

5.0 Field Results

5.0 FIELD RESULTS

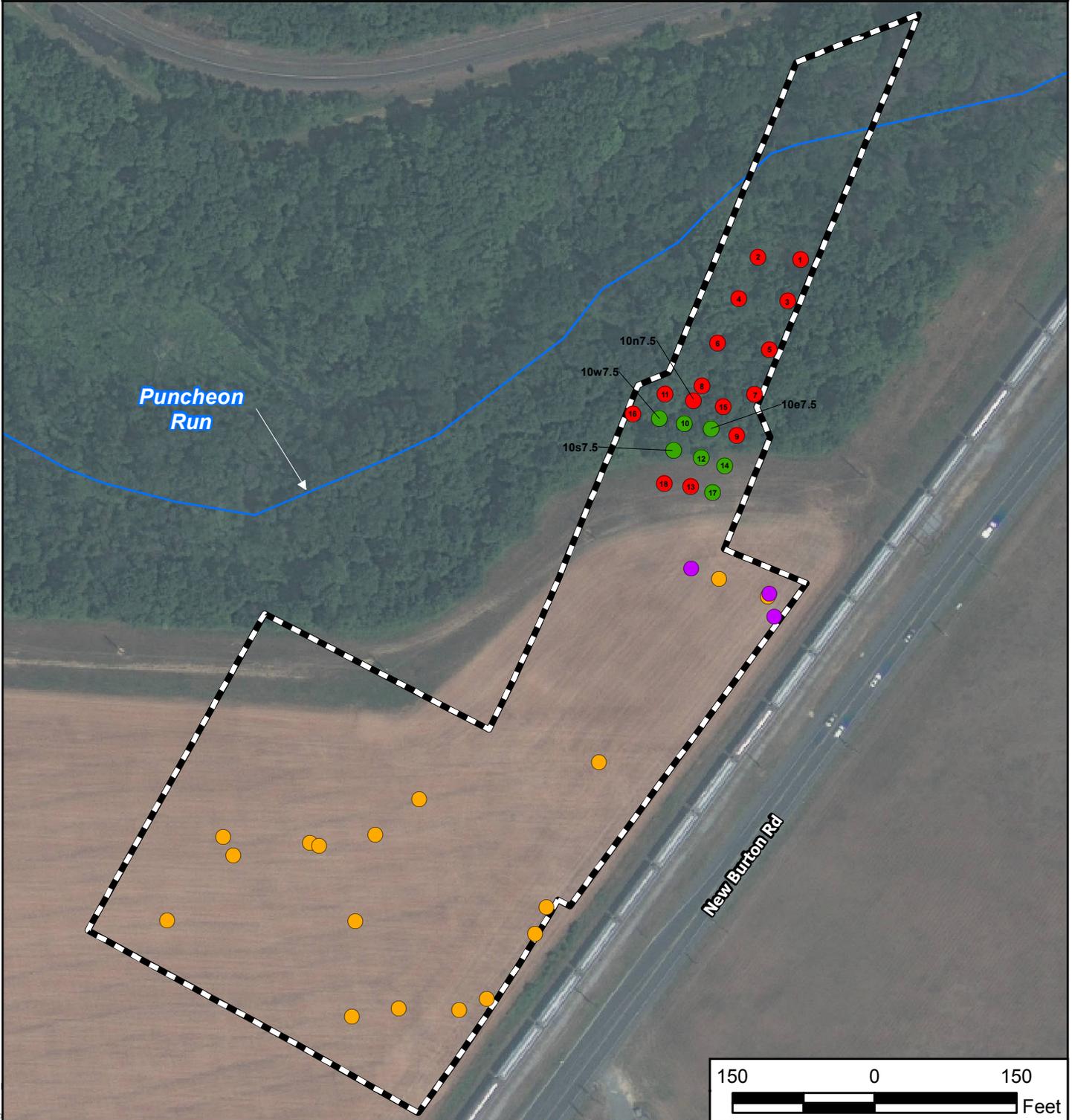
This section reviews the investigation results associated with the previous Phase I survey at 7K-C-73, the additional background research, additional Phase I survey conducted adjacent to the east and west of the site, Phase II evaluation of 7K-C-73, and the geomorphological study of the site. Artifact tables, distributions maps, and photographs are included when appropriate.

5.1 Results of Previous Phase I Survey at 7K-C-73

Previous Phase I survey in Test Area 1 of the West Dover Connector Project APE re-identified 7K-C-73 (Figure 4). Test Area 1 was a 5.5-acre area located in the southwest quadrant of the intersection of New Burton Road and Puncheon Run (A.D. Marble & Company 2012: Figure 2). The southern half of the test area is a relatively flat 3.5-acre portion of an agricultural field. The northern half of the test area is an approximately 2-acre portion of the wooded riparian buffer of Puncheon Run. This latter section of the test area slopes downhill northward toward the creek. The test area is located in the northeast corner of the Kesselring farm property (CRS K-1030). Background research had determined that the Woodland I-era site, 7K-C-73, is located on the south bank of Puncheon Run in the vicinity or inside Test Area 1. As anticipated, the field team re-identified the site in the north end of Test Area 1.

The previous (2012) Phase I survey in the test area consisted initially of laying in and excavating two transects of 50-foot interval STPs (STPs 1 through 10) in the wooded portion of the test area and pedestrian surveying the field portion of the test area. Additional STPs (N=12) were laid in and excavated following the recovery of three precontact artifacts in STP 10. A total of 22 STPs were excavated in the wooded portion of Test Area 1. The northern 150 feet of the wooded portion of the test area did not undergo shovel testing due its location within a low-lying wet area. An unmarked electrical utility was observed in the vicinity of STPs 12, 13, and 14. The profiles of these STPs confirmed disturbance at this location. STP 17, which was located southeast of the STP 12 through STP 14 cluster, was a low-lying wet and disturbed area that appeared to be filled with railroad ballast and soil, potentially used to level out an eroded gully.

Figure 4
Previous Phase I Results
 West Dover Connector
 Kent County, Delaware



X:\Projects\PI1311B\MXD\Figure4 - Previous Phase I Results.mxd



 Test Areas



-  Surface Collection - Historic
-  Surface Collection - Precontact
-  Shovel Test Pit - Positive
-  Shovel Test Pit - NCM

The stratigraphic sequence in STP 10, located near the top of the terrace overlooking Puncheon Run, consisted of an O-horizon, A-horizon, B-horizon, and B2-horizon. This sequence was the same basic sequence (with the occasional addition of an E-horizon between the A- and B-horizons) that was encountered during the Phase II evaluation program at the site. The field team recovered a total of 29 precontact artifacts in the wooded, shovel tested portion of Test Area 1. These artifacts consisted of jasper, chert, quartz, quartzite, and argillite debitage, as well as one jasper edge-modified flake (utilized flake) with a steep scraper-like edge and one Lamoka-like stemmed projectile point/knife fragment. Lamoka-type tools range in date from the Late Archaic to Woodland I periods (Custer 2001:63). This time period is consistent with diagnostics found previously in 1976 when the site was first discovered.

It was concluded that the field team re-identified 7K-C-73 in the wooded portion of Test Area 1. Precontact artifacts were recovered from intact deposits surrounding STP 10 and from disturbed contexts in STPs 12, 14, and 17 near a buried utility line. Although the field team recovered precontact artifacts from STPs 12, 14, and 17, the integrity of those deposits was considered questionable and, consequently, it was surmised that the intact portion of the test area (i.e., of the site) producing precontact artifacts was limited to the area encompassing STPs 10, 10 S7.5, 10 E7.5, and 10 W7.5 (Photograph 5). The presence of intact deposits in the STP 10 vicinity along with the overall concentration of precontact artifacts suggested that precontact features could have been present at the site.

The field team then conducted pedestrian survey of the agricultural field portion of Test Area 1 and encountered a diffuse concentration of mostly historic artifacts that also included three precontact artifacts (two quartz and one chert debitage). Altogether, the crew recovered 50 artifacts (32 precontact, 18 historic) during the pedestrian survey and shovel testing in Test Area 1. The three debitage in the field were recovered near the shovel-tested wooded area where the crew re-identified 7K-C-73 and recovered the 29 precontact artifacts. The locations of the three debitage in the field suggested that the site boundary extended from inside the woods near STP 10 to where they were found in the field. In sum, the re-identified 7K-C-73 site consisted of 32 precontact artifacts discovered within an approximately 1.5-acre area (Table 2). Based on the overall chronological and domestic/architectural character of the historic artifact assemblage



Photograph 5: General conditions in vicinity of STP 10

recovered in the field, it was argued that the historic artifacts likely originated from the practice of field manuring by the occupant households of the Kesselring farm property (CRS K-1030) throughout the nineteenth and early twentieth centuries. As a result, A.D. Marble & Company concluded that the historic artifact assemblage in the field portion of Test Area 1 was part of an archaeological site (the Kesselring Farm Site [7K-C-457]).

Table 2. Previous Phase I Survey: 7K-C-73 Artifact Assemblage.

Artifact	Notes	Quantity
Debitage	9 chert, 11 jasper, 1 argillite, 7 quartz, 2 quartzite	30
Edge-modified flake	Jasper, possible scraper function	1
Projectile point/knife	Lamoka-like, fragment	1
TOTAL		32

A.D. Marble & Company also concluded that the re-identified portion of 7K-C-73 was a potentially significant archaeological resource, and subsequently recommended that the project avoid the site. If the project could not avoid the site, A.D. Marble & Company further recommended Phase II evaluation-level study at the site to determine if subsurface features or artifact patterning within the site deposits was present, to determine the integrity of the site deposits, and ultimately to evaluate the information potential of the portion of 7K-C-73 that lies within the West Dover Connector APE to determine its NR eligibility.

