	15	8	15	59	41.4
Site Total	16	3	29	47	25	24	144	165.3

TABLE 3: INVENTORY OF CULTURAL ITEMS COLLECTED FROM THE SURFACE OF 20BE415 AND 416 FOLLOWING PLOWING OF THE FIELD AND DURING PHASE II EXCAVATIONS

20BE415

1-unifacial scraper made on a secondary flake of Deerlick Creek chert
2-secondary flakes of Purple chert
1-flake fragment of Purple chert
3-secondary flakes of Burlington chert
1-flake fragment of Burlington chert
2-unidentified secondary flakes
1-core of Deerlick Creek chert
1-core of Purple chert
1-core of Lambrix chert
1-primary flake of Purple chert
1-tertiary flake of Purple chert
1-secondary flake of Deerlick Creek chert
1-tertiary flake of Burlington chert
1-unidentified primary flake
3-unidentified tertiary flakes
3-unidentified flake frsgments
1-flake tool on an unidentified secondary flake
1-core of an unidentified raw material

20BE416

1-flake tool made on a decortication flake of Deerlick Creek chert
3-secondary flakes of Deerlick Creek chert
1-secondary flake of Lambrix chert
1-tertiary flake of Lambrix chert
1-flake fragment of Lambrix chert
1-point base of heat-treated Burlington chert
1-block fragment of Deerlick Creek chert
1-secondary flake of Burlington chert
1-flake fragment of Burlington chert
1-secondary flake of quartzite
1-secondary flake of Moline chert
1-unidentified primary flake
1-unidentified secondary flake
1-unidentified flake fragment