

Standing Committee on Landscape and Environmental Design (AFB40)
Keith Robinson, Chair

Landscape and Environmental Design

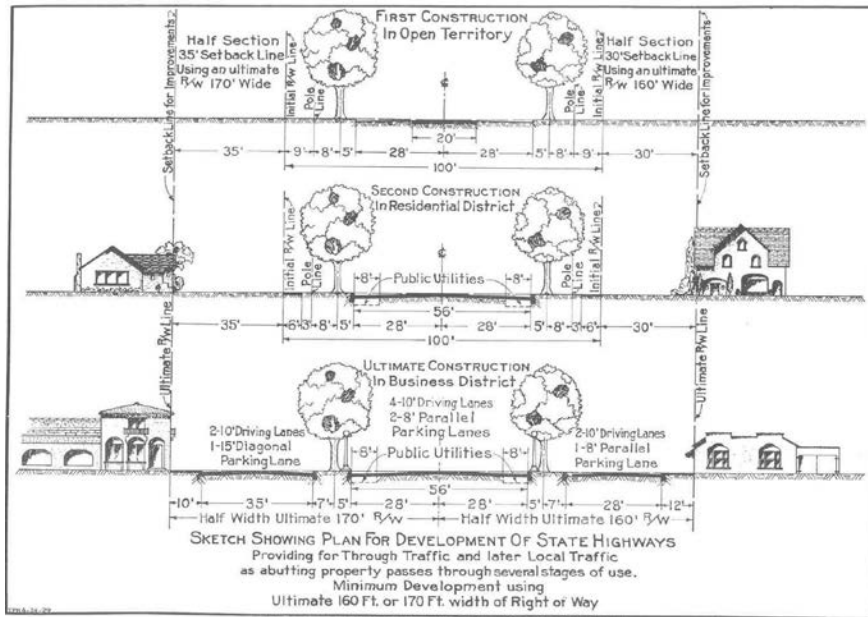
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COMMITTEE HISTORY

Committee Background

The Committee on Landscape and Environmental Design was appointed in 1932 and is the oldest Standing Committee of the Transportation Research Board. Prior to its establishment, the Highway Research Board (HRB) was urged by the American Society of Landscape Architects to conduct a nationwide survey of all aspects of roadside development. This led to the American Association of State Highway Officials (AASHO) to recommend a joint committee of AASHO and HRB on roadside development, which was established as *the Joint Roadside Development Committee of HRB and AASHO*. The research projects that resulted from the first meeting in 1932 were: 1) slope erosion; 2) education and public relations; 3) zoning; 4) highway types and road areas; and 4) plant materials. The committee also defined roadside development as:

Roadside development must conserve, enhance, and effectively display the natural beauty of the landscape through which the highway passes, as well as provide safety, utility, economy, and recreation facilities by means of proper location, construction, and maintenance of the highways.



Early Roadside Design Guidance

(image courtesy Caltrans)

Throughout its history the Committee has produced numerous publications, proposed nationally significant research, and identified emerging issues such as highway drainage, roadside maintenance, environmental analysis, noise attenuation, historic and cultural preservation, and context sensitive solutions. In addition, the Committee has identified preservation and enhancement of scenic and natural resources through the establishment of Task Forces and Subcommittees and advocacy of National Cooperative Highway Research Program (NCHRP) studies. Originally designated as A2A05, the Standing Committee on Landscape and Environmental Design (AFB40) has been a timely, productive and innovative committee of the Transportation Research Board.

From 1932-1939 published papers supported by the Committee included: “Design of the Highway Cross Section,” “Highway Design: Its Relation to Landscape Objectives,” “The Sectional Layout of Multiple-Lane Highways,” “Erosion Control,” and “Snow Control by Tree Planting.” In 1939, AAASHO and HRB split and developed separate committees. Within the HRB, the Roadside Development Committee was the only HRB committee that was permitted to publish separate annual documents.

During the 1930s and 1940s, the Committee began utilizing subcommittees to tackle emerging issues including public education, urban zoning, plant ecology, environmental factors, joint use, roadside economic benefits, and rest areas. Committee members advocated for and supported research to expand function of the road right-of-way to include adequate shoulders, drainage ways, functional planting and flattened cuts and fill slopes that were rounded to create a cross-section that was safer, easier to maintain, and aesthetically pleasing. By 1942, the Committee structure included three divisions: Design, Right-of-Way and Border Patrol; Construction and Maintenance; and Education, Economics and Public Relations. It was the largest committee within HRB. This era began a practice which still exists today—subcommittees breaking off and becoming full committees, with the first break-off committee being the Committee on Surface Drainage of Highways.

