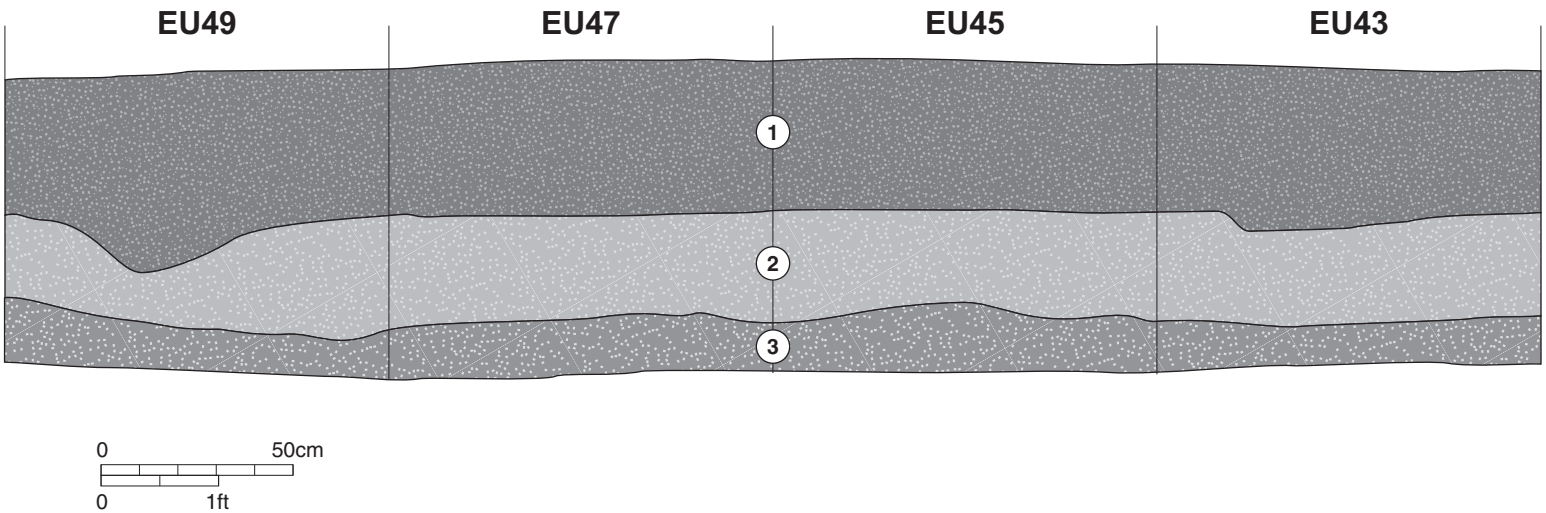
3.0 INTRASITE DESCRIPTION AND ANALYSIS – AIRPARK EAST SITE

3.1 GEOMORPHOLOGICAL AND PEDOLOGICAL INVESTIGATION

The Airpark East site is positioned along the 50-foot contour within a gently sloping portion of an agricultural field and overlooks a wetland to the north. Dr. Daniel P. Wagner's soils investigation (Appendix III) documented a much less variable stratigraphic profile than at the Airpark West site (see below), with uniformly very sandy sediment throughout. Medium (0.25–0.5 mm) and coarse (0.5–1.0 mm) sands predominate the particle-size categories, which rules out any significant eolian source as the depositional mode. The relatively coarse grain size as well as the highly siliceous mineralogy of the quartz sands have severely impeded the degree of pedogenesis that has occurred, despite the likely prolonged weathering history for the sediments, limiting subsoil expression to weakly developed cambic (Bw) horizons. No increase in clay content in the subsoil was evident during field examination, which was borne out by laboratory testing of collected samples. The presence of artifacts in subplowzone context is attributable to biomantle processes such as tree throws and animal/insect burrowing (Appendix III).

The plowzone (Ap horizon) was easily distinguishable across the entire site, consisting of dark grayish brown (10YR 4/2) loamy sand in the Block A units, in the central portion of the site (Figure 11), and in the Block D units, in the eastern edge of the site (Figure 12); brown (10YR 4/3) loamy sand in the Block B units, in the eastern portion of the site (Figure 13); and brown (10YR 4/3) to dark brown (10YR 3/3) loamy sand in the Block F units, in the central portion of the site (Figure 14). Thicknesses ranged from 34–43 cm in Block A, 26–32 cm in Block B, 23–32 cm in Block D, and 29–33 cm in Block F. Considerably thicker plowzones were present in those units located in proximity to the wooded wetland along the northern margin of the site, the result of appreciable downslope accumulations of wash derived primarily from almost yearly surface erosion that occurred following seasonal plowing. Especially before the planted crops had established their root systems, the upper portion of the loose, recently tilled sediment was prone to being mobilized, i.e., eroded, by heavy rainfalls, producing overthickened surface horizons across the lower-lying landscape positions in concert with deflated profiles across the higher-lying, upslope positions, which experienced soil loss.

Primarily prehistoric and occasionally historical artifacts were recovered from what was initially thought to be unplowed A horizon contexts below the Ap horizon in 24 Phase III units (EUs 10, 15, 16, 20, 24, 28, 29, 32–34, 37; 51 and 55–58 in Block A; 83 and 84 in Block C; 93–95, 98 and 99 in Block D; and 100 in Block E). However, upon reexamining the pertinent stratigraphic profiles and excavation forms for these units, it became evident that in fact the full depth of the A horizon had been plowed, based on the observed presence in most units of plowscars at the base of the Ap horizon at its interface with the underlying subsoil, which was typically called a B1 horizon during Phase II/III field work. Therefore, these artifacts derived from the lower portion of the plowzone rather than from an unplowed A horizon. As is discussed below, the soil horizon underlying the plowzone in most units excavated at the Airpark East site was actually an E horizon, with a minority of profiles transitioning directly from the plowzone to a weakly developed cambic (Bw) horizon. The initial misinterpretation seems to have resulted from confusion regarding the distinction between the terms "subplowzone" and "subsoil," which in the previous reports were meant to be synonymous. Thus, the ambiguous word "subplowzone" has herein been deleted in favor of "subsoil" when discussing the site stratigraphy.



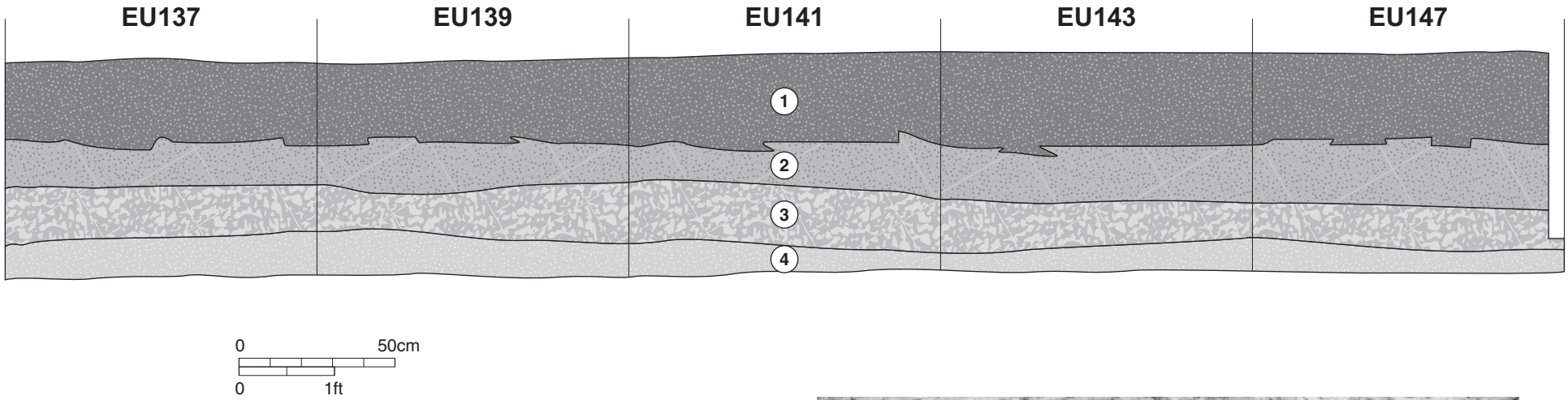
1 10YR 4/2 dark grayish brown loamy sand; Ap horizon

2 10YR 5/6 yellowish brown medium sand; E horizon

3 7.5YR 5/6 strong brown coarse sand with 10-30% iron concretions; Bw horizon

Excavation Block A representative profile (west wall of EUs 47 and 49) within 7K-C-431.

Figure 11. West profile of Excavation Block A.



1 10YR 4/2 dark grayish brown loamy sand; Ap horizon

2 10YR 5/6 yellowish brown loamy sand with less than 1% gravels; Bw horizon

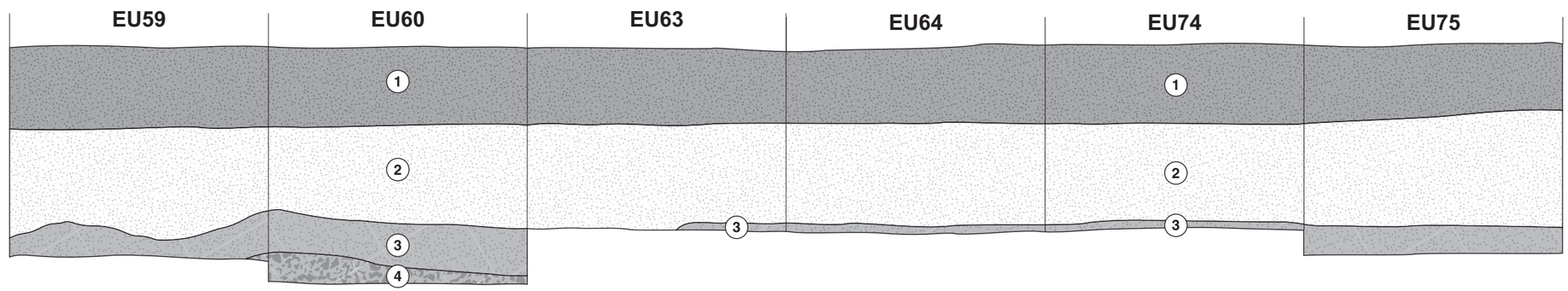
3 10YR 5/6 yellowish brown mottled with 10YR 6/4 light yellowish brown loamy sand with less than 1% gravels; BC horizon

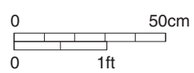
4 10YR 6/4 light yellowish brown loamy coarse sand with less than 1% gravels and 1-2% iron concretions; C horizon

Excavation Block D representative profile (east wall of EUs 137 and 139) within 7K-C-431.

Figure 12. East profile of Excavation Block D.

BLOCK B NORTH WALL PROFILES



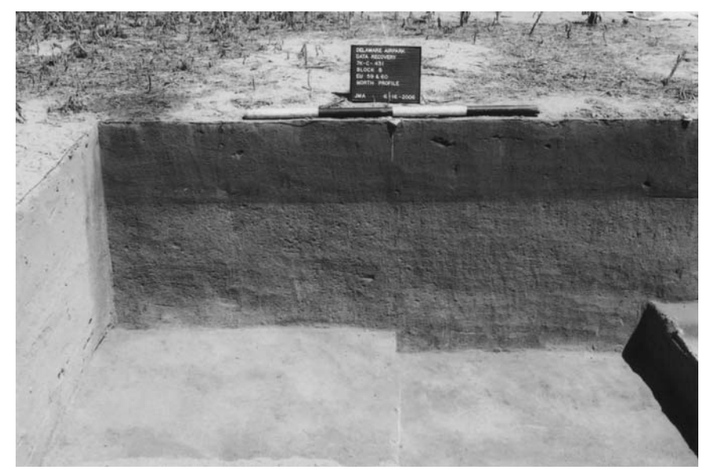


1 10YR 4/3 brown loamy sand; Ap horizon

2 10YR 5/6 yellowish brown medium sand; E horizon

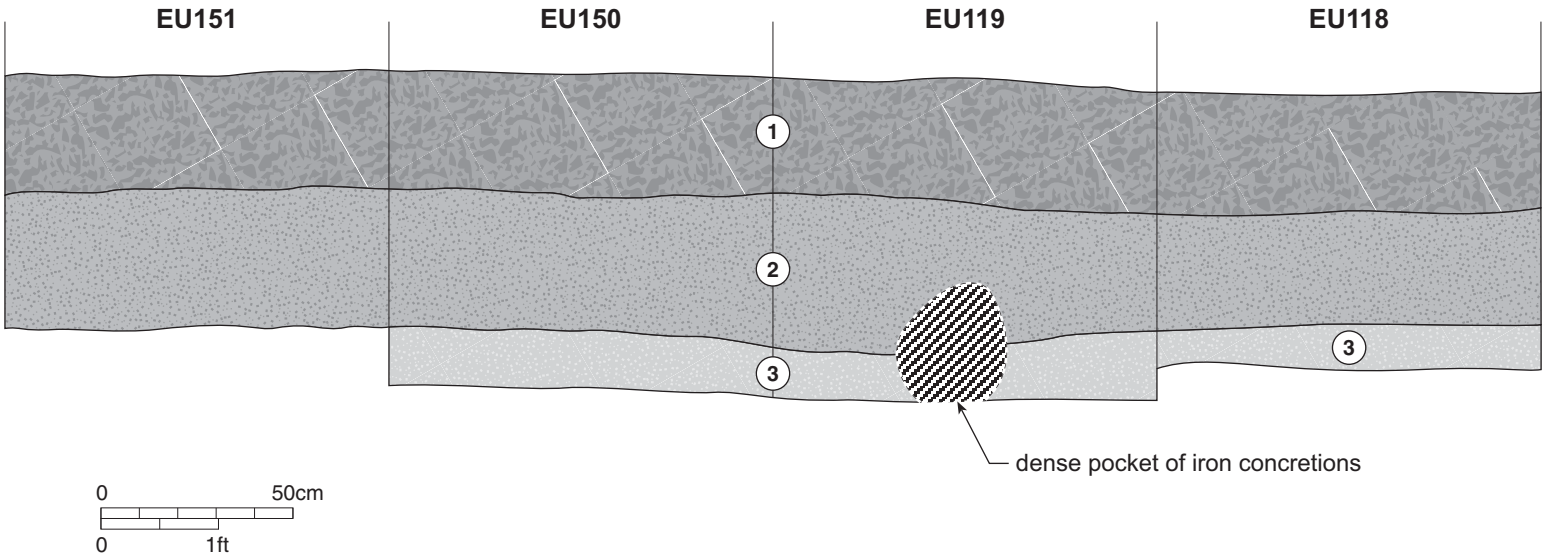
3 10YR 6/6 brownish yellow coarse sand; Bw1 horizon

4 10YR 6/6 brownish yellow mottled with 30% 7.5YR 5/6 strong brown coarse sand; Bw2 horizon



Excavation Block B representative profile (north wall of EUs 59 and 60) within 7K-C-431.

