

1. Report No. HPR/VA 91-R1	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Developing Design Elements for Scenic Byways in Virginia		5. Report Date	
7. Author(s) Bradbury Purinton, Lester A. Hoel, & Michael Perfater		6. Performing Organization Code	
9. Performing Organization Name and Address Virginia Transportation Research Council Box 3817 University Station Charlottesville, VA 22903		8. Performing Organization Report No.	
12. Sponsoring Agency Name and Address Virginia Department of Transportation 1221 E. Broad Street Richmond, VA 23219		10. Work Unit No. (TRAIS)	
15. Supplementary Notes In cooperation with the U.S. Department of Transportation, Federal Highway Administration		11. Contract or Grant No. 2663	
16. Abstract		13. Type of Report and Period Covered Final -- February 1991	
<p>Virginia has had a scenic roads program since 1966 that provides for the designation of certain roads as Virginia Byways. This program does not require the application of any special technical requirements in the selection, designation, maintenance, or modification of these roads.</p> <p>The research reported herein was undertaken to determine (1) whether these Virginia Byways require special design considerations by virtue of their use, (2) what design elements that would be dictated if special design considerations were found to be appropriate, and (3) the degree to which current standards provide for these considerations.</p> <p>The institutional memory on the subject was reviewed, and current federal and state scenic roads programs were examined. It was concluded (1) that special design considerations are appropriate, (2) that design elements could be identified, and (3) that current design standards provide for neither the design considerations nor the resulting design elements. Recommendations are made for future practice and further research.</p>		14. Sponsoring Agency Code	
17. Key Words Byways, scenic roads, design elements, design standards, national roads		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

FINAL REPORT**DEVELOPING DESIGN ELEMENTS FOR SCENIC BYWAYS IN VIRGINIA**

Bradbury Purinton
Graduate Research Assistant

Lester A. Hoel
Faculty Research Scientist

Michael A. Perfater
Research Scientist

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

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

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

Charlottesville, Virginia

April 1991
VTRC 91-R1

ADMINISTRATION & FINANCE RESEARCH ADVISORY COMMITTEE

- J. W. ATWELL, Co-Chairman, Director of Finance, VDOT**
- A. W. COATES, JR., Co-Chairman, Asst. Commissioner, VDOT**
- M. A. PERFATER, Executive Secretary, Research Scientist, VTRC**
- F. C. ALTIZER, Salem Resident Engineer, VDOT**
- A. V. BAILEY, II, Fairfax Resident Engineer, VDOT**
- A. C. BAIRD, Administrative Services Officer, VDOT**
- R. J. BOYD, JR., Human Resources Administrator, VDOT**
- R. G. CORDER, Rail & Public Transportation Administrator, VDOT**
- J. L. CORLEY, Bristol District Administrator, VDOT**
- T. F. FARLEY, Culpeper District Administrator, VDOT**
- C. D. GARVER, JR., Northern Va. District Administrator, VDOT**
- J. S. GIVENS, Asst. Budget Officer, VDOT**
- J. GROUNDS, Financial Manager, Federal Highway Administration**
- M. S. HOLLIS, Urban Engineer, VDOT**
- L. D. JONES, Management Services Administrator, VDOT**
- E. T. ROBB, Asst. Environmental Quality Engineer, VDOT**
- A. S. SABO, Internal Audit Manager, VDOT**
- C. S. SORRELL, Richmond District Administrator, VDOT**
- P. C. TARDY, Information Systems Manager, VDOT**
- M. L. TISCHER, Policy Office Administrator, VDOT**
- S. A. WAYMACK, Right-of-Way Engineer, VDOT**
- G. A. WHIRLEY, Fiscal Manager, VDOT**

TABLE OF CONTENTS

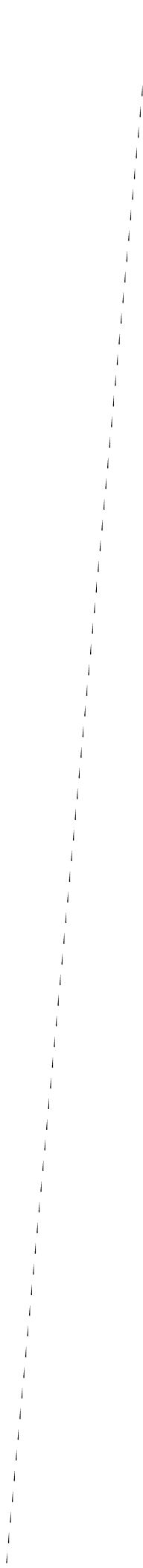
ABSTRACT	v
INTRODUCTION	1
National Scenic Roads Efforts	1
Virginia's Scenic Roads Efforts	9
PURPOSE AND SCOPE	12
METHODOLOGY	12
RESULTS AND DISCUSSION	13
The Nature and Purpose of Scenic Roads	13
Identification of Design Considerations	14
Identification of Design Elements	18
Examination of Current Standards	19
CONCLUSIONS	21
RECOMMENDATIONS FOR FUTURE PRACTICE	22
RECOMMENDATIONS FOR FURTHER RESEARCH	23
APPENDIX A: Summary of Virginia Byways	25
APPENDIX B: Sample Current State Programs	29
APPENDIX C: National Scenic Byways Study Case Study Summaries	41

ABSTRACT

Virginia has had a scenic roads program since 1966 that provides for the designation of certain roads as Virginia Byways. This program does not require the application of any special technical requirements in the selection, designation, maintenance, or modification of these roads.

The research reported herein was undertaken to determine (1) whether these Virginia Byways require special design considerations by virtue of their use, (2) what design elements would be dictated if special design considerations were found to be appropriate, and (3) the degree to which current standards provide for these considerations.

The institutional memory on the subject was reviewed, and current federal and state scenic roads programs were examined. It was concluded (1) that special design considerations are appropriate, (2) that design elements could be identified, and (3) that current design standards provide for neither the design considerations nor the resulting design elements. Recommendations are made for future practice and further research.



FINAL REPORT

DEVELOPING DESIGN ELEMENTS FOR SCENIC BYWAYS IN VIRGINIA

Bradbury Purinton
Graduate Research Assistant

Lester A. Hoel
Faculty Research Scientist

Michael A. Perfater
Research Scientist

INTRODUCTION

The closing years of the 1980s saw a resurgence of interest in scenic roads especially in the National Scenic Byways Program. Although the form this program might take has thus far been described by its backers only in abstract terms, the funding for an initial study of the feasibility of such a program was to be provided by Congress in 1990.¹ The idea of a scenic byways program seems to have significant support at the federal level. On a visit to Virginia in June 1989, President Bush said:

I want to preserve our scenic byways—those picturesque roads that offer powerful views of the nation's natural splendor. These are the roads Americans love—and such scenic roads can and should be designated for the enjoyment and the convenience of travelers.²

The current interest in a national scenic byway system is similar to that which developed in the mid-1960s and in the early 1970s. During the former period, a number of states initiated scenic road programs of one sort or another. This flurry of activity over the last two decades regarding the need for scenic roads and the fact that Virginia considers itself committed to promoting tourism points up the need for this research.

National Scenic Roads Efforts

In order to better understand the omission of the consideration of these standards up until now, it will be helpful to review briefly the history of the scenic roads

1. Speech by Sen. Rockefeller at "Scenic Byways 89" Conference, Washington, D.C., 6 November 1989.

2. President Bush, speaking on 21 June 1989 at a Richmond, Virginia, meeting of the Family Motor Coach Association. Quoted in *Scenic Byways Bulletin*, 1, No. 4 (July/August 1989), p. 1.

movement in the United States. There are two basic perspectives from which the federal efforts can be discussed: the programs that have existed for many years and the programs that have been proposed or instituted more recently. The former comprise the programs of the various agencies that have responsibility for management of public lands, such as the Park Service, the Forest Service, the Bureau of Land Management, and the Corps of Engineers—to name the most visible. The scenic roads on the agencies' respective land holdings were constructed originally for purposes other than recreational travel and scenic viewing. These purposes included basic access where no prior roads had existed (as in some of the National Parks and National Forests), commercial uses of the lands (such as the forest access roads used in timber hauling and the roads on BLM land leased to ranchers), and the WPA projects during the Depression. Examples of programs that have been instituted more recently are well known and serve as models cited by supporters of scenic road programs in descriptions of the favorable impact that such roads can have on the tourist industry in the road corridor involved. The Blue Ridge Parkway is the best known and most visited of these. The scale of use of the major National Park Service roads is evidenced by the fact that the Blue Ridge Parkway, the George Washington Memorial Parkway, the Natchez Trace, and the John D. Rockefeller Memorial Parkway had 39,337,541 visitors in 1987.³

The Forest Service Scenic Byway Program, announced in May 1988, is the first federal designation program. The Chief of the Forest Service, Dale Robertson, said that the program resulted from the increased demand for emphasis on recreational rather than commercial use of National Forests.⁴ Discussions that the author had with a number of Forest Service officials involved with the program gave the impression that this has produced a tiger-by-the-tail situation: the enthusiasm and extent of response has far exceeded all expectations.

Apparently, the program was initially envisioned as a low-key, low-cost means of addressing the demand for recreational use of the forests, which has been widely publicized recently in debates over the forest management plans. Mr. Robertson has stated in testimony before Senate Committees that the program is especially attractive in that it is low cost (the roads exist); it will benefit the Forest Service in enhancing the public awareness of the multiple functions of National Forests; and it will benefit the visitors who are already using forest roads in growing numbers by directing them to roads that are both scenic and functionally adequate.⁵ The Chrysler Corporation has joined this effort with a number of initiatives, including providing information booklets on the roads with each new Plymouth sold and a major *Readers Digest* advertising supplement. Robertson has described the program as one in which everyone wins.⁶ One interesting aspect of the program, described by a Forest Service engineer who was dealing with the tech-

3. John O. Spengler and George H. Siehl, "Scenic Byways: Issues and Action" (Washington: Congressional Research Service, 1988), p. 5.

4. Dale Robertson's testimony at 14 April 1989 hearing before the Subcommittee on Foreign Commerce and Tourism.

5. *Ibid.*

6. *Ibid.*

nical issues involved, is that the very success of the concept may produce unexpected problems. As noted above, the roads involved are existing ones, and the program does not include any special technical standards or requirements. In fact, all the roads involved are not under Forest Service jurisdiction (some are county or state roads within and/or adjacent to national forests), and an upgrade or improvement of these roads was not foreseen as an element of the program. As the traffic volume on some of the less-improved (some unpaved) roads increases through growing public awareness of their availability, the roads may prove inadequate.⁷

The Bureau of Land Management Backways program, announced in 1989 and just now getting underway, is a similar effort, i.e., largely an informational one.⁸ This program includes virtually unimproved tracks for four-wheel drive vehicles.

All of these programs are special in nature, and in that sense not directly relevant in technical terms to multipurpose or general purpose state or county roads designated as scenic byways, but they do illustrate some of the impacts of increased tourist use of existing low-volume roads.

