ITE Committee Report Summary

CONTEXT SENSITIVE SOLUTIONS IN DESIGNING MAJOR URBAN THOROUGHFARES FOR WALKABLE COMMUNITIES: AN ITE PROPOSED RECOMMENDED PRACTICE

By James M. Daisa, P.E.

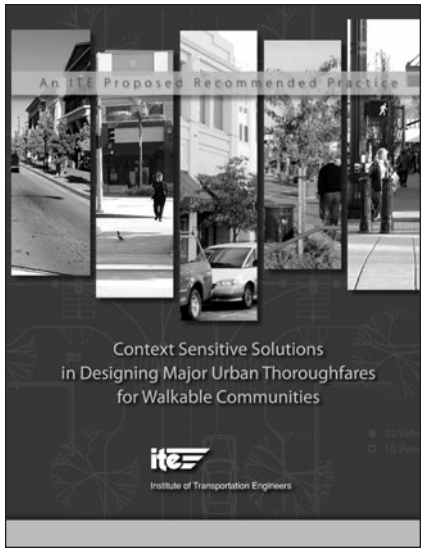
This feature highlights the content of the recently published Institute of Transportation Engineers (ITE) proposed recommended practice to provide guidance for the context sensitive design of major urban thoroughfares.

This report is published as a proposed recommended practice of ITE. As such, it is to be considered in its proposed form, but is subject to change after receipt and consideration of suggestions from those who have reviewed the report.

Readers are encouraged to submit written suggestions for improving this report to: Lisa Fontana Tierney, Technical Projects Senior Director, ITE, 1099 14th Street, NW, Suite 300 West, Washington, DC 20005-3438 USA; fax +1 202-289-7722; e-mail ltierney@ite.org. Written suggestions should be received no later than December 31, 2006 to ensure consideration for incorporation into the final recommended practice report.

IN 2003, A GROUP OF TRANSPORTATION professionals, planners, architects and urban designers took on an exciting yet challenging assignment—to develop national guidance for context sensitive solutions (CSS) in the design of major urban thoroughfares for walkable communities. The joint effort by the Institute of Transportation Engineers (ITE) and the Congress for the New Urbanism is sponsored by the Federal Highway Administration's (FHWA) Offices of Infrastructure and Planning, Environment and Realty and by the U.S. Environmental Protection Agency's (EPA) Office of Policy, Economics, and Innovation Development.

This project is intended to advance the successful use of CSS by practitioners. The resulting proposed recommended practice (PRP) provides technical guidance for the application of CSS principles in urban areas and is sure to spark a constructive national debate on key issues in the design of urban thoroughfares.



RESPONDING TO A NEED

The PRP responds to the needs of those who plan and design urban thoroughfares and those who use them—the community. These needs are reiterated in the overall goals:

- Identify the inherent flexibility in design guidelines to meet local objectives;
- Improve compatibility between thoroughfares and surrounding context;
- Balance the land use and transportation functions of corridors;
- Design thoroughfares that support and enhance the activities of adjacent land uses;
- Ensure truly multimodal facilities; and
- Create streets that are quality public space.

The PRP supplements and expands on policies, guidelines and standards commonly used by transportation professionals, including the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*, other AASHTO publications, state department of transportation design policies and manuals and local municipal street design standards.

The PRP is not intended to supersede any of these sources of information, but to illustrate how established guidance can be applied to roadway improvement projects to make them more compatible with community objectives and context in urban areas.

