

THE FEASIBILITY OF USING COMPUTER  
GRAPHICS IN ENVIRONMENTAL EVALUATIONS

Interim Report  
Documenting Historic Site Locations  
Using Computer Graphics

by

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(The opinions, findings, and conclusions expressed in this report are those of the author and not necessarily those of the sponsoring agencies.)

Virginia Highway & Transportation Research Council  
(A Cooperative Organization Sponsored Jointly by the Virginia  
Department of Highways & Transportation and  
the University of Virginia)

In Cooperation with the U. S. Department of Transportation  
Federal Highway Administration

Charlottesville, Virginia

June 1981  
VHTRC 81-R52

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PREFACE

This report has been prepared as part of the HPR study entitled, Feasibility of Using Computer Graphics in Environmental Evaluations. This illustration of the use of computer graphics in locating historic landmarks is an important element in the study because it demonstrates a format that can be used for all other variables considered in environmental evaluations. Use of the technique demonstrated will enable the Department to significantly reduce the amount of time required to obtain approval for federally-funded projects.

The position of approximately 1,000 locations listed on the Virginia Landmark Register, nominated for or included on the National Register of Historic Places have been plotted.

In order to meet a current need (i.e. obtain quick approval of federally funded projects); and to achieve implementation of recommendations as soon as possible, this report is being submitted prior to the target date for completion of this project, August 15, 1981. A final report will be submitted to document the completion of this study.



## FINDINGS AND RECOMMENDATIONS

Findings

1. The computer hardware, software, and expertise needed to develop a computer graphics data system for locating known historic landmarks are available within the Virginia Department of Highways and Transportation.
2. The information needed to accurately determine the location of known historic landmarks can be obtained from the files of the Virginia Historic Landmarks Commission.

Recommendations

1. That the data system presented in this report be used to identify the locations of historic landmarks.
2. That an agreement be made between the Department and the Virginia Historic Landmarks Commission that will allow immediate authorization of proposed highway projects in areas containing no significant historic locations.



## SUMMARY

This report describes a method for locating historic site information using a computer graphics program. If adopted for use by the Virginia Department of Highways and Transportation, this method should significantly reduce the time now required to determine the locations of historically significant sites and their proximity to highway and transportation projects.

A data bank containing all properties either listed on or nominated for the National Register of Historic Places, and those listed on the Virginia Register of Historic Places has been developed. These data can be retrieved in standard line-printer output or in a graphic representation using a pen plotter. With this information, the absence of historically significant sites in an area can be quickly established, thereby reducing the time needed to meet federal regulations and obtain approval for a proposed highway project.

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INTRODUCTION

When a transportation project involving federal funds, federal approval, or federal licensing will affect a historically significant property, a detailed plan for the use of that property must be developed by the agency responsible for the project. This plan must be approved by the Secretary of Transportation under section 4f of the National Transportation Act of 1966 and by the Executive Director of the Advisory Council on Historic Preservation under section 106 of the National Historic Preservation Act of 1966.\* While it has been estimated that only 20% of the projects undertaken yearly affect properties designated as being historically significant, to identify these 20% all projects must be surveyed and approved by the state historic preservation office.

PROBLEM STATEMENT

Requests for historic location surveys are sent to the Environmental Quality Division from the Location and Design Division and from the district environmental coordinators. These requests are forwarded to the state historic preservation officer at the Virginia Historic Landmark Commission, where the files are searched and the findings sent to the Environmental Quality Division. This process is very time consuming because the files of the Landmark Commission are manually maintained, but there presently is no alternative. In summary, the Department is completely dependent upon the Landmark Commission for its information on historic sites, and cannot expedite the retrieval of this information.

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\*The Secretary's approval under section 4f of the National Transportation Act of 1966 is required only when there is a taking of right-of-way.

## OBJECTIVE

The objective of this study is to develop a procedure that can be used by the Department to quickly distinguish between proposed transportation projects that would affect historically significant properties and thus require 106 or 4(f) approval and those that would not. This procedure could be used as the basis for an agreement between the Department and the Historic Landmarks Commission to expedite evaluations of environmental impact.

## METHODOLOGY

The methodology used in this study involved the selection of an appropriate computer program, the establishment of a data bank, the development of procedures for accessing and updating information, and the design of a suggested agreement under which the existence or nonexistence of historic sites within a project area could be documented.