Figure 13. North profile of Excavation Block B.



1 10YR 4/3 brown to 10YR 3/3 dark brown loamy sand; Ap horizon

2 10YR 5/6 yellowish brown loamy sand with 10-15% iron concretions; E/Bw horizon

3 10YR 6/4 light yellowish brown coarse sand with fewer concretions (except for pocketed area); Bw horizon

Excavation Block F representative profile (north wall of EUs 116 and 117) within 7K-C-431.

Figure 14. South and north profiles of Excavation Block F.

Although plowing usually destroys the upper portion of an eluvial (E) horizon, if present, the lower portion typically is preserved unless other sources of pedoturbation are active. The combined effects of plowing and soil erosion, however, can result in the complete loss of an E horizon, and in some severe cases even the upper portion of the B horizon. The Ap horizon is thinned by erosion, and subsequent plowing then can extend deep enough to remove these upper subsoil horizons. Conversely, the accumulation of slopewash in lower-lying positions makes the preservation of an E horizon much more likely, because with successive additions to preexisting surface layers, the depth of plowing no longer reaches the base of the lowermost Ap horizon. Both scenarios were documented at the Airpark East site: for example, in EU 150, located in Block F in the central portion of the site area, Wagner identified a 13-cm-thick E horizon composed of dark yellowish brown (10YR 4/4) sand between 32–45 cm below surface, directly overlying a cambic (Bw) horizon of strong brown (7.5YR 4/6) sand to loamy sand. In EU 143, however, located in Block D within the eastern portion of the site, a Bw horizon of dark yellowish brown (10YR 4/6) sand occurred directly below the plowzone, between 29–48 cm below surface (Appendix III). What was recorded during Phase III excavation in the Block A and Block B units as an E horizon was described as yellowish brown (10YR 5/6) medium-grained sand, roughly 30–35 cm thick, overlying a strong brown (7.5YR 5/6) coarse sand with 10–30 percent iron concretions in Block A and a mottled brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) coarse sand in Block B corresponding to a Bw horizon (Figures 11 and 13). The E horizon identified farther east in the Block D units was notably thinner, varying between 10–20 cm thick, although the color and texture were comparable to those in Blocks A and B (Figure 12).

The Bw horizon in the pedologically examined Block F unit, EU 150, contained about 10–15 percent of what were termed “cemented Bt bodies” composed of dark reddish brown (2.5YR 3/3) loamy sand (Appendix III). These bodies correspond to lamellae, which are pedogenic accumulations of relatively finer material typically occurring as banding in very sandy soils and are often the only indication of advanced soil development. The lamellae tend to thicken, merge, and become redder with age, in the absence of significant pedoturbation. Therefore, the recorded 2.5YR hue, signifying a high degree of reddening, is a good indicator of a long weathering history for the site sediments. However, the percentage of the lamellae in the cambic horizon of several Airpark East units, as typified in the EU 150 profile, was insufficiently dense or extensive to warrant an “upgrade” of subsoil development from cambic (Bw) to argillic (Bt).

Wagner identified a transitional BC horizon below the Bw in EU 143 (Block D), composed of yellowish brown (10YR 5/6) sand and overlying C and Cg (gleyed) horizons; the C and Cg horizons directly underlay the Bw horizon in EU 150 of Block F. All of these lower horizons consisted of sand, with some redoximorphic features (pedogenic mottles) in the C and Cg (Appendix III).

As is the case at the Airpark West site (see below), Wagner concluded that the occurrence of a substantial quantity of prehistoric lithic artifacts in the upper and intermediate subsoil layers (Levels 2.1–2.5, 3.1–3.3) at Airpark East was attributable to the downward translocation and mixing of cultural material from the surface horizons into the subsoil via biomantle processes throughout the Holocene, such as tree throws and the burrowing of various animals and insects, which is especially common in loose, very sandy soils. The possibility of in situ artifact burial resulting from eolian deposition was almost certainly eliminated from consideration, because the predominant grain sizes of the sand fraction composing the site soils were determined to be too coarse to have been deposited by widespread wind mobilization and transport (Appendix III).

3.2 FEATURES

Three cultural features, designated Features 2, 3, and 4, were identified at the Airpark East site during the Phase III data recovery. Feature 2 was delineated in EUs 33 and 82–84 in Block C, in the northeastern portion of the site (Figure 9). It was initially identified across all but the northwestern quarter of Stage 1 EU 33, Level 2.3, as a cluster of FCR within a matrix of yellowish brown (10YR 5/4) medium to coarse sand with charcoal flecking, which was bordered by an intact subsoil of light yellowish brown (10YR 6/4) coarse sand with iron concretions on the northwest. This rock cluster, which occurred as shallow as 60 cm below ground surface, was not densely packed but was suggestive of a dispersed hearth feature.

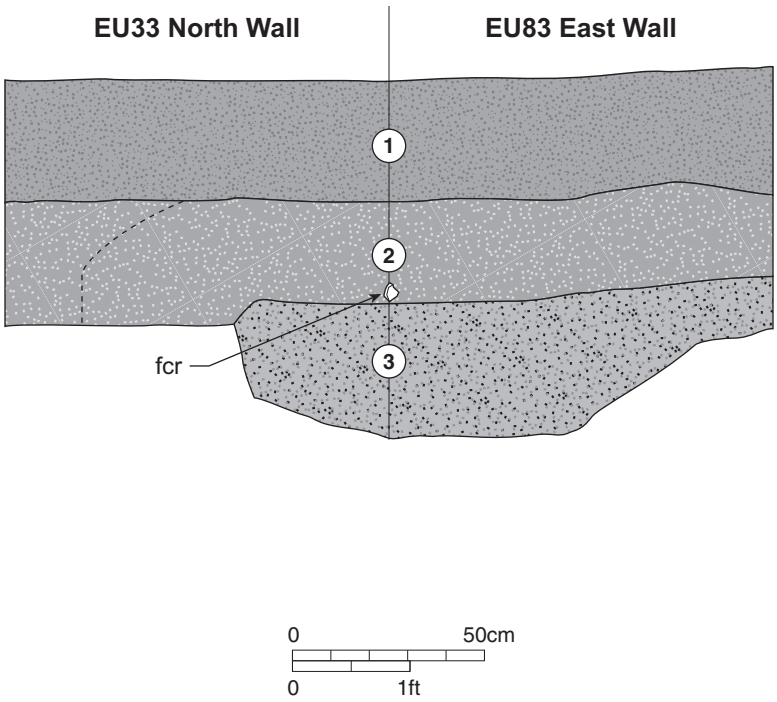
A total of 14 prehistoric artifacts were recovered from the feature fill of EU 33, including nine quartzite FCR, one chert flake, one quartz blocky fragment, and three unidentified potsherds from Level 1; one unidentified grit-tempered sherd and three quartzite FCR from Level 2; and one chert flake from Level 3. Excavation of EU 33 was temporarily discontinued at this depth (95 cm below ground surface), revealing an elongated basin-shaped profile (Figure 15), and subsequently, contiguous EUs 82, 83, and 84 were begun to the north, northeast, and east, respectively.

The remainder of Feature 2 was exposed in EUs 82–84 near the base of Level 2.1, the first subplowzone level, and into Level 2.2 (Figure 16). A majority of the FCR had been contained within EU 33, with eight additional fragments recovered from Feature Levels 1–3 of EU 82 (n=6), Feature Level 1 of EU 83 (n=1), and Feature Level 1 of EU 84 (n=1). These three units also yielded a small number of lithics and ceramics, including one jasper flake from the upper feature level of EU 82, five jasper flakes and one chert flake from Feature Levels 1–3 of EU 83, and six flakes (3 chert, 1 jasper, 1 quartzite, 1 chalcedony) from Feature Levels 1 and 2 of EU 84, which also produced a single grit-tempered, cordmarked body sherd from Feature Level 3 (Appendix I). The feature extended to a maximum depth of 93 cm below ground surface, or 63 cm below plowzone, its undulating base bottoming out on brownish yellow (10YR 6/8) medium to coarse sand with minimal gravel (Figure 17).

Feature 3 occurred in EUs 18 and 101–107 in Block E, located within the western third of the site (Figure 9). The feature encompassed nearly all of Stage 1 EU 18, and thus it was not recognized as such until the surrounding seven units were added and their plowzones had been removed. However, a substantial quantity of lithic debitage, including chert, jasper, chalcedony, quartzite, and argillite flakes, as well as an unidentified prehistoric potsherd from Level 2.1, had been recovered from atypically deep subplowzone levels (2.1–2.5) in EU 18, indicating the presence of some sort of anomaly, either an intact cultural feature or a natural intrusion. The Level 2 soil in EU 18 consisted of yellowish brown (10YR 5/4) loamy sand, with yellowish brown (10YR 5/6) coarse sand noted as appearing in the northwest quarter of the unit during the excavation of Level 2.3; this coarse sand was recorded as the sole soil in Levels 2.4 and 2.5, beginning at a depth of about 62 cm below ground surface. The 10YR 5/6 coarse sand graded to a slightly redder 10YR 5/8 (yellowish brown) coarse sand with manganese concretions at about 82 cm below ground surface, constituting the top of Level 3.1, which was the lowermost level excavated in EU 18.

The periphery of Feature 3 was identified within Level 3.1 along the eastern edge of EU 103, west of EU 18; the northeastern corner of EU 104, southwest of EU 18; and the northern third of EU 106, south of EU 18. The feature was not obvious in plan view until this depth, because of its faint contrast with the surrounding subsoil. Soil slumpage in the EU 18 walls had resulted in the loss of portions of the surrounding EUs 101, 102, 105, and 107, which made delineation of the