The Committee’s forward-looking focus continued to keep roadside design as an innovative and integral part of highway design and planning. Beginning in 1943, the

Committee was percipient in advocating that highways should be planned for both permanency and utility and described the need for “Complete Highways”, well before the “Complete Streets” movement of the 2000s. This concept included four basic requirements:

UTILITY as the most important, for unless a highway is serving completely in a useful capacity, its value is limited. In the broader sense, utility meant service, and as such included provision for the handling of all types of users, with adequate safety -turnouts, waysides, parking facilities for school and commercial buses, service areas for the distribution of mail, gasoline, milk, and farm products, as well as elements that result in the enhancement of land values.

SAFETY meant orderly movement of vehicular and pedestrian traffic. The complete highway design should eliminate present and potential traffic hazards by keeping sight distance open on curves and at intersections, by flattening slopes so that traffic may leave the traveled way quickly and safely in emergencies, and by preventing erosion from forming gullies or deepening ditches into traps for motor vehicles. These and other hazards may be avoided by demonstrated roadside development methods.

BEAUTY, an essential part of the complete highway, requires the harmonious integration of engineering, architectural, and landscape architecture techniques. Conservation of stream shores, fine trees, weathered rock ledges, and similar natural features are essential to the attainment of beauty with pleasing and long-lasting qualities, which appeal to both the community and highway user.

ECONOMY, the quality of providing maximum vehicular and driver service combined with safe design and pleasing appearance, at relatively low construction and maintenance costs. Since the unit costs of annual highway maintenance may be decreased through the integration of the basic principles of landscape design and practice.

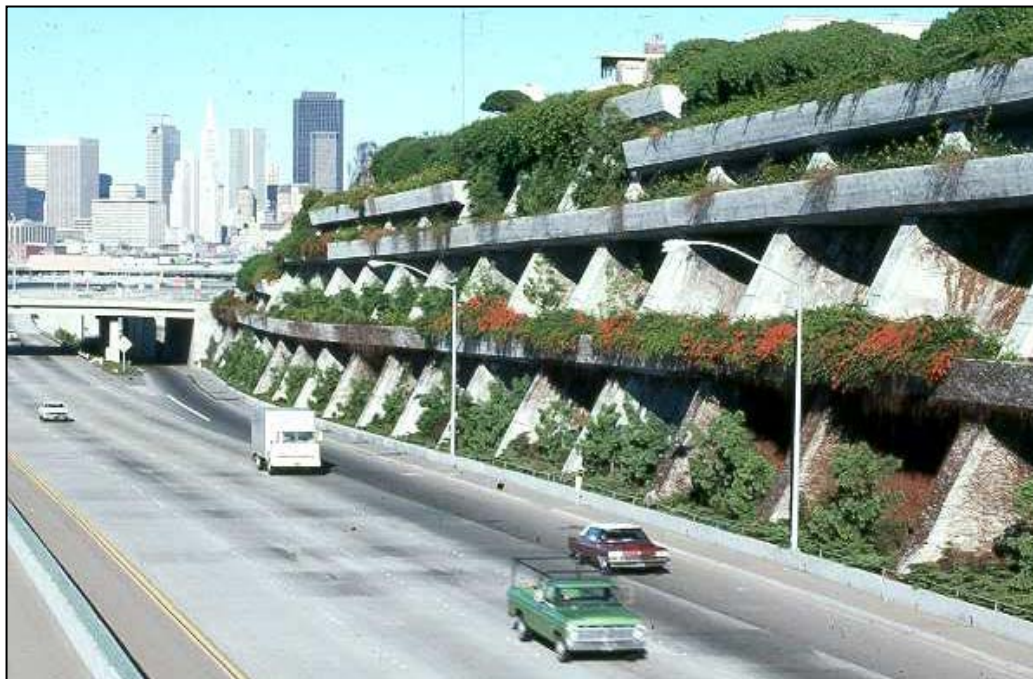
In the post-World War II era, the Committee advocated for highway planning and design as being a product of a team with special training and experience in engineering, soil science, architecture, and landscape architecture techniques. This type of multi-functional team approach facilitated the design of parkways and urban freeways. The Committee produced and supported research reports and circulars on the following topics: roadside use and protection, correlations between roadside development with highway design, stabilization of turf shoulders, turnouts, and rest areas; and mechanizations of roadside operation. The Committee continued its advocacy for the use of functionally designed plantings of trees and shrubs. The purpose of the designed planting was to assist in guiding traffic; reducing headlight glare; controlling drifting snow and wind; and screening against noise, dust, fumes, and visual pollution. The first female member of the committee joined in 1954 as the chair of the Subcommittee on Publications.

