By the time Byles' map of Kent County was inscribed in 1859 (Figure 6), Duck Creek Hundred had changed dramatically from that which John Darrach had known at the beginning of the century. The agricultural economy had virtually collapsed, and in its recovery, the social order was transformed as well as the landscape. Not only were tracts consolidated during the years of depressed land prices, and then redistributed into smaller tenant farms, but the landscape was rebuilt - new houses, outbuildings, fence rows (Herman 1987:116, 122). Yet the continued importance of agriculture meant families still distributed themselves across the landscape, clustering only in towns such as Smyrna. In scanning the map, another important and remarkable consistency is visible - the Cumminses, Spruances, Reeses, Van Gaskens, Maberrys, Seversons, Cavenders, Cloaks, Hoffeckers, Petersons, Allees, Collinses, Palmaterys, Raymonds, Dennys, Griffins, Letherburys, and Budds - those whose names appeared in the accounts of Darrach, Allee and Coombe, were all still there. The Darrachs, however, had gone, and in 1863 the heirs, now scattered in Michigan, Pennsylvania, Wisconsin, Indiana and New York, sold their remaining Duck Creek property to Joseph Comegys (Table 1). The plat accompanying the sale shows that the Darrach store property has been reconfigured since allotted to Eleanor Darrach Kennedy in 1810 (Figure 24). Comegys transfers the tract and others to John Black later that same year, and by the time Beer's Atlas was published in 1868, the "old Brick house and granary" was gone.

FIELD TESTING AND LABORATORY ANALYSIS: METHODOLOGY

The John Darrach Store site was a cornfield, and the corn had been recently cut by DelDOT, when the Phase III excavations began in July 1989. Utilizing the same fixed datum employed in the Phase I and II investigations, a Diamond State Telephone (DST) #32 telephone stub-up along Woodland Beach Road, the field team first established a site grid. This grid employed the same grid north as the Phase I and II investigations had, but not the same grid coordinates. Thus, the Phase I and II shovel test pits did not line up on the 10' grid coordinates of the Phase III grid. The grid base line was established along the eastern edge of the site, with the 0/0 point originally intended to be the northeast corner of the site. Later, the grid was extended 10' to the north, but originally the site boundaries were delimited by a grid extending 190' south of 0/0 and 240' west.