BLOCK C PROFILES

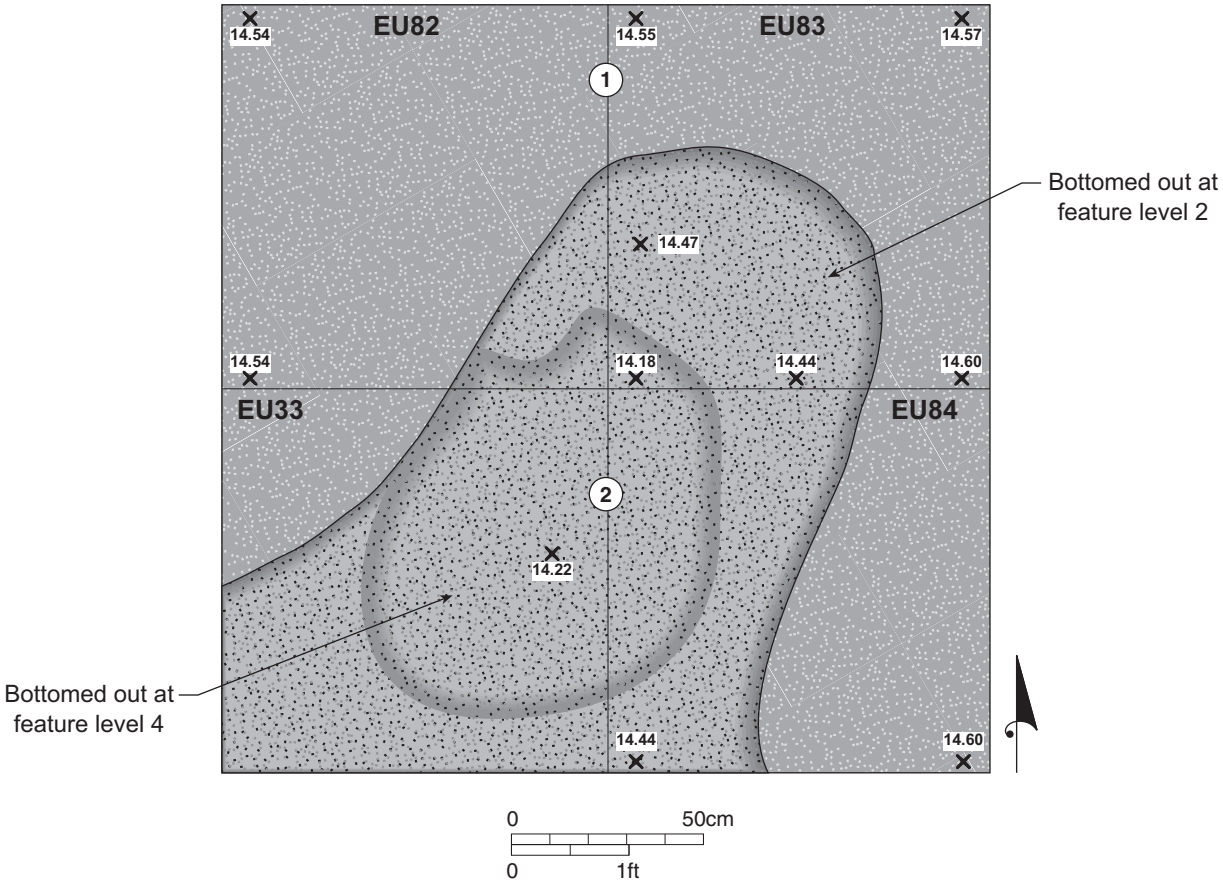


1 10YR 4/3 brown loamy sand; plowzone

2 10YR 6/8 brownish yellow medium coarse sand

3 10YR 5/4 yellowish brown medium coarse sand with carbon flecking

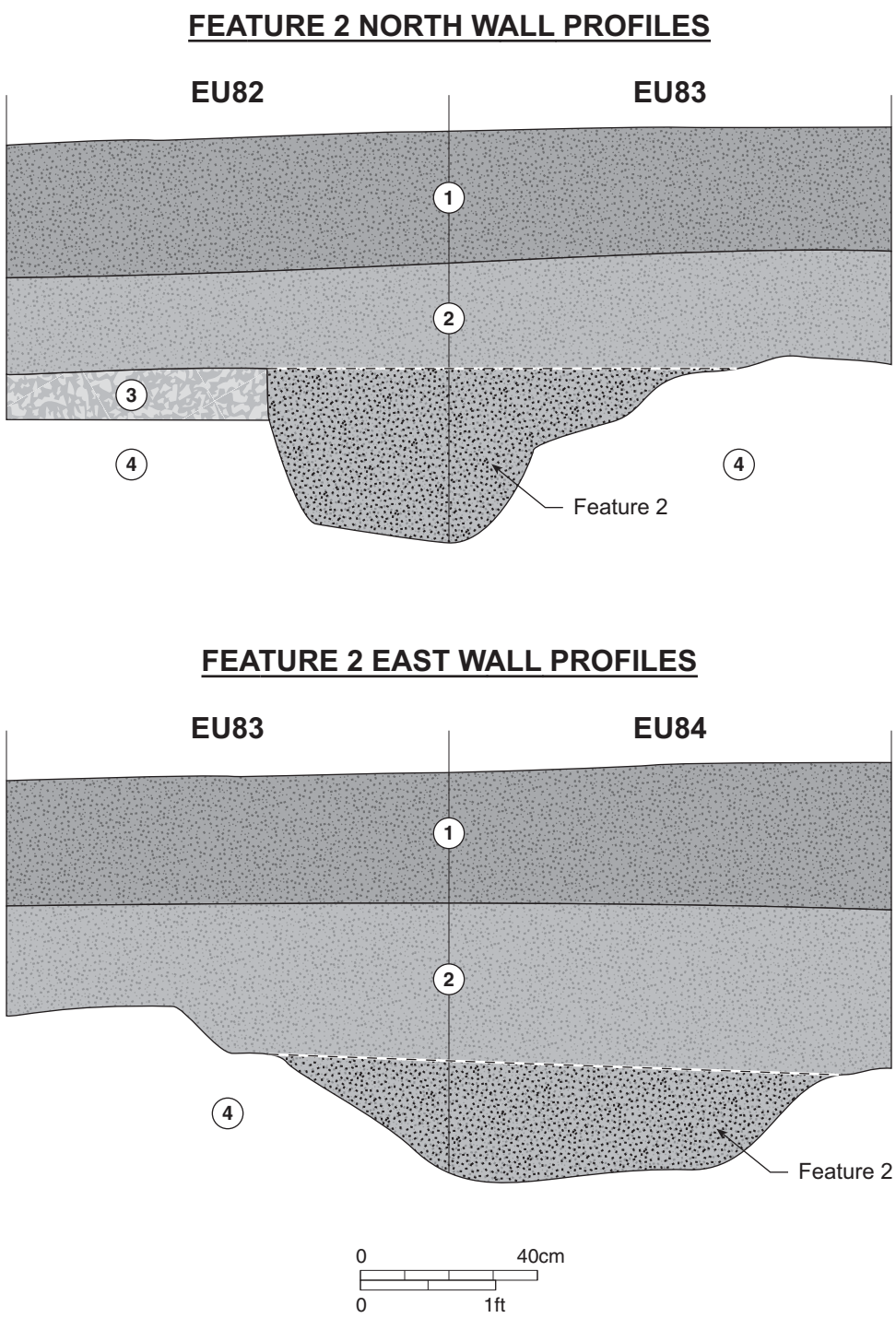
Figure 15. North and east profiles of EU 33 (Excavation Block C), showing Feature 2.



1 10YR 6/8 brownish yellow medium to coarse sand

2 10YR 5/4 yellowish brown medium to coarse sand with charcoal flecking (Feature 2)

Figure 16. Closing plan view of Feature 2 located within EUs 33, 82, 83, and 84 (Excavation Block C).



1 10YR 4/3 brown loamy sand; Ap horizon

2 10YR 5/6 yellowish brown loamy sand

Feature 2 10YR 5/4 yellowish brown medium to coarse sand with charcoal flecking

3 10YR 5/6 yellowish brown mottled with 10YR 7/3 very pale brown medium to coarse sand with less than 5% gravels

4 10YR 6/8 brownish yellow medium to coarse sand with less than 1% gravels

Figure 17. Bisection (north and east) profiles of Feature 2 (Excavation Block C).

feature along its north and east sides tenuous. When fully exposed, Feature 3 appeared as an oval pit filled with yellowish brown (10YR 5/6) loamy sand, with maximum dimensions of about 3.75 m north-south by about 2.75 m east-west as measured at a depth of 72 cm below ground surface (Figure 18). In profile, the feature exhibited a smooth-bottomed basin shape with gently sloped sides, likely representing a truncated pit (Figure 19). A minimal quantity of prehistoric artifacts were recovered from the Feature 3 fill in the additional units, including two jasper flakes from Feature Level 1 of EU 103 and two jasper and two quartz flakes from flotation samples taken from EU 106 (Feature Levels 1–2, and the feature base) (Appendix II).

Lastly, Feature 4 was identified in EUs 116, 117, and 119 of Block F, located in the central portion of the site (Figure 9). The feature was recognized directly below the plowzone in the 2x2-m block of units that also included EU 118, consisting of a small concentration of FCR and cobbles at about 46 cm below ground surface (Figure 20). The surrounding and underlying matrix of Level 2.1 was yellowish brown (10YR 5/6) medium to coarse sand with some iron concretions. Four FCR fragments were recovered from feature context, including four of quartzite from EUs 116, 117, and 119 and one of quartz from EU 117; in addition, a single quartz flake was recovered from within the feature boundaries in EU 117 (Appendix II). Whether the feature represented a disturbed hearth is uncertain, given the sparseness and thinness of the FCR cluster and the absence of any associated soil reddening or other discoloration. The FCR and cobbles were pedestaled, photographed, in drawn in plan before their removal, and no other evidence of the feature was present in the underlying levels of Layers 2 and 3.

3.3 LITHIC ANALYSIS

3.3.1 Lithic Raw Materials

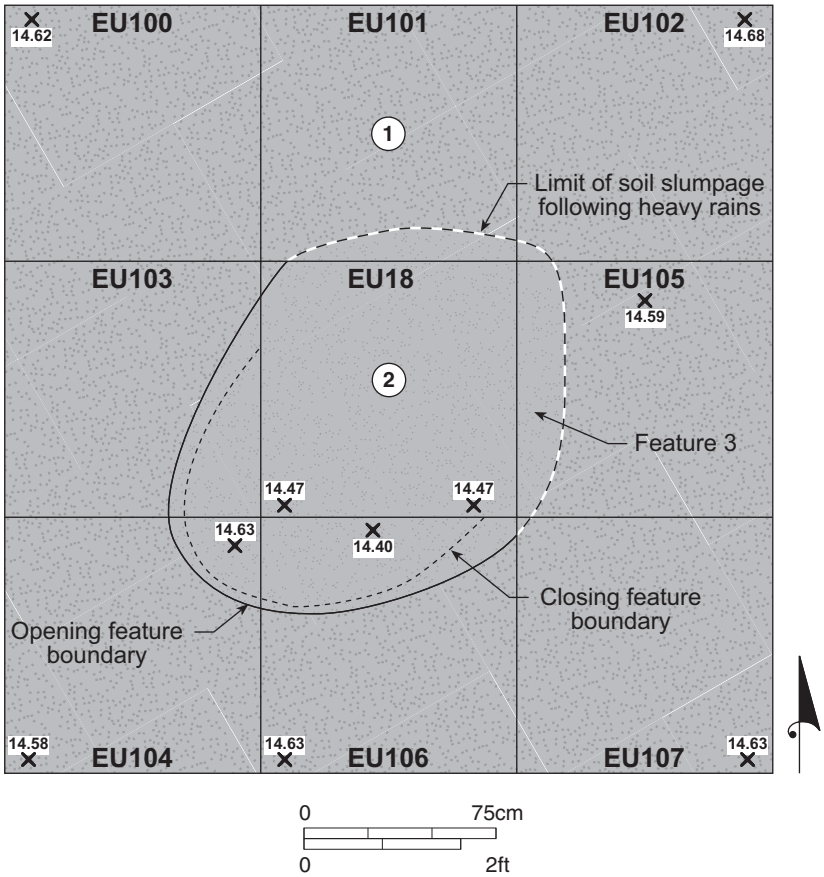
The lithic assemblage from the Airpark East site totals 11,105 chipped stone specimens. Eight types of raw materials are present: jasper (n=5,317; 48%), chert (n=2,393; 22%), quartz (n=2,070; 19%), quartzite (n=686; 6%), argillite (n=369; 3%), chalcedony (n=120; 0.1%), rhyolite (n=16; 0.1%), and unidentified (n=3) (see Table 1).

Table 1. Frequencies of chipped-stone raw material types at the Airpark East Site.

	Raw Material								
	Jasper	Chert	Quartz	Quartzite	Argillite	Chalcedony	Rhyolite	Unidentified	Total
Quantity	5,317	2,393	2,070	686	369	120	16	3	11,105
%	48	22	19	6	3	1	0.1	0.02	99

The vast majority of the jasper is a dull, yellowish brown stone with good to excellent flaking qualities. Where present, cortex is predominantly chalky and tan. Some or most of the jasper assemblage is assumed to be derived from the deposits at Iron Hill to the north, though a sizable proportion of the material appears to be derived from small stream cobbles. A minority of the jasper appears to be high-quality stone from the Hardyston Formation deposits in eastern Pennsylvania.

The chert assemblage represents a mixed bag of materials. Quality ranges from poor to excellent, from coarse to crystalline. Colors are likewise highly varied, ranging from jet black to tan/brown to light grey. A small amount of “exotic” material is present, consisting of a mottled grey/tan material. Most of the chert appears to be locally derived, much of it from stream cobbles. Some of the finer material could be Allentown chert from the Hardyston Formation to the north.



1 10YR 6/6 brownish yellow loamy coarse sand with less than 1% gravels; C horizon

2 10YR 5/6 yellowish brown loamy sand (Feature 3)

Excavation Block E representative profile (south wall of EUs 106 and 107) within 7K-C-431.

Figure 18. Closing plan view of Feature 3 and south profile of EUs 107 and 106 within Excavation Block E.

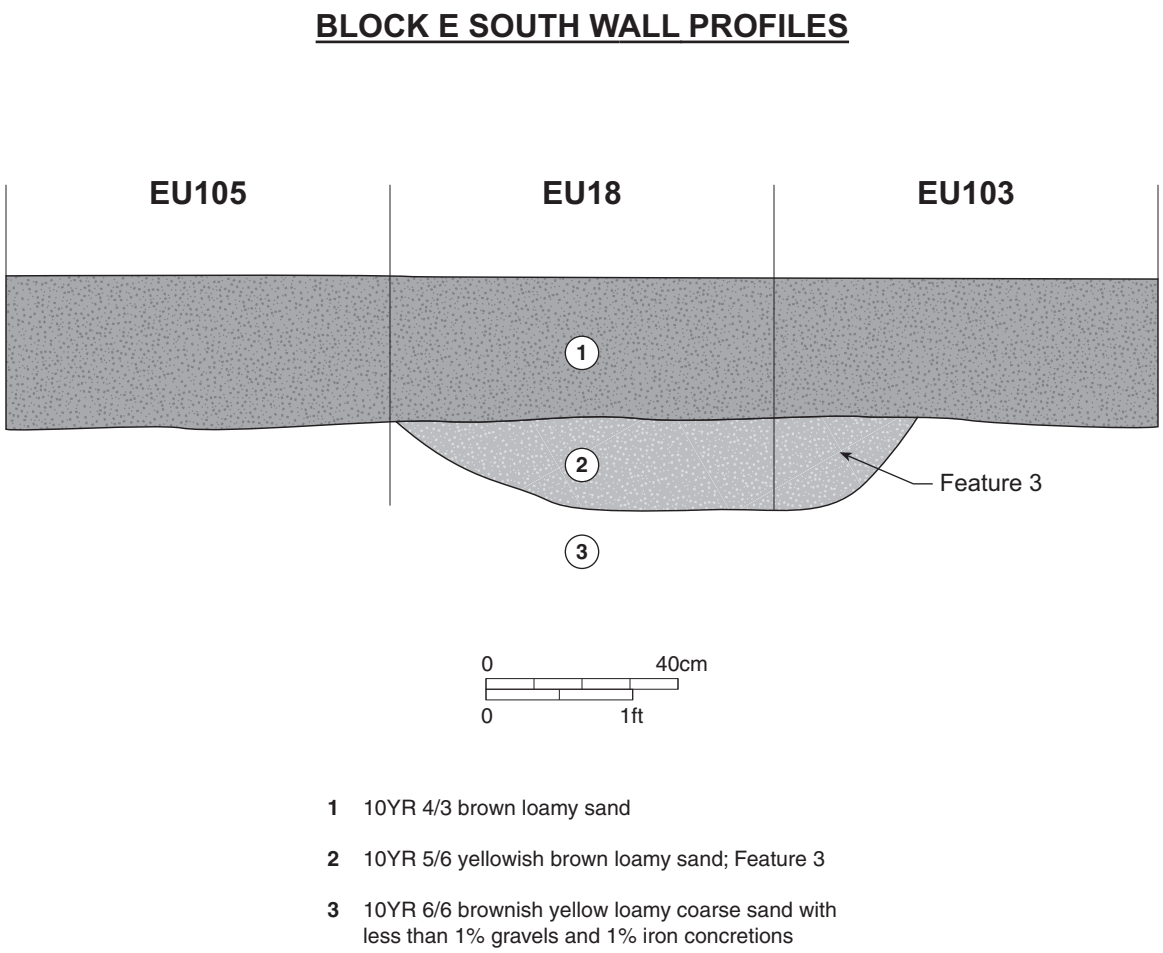
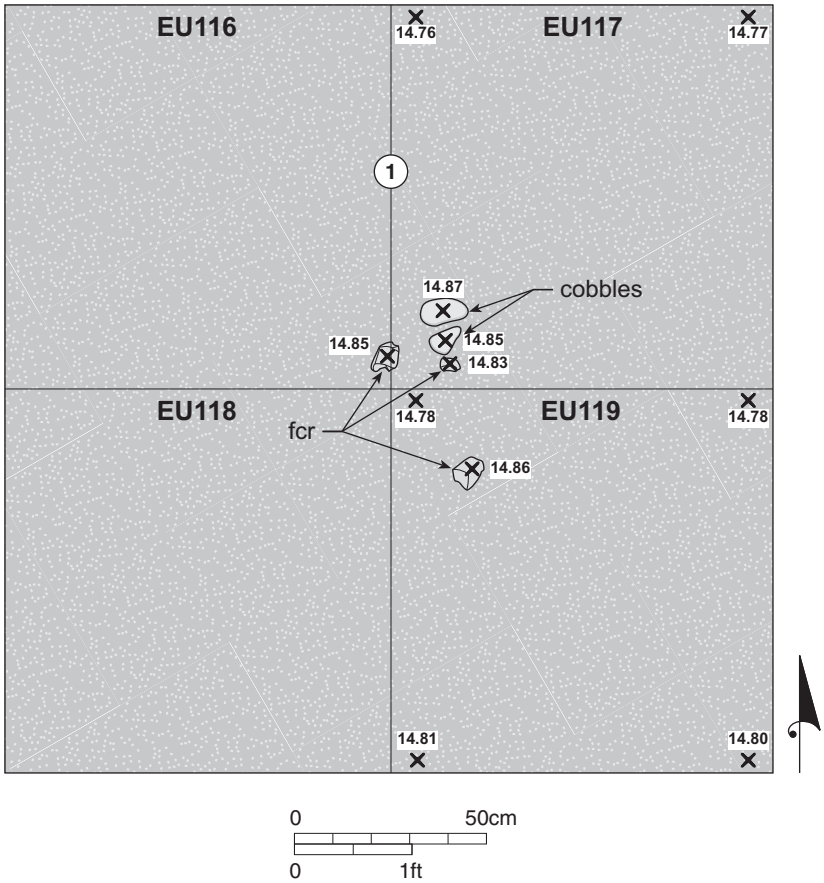