In 1958, the Committee began to focus on the Interstates with its two primary topics being shoulder design and noise abatement. During this period the committee recruited members from the National Park Service and the U.S. Forest Service. In 1964, the Committee began a long-standing practice of convening joint mid-year meetings with AASHO committees and other organizations. An early topic was the need to provide the

public with safe stopping opportunities to rest and maintain safe driving habits by developing concepts for implementation of rest areas along the Interstate system, which at the time the Federal government did not fund. Based on the work of the joint Committee efforts, federal funding was approved to provide the roadside rest area facilities.

The Committee's efforts to highlight the need for attractive and functional highways was instrumental in supporting passage of the Highway Beautification Act by Congress in November 1965. In 1965, the Committee authored HRB Special Report 88, "*Art and Science of Roadside Development*," which supported the concepts of highway beautification and was later published as a textbook used by Syracuse University. In 1966, the committee chair conferred with Lady Bird Johnson regarding the need for visual improvement of the highway approaches to Washington, D.C. On three other occasions, the chair attended White House meetings on roadside development, resulting in President Lyndon Johnson convening a White House Conference on Natural Beauty.

In 1969, the Committee assisted the AASHO Committee on Roadside Development in preparing the AASHO Guide for Highway Landscape and Environmental Design, which was published in 1970. The Committee, in collaboration with other HRB Committees and other organizations, became deeply involved in improving aesthetic elements, applying landscape architectural and ecological principles and practices to highway location, design, construction and maintenance.



(photo courtesy Caltrans)

Landscape Architecture and Structure design combine for an appealing highway in San Francisco

As the Committee was solidifying its activities for the consideration of aesthetics and ecology in highway planning and design, the National Environmental Policy Act (NEPA) was passed by Congress in 1970 and ultimately shifted the Committee's awareness from beautification to the protection and enhancement of natural environmental features such as wetlands, erosion control, wildlife, and water quality. The 1972 mid-year meeting of the Committee was themed, "Highways and the Environment", which included topics on erosion control, during construction and long-term. In 1973, the Committee name was changed to the Committee on Roadside Environment, and during the next several years the Committee sponsored papers on bikeways and explored bikeway design. In the same year they started work on another new federal program, "Operation Wildflowers". Continuing its long-standing focus on emerging issues, in 1976, the Committee sponsored a symposium titled, "Visual Aspects of Transportation Facilities."

In 1978, the Committee name changed to A2A05, Committee on Landscape and Environmental Design. In 1982, the 50th anniversary of the Committee, the members recommended updating the 1970 Guide for Highway Landscape and Environmental Design. As a result, AASHTO (formerly AASHO) requested that their Highway Subcommittee on Design, Task Force on Environmental Design proceed with the updating process. The Task Force welcomed assistance from TRB Committee A2A05 in writing and in producing graphics and photographs for the new guide. Committee members authored the new Guide and added new subjects including wetlands, water quality, erosion control during construction, park and rides, as well as including discussion of the needs of other modes of transportation. AASHTO approved publication of the new Guide for Transportation Landscape and Environmental Design in June 1991.

The Committee continued their work on the relationship between highways and the environment with a focus on designation and protection of scenic byways. In 1988, papers were presented at the mid-year meeting on the Scenic Highway Program, Scenic and Historic Highways, and Restoring the Historic Landscape. Soon thereafter, a Committee task force on scenic byways was implemented. In anticipation of legislation establishing a National Scenic Byways Program, the Committee solicited papers throughout 1991 and sponsored a session on Scenic Byways at TRB's 1992 Annual Meeting. The Scenic Byway legislation was passed in November 1991 and signed into law by President George H.W. Bush in December 1991. Once again, the Committee demonstrated that it was well prepared to address the next generation of transportation needs in support of new public policy.