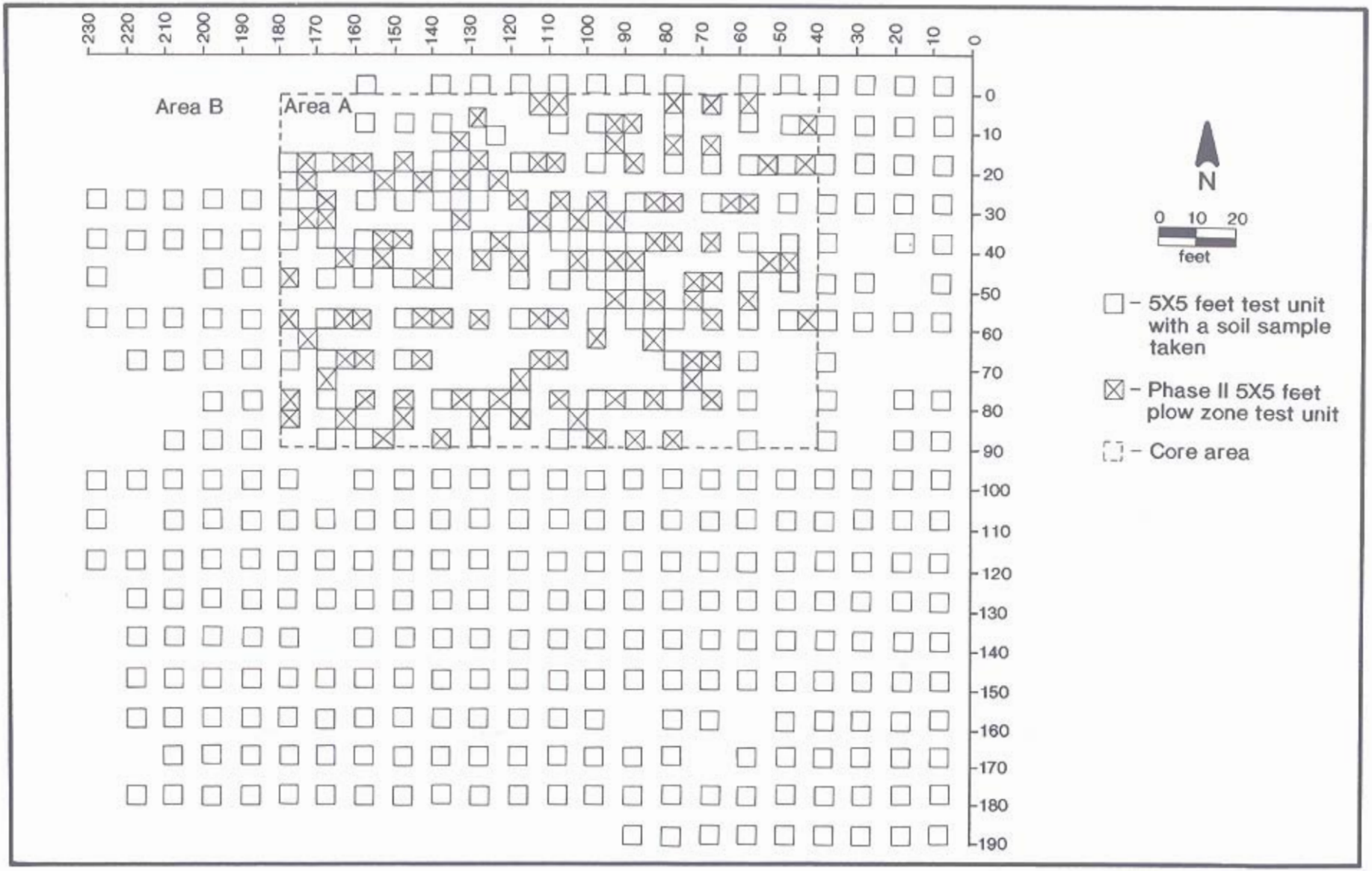
The initial stage of the Phase III excavations consisted of excavating a 25% random sample of the plow zone within what had been designated Area I based on the Phase I and II investigations (Figure 25). This roughly oval-shaped zone around the store (Figure 23) contained all of the features discovered during the Phase I and II excavations and was the area of greatest artifact densities, which ranged between 15 and 50 artifacts per shovel test pit.

Recently, historic archaeologists have begun to recognize the importance, for site interpretation and the identification of intrasite patterning, of adequate and systematic plow zone sampling and surface collections (Lewarch and O'Brien 1981; Moir and Jurney 1987; Riordan 1988; Pogue 1988; Shaffer et al. 1988; Hoseth et al. 1990). In order to sample the plow zone at the Darrach Store site, the grid was conceived of as consisting of 10' by 10' units, each divisible into four 5'X 5' units. One 5'X 5' unit was selected at random from each 10'X 10' for excavation to the base of the plow zone. This sampling scheme constituted a 25 percent stratified, systematic, unaligned sample (Plog 1976:136-144).

One hundred nineteen 5' by 5' units were thus to be excavated; only four in the northwest corner were not excavated due to previous disturbance (Figure 25). All units were excavated by hand to the plow zone/subsoil interface and the soils screened through 1/4" mesh hardware cloth. The surface of subsoil was then scraped, and any features noted, marked and drawn to scale. The only exception occurred in excavating units within the store foundation. The store's cellar was full of brick rubble from the building's demolition. During the plow zone testing, this was removed down to the cellar floor from the nine 5' x 5' units which fell within the foundation. The brick rubble itself was discarded, the soils were screened and artifacts recovered as in the other plow zone tests. Across the remainder of the testing area, all cultural material was recovered, but brick fragments were for the most part weighed in the field and discarded. Soil samples for chemical analysis were taken from the perimeter of the site in the plow zone.