The Corps of Engineers program for recreational roads deals with access roads at Corps-operated reservoirs. It is one of the few programs for which technical standards have been developed. These were developed by the Army Construction Engineering Research Laboratory and published in 1975 as *Design Guidelines for Recreational Roads* (by James McNamara, Alan Moore, and John Baerwald; CERL Technical Report D-63, November). Like the Park Service roads, they serve a variety of access needs but are not general purpose in the sense that state or county scenic byways are.

The federal interest in a National Scenic Roads program began with the 1964 recommendation of the Recreation Advisory Council (established by President Kennedy in 1962) calling for the development of a national system of scenic roads. The Department of Commerce studied the possibilities of such a system and, in 1966, published *A Proposed Program for Scenic Roads and Parkways*.⁹ This was, of course, the heyday of the large federal social engineering program, and the proposed program was indeed big: the proposed "minimum program" comprised a total of 54,411 miles, estimated at that time to cost \$3.97 billion. Perhaps reflecting the times, the document itself is big (254 pages), glossy, and expensive. Although it contains many descriptive examples of scenic roads, and much discussion of how to fit a road into a landscape aesthetically, it does not define the roads in technically useful terms, nor does it classify them.

In 1965, President Johnson hosted a White House Conference on Natural Beauty. The President said: "Our task is twofold. First, to ensure that roads themselves are not destructive of nature and natural beauty. Second, to make our roads

7. Interview at Forest Service Headquarters, 14 August 1989.

8. *Scenic Byways Bulletin*, Vol. 1, Issue 3, (May/June 1989), p. 2.

9. U.S. Department of Commerce (Washington: GPO, 1966).

ways to recreation and pleasure.”¹⁰ The 1965 Highway Beautification Act (junkyard control, outdoor advertising control, etc.) grew out of this concern.

In 1973, congress gave the FHWA the task of investigating the feasibility of developing a national scenic highway program. With a view to today’s efforts in this direction, it is informative to examine the events of that year.

The authorizing legislation specifies what the study should consider but not what the characteristics of the considered system should be.

Sec. 134 (a) The Secretary of Transportation shall make a full and complete investigation and study to determine the feasibility of establishing a national system of scenic highways to link together and make more accessible to the American people recreational, historical, scientific, and other similar areas of scenic interest and importance. In the conduct of such investigation and study, the Secretary shall cooperate and consult with other agencies of the Federal Government, the Commission on Highway Beautification, the States and their political subdivisions, and other interested private organizations, groups, and individuals. The Secretary shall report his findings and recommendations to the Congress not later than July 1, 1974, including an estimate of the cost of implementing such a program. There is authorized to be appropriated \$250,000 from the Highway Trust Fund to carry out this subsection.

(b) The Secretary of Transportation shall make a full and complete investigation and study to examine problems of user access to parks, recreation areas (including public recreation areas on Federal lakes), historic sites and wildlife refuges. Such study and investigation shall include, but not be limited to, an analysis and feasibility of a national scenic road and parkways system referred to in subsection (a) including benefits to the user if any and total long range environmental impact of such system on the Nation’s recreation resources; alternatives to private automobile access to parks and recreation resources, including mass transit; and special problems of safe access to urban and metropolitan parks and recreation resources. In the conduct of such investigation and study, the Secretary shall cooperate and consult with other agencies of the Federal Government, the States and their political subdivisions, and interested private organizations, groups and individuals. The Secretary shall report his findings and recommendations to the Congress not later than January 1, 1975, including an estimate

10. John O. Spengler and George H. Siehl, “Scenic Byways: Issues and Action” (Washington: Congressional Research Service, 1988), p. 5.

of the cost of implementing any suggested programs.¹¹

In February 1974, the FHWA issued to the states a manual entitled *National Scenic Highway Study*¹² telling how the study should be carried out. The time frame specified was incredibly tight (one month) so that the FHWA would have three and a half months to prepare the report to Congress, which was due by July 1, 1974. The data requirements were huge: 5 data cards for each nominated segment of road, each card requiring up to 140 entries. This was to have several effects: with such a short time frame, states would have to provide whatever data they had available or look only at routes for which the data were available. The FHWA, working through The Institute for Analysis in Los Angeles and Fact Research Inc. in Washington, anticipated this in the introductory sections of the manual:

In design, the attached inventory worksheet builds upon the information requested in the 1964-65 "Scenic Roads and Parkways Study." By judicious updating of responses to the earlier data collection effort, it should be possible for the States to provide the requested information. The scope of the data collection effort has been modified to reflect changing national priorities and public sentiment, with special attention to facts concerning energy conservation, environmental preservation and protection, urban emphasis, safety, and enhancement of the quality of life.¹³

It certainly was remarkable, all the incompatible and competing things this study was going to combine and consider.

The problem with this approach was that it virtually ensured a replication of the earlier study's results. Moreover, the new manual, although it is 35 pages long, does not give standards or criteria for selection but rather only a description of items to be considered and then rated. If this was to be a replay of the earlier study, which was almost dictated by the data required and the short time frame available, then the results were almost guaranteed to be similar, though statistically skewed by the introduction of some new variables. (The state of Virginia proposed that some 1,288 miles be designated at a total cost of \$597,140,000, including \$100,000,000 for "corridor protection."¹⁴)

The resulting report, "An Assessment of the Feasibility of Developing a National Scenic Highway System,"¹⁵ examined three scenarios: Alternative I comprised 28,101 miles with a cost of \$2.2 billion; Alternative II comprised 60,395 miles at \$6.1 billion; and Alternative III comprised 93,222 miles at \$10.0 billion—all

11. Public Law 93-87-August 13, 1974, Sect. 134.

12. FHWA (Washington: 1974).

13. *Ibid.*, p. 3.

14. Virginia Department of Highways submission for the 1974 FHWA Study, 1974.

15. FHWA, Report to Congress: An Assessment of the Feasibility of Developing a National Scenic Highway System (Washington: FHWA, 1974).

costs. . . spread over a period of several years.”¹⁶ The report addressed five issues: national designation, corridor protection and scenic enhancement, complementary facilities, urban emphasis and energy efficiency, and national connectivity.¹⁷ It went on to note the dilemma of the desire to reduce energy consumption while expanding the development of scenic highways and made reference to the possibility of “developing scenic bus service.”¹⁸ The report concluded:

In view of national objectives for the conservation of energy resources, it is not found desirable or in the national interest to propose Federal legislation which would establish a new categorical grant program and provide funds exclusively for the construction or reconstruction of scenic highways. . . . However, with respect to national objectives seeking to protect and enhance environmental resources, it is found desirable to propose Federal legislation which would provide a program for the designation of existing high quality scenic highways and for the protection and enhancement of scenic resources on and adjacent to these highways.¹⁹

The report goes on to propose the use of states’ existing federal-aid highway funds (noninterstate) for these purposes. The problem with this approach is, of course, that it offered the states no federal incentive for such a program.

It is important to consider these earlier efforts at a National Scenic Roads Program when trying to foresee the outcome of the current effort on the subject and the concomitant effects that that outcome will have on the entire issue of design considerations, design elements, and design/analysis standards. It is the clearly expressed hope of the sponsors of the current federal legislation²⁰ to get a slice of the federal pie when the 1991 Surface Transportation Assistance Act (STAA) is drafted. Although all of the discussion thus far has been in terms of voluntary programs of the various states, what is eventually foreseen would undoubtedly be much more than that: a simple designation and information program would not have to be hugely expensive, so eventually the national program would have funds for some sort of road or corridor development, though not necessarily on the scale of the 1966 or 1974 proposals.

The current effort toward such a program really began in earnest with a May 1988 national conference “Scenic Byways ’88,” which brought together many of the varied groups having an interest in the subject. The FHWA took the lead in prepar-

16. *Ibid.*, p. 13.

17. *Ibid.*, p. iii.

18. *Ibid.*, p. 14.

19. *Ibid.*, p. iv.

20. Senator Rockefeller’s remarks at 14 April 1989 hearing of the Subcommittee on Foreign Commerce and Tourism.

ing a publication, *Scenic Byways*,²¹ which pulled together much of the information on the history of scenic roads, current state programs, federal-aid highway programs, federal lands programs, past program proposals, and factors that might be considered in a new program.

At the January 1989 Transportation Research Board Annual Meeting, a new Task Force on Scenic Byways and Recreational Travel met for the first time. AASHTO voted to form a task force to "investigate the role of AASHTO in developing guidelines for designing, designating, and/or signing of scenic byways."²² On February 22, 1989, The Scenic Byways Study Act of 1989 was introduced in Congress in the Senate as S.432 by Senator Rockefeller and the House as H.R. 1087 by Congressman Oberstar. In April, Senator Rockefeller held an oversight hearing of the Subcommittee on Foreign Commerce and Tourism on the economic benefits resulting from tourist travel on scenic byways. In June, Senator Moynihan chaired a hearing on the bill by the Subcommittee on Water Resources, Transportation, and Infrastructure.

During the summer of 1989, The National Trust for Historic Preservation sponsored two workshops (in New York and Minnesota) entitled "Tourism and America's Heritage: Opportunities for Growth," which included half-day sessions on scenic byways and heritage corridors.²³ The Third Biennial International Linear Parks Conference, "Parkways, Greenways, Riverways: The Way More Beautiful," in Asheville, North Carolina, which included the presentation of a preliminary version of this report, was held in September of 1989. Funding for the Scenic Byways Study proposed by S.432 was provided in November of 1989 in a conference committee version of an appropriations bill, thus S.432 and H.R. 1087 never even came up for a committee vote. However, the study will proceed as anticipated, with a completion date that will allow consideration of its results during the drafting of the 1991 STAA. A second conference, "Scenic byways '89," was held in November along with the second meeting of the TRB Task Force. A shortened version of this report was presented at this conference.

There can be no doubt that the scenic byways movement is very active as the decade of the '90s begins. The new national study will undoubtedly propose (at the very least) some sort of designation program in time for the 1991 STAA. The tourism industry, especially that segment dealing with foreign tourists in this country, has made a persuasive case for travel on scenic and historic roads. This effort has caught the attention of decision makers who are interested in both the economic well-being of target areas (i.e., West Virginia) and in the foreign trade balance impact of tourism. On the other hand, there are a lot of officials involved in highway programs who do not see the need for another federal program at a time when maintenance and repair needs of existing infrastructure are so pressing. Others want to avoid any further intrusion of federal regulatory activity into programs that are traditionally the domain of the states. This latter view has been especially vis-

21. FHWA (Washington: 1988).

22. *Scenic Byways Bulletin*, Volume 1, Issue 2 (March/April 1989), p. 3.

23. *Ibid.*, p. 2.

ible during the effort to pass the 1989 Study Act and during the Moynihan subcommittee hearing.