5.2 Additional Background Research of 7K-C-73

The principal investigator met with Chuck Fithian of the Delaware State Museum to examine the artifact assemblage that was previously recovered from 7K-C-73 during a Phase I survey conducted in 1976 for a 100-foot wide utility pipeline corridor that runs west-to-east on the southern edge of Puncheon Run. The principal investigator reviewed the site materials, which consisted of approximately 100 lithic artifacts; a few historic artifacts that included a slip-trailed redware, Rhenish stoneware, and whiteware sherds; approximately 15 pages of field notes, and the CRS-4 archaeological site form for 7K-C-73. No field catalog, excavation records, artifact catalog, or laboratory notes were available for review. The field notes contained a marked-up aerial photograph dated ca. 1976 that originally defined the site as extending from the southwest corner of the intersection of New Burton Road and Puncheon Run, along the southern edge and within 125 feet of Puncheon Run, across Wyoming Mill Road, and to the lightly wooded headwaters of Puncheon Run west of Wyoming Mill Road. The map shows that the site consists

of three sub-areas, as well as an unnamed area designated merely as “7K-C-73.” This latter, unnamed area equates to the area that underwent Phase I and II investigations for the West Dover Connector project. 7K-C-73 Sub-Areas 1 and 2 are located west of the main site (“7K-C-73”) between New Burton Road and Wyoming Mill Road, while Sub-Area 3 is located west of Wyoming Mill Road and extends along the south side of Puncheon Run to its lightly wooded headwaters, approximately 0.5 mile west of Wyoming Mill Road.

Much of the artifact assemblage was collected from this approximately 1.5-mile stretch of the south edge of Puncheon Run during a surface collection that yielded thermally altered rock, quartz, jasper, and chalcedony debitage; an argillite biface fragment; and the base of a red jasper stemmed projectile point fragment. The field notes and aerial map show that eight 2-meter-by-2-meter TUs (Test Units 1 through 8) were excavated adjacent to one another on the western edge of the western portion of the expanded West Dover Connector APE, at the edge of the agricultural field adjacent to the wood line. The field notes also show that one test unit (Test Unit 9) was excavated inside the current APE, inside the woods close to the location of STP 5, which was excavated during the 2012 Phase I testing program (see Figure 4).

The field notes remark that the plowzone/B-horizon interface of TUs 5 to 8 revealed an oval 1.2-meter-by-1-meter brown sandy silt stain with fire-reddened earth and charcoal. The feature was labeled Feature 1, bisected and excavated in halves, and determined to be a roughly 30-centimeter deep bowl-shaped pit feature. The field notes say that the north half contained quartz, jasper, and chert debitage and a stemmed jasper projectile point fragment, and that the south half contained two precontact quartz-tempered ceramic sherds and single chert, jasper, and quartz core fragments. Thermally altered rocks are noted as present in both halves of the feature. The notes also reveal that TU 9 contained a single possible cobble chopper in its A-horizon. Following the TU excavations, the 1976 field crew conducted another surface collection along the farm lane stretching along the edge of the woods south of Puncheon Run. The author of the field notes points out that debitage and cores occur infrequently along the lane and that the overall diffuse pattern of materials indicates that the site was “not likely highly or even moderately repeatedly occupied.” It would appear that the thermally altered rocks and debitage

and cores suggest ephemeral open camp occupations, perhaps associated with resource procurement activities and not with microband base camp settlements.

The CRS-4 form prepared in 1976 indicates that in addition to debitage, single Jack's Reef, corner-notched, and "Lyons-stemmed" projectile points were also recovered at the site. Lyons was the name of one of the artifact collectors that the 1976 field crew encountered. However, these points were not present when the principal investigator reviewed the assemblage in May 2013. The CRS-4 form also notes that soapstone, Hell Island ceramic sherds, and hammerstones were also recovered in 1976. The two sherds were observed during the review and presumably are the Hell Island ceramics noted on the form and originally recovered from Feature 1. An anvilstone and two hammerstones were also present when the assemblage was examined. The soapstone artifact was not present when the assemblage was reviewed.

The goal of the assemblage review in May 2013 was to examine it and then compare it with the assemblage recovered during the West Dover Connector project Phase I survey conducted in 2012. A few similar artifact types were recently recovered: debitage and a projectile point. The lithic raw material types were very consistent with the previous finds: quartz, jasper, chert, argillite, and quartzite. No thermally altered rocks were recovered during the recent Phase I program. Note, however, that during the review of the assemblage recovered in 1976, many of the materials identified as thermally altered rocks might best be described as possibly thermally altered rocks, as many of these appeared to be plow-cracked rocks and not necessarily broken via heat. The principal investigator discussed the results of the review with DelDOT archaeology staff, and it was confirmed that the additional Phase I and the Phase II investigation methods and excavation strategies were appropriate for the 2013 investigation.

5.3 Additional Phase I STP Results

Additional Phase I survey took place in the portions of the expanded APE east and west of the previous test area where 7K-C-73 was re-identified during the 2012 Phase I survey program. The area east of the site measures approximately 1.5 acre, and the area west of the site measures approximately 1 acre (see Figure 3; Photographs 6 to 8). The A.D. Marble & Company field



Photograph 6: General conditions, additional test area east of site core



Photograph 7: General conditions, additional test area west of site core, in field



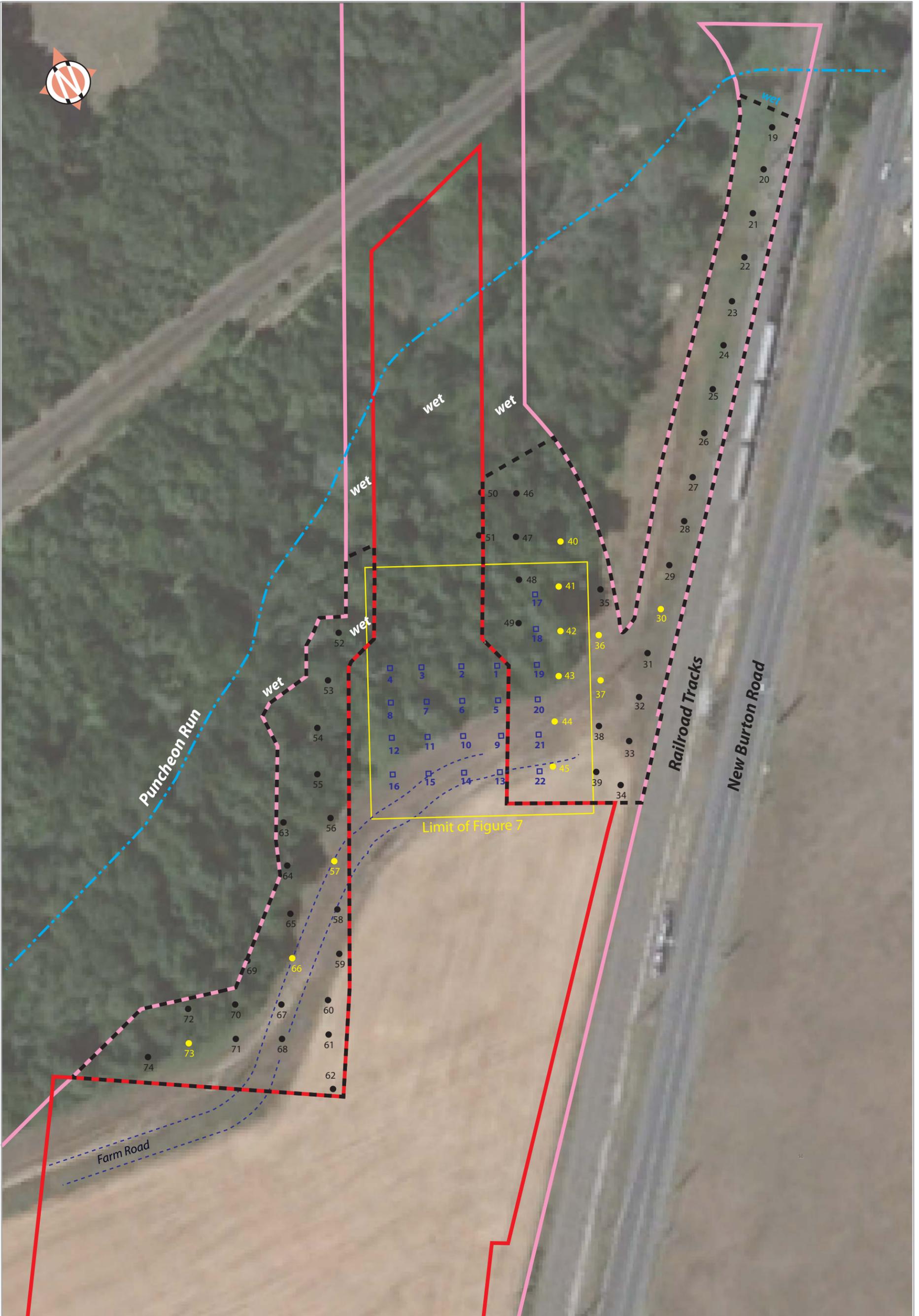
Photograph 8: General conditions, additional test area west of site core, in woods

team placed and excavated a total of 56 STPs during the additional Phase I survey program in April 2013 (Figure 5).