FIGURE 25

Map Showing Distribution of 5'X5' Test Units Excavated in the Plowzone, Darrach Store Site, Phase III



Once the plow zone testing was complete, backhoes and gradalls stripped the remaining plow zone from the site. The entire area within the original grid was stripped, the subsoil surface scraped and features noted and marked. About two-thirds of the rubble remaining within the store's foundation walls was also removed by backhoe, the balance then shoveled out by hand. The store's cellar floor and foundation walls were then tested through excavation of a sample of thirteen 5' x 5' units (these occasionally varied in size from this norm); they were oriented to the walls of the foundation, rather than to grid north as elsewhere across the site (Figure 26). Excavation proceeded by natural levels and features until subsoil was reached.

Excavation of the other features then began. In all, a total of 236 features were identified and excavated at the Darrach Store site (Figure 26). Smaller features, such as post holes, were first sectioned. Half of the feature was excavated, a profile drawn and photograph taken, and then the other half of the feature removed. As with the plow zone testing, soils were screened and all cultural material recovered, with brick usually weighed in the field and discarded. Larger features, such as the wells and privy, were treated similarly, with a few differences. Excavation proceeded according to cultural levels, and within these, by 0.4' arbitrary levels. Plans were drawn and photographs taken, often at the completion of each level. Flotation and soil chemistry samples were also collected from these features.

Also excavated somewhat differently were those few features extending over large areas. The midden in the eastern central portion of the site (Figure 26) was excavated as a series of 5' by 5' units within the grid, in order that profiles could be drawn across the feature at several points. Being shallow, it was excavated according to natural levels, and soil samples taken for flotation and soil chemistry analysis. The other two large features, the gully and the pond (Figure 26), were only sampled. Six 5' x 5' units were placed along the length of the gully, to determine its eastern and western boundaries, to obtain profiles and artifact samples, and to view it at different points along its length. Excavation of these 5' x 5' units proceeded along natural and 0.4' arbitrary levels. The pond was sampled via a 64' long backhoe trench cut through it from east to west, beginning at approximately S160 W120 and extending to S155 W184. Artifacts were noted but not collected; the depth and stratigraphy of the pond fill were recorded in profile drawings and photographs.

The final stages of the fieldwork consisted of collecting soil samples from the subsoil for chemical analysis, continuing excavation of the three wells below the five foot depth to which they had been excavated by hand, and excavation of the burial. Soil samples from the subsoil were taken at all the coordinates of the 10' site grid. A backhoe assisted with excavation of the wells. The backhoe first excavated a platform around the wells down to the level at which hand excavation had stopped. One large excavation encompassed both Wells 82 and 99 (Figure 26); a separate excavation was undertaken for Well 2. An excavator then got down in the wells and shoveled out the fill; this fill was brought to the surface by the backhoe and artifacts retrieved. These soils were not screened. When the excavator got as deep as possible, the backhoe then lowered the platform around the well, and excavation proceeded as described. Once the water table was encountered beginning at 10'-11' below subsoil, excavation continued principally by backhoe. In all three wells, the excavations had to be abandoned at 14' due to water and the instability of the soils. All three wells continued an indeterminate depth below this level. Finally, the burial was carefully excavated by hand, recorded in place and the bones removed. Excavation was completed in December 1989.

Recording of the excavations included taking black and white photographs and color slides, and preparing plan and profile drawings. In addition, standardized field record sheets were completed on each unit and feature excavated. All features were drawn onto a master site map as they were identified and assigned numbers for excavation. The excavations were also recorded via a video camera. Three tapes of the excavations were prepared, narrated by the Field Director, Angela Hoseth, recorded between August 10 and December 13, 1989.