During the Moynihan committee meeting, Hugh Lydston of the Idaho Transportation Department argued against the program, saying that Idaho already had a scenic roads program that it wanted to continue to control without federal interference. His primary concern seemed to be that there were relatively few alternatives to the existing roads, scenic or otherwise, and that the roads were used for hauling timber, ore, and farm produce. He felt their use should not be restricted, nor should the ability of the Idaho Transportation Department to make needed improvements be impaired.²⁴ The Idaho Transportation Department had been in contact with the departments of several other western states and had received support for its position. FHWA Executive Director Richard Morgan discussed the implications of the program from a federal perspective. The thrust of his testimony was that the states did not need the federal government looking over their shoulders any more than was already the case. As a result of these discussions, the bill was redrafted to clarify the intentions of the study. The revised bill was not presented for hearings since the funding was provided by the appropriations bill. Lack of enthusiasm for, or perhaps even antipathy toward, additional federal programs seems relatively widespread among highway departments: an AASHTO survey during the summer of 1989 found that 21 states said that they would support a federal scenic byways program, whereas 22 said that there should not be national standards for scenic byways.²⁵

There is a diversity of opinion about scenic byways. As noted in this report, there are advocacy groups comprising people who like to drive these roads, who benefit economically from them, or who hope to use designation as a means of blocking unwanted development of the road or the corridor. However, there are other groups not supportive of the programs, who resist especially the additional slow tourist traffic that designation may bring. For instance, a two-year study,²⁶ "Scenic Byways: Their Economic Benefits/Selection/Designation/Protection and Safety," is currently being conducted by Kansas State University Civil Engineering Professor Bob Smith and others in Kansas, Missouri, Iowa, and Nebraska.

Thus, the movement is very active; lots of people are talking about program benefits and drawbacks—but few are talking about the engineering of the roads themselves.

Virginia's Scenic Road Efforts

In 1964, the Virginia Outdoor Recreation Study Commission was formed. This body published its recommendations in the 1965 report *Virginia's Commonwealth*, which recommended the establishment of a long-range Virginia outdoor

24. *Scenic Byways Bulletin*, Volume 1, Issue 4 (July/August 1989), p. 3.

25. AASHTO Survey, 1989.

26. *Scenic Byways Bulletin*, Volume 1, Issue 4 (July/August 1989), p. 3.

plan and the establishment of a state scenic roads network.²⁷ The 1966 General Assembly acted on recommendations of this report, enacting a number of pieces of legislation, including the Scenic Highways and Virginia Byways Act. “Unlike the proposed federal scenic roads system [of 1966], the State’s Scenic Highway and Virginia Byways legislation imposed no restrictions upon existing land use” as is evidenced by the following excerpts from it:

S.33.1-62. Designation. The Commonwealth Transportation Board is hereby authorized to designate any highway as a scenic highway or as a Virginia byway. This designation shall be made in cooperation with the Director of Conservation and Historic Resources. Prior to designation, the local governing body and the local planning commission, if any, in each county or city wherein the proposed scenic highway or Virginia byway is located shall be given notice and, upon request by any of the local governing bodies, the Commonwealth Transportation [Board] shall hold a hearing in one of the counties or cities wherein the proposed scenic highway is located. (Code 1950, S.33-43; 1966, C.11;1970. c.322; 1974, c.739.)

S.33.1-63. “Virginia Byway” defined; preference in selecting. For purposes of this article, a “Virginia Byway” is defined as a road designated as such by the Commonwealth Transportation Board having relatively high aesthetic or cultural value, leading to or within areas of historical, natural, or recreational significance. In selecting a Virginia Byway, the Commonwealth Transportation Board and the Director of Conservation and Historic Resources shall give preference to corridors controlled by zoning or otherwise so as to reasonably protect the aesthetic or cultural value of the highway. (Code 1950, S.33-43.2; 1966, c.11; 1970, c.322; 1984, c.739.)

S.33.1-64. “Scenic Highway” defined. For the purpose of this article, a “Scenic Highway” is defined as a road designated as such by the Commonwealth Transportation Board, with a protected scenic corridor located, designed and constructed so as to preserve and enhance the natural beauty and cultural value of the countryside. (Code 1950, S.33-43.3; 1966, c.11; 1970, c.322.)²⁸

The legislation also did not specify any standards or criteria to be applied in route selection. The Commission on Outdoor Recreation (now the Department of Conservation and Historic Resources) developed the following selection criteria and procedures, which were adopted by that Commission on 18 December 1972 and by

27. Virginia Department of Conservation and Historic Resources, *A Guide for Virginia Byway Management* (Richmond, Department of Conservation and Historic Resources, 1988), p. 3.

28. *Ibid.*, p. 4.

the Virginia Highway Commission on 18 January 1973.²⁹

Adopted Criteria

In Virginia there are approximately 629 miles of officially designated Virginia Byways located in 28 counties (Appendix A). In order to be considered for designation as a Virginia Byway, a segment of road must substantially meet the tests of the following physical criteria:

1. The route provides important scenic values and experiences.
2. There is a diversity of experience as in transition from one landscape to another.
3. The route links together or provides access to significant scenic, scientific, historic, or recreational points.
4. The route bypasses major roads or provides opportunity to leave high-speed routes for variety and leisure in motoring.
5. Landscape control or management along the route is feasible.
6. The route is susceptible to techniques to provide for user safety.
7. The route contributes to good distribution within elements of the Scenic Highway and Virginia Byway system.
8. Preference shall be given to those corridors with controlled zoning or otherwise, so as to reasonably protect the aesthetic or cultural value of the highway.³⁰

Procedures for Designation

The Department of Conservation and Historic Resources and the Department of Transportation will jointly:

1. Initiate the study of a potential Scenic Highway or Virginia Byway as a measure implementing the *Virginia Outdoors Plan* or upon the request of a local governing body.
2. Make on-site inspection of the route to determine if it meets the physical criteria.
3. Request a resolution or other assurance, indicating that the local governing body (bodies) is interested in scenic designation.

29. Narrative of Virginia Department of Highways submittal for FHWA 1974 National Scenic Highways Study.

30. Virginia Department of Conservation and Historic Resources, *A Guide for Virginia Byway Management* pp. 5-6.

The Director of the Department of Conservation and Historic Resources will:

4. Coordinate with the Department of Transportation, with the Virginia Outdoors Foundation, and with other appropriate state agencies to determine the location and significance of historic sites and/or other natural resources in close proximity to the road corridor.
5. Determine that local zoning and comprehensive planning programs of the locality and the planning district commissions are consistent with the management objectives established for Scenic Highways or Virginia Byways.
6. Recommend the designation of the potential Scenic Highway or Virginia Byway to the Commonwealth Transportation Board through the Commissioner of the Department of Transportation.

The Commissioner of the Department of Transportation will:

7. Submit potential scenic highways or Virginia Byways proposals recommended by the Director of the Department of Conservation and Historic Resources to the Commonwealth Transportation Board for their action.
8. Advise the Director of the Department of Conservation and Historic Resources of Board action.
9. Work with local governing agencies to achieve the management objective(s).
10. Conduct annual inspections of the maintenance and improvements of the route.³¹

A Guide for Virginia Byway Management (Richmond: Department of Conservation and Historic Resources, Division of Parks and Recreation, 1988) lists a number of state programs and laws that can assist in corridor conservation, ranging from the outdoor advertising law and the junkyard law to various land-use taxation acts.

The narrative provided by the Virginia Department of Highways as part of its response to the reporting requirements of the 1974 National Scenic Highway Study includes a statement of the management objectives established for Virginia byways, which states in part:

Development—improvement necessitated by traffic safety and convenience should be carried out in conformance with the following recommendation of the *Virginia Outdoor Plan* for upgrading Virginia's highway system. "Everything that can be done within the limitation of available funds should be done toward providing wide rights-of-way,

31. *Ibid.*, pp. 6-7.

adopting corridor zoning and designing for visual enjoyment.”³²

It is interesting to contrast this objective with the standards adopted by other states in efforts to preserve historic scenic roads. See, for example, the Connecticut standard in the Appendix, which states that rights of way should be widened only under conditions of real necessity, which are reviewed and formally determined by the Commissioner.

PURPOSE AND SCOPE

The purpose of this study was to investigate (1) whether there is a need for special design considerations for Virginia byways in order to ensure that they perform their function safely and efficiently, (2) to determine what physical design elements would effectively fulfill those design considerations, and (3) to determine the extent to which these elements are provided for by existing standards.

The scope of this study was limited to roads that meet the criteria for designation as Virginia byways, i.e., roads with low traffic volume and low posted speeds that also have a particular aesthetic, historic, or cultural value. The design elements to be considered will be limited to the travelway itself and the immediately adjoining right of way.

METHODOLOGY

In order to determine whether there is a need for special design considerations, the following questions were addressed:

1. Are scenic byways ordinary roads in extraordinary settings and thus deserving of no special engineering consideration in themselves, or do scenic byways deserve special design considerations in virtue of their form and/or function to ensure that they serve their intended purpose well and safely?
2. If special design considerations are identified, how can they be translated into design elements?
3. How well do current design standards applied in Virginia provide for these design elements?

Questions 1 and 2 were addressed in three steps:

1. an analysis of scenic byways in terms of drivers, vehicles, trip purpose, and competing/conflicting traffic from other modes

32. Narrative, p. 4.

2. a review of the relevant research literature
3. an examination of current programs of other states, including the documentation of existing programs and interviews with officials involved in other states' programs.

Question 3 was addressed through an examination of standards currently in force (and new standards proposed) in Virginia, including the VDOT Road and Bridge Standards (1989), the VDOT Statewide Highway Plan (1983), and the TRB Special Report 214 Standards.

RESULTS AND DISCUSSION

The Nature and Purpose of Scenic Roads

Practitioners repeatedly mix ideas of purpose and definition when speaking of scenic roads by freely interchanging such terms as *scenic byway*, *scenic road*, and *scenic highway*. Definitions found in some of the important recent source documents in the field do little to clarify the situation. Proposed Senate Bill S.432 (1989) states that, "The term 'scenic byway' means a highway or secondary road which passes through scenic, cultural, recreational, or historic landscapes."³³ The 1966 study prepared for the President's Council on Recreation and Natural Beauty stated:

A scenic road is more than just a public highway with some trees and shrubs beside it. . . . [It should] clarify and strengthen the motorist's image of the environment. . . . [The purpose of its design] should be to deepen the observer's grasp of the meaning of his environment.³⁴

The guidelines for the 1974 National Scenic Highway Study state:

A scenic highway may be any highway, including roads, streets, parkways, and occasionally freeways and expressways, traversing areas of relatively high value from an aesthetic, recreational, historical, scientific, or cultural standpoint.³⁵

Although these descriptions are accurate and appealing, they offer little help to the highway engineer charged with the design of the roadway.

There are at least two perspectives from which the purpose of scenic roads can be examined: that of the sponsor and that of the traveler. These are consistent-

33. U.S. Congress, Senate Bill S.423, 101st Congress, 1st Session (January 2, 1989), p. 7.

34. U.S. Department of Commerce, for the President's Council on Recreation and Natural Beauty, *A Proposed Program for Scenic Roads and Parkways* (Washington: GPO, 1966), pp. 4-5.