In the 1990s, two Congressional acts affected the work of the Committee. The Intermodal Surface Transportation Efficiency Act (ISTEA), enacted in 1991, was a six-year reauthorization of federally funded transportation programs which revamped the federal funding priorities and provided set-aside funds for transportation enhancements spread over ten categories. ISTEA authorized the National Scenic Byways Program. In May 1995, the FHWA published an Interim Policy for the National Scenic Byways Program with the first round of national and all-American road designations made in September 1996. The Transportation Efficiency Act (TEA-21) carried on the priorities of ISTEA until 2003.

The Committee participated in developing the Scenic Byways Program, with several new members recruited from outside conventional membership areas, including the National Trust for

Historic Preservation. In the 1990s the Committee began its close working relationship with the American Society of Landscape Architects (ASLA). ISTEA enhancement activities presented new challenges for those involved in landscape and environmental design creating a need for new research, technology and process transfer as well as design standards for scenic byways and other transportation settings. The Committee shifted its research needs approach to issues such as scenic corridor management, hydraulic and biologic design and management, waste management and visualization. Other issues such as rest areas and roadside vegetation were still being addressed as evidenced by the publication in 1991 of TR Record 1326, “Safety Rest Areas, Roadway Vegetation, and Utility and Highway Issues.”

In 1992, the publication of TR Record 1363, Scenic Byways, helped to focus Committee activities. The subsequent publication of TR Record 1419, “Roadside Safety Features and Landscape and Environmental Design,” in 1993 provided states design guidelines for the design and safety of alternative barriers, computer visualization and visual prioritization issues for scenic roads. The Committee was instrumental in identifying opportunities under ISTEA for ten enhancement categories:

- facilities for bicycles and pedestrians
- scenic easements and scenic or historic sites
- scenic or historic highways
- landscaping and other beautification
- historic preservation
- rehabilitation and operation of historic buildings, structures or facilities
- preservation and conversion of abandoned railway corridors
- control of outdoor advertising
- archaeological planning and research
- mitigation of water pollution due to highway runoff

ISTEA also brought a greater emphasis on wildflowers with dedicated funding. After considerable research supported by the Committee into plant ecology and construction methods in a roadside context, successful wildflower plantings are now enhancing our nation’s highways. Wetland and tree establishment research continued to be a prominent component of the Committee’s efforts, as evident in Committee-sponsored papers such as wetland creation, wetland restoration, ecological functions, and factors affecting plant survival.



Evaluating tree establishment techniques

(photo courtesy Caltrans)

By the late 1990s, the scenic byways initiative had matured to the point where research needs, papers, and presentations on scenic byways design issues were no longer a high priority so the Committee was seeking to move in new directions. Context Sensitive Design (CSD), later called Context Sensitive Solutions (CSS), had come to the forefront of transportation design and became one of the new planning and design methods to deal with the fundamental shift in power for design decisions from transportation agencies exclusively to shared decision making with transportation users and stakeholders empowered in the decision-making process. CSS was seen by Committee members as simply “design excellence” because it embodied many of the scope and goal statements of the Committee since its inception in 1932.

After the 1999 mid-year meeting, the Committee turned its full attention to the issue of CSS. Many Committee members took leadership roles in the development and implementation of the programs in both the pilot states and other states wishing to explore CSS and the development of research need concerning CSS.

In 2000, the AASHTO Task Force for Environmental Design once again requested that the Committee take on the responsibility of re-writing and updating the AASHTO Landscape and Environmental Design Guide. Committee members participated in multiple NCHRP projects that produced a draft of the new guide. Although approved by the NCHRP Panel, AASHTO elected not to publish the document. Nonetheless, the Committee continued to contribute to improve transportation-related guidance for CSS, Scenic Byways, and other leading topics of the day. Such topics included research on visual impact assessments, roadside animal habitat, animal crossings, Low Impact Development (LID), Erosion Control, Complete Streets, Green and Blue Streets, and Crime Prevention Through Environmental Design.



Complex Erosion Control Treatment

(photo courtesy Caltrans)

Historically, topic areas taken up by the Committee have led to separate TRB committees, subcommittees, or task forces being spun off from AFB40. Some recent spin-offs include CSS and stormwater management.