Once in the lab, artifacts were processed according to the guidelines of the State of Delaware's Bureau of Museums. All artifacts, bone and shell were cleaned with plain water, or, in the case of deteriorating bone, damp-brushed. Bone and shell were then placed in labeled bags, while other artifacts were themselves labeled with the site numbers and three digit provenience number. Catalog forms were completed for each provenience, noting the

Figure 26

Found on the inside of the back cover in a pocket.

number of each artifact type. Ceramic sherds from each provenience were quantified by South type number (Appendix XVI). The data on select artifact types from the plow zone excavations were then entered into a data base so that distribution maps could be prepared. These artifact distributions were expected to yield important information on activity areas within the site, and on changing patterns of trash disposal and land use over time. The data form in essence a substitute for the stratigraphic data lost by the plowing of the site. Other selected artifact types recovered from the features, specifically the ceramics, the shells retrieved from the midden (Feature 108), and the faunal remains, were the subject of more intensive analysis.

The ceramics from the features were crossmended, and then a list of minimum vessels prepared. The attributes recorded for each ceramic vessel were:

1) Proveniences represented
2) Number of sherds from each provenience
3) South type number of the vessel
4) Any other information regarding the vessel's form, size, and decoration determinable from the portion of the vessel recovered.
5) Vessel form ie.,
   a) Flatware vs. hollowware
   b) Drinking form, cups vs. mugs/jugs
6) Vessel function
   a) Dining (Tableware)
   b) Drinking (including tea and coffee wares)
   c) Food Preparation
   d) Food Storage
   e) Medicinal and Hygenic
   f) Other
   g) Food Storage or Dining
   h) Dining or Drinking

The latter two categories were utilized for vessels which could not be assigned definitely to one of the more specific categories. In the designation of the South number for sherds and vessels, an effort was made to maintain South's original numbering scheme. Mean ceramic dates were obtained from South (1977) or the adjusted dates found in Carlson (1983). Lacking stratigraphic data with which to establish chronological relationships among features, the dates determined from artifact analysis, especially the analysis of the ceramics, assumed special significance. Interpretation of the ceramics data focussed on the research questions relating to household goals, statuses and strategies and the changes in them resulting from the agricultural crisis and reform efforts of the nineteenth century.

Pipe stem fragments from each provenience were analyzed employing both the Harrington (1954) and Binford (1961) methods, yet in all cases sample size was so small as to produce invalid deposit dates. Comparatively little bottle and tableware glass was recovered from the features, and sherd size was small.

The analysis of oyster shells recovered from Feature 108, the midden, was undertaken by Keith Doms of the University of Delaware Center for Archaeological Research. This too was expected to inform on the foodways of the store's occupants, an important component of household strategies amenable to archaeological research. A random sample of 100 oysters was selected for analysis, and examined using techniques derived from Kent (1981, n.d.). The length and width of each shell was measured, and the salinity regime, season of harvest, method of opening, age, presence of other organisms, and special characteristics of the shell recorded. Salinity regime was determined by the presence or absence of different characteristic sponge bore holes (Table 8). "These bore holes are caused by c. truttitype, which makes the small holes, and c. celata, which makes holes about four times the size

of c. truttitype. These sponges are very sensitive to salinity and, therefore, act as good salinity markers" (Beidleman, Catts, and Custer 1986:60).

> The oysters were [also] sorted into three groups depending on their shape. Though all are the same species, Crassostrea virginica, the environment in which the oyster is grown can drastically change its shape. Mud flat oysters grow in shallow water on firm muddy sand bottoms. These oysters have a height/length ratio of less than two (Kent 1981, n.d.). Channel oysters usually grow in clumps or reefs in deeper water and are more elongated, having a height/length ratio greater than two. Coon oysters also grow in reefs, but in shallow water, and usually are exposed to the air and sun for long periods. These oysters also have a height/length ratio greater than two, but they have very thin shells, never grow very large, and have multiple attachment scars (Beidleman, Catts and Custer 1986:60).

Season of harvest was identified by studying the growth rates exhibited on the hinge or umbo of the oyster's left ventral valve, with special attention paid to the presence of a winter break and spawn check. Age was also determined by reference to evidence of growth.

TABLE 8

SALINITY REGIME DETERMINATION

Salinity regimes as indicated by combinations of small (c. truttitype) and large (c. celata) boreholes (Kent 1981, n.d.)