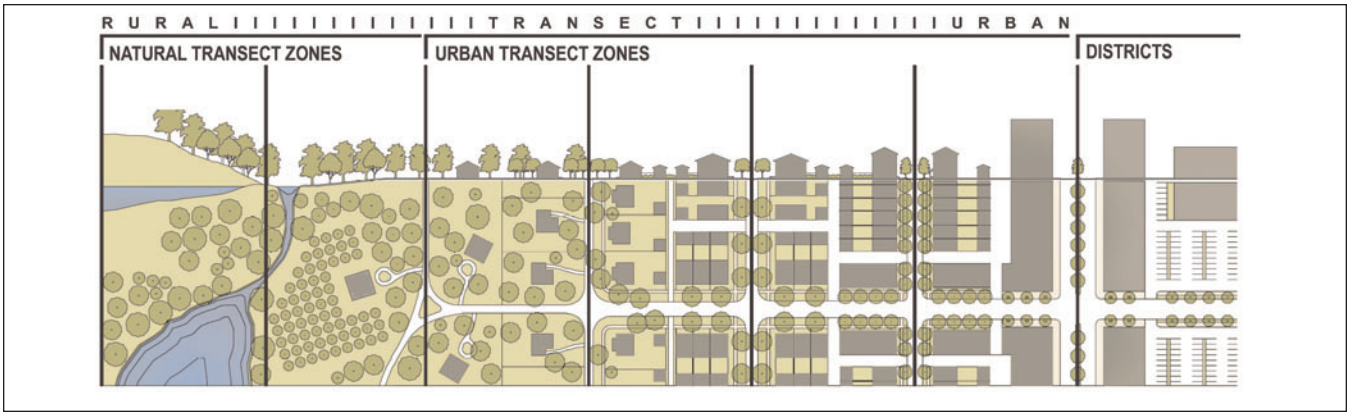
FOCUS OF THE PRP

The guidance in the PRP draws upon the philosophies and practices of smart growth and new urbanism—movements that stress multimodal transportation systems with an emphasis on walkability. The focus is on major thoroughfares—facilities that function as collectors and arterials—in urban environments where development intensity, mix of land uses and design features combine to create the opportunity for walking, transit and biking to be efficient and attractive transportation choices.

The traditional term "thoroughfare" is used instead of conventional terms (street, roadway, or highway) to distinguish lower-speed urban roadways from other types of roadways. Low speed, as defined in the PRP, is a range of operating speeds from 25 to 35 miles per hour (mph).

Although the focus is on lower-speed walkable thoroughfares, the PRP also provides design guidance for higher-speed facilities (greater than 40 mph) in areas where the movement of vehicles is a priority. The PRP also addresses:

- The relationships and tradeoffs involved in balancing mobility



SOURCE: Duany Plater-Zyberk and Company.

Figure 1. A continuum of development patterns ranging from rural (in context zone 1) to the most urban (in context zone 6).

needs, adjoining land uses and environment and community interests;
- Approaches to resolving the challenges encountered on an individual thoroughfare by addressing the larger scale of the network or the corridor;
- Guidance to identify and select thoroughfare types and design parameters to best meet the needs of a particular context; and
- Design criteria for roadway elements.

CHARACTERISTICS OF WALKABLE COMMUNITIES

The PRP provides guidance and examples of the use of CSS where a community puts a high priority on places with the following characteristics:
- Mixed land uses in close proximity to one another;
- Building entries that front directly onto the street without parking between entries and the public right of way;
- Building, landscape and thoroughfare design that is pedestrian-scale; in other words, it provides architectural, urban design and streetscape detail with size and design appreciated by persons who are traveling slowly and observing from the street level;
- Relatively compact developments (both residential and commercial);
- A highly connected, multimodal circulation network, usually with a fine "grain" created by relatively small blocks; and
- Thoroughfares and other public spaces that contribute to "placemaking"—the creation of unique locations that are mixed-use and pedestrian- and transit-oriented and have a strong civic character with lasting economic value.

The above characteristics, to varying degrees, are found in urban locations ranging from suburban communities to the most intensive central cities. The guidance and examples in the PRP build upon and emphasize these attributes as the foundation for walkable communities.

A FRAMEWORK FOR URBAN THOROUGHFARE DESIGN

Successful urban thoroughfare design requires an understanding of context and thoroughfare design. Although one can sense whether an environment is suburban or highly urban, it can be difficult to describe the specific features that collectively define a particular urban context and its unique needs. The PRP presents a framework to assist the practitioner in both identifying context and developing context-sensitive thoroughfare designs.

The framework begins by explaining the fundamental principles and features of the built environment that create and shape urban context. With this as background, the framework:
- Introduces and defines a series of context zones that describe places varying in intensity from walkable suburbs to the most urban downtowns;
- Introduces a roadway classification system that uses both functional class (such as arterial and collector designations) and thoroughfare type (such as boulevard, avenue and street types) to describe the role of a thoroughfare in the circulation network and its design character; and
- Describes features of thoroughfare types and context zones that result in compatibility.

The premise of this framework is that the design of a thoroughfare should change in response to changes in the surrounding context—and change in a way that specifically addresses the activities and functions required of adjacent land uses. This change determines the need for transitions and change in thoroughfare design parameters.