Figure 19. North bisection profile of Feature 3 (Excavation Block E).



1 10YR 5/6 yellowish brown loamy sand

14.68 ✕ Elevation in meters

Figure 20. Closing plan view of Feature 4 (Excavation Block F).

With a few exceptions, the quartz and quartzite both appear to be locally derived from cobbles. Both are unremarkable, and quality ranges from poor to reasonably good. The argillite is believed to be imported from the Lockatong Formation deposits in southeast Pennsylvania. Lockatong Formation argillite is common in Delaware, though always in relatively small amounts compared to the rest of the lithic assemblage. All of the argillite from Airpark East is highly eroded, which is common for this stone. The uncommon chalcedony is a variable category; quality is generally good. Finally, the very rare rhyolite rounds out the assemblage.

3.3.2 Typology and Classification

3.3.2.1 Chipped Stone Tools

1. Piscataway (Plate 5)
   n=12
   Raw Materials: Jasper=10
   Chert=1
   Argillite=1

Description: This is a rather homogeneous group. Seven jasper specimens have cortex at the end of the stem. Five have small spikes at the haft element, suggesting resharpening while hafted; indeed, most show some evidence of resharpening. The argillite example is heavily weathered and is equivocal. Most points are biconvex, and bases are lobate or pointed; one and possibly three points show basal grinding.

2. Untyped Corner-notched (Plate 6)
   n=14
   Raw Materials: Jasper=8
   Chert=3
   Argillite=2
   Quartz=1

Description: Ten of these artifacts display slightly concave bases, and six display basal grinding. One jasper specimen has been destroyed by fire. Asymmetrical beveling of the blade is present, probably indicative of resharpening. The argillite examples are highly eroded but overall conform to shape.

3. Teardrop (Plate 7e-g)
   n=3
   Raw Material: Jasper=3

Description: One artifact resembles a steep-retouch end scraper and has a ground base. All are diminutive and quite symmetrical.

4. Bifurcate-base (Plate 7h)
   n=1
   Raw Material: Jasper=1

Description: The characteristic basal notch on this tool is shallow but was deliberately chipped. The beveled blade and slight barbs might suggest resharpening while hafted. This artifact resembles the type Kanawha Stemmed.

Plate 5. Airpark East site, Piscataway projectile points.

Plate 6. Airpark East site, Untyped Corner-notched projectile points.

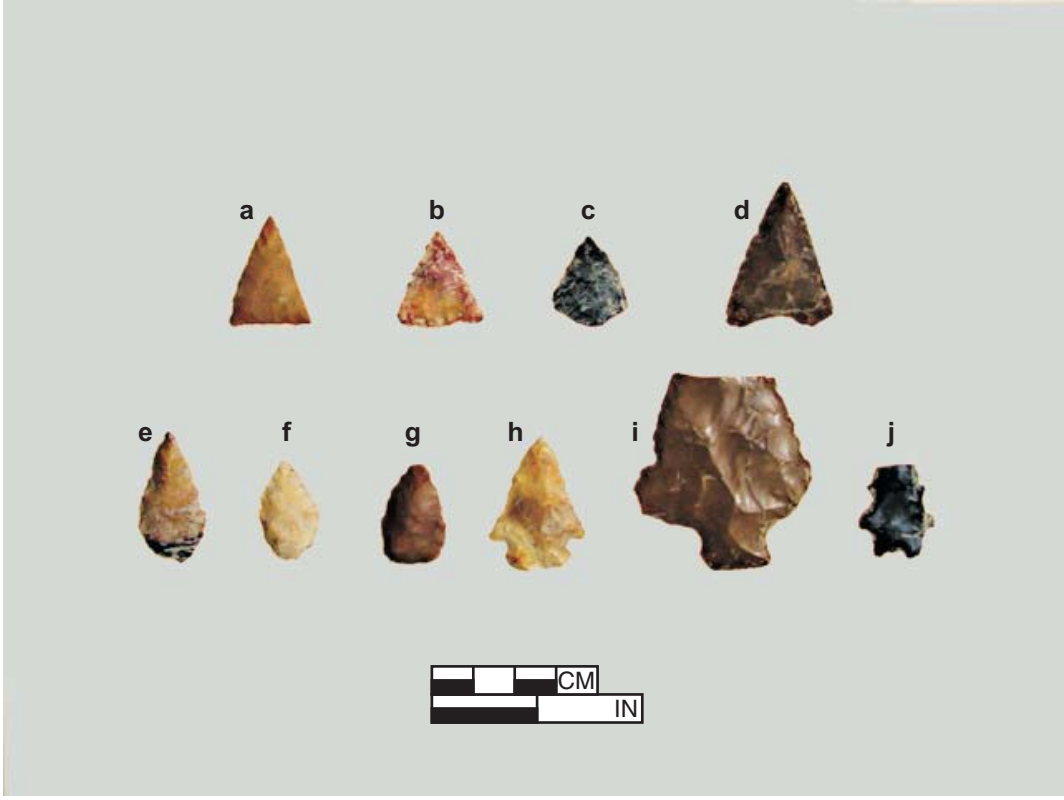


Plate 7. Airpark East site, projectile points. Top: a–c, Madison; d, Levanna; Bottom: e–g, Teardrop; h, Bifurcate-base; i, Perkiomen Broadspear; j, Kirk Serrated.

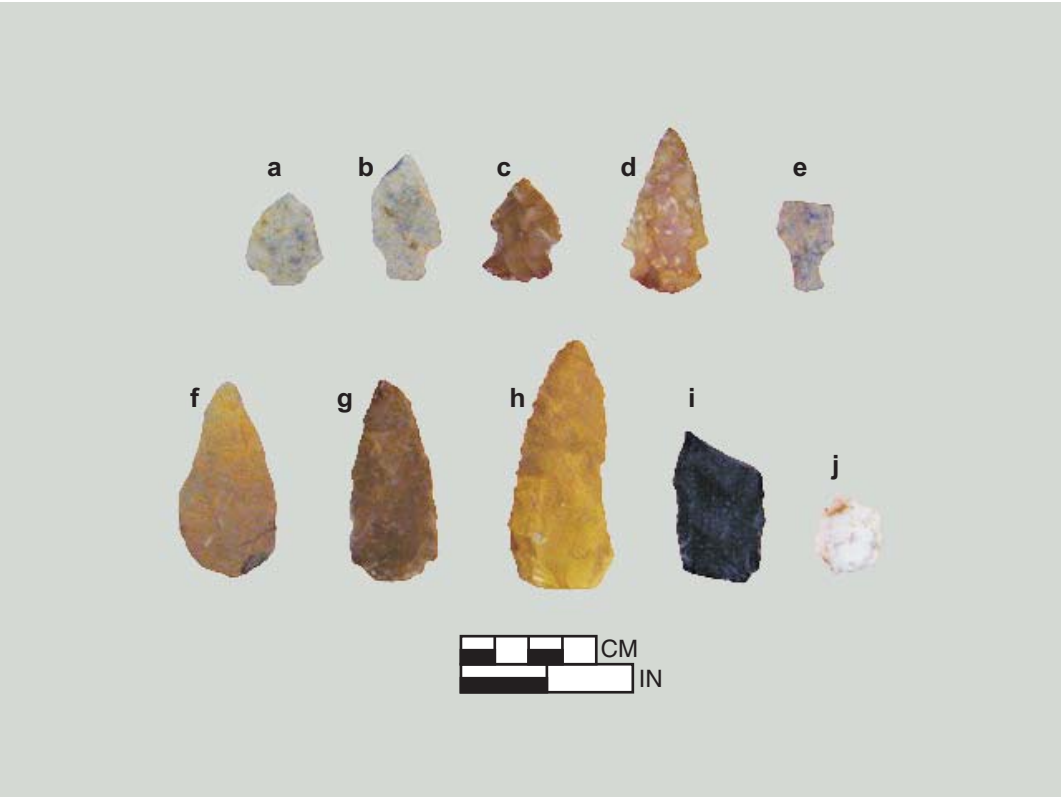


Plate 8. Airpark East site, projectile points and bifaces. Top: a–b, Untyped Stemmed; c–e, Untyped Side-notched; Bottom: f–j, Late-stage bifaces.

5. Perkiomen Broadspear (Plate 7i)
n=1
Raw Material: Jasper=1 (Hardyston)

Description: This large biface has been heavily reworked, which might suggest use as a knife of cutting tool. The jasper material is much finer than is the norm at the site and appears to derive from the Hardyston Formation in Pennsylvania.

6. Kirk Serrated (Plate 7j)
n=1
Raw Material: Chert=1

Description: This artifact may be one of the smallest Kirk Serrated points ever found. Despite its diminutive size, the point possesses all the key attributes of the type, including basal- and corner-notching and the characteristic heavily serrated blade element.

7. Madison (Plate 7a-c)
n=3
Raw Materials: Jasper=2
Chert-1

Description: The chert example is difficult to orient and appears to have a missing ear. The two jasper points are thin and very well made.

8. Levanna (Plate 7d)
n=1
Raw Material: Jasper=1

Description: This well-made artifact has a concave base and is missing one ear.

9. Untyped Side-Notched (Plate 8c-e)
n=3
Raw Materials: Jasper=2
Argillite=1

Description: The argillite point in this group does not resemble the jasper examples save for the presence of side-notching. The argillite point is eroded and approximates the Lamoka type, with narrow blade and wide side notches. Both jasper specimens have wide convex bases and wide notches; both are quite thick and have beveled blades. The shorter point shows apparent heavy use and repeated resharpening.

10. Untyped Stemmed (Plate 8a-b)
n=3
Raw Materials: Argillite=2
Quartz=1

Description: This rather dismal lot consists of two heavily eroded argillite examples and a single quartz tool that does not resemble the former. The more complete argillite specimen has a squared-off stem, the others are indeterminate.

11. Drills (Plate 9)
n=2
Raw Materials: Jasper=1
Chert=1

Description: Without a doubt, these are the two most remarkable artifacts in the assemblage. Though herein classified as drills on the basis of morphology, neither artifact was ever used for that purpose. The chert example is made of a high-quality light tan-brown-gray mottled material of undetermined source. The artifact appears to have been fabricated from a large flake. Flaking is very fine, and the edges of the basal element have been heavily ground. The blade is not ground and shows no evidence of use. This is the most well-made artifact at the site.

At first glance, the jasper specimen appears to be the less impressive stepchild of the chert drill, but aside from the difference in raw material, it too displays excellent workmanship. The jasper is good quality and appears to be the same variety as most of the jasper in the assemblage. The blade is not quite as finely finished as the previous specimen though shows no use wear. The basal margins are heavily ground. The means by which the tip became broken is not apparent, though it likely did not happen during tool manufacture.

12. Late-Stage Bifaces (Plate 8f-j)
n=4
Raw Materials: Jasper=2
Chert=1
Argillite=1

Description: The jasper artifacts are both well-made and appear to represent finished tools, but show no evidence of use; perhaps they represent finished performs. The chert piece likewise shows no use wear and may have broken in manufacture. The argillite example is heavily weathered and reveals no morphology save for being an unbroken biface.

13. Rough Bifaces
n=23
Raw Materials: Jasper=10
Chert=5
Quartz=7
Argillite=1

Description: Rough bifaces are defined as artifacts that have been bifacially flaked but were not finished into formal tools. Most of these specimens likely represent discarded knapping failures. Others may be remnant flake cores.

14. Biface Fragments (Broken Finished Tools)
n=9
Raw Materials: Jasper=1
Chert=2
Quartz=2
Argillite=4

Description: This class describes bifacial tools that were broken after finishing, presumably from use. Most are blade fragments and biface margins.

Plate 9. Airpark East site, drills.

Plate 10. Airpark East site, scrapers. Top: hafted scrapers; Bottom: steep-sided end scrapers.

15. Bases
n=4
Raw Materials: Jasper=2
Chert=2

Description: Bases also represent broken finished tools. All four of these examples are corner- to side-notched, and resemble the corner-notched class described above.

16. Tips
n=12
Raw Materials: Jasper=6
Chert=5
Quartz=1

Description: These broken tips derive from broken finished tools. This is an unremarkable lot with the exception of one chert example exhibiting a very narrow blade suggestive of a drill, though no use wear is visible. It may represent the tip of a notched drill as described above, though this inference is equivocal at best.