### Computer Program

A computer program designed to display data on a pen plotter was obtained from the Federal Highway Administration (FHWA) and is being used by the Data Processing Division of the Department to display the location of known historic landmarks. The information can be obtained in standard line-printer output form as in Figure 1 or in a graphic representation as in Figure 2. The scale of the data collected can be varied to enable displays at the state level, as in Figure 2, or at the county and quadrangle levels, as in Figures 3 and 4, respectively.

### Data Bank

The information to be collected and maintained in the data bank was decided upon through discussions with representatives of the Department, the Landmarks Commission, and the registrar from the National Registrar of Historic Places.

In the files of the Landmarks Commission there are approximately 20,000 historic locations that were identified in a survey of Virginia. From those files, only about 1,000 representing locations listed on or nominated for the National Register and those listed on the Virginia Register were selected for this study.

## VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION

## HISTORIC LANDMARK DATA

FILE NUMBER	099065	
DESCRIPTION	BRYAN SITE	
CATEGORY	SITE	
AREAS OF SIGNIFICANCE		
	ARCHEOLOGY - HISTORIC	
	ARCHITECTURE	
ACREAGE	10	
CITY/COUNTY	YORK	COUNTY
QUADRANGLE	WILLIAMSBURG	096C
COORDINATES	NORTH	EAST
	18 4215820	353200
	18 4125700	353270
	18 4125800	352890
	18 4125920	352940
	18 4125820	353200
HABS	NO	
REGISTRATION	NATIONAL REGISTER OF HISTORIC PLACES	
DATE	1700	
ORIGINAL USE		
HISTORIC USE		

Figure 1. Typical printout of information contained in historic DATA Bank.