35. U.S. Department of Transportation, Federal Highway Administration, *Manual: National Scenic Highway Study* (Washington: FHWA, 1974), p. 5.

ly interchanged in statements of purpose in the various studies that have been done over the past 20 years. One school of sponsors sees these programs as a preservation tool to block, limit, or control change in a location, right of way, or corridor. A second school sees them as a means to increase and direct tourist travel to and within certain areas. These are not mutually exclusive views. Perhaps there is no more important function that those concerned with the preservation of scenic corridors can perform than to convince economic and political decision makers that the long-term economic benefits of protecting scenic values will far outweigh the short-term benefits of destroying those values. Nevertheless, a clear statement of purpose from the sponsor's perspective would be useful.

To the traveler, the road may serve many purposes: it may be a loop, serving as a destination in itself; it may provide access to recreational, historical, or other sites; it may be a lower-speed, lower-stress alternative route between two points; or it may be a high-speed, high-volume route between two points. A knowledge of the road's purpose from this perspective is obviously essential in engineering the road.

What these descriptions and statements of purpose do make clear is that there is no one definitive—or even typical—classification of scenic highways or byways. One can quickly suggest many classifications, but the sponsor's and traveler's perspectives are one reasonable starting point. Traffic volume, running speed, road geometry, surface type, service level, and traditional functional classification might all be used as bases for categorization. Each of these would give the highway engineer a starting point. The existing state and federal facilities, which include everything from interstate system highways to unpaved tracks for four-wheel drive vehicles, could each be located in some sort of continuum or matrix, and technical issues of appropriate, desirable, or essential design elements could be examined in that context.

Identification of Design Considerations

For purposes of this study, the wording of the legislation that created Virginia's scenic byways can be used to categorize them:

The route bypasses major roads or provides opportunity to leave high-speed routes for variety and leisure in motoring [and] the route links together or provides access to significant scenic, scientific, historic or recreational points.³⁶

Thus, the focus should be on low-speed, low-volume roads and on alternative routes between or to points of interest. The Virginia Act requires that the designated roads "substantially meet the tests" of seven criteria but not that they meet all of them.³⁷ Thus, even within the limited scope of this single program, there will be a variety of road types.

36. Virginia Department of Conservation and Historic Resources, p. 5.

As noted earlier, this inquiry focuses on design elements associated with traditional highway engineering in its narrowest sense: the roadway itself and the immediate roadside within the right of way. As the literature on the subject and sessions at recent national conferences on scenic byways and parkways make obvious, this is only one very small part of the scenic road picture.³⁸ Naturally, the road *is* important, since without it there would be no vehicular traffic. However, scenic byway enthusiasts seem to take the roadway for granted while concentrating on the more exotic and exciting questions of aesthetics, easements, and signage. This leads to the question: Are scenic byways ordinary roads in extraordinary settings deserving of no special engineering consideration in themselves, or do scenic byways deserve special consideration in virtue of their form and/or function to ensure that they serve their intended purpose well and safely?

The definitions cited earlier do not help to answer this question, nor do the statements of purpose contained in various studies on the subject.³⁹ A review of the literature and of current state programs seems to support the view that scenic byways are ordinary roads insofar as engineering goes. However, an analysis of the roads and their uses provides a different picture.

Analysis of Scenic Roads

The usual analysis of the operation of a road includes examination of at least four factors: (1) drivers, (2) vehicles, (3) purposes of trips, and (4) competing/conflicting traffic from other modes.

1. *Drivers.* If the scenic byway is a leisurely paced alternative to a high-speed major route, it is almost axiomatic that through commuter and commercial traffic will avoid it, and some vacationing visitors will choose it. Although differences in the demographics of the driver population would occur (e.g., a higher proportion of older drivers during the school year), the most obvious difference will be in terms of driver familiarity with the road. The first-time visitor obviously would not know what lies ahead in terms of grades, clearances, passing zones, etc., whereas a local driver would know what to expect. On a primary system arterial, this would present no problem because of consistency of design and standards; on a byway or rustic road, it may.

2. *Vehicles.* The popularity of recreational vehicles, both self-propelled and towed, and their drivers' lack of familiarity with scenic roads has implications for road design. The increased height of the eye of the driver provided by most of these vehicles will benefit sight distance. The low speed limits, less direct routes, and difficult geometry of these roads will help to keep down the percentage of trucks traveling them.

3. *Purposes of Trips.* Since a certain—perhaps high—proportion of the travelers on a scenic byway will be driving it specifically to enjoy the trip and the set-

37. *Ibid.*, p. 5.

38. For example, *Scenic Byways '88* (Washington: FHWA, 1988).

39. Note 7 is one example.

ting, they should be able to do so at a speed consistent with that purpose. Moreover, drivers must have a safe opportunity to view the features that make the route scenic, historic, etc. The highway engineer must thus assume that, at least part of the time, drivers will want to divert their attention from the center line. However, sightseers traversing the byway at a leisurely pace are not the only travelers on the road. Byways are not parkways; thus, they are not functionally restricted, and they must continue to serve as normal roads for the people who use them as access to homes, farms, etc. without forcing these local citizens to pay an excessively high price in terms of inordinate delays, artificially low speed limits, etc.

4. *Competing/Conflicting Traffic From Other Modes.* With urban traffic, the planner primarily thinks in terms of competition from pedestrians; with the rural scenic byways, the growing competition is from bicycles. On some of the rural byways, other significant conflict comes from farm equipment.

If one acknowledges the existence of the aforementioned characteristics, a plausible case can be made that scenic byways are different from other low-volume roads in the state. If scenic byways are a special case by virtue of their form and function, special design considerations may be appropriate in their design, analysis, modification, maintenance, and operation. These considerations will take concrete form as special design elements.

Review of Research Literature

The primary instrument of the literature review was a computer search of the Transportation Research Board's Transportation Research Information Service (TRIS).

It was immediately clear that there is an abundance of information available in readily accessible research literature⁴⁰ on questions of design elements for scenic roads if one thinks of the scenic road as comprising the entire scenic corridor. However, with few exceptions, the literature is largely silent on issues dealing with the design of the roadway itself. The rare exceptions are instructive, though not particularly useful for the questions at hand. For example, Bamford Frankland, Assistant to Chief Right-of-Way Agent, CALTRANS, expressed one perception of the design issue, writing in 1967 of California's scenic highway program:

The compatibility of scenic highways with the basic purpose of highways, allegedly to move traffic, has been questioned. Some people make a distinction between the two purposes: people who drive scenic highways are not necessarily interested in going from one point to another; whereas people who drive on primary highways are. The purpose of scenic highways is viewing, and the purpose of other highways is to move traffic. These two purposes seem inconsistent to some people. . . .The California Division of Highways does not agree with that

40. IFLA, *Roads in the Landscape* (Denver: National Park Service, 1987), is one good bibliographic example.

philosophy. We think that high speed highways and beautiful highways are perfectly compatible. . . .⁴¹

He goes on to note that 480 miles (in 1967) of California's interstate highways were recommended for the program.

This statement is indicative of the basic dilemma regarding scenic highways. It demonstrates the need to classify roads, *inter alia*, by trip purpose or trip type. Obviously, it is of little relevance to a program limited to low-volume, low-speed byways. The series of papers presented at the 1985 TRB Annual Meeting dealing with the design and construction of I-70 through Glenwood Canyon, Colorado, dealt with specific design issues, but they were ones that have little relevance to existing low-volume roads.

One concept that is of interest was included in a 1974 paper by William J. Mulder, Jr., *Development of Criteria for Scenic Roads*.⁴² Mulder discussed the concepts of viewing angle and viewing duration as related to design speed. Although he was primarily discussing corridor and alignment selection, these concepts seem directly applicable to the safety analysis of existing roads. At least one state is currently using this approach when doing selective removal of roadside trees and understory along a ridgeline road. In this case, vistas are being developed with driver safety in mind.

For all practical purposes, insofar as existing low-volume, general-purpose roads are concerned, the scenic byways research literature is essentially silent on travelway engineering issues, even though it is fertile on roadside matters, including turnouts, overlooks, and signage.⁴³ Reviewing the literature, one gets the impression that planners and landscape architects have been active in this field, while engineers have looked on byways as ordinary roads.

Current Practice: State and Federal Programs

A review of current scenic road programs of various states provides much the same impression as the review of the research literature: great concern for issues of aesthetics, roadside features (including signage and pull-offs), and corridor preservation and control, but scant attention to road geometry or cross section. Moreover, one gets the distinct impression that the majority of officials responsible for the development and implementation of these programs are not found in the design, safety, or maintenance branches of their highway departments. (Various states' programs are examined in Appendix B.) On the other hand, the federal agencies that have responsibility for recreational or scenic road programs have shown concern for design issues. The problem here is that the federal programs are so highly focused

41. Bamford Frankland, "California's Scenic Highway Program," Highway Research Record #161 *Roadside Development* (Washington: HRB, 1967), p. 53.

42. William J. Mulder, Jr., "Development of Criteria for Scenic Roads," Transportation Research Record #508 *Social, Economic, Behavioral, and Urban Growth Considerations in Planning* (Washington: TRB, 1974), p. 101.

43. IFLA, *Roads in the Landscape* (Denver: National Park Service.)

in terms of road type, volume, design speed, and surface that they have little applicability to general purpose, mixed-use state or county roads. Two of these programs, however, are exemplary in terms of design considerations and thoroughness of standards: the Park Service roads program and the Corps of Engineers program for recreational roads at Corps' reservoirs.

In contrast with the silence on design issues in the states' programs as documented and written into statutes and regulations, telephone interviews with officials involved in the programs in many of the states brought forth expressions of concern for the ability of the roads to function adequately for scenic travel. The important thrust of these discussions was not that there was one superior design for accommodating concerns such as the road's adequacy for over-sized vehicles, appropriate running speeds, safety and comfort of drivers, etc., but rather that these considerations should be addressed in design, analysis, evaluation, improvement, and maintenance of scenic roads.

Identification of Design Elements

If scenic byways are a special sort of road by virtue of their form and function, how would special design considerations then be translated into substantive design elements? It is clear that the practitioners interviewed felt that there is no one set of design considerations suitable for all scenic roads. Each road must be evaluated individually, and the design considerations must be translated into elements that are appropriate and practical. The following are examples of how this might be done:

1. *Driver unfamiliarity with the road.* There is a need to concentrate on consistency of design and informational signage. Since the former is an important part of good road design practice, it can be expected in new construction. However, it is often nonexistent on old (especially historic) roads. Informational signage becomes especially important in this latter case.

2. *The over-sized vehicle.* This issue could have an impact on questions of lane and shoulder width, pull-off design, and passing opportunity. Sight-distance might be favorably affected by the increased height of the driver's eye. Most important of all, it may be necessary to restrict access to certain road sections for certain classes of vehicles. Perhaps a classification system such as that used for white water rivers is necessary to indicate which road sections are not recommended for certain vehicle types under certain conditions.

3. *The suitability of the road for the purpose of the trip.* This could require a rethinking of posted speed limits, pull-offs, passing opportunities, overlooks, clearing of vistas, etc. to allow viewing without sacrificing safety. For example, historical markers should be placed where there is a safe place to stop long enough to read the message.

4. *The consideration of conflicting modes.* This is especially difficult for narrow historic roads with narrow lanes, no shoulders, and limited sight distances.