	Borehole Combination	Salinity Regime
I	No boreholes	Salinity below 10 ppt for about half of year and rarely above 20 ppt.
II	Valves with small boreholes present, no valves with large boreholes	Salinity below 10 ppt for about one-fourth of year below 15 ppt for about half of year, and occasionally above 20 ppt.
III	Valves with small boreholes more common than valves with large boreholes	Salinity occasionally below 15 ppt and above 20 ppt for one-fourth to to half of year.
IV	Valves with large boreholes as common or more common than valves with small boreholes	Salinity rarely below 15 ppt and above 20 ppt for most of year.

ppt = parts per thousand

After examining an oyster under the microscope it was placed into one of the following six seasonal categories: fall (September-November); late fall/early winter (December); winter (January and February); late winter/ early spring (March); spring (April and May); and summer (June through August). Seasonal limits were based on the ease with which growth rates can be seen. During the winter, January and February, the oyster closes and deposits a conchiolin-rich layer instead of the CaCO3-rich layers that are deposited during the rest of the year. These conchiolin layers, known as winter growth checks, are visible as deep "V"-shaped grooves or, on some eroded oysters, as narrow raised ridges. The distance beyond the last growth check when correlated with the previous three years of growth determines the amount of time that has passed since winter (Beidleman, Catts, and Custer 1986:60).

Different types of damage to the shells correlated with the method of opening employed, either breakage or frontal or side shucking. "Shucking can leave a shallow, "U"-shaped scar along the edge. Breaking leaves a relatively straight line across the edge when broken with a heavy blade (e.g., a hatchet) or large U-shaped indentations around the edge from blunt instruments" (Beidleman, Catts, and Custer 1986:62). Finally, the presence of mudworms, ribbing, attachment scars, barnacles, and brazoas was noted.

Karen Iplenski of the University of Delaware Center for Archaeological Research performed the analysis of the faunal remains recovered from the features. Faunal remains obviously also relate to the site inhabitants' foodways, and information was sought on household strategies and possible changes therein over the course of the late eighteenth and first half of the nineteenth centuries. Analysis began with the identification of each specimen from each provenience. Grayson's definitions of specimen and element were employed. A specimen is defined as "a bone or tooth, or fragment thereof, from an archaeological or paleontological site, while an element is a single complete bone or tooth in the skeleton of an animal" (Grayson 1984:16). Standard faunal analysis techniques were applied, consisting of macroscopic examination, identification and tabulation of attributes. Comparative faunal materials at the University of Delaware were used for identification verification. Of a total of 914 specimens, 381 or 42% were not identifiable, this being primarily a consequence of the highly fragmented nature of the sample. Five hundred thirty-three specimens (58%) were identified, of which 431 were attributable to species. Several of the 533 specimens mended, resulting in a final total of 340 identifiable specimens. Only these were considered further in the analysis. In addition to species, the element represented and any other diagnostic features of the bone were recorded. Analysis then proceeded first considering the entire collection as a single assemblage. A minimum number of individuals (MNI) was computed, and the collection described in terms of the variety, quantity, relative percentages and ages of the species represented, any patterns of element distribution within each species, and any evidence of gnawing, butchering, and/or cooking. In this analysis, both the MNI and the number of identified specimens (NISP) (Grayson 1984) were utilized. It is important to note that the small sample size (Reitz notes a sample of several thousand elements is required to be statistically valid, Reitz and Scarry 1985) has necessitated analyses which must be considered in a qualitative rather than quantitative sense. This is even truer in the case of the analyses and comparisons of the assemblages from individual and temporally associated features. The largest assemblages, recovered from Feature 38 (a post hole or trash pit within the store's addition), from contexts within the store foundation, from Feature 108 (the midden), from Feature 132 (a privy), from Feature 148 (a privy), and from Feature 109 (the remains of the foundation of the store's addition), were analyzed separately and compared to each other and to the entire collection. The analysis paralleled that of the entire collection from the features.