The most identifiable example is the transition of a rural highway as it enters a town center. It is more challenging, however, to identify the appropriate transition between different urban contexts where the distinction between one context and another blurs.

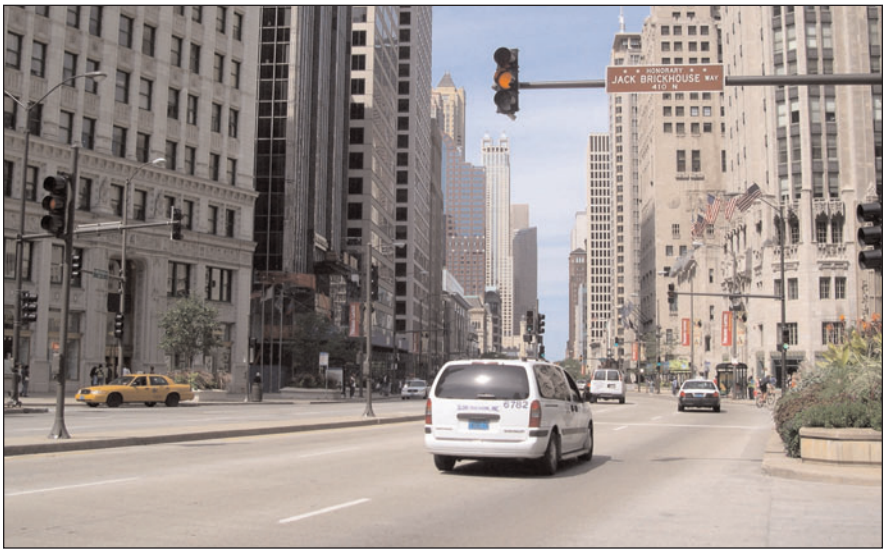
The Concept of Context Zones

Every thoroughfare has an immediate context created by buildings and activities on adjacent properties and is part of a broader context created by the surrounding neighborhood or district. The elements of context relating to buildings, landscape, land uses and public facilities can combine in almost infinite varieties. The PRP presents a set of four "context zones" defining urban areas.

Context zones offer an understandable way to describe different parts of cities and towns, emphasizing the characteristics that create walkable communities. The four context zones are a subset of the seven zones describing a full continuum of environments from natural to highly urbanized, as shown in Figure 1. The PRP's framework uses these context zones

Table 1. Roles of functional classification and thoroughfare type in CSS.

	Role in design	Determines
Functional classification	• Defines function and operational role in the network • Governs design controls of speed and sight distance	• Continuity of the thoroughfare through a region • Purpose and lengths of trips • Level of land access • Type of freight service • Suitability of different types of public transit service
Thoroughfare type	• Governs design criteria • Determines physical configuration of thoroughfare • Identifies design elements • Governs dimensions	• Roadside design criteria • Traveled way design criteria • Intersection design criteria



SOURCE: The Congress for the New Urbanism.

Figure 2. A boulevard in an urban core context.

SOURCE: Kimley-Horn and Associates Inc.

Figure 3. An avenue in a suburban context.

first to describe adjacent surroundings, then to help select compatible thoroughfare design parameters.

Thoroughfare Types

The framework calls for the design of thoroughfares in pedestrian-oriented areas to be governed by both functional class and thoroughfare type. The purpose of these classifications as used in CSS applications for urban areas with characteristics of walkable communities is described in Table 1.Three types of major thoroughfares can meet the needs of urban contexts in walkable communities:

- Boulevards are moderate speed (35 mph or less) divided arterial thoroughfares that serve multimodal movement. They serve a mix of regional and local traffic and important transit routes, including bus rapid transit. They may be long corridors, typically four lanes but sometimes wider, serve longer trips and provide limited access to land through the use of access management. Curb parking can be an important element of boulevard design, as it offers convenience as well as creating a buffer for activity on the sidewalk and adjoining properties (see Figure 2).
- Avenues are moderate speed (30 to 35 mph) urban arterial or collector thoroughfares, generally shorter in length than boulevards. They are primary pedestrian and bicycle routes and may serve local transit. Avenues do not exceed four lanes. Some avenues feature a raised landscaped median. Avenues may serve commercial or mixed-use areas and usually provide curb parking (see Figure 3).
- Streets are low speed (25 mph) thoroughfares, generally two lanes and serve predominantly local traffic and access to abutting property. Streets may serve as the main street of commercial or mixed-use areas and emphasize curb parking (see Figure 4).