17. Steep-Retouch End Scrapers (Plate 10, bottom)
n=16
Raw Materials: Jasper=10
Chert=4
Quartz=1
Unidentified=1

Description: This lot of "thumbnail" scrapers shows considerable variability in overall shape, but all share a steeply retouched bit on a (usually) convex end. Most specimens are nicely flaked, though some are on the crude side; five are bifacial. All but a few are rather diminutive in size with a tendency for the proximal end to be pointed, or otherwise narrower than the bit end. The pointy end may have facilitated hafting. Use wear is variable, ranging from no apparent wear to deep undercutting step and hinge fractures.

18. Hafted Scrapers (Plate 10, top)
n=4
Raw Materials: Jasper=2
Chert=1
Quartzite=1

Description: These four bifacial scrapers have concave bases and side or corner notches, and closely resemble the bases of the corner-notched points described above. The bit ends have steep retouch on a convex margin, identical to the steep-retouch end scrapers. Some edge wear is visible, but it is not pronounced. These specimens appear to be former projectile points reworked into scrapers, probably subsequent to breakage.

19. "Other" Scrapers
n=12
Raw Materials: Jasper=6
Chert=6

Description: This lot is essentially a catch-all for scrapers not fitting the previous categories. Four specimens have retouch on a side, and four are retouched on an end. The remaining four are variously retouched; some of these artifacts might be classed as Utilized Flakes by other archeologists, and they might be right.

3.3.2.2 Ground and Pecked Stone Tools

1. Hammerstones
   n=3
   Raw Material: Possibly Gneiss=3

Description: These tools are small cobbles with distinctive pitting on opposite ends (one is broken). The raw material is very dense and resembles gneiss.

2. Chopping Tools (Plate 11)
   n=5
   Raw Materials: Hard Sandstone=2
   Argillite=1
   Quartzite=1
   Probably Gneiss=1

Description: This is a small but diverse lot. The sandstone examples are cobbles with use wear on one end. The argillite piece is irregular and may actually be a core. Likewise, the quartzite tool might also be a core. Finally, the gneiss artifact is unusual in that it has a large notch in the ventral face near the center; this may simply be a large cobble that was tested and rejected.

3.3.2.3 Discussion

The lithic tool assemblage from the Airpark East site displays a high degree of typological homogeneity. That is, most of the types and classes described above evince a low degree of within-class variability. This is particularly true for the Piscataway type. These points are typed principally following Dent (1995:178ff), who places these artifacts within the Late Archaic (early Woodland I) period based on stratigraphic excavations in the Potomac valley. Similar points have been found at the Hawthorn site in northern Delaware; Custer (1989:149-150; 1996:Fig. 48, 170-171; Custer and Bachman 1984) likewise places them in the Late Archaic.

Further, small stemmed points similar to the Airpark East examples were the principal point type at the Puncheon Run site, located on the St. Jones River near Dover, downstream from the Airpark sites (LeeDecker et al. 2005:144ff, 298, Plate 24). The authors decline to assign these artifacts to a named type and refer to them as “pebble points”; of importance, these points were radiocarbon dated to an approximately 3,000-500 BC time frame, which is overall consistent with a Late Archaic or early Woodland I temporal placement. Also similar is the retention of the cobble cortex on the bases of the Puncheon Run (LeeDecker et al. 2005:298) and Airpark East points, suggesting a similar manufacturing trajectory. Finally, five of the Airpark East points have small spurs or spikes at the blade-basal juncture; these are interpreted as the result of repeated resharpening with the point still on the shaft. It might be added that these points have been found at other sites in the neighborhood as well, such as at the Hickory Bluff site (Petraglia ert al. 2002) located near Puncheon Run on the St. Johns, and the Pollack site (Custer et al. 1994) located a short distance downstream from the Airpark sites in the Leipsic.

Plate 11. Airpark East site, chopping tools.

The Untyped Corner-Notched points are the most numerous point class at the Airpark East site. In addition to the 14 intact specimens, four hafted scrapers and four broken bases closely resemble the type. The Phase IB field work did not produce any (McVarish and Siegel 2004:Plates 10, 12, 15), and the Phase II investigation found two similar examples (McVarish and Siegel 2004:Plates 10, 12, 15). Assigning these artifacts to an established type is difficult; the previous investigators tentatively called these points Brewerton Side-notched-like and Jack's Reef Corner-notched-like (Siegel et al. 2004:Plate 5). A few similar-looking points from the Pollack site, located on the Leipsic River approximately 3.2 kilometers (2 miles) downstream from the Airpark sites, were not assigned to types (Custer et al. 1997:84, Figs. 59, 91). Analogous forms from the Hawthorn site further north in Delaware have been inferred to be late-stage butchering tools and are not assigned to type (Custer 1989:149-150, Fig. 26). Closer to home, the Carey Farm site (Custer et al. 1996) downstream on the St. Jones that were not typed, but LeeDecker et al. (2005:23) have recently expressed their opinion that these types likely date to the Woodland I period.

The Airpark East artifacts do not closely resemble the Brewerton Side-notched or Jack's Reef types, though one could "force-fit" them into the Brewerton category. To the extent that distinctive artifact types are indicative of distinctive prehistoric groups – which is by no means a universally accepted concept – it seems unlikely that these points represent a Brewerton occupation in central Delaware. For the present, these artifacts will remain untyped, but are assumed to represent a distinctive occupation of the site, either by themselves or in conjunction with other types.

Teardrop points are nowhere common but occur with some frequency in New Jersey and Northern Delaware. However, some examples were recovered from the Beech Ridge site located some four kilometers southeast of the Delaware Airpark. Barse and Marston (2007:4.23-4.26) note that some investigators link Teardrop points to the Piscataway type, and posit an Early Woodland temporal placement.

Bifurcate base points are not infrequent in central Delaware. The single example from Airpark East resembles the Kanawha type, and tentatively suggests some kind of presence at the site during the middle Archaic period. Earlier still, the lone Kirk Serrated specimen is one of the smallest examples of this type observed by the authors; however, the point is very similar to a very small Kirk Serrated point from the Puncheon Run site downstream on the St. Jones (LeeDecker et al. 2005:Plate 23, 137), thus establishing that the Airpark East example is not unique.

The Perkiomen Broadspear is an impressive find. While more common in the middle Delaware and Lehigh valleys in eastern Pennsylvania, this type – like many Broadspear types – can be found far afield. This example appears to be made of high-quality Hardyston Formation jasper obtained from the Macungie or Vera Cruz quarries near Bethlehem, Pennsylvania. Dating to the Woodland I (also Terminal Archaic) period, its presence at the site may represent trade or interaction with groups to the north.

The three Madison and single Levanna points indicate a sparse Woodland II period presence at the Airpark East site. The Untyped Side-notched and Untyped Stemmed points simply do not fit well into an established type. Their temporal placement is uncertain but early in the Woodland I period seems likely.

The two artifacts labeled "drills" are extraordinary. Both display extremely excellent craftsmanship, skill, and imagination. Clearly they were meant to impress somebody. Unfortunately, clues as to their antiquity or cultural derivation are not forthcoming. Custer (1996:Fig. 51) illustrates but does not discuss a similar drill form and posits that it is broadspear-related, that is was reworked from a

broadspear point. Perhaps so, but the bases of the Airpark East artifacts in no way resemble any known broadspear types.

It is difficult to refrain from ascribing some kind of "special" status to these tools. That is, clearly these were not everyday, run-of-the-mill tools, to be used up and discarded. These were made by a skilled stone worker, presumably for a purpose more lofty than drilling holes. Perhaps these artifacts reflected – or conferred - some kind of social status to the owner; on the other hand, it simply may be a case of the best knapper in the group showing off.

Moving to the non-projectile point stone tool categories, late-stage bifaces are interpreted as artifacts that approached but never attained the status of finished artifacts. None show obvious or apparent of wear from use as knives or scraping tools. The appreciable sizes of the specimens suggest that they date to the early Woodland I period.

Rough bifaces are interpreted principally as stone working rejects and mistakes, and likely as cores for the production of useable flakes. By contrast, the category broken finished tools represents finished specimens that broke through use. Tips and bases represent the same thing.

The steep-retouch end scrapers and hafted scrapers form an interesting lot. As noted, the bases of the hafted scrapers closely resemble those of the Untyped Corner-notched points. Most scrapers are rather diminutive in size, and one wonders at how they may have been used. Many have a pointed base, which in turn could indicate insertion into a hollowed-out wooden rod or dowel. The small sizes might be the result of resharpening and reuse, though none show strong evidence for this. Also uncertain is the function of this tool class; typically, most archeologists appeal to hide and/or woodworking to account for steep-retouch end scrapers, which seems a reasonable supposition. The odd lot of "other" scrapers requires little comment, only that they were evidently used for some kind of scraping activity.

Despite ample evidence for stone tool working at the Airpark East site, hammerstones, numbering three, are rare. Certainly some with only light or "casual" usage may have been overlooked in the field. The various chopping tools are posited to have been used for some kind of heavy-duty activity, such as chopping wood. As noted, this is a diverse group of tools and the argillite specimen may have been intended for use as a flake core.

3.3.3 Debitage Analysis

Debitage was sorted by raw material type, size category, whether the piece constituted a flake or shatter (or "blocky fragments"), and by the presence or absence of cortex. These data are depicted in Table 2. The data may be used to identify the nature of lithic technology at the Airpark East site. The analysis proceeded initially with debitage segregated by raw material type.

Beginning with jasper, the most plentiful lithic material at the site, it can be observed that flakes (n=3,974; 97%) greatly outnumber shatter (n=122; 3%) in the assemblage. Flakes and shatter without cortex (n=4,025; 76%) outnumber flakes and shatter with cortex (n=1,290; 24%), though not nearly to such a pronounced degree. At face value, these data may seem somewhat contradictory: the very low amount of shatter would suggest that very little primary jasper core reduction was conducted at the site, while the relatively large amount of cortex present on flakes and shatter (nearly one-quarter of the assemblage) would indicate that cores were indeed reduced on-site. Rather, this pattern is interpreted as a function of the nature of the jasper material that most of the raw material consisted of small cobbles found locally. Knapping small jasper cobbles would produce a fair amount of cortex

Table 2. Airpark East Site Debitage Frequencies by Raw Material, Size Category, and Presence/Absence of Cortex.

	Raw Material								
	Jasper	Chert	Quartz	Quartzite	Rhyolite	Chalcedony	Argillite	Unidentified	Total
Flake without cortex, <6 mm	11	3	3						17
Flake without cortex, 6–10 mm	1762	750	569	124	3	35	64	1	3308
Flake without cortex, 11–15 mm	1717	893	601	238	5	53	104	2	3613
Flake without cortex, 16–20 mm	347	181	176	96	1	19	43		863
Flake without cortex, 21–25 mm	94	68	51	31	3	4	24		275
Flake without cortex, 26–30 mm	22	29	26	22		2	19		120
Flake without cortex, 31–35 mm	15	11	11	6	1	1	5		50
Flake without cortex, 36–40 mm	5	2	4	2	2		6		21
Flake without cortex, 41–45 mm	1		1	4			3		9
Flake without cortex, >45 mm		1	4	2			1		8
Total without cortex	3974	1938	1446	525	15	114	269	3	8284
Flake with cortex, <6 mm	3	1	1						5
Flake with cortex, 6–10 mm	329	80	21	6		1	14		451
Flake with cortex, 11–15 mm	544	173	68	38		1	35		859
Flake with cortex, 16–20 mm	182	63	43	26		3	22		339
Flake with cortex, 21–25 mm	79	42	33	25			6		185
Flake with cortex, 26–30 mm	41	14	20	12		1	8		96
Flake with cortex, 31–35 mm	25	7	12	6			7		57
Flake with cortex, 36–40 mm	10	6	5	5			3		29
Flake with cortex, 41–45 mm	6	1	3	2			1		13
Flake with cortex, >45 mm	2	1	4	2			4		13
Total with cortex	1221	388	210	122	0	6	100	0	2047
Grand Total	5195	2326	1656	647	15	120	369	3	10,331

Table 2 continued. Airpark East Site Debitage Frequencies by Raw Material, Size Category, and Presence/Absence of Cortex.

	Raw Material								
	Jasper	Chert	Quartz	Quartzite	Rhyolite	Chalcedony	Argillite	Unidentified	Total
Blocky Fragment without cortex, <6 mm	1								1
Blocky Fragment without cortex, 6–10 mm	8	5	47	4					64
Blocky Fragment without cortex, 11–15 mm	24	20	114	5			1		164
Blocky Fragment without cortex, 16–20 mm	12	7	59	3			1		82
Blocky Fragment without cortex, 21–25 mm	5	2	35	2	1				45
Blocky Fragment without cortex, 26–30 mm	3	3	22						28
Blocky Fragment without cortex, 31–35 mm			9	1					10
Blocky Fragment without cortex, 36–40 mm		1	6	2					9
Blocky Fragment without cortex, 41–45 mm			4	1			1		6
Blocky Fragment without cortex, >45 mm		1	5						6
Blocky Fragment with cortex, <6 mm									0
Blocky Fragment with cortex, 6–10 mm	8	2	4	3					17
Blocky Fragment with cortex, 11–15 mm	20	7	21	2					50
Blocky Fragment with cortex, 16–20 mm	18	8	26	6					58
Blocky Fragment with cortex, 21–25 mm	6	2	25	3					36
Blocky Fragment with cortex, 26–30 mm	7	3	20	2					32
Blocky Fragment with cortex, 31–35 mm	4	2	4	1					11
Blocky Fragment with cortex, 36–40 mm	1	2	3	4					10
Blocky Fragment with cortex, 41–45 mm	5	2	8						15
Blocky Fragment with cortex, >45 mm			2						2
Total	122	67	414	39	1	0	3	0	646

but not much in the way of shatter or "core trimming" flakes; large quantities of the latter would be precluded by the small sizes of the original cobbles.

Considering flake sizes reinforces this interpretation. The data in Table 2 show that fully 84 percent of all jasper flakes measure less than 15 millimeters in greatest dimension. Clearly, large jasper rocks were not being reduced at the Airpark East site. Further, the preponderance of small flakes in the assemblage may indicate that maintenance of jasper tools may have been a more important activity than the manufacture of jasper tools. This supposition is further discussed below.