Several task forces at the national and state level are looking into this issue. In the case of Virginia Byways, a four-foot paved shoulder is often simply impossible to have from both an economic and aesthetic point of view. Although the need for a special design consideration is universally recognized, the appropriate design elements are very much a matter of debate.

Examination of Current Standards

Geometric design standards are contained in the VDOT's *Road and Bridge Standards (1989)*, which is based on AASHTO's *A Policy on Geometric Design of Highways and Streets (1984)*.⁴⁴ These are, of course, the nationally recognized and accepted standards for new construction or reconstruction of highways. The problem is that these standards are not practical for anything less than a major reconstruction of many existing (especially very old) roads in this part of the country.

The difficulty with the application of these standards to existing roads became clear at the time that the FHWA authorized the use of federal-aid funds for resurfacing, restoration, and rehabilitation projects (RRR).⁴⁵ Reconstruction had long been authorized with these funds. States found they could not afford to use federal-aid funds for RRR projects because of the "string" attached: if these funds were used, the entire project would have to be brought up to current standards. Since in virtually every case the only standards available were those for new construction, the requirement came to mean that the relatively minor repair or improvement of a road section would trigger the need for major reconstruction. The result was that states used their own funds for RRR projects and federal-aid funds for other work where the standards dictated by their use were those appropriate for the work being performed.

State officials, the FHWA, and Congress were aware of the difficulties generated by this requirement. AASHTO prepared the so called "Purple Book" of RRR standards, which met great resistance from the insurance industry as well as highway safety advocacy groups; consequently, it was never accepted.⁴⁶ In 1978, the FHWA proposed a more conservative set of RRR standards,⁴⁷ which again were not accepted. In the 1982 Surface Transportation Assistance Act, Congress directed the National Research Council to examine the question of appropriate standards for RRR projects. This work was performed by a committee of experts for the Transportation Research Board and was published in 1987 as Special Report 214, *Designing*

44. VDOT, *Road and Bridge Standards 1989* (Richmond: VDOT, 1989). This was first reflected in the 1986 edition.

45. In 1983, Part 625 of Title 23 CFR (23 CFR 625) was revised to permit the use of lesser standards if these standards had been developed and adopted. (47 FR 25263.)

46. Transportation Research Board, *Special Report 214: Designing Safer Roads: Practices for Resurfacing, Restoration, and Rehabilitation* (Washington: TRB, 1987), p. 27.

47. *Ibid.*, p. 27.

*Safer Roads.*⁴⁸ This committee examined the safety implications of a series of design elements and proposed an approach that maximized the safety cost-effectiveness of investments in road improvements. In many respects, the standards they propose are a modification of the proposed 1978 FHWA standards. Two factors seem to have implications for the study at hand: (1) the TRB study stated that the standards are not absolute and that every project must be examined on its own merits; (2) the threshold for the low-volume (or more exactly, the lowest-volume) category is raised from 400 to 750 ADT. This means that many more rural roads in an old system such as Virginia's will fall into this category. The TRB study then went on to apply minimal standards to the low-volume roads and high standards to the high-volume roads on the principle that one gets more bang for the buck by putting the money into improvements that will enhance safety on high-volume roads.

The FHWA had not been unsympathetic to the plight of the states, had consistently been able to grant exceptions to standards where justified on specific projects, and, as early as 1983, had suggested to officials in each state that they propose (for FHWA approval) special standards for RRR projects in their respective state. In October 1988, the FHWA issued a technical advisory on the subject of RRR standards.⁴⁹ This technical advisory promulgated what is, in effect, a condensed version of the TRB report⁵⁰ and suggested to the states that they adopt one of the three following courses of action for RRR project standards: (1) the states could continue to use new construction standards; (2) they could adopt the standards contained in the technical advisory; or (3) they could propose other standards.

In December 1988, the VDOT appointed a committee to look into the question of appropriate standards for RRR projects.⁵¹ This group met regularly during 1989 and, after 10 months, proposed that the VDOT adopt a set of standards very much like those of the TRB report. These standards were adopted for use in Virginia as of June 1, 1990; previously, the main criteria applied to rural low-volume roads were based on traffic volume, roadway width, and surface type.⁵² On low-volume and high-volume roads, geometry is taken into account when considering repairs and/or improvements.⁵³ However, in both cases, this has been done subjectively by the inspector on no-plan projects (or in the case of a more important project, by the engineer) and not by applying an accepted set of criteria appropriate for the analysis of existing roads.

48. *Ibid.*, p. v.

49. FHWA Technical Advisory, "Developing Geometric Design Criteria and Processes for Nonfreeway RRR Projects," T 5040.28 of 17 October 1988.

50. *Ibid.*, pp. 10-20.

51. K. F. Phillips, Memorandum to J. S. Hodge dated 12 December 1988; subject: "Geometric Design Criteria and Processes for Nonfreeway RRR Projects."

52. VDOT, *Statewide Highway Plan, November 1983; Documentation of Procedures* (Richmond: VDOT, 1983), p. 15.

53. *Ibid.*, p. 13.

CONCLUSIONS

1. It appears that a reasonable case can be made for the proposition that scenic byways require consideration of a number of operational issues in order to serve their purposes safely and effectively. These considerations include driver unfamiliarity with the road, a high proportion of over-sized vehicles, and the desire to travel at reduced speeds.

2. These design considerations can be expressed in terms of specific design elements, such as wider-than-normal lanes on tight turns, overwidth shoulders for safety pull-offs, increased passing opportunities, and special informational signage.

3. Neither the special design considerations nor their respective design elements are provided for in the standards currently used for road construction, improvement, or analysis by the VDOT.

4. No current state or federal scenic roads program addresses the sort of design/evaluation standards required for the Virginia Byways Program, i.e., standards appropriate for existing low-volume, low-speed, mixed-use scenic roads.

5. Addressing the special design considerations to be applied still leaves unanswered the question of the standards to which the special considerations should be applied. However, we may be closer to an answer than we realize (and one that addresses tort liability concerns). The proposed RRR standards based on TRB Special Report 214 are to be applied to roads undergoing minor improvement. This means that when a road is improved, it is considered to be an adequate or acceptable road for the level of service, volume, speed, truck percentage, etc. involved. It follows that an existing road segment that meets the RRR standard appropriate for its level of service, etc. is also, by definition, an adequate and acceptable road. It is not being suggested that every road, or every scenic byway, should be evaluated in terms of RRR standards. Rather, when evaluating a road segment with special design considerations in mind, if engineers need hard number standards for certain geometric and cross-sectional factors, it is suggested that they now have them at hand.

RECOMMENDATIONS FOR FUTURE PRACTICE

1. The special design considerations described in this study should be taken into account in the analysis, evaluation, modification, or maintenance of existing or proposed Virginia scenic byways.

2. Traffic engineers, planners, and design engineers involved in the evaluation and planning of, designation of, or work on Virginia's scenic byways should be instructed in the application of these considerations and in the design elements that follow from them.

3. VDOT procedures should be modified to require the involvement of landscape planners when changes to the road or roadside are contemplated on a designated scenic byway. This should not restrict the ability of the responsible engineer to make needed changes or improvements. But it would ensure that the least offensive or least destructive alternative was brought to the attention of the engineer.

4. The easiest design consideration is also perhaps the most important one, and it could be brought into play at low cost under existing laws and regulations: special informational signage could tell visitors in advance not only about the scenery to be expected along a scenic byway but also about the road itself.

5. The RRR standards recently approved by VDOT shall be examined by other states for their usefulness as a tool for the evaluation of existing roads. They could be used as the standard for scenic byways, modified as necessary to reflect special design considerations that may exist.

6. In late 1990, the FHWA released 26 case study summaries from a National Scenic Byways Study. Since several of these case studies appear to contain information that could be relevant to Virginia, they should be reviewed for additional input on design elements for Virginia's byways by those involved in work on these scenic roads (see Appendix C).

RECOMMENDATIONS FOR FURTHER RESEARCH

Further research should be directed at the needs of a national effort such as the National Scenic Roads Program because, if this program does go forward, the development of national standards will be considered. There are two basic research needs for a national program: (1) a system of classification that will allow the examination of the various states' programs while showing how the vastly different programs fit within a matrix of type, purpose, road class, etc. and (2) a "common denominator" of the sort of special design considerations examined in this report to permit the examination, evaluation, or description of the many types of scenic roads in terms common to all.

One approach to developing a "common denominator" is as follows: With the "low-end" exception of a road that cannot be traversed safely by a particular vehicle, the design considerations suggested can all be translated into *desired running speed for the tourist vehicle*: driver unfamiliarity with the route, over-sized vehicles, geometric and cross-sectional limitations of historic roads, the temptation of scenic views, and even bicycles on the road will all help to determine the speed at which visitors would drive the road. This is a special sort of running speed, since it is not a function of congestion, geometry, or vehicle performance limitations alone but also of the fact that drivers want to enjoy the view and the trip. The problem arises from conflict between the running speed of this traffic and the desired running speed of the normal traffic on the road. Where no normal traffic exists (e.g., on park roads), there is no conflict and no problem.

A level-of-conflict factor could be developed that described this conflict for a particular road segment, taking into account the two running speeds, traffic volume, proportions of visitor and normal traffic, passing opportunities, etc. This factor would describe the physical performance (as opposed to the aesthetic or recreational performance) of the byway as a tourist route. Traffic mix during different time periods would be considered where appropriate. This conflict factor could be established to represent a "satisfactory" condition. At that level, the special design considerations of the byway as a tourist route and the needs of normal traffic have been taken into account. Many means of changing this conflict level come to mind: modification of the road to provide passing opportunities is one, but the provision of access to a higher speed alternate route for normal traffic is another. A lower posted speed limit would reduce the differential between running speeds.

On a national scale, the establishment of a standard level of conflict would run into the real-world political and physical problems discussed earlier: states do not want more standards, and some roads simply cannot be changed at a reasonable cost.

A solution might be found in looking at the other side of the coin: if existing roads were analyzed in terms of the level of conflict and classified accordingly (and the classification published and posted), visitors would know what to expect when they chose a road. An "improvement" in the level of conflict would change the classification of a scenic road. As mentioned earlier, this could be accomplished through scenic pull-offs, changes to geometry, lower posted speed limits, or provisions of access to alternate main routes.

If a federal-aid program were to be developed, the funds could be used to improve the level-of-conflict classification of the roads. This would not be telling the states what to do or how to do it, but it would contribute to the provision of a safe and more efficient scenic road network for visitors.