ANATOMY OF A THOROUGHFARE

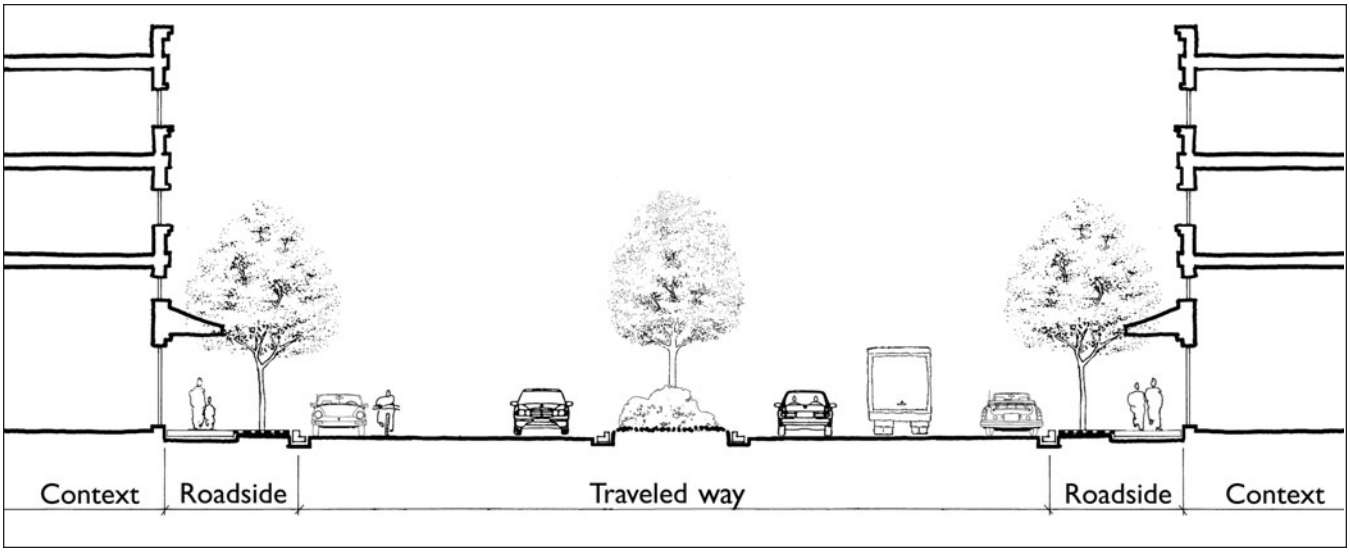
To assist practitioners in successfully assembling the elements of a thoroughfare, the PRP organizes definitions,

design principles and criteria into sections corresponding to thoroughfare components. The three components that compose the cross-section of a thoroughfare are illustrated in Figure 5; the fourth component, the intersection, is defined below. The components are:

- Context: In urban areas, the built environment consisting of properties and activities within and adjacent to the public right of way and the thoroughfare itself, with surroundings that contribute to characteristics that define the context zone, such as buildings, landscaping, land-use mix, site access and public and semi-public open spaces.
- Roadside: The public right of way, including the planting area and side-