The field team placed and excavated 33 STPs at 50-foot intervals east of the previously tested area. Sixteen of these (STPs 19 to 34) were placed in a grassy area adjacent to the west of the railroad tracks that parallel New Burton Road. STPs 19 to 31 shared similar profiles of A-horizon overlying one or more layers of fill containing modern and historic artifacts which, in turn, were often overlying a buried A-horizon overlying B-horizon subsoil (see STP 24 on Figure 6). STPs 32 to 34 contained profiles that appeared more intact and exhibited an A-horizon, E-horizon, and B-horizon sequence (see STP 32 on Figure 6). Together, the STPs near the tracks yielded 147 (one precontact, 146 modern and historic) of the 180 artifacts recovered from all of the Phase I survey STPs. One jasper debitage originated in a fill deposit in STP 30. Historic artifacts were clustered near the New Burton Road bridge over Puncheon Run. STPs 19 to 21 contained 126 modern and historic materials that primarily included coal; coal slag; cinders; and aqua, amber, and colorless bottle glass.

STPs 35 to 39 and 43 to 45 were placed outside of the wooded buffer of Puncheon Run and in the grassy area on the edge of the agricultural field or in the field. STPs 35 to 39 contained an approximately 25-centimeter thick A-horizon overlying B-horizon subsoil. The B-horizon encountered in STPs 35 and 37 was extremely compact, likely because these STPs lie on the old farm road on the field edge. The field team encountered a 7-centimeter thick A-horizon in STP 36 overlying an unmarked utility trench of mixed fill soils that contained one jasper flake and plastic flagging that read "...Line Below." Excavations halted at this depth (i.e., 48 centimeters below surface). The STP 37 A-horizon contained one jasper flake. STPs 43 to 45 revealed consistent stratigraphic profiles of A-, E-, and B-horizon soils (see STP 45 on Figure 6). The A-horizons of each of these yielded jasper and/or chert debitage: two jasper flakes in STP 43, a chert and a jasper flake in STP 44, and a jasper flake in STP 45.

The remaining STPs (STPs 40 to 42 and 46 to 51) east of the previously tested area were placed in the gently northward-sloping wooded area leading to Puncheon Run. Aerial photographs dating to the first half of the twentieth century show that the area inside the woods was



- TU Location
- STP Location
- Positive Precontact STP Location
- Former APE
- Revised APE
- - - Additional Tested Portions of APE

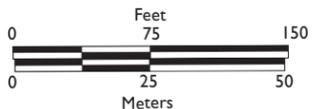


Figure 5
Shovel Test Pit and Test Unit Locations
 West Dover Connector
 Kent County, Delaware

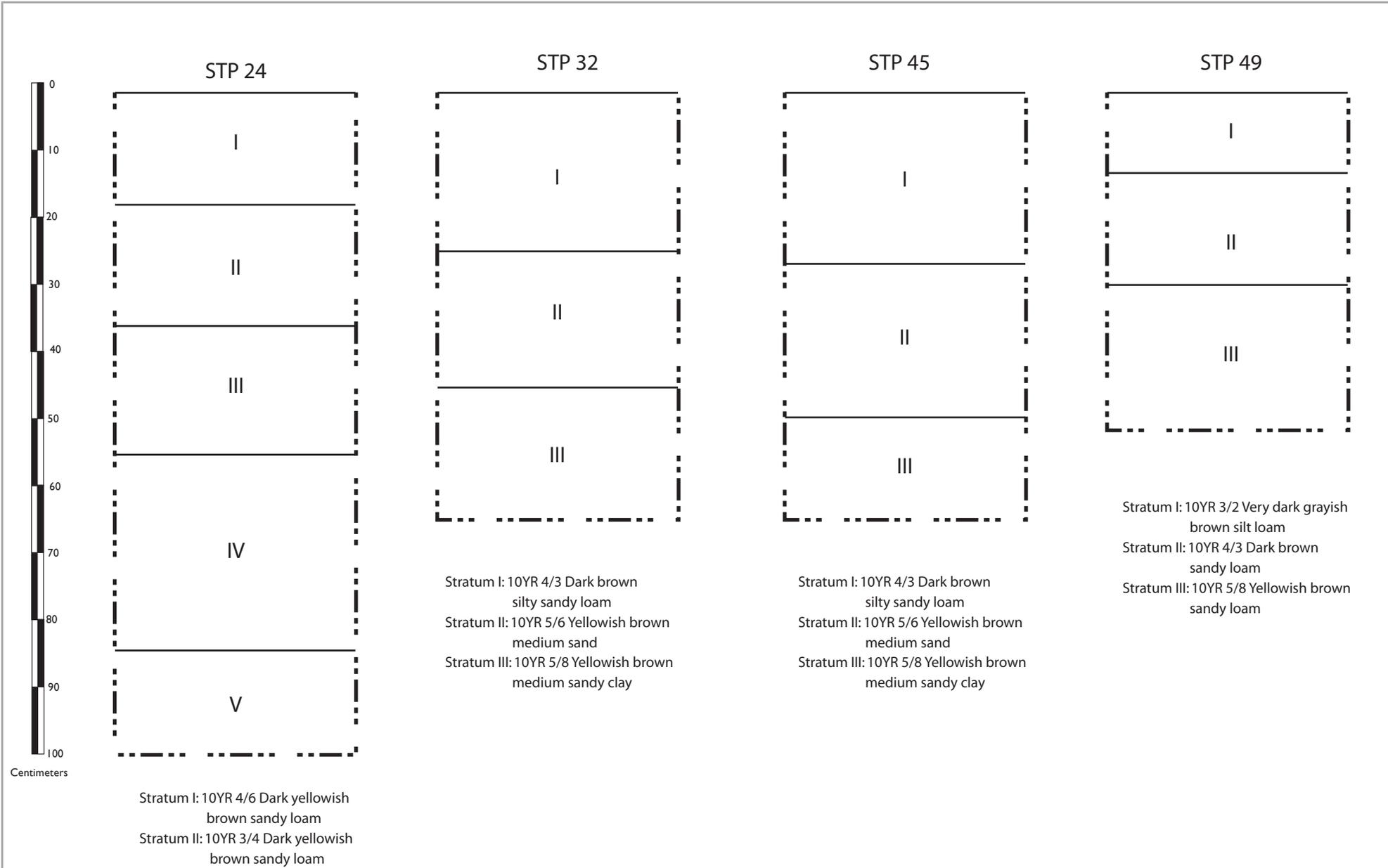


Figure 6
Representative Shovel Test Pit Profiles - East of Site Core
 West Dover Connector
 Kent County, Delaware



previously plowed and part of the agricultural field, and has been allowed to regrow into a lightly wooded forest (Delaware DataMIL, accessed May 2013). The profiles of the STPs in the woods exhibit a plowzone/A-horizon overlying B-horizon subsoil (see STP 49 on Figure 6). Some portions of this area exhibited a cut-and-fill landscape as well as sections with long linear depressed areas that appeared to be the former farm lane that skirted the edge of the woods when the field extended into the now-wooded/reforested area.

STP 40 contained single jasper flakes in its A- and B-horizons. STP 41 contained a piece of caution tape and single jasper and chalcedony flakes in its A-horizon and a chert flake in its B-horizon. The A-horizon of STP 42 contained two zinc metal bottle cap fragments, a piece of colorless bottle glass, and a quartz flake, two jasper flakes, and a chert edge-modified flake (utilized flake). The STP 47 A-horizon held a toy marble and a piece of colorless bottle glass, and the STP 51 A-horizon held a piece of colorless bottle glass, a piece of colorless jelly jar glass, an eroded redware sherd, and charcoal.