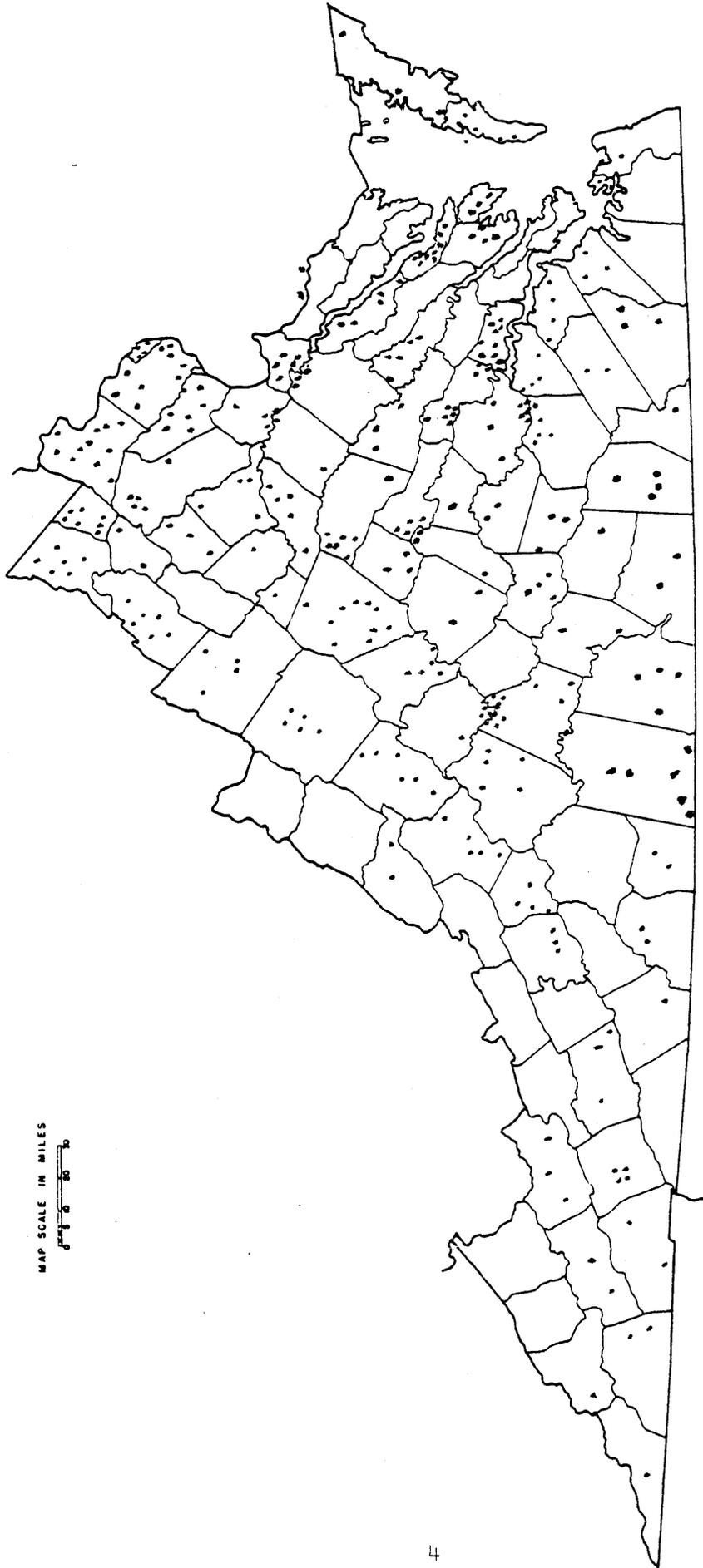


Figure 2. Density map of known historic landmarks.



Figure 3. County map with historic site location overlay.

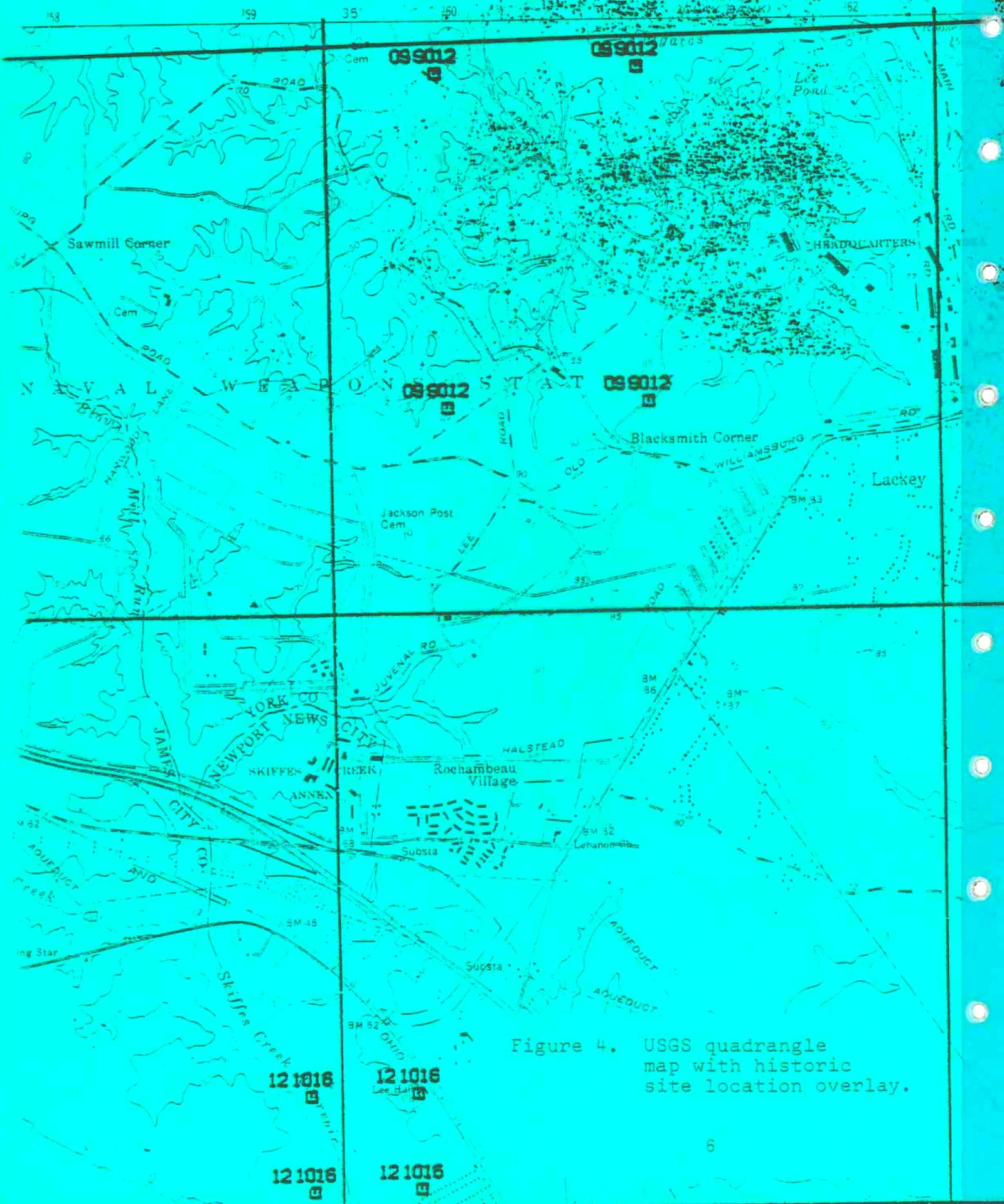


Figure 4. USGS quadrangle map with historic site location overlay.