APPENDIX A

SUMMARY OF VIRGINIA BYWAYS

SUMMARY OF VIRGINIA BYWAYS

Date of Designation	Route	County	Length (Miles)
June 20, 1974	193	Fairfax	12
August 21, 1975	5	City of Richmond, Henrico, Charles City, James City, City of Williamsburg	54
August 19, 1976	20	Albemarle	17
August 19, 1976	6	Albemarle & Nelson	35
August 19, 1976	151	Nelson	18
August 19, 1976	56	Nelson	18
January 27, 1977	39	Rockbridge	20
July 14, 1979	723	Frederick & Clarke	10
October 27, 1977	39	Rockbridge & Bath	36
June 21, 1979	623	Tazewell	10
December 17, 1983	250	Albemarle & Nelson	17
September 15, 1983	802, 245, 626	Fauquier & Culpeper	25
May 15, 1986	785	Montgomery & Roanoke	18
January 15, 1987	6, 650	Henrico, Goochland, and Fluvanna	60
January 15, 1987	130	Amherst & Rockbridge	32
July 16, 1987	601, 676, 614	Albemarle & Orange	11
November 19, 1987	20, 22, 231	Albemarle & Orange	36.2
May 19, 1988	15, 665, 662, 719, 704, 690, 734	Loudoun County 71	
August 18, 1988	231	Orange, Rappahannock, Madison	39
July 20, 1989	659	Halifax	16
February 15, 1990	617, 673, 711	Chesterfield, Powhatan City of Richmond	25
May 17, 1990	624, 652, 621, 633, 620, 652, 655, 628, 622, 627, 608, 612, 626, 255	Clarke	37.5
May 17, 1990	606, 628, 641, 647	Rappahannock	11

APPENDIX B

SAMPLE CURRENT STATE PROGRAMS

State programs were chosen for examination from the inventory in Chapter 3, "State and Local Scenic Road Programs," of *Scenic Byways* (Washington: FHWA, 1988).

The following interview procedure was used:

1. Contact transportation agency, and determine point of contact for
 - scenic roads program
 - engineering of scenic roads program.
2. Determine if there is an *active* program.
3. Determine whether special standards exist for engineering aspects of the scenic roads program.
 - If *no* special standards exist, determine what standards *are* used for existing roads.
 - If special standards exist, determine what they are, how they are used, and request a copy of them.
4. Determine, to the extent possible, the concerns of the interviewee and the department on the adequacy of the current approach to scenic road design, analysis, maintenance, and operation. Specifically inquire about engineering standards, signage, and other means of providing information to motorists, traffic volumes and mixes on scenic roads, and land use controls in the scenic corridors to the extent that they have an impact on modifications to the road itself.

The following states were contacted:

State	Contact
Arizona	Mr. Leroy Brady
Arkansas	Mr. Larry Long
California	Ms. Chris Hatfield
Connecticut	Mr. Ray Myhar
Idaho	Mr. Gordon Pronty
Maine	Mr. Paul Minor
Maryland	Mr. John Bruck
Massachusetts	Ms. Liz Shultis
Michigan	Mr. Mike Saunders
Minnesota	Mr. Dennis Adams
Missouri	Mr. Will Brann
Nebraska	Mr. Malcomb Hardin
New Hampshire	Mr. Dick Latham

New York	Mr. Michael Barylski
Ohio	Mr. Robert Allen
Oregon	Mr. Don Byard
Pennsylvania	Mr. John Whaley
Rhode Island	Ms. Dianne Badorek
South Dakota	Mr. Craig McIntyre
Tennessee	Ms. Gwen Hopkins
Utah	Mr. Jim Naegle
Vermont	Mr. Donald Remick
Washington	Mr. Don Lund
Wisconsin	Mr. Steve Koons

A sampling of the more interesting information on these programs follows.

ARIZONA

6/26/89 Mr. E. Leroy Brady, Manager, Roadside Development Services.

Regular AASHTO *Green Book* standards are used; 394 miles of designated parkways, historic roads, and scenic roads.

Emphasis on aesthetics: “weathering” steel guardrail, “veneer” on retaining walls, “desert varnish” color treatment on new cuts in basalt rock, limit use of gray concrete in “red rock” country, color treatment for *backs* of signs, wood posts in mountain areas, colored metal posts in desert.

\$5 million/year program for state parks access roads using new standards, published as *Standards for Park Roads & Related Improvements*. These standards classify roads as:

1. Park Access Road
 - 50 mph design speed; 40 mph posted speed
 - 12-foot lanes; 2-foot shoulders; shoulders paved
2. Major Park Road
 - 35 mph design speed; 25 mph posted speed
 - 12-foot lanes; 2-foot shoulders; shoulders paved
 - local colored aggregate surface colors
3. Secondary Park Road
 - 25 mph design speed; 15 mph posted speed
 - 11-foot lanes; 2-foot shoulders; shoulders paved
 - local colored aggregate surface colors
4. Special Purpose Park Road

- 20 mph design speed; 10 mph posted speed
- 11-foot lanes; 1-foot shoulders; shoulders paved or gravel
- local colored aggregate surface colors

5. Primitive Park Road

- 9-foot lanes; 1-foot shoulders; shoulders gravel or graded soil

The State provides a 48-page manual *Application Procedures for Designation of Parkways, Historic and Scenic Roads* as well as a recently revised document "Visual Quality Assessment," which is an important element of the designation procedure

Comment: Obviously a major and well thought-out program; however, the roads involved are undoubtedly newer than those with which Virginia is dealing, permitting the use of the single standard (AASHTO *Green Book*). The *Standards for Park Roads* is a very good document. Even in this case, the lane widths required would be the exception rather than the rule on many of the lowest volume Virginia byways.

ARKANSAS

6/28/89 Mr. Larry Long, Coordinator, Beautification Unit, Environmental Division.

State law passed in 1975 listed 34 roads as "scenic;" 13 others have been subsequently added, as well as 3 state highways, which have been included in the new Forest Service Scenic Byways Program. Designated highways include 2 interstate highway segments, 12 U.S. numbered highways, and 33 state numbered highways.

No special design standards in use.

Current primary emphasis is highway maintenance, including mowing practices, vegetation control at vista areas, signage maintenance, and litter control. Several of the roads are included in the Department's Wildflower Program, "which promotes the establishment of wildflower growth within rights-of-way" (Mr. Long's letter of 21 August 1989). The roads fall under the State Highway Beautification Act, which regulates advertising signs and junkyards on private property adjacent to the roads (letter of 8/21/89).

Comment: Mr. Long provided the information on the creation of "scenic windows" mentioned earlier in this report. In his words, "the department is . . . interested in developing 'scenic windows' to enhance those significant views along many of the highways. This will involve not only vegetation clearing and/or pruning within our rights-of-way, but also the adjoining properties" (letter of 8/21/89).

CALIFORNIA

7/6/89 Ms. Chris Hatfield, Scenic Highway Coordinator, Office of Strategic Management and Policy Analysis, Division of Transportation Planning, CALTRANS.

AASHTO standards are used, aesthetics weigh heavily; most designated roads *not* backroads. Most are state highways (federal-aid primary system); to date, 51 state

highways, comprising 1,067 miles. Also, CALTRANS will authorize counties to designate County Scenic Highways; to date, 4 highways have been so designated.

Official manual is *Guidelines for the Official Designation of Scenic Highways*, a CALTRANS April 1988 publication.

Highway segment must be shown on the *legislated* "Master Plan of State Highways Eligible for Official Scenic Highway Designation."

Department of Transportation Advisory Committee reviews application (also recommends standards, approvals).

Local jurisdictions must adopt a scenic corridor protection plan. This involves

1. regulation of land use and density
2. authority and defined regulations for view of planned development
3. control of outdoor advertising
4. controls on earth moving and landscaping through grading ordinance, grading permits, and landscaping and vegetation requirements
5. design review authority and regulations for design and appearance of structures and equipment.

Comment: Compared to other state programs, California's seems highly authoritarian and legalistic. Emphasis is on land use and other controls along the scenic corridor. This is probably appropriate in view of the fact that these are state highways and there is continued population growth and many wide corridors in the central and southern part of the state. It is hard to imagine how any of this would apply to Virginia, where the physical constraints on existing scenic corridors limit restrictions on land use and density, and the political realities and traditions do not realistically permit either the VDOT or the General Assembly to dictate land use control requirements to the local jurisdictions.

CONNECTICUT

7/25/89 Mr. Raymond L. Mihon, Engineer of Geometrics, Bureau of Highways.

Two sections of the General Statutes provide for designation of scenic roads. These statutes discuss definition and designation and really have teeth when dealing with alteration or improvement of the roads:

Prior to altering or improving a state highway or portion thereof that has been designated a scenic road, pursuant to section 13b-13c, the Commissioner of Transportation shall cause to be published in a newspaper of general circulation in the municipality or municipalities in which such scenic road is located, a notice describing the alteration or improvement. There shall be a comment period following the public notice during which interested persons may submit written comments (section 13b-31d).

Section 13b-31e. Regulations. The Commissioner of Transportation, in consultation with the Commissioners of Environmental Protection and Economic Development, shall adopt regulations . . . setting forth special maintenance and improvement standards for scenic roads which shall include provisions for widening of the right-of-way or traveled portion of the highway and for guardrails, paving, changes of grade, straightening and removal of stone walls or mature trees. In adopting such regulations the commissioner shall consider the protection of historic and natural features of scenic roads (Section 13b-31e).

The regulations implementing these statutes show how serious the state is about restricting change to the roads. Once written comment has been received (in response to the published notice of intent), the Scenic Road Advisory Committee, appointed by the Commissioner of Transportation, with representation from the Departments of Transportation, Environmental Protection, and Economic Development, will review the comments and issue a written recommendation to the Commissioner of Transportation for his decision (*Regulations of State of Connecticut Agencies*, Sections 13b-31c-1 to 13b-31c-5, inclusive, pages 1-4).

Section 13b-31e-3. (a) At the time a highway is officially designated as scenic, the characteristics responsible for this designation shall be clearly identified and recorded. Any alteration to a scenic road shall maintain these characteristics, if practical. (b) Improvements to scenic roads shall be developed in conformity with current Department design and/or maintenance standards for the type road unless it is determined that using such standards will have a significant adverse impact upon the roadway's scenic characteristics. In which case, exemption from Department or Federal standards may be considered to preserve the roadway's scenic qualities.

The section goes on to discuss widening of right-of-way (don't, unless Commissioner, responding to a written special report, has deemed it essential, then minimum widening), widening of traveled portion (don't, unless Commissioner, responding to a traffic engineering report, finds it necessary to improve an existing or potential traffic problem, then minimum, as safety allows, and accomplish within existing right-of-way), guardrails (replace in kind, in accordance with current Department regulations, unless Commissioner determines, after review of traffic engineering report, that a safety problem exists and another type of guardrail is necessary), change of grades (do so only as necessary, and then minimize impact).

(6) *Straightening or Removal of Stone Walls:* The Commissioner

may approve the straightening or removal of a stone wall after review and approval of a traffic engineering report that has determined that such action is necessary to improve an existing or potential safety hazard, improve a sight line restriction, for installation of drainage appurtenances, or for other sound reason. The Department will attempt, if practical, to relocate the stone wall within the highway right-of-way or on private property of the abutting property owner. The stone wall

should be reconstructed in a manner consistent with its former appearance.

(7) *Removal of Mature Trees*: Whenever possible and as safety allows, mature trees within the highway right-of-way should not be removed. If roadway widening is approved, the alignment should be such as to restrict its impact on mature trees. The Commissioner may approve the removal of mature trees after review of an engineering report which outlines the need.

General maintenance, road bed maintenance, cross-drainage maintenance, vegetation maintenance, sign maintenance, and winter maintenance are all specified in these regulations.