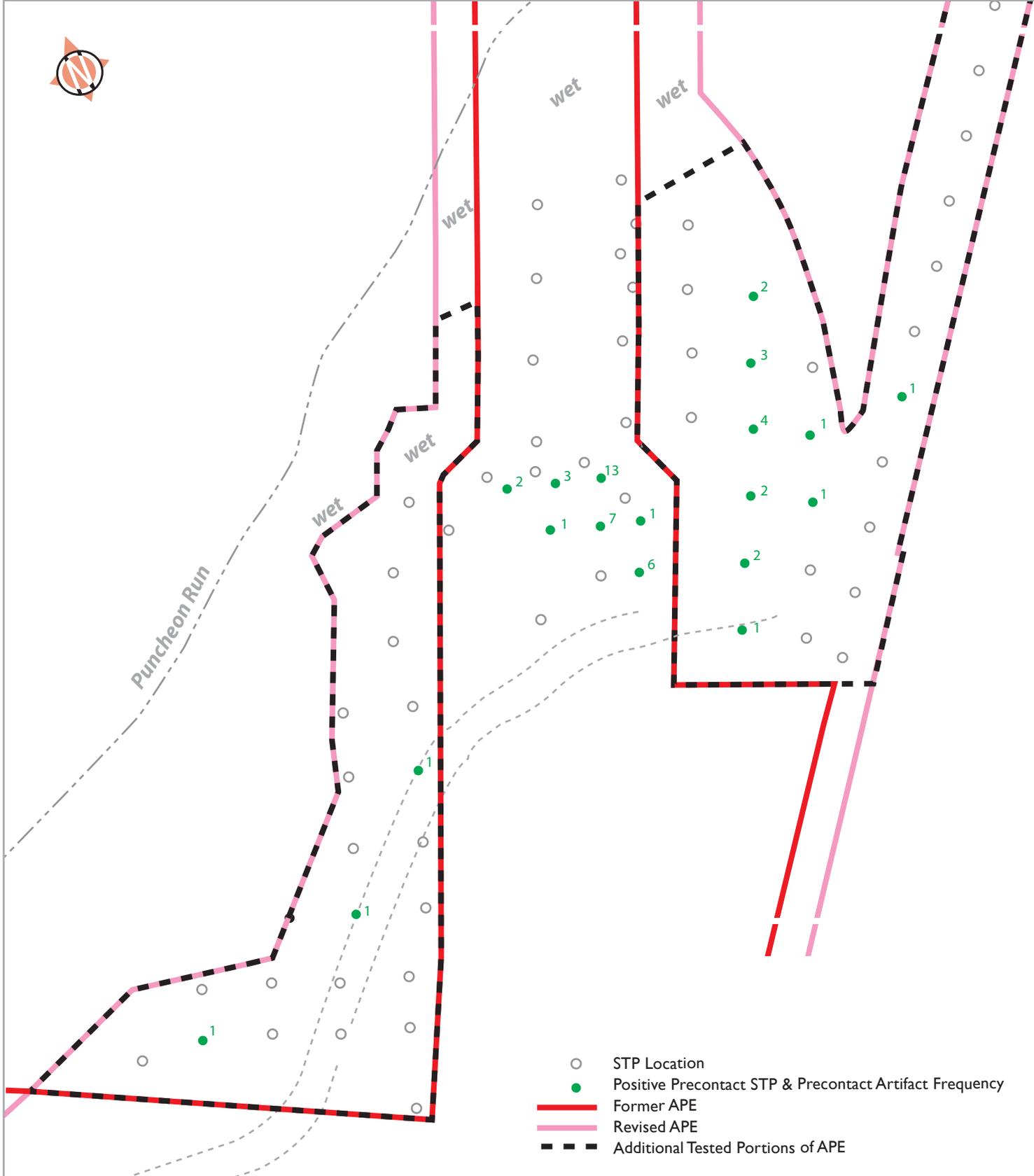
In sum for this greater area to the east, historic artifacts occurred in fill layers adjacent to the railroad and were most frequently toward the north end of the APE near the Puncheon Run, as well as on the edge of the former agricultural field that has re-grown into the current woods that it is today. Precontact artifacts occurred most frequently in the field and woods adjacent to the east of the recently defined site core (Figure 7). Many of these were recovered in chronologically mixed contexts (i.e., with historic artifacts). Nonetheless, the Phase II evaluation test area expanded eastward to examine this area to find precontact features, but only after conducting shovel test survey in the portions of the APE expansion to the west.

It was roughly around this time during the 2013 fieldwork that a local amateur archaeologist/collector (name withheld) visited the site to inquire about the investigation. He returned a few hours later to show the team the projectile points/knives and other artifacts he had collected in the nearby fields. Most were chert, jasper, and quartz soft- or round-shouldered contracting or straight-stem point types that fit with the hypothesized period of site occupation in the Late Archaic and early Woodland I periods (Photograph 9).



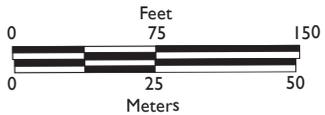
Puncheon Run

wet
wet
wet
wet



- STP Location
- Positive Precontact STP & Precontact Artifact Frequency
- Former APE
- Revised APE
- - - Additional Tested Portions of APE

Figure 7
Shovel Test Pit Results: Precontact Artifact Frequencies
 West Dover Connector
 Kent County, Delaware





Photograph 9: Artifacts collected from nearby area by local collector

The field team then placed and excavated 23 STPs (STPs 52 to 74) at 50-foot intervals west of the previously tested area (Figure 5). Twelve of these STPs were placed in the woods and included STPs 52 to 56, 63 to 65, 69, 70, 72, and 74. STP 52 was placed near the north end of the test area, and its excavation was halted when the crew encountered the water table at approximately 10 centimeters below surface. STP 54 also exhibited a shallow water table at 15 centimeters below surface. The other STPs in the woods generally shared profiles characterized by an A-, E-, and B-horizon sequence (see STPs 56 and 70 on Figure 8). Historic aerial photographs show that this portion of the woods had never been plowed and thus seemed relatively intact. However, the STPs placed in the woods yielded no cultural materials or features.

STPs 57 to 62, 66 to 68, 71, and 73 were placed outside of the woods, either in the grass next to the woods or in the agricultural field (Figure 5). Many of the STPs in the grass were placed in or alongside the farm road that ran around the perimeter of the field. These STPs exhibited A-horizons overlying very compacted B-horizon subsoil (see STP 66 on Figure 8). STPs in the field (STPs 59 to 62) shared similar profiles: plowzone A-horizon overlying B-horizon subsoil (see STP 62 on Figure 8). The A-horizons of three STPs (STPs 57, 66, and 73) contained single pieces of debitage derived from three different lithic materials: jasper in STP 57, rhyolite in STP 66, and quartz in STP 73. The diffuse distribution did not warrant additional testing (Phase II evaluation testing); nonetheless, the finds are considered to be part of 7K-C-73. After the STP survey was completed, the field team placed 22 TUs in the site core, which was defined during the initial Phase I program in 2012 and expanded during the 2013 STP survey on the east side of the site core. TUs 17 through 22 constitute the additional area evaluated during the Phase II program. The results of the Phase II evaluation TU excavations are discussed below.

5.4 Phase II Evaluation Test Unit Results

The field team placed 22 1-meter-by-1-meter TUs in the artifact-dense core of 7K-C-73, as defined by the STP survey in 2012 and 2013 (Figure 5). The Phase II work plan had initially called for 16 TUs to be laid in four rows of four TUs on a 25ft-interval grid. However, the 2013 STP survey conducted adjacent to the east of the site core effectively expanded the site core to the east, and therefore an additional six TUs were placed east of the previously defined core.