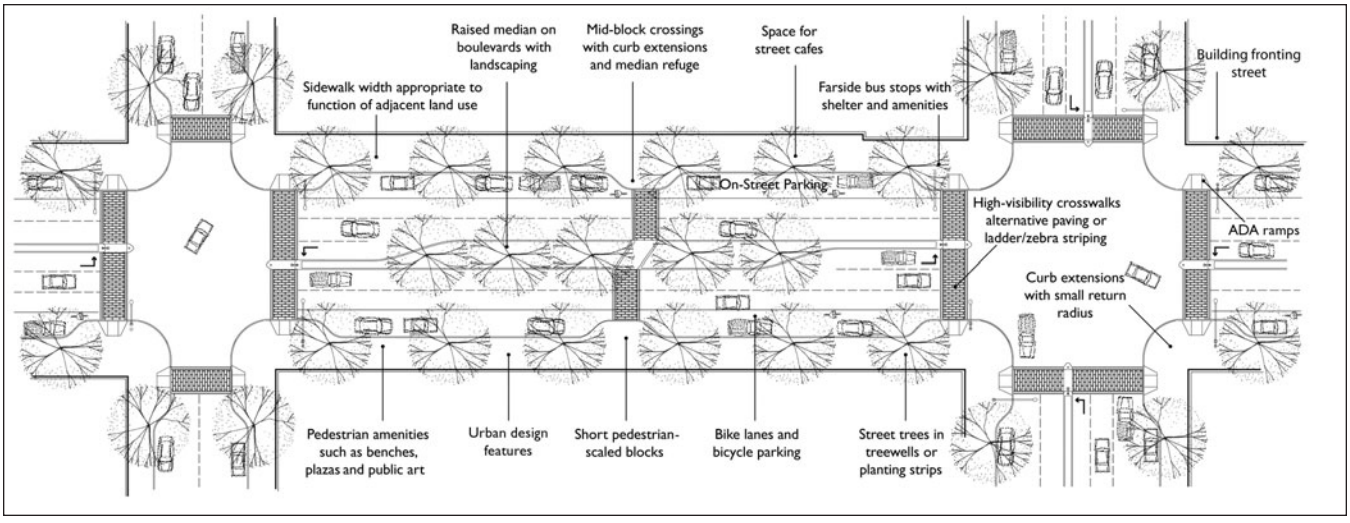
SOURCE: Meyer, Mohaddes Associates.

Figure 4. A street in an urban center context.



SOURCE: Community, Design + Architecture.

Figure 5. Components of an urban thoroughfare.



SOURCE: Community, Design + Architecture.

Figure 6. An illustration of the context-sensitive urban thoroughfare design elements addressed in the proposed recommended practice.

walk, from the back of the curb to the front property line of adjoining parcels. The roadside is further divided into a series of zones that emphasize different functions, including frontage, throughway, furnishings and edge zones. The function of the roadside, its width and the level of pedestrian use is directly related to the activities of the adjacent context.

- Traveled way: The public right of way between curbs, including parking lanes, the travel lanes for vehicles and bicycles, medians, turn lanes, transit stops and exclusive transit lanes and curb and gutter.
- Intersections: Where two or more public streets meet. Intersections are characterized by a high level of activity and shared use, multimodal conflicts, complex movements and special design treatments.

Table 2. Chapter overview.

Chapter	Material addressed
Part 1: Introduction	
1: Foundation	The background behind this guidance, principles of CSS, definitions and an overview of the CSS process.
2: Planning and Developing Context Sensitive Urban Thoroughfares	An overview of the transportation planning and project development process and how CSS is applied with these processes.
Part 2: Planning	
3: Network and Corridor Planning	An overview of thoroughfare network types, characteristics of successful networks and network design guidelines. An overview of the corridor planning process and the role of CSS.
4: A Framework for Urban Thoroughfare Design	An introduction to the design framework for context-sensitive thoroughfare design, context zones, their characteristics and the features that create context, a description of thoroughfare types and their relationship with functional classifications, compatibility with context zones and general design parameters.
Part 3: Design	
5: Thoroughfare Design Process	Process for using this report to design thoroughfares, how to design thoroughfares within constrained rights of way and flexibility in the application of design criteria.
6: Typical Thoroughfare Designs	General design parameters for thoroughfare types, variations in the roadside and traveled way under varying conditions and example thoroughfare designs.
7: Design Controls	A discussion of the engineering controls and level of flexibility critical in context-sensitive design, including design vehicle, roadway geometrics and design speed.
8: Roadside Design Guidelines	General principles, design considerations and detailed guidance for the design of the elements that comprise the roadside.
9: Traveled Way Design Guidelines	General principles, design considerations, and detailed guidance for the design of the elements that compose the traveled way.
10: Intersection Design Guidelines	General principles, design considerations, and detailed guidance for the design of the elements that compose multimodal intersections.
11: Thoroughfares in Vehicle Mobility Priority Areas	General design parameters for thoroughfare design in single use areas and areas where vehicular mobility is a priority, and comparison of conventional and CSS cross-section determination in these areas.

Figure 6 illustrates some of the fundamental elements of a context-sensitive thoroughfare design in walkable urban contexts.

CONTENTS OF THE