# MANAGEMENT SUMMARY

This report forms part of the Alternative Mitigation treatment program for the Reedy Island Cart Road 4 Site [7NC-F-153], a historic archaeological site treated as eligible for the National Register of Historic Places under the 2007 Memorandum of Agreement for the U.S. Route 301 project in New Castle County, Delaware. Phase I and II studies at 7NC-F-153 showed it to consist of four 18th-century domestic loci, and a fifth area to the south which contained features probably relating to a late 17th- and 18th-century cart road connecting Choptank Road with the east-west route leading to Bohemia Manor from Port Penn and Reedy Island. The cart road features are contributing elements to 7NC-F-153. Since they could not be avoided, a treatment program was agreed to address the adverse effect of the U.S. Route 301 construction.

The component of the treatment plan documented in this report is the testing of a depositional model developed to predict the physical survival of cart-road features in different topographic zones within the U.S. Route 301 corridor. Soils were predicted to have been subject to different degrees of deflation and colluviation depending on the degree of slope and the extent to which they had been cultivated. This deflation and colluviation would have either preserved or destroyed the physical features relating to the road.

The model was tested in the area immediately east of 7NC-F-153, comprising a crossing of the Spring Mill Branch of the Drawyers Creek drainage and the agricultural field on its eastern side. A total of six distinct but complementary and integrated techniques were used in combination to test the model.

Firstly, LIDAR imagery of the area was obtained and reviewed as bare earth contours at two foot intervals. It was hoped that this technique would be particularly effective in identifying features around the wooded crossing point of the creek. Several possible crossing points were identified, but none showed conclusively cultural features.

This was followed up with detailed contour mapping of the crossing area using a total station. This technique proved more useful than the LIDAR, and identified possible ramp-like features on both sides of the incised valley through which the drainage runs. These are interpreted as landscaping features designed to facilitate access by carts to the crossing.

Two remote sensing technologies, ground-penetrating radar (GPR) and gradiometry, were used in tandem on the sloping agricultural field on the east side of the drainage in an attempt to identify signatures that could be related to the cart-road alignments. The GPR approach located several paired linear anomalies that appeared similar to the parallel ditches or ruts noted in the Phase II work at 7NC-F-153. These were provisionally interpreted as several roadway alignments converging on the crossing zone from the east.

## MANAGEMENT SUMMARY (CONTINUED)

Gradiometry proved more effective at identifying natural geomorphological features, particularly infilled circular and ovoid seasonal drainage features known as Delmarva Bays. An extant example of one of these bays remains in another portion of the field. Other identified points were predicted to be cultural in origin.

After review of the remote-sensing data, a series of 14 machine-assisted trenches were placed in the agricultural field and on the vegetated east margin of the Spring Mill Branch. These were intended to investigate the physical expression of the anomalies found in the GPR and gradiometer surveys.

Trench B-A-H yielded a large deep prehistoric storage pit (not predicted by the remote sensing). Trenches T and U, which were located within the secondary growth wooded upland between the Spring Mill Branch and the agricultural field, identified possible shallow traces of ditches/ruts. Despite the strong imagery from the remote sensing data, it was not possible to identify any corresponding physical expressions of the linear features in the remaining trenches. Review of the apparently contradictory data suggests that the linear features visible on the GPR reflect real chemical, magnetic and compaction contrasts in the soils that are simply not observable by conventional visual and tactile archaeological techniques.

The final technique deployed was the use of a penetrometer to test for differences in soil compaction predicted to be created by animal-powered wheeled transport over a defined cart road route. Results from the main investigation area were compared with readings from a re-exposed section of the cart road alignment in 7NC-F-153 to the west of the Spring Mill Branch. The studies showed that the “berm” area between the ditches or ruts was significantly more compact than areas outside the ditches or ruts. The bases of ditches/ruts themselves showed compaction intermediate between the “berm” and areas beyond. The working hypothesis from these data is that the “berm” reflects compaction created by draught animals pulling carts, wagons or sleds.

Overall, this research program showed that the original model was over-optimistic in its prediction of the likely physical survival of features of these early, somewhat ephemeral, roads. The distinctive ditches or ruts now seem likely to survive as physically observable features only where protected first by colluviation and then by successional growth. However, ground-penetrating radar frequencies appear to have the ability to detect the signature of these features, which therefore survive almost as “ghosts” in the soil profile.