Turning to chert, flakes (n=2,325; 97%) again dominate shatter (n=67; 3%) by a large margin, indeed, by the same margin as jasper. Flakes and shatter displaying cortex (n=416; 18%) are less frequent than flakes and shatter without cortex (n=1,976; 82%), though not to the same degree as the jasper assemblage. However, the same overall pattern is evident, that most chert knapping did not involve the reduction of large chert cores. Flakes measuring less than 15 millimeters in greatest dimension comprise 81 percent of the chert assemblage. These data mirror that of the jasper in that relatively little primary reduction of large cores occurred on-site; cobble cores are more likely.

For quartz, flakes (n=1,808; 87%) once again outnumber shatter (n=379; 13%), though not to the degree seen with chert or jasper. The amount of shatter seems somewhat low, especially given quartz' propensity for angular breakage and difficulty in working. Flakes and shatter without cortex (n=1,686; 81%) are more numerous than those with (n=501; 19%), which is close to the same proportions as for chert. Regarding size, flakes measuring less than 15 millimeters in greatest dimension comprise just 46 percent of the assemblage; shatter under 15 millimeters comes in at 40 percent.

Taken together, these data suggest a similar reduction sequence to that of jasper and chert, though the sizes of the individual debitage tend to be larger. This, in turn, likely indicates that the quartz cores used were larger in size than their jasper and chert counterparts. Still, one would expect a higher proportion of shatter than present in the assemblage, if only because quartz tends to fracture in such a way that large amounts of shatter are produced. The explanation for this situation is not clear.

Small sample sizes hinder analysis of the remaining debitage. For quartzite, the 696-specimen sample breaks out into flakes (n=647; 94%) and shatter (n=39; 6%). These proportions are overall similar to the chert and jasper. Flakes and shatter without cortex (n=543; 79%) again outnumber those with cortex (n=143; 21%). Flakes smaller than 15 millimeters in greatest dimension account for 66 percent of the quartzite assemblage. As with quartz, it appears that the parent quartzite cores were larger than those for jasper and chert.

The 369 pieces of argillite are all flakes; argillite shatter was not identified. Flakes lacking cortex (n=269; 72%) outweigh those that have cortex (n=100; 28%), but the proportion of flakes with cortex seems high. Flakes smaller than 15 millimeters comprise 59 percent of the assemblage. It seems clear that primary reduction of argillite cores was rarely or never practiced at the Airpark East site. Having stated that, however, it may be recalled that a large piece of argillite was found on the site that has been identified as a chopping tool; this item could just as well serve as a flake core that was not exhausted for some reason. In any case, small quantities of argillite are common on sites in central Delaware, and the present assemblage does not contradict this pattern.

Chalcedony (n=120) and rhyolite (n=16) may be considered trace occurrences on the site. All chalcedony pieces are flakes; one piece of rhyolite is shatter. Flake sizes are small. Obviously no substantial working of these materials occurred on-site. Rather, flakes of these materials may represent tool maintenance activities.

Considered together, the preceding tool and debitage data elucidate the nature of lithic technology at the Airport East site. For the most plentiful raw material types, jasper, chert, quartz, and quartzite, knapping centered on the bifacial reduction of small cobble cores for the purpose of making tools or producing useable flakes. No "formal" cores were identified in the assemblage, but some or most of the 23 rough bifaces may have served as flake cores. Many tools appear to have been made from "expedient" flakes, i.e. made from any suitable flake found on the ground as opposed to being made from carefully prepared flake blanks or preforms. The four principal raw material types are believed to be mostly locally derived, though some of the jasper and chert might have been imported from some distance. Certainly the argillite, rhyolite, and probably the chalcedony were brought in.

The tool and debitage data tend to suggest that the production of stone tools was not an important activity at the Airpark East site. For primary reduction and tool production to be evident, one would expect higher frequencies of shatter, more cores, and perhaps better quality raw material than the small cobbles that appear to have been used. Impressionistically, the lithic assemblage does not have the feel of an intensive, large-scale lithic workshop.

Rather, the overall assemblage indicates that a substantial amount of tool maintenance and replacement activities took place at Airpark East. This supposition is supported by the relatively abundant amount of broken finished tools (n=9), tips (n=12), bases (n=4), and hafted scrapers (presumably) made from broken bases (n=4) found at the site. It may be surmised that these artifacts represent broken tools that were discarded at the site, to be replaced with new examples. To this may be added that a large proportion of the projectile point assemblage showed slight to pronounced beveling of blades that is characteristic of point resharpening while still hafted. The appreciable numbers of hafted and non-hafted scrapers suggest that on-site production of these tools, most of which are inexplicably diminutive, was an important activity at the site. Finally, it is instructive to reintroduce the finding that the vast majority of the debitage consisted of flakes measuring less than 15 millimeters in greatest dimension; the manufacture of small tools creates small debitage. The small scrapers may be a function of the limitations of the parent raw material, i.e. small cobbles.

In sum, the lithic data from the Airpark East site indicate that primary tool production was not the principal lithic-related activity conducted at the site. Rather, tool maintenance and replacement, and the manufacture of scraping tools, were the principal foci of lithic activity. Further implications of these findings will be explicated in the concluding section.

3.4 CERAMIC ANALYSIS

Approximately 1,064 ceramic sherds were recovered from the Airpark East site. An estimated 90 percent of these measure less than one centimeter in greatest dimension, and most of these are highly eroded. These conditions are believed to be the result of repeated plowing of the sandy site soils. To say the least, the overall small sherd size and poor quality of the assemblage frustrate meaningful ceramic analysis.

The ceramic assemblage was sorted and identifiable attributes were recorded. In a great many cases, the only discernable attribute (other than paste) was temper, resulting in many sherds being classified as unidentified (but see below). The entire ceramic assemblage consists of body sherds; no rimsherds were observed. The ceramics are classified as follows.

1. Grit-Tempered, Cordmarked Exterior
   n=58

Description: As indicated, these sherds display cordmarking on exteriors and grit temper. The nature of the cordmarking varies widely, from fine and sharp to barely discernable, mostly the latter. Where observable, the cordmarking seems to run vertically and in single lines; i.e. no angled or horizontal (or "waffle pattern") marking was recognized. No obvious or apparent interior cordmarking was noted and where present, interiors were smooth. Most observable grit consisted of very tiny to medium-sized pieces of quartz with possible sand mixed in. The paste composition of most sherds was a uniformly fine, sandy matrix, typically orangish in color.

2. Grit-Tempered
   n=168

Description: This class is identical to that described above but for the absence of cordmarking, or any other deliberate surface treatment. Where present, surfaces are smooth, though whether from intent or erosion cannot be ascertained.

3. Shell-Tempered, Cordmarked Exterior
   n=5

Description: This small sample is equivocal. The possible shell tempering is suggested by characteristic pits and holes in the sherds where shell has leached out; no actual shell was observed. On several sherds, the apparent leached cavities have imparted a "lumpy" quality to the surfaces that is unlike other sherds in the assemblage.

4. Shell-Tempered
   n=7

Description: As previously, these few sherds display characteristics of shell tempering but lack discernable surface treatment.

5. Unidentified
   n=825

Description: These sherds are all very small and temper is not discernable. This is not to say that they represent temper-free vessels; indeed, the paste characteristics of these sherds are identical to the grit-tempered ceramics described above. It would appear that the grit-tempered vessels represented by these sherds were sparsely tempered with fine quartz and likely sand.

Constructing a possible typology for the ceramic assemblage from Airpark East is a tenuous proposition. Based on the even smaller sample from the Phase II investigations, Siegel et al. (2004:9ff) tentatively identified possible Mockley and Hell Island ceramics, the former possessing shell tempering and the latter fine quartz grit. The present assemblage does not counter these descriptions (e.g. Custer 1989:173-176) and indeed lends support to them. As defined, both types display cordmarked exteriors among other forms of surface treatment (Stewart and Gardner 1978). Generally accepted date ranges for Mockley ceramics cover ca. A.D. 110-450, while Hell Island is posited to span ca. A.D. 600-1000 (Custer 1989:174, 176).

3.5 SOIL CHEMICAL ANALYSIS

Of the 55 soil samples submitted to the University of Delaware Soil Testing Program for soil chemical analysis, the 30 samples submitted from the Airpark East site included 7 from Stage 1 units (EUs 10, 12, 17, 21, 25, 30, and 41), 2 from Block A units (EUs 43 and 55), 3 from Block B units (EUs 71, 123, and 125), 8 from Block C units (EU 82; 7 samples from Feature 2 in EU 84), 2 from Block D units (EUs 99 and 137), 4 from Block E units (EU 101; 3 samples from Feature 3 in EUs 18 and 106), and 4 from Block F units (EUs 110, 115, and 117; Feature 4 in EU 119). All samples derived from non-feature contexts were procured from Levels 2.1 or 2.2, with the exception of EU 71 in Block B (Level 2.3). The seven Feature 2 samples were taken mostly from 10-cm levels measured below the base of the plowzone, i.e., 0–10 to 50–60 cm, with an additional sample coming from 102–112 cm BD. The two Feature 3 samples came from 0–10 cm below plowzone and 100–105 and 105–110 cm BD, and the Feature 4 sample derived from Level 2.2 (Table 3).

The analysis tested for the levels of pH, buffer pH, organic matter (% OM by LOI), phosphorus (P), potassium (K), calcium (C), magnesium (Mg), manganese (Mn), zinc (Zn), copper (Cu), iron (Fe), boron (B), sulfur (S), and aluminum (Al), as is shown in Table 3; the elemental levels are expressed in milligrams per kilogram (mg/kg). Of these, soil pH, phosphorus, potassium, calcium, magnesium, and manganese are generally considered to be of most use as indicators of human activity areas at prehistoric archeological sites. Elevated levels of phosphorus (phosphate) in a soil might indicate refuse horizons, such as storage pits used for trash receptacles, and elevated manganese counts have also been associated with areas of organic refuse disposal. Phosphate analysis is especially useful for showing horizons or areas associated with bone material (e.g., occupation or burial sites) where high concentrations have been produced by the decay of human and animal excreta. The "background" phosphate content in some sediments, for example in the sands prevalent at the Airpark West and Airpark East sites, is lower than that of others, such as loamier or siltier soils. Sandy sediments are often heavily leached, and care must be taken to avoid samples contaminated by recent additions of phosphates from modern fertilizers (Shackley 1975:68). Phosphate fixes to iron oxide and organic components of site soils; therefore it does not move significantly via leaching or water percolation. Elevated readings of magnesium and potassium may identify the character of the fires associated with hearths and firepits (wood-ash horizons), and elevated calcium could indicate the presence of decayed bone and shell. In addition, zinc and iron may be present in elevated amounts in midden deposits. The pH can be used to assess the suitability of the soil for raising crops, with a pH of between 6.0–7.0 recommended for mineral soils, such as at Delaware Airpark, and a pH between 5.5–6.0 considered adequate for highly organic soils.

To determine which results represent elevated levels that are statistically significant, the arithmetic mean (average) and standard deviation were calculated for each category. Those numbers that exceed the sum of the mean and standard deviation were deemed to be noteworthy.

The pH of the 30 submitted samples from Airpark East ranged from a low of 5.0 in the 100–105-cm level (below datum) of Feature 3 in EU 18 (Block E) to a high of 6.4 in the 50–60-cm (below plowzone) and 102–112-cm (below datum) levels of Feature 2 in EU 84, Block C, and in EU 25 (Table 3). The arithmetic mean was 6.1, which added to the standard deviation of 0.3 indicates statistical significance for those readings of 6.4 or more, occurring in the three above-noted samples.

Phosphorus counts ranged from 4.96 mg/kg in the 105–110-cm level (below datum) of Feature 3 in EU 18 (Block E) to 68.25 mg/kg in the 30–40-cm level (below plowzone) of Feature 2 in EU 84, Block C, averaging 28.64. Adding the standard deviation of 19.23 gives a statistically significant

Table 3.
Results of Soil Chemical Analysis

University of Delaware Soil Testing Program
Analysis Report for Data Set: O7TOB001

John Milner Associates, Inc.
Delaware Airpark Phase III (DAP3) Project
Contact: Mark Tobias