From these files, the following information was extracted:

File number: This is a six-digit number. The first three digits represent the geographic location of the site, the remaining three identify the specific site within that location.

Description: The preferred historic name of the location.

Category: A one-digit number that identifies the location as a district, a building, a structure, a site, or an object. (See Appendix A for code sheet.)

Area of Significance: A two-digit number that identifies the reason(s) the site is historically significant (e.g., architecture, art, commerce, or transportation.)

Acreage: The amount of acreage surrounding the site. This number may be an overestimate of the property involved. For example, if the record shows "less than (1) acre", 1 acre will be recorded; and if the property is recorded as a fraction, the next whole number will be recorded.

City/County/Town: Both the name and a three-digit code assigned by the state are used to identify the geographic location of the site.

Quadrangle map: The name and quadrangle number assigned by the United States Geological Survey (USGS) are used for location.

Latitude and Longitude: The coordinate system was used to gather historic data prior to 1966; consequently these data are gathered and translated into state plane coordinates (SPC) for use by the Department.\*

UTM Coordinates: The Universal Transverse Mercator (UTM) system is presently used to locate historic sites. These are translated to SPC for use in the program.\*

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\*A program obtained from the USGS is used to make these conversions.

HABS: Refers to the Historic American Building Survey. A "1" is used to indicate that the historic sight was a part of this survey.

Registration: This indicates if the landmark is on the National Register, is a National Historic Landmark, has been nominated to the National Register, or is on the Virginia Landmark Register.

Date: This is the most significant date of the landmark or a date that has been established for the origin of the landmark.

Original Use: The use for which the landmark was originally constructed or used (e.g., nationally the Alamo was originally a church; in Virginia the Sutherland Mansion was originally a private residence.

Historic Use: The use for which the landmark is known and because of which it is deemed historically significant (e.g., the Alamo was originally a church but is historically noted as a fortress; the Sutherland Mansion was the last capitol of the Confederacy).

An effort was made to collect enough data to make the program useful to the Historic Landmark Commission while at the same time not so complex that the time required to complete the data bank and the effort needed for updating would be unreasonable. (Examples of the Code Sheet and Information Keys used to facilitate collection of data are in Appendix B.)

#### Data Access

Information from the data bank can be obtained upon request from the Data Processing Division. The process is intended to be easily used by people in various disciplines; consequently, the information can be retrieved by identifying the code number of the county or quadrangle for which data are desired. Also, the information can be retrieved by identifying the latitude/longitude, UTM, or state plane coordinates that encompass the area for which information is desired. USGS maps and county code numbers are now being processed and will be supplied to potential users of the data bank.

### Security

The information will be available to a broad range of users. However, changes in the data, such as the addition of new properties or sites, changes in the status, or the deletion of information, will be made only by those designated by the Manager of the Data Processing Division.

### Updating

The approximately 100 sites added to the Virginia Register each year by the Virginia Historic Landmarks Commission would be added to the data bank at the rate of about 10 per month for 10 months each year. Any landmarks declared "of local interest" at such occasions as scoping meetings, will be added to the bank by the Department. The decision to delete a property from the data bank can be made only by the authority of the Manager of the Data Processing Division in agreement with the state historic preservation officer or his representatives.

### Benefits

The major advantage of using a computer graphics system for locating historic site data is the elimination of delays resulting from the manual plotting of coordinates now needed to enter new data and the manual search now required to retrieve data.

With the present method, the location on a newly recorded site must be plotted on a USGS quadrangle map. With the computer graphics technique, overlays of the new location can be produced by entering coordinates into the data bank.

Presently, requests for surveys are forwarded to the state historic preservation officer at the Virginia Historic Landmarks Commission, where the files are searched and the findings sent to the Environmental Quality Division. This process is extremely time consuming because the files of the Landmarks Commission are manually maintained. Consequently, the technique developed as a result of this study is valuable because it can be used to quickly eliminate from consideration those projects (approximately 80%) which need no further scrutiny.