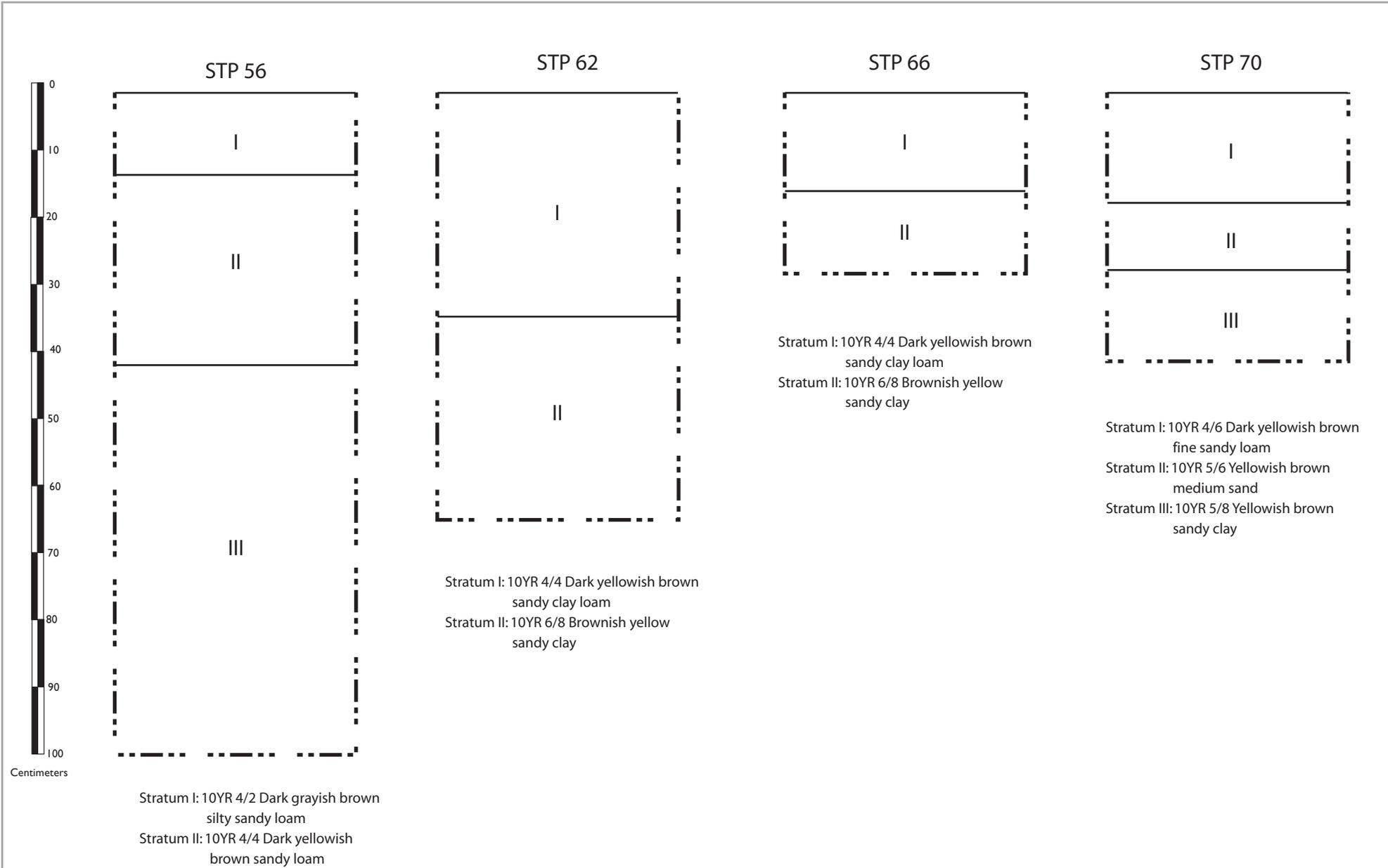


Figure 8
Representative Shovel Test Pit Profiles - West of Site Core

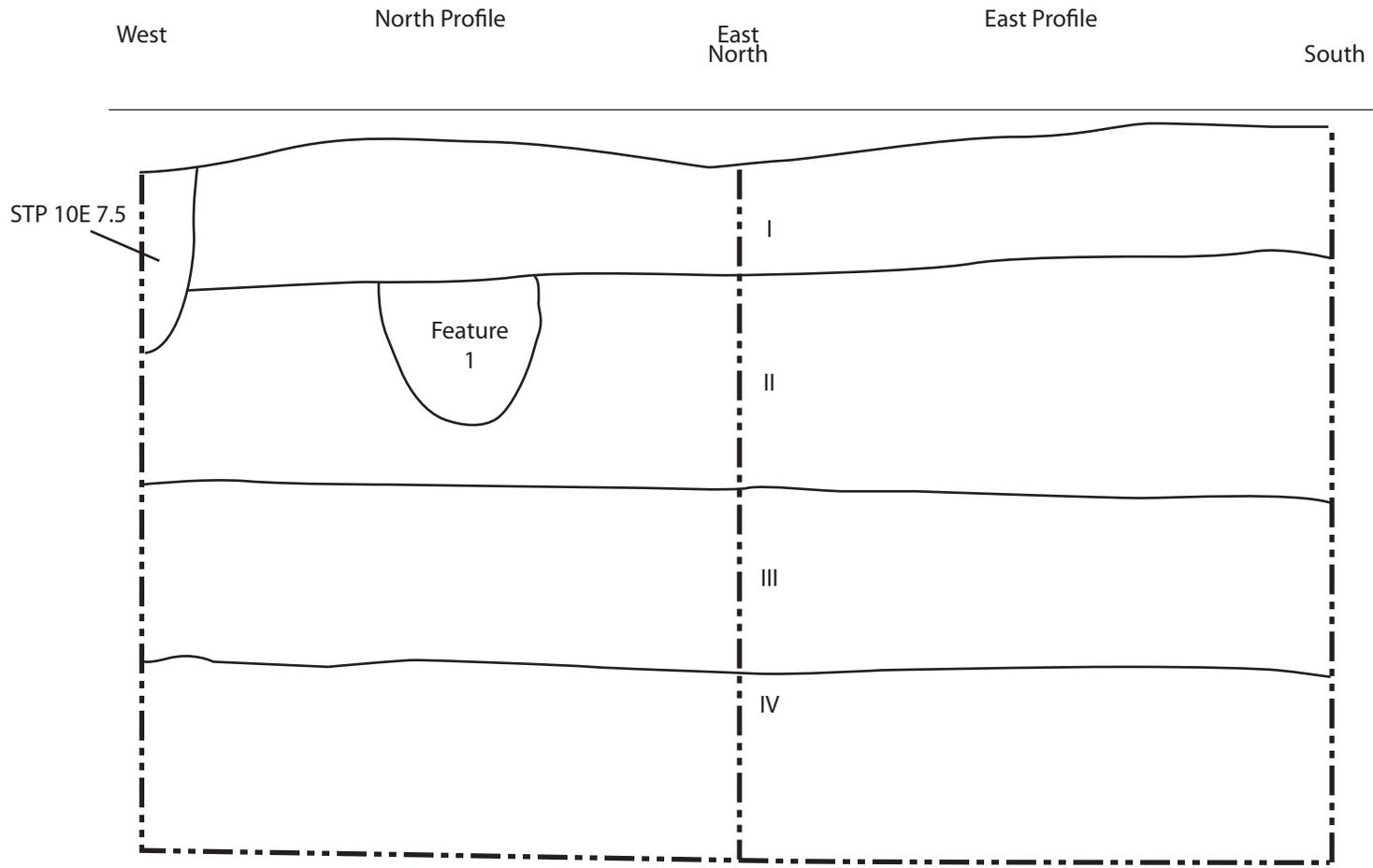
West Dover Connector
 Kent County, Delaware

Altogether, nine of the TUs were inside the woods, while 13 were either in the grass/farm lane on the edge of the field or inside the field.

It was hoped that the Phase II testing would identify cultural features if they were present, gather a larger sample of site artifacts to better understand site function, and further delineate the boundaries of the site. A total of five features were encountered during the Phase II evaluation testing. These included a historic posthole in TU 2 that likely served as a hole for a historic-era fencepost on the edge of the field, three krotavina (tree roots/rodent burrows located in TUs 13, 14, and 16), and a utility trench that was first defined as a possible cultural feature in TU 10. In total, five portions of trenches or trench-like features (i.e., farm road ruts) were encountered during the Phase II fieldwork, and these were located in TUs 7, 10, 12, 15, and 20. These trenches are believed to be associated with the emplacement of utility lines or with farm lane maintenance given their location near the edge of the field. None of them was designated a feature because they were clearly not cultural in nature. Although each TU is discussed below individually, many shared similar stratigraphic profile signatures of plowzone/A-horizons that overlay E-horizons over B-horizon subsoil.

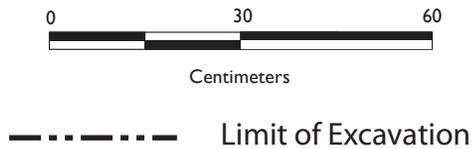
TU 1 was placed in the edge of the woods near the top of the gradual slope down and north toward Puncheon Run. The wooded portion of the APE was part of the larger agricultural field in the mid-twentieth century. Excavators observed a 10-centimeter thick very dark brown silt O-horizon overlying a 20-centimeter thick sandy loam plowzone/A-horizon that covered a yellowish brown sandy clay loam B-horizon. The humic layer contained 11 artifacts, including amber and colorless bottle glass; an aluminum can; and jasper, quartz, and chert debitage. Its A-horizon contained seven artifacts: one amber bottle glass and six debitage (jasper, chert, chalcedony, and quartz). Not surprisingly, the lithic raw materials were consistent with those encountered during the Phase I surveys. No features were identified in TU 1.

TU 2 exhibited a 20-centimeter thick yellowish brown sandy loam A-horizon over a 35-centimeter thick sandy clay loam E-horizon overlying a 30-centimeter thick yellowish brown sandy clay B1-horizon atop a yellowish brown medium to coarse sand B2-horizon (Figure 9; Photograph 10). Note that the TU was excavated deeply to expose a soil profile for the geomorphological



- Stratum I: 10YR 5/4 Yellowish brown sandy loam
- Stratum II: 10YR 5/6 Yellowish brown sandy clay loam with pea gravel
- Stratum III: 7.5YR 5/6 Strong brown sandy clay with 10-15% pebble
- Stratum IV: 7.5YR 5/8 Strong brown medium to coarse sand
- Feature 1: 10YR 5/3 Brown silty sandy loam

Figure 9
Test Unit 2 North and East Wall Profiles
 West Dover Connector
 Kent County, Delaware





Photograph 10: TU 2, north wall profile, Feature 1 below plowzone in center of frame

study, which is reviewed later in this section. Excavators identified Feature 1 at the interface of the A- and E-horizons. The feature is a round, 30-centimeter wide and 20-centimeter deep basin-shaped pit. It contained no cultural materials, but based on its location near the edge of the field and its morphology, it is interpreted as a fencepost posthole. STP 10E 7.5 is present in the northwest corner of the TU. This STP was excavated by the field team during the 2012 Phase I study, and 13 artifacts that included 12 jasper, quartzite, and chert debitage and a chert Lamoka-like projectile point/knife were recovered. The A-horizon of TU 2 contained two aqua bottle glass fragments, a sandstone thermally altered rock, and 22 debitage (four secondary, 18 tertiary: five chert, two quartz, 15 jasper). Its E-horizon contained two thermally altered rocks and 33 debitage (one primary, six secondary, 26 tertiary: one chalcedony, two chert, 23 jasper, seven quartz; Photograph 11). Although the field team recovered 60 flakes in the unit, the team identified no precontact features.

TU 3 exhibited an O-, A-, E-, and B-horizon sequence. Its 5-centimeter thick humus/duff layer contained no cultural materials, but its 20-centimeter thick dark yellowish brown sandy loam A-horizon contained seven debitage (one primary, six tertiary: all jasper). Its 15-centimeter thick yellowish brown sandy loam E-horizon held 19 precontact artifacts, including one quartz biface fragment with a serrated, knifelike edge and 18 debitage (nine secondary, nine tertiary: two quartz, one chert, 15 jasper). Its strong brown B-horizon contained no cultural materials. In sum, the TU had 26 precontact artifacts but no features.

TU 4 exhibited a 20-centimeter thick dark yellowish brown sandy loam A-horizon overlying a brownish yellow sandy clay loam B-horizon subsoil. The A-horizon contained three artifacts: two chert and one quartzite debitage. It would later become evident that the west side of the site core contained few artifacts in comparison to other areas within the site, which is consistent with the findings of the Phase I survey conducted in this area of the site.