If these regulations seem strict, the statute that governs the *municipal* (town, city or borough) authority to designate scenic roads seems even more so: "to be designated as a scenic road, a highway or portion of a highway must be free of intensive commercial development and intensive vehicular traffic and must meet at least one of the following criteria: (1) It is unpaved; (2) it is bordered by mature trees or stone walls; (3) the traveled portion is no more than 20 feet in width; (4) it offers scenic views; (5) it blends naturally into the surrounding terrain, or (6) it parallels or crosses over brooks, streams, lakes or ponds." Designation requires a written statement of approval by the owners of the majority of the lot frontage abutting the road, and any person aggrieved by the designation by a planning commission may appeal the designation (Title 7, Ch. 98, Sec. 7-149a-e).

Comment: This is one of the rare examples of a highly focused set of design considerations translated into design elements. The clear preservation intent of the program reflects the historical, physical, political, and economic environment of Connecticut. The considerations address the special scenic and historical aspects of the road itself and not the special nature of its use, however.

MARYLAND

8/16/89 Mr. John Bruck, Planning Division.

No special standards, no major active program; however, there is a designated route across (West-East) the state, with a series of short side routes off of it. Apparently, the Office of Economic Development took the lead in the program, though the Highway Department developed the map. The map is an outstanding product: It is clear, and it is easy to distinguish the main route and side routes—a sharp contrast to the indication of Virginia Scenic Byways on the VDOT General Highway Map.

MASSACHUSETTS

8/17/89 Elizabeth W. Shultis, Acting Director, Open Space Program, Office of Transportation and Construction, Department of Public Works.

No state scenic roads program, hence no special standards. There is a current effort underway to draft legislation that would permit designation of state scenic highways.

There is a Scenic Roads Statute that applies to cities and towns that deals with changes and/or improvements, cutting trees, and removing stone walls (notifications, hearings, appeals, etc.).

Of special interest is the Open Space Program, designed to preserve scenic areas, vistas, and green space along public roads. Funded by \$17.5 million in bond issues (1985 and 1988), the program seeks to preserve scenic values through fee-simple acquisition or conservation easement of parcels of land proposed by local government bodies, conservation groups, and others. In the words of the program, "The Open Space Program seeks to help preserve green corridors and the traditional New England landscape seen from public ways throughout Massachusetts" (Massachusetts Department of Public Works Information Sheet, "Open Space Program").

MINNESOTA

8/3/89 Mr. Dennis Adams, Senior Landscape Architect, Environmental Studies Unit.

There are long-established, legislatively-designated scenic routes in the state, but no special standards or formal scenic roads program, as such. However, a major new study by the Minnesota Department of Transportation, *Highways in Recreational Areas*, thoroughly covers the entire scenic roads field. In view of Congressman Oberstar's pivotal role in the national scenic roads movement, this is not surprising. The plan is truly state-of-the-art in its approach. It includes the usual provisions to develop scenic overlooks, interpretive pull-offs, and facilities along the routes such as safety rest areas, picnic areas, campgrounds, bikeways, water access sites, hiking trails, and travel information. Of particular interest to the study at hand, however, are two "effects of designation:"

Special highway geometric design considerations which will protect or enhance the scenic/natural/cultural character of the road and take advantage of striking vistas and allow for stopping locations.

Highway capacity design based on a peak period to represent the critical tourist demand and recreational user impact for that corridor or segment" (*Highways in Recreational Areas* [Minneapolis: MNDOT, 1988], p. 36).

Comment: During this survey, this was the only reference in a state program or proposed program that related capacity to tourist demand.

NEW HAMPSHIRE

8/30/89 Neil D. MacPherson, Administrator, Bureau of Right-of-Way.

No state program, no state special standards.

Legislative authority to cities, towns, etc. to designate.

State had acquired scenic easements at nine locations.

Section 231:158 of the State Code, dealing with Highways, Bridges, & Turnpikes, "Effect of Designation as Scenic Roads," goes into tree removal and stone wall modi-

636 fication or removal; however, the statute provides that the roadside may be cleared within 3 feet of the main traveled portion of road without hearing or consent.

Comment: The 3-foot item is sort of a super-minimum clear zone. This approach is similar to that of Connecticut and Vermont, with special emphasis on trees and stone walls.

NEW YORK

8/21/89 Mr. Michael K. Barylski, Scenic Roads Program, Manager, Bureau of Land Resources, Division of Lands and Forests, Department of Environmental Conservation.

A department of Environmental Conservation publication, *Preserving New York State Scenic Roads: A Guide to Designation* (Albany, 1988), discusses the program for local (township, etc.) roads that "does not add any restrictions to land use in or beyond the highway corridor. Preservation of scenic quality depends upon the commitment of local governments and private property owners" (p. 1). DOT retains control over maintenance, etc. within the right of way, and its policies prevail therein.

Mr. Barylski provided a copy of Deborah Shanahan's *A Manual for the Management of Vegetation on Scenic Roads in New York State* (Syracuse: SUNY, 1987), a Master's thesis that is proposed as the basis for recommended practice. However, just as the Scenic Roads Program is one of local initiative, so, apparently, are the maintenance practices: The Hudson Valley Scenic Roads Program has also published maintenance guidelines for two classes of scenic roads, those under state jurisdiction and those under local jurisdiction. In the former case, three types of roads are considered: Type I, Aesthetic, Arterial Corridor, are Parkways. Type II, Rural/Urban, Arterial Corridor are regional thoroughfares, with contemporary roadside development and high speed, moderate to heavy traffic. Type III, Rural, Collector/Arterial corridor, are a lower class of road than Type II, more rural scenery, low to moderate traffic volume. The scenic road standards advise that Type III roads should remain unchanged, consistent with safety needs, in terms of lane, shoulder, and alignment (p. 3.).

The portion of the manual dealing with roads under town or county jurisdiction is even more explicit in terms of preservation of scenic values that existed when the road was designated:

Upgrading the pavement by changing its width and/or alignment characteristics is discouraged if these changes would increase user speed and alter the visual character of the road. If portions of the road have been previously altered (by widening or altering alignments, etc.), these sections should be reviewed to determine if there is any reason why they cannot be modified through maintenance practices to be more consistent with the dominant standard existing on the road, thereby enhancing the road's design unity. As always, the safety of the traveling public must be the first consideration, but designated scenic roads should not be upgraded to accommodate higher speeds or increased traffic volume (Part 2, p. 3).

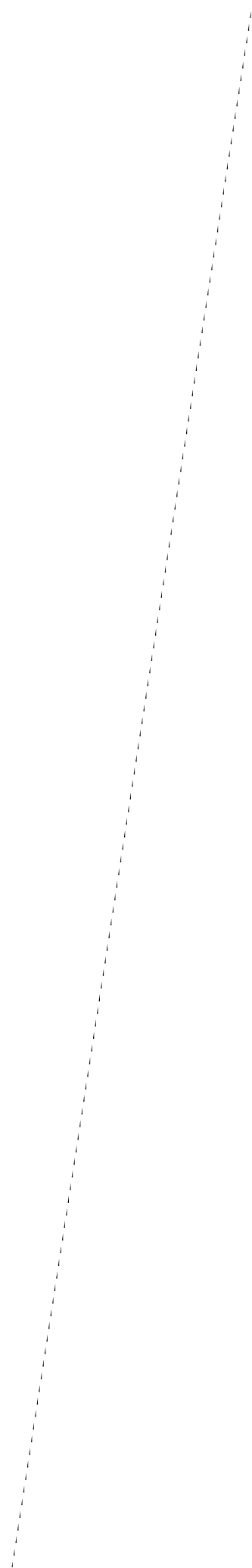
Shoulders should be maintained as sod or gravel surfaces. Paved shoulders should not be introduced. Paved shoulders significantly widen the perceived travel corridor and reduce the local, rural character of the road and are therefore not desirable for general usage on designated town and county scenic roads. Where they presently exist, paved shoulders should be retained if warranted or if possible from a safety standpoint be phased out and replaced with gravel or sod surfaced within the context of on-going maintenance repair and restoration work" (Park 2, p. 3).

New York has always been in the lead in parkways since the days of the Bronx Parkway Commission in 1918. In January 1989, the Parkway Standards Task Force published a draft "Recommended Standards Construction and Reconstruction of State Parkways," a comprehensive and state-of-the-art document. The geometric and other standards upon which it is based are all current new construction AASHTO standards and thus have little relevance to existing roads.

Comment: These standards represent two extremes of the scenic road continuum: on the one hand, the controlled use corridor of the parkway, where the entire scenic context is constructed and controlled, and on the other hand, the preservation of the existing historical road in as near to an undisturbed state as possible, even to the extent of reducing the class of shoulders and geometry to return it to a former condition. Currently, neither approach has much direct relevance to Virginia Byways, though there are roads where the latter approach would be locally popular and perhaps appropriate if sanctioned by the General Assembly.

APPENDIX C

**NATIONAL SCENIC BYWAYS STUDY
CASE STUDY SUMMARIES**



NATIONAL SCENIC BYWAYS STUDY CASE STUDY SUMMARIES

1. Academy for State and Local Government -- Scenic Byways Programs Outside the United States. This study documents the experiences with scenic roads internationally, with emphasis on the European countries. It includes comments on safety and signing standards, environmental issues, marketing approaches and economic impact. Most of the action occurs at the local and regional levels rather than the national level. Uniform practices do not exist.
2. American Automobile Association -- AAA's Scenic Byways Designation and Mapping. This study documents the approach used by AAA in mapping designated scenic byway routes. The study describes the history of the program, the methodology used to select scenic routes including the four criteria for selection, future plans for its continuing activities, and a physical description of a sample of the currently mapped designated scenic routes. AAA has identified 631 routes and is developing in-depth computerized data on each one of these routes for motorist information.
3. American Planning Association -- The Role of Local Planning Authorities in Scenic Byways Programs. This study identifies key relationships between local planning authorities and statewide and/or regional scenic byway programs and provides informal guidance and information for local planning authorities in support of these programs. Representative scenic byway programs are reviewed as they affect local planning authorities and key elements are highlighted. Based on these elements, the study indicates effective local planning authority participation in a scenic byway program. Included are inventory of significant features, scenic corridor preservation and protection management, and related elements.
4. American Recreation Coalition -- Common Elements of State and National Scenic Byways Programs. This study analyzes state scenic byway programs in Colorado, Utah, North Carolina and Maryland, all developed in the last three years, and identifies the forces which led to their development and shaped their key features. The most successful aspects of each program are highlighted for the future guidance of other states. The study also summarizes key presentations and information collected at three major scenic byways conferences, with particular attention to discussions of special programs and issues involving state scenic byway efforts. Finally, it offers an analysis of elements of a national scenic byway program that would be most compatible with and beneficial to existing, evolving and potential state scenic byway programs.
5. American Society of Landscape Architects -- Creative Landscape Design Solutions for Scenic Byways. This study identifies examples of landscape design which accommodate development while enhancing scenic highway environments. It describes design and planning considerations which can help scenic road planners incorporate creative landscape design solutions in scenic byways. Effective landscape design approaches for scenic byways are those which enhance positive scenic values and mitigate negative scenic values. Case examples reviewed include: Arkansas SH 7 (Harrison to Hot Springs), U.S. 285 (Morrison, CO to Taos, NM), the Colorado Peak-to-Peak Highway (Estes Park to Central City), Oklahoma/Kansas Prairie Route (Pawhuska to Manhattan, KS), Texas Seawall Boulevard in Galveston, Texas Hill Country (U.S. 281-290), and Vail Pass (I-70, Dillon to Vail).
6. Bellomo-McGee, Inc. -- Evaluation of Scenic Byways in Terms of Safety Impacts, Operational Impacts, Maintenance Impacts and Design Standards. Because scenic byways range in type from expressways to single-lane unpaved roads, it is necessary to assess the implications of designation from an engineering and design perspective and identify mitigating measures to minimize such impacts, if such scenic byways programs are to be successful. A five-category classification system is suggested. The impact of scenic designation on the operation and maintenance of scenic byways are identified and analyzed. Design standards are considered. Matrices are provided in each of these categories by the five-type classification system suggested. Variables within these classes are also dealt with.