## PROPOSED AGREEMENT FOR USE OF HISTORIC SITE LOCATION DATA

It is desirable that there be an agreement between the Department and the Landmarks Commission that would enable the Department

to proceed with projects that do not involve or affect historically significant properties without approval of the Commission. The major difference between this proposal and the existing situation is that the Department would obtain the needed information from the Data Processing Division rather than from the Commission. Retrieval would be much quicker and requests to the Commission for subsequent data would be specific and imply a time limit.

The basis of the agreement must be an accurate data base. The accuracy of the base would have to be decided upon by parties to the agreement. The listings in the data bank would be cross checked with the listings of the files of the Commission. Since the initial data collection was performed by the Department, the accuracy of these data should be verified by the Commission. The accuracy of the graphics should also be checked against the files of the Commission. Once it has been agreed that the data bank is accurate, an agreement could be documented.

The next phase of the agreement would be to designate a person in the Department, most likely someone from the Environmental Quality Division, to access and evaluate historic site location data.

Procedures would be established that would enable the Environmental Quality Division to decide if a project should be referred to the Commission for further study.

If a decision were made not to involve the Commission in a specific project, a memorandum would be sent to the state historic preservation office, along with documentation of the data upon which the decision was made. Time limits for replies could be established.

## APPENDIX A

Historic Sites  
Information Key

## Category (Column 7-46)

1. District
2. Building
3. Structure
4. Site
5. Object

## Significance (Column 48-61)

- |                             |                             |
|-----------------------------|-----------------------------|
| 1. Archeology - prehistoric | 27. theater                 |
| 2. Archeology - historic    | 28. transportation          |
| 3. agriculture              | 29. local history           |
| 4. architecture             | 30. scenic                  |
| 5. art                      | 31. medicine                |
| 6. commerce                 | 32. presidential birthplace |
| 7. communications           | 33. animal husbandry        |
| 8. community planning       | 34. folklife                |
| 9. conservation             | 35. decorative arts         |
| 10. economics               | 36. 19th century townscape  |
| 11. education               | 37. revolutionary history   |
| 12. engineering             | 38. afro-american           |
| 13. exploration/settlement  | 39. fire fighting           |
| 14. industry                | 40. civil war               |
| 15. invention               | 41. printing                |
| 16. landscape architecture  | 42. resort                  |
| 17. law                     | 43. stone structure         |
| 18. literature              | 44. presidential home site  |
| 19. military                | 45. equestrian              |
| 20. music                   | 46. labor                   |
| 21. philosophy              | 47. funerary art            |
| 22. politics/government     | 48. park planning           |
| 23. religion                | 49. health                  |
| 24. science                 | 50. maritime                |
| 25. sculpture               | 51. colonial settlement     |
| 26. social/humanitarian.    | 52. nautical                |

## Registration (Column 106)

1. National Register of Historic Places
2. National Historic Landmark
3. Virginia Landmark Register
4. Determination of Eligibility
5. Virginia Historic Landmark Commission Inventory



APPENDIX B

VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION  
RESEARCH COUNCIL  
LANDMARK RESEARCH DATA

FILE NO \_\_\_\_\_  
COL 1-6

DESCRIPTION \_\_\_\_\_ Name of Property \_\_\_\_\_  
COL 7-46

CATEGORY See Information Key  
47

AREAS OF SIGNIFICANCE \_\_\_\_\_ See Information Key \_\_\_\_\_  
COL 48-61

ACREAGE In even numbers 1 through 1,000  
62-65

CITY/COUNTY/TOWN spelled out \_\_\_\_\_ CITY/COUNTY/TOWN CODE \_\_\_\_\_ Standard State Code  
66-68

QUADRANGLE MAP spelled out \_\_\_\_\_ QUADRANGLE CODE \_\_\_\_\_ USGS Code  
COL 69-72

LATITUDE \_\_\_\_\_ LONGITUDE \_\_\_\_\_  
73-78 79-84

UTM COORDINATES

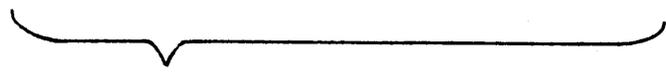
NORTH \_\_\_\_\_ EAST \_\_\_\_\_  
85-94 95-104

HABS "1" if yes, otherwise blank  
105

REGISTRATION See Code Sheet  
106

DATE Most significant or earliest  
107-110

ORIGINAL USE \_\_\_\_\_ HISTORIC USE \_\_\_\_\_  
111-113 114-116



For future use

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