TU 5 contained the same A- and B-horizon profile. Its A-horizon held nine artifacts: a Bakelite shooting pigeon fragment and eight debitage (one primary, seven tertiary: one chert, one quartz, six jasper). It was incorrectly anticipated that an E-horizon would be present between the A- and B- horizons; its absence suggests that the original solum has been truncated, which is likely



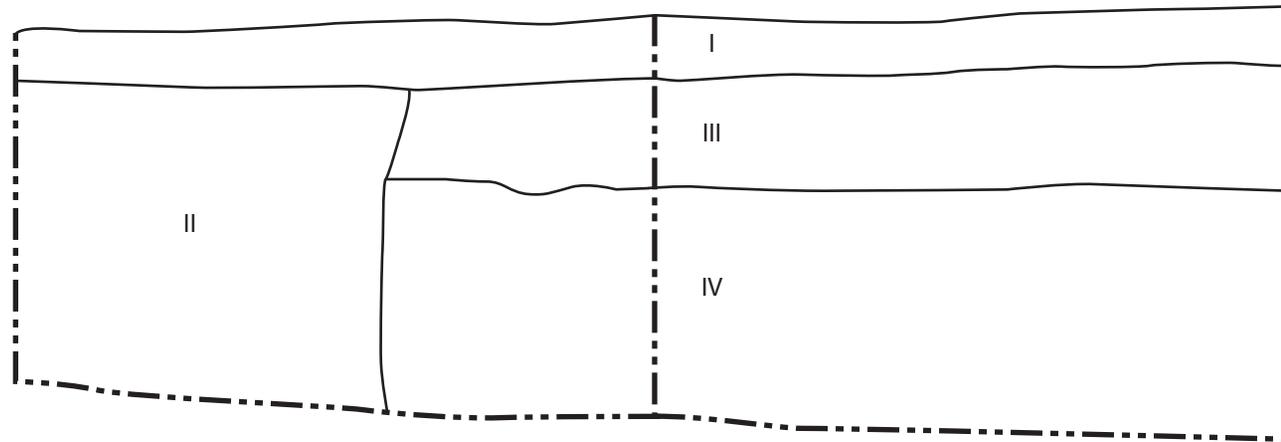
Photograph 11: Example of debitage recovered from TU 2 E-horizon

given that this area has been somewhat disturbed by serving as a farm lane, which is considered (along with the excavation of unmarked utility trenches) to be a major mechanism of soil erosion/truncation.

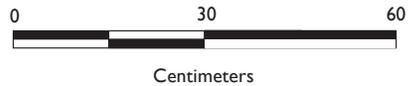
The field team reported a sequence of A-, E, and B-horizons in TU 6. The 15-centimeter thick dark yellowish brown sandy loam plowzone/A-horizon held five debitage (one primary, four tertiary: two jasper, two chert, one chalcedony) and a jasper projectile point tip. The 30-centimeter thick dark yellowish brown sandy loam E-horizon held 38 artifacts, all debitage (four primary, 11 secondary, 23 tertiary: three chert, six quartz, 29 jasper). In sum, TU 6 contained 43 debitage and one projectile point tip, but no features.

TU 7 was placed on the edge of the tree line (see Figure 5). It exhibited an A-, E-, and B-horizon sequence, but was intersected by an unmarked utility trench in the southern part of the unit (Figure 10). The trench was identified at the interface of the plowzone/A-horizon and E-horizon and generally traverses the site in an east-west orientation, based on its location in the TU. The trench fill is composed of brown and yellowish brown sandy loam that extends at least approximately 45 centimeters below surface where pink flagging labeled “Caution – Buried Electric Line” was uncovered; excavation halted at this point. The trench cuts the E-horizon and B-horizon and contained 23 modern, historic, and precontact artifacts: seven pieces of plastic, an emerald green bottle glass fragment, and slag, as well as a thermally altered rock and 13 debitage (all tertiary: seven jasper, two quartzite, one quartz, and three chert). The overlying dark grayish brown sandy loam plowzone/A-horizon is approximately 12 centimeters thick and contained nine artifacts that included a piece of Bakelite shooting pigeon, two slag, an emerald green bottle glass fragment, and five debitage (one secondary, four tertiary: one quartz, four chert). The 20-centimeter thick dark brown sandy loam E-horizon was cut by the trench and overlain by the plowzone/A-horizon and contained 13 artifacts: eight pieces of black plastic bag, a piece of colorless bottle glass, and four debitage (one secondary, three tertiary: one quartz, three jasper). The uppermost level of the underlying dark grayish brown sandy loam B-horizon subsoil contained one secondary jasper flake. A total of 24 precontact lithics were recovered from TU 7, but no cultural features (other than the modern utility trench) were encountered.

South West Profile North West North Profile East



- Stratum I: 10YR 4/4 Dark grayish brown sandy loam
- Stratum II: 10YR 4/3 Dark brown sandy loam mottled with 10YR 5/6 yellowish brown
- Stratum III: 10YR 4/3 Dark brown sandy loam
- Stratum IV: 10YR 4/4 Dark grayish brown sandy loam



----- Limit of Excavation

Figure 10
Test Unit 7 North and West Wall Profiles
 West Dover Connector
 Kent County, Delaware

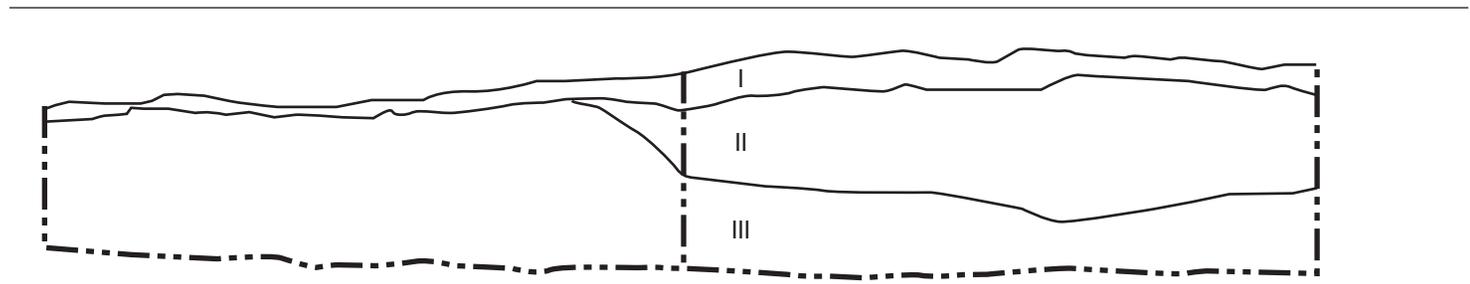


Like TU 7, TU 8 was also placed on the tree line and revealed a stratigraphic package of A-, E-, and B-horizon soils, but no trench disturbance. The A-horizon was relatively deeper than the A-horizons encountered in the other TUs excavated by this time and consisted of a 30-centimeter thick dark yellowish brown sandy loam and held 11 artifacts that included two window glass fragments, a piece of rigid plastic, single amber and colorless bottle glass fragments, and four debitage (two secondary, two tertiary: two jasper, one quartz, one chalcedony) and two edge-modified flakes (utilized flakes) derived from a secondary chert flake and a tertiary jasper flake. Both of these tools exhibited use-wear retouch on single lateral acute (knife-like) margins and were likely employed for cutting. The 10-centimeter thick E-horizon and underlying B-horizon (both dark yellowish brown loamy sands) contained no cultural materials, and no features were observed in the solum.

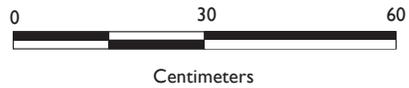
TU 9 was placed adjacent to the north of the farm lane. The unit exhibited an A-horizon, fill, and B-horizon sequence. Specifically, the 15-centimeter thick very dark grayish brown sandy loam plowzone/A-horizon overlay dark grayish brown sandy loam fill. The fill was 5 centimeters thick near the north wall and 20 centimeters thick near the south wall; thus, it appeared that the fill may have been associated with an infilled depression. It is hypothesized that the depression may have been a former farm lane. The fill overlay compact yellowish brown sandy clay loam with pea-sized gravel B-horizon. The fill layer was the only layer that contained artifacts: a metal bolt, a piece of rigid plastic, single amber and colorless bottle glass fragments, thermally altered rock, and 12 debitage (all tertiary: four quartz, one chert, seven jasper).