Current Committee Mission

The Landscape and Environmental Design Committee, AFB40, effectively influences transportation policy and practice through the development, distribution and support of transportation research. The Committee is specifically concerned with research on integrating the transportation facilities with their settings and creating a visually pleasing travel experience for all who live, work, and travel, including:

- conservation of the environment and natural resources,
- preservation of cultural and historic resources,
- preservation of scenic landscapes, and
- an increase of the ecosystem services and other functionalities provided by roadsides.



Roadside planting for biofiltration

(photo courtesy AFB40)

The Landscape and Environmental Design Committee is proud of its many accomplishments to improve the design, construction, and care of transportation systems whose form is in harmony with the surrounding natural and man-made environment. The Committee continues to promote cost-effective, efficient, and buildable design solutions that enhance the traveler's experiences. At the same time, the Committee promotes careful stewardship, wise planning, and artful design that supports responsible development, restores and conserves natural resources, respects cultural heritage, and improves the quality of life.

Accomplishments to Date

Historic accomplishments are noted above. Recent accomplishments include:

- **Recent Annual Meeting Sessions/Workshops Sponsored or Co-Sponsored:**
A Worker Safety Workshop to share information and issues with perspective from New York DOT (how to be cost effective) and Caltrans (how to design for inherent safety).
- Papers Reviewed/Lectern Session: "Humanizing Highway Landscape Design" and 2 papers reviewed on analyzing driver behavior and fatigue with simulations of differing road conditions and evaluating road conditions for comfort and speed with visualization tools, and a presentation on "A Brief History of Trees: Case Study of New Mexico Urban Development."
- Poster sessions: First time committee had a poster session. A call for posters went out in August 2017. Seven posters submitted and reviewed and 6 were invited to present.
- Co-sponsored Sessions: "Developing Customer Experience through Art and Design Practices and Policies" and "Green Stormwater Infrastructure".
- A Workshop was cosponsored with AP045 and AFF10 – Making Connections through Art, Culture and Design Excellence
- Lectern Session: The Committee-sponsored session: "Low Impact Development and the Urban Landscape" and two jointly-sponsored sessions with AFB65: "Sustainable Stormwater Management for DOTs" and "Research and Innovative BMPs for Stormwater."

- Poster session: “Trends in Landscape and Environmental Design for Urban, Suburban & Rural Roads With a focus on university research and projects, bringing in younger participants to the Annual Meetings.

Current Committee Activities

Due to the wide range of emerging issues related to the Committee Scope and Mission, the Committee has created an organizational structure to engage all members and encourage participation by friends. Specific work groups include:

North American Outreach - Expansion of the Committee Friends and engagement with and through State Departments of Transportation, Affiliated Professional Organizations, Educational and Research Institutions.

International Outreach - Expansion of the Committee Friends and engagement with transportation professionals and academics, primarily in Europe, South America, and Asia.

Research Needs - Development of Research Needs priorities and new research needs statements which led to a greater number of funded NCHRP research project and synthesis proposals. Additionally, this group is engaged with outreach with academics to understand their current research priorities and needs that can be facilitated but the Committee.

Mid-Year Meetings - Past, present and future mid-year hosts lead the development of the current mid-year meeting.

ASLA Liaison - The Committee continues a collaborative relationship with the American Society of Landscape Architects. ASLA has recently provided sponsorship of the Mid-Year meeting to allow for local ASLA members and student affiliates to participate with no registration fee. Committee members have presented at ASLA conferences and serve on the Transportation Professional Practice Network and the Governmental Affairs Committee. In addition, members have provided expertise for design/build, Congressional and White House pollinator events, and special coordination on transportation related legislation.

ADC50 Liaison - Coordination of research needs with the Committee on Historic and Archeological Preservation in Transportation that are of interest to both Committees.

CSS&D Task Force Liaison - The Committee continued to provide support for CSS&D implementation, and joint annual meeting sessions.

AASHTO Liaison - The Committee continues to provide close connections with the AASHTO standing committees and works on jointly developing NCHRP proposals and populating research panels.

AFB40 Website - The Committee has increased its focus of information sharing with transportation professionals through development of a fully functional website that is a resource for Committee members, friends, and others. The website continues to serve as a tool for both national and international outreach.

Communications Coordinator - Enhance committee communications, both internal and external.

TRB Committee ADC10 Liaison – Coordination of research needs with the Standing Committee on Environmental Analysis in Transportation.