7. Bicycle Federation of America -- The Impact of Bicycling on Scenic Byways. The potential impact of increased bicycle use on scenic byways may be minimal as compared with the potential impact of scenic byway programs on bicyclists. This study identifies the engineering, planning and promotional strategies necessary to minimize adverse impacts and maintain enjoyment of scenic resources for bicyclists. The study identifies planning considerations for bicycle trips as part of the scenic byway experience. It inventories the current planning requirements which affect bicycle use and safety on scenic byways and evaluates the impacts of increased bicycle use.
8. Southeastern Research Institute, Inc. -- The Economic Impact of the Blue Ridge Parkway. This study identifies and evaluates the impact of the Blue Ridge Parkway upon the economies of the counties contiguous to the Parkway corridor. The Parkway traverses approximately 500 miles in western Virginia and North Carolina and attracts over 20 million visitors a year. Estimates are made of the impacts of expenditures from non-local tourism and employment. Equations are developed to calculate impacts from primary income, tax-base impact, and job-base impacts.
9. Benjamin Cottrell, Jr. -- The Safety Impact of the Blue Ridge Parkway. The study identifies and documents the highway safety and operational consequences associated with travel on the Blue Ridge Parkway. It also seeks to determine the design features and operational characteristics of scenic byways that are most likely to have the greatest impact on highway safety.
10. John Blount -- The Environmental Impact of the Blue Ridge Parkway. This study addresses a range of environmental impacts of the Blue Ridge Parkway. It identifies any significant changes that may have occurred over time in terms of each type of impact, and analyzes both beneficial and adverse impacts. Suggestions are made to assist emerging scenic byway programs.
11. Greenhorne & O'Mara, Inc. -- Safety, Traffic and Cost Considerations on Scenic Byways. This safety analysis investigates federal and state experience with safety issues on scenic byways including a comparison of state accident statistics. Data were obtained from Arizona, Oregon, Washington, Tennessee, and the National Park Service. Data were either "before and after" designation data or data that could be compared with statewide averages. Twenty-four scenic byway routes were studied. The cost analysis estimates the costs that might be associated with scenic byway designation and improvement. These generalized costs are based upon a sampling of actual experience and include a broad range of facilities ranging from basic road improvement to the provision of parking facilities, information centers, scenic overlooks, boat launching sites, and others. The range provided is from low, to medium to high. A matrix is provided for easy reference. The traffic analysis identifies the magnitude of travel increases, if any, due to the designation of a road as a scenic byway. Five states' data are involved: Arizona, Arkansas, Oregon, South Carolina and Washington, involving sixteen byways.
12. Heritage Task Force -- Scenic Roads in New York State. This study describes the origins, development and implementation of the New York State Scenic Roads Program, including the Hudson Valley Scenic Roads Program. Of 350 miles of scenic roads nominated, 83.9 miles have been designated as of June 1990. The study discusses the guidelines pertinent to the evaluation and designation of state scenic roads, as well as analyzes the impact of designation on conservation efforts and tourism. The study contains a most valuable assembly of the hands-on mechanics involving scenic road promotion and designation, including memoranda, criteria, directives and much more.
13. Iowa State University -- An Analysis of the Wisconsin Rustic Roads Program. Wisconsin's Rustic Roads Program was initiated in 1973 and involves fifty-seven county, town and municipal roads, varying in length from one to twenty-six miles each, and ranging in design from single-lane unimproved to two-lane paved roads. The study describes the origins of this program in terms of who proposed and implemented it, what it costs, what it intended to accomplish, and what, in fact, it did accomplish.
14. Marshall University -- Actual and Potential Scenic Byways in Mining and Extraction Industry Areas in Rural America. This study identifies and analyzes successful applications of scenic byways in the Minnesota Iron Ranges, the Black Hills Gold Field of South Dakota and the Anthracite Basin of Eastern Pennsylvania. These are then compared with features for a Coal Heritage Corridor in southern West Virginia. Successful tourism programs incorporating industrial heritage and scenic and natural landscapes have been developed in the examples cited, and the same apparently can be done in West Virginia, according to this special study. Pertinent detail is developed to support this contention.

15. The Mississippi River Parkway Commission -- The Great River Road Experience. This study documents the history and development of the Great River Road in establishing, maintaining, and enhancing its scenic, recreational and historical qualities. It also analyzes the economic impacts of the Great River Road on tourism, development, travel, employment and investment opportunities. The Mississippi River Parkway Commission has been involved with the ten river states in promoting and marketing the Great River Road throughout the last twenty years or more. In the last several years, the Commission has developed an international marketing program to promote travel opportunities for visitors from abroad -- a very significant new direction. There is much in this study to encourage and assist other states in connection with their scenic byway programs.
16. National Trust for Historic Preservation -- Techniques Available to Protect Scenic and Historic Resources. This study identifies, describes and evaluates devices presently available to protect and enhance historic resources and vistas along scenic byways. These techniques involve a wide spectrum of tools ranging from fee simple acquisition to land use controls. For each of these tools, examples of their application are provided as well as a determination of their effectiveness. Four scenic roads were selected, based upon established criteria. These included the Blue Ridge Parkway in Virginia and North Carolina; Route 75, Sawtooth National Recreation Area in the Sawtooth National Forest, Idaho; Route 5 connecting Richmond and Williamsburg, Virginia; and Route J40, in Van Buren County, Iowa.
17. New Hampshire Department of Transportation -- The Economic Impact of the Kancamagus Highway on Tourism and Its Possible Application to the Lake Sunapee Area. This study documents the economic impact of the Kancamagus Highway on the tourism industry within its travel corridor. It then applies its findings to determine potential benefits to be derived from an official designation of a scenic highway in the Lake Sunapee Area in another portion of New Hampshire.
18. North Carolina Department of Transportation -- Resolution of Safety, Environmental and Economic Impact Issues in the North Carolina Scenic Byways Program. This study documents and analyzes the processes and techniques used in establishing and implementing the North Carolina Scenic Byways Program. Emphasis is placed on the resolution of safety, environmental and economic issues surfaced during the development of the program. This is a very practical and hands-on evaluation. Finally, the study concludes with an identification of the issues that this program will need to address in the future.
19. Oregon Department of Transportation -- Behavior and Preferences of Oregon Scenic Road Users. This study focuses on understanding the preferences of Oregon's Pacific scenic road users and how these preferences relate to further development of the scenic road corridor. Through a travel survey, the study attempts to identify travelers' wants and attitudes, and seeks to incorporate these findings into planning and design efforts for the future.
20. Oregon Economic Development Department -- Design of an Integrated System of Roadside Information for Scenic Roads. This study designs an integrated system of roadside information for users of scenic roads, including details on how to mark and interpret historic sites, geologic formations and other special elements. It also documents how visitors use signing and tour routes, based upon field data and actual use. It suggests practical applications of its findings for those interested in establishing successful programs.
21. U.S. Forest Service, Department of Agriculture -- The Use of a Public-Private Partnership on the San Juan Skyway. This study identifies examples of several partnership arrangements that have resulted in successful interpretive/educational sites or programs along scenic byways in the National Forests (San Juan Skyway). It provides guidance on how to develop strategies for establishing and implementing workable partnerships of this kind on scenic roads. The San Juan Skyway in Colorado is the longest National Forest Scenic Byway in the nation. This outstanding partnership arrangement is the result of cost-sharing between many federal, state and local agencies and private industry, as well.
22. Scenic America -- Scenic Corridor Protection Devices for a Range of Scenic Environments. This study is a primer on scenic resource protection tools for scenic roads. It identifies representative scenic resource protection programs. It analyzes, develops and evaluates a range of protection approaches reflecting a broad range of scenic environments. The result is an identification of the most effective tools based upon broad experience and application.

- 23. Seaway Trails, New York -- Effective Procedures for a Scenic Byways Program Evolved by a Largely Private Approach.** This New York Seaway Trail consists of 454 miles, paralleling four waterway systems across northern New York's freshwater shoreline. It is a greenery offering public access to 38 state parks, 13 wildlife management areas, 37 fishing access sites and 21 public beaches. This study identifies and analyzes Seaway Trail procedures that involve criteria for consideration in selection, inventory collection, review procedures, and organization elements, funding, planning and development, signage and interpretation, merchandising and safety and environmental impacts.
- 24. United States Travel Data Center -- A Data-Based Analysis of Tourism and Scenic Roads.** This study evaluates the impacts of scenic byways on tourism through the analysis of tourism data at select locations throughout the nation. A comparison of the economic impacts of travel on scenic roads and on other roads for specified counties is also provided. Five scenic byways were selected for special scrutiny. These include the Blue Ridge Parkway in nine counties; the Natchez Trace Parkway in two Tennessee counties; U.S. 322 in two Pennsylvania counties; S.R. 404 in two Maryland counties; and S.R. 11 in one South Carolina county. By extrapolation of these data to the entire network of scenic roads, some very significant findings are provided.
- 25. The Urban Institute -- Economic Impacts of Scenic Byways.** This study documents the economic impacts of scenic byways on tourism revenues, jobs, land values and the pattern and rate of development. It seeks to develop a framework for evaluating these impacts and to apply this framework with major emphasis on tourism expenditures and land values. The analysis was confined to the Virginia Byway Program.
- 26. Utah Travel Council -- The Development of Utah's Scenic Byways and Scenic Backways.** This study sketches the history and development of a two-tiered integration of systems of byways and backways. This local initiative five years ago by the Five County Association of Governments became the prototype of a statewide program that now involves participation by several federal and state agencies and many local government groups, and inspired a major marketing action for Utah's tourism and recreation industry. The dedication of many groups and individuals has resulted in a very successful effort. The study contains many suggestions for program development, involving just about every segment of a program.

TO ORDER:

Copies of these case studies are available at no charge beginning January 1, 1991. Please specify the titles of the case studies you wish to obtain. Orders should be sent to:

**Office of Planning and Environment
Room 3301
Federal Highway Administration
400 - 7th Street, SW
Washington, D.C. 20590**