TU 10 was also placed adjacent to the north of the farm lane. It contained a 7-centimeter thick vary dark grayish brown loamy and humic O-horizon overlying brownish yellow sandy loam B-horizon subsoil across most of the TU; however, it was overlying a dark yellowish brown sandy loam layer in the northern margin of the TU (Figure 11; Photograph 12). This layer apparently cuts into the B-horizon and reaches its greatest depth along the north wall. Given its proximity to the farm lane and the truncated natural profile evinced by the O-horizon that immediately overlies the B-horizon, it would appear that the descending fill layer is the edge of an infilled roadbed/farm lane. The fill layer was identified in the field as a trench and designated Feature 2. The field team recovered an aqua bottle glass fragment from the fill and an amber bottle glass

South West Profile North West North Profile East



- Stratum I: 10YR 3/2 Very dark grayish brown humus/loam
- Stratum II: 10YR 4/4 Dark yellowish brown sandy loam; Feature 2
- Stratum III: 10YR 6/8 Brownish yellow sandy loam



----- Limit of Excavation

Figure I I
Test Unit 10 North and West Wall Profiles
 West Dover Connector
 Kent County, Delaware





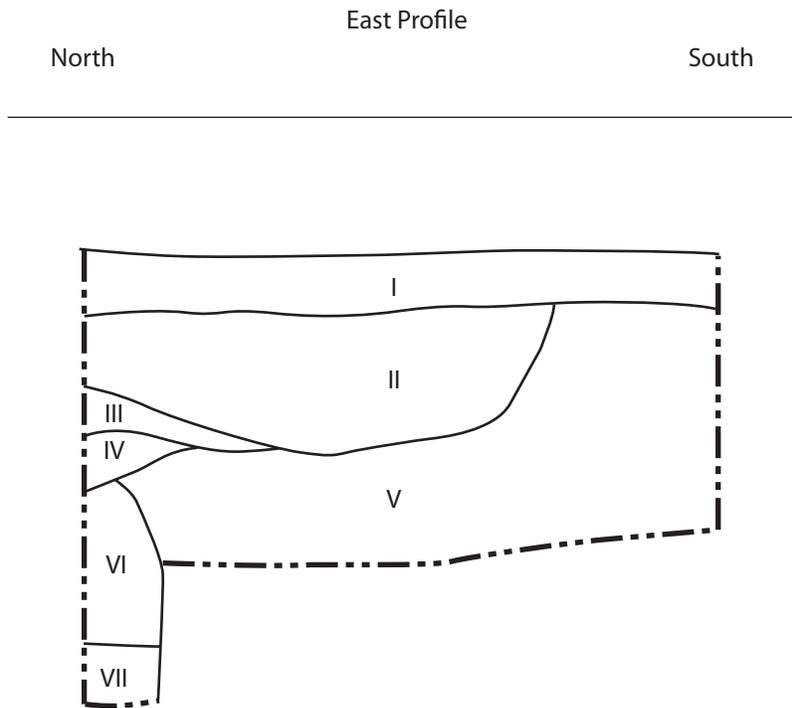
Photograph 12: TU 10, west wall profile, showing Feature 2

fragment and a piece of tertiary-stage jasper debitage from the uppermost level of the B-horizon. With the exception of the possible infilled road cut (i.e., Feature 2), no additional features were identified in TU 10.

TU 11 exhibited a basic A- and B-horizon sequence. The 18-centimeter thick dark yellowish brown sandy loam plowzone contained two slag and six debitage (two secondary, four tertiary: five jasper, one chert). The strong brown sandy loam B-horizon contained no artifacts. No features were observed. The lack of an E-horizon suggests that the E-horizon was truncated, removed, or incorporated into the plowzone at this location.

TU 12 contained a profile similar to that encountered in TU 7. Excavation of TU 12 revealed a 10-centimeter thick dark yellowish brown sandy loam plowzone/A-horizon atop an at least 40-centimeter thick mottled dark yellowish brown sandy loam with yellowish brown sandy loam and dark yellowish brown sandy loam lenses. The layer was defined as trench fill because the stratigraphic relationship showed that it overlay/cut the naturally occurring E-horizon, which slopes upward in the northern margin of the TU (Figure 12; Photographs 13 and 14). Excavation of the fill was halted because of its close similarity to the utility trench fill encountered in TU 7. The E-horizon was a 20-centimeter thick dark yellowish brown sandy loam overlying yellowish brown sandy loam B-horizon subsoil. The trench fill contained seven artifacts: a colorless bottle glass fragment, an eroded redware sherd, and five debitage (one secondary, four tertiary: one chert, one quartz, three jasper). No features other than the likely utility trench were encountered in TU 12.

TU 13 exhibited an A-horizon/B-horizon sequence. The interface of the A- and B-horizons revealed Feature 4, an amorphous, loose, dark brown sandy loam stain that was interpreted as a rodent burrow or tree/shrub root tunnel after it was excavated. The fill contained no artifacts. The plowzone/A-horizon was a 10-centimeter thick dark yellowish brown sandy loam overlying a yellowish brown sandy loam B-horizon subsoil. Neither layer contained any artifacts. The absence of an E-horizon may be related to the location of TU 13 on the edge of the farm lane, where soils were more susceptible to erosion.



- Stratum I: 10YR 4/4 Dark yellowish brown sandy loam
- Stratum II: 10YR 4/4 Dark yellowish brown sandy loam mottled with 10YR 4/6 Dark yellowish brown
- Stratum III: 10YR 4/4 Dark yellowish brown sandy loam mottled with 10YR 5/8 Yellowish brown
- Stratum IV: 10YR 4/3 Dark brown sandy loam
- Stratum V: 10YR 5/6 Yellowish brown sandy loam with pockets of 10YR 4/4 Dark yellowish brown and 10YR 3/2 Very dark grayish brown sandy loam
- Stratum VI: 10YR 4/6 Dark yellowish brown sandy loam
- Stratum VII: 10YR 5/8 Yellowish brown sandy loam

Map Document X: Graphics\Projects\P-131\mapping\TU 12_pro.ai

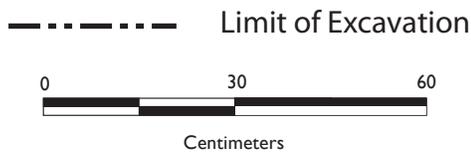
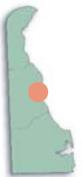


Figure 12
Test Unit 12 East Wall Profile
West Dover Connector
Kent County, Delaware



Photograph 13: TU 12, east wall profile, showing utility trench



Photograph 14: TU 12, north wall profile, showing utility trench

TU 14 was placed in the farm lane (see Figure 5). It contained a shallow (7-centimeter thick) dark yellowish brown sandy loam A-horizon overlying the very compact yellowish brown sandy loam B-horizon and Feature 3 in the northeast corner of the TU at the B-horizon surface (Photograph 15). Feature 3 extended out of the unit and to the north and east. It was excavated separately and discovered to be a burned tree root ball with root tunnels that spread out and into the B-horizon subsoil. The excavated portion of Feature 3 was 86 centimeters deep and contained four debitage (one primary, three tertiary: one chert, three jasper). The A-horizon contained 19 artifacts: a metal staple, two Bakelite shooting pigeon fragments, four amber bottle glass fragments, ten debitage (one primary, three secondary, six tertiary: one quartz, three chert, six jasper), a jasper core, and a Lamoka-like chert projectile point/knife fragment (Photograph 16). No additional features were observed in TU 14.

TU 15 was also placed in the farm lane. The northern margin of the TU contained the edge of a trench that was overlain by 10-centimeter thick compact dark grayish brown sandy loam A-horizon/topsoil and abutted by a stack of two up-cast fill layers (a compact very dark grayish brown sandy loam and a compact and mottled yellowish brown silty clay loam, respectively) likely placed to its south when it was first excavated. The trench cuts strong brown sandy clay loam B-horizon subsoil. The trench fill was akin to the fills identified in TU 7 and TU 12, but was excavated to a depth of roughly 35 centimeters where the trench bottomed out where it overlay B-horizon subsoil. The field team recovered no cultural materials in any of the TU deposits. Based on the location of TU 15 in the farm lane and location of the trench in the northern margin of the TU, it would appear that the trench is likely related to a utility that skirts the north edge of the farm lane.

TU 16 exhibited an A-horizon, a buried A-horizon, and B-horizon profile that contained a thin 5-centimeter thick lense at the interface of the A- and buried A-horizons and designated Feature 5 (Photograph 17). The feature/lens was an extremely compact, amorphous, dark yellowish brown sandy loam stain in the southern half of the TU. Excavation of the feature revealed that it was 5 centimeters deep and exhibited an irregular plan and undulating bottom. A recent A-horizon appears to overlay an older and buried A-horizon. It is hypothesized that the overlying A-horizon developed after this portion of the field was no longer plowed and instead served as a farm lane.



Photograph 15: TU 14, north wall profile, showing Feature 3



Photograph 16: Projectile points: (left) TU 14, Stratum I, Level 1; (right) TU 18 Stratum II, Level 1



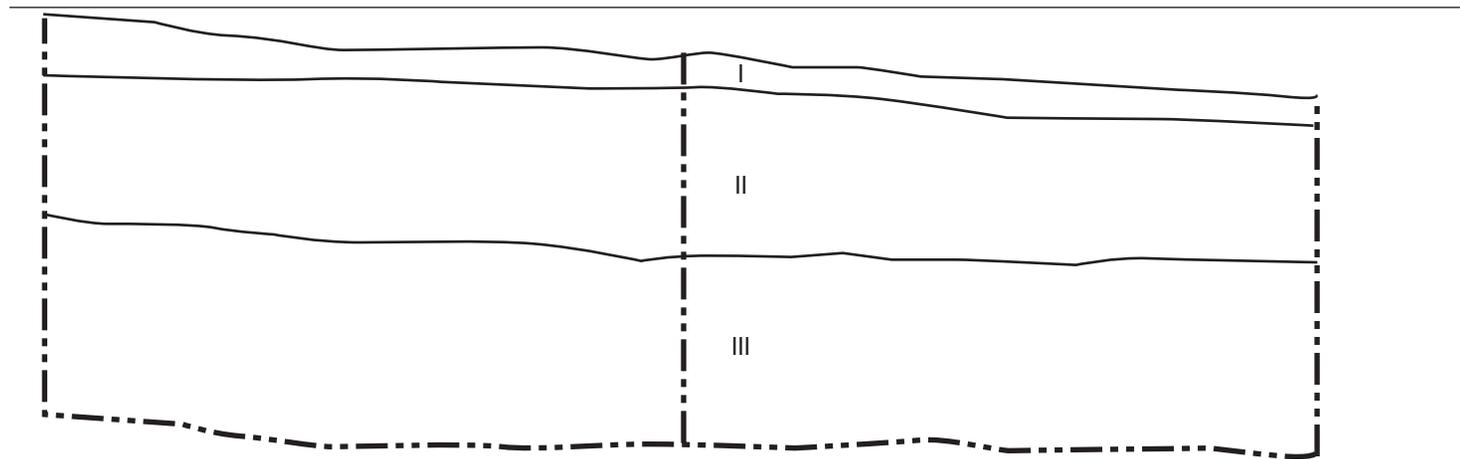
Photograph 17: TU 16, north wall profile, showing Feature 5

It would appear then that Feature 5, the compact lense, is related to a farm lane. The buried A-horizon/possible plowzone is a very compact, 17-centimeter thick, very dark grayish brown sandy loam overlying a compact yellowish brown loamy sand B-horizon subsoil. The field team recovered no cultural materials in TU 16.