TRB Committee AHD50 Liaison - Coordination of research needs with the Standing Committee on Roadside Maintenance

Current Committee Research Needs Statements and High Priority Issues:

- Performance Measures, Best Practices and Recommended Design Guidance for Green Streets.
- Transportation Design Impacts on the Social, Economic and Sustainable Function of Main Streets.
- Deterring Crime through Urban Complete Street Design Policies.
- Designing and Managing Roadsides to Encourage Pollinators.
- Cost-Benefit Analysis of Green vs. Gray Stormwater Management.
- Designing Roadsides to Address Extreme Climate Events
- How are Artists Transforming Transportation Projects and the Customer Experience?
- Landscape and environmental design contributing towards zero deaths safety strategies.
- Evaluating and quantifying benefits of designing and implementing green infrastructure.
- Designing and managing roadsides and rights-of-way as productive, and sustainable environmental and economic assets.
- Design roadside function with human factors, such as livability, sustainability, and climate change.
- Strategies for integrating and achieving CSS in design-build and other alternative project design and delivery approaches.
- Apply flexibility in design to achieve right-sized solutions and investments.
- Designing transportation systems for active living and healthier populations and environments.
- Strategies for implementing and managing mandates for sediment and erosion controls on transportation projects.
- Strategies to address safety and security in the design of roads and roadside facilities.
- Design strategies for re-allocating space to implement Complete Streets approaches that benefit all users.
- Innovative and systematic approaches applying visual impact assessment to integrate transportation facilities successfully in their surrounding environments.

Committee Vision for the Future

Today AFB40 leads the way identifying emerging and cross cutting issues of interest to transportation professionals to help practitioners increase the utility, safety, beauty and economy of the highway environment. In addition, AFB40 aims to support innovative technical and practical guidance and policy through proactive collaboration with numerous other committees, organizations and initiatives, including:

- a) Landscape and environmental design strategies and approaches that contribute towards influencing driver behavior and safety and other modal user's behaviors and safety
- b) Sustainable design, and design and management of green infrastructure
- c) Designing for Complete Streets, more active living and more sustainable and healthier choices in transportation.
- d) Designing and managing roadsides that are productive, restorative, and sustainable as environmental and economic assets and approaches to keep roadside ecology, climate change, and energy concerns in mind.

- e) The widespread decline in pollinator insects and animals and the potential for the roadside environment to encourage the well-being of pollinator species.
- f) The FHWA and many local stakeholders have emphasized that the transportation sector take a role in community building by implementing livability and sustainability components into transportation improvements. Livability, sustainability, and the economic impacts from transportation are still not fully understood. Performance measures for these issues are seldom addressed or identified, creating an opportunity for the committee to lead in their development.
- g) The Committee is focusing on being more aggressive, sophisticated, and multi-faceted in its outreach and dissemination of information beyond the TRB audience. The Committee will continue to reach a much wider national and international audience through developing the following: active national and international outreach coordinators, a new dynamic Google Sites website, an annually updated marketing flyer and collaborative efforts with external organizations, and initiatives (ICOET, CSS National Dialog, ASLA, FHWA, AASHTO, etc.).
- h) The Committee has many members that are involved in numerous organizations in addition to TRB and they continue to work as liaisons with these organizations in order to make transportation issues and the scope of AFB40 part of the discussion and consideration in their activities and opportunities for collaboration.
- i) The Committee's international members are active and influential in fostering collaborative opportunities and disseminating Committee information with their European and South American colleagues.
- j) The Committee continues to build its membership with strong academic members who are active researchers employed by universities who can foster collaborative opportunities within their academic and research circles while disseminating information and providing outreach to their colleagues and students.

The Committee is now eighty-seven years old. Member enthusiasm and commitment to relevance in the transportation community is as high as when the first group gathered in 1932.

Collectively, the numerous research publications and hundreds of fine papers reviewed by the Committee and published fill many volumes. The Committee embraces its TRB role to further its current mission and scope, which support the original 1932 Joint Roadside Development Committee's mandate statement to:

“conserve, enhance, and effectively display the natural beauty of the landscape through which the highway passes, as well as provide safety, utility, economy, and recreation facilities by means of proper location, construction, and maintenance of the highways”.

As we move into the future, the Committee has re-vitalized its membership, developed a web site for the exchange of information, ideas and communication and is poised to continue to investigate and encourage research and ensure that it meets TRB's high quality standards. The Committee will continue to share the results of these endeavors through improved communications, liaisons, sponsorships, publications and postings.

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