1.0 INTRODUCTION

This report presents Skelly and Loy's computer-generated archaeological predictive surfaces for pre-contact period archaeological resources and historic period archaeological resources developed for the proposed Western Parkway project.

1.1 Purpose and Need

The Delaware Department of Transportation (DelDOT) is studying the feasibility of constructing the Western Parkway, an alternate route to U.S. Route 1, between Red Mill Pond and Delaware Route (S.R.) 24 in Lewes and Rehoboth hundreds, Sussex County. As part of the project feasibility studies, DelDOT will complete an Environmental Impact Statement (EIS). In accordance with Section 106 of the Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969, the EIS must address the impact of proposed project construction on archaeological resources. Skelly and Loy is providing the predictive surfaces in this report for DelDOT to use within the proposed roadway alternatives selection process in order to help minimize the impacts of the project on significant archaeological resources and to help reduce the costs and work effort required for subsequent archaeological testing and/or mitigation within the selected preferred roadway alternative.

The need for transportation changes in eastern Sussex County was introduced in the DelDOT-sponsored Sussex Route 1 Grid Study in 1999. As part of the recommendations, a network of secondary road connections was proposed to create a new roadway connection between U.S. Route 1 west of Five Points, south to S.R. 9. Subsequent to the Sussex Route 1 Grid Study, DelDOT and Sussex County jointly conducted the S.R. 1 Land Use & Transportation Study in 2003. The overall objectives of this study were to increase the mobility of area residents by developing alternative roadway links and connections; provide a variety of ways to travel; reduce congestion; improve safety; maintain the character of the study area; and gain public acceptance of the study recommendations. As a result of these studies, DelDOT is initiating the Western Parkway Project to accommodate anticipated traffic growth due to existing and future land development and to provide local travel options for existing and future residents west of U.S. Route 1.

1.2 Study Area Description

The Western Parkway study area is located on the Fairmount and Lewes, Delaware 7.5 minute United States Geological Survey (USGS) topographic quadrangles (USGS 1984, 1997) (Figure 1). For the purposes of the predictive surfaces construction, DelDOT specified a study area which encompasses all of the routes of the proposed roadway alternatives being considered. The Western Parkway study area is bounded by Red Mill Pond on the northwest, Love Creek on the southwest and south, S.R. 24 on the southeast and east, and U.S. Route 1 on the north. The study area encompasses 2,557.48 ha (6,319.45 ac) and is a mix of residential, commercial, public, and agricultural buildings/facilities and uses. The commercial uses are mainly concentrated along the U.S. Route 1 corridor, while the agricultural lands are mainly in the southwestern portion of the study area. Traditional residential areas occur along U.S. Route 1, while newer subdivisions and residential development is occurring in the areas to the southwest and northeast of the highway.

The study area has been predominantly agricultural in the past, but increased tourism, along with commercial and residential development has converted many crop fields to shopping areas and housing plans. Within newer residential plans and commercial areas, initial construction and site preparation included the complete excavation of the surface and upper subsoil, with re-grading and landscaping after construction. This development has disturbed large portions of the study area and is a major averaging variable in the compilation of the predictive surfaces.

1.3 Geographic Information Systems (GIS) and Archaeological Predictive Surfaces

Archaeological predictive modeling and construction of predictive surfaces for pre-contact and historic period site locations has become an increasingly valuable tool, particularly within the applications of site/alternative selection and impact assessment in project planning (Allen *et al.* 1990; Carr 1985; Judge and Sebastian 1988; Kohler and Parker 1986; Kvamme 1983, 1986, 1990). The primary reasons for the application of archaeological predictive surfaces are cost effectiveness and planning utility. In order to be effective, a predictive surface must be flexible and inexpensive to apply and be capable of projecting likely cultural resource distributions across an area based on a sample of that region's known resources or on fundamental notions of human behavior (Kohler and Parker 1986), while retaining a reliable

degree of accuracy and validity. If effectively developed, tested, and applied, the use of predictive surfaces early in project planning allows the proposed project construction to avoid destruction of cultural resources and to potentially limit expenses associated with cultural resource testing, assessment, and mitigation.

In order to be effectively developed, tested, and applied, the predictive surface methodology must be flexible, allowing for refinements and reiterations to be quickly and inexpensively made as the process proceeds. In recent years, the development of more powerful and sophisticated computer hardware and software has lead to the growing use of computer-generated models involving geographic information systems (GIS). Working in a GIS environment for the construction of the predictive surfaces allows the flexibility necessary to make the predictive surfaces as powerful as possible. The spatial data are created, processed, and displayed within a GIS, using ARC/INFO® software (ESRI 1992). The GIS uses locational data, such as mapped features, and a relational database to allow for sophisticated spatial analyses and data manipulation/querying. This capability allows for the construction of archaeological predictive surfaces within any mapped geographic area by using the distribution and character of environmental variables in relation to patterns of archaeological site locations (Allen *et al.* 1990; Calamia 1986; Kvamme 1986, 1989; Savage 1989). The Western Parkway predictive surfaces were constructed using GIS and environmentally correlative data associated with the study area and its surrounding environs, and are based on a methodology utilized by Skelly and Loy in the past (Duncan 1997, 1998, 2002; Duncan and Schilling 1998, 1999; Duncan *et al.* 1995, 1998, 1999; Espenshade and Duncan 2000; Skelly and Loy, Inc. 1996).