The soil samples taken from select features were floated and sorted. Of those sampled, the following were employed in the site analysis: Feature 99 (Well), Feature 82 (Well), Feature 2 (Well), Feature 75 (Fire pit), Feature 83 (Fire pit), Feature 108, 108A and 108B (Middens), and Feature 132 (Privy). Emphasis was placed on the ethnobotanical remains recovered in the flotation light fraction in order to determine, for example, whether a feature was utilized as a privy or whether the midden received vegetable waste in addition to the bone, shell and other household trash recovered from it. The samples were not analyzed by an ethnobotanist. Qualitative analytical techniques were employed by lab personnel in which the presence of commonly identifiable seeds, charcoal and other specimens was noted.

The University of Delaware Soil Testing Laboratory determined the levels of pH, phosphate, potassium, magnesium, and calcium in 46 soil samples from plow zone contexts, 382 from the subsoil, and 113 from features. The readings from the plow zone and subsoil samples were then entered into a data base and distribution maps generated. An insufficient distribution of samples prevented preparation of valid maps of the plow zone chemical readings. As high levels of each of these chemicals in the soil ideally indicate different human activities and uses of that area of the site, the soil chemistry analyses were conducted in the hope of contributing data relevant to the research questions relating to landscape and land use.

> Relatively high levels of phosphate are known to be derived from the deposition of organic wastes through purposeful manuring or due to the presence of an area where animals were confined either by fences or by a structure. [They would also be expected from privy features, for example.] Elevated concentrations of potassium are derived from the deposition of wood ash through surface burning or by the dumping of fireplace or stove ash. Calcium concentrations result from agricultural liming, the deposition of oyster shells, or the presence of building materials such as mortar or cement. Magnesium concentrations are affected by most of the processes controlling calcium concentrations and magnesium is especially elevated if dolomitic limestone has been applied. With the pH of a soil, readings greater than 7.0 indicate alkaline soils and less than 7.0 indicate acidic soils. Delaware soils are naturally acidic, and readings above 6.0 indicate agricultural liming (Coleman et al. 1985:81).

ARCHAEOLOGY AND MATERIAL CULTURE

Introduction

A 190' by 240' area of the John Darrach Store site, 45,600 square feet or just over one acre, was stripped and virtually completely excavated in the course of the Phase III excavations. The only exceptions were the three wells incompletely excavated due to their depth and the gully and pond only sampled due to their size. The landscape and land use data generated by the excavations are outstanding. Discussion will begin with the brick store itself, then move to the post-in-ground outbuildings, the wells, privies, trash pits and midden, and then to the series of fencelines which divided functional areas of the site and planting holes often found in association with them. From there, attention will be turned to the roasting pits, the grave, the gully and pond, and finally to the remaining miscellaneous and unidentified features. Artifacts from each feature will be considered along with the site data. Specialized analyses will be reported separately. These include the distribution studies of the plow zone artifact assemblages, the faunal analysis, the feature ceramics analyses, and the soil chemistry distribution studies. Synthetic conclusions and interpretations will complete the presentation of the intrasite data. In a final section of the report, intersite comparative analyses will be presented.

Before proceeding with the dissection of the site into its component features, an overview of the site layout and land use is warranted. This introductory orientation to the site is based solely on the nature and distribution of features (Figure 26). The Darrach Store site is bounded to the north by Woodland Beach Road. To the east and south, the site boundary was defined as the point beyond which no features occurred. On the eastern side, this is just beyond the edge of the midden. To the south, features become sparse beyond a cluster at S130-S150, and disappear altogether by S180. The western boundary of the site appears to be marked by a fence and planting line about 40' west of the gully, and oriented roughly along the grid north-south line.

The remains of the brick store occupy the central portion of the site along its northern boundary. Evidence of a small addition, similarly oriented, appears beyond the store's east wall. Not far from the southeast corner of this addition was found a grave. The balance of the site can perhaps best be described by reference to the natural and cultural features created and/or used by the store's owners and residents to separate and segregate spaces upon the land. The gully and pond form the only natural boundaries in the Darrach Store landscape. The pond occupied the southwestern corner of the site and was drained by the gully trending roughly grid north-south. With the