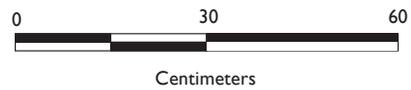
TU 17 was placed in the woods at the north end of a column of six TUs that were laid in east of TUs 1 to 16, based on the 2013 Phase I survey results that revealed relatively high artifact frequencies in the expanded APE east of the portion of the APE surveyed in 2012 (Figure 5). TU 17 exhibited a sequence of O-, A-, and B-horizon soils. Specifically, a 6-centimeter thick humus/very fine dark brown loam layer overlay a 25-centimeter thick, very dark grayish brown, fine sandy loam overlying a yellowish brown sand B-horizon subsoil. The O-horizon contained three plastic four-hole shirt buttons, single pieces of amber and dark aqua bottle glass, and two pieces of aqua bottle glass. The A-horizon contained two more plastic four-hole shirt buttons and nine debitage (two secondary, seven tertiary: one chalcedony, three quartz, and five jasper). A tree root disturbance was encountered in the upper B-horizon in the northwest quadrant of the TU. It was excavated separately and contained no cultural materials. No features were discovered in TU 17.

TU 18 exhibited the same stratigraphy as TU 17: an O- horizon overlying an A-horizon overlying a B-horizon (Figure 13). The 5-centimeter thick O-horizon consisted of dark brown sandy loam and contained a plastic shotgun shell. The underlying 27-centimeter thick A-horizon consisted of dark yellowish brown sandy loam that contained 39 artifacts: a piece of a Bakelite shooting pigeon, a piece of amber bottle glass, a three-piece pull-tab Pepsi can with a steel bottom and bar code (Photograph 18), a thermally altered contracting stem jasper projectile point, and 35 debitage (one primary, five secondary, and 29 tertiary: four chert, three chalcedony, eight quartz, 20 jasper; Photograph 16). The uppermost level of the underlying yellowish brown B-horizon subsoil contained nine debitage (one primary, four secondary, and four tertiary: five chert and four jasper). Although 45 precontact artifacts (44 debitage and one projectile point/knife) were recovered, no features were identified in TU 18.

South West Profile North West North Profile East



- Stratum I: 10YR 3/3 Dark brown sandy loam
- Stratum II: 10YR 4/4 Dark yellowish brown sandy loam
- Stratum III: 10YR 5/8 Yellowish brown coarse sand



----- Limit of Excavation



Figure 13
Test Unit 18 North and West Wall Profiles
West Dover Connector
Kent County, Delaware



Photograph 18: TU 18, Stratum II, Level 1, circa-1976 Pepsi Can with steel bottom, bar code, and pull tab

TU 19 was placed near the edge of the tree line. Its stratigraphic profile was similar to TUs 17 and 18 and exhibited O-, A-, and B-horizons, but also included an E-horizon between the A- and B-horizons. The O-horizon was a roughly 12-centimeter thick dark brown sandy loam that contained one tertiary jasper flake. The underlying 20-centimeter thick dark yellowish brown sandy loam A-horizon contained two Bakelite shooting pigeon fragments and five debitage (two secondary, three tertiary: single quartz, chalcedony, and chert flakes; and two jasper flakes). The yellowish brown coarse sand B-horizon subsoil contained no cultural materials. The field team identified no features in the TU.

TU 20 was placed in the grassy edge of the agricultural field (see Figure 7). It contained a trench in the southern third of the TU beneath the A-horizon (Photograph 19). The trench abuts an upcast/fill layer and cuts the B-horizon. The trench fill was generally similar to the trench fills encountered in TUs 7 and 12, but it was specifically characterized as a moderately compact, yellowish brown sandy loam with 0.5-inch diameter gravels. The field team removed the fill to an approximate depth of 45 centimeters below surface before halting the excavation. The field team recovered seven artifacts from the trench fill, which consisted of seven debitage (two secondary and five tertiary: four quartz and three jasper). The overlying A-horizon consisted of a 12-centimeter thick, compact, dark grayish brown sandy clay loam that contained nine debitage (two secondary, seven tertiary: one chalcedony, one quartzite, two chert, two quartz, and three jasper). The A-horizon overlay a 30-centimeter thick, compact, strong brown silt loam mottled with light gray containing a moderate amount of pea-sized gravels. It is hypothesized that this layer represents upcast soil that resulted from the excavation of the adjacent trench. It was then covered by a re-formed A-horizon. The layer contained 17 debitage (ten secondary, seven tertiary: two chert, 15 jasper). The B-horizon contained no cultural materials, and with the exception of the unmarked utility trench, no cultural features were encountered.

TU 21 was placed on the edge of the farm lane. It contained an A- and B-horizon sequence. The A-horizon is a compact 30-centimeter thick dark grayish brown sandy loam that yielded 12 artifacts: two pieces of Bakelite shooting pigeon, a cut nail, an amber bottle glass fragment, an early stage quartz biface, and seven debitage (two secondary, five tertiary: four chert, one quartz, two jasper). It was anticipated that if features were to be encountered, they would be identified at



Photograph 19: TU 20, west wall profile

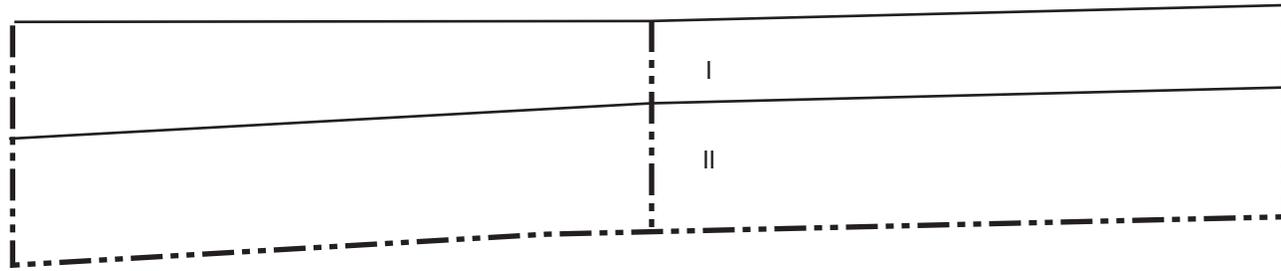
the interface of the A- and B-horizons. The B-horizon is compact yellowish brown sandy loam that contained no artifacts and no features.

TU 22 was located on the opposite edge of the farm lane across from TU 21 and exhibited the same A- and B-horizon sequence as TU 21 (Figure 14). An approximately 20-centimeter thick compact dark grayish brown medium sand overlay a compact strong brown medium sand. The field team recovered eight debitage from the A-horizon. These consisted of three secondary and five tertiary flakes derived from chert and jasper. The team observed no features in TU 22.

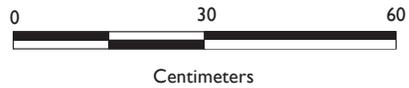
5.5 Summary of Geomorphology Study Results

Pedologist Dr. Daniel Wagner conducted soil investigations at the site during the Phase II evaluation fieldwork in May 2013 (see Appendix B). He first performed pedestrian reconnaissance of the project area landscapes and then examined soils exposed in the 1-meter-by-1-meter TUs. He noted that although close proximity to Puncheon Run was obviously a desirable attribute of the site, occupations appear to have been exclusively limited to the more level terrain above the slope inflection. He also noted that, as would be expected for a relatively small upland position, soils throughout the site are similar and consisted of A-, E-, and various B-horizons. His report notes that subsoil development is advanced and has achieved argillic horizon formation compatible with a probable Pleistocene age typical for most of the regional uplands. He further notes that because of this antiquity, most cultural materials should be confined to levels relatively near the surface, but some could also be present as deep as 0.5 meter or so over most of the site due to introduction by biomantle processes above more stable argillic horizon levels. In sum, he states that in any event, as with the rest of the examined TUs, the depth of excavation in the TUs was sufficient to intercept the entire potential cultural zone. The full report is attached as Appendix B.

South West Profile North West North Profile East



Stratum I: 10YR 4/2 Dark grayish brown medium sand
Stratum II: 7.5YR 5/6 Strong brown medium sand



----- Limit of Excavation



Figure 14
Test Unit 22 North and West Wall Profiles
West Dover Connector
Kent County, Delaware