UDSTP Lab No.	Bag No.	Sample No.	Provenience Site	Unit	Layer	Level	Feature	Excavation Block	Comments	pH	Buffer pH	OM (%) by LOI	M3-P (mg/kg)	M3-K (mg/kg)	M3-Ca (mg/kg)	M3-Mg (mg/kg)	M3-Mn (mg/kg)	M3-Zn (mg/kg)	M3-Cu (mg/kg)	M3-Fe (mg/kg)	M3-B (mg/kg)	M3-S (mg/kg)	M3-Al (mg/kg)
10035	852027	SC 1	7K-C-382	EU 138			Fea. 1	Block C	0-10 cm below Ap Horizon, NE Corner	5.2	7.68	0.5	25.24	30.16	158.93	36.67	6.30	0.34	0.97	68.70	0.93	13.36	854.78
10036	852028	SC 2	7K-C-382	EU 138			Fea. 1	Block C	10-20 cm below Ap Horizon; NE Corner	5.4	7.70	0.3	12.29	32.27	137.88	24.75	6.94	0.20	0.60	60.85	0.86	10.07	719.29
10037	852029	SC 3	7K-C-382	EU 138			Fea. 1	Block C	20-30 cm below Ap Horizon; NE Corner	5.5	7.71	0.3	12.39	36.24	190.99	26.95	8.09	0.32	0.69	66.57	0.93	11.42	802.35
10038	852030	SC 4	7K-C-382	EU 138			Fea. 1	Block C	30-40 cm below Ap Horizon; NE Corner	5.6	7.72	0.3	10.57	39.50	174.37	25.93	5.92	0.27	0.64	76.13	0.78	10.84	830.16
10039	852032	SC 5	7K-C-382	EU 138			Fea. 1	Block C	40-50 cm below Ap Horizon; NE Corner	5.5	7.72	0.3	9.21	36.69	157.33	22.11	4.27	0.19	0.53	54.69	0.85	9.68	737.80
10040	852033	SC 6	7K-C-382	EU 138			Fea. 1	Block C	50-60 cm below Ap Horizon; NE Corner	5.6	7.76	0.1	5.25	36.77	154.48	19.65	3.16	0.17	0.52	46.59	0.73	7.81	553.14
10041	852034	SC 7	7K-C-382	EU 113			Fea. 1	Block C	Base of feature; SE corner	5.8	7.74	0.1	10.87	43.88	257.41	44.00	5.27	0.15	0.65	134.12	0.97	7.57	618.16
10042	852035	SC 8	7K-C-382	EU 29	2	2			SE Corner	6.1	7.76	0.2	14.06	41.94	216.75	28.57	3.78	0.22	0.72	78.37	0.96	10.49	746.95
10043	852036	SC 9	7K-C-382	EU 34	2	1			SW Corner	5.8	7.69	0.5	4.31	59.19	349.84	77.44	4.59	0.24	0.85	211.76	1.24	10.02	875.51
10044	852037	SC 10	7K-C-382	EU 40	2	1			SW Corner	6.2	7.71	0.4	4.20	66.53	324.37	75.47	5.26	0.25	0.73	96.49	1.08	10.12	778.46
10045	852038	SC 11	7K-C-382	EU 43	2	1			SW Corner	5.5	7.65	0.4	5.59	52.78	366.82	72.97	1.93	0.21	0.70	57.29	0.91	11.93	780.40
10046	852039	SC 12	7K-C-382	EU 47	2	1			SW Corner	6.0	7.62	0.8	2.24	69.80	535.75	142.85	5.73	0.25	0.87	380.06	1.37	12.21	970.98
10047	852040	SC 13	7K-C-382	EU 48	2	2			SW Corner	5.6	7.69	0.3	3.22	61.19	313.31	63.50	2.33	0.19	0.53	84.18	0.99	17.62	722.63
10048	852041	SC 14	7K-C-382	EU 49	2	2			SW Corner	6.4	7.75	0.2	10.88	51.15	172.43	43.34	4.66	0.17	0.67	64.06	0.80	9.41	712.55
10049	852042	SC 15	7K-C-382	EU 58	2	2			SW Corner	5.2	7.68	0.3	5.23	55.03	246.30	43.84	3.18	0.27	0.49	69.35	0.99	13.09	757.57
10050	852043	SC 16	7K-C-382	EU 61	2	1			SW Corner	5.5	7.69	0.3	5.41	50.22	283.66	55.37	4.31	0.25	0.81	171.91	1.12	11.31	761.21
10051	852044	SC 17	7K-C-382	EU 64	2	1			SW Corner	6.0	7.65	0.6	4.34	35.05	453.29	105.51	2.42	0.19	0.69	161.93	1.21	13.05	940.72
10052	852045	SC 18	7K-C-382	EU 67	2	1				6.0	7.74	0.2	10.72	31.53	182.56	37.27	2.97	0.20	0.56	60.72	0.84	7.95	588.23
10053	852046	SC 19	7K-C-382	EU 70	2	2		Block A	SW Corner	5.1	7.73	<0.1	35.44	24.13	75.52	13.90	2.26	0.23	0.52	55.99	0.70	8.21	455.98
10054	852047	SC 20	7K-C-382	EU 80	2	2		Block A	NW Corner	5.6	7.74	0.1	9.14	40.91	174.61	26.23	3.45	0.25	0.58	42.24	0.94	10.79	651.86
10055	852048	SC 21	7K-C-382	EU 88	2	2		Block B	SE Corner	5.8	7.75	0.1	9.51	25.24	164.28	20.14	3.82	0.18	0.57	50.86	0.93	8.41	689.01
10056	852049	SC 22	7K-C-382	EU 108	2	2		Block B	NE Corner	5.7	7.68	0.3	7.33	56.21	278.10	51.60	1.71	0.14	0.62	120.49	0.93	9.59	728.43
10057	852050	SC 23	7K-C-382	EU 131	2	2		Block D	SW Corner	5.4	7.62	0.4	2.96	52.37	388.87	87.71	1.95	0.17	0.56	99.73	0.98	16.19	854.20
10058	847751	SC 24	7K-C-382	EU 139	2	2		Block C	SE Corner	5.7	7.66	0.3	4.88	87.21	345.50	64.91	3.93	0.17	0.63	85.44	0.97	10.34	755.09
10059	847752	SC 25	7K-C-382	EU 140	2	2		Block B	NE Corner	5.6	7.73	0.1	22.38	29.50	140.94	26.66	2.23	0.14	0.43	43.36	0.95	8.45	565.96
10060	847753	SC 26	7K-C-431	EU 84			Fea. 2	Block C	0-10 cm below Ap Horizon, NW Corner	5.9	7.72	0.2	63.20	24.67	171.96	21.30	3.95	0.32	1.73	142.99	1.06	9.76	619.71
10061	847754	SC 27	7K-C-431	EU 84			Fea. 2	Block C	10-20 cm below Ap Horizon; NW Corner	6.1	7.73	0.2	53.20	32.76	169.10	25.36	1.63	0.16	1.01	149.41	1.04	7.73	625.10
10062	847755	SC 28	7K-C-431	EU 84			Fea. 2	Block C	20-30 cm below Ap Horizon; NW Corner	6.2	7.72	0.2	67.32	42.51	174.19	29.39	0.96	0.16	1.02	154.81	1.12	9.82	739.54
10063	847756	SC 29	7K-C-431	EU 84			Fea. 2	Block C	30-40 cm below Ap Horizon; NW Corner	6.2	7.73	<0.1	68.25	43.09	157.16	27.02	0.95	0.24	0.81	151.95	1.03	9.25	638.59
10064	847757	SC 30	7K-C-431	EU 84			Fea. 2	Block C	40-50 cm below Ap Horizon; NW Corner	6.2	7.74	<0.1	40.45	43.22	146.61	28.11	0.79	0.16	0.54	97.64	0.96	8.87	543.56
10065	847758	SC 31	7K-C-431	EU 84			Fea. 2	Block C	50-60 cm below Ap Horizon; NW Corner	6.4	7.76	<0.1	25.75	34.20	146.08	23.80	1.20	0.14	0.42	62.08	0.92	7.38	472.00
10066	847759	SC 32	7K-C-431	EU 84			Fea. 2	Block C	102-112 cmbd	6.4	7.77	<0.1	14.31	35.32	138.54	26.85	2.46	0.14	0.47	52.98	0.86	7.66	395.64
10067	847760	SC 33	7K-C-431	EU 106			Fea. 3	Block E	Level 1	6.2	7.79	<0.1	8.65	23.00	92.34	15.03	2.18	0.17	0.35	46.72	0.81	7.54	263.79
10068	847761	SC 34	7K-C-431	EU 18			Fea. 3	Block E	100-105 cmbd; SW corner	5.0	7.77	<0.1	7.64	16.56	94.87	14.49	5.35	0.18	0.29	60.15	0.79	8.97	286.75
10069	847762	SC 35	7K-C-431	EU 18			Fea. 3	Block E	105-110 cmbd	5.2	7.79	<0.1	4.96	10.80	63.83	9.04	1.61	0.22	0.28	40.70	0.75	6.24	225.30
10070	847763	SC 36	7K-C-431	EU 10	2	2			NW Corner	5.9	7.68	0.4	9.18	84.96	211.82	44.94	2.88	0.25	1.22	129.70	1.11	10.10	764.91
10071	847764	SC 37	7K-C-431	EU 12	2	1			SW Corner	6.1	7.73	0.2	27.65	19.61	148.95	16.24	1.07	0.26	0.87	107.81	0.91	8.53	515.40
10072	847765	SC 38	7K-C-431	EU 17	2	1			SW Corner	6.0	7.77	<0.1	21.51	16.58	99.37	14.17	2.06	0.21	1.38	38.52	0.72	5.98	203.34
10073	847766	SC 39	7K-C-431	EU 21	2	2			NE Corner	6.2	7.77	<0.1	40.40	21.57	138.19	21.54	4.68	0.25	1.11	100.53	0.86	8.23	312.92
10074	847767	SC 40	7K-C-431	EU 25	2	2			SW Corner	6.4	7.74	0.1	53.59	31.83	203.87	32.64	1.71	0.19	1.63	167.42	1.14	8.49	467.49
10075	847768	SC 41	7K-C-431	EU 30	2	2			NW Corner	6.2	7.77	<0.1	10.73	26.66	116.34	22.23	2.30	0.20	0.57	47.12	0.96	8.40	356.08
10076	847769	SC 42	7K-C-431	EU 41	2	2			SW Corner	5.7	7.73	<0.1	15.21	38.26	107.57	21.04	1.19	0.17	0.53	83.39	0.87	8.42	399.17
10077	847770	SC 43	7K-C-431	EU 43	2	2		Block A	NW Corner	6.3	7.75	<0.1	52.03	31.84	158.45	24.24	3.19	0.28	0.94	100.06	0.89	7.90	375.29
10078	847771	SC 44	7K-C-431	EU 55	2	2		Block A	NW Corner	6.3	7.78	<0.1	41.94	19.41	99.20	15.14	5.58	0.20	0.67	74.53	0.77	6.52	300.77
10079	847772	SC 45	7K-C-431	EU 82	2	2		Block C	NW Corner	6.2	7.78	<0.1	31.82	22.32	120.34	15.24	4.77	0.17	0.80	88.47	0.80	6.74	295.10
10080	847773	SC 46	7K-C-431	EU 99	2	2		Block D	SE Corner	6.3	7.77	<0.1	6.60	30.17	112.64	20.33	1.93	0.11	0.36	54.89	0.84	6.56	374.62
10081	847774	SC 47	7K-C-431	EU 101	2	2		Block E	NW Corner	6.1	7.77	<0.1	12.25	29.41	97.07	14.73	1.64	0.31	1.05	55.30	0.81	7.05	295.49
10082	847775	SC 48	7K-C-431	EU 110	2	2		Block F	NE Corner	6.2	7.76	<0.1	29.21	25.71	132.10	19.75	15.01	0.21	1.00	83.22	0.82	6.95	323.29
10083	847776	SC 49	7K-C-431	EU 115	2	2		Block F	SE Corner	6.2	7.74	0.1	32.05	29.65	148.93	22.23	6.77	0.32	1.09	100.84	0.92	8.14	380.07
10084	847777	SC 50	7K-C-431	EU 117	2	2		Block F	SE Corner	6.1	7.73	0.2	39.13	30.61	140.32	21.96	5.85	0.24	1.27	97.96	1.01	7.67	458.07
10085	847778	SC 51	7K-C-431	EU 123	2	2		Block B	SE Corner	6.2	7.76	<0.1	12.68	33.16	136.11	18.36	2.71	0.19	0.90	62.20	0.93	7.13	400.41

Table 3.
Results of Soil Chemical Analysis

University of Delaware Soil Testing Program
Analysis Report for Data Set: O7TOB001

John Milner Associates, Inc.
Delaware Airpark Phase III (DAP3) Project
Contact: Mark Tobias

UDSTP Lab No.	Bag No.	Sample No.	Provenience						Comments	pH	Buffer pH	OM (%) by LOI	M3-P (mg/kg)	M3-K (mg/kg)	M3-Ca (mg/kg)	M3-Mg (mg/kg)	M3-Mn (mg/kg)	M3-Zn (mg/kg)	M3-Cu (mg/kg)	M3-Fe (mg/kg)	M3-B (mg/kg)	M3-S (mg/kg)	M3-Al (mg/kg)
			Site	Unit	Layer	Level	Feature	Excavation Block															
10086	847779	SC 52	7K-C-431	EU 125	2	2		Block B	NE Corner	5.9	7.76	<0.1	16.24	23.64	82.23	12.86	2.68	0.21	0.64	49.10	0.90	5.68	367.09
10087	847780	SC 53	7K-C-431	EU 137	2	2		Block D	NE Corner	5.9	7.75	<0.1	16.61	33.01	123.22	17.92	1.60	0.13	0.76	96.80	0.88	7.35	360.94
10088	847781	SC 54	7K-C-431	EU 71	2	3		Block B		6.1	7.77	<0.1	13.85	32.06	145.10	19.74	1.99	0.17	0.63	71.48	0.90	7.78	341.18
10089	847782	SC 55	7K-C-431	EU 119	2	2	Fea. 4	Block F	NW Corner	6.2	7.76	<0.1	22.84	25.51	124.82	18.26	6.32	0.21	0.80	66.71	0.86	7.68	313.04

reading of 47.87 mg/kg, which was exceeded in the upper four arbitrary levels (0–40 cm below plowzone) of Feature 2 in EU 84, as well as in EUs 43 (Block A) and 25 (Table 3).

Potassium levels varied from 10.80 mg/kg in the 105–110-cm level of Feature 3 in EU 18 (Block E) to 84.96 mg/kg in EU 10. The mean was 30.40 mg/kg and the standard deviation was 13.02, the sum of which was surpassed in only the EU 10 sample (84.96 mg/kg), which was substantially higher than the next highest count of 43.22 mg/kg in the 40–50-cm level (below plowzone) of Feature 2 in EU 84 (Table 3).

The calcium totals ranged from 63.83 mg/kg in the 105–110-cm level (below datum) of Feature 3 in EU 18 (Block E) to 211.82 mg/kg in EU 10, averaging 133.38 mg/kg, which was substantially lower than the figure of 249.77 mg/kg from Airpark West (Table 3). A statistically significant level of 167.52 mg/kg results when the standard deviation of 34.14 is added, which the samples from the upper three 10-cm levels of Feature 2 (0–30 cm below plowzone) in EU 84 and those from EUs 10 and 25 exceeded.

Magnesium counts ranged from 9.04 mg/kg in the 105–110-cm level (below datum) of Feature 3 in EU 18 (Block E) to 44.94 mg/kg in EU 10, with a mean of 21.13 mg/kg. Adding the standard deviation produces a statistically significant level of 28.16 mg/kg (much lower than the 80.55 mg/kg from Airpark West), which the samples collected from the 20–30-cm level (below plowzone) of Feature 2 in EU 84 and in EUs 10 and 25 surpassed (Table 3).

Manganese levels averaged 3.23 mg/kg, with extremes of 0.79 mg/kg in the 40–50-cm level (below plowzone) of Feature 2 in EU 84 (Block C) and 15.01 mg/kg in EU 110. Only the EU 110 sample and that from Feature 4 in EU 119 (6.32 mg/kg), both in Block F, were higher than 6.06 mg/kg, the calculated level of statistical significance (Table 3).

Lastly, zinc ranged from 0.11 mg/kg in EU 99 (Block D) to 0.32 mg/kg in the upper 10-cm level of Feature 2 in EU 84 (Block C) and in EU 115 (Block F), averaging 0.21 mg/kg (Table 3). Four proveniences yielded zinc levels higher than the statistically significant minimum of 0.27 mg/kg: in addition to the sample from Feature 2, Level 1, in EU 84, and from EU 115, the samples from EU 101 in Block E (0.31 mg/kg) and EU 43 in Block A (0.28 mg/kg) were statistically elevated (Table 3).

Based on these results, Feature 2 may have been a storage or trash pit in which organic refuse was disposed of, accumulating as a midden deposit, given the elevated counts of phosphorus, calcium, and zinc. The magnesium level in the 20–30-cm sample from the feature was also elevated, suggesting the presence of wood ash indicative of a hearth or firepit, which corresponds to its interpretation as a dispersed hearth. Areas of refuse disposal are also indicated in EUs 25, 43, and 110, and the presence of fire associated with hearths or firepits is suggested in Feature 2 and EUs 10 and 25, which may contain elevated levels of wood ash. Decayed bone and/or shell are indicated as present in Feature 2 and EUs 10 and 25, based on calcium content; note that EUs 10 and 25 exhibited elevated levels for three of the tested elements (potassium, calcium, and magnesium in EU 10; phosphorus, calcium, and magnesium in EU 25), and the EU 25 sample had a slightly elevated reading for pH as well.

None of the soil samples submitted from Feature 3 (EUs 18 and 106 in Block E) had statistically significant elevated amounts of any of the primary elements, precluding a further fine-tuning of feature type beyond that of truncated pit. The Feature 4 sample returned a slightly high manganese level, which has been associated with areas of organic refuse disposal, although no indication of a

filled pit such as soil staining or discoloration was in evidence in the soil profile directly adjacent to or below the few FCR composing the feature (Table 3).

3.6 SPATIAL ANALYSIS

3.6.1 Lithic Artifacts

Spatial analysis was conducted for both the Airpark East and Airpark West sites, with identical analytical approaches. Data from each site was entered into a Microsoft Excel spreadsheet by order of excavation unit, artifact type, material, lot number, and the north and east coordinates. These were then input into a separate spreadsheet where each material was given a number that is interpreted as a symbol in a Surfer Mapping System program (Version. 8.082167). Maps were then generated by Surfer for each artifact type and material in order to determine how each distributed throughout the site.

For purposes of discussion, the Airpark East site is separated into two arbitrary areas, the east and west areas. Two diagnostic projectile points represent the early Archaic period: a jasper Bifurcate projectile point was recovered from the central east area and a Kirk Serrated point was recovered from the eastern area (Figure 21). Teardrop projectile points made from jasper were recovered from the site, two in Blocks A and B in the east and one in Block E in the western half; these points have been identified in the Mid-Atlantic during the early Woodland I period (or Late Archaic) (Figure 21).

A jasper Perkiomen Broadspear was recovered in Block F that is diagnostic for the early Woodland I period (or Terminal Archaic) (Figure 21). Also roughly dating to this period are 13 Piscataway projectile points. Eleven of these artifacts were recovered from most blocks in the eastern half of the site and include 10 jasper artifacts and one chert point. In the western half of the site a single jasper Piscataway point was recovered as well as a single argillite Piscataway point from Block E (Figure 22).

The Late Woodland period is sparsely represented by a Levanna point made of jasper found in the eastern half as well as a chert Madison point and two jasper Madison points, all found in the eastern half of the site (Figure 23).

Three untyped projectile point classes were found at the Airpark East site: corner-notched points, side-notched points, and stemmed points. Thirteen corner-notched projectile points were widely spread across the entire site (Figure 24). In the eastern half, five jasper and one each chert, quartz, and argillite points were found. In the western half of the site, two jasper and single chert and argillite points were found. All three side-notched points were recovered from the eastern half of the site, two jasper and one argillite (Figure 25). For the three stemmed points, two argillite were found in the eastern half and one quartz point in the western (Figure 25).

The two unusual drills were found to be widely separated across the site, with the chert example occurring in the western part and the jasper in the east (Figure 25). The latter's two broken parts were found in adjacent units in Block B.

Eight out of nine broken finished tools were recovered from several blocks in the eastern half of the site, including one jasper, two chert, two quartz, and three argillite examples. One argillite tool was found in the western half in Block E (Figure 26). All four projectile point bases were found in the eastern half of the site, two jasper and two chert pieces (Figure 26). Likewise, all 12 projectile point

tips were recovered from the eastern blocks (Figure 26) including one quartz, six jasper, and five chert examples.

The numerous scraping tools are widely spread. All four hafted scrapers, one jasper, two chert, and one quartz, were recovered from the eastern half (Figure 27). All but one chert and one jasper steep-retouch end scrapers occurred in the east half, and include nine jasper, three chert, one quartz, and one of unidentified material (Figure 27).

For the four late-stage bifaces, one chert artifact occurred in the western half, while one argillite and two jasper specimens were found in the eastern half. The "other" scraper class is probably mostly an expedient tool type produced from waste flakes; like the steep retouch scrapers, they tend to occur with most frequency in the eastern part of the site, with only two jasper examples in the western part.

The 23 rough bifaces were distributed nearly from one end of the site to the other, though they present in greater numbers in the eastern block excavations. Three hammerstones, a quartzite and sandstone chopper, and one sandstone chopper were all recovered from the eastern half of the site. One argillite chopper and one gneiss chopper were both found on the western half of the site.

3.6.2 Debitage

Analysis of debitage distributions across the Airpark East and Airpark West sites was accomplished using the Surfer program. The program produced detailed contour maps of debitage densities. For analytical purposes, contour maps were generated by lithic raw material type, flakes versus blocky shatter, debitage with versus without cortex, and size. The latter was categorized as less than 10 millimeters in greatest dimension, 10-30 millimeters, and greater than 30 millimeters. Close scrutiny of this body of maps forms the basis for the following discussion. To anticipate, the maps in general show very similar distributions of most raw material types and flake sizes.

Figure 28 shows the spatial distribution of all debitage on the site. Figure 29 depicts the distributions of jasper flakes (top) and blocky shatter (bottom) across the Airpark East site. Though flakes greatly outnumber shatter, it may be observed that overall the distributions are complementary; they also mirror the distribution of all debitage. It is also clear that the jasper tends to occur in discrete clusters roughly centered on the several block excavations, which is not surprising since the block excavations were purposefully sited to sample the densest concentrations of materials. Figure 30 depicts jasper flakes less than 10 centimeters in size and with (top) and without (bottom) cortex. Again, the distributions are very similar, clustering heavily in Blocks F, A, and the northeast portion of B. (Note that the contour interval on the "with cortex" map tends to visually accentuate the amount of material actually represented on the map).

Figure 31 shows the distribution of jasper flakes measuring 10-30 millimeters and with (top) and without (bottom) cortex. Again, the overall pattern of distribution is quite similar to that in Figure 30, though with somewhat greater densities in the central block excavations and, in particular, Block B. Flakes with cortex do not differ significantly from those without. Finally, due to small sample sizes, maps depicting jasper flakes greater than 30 millimeters in size produced meaningless results, though it might be mentioned that no surprises were noted.

Turning to chert, Figure 32 shows the distribution of all chert flakes (bottom) and shatter (top) across the site. Again, the distributions nicely complement each other, though the flakes enjoy a somewhat wider distribution than shatter. Distribution of chert flakes less than 10 millimeters in size are illustrated in Figure 33. Here, shrinking sample sizes are beginning to play havoc with the Surfer

program, but patterns may be discerned nonetheless. The pattern of flakes without cortex (bottom) mirrors that of flakes with cortex (top), and are particularly dense in Blocks F and B.

Figure 34 depicts chert flakes with (top) and without (bottom) cortex measuring 10-30 millimeters. Again, compared with each other, as well as with the preceding maps, very little spatial variability is in evidence. Heavy concentrations are seen in Blocks D and B in the eastern third of the site, slightly less in Block F in the center, and quite less to the west. Chert flakes greater than 30 millimeters in size could not be mapped due to small sample sizes.

Quartz is the third most plentiful raw material at the Airpark East site, and the distributions of flakes (bottom) and shatter (top) may be seen in Figure 35. The respective distributions are nearly identical with somewhat more flakes occurring in the northeastern area, principally in Blocks B and D, as well as in Block F in the center. Figure 36 shows quartz flakes without cortex measuring less than 10 millimeters; the corresponding map for flakes with cortex could not be created due to small sample size. Once, again, the pattern is maintained. Finally, quartz flakes 10-30 millimeters in size are shown without (top) and with (bottom) cortex in Figure 37. Again, Blocks F, B, and D possess the densest concentrations.

The overall distribution of quartzite is shown in Figure 38, with shatter at the top and flakes on the bottom. Figure 39 depicts quartzite flakes without cortex measuring 10-30 millimeters; maps of the rest of the size categories were not feasible with the Surfer program due to small sample sizes. The quartzite perpetuates the overall tripartite distribution of lithics on the site. Such is also the case for argillite and chalcedony (Figure 40), though the latter tends toward concentrating in the northeastern part of the site.

If the reader has made it this far in this discussion, the reader will have noticed that a very regular – perhaps monotonous – pattern has developed for the Airpark East lithic assemblage distribution: lithic materials concentrate in the eastern portion of the site, tend to ameliorate to the center, and fade away to the west. As the numerous contour maps have shown, there is little spatial variability in the lithic domain, whether on the basis of flakes/shatter, raw material, cortex, or size. It is thereby concluded that the stone-working industry at the Airpark East site was not segregated on the basis of space. All stages of tool production using all raw materials were basically concentrated in the same areas of the site. Some of the individual clusters of different raw materials might represent discrete activity areas, but other activities were taking place right next to (or on top of) them.

3.6.3 Ceramics

As discussed in the ceramic descriptions, 1,064 ceramic sherds were recovered from the Airpark East site, the majority of which (n=825, 76%) measure less than one centimeter in greatest dimension and are highly eroded. Nonetheless, these Unidentified sherds belong to the same ware category as the less common Grit-Tempered, Cordmarked and Grit-Tempered sherds. Figure 41 (top) shows the distribution of the Unidentified sherds; this map will serve as a backdrop for examining the other classes. As can be seen, the small sherds occur across nearly the entire site area. Like most of the debitage, most sherds tend to cluster around the large excavation blocks, in particular, Blocks B and F. The distribution of the sherds identified only as grit-tempered is shown in Figure 42 (bottom). The distribution is nearly identical.

The relatively rare Grit-Tempered, Cordmarked sherds are depicted in Figure 43 (top). The distribution of these 58 sherds is localized in Blocks F, A, and B. It is worth emphasizing at this point that the distribution of cordmarked sherds in Figure 43 is less a reflection of the location of cordmarked ceramics than it is a reflection the locations of larger-sized sherds. That is, the apparent

clusters observable in the figure likely do not represent the true distribution of cordmarked sherds; rather, it shows the locations of sherds large enough for the surface treatment to be observable. No doubt some or most of the Grit-Tempered and Unidentified sherds were also originally cordmarked but can no longer be identified as such. This phenomenon is being brought up because it has implications for attempting to discern potential activity areas on the site: the apparent clustering of some materials may be just that – apparent.

The 12 possible shell-tempered sherds distribute thusly: Block A (n=4), Block B (n=7), and Block E (n=1). Obviously, these few sherds are spread widely across the site and no meaningful patterning is discernible.

3.6.4 Fire-Cracked Rock

A total of 1,440 fragments of FCR were recovered during the Phase III data recovery at the Airpark East site (Appendix II). The great majority of these consist of quartzite (n=1,313; 91.2%), followed by sandstone (n=96; 6.7%) and quartz (n=31; 2.2%). The count in those units that produced FCR ranged from one to 30 fragments, the higher number derived from EU 71 of Block B (Figure 44) (bottom). The FCR occurred in the plowzone (Layer 1), Levels 2.1–2.4 of the underlying E/Bw horizon, and, in three cases, Level 3.1 of the Bw horizon in EU 56 of Block A and EU 76 of Block B, and Levels 3.1 and 3.2 of the Bw or upper BC/C horizon in EU 115 of Block F. The higher counts (16–30 fragments per unit) were concentrated within Block A as well as somewhat less in Blocks B, C, and D in the eastern portion of the site, where most of the block excavations were located; Block F in the center of the site also had a relatively dense concentration (Figure 44) (bottom). A mere 25 fragments derived from feature context, including 20 from Feature 2 (EUs 33, 82–84) in Block C and five from Feature 4 (EUs 116, 117, 119) in Block F.

3.6.5 Discussion

As noted at the outset, part of the research design for the Airpark sites was to utilize spatial analysis in the effort to isolate discrete activity or living areas. The spatial analysis has revealed the vagaries often found at a large, mostly plowzone site. Nonetheless, some patterning may be discerned.

To begin, it may be generalized that the eastern portion of this linear site has more of everything than the west. Tools and debitage of all raw materials are more plentiful here. As remarked earlier, some of the debitage concentrations may represent discrete activity areas, but other activities also took place on the same spots; whether the activities were temporally congruous or separate cannot be determined.

It does not appear that any portion of the Airpark East site was exclusively occupied/utilized by any specific group; that is, artifacts of most classes occur all across the site area, but higher quantities occur in the eastern part. In particular, the enigmatic Untyped Corner-notched points span the length of the site. The distribution of tips, bases, and broken finished tools in the eastern part dovetails with the debitage distribution, indicating where the most intensive tool maintenance and replacement took place. Whatever activity is indicated by the steep-retouch end scrapers and hafted scrapers, it occurred mostly in the eastern part but also in the center and west. Finally, some fire-cracked rock concentrations are evident, mostly in the same areas as the debitage, but few were found in feature contexts; some of these concentrations may represent former fire-features that have been wholly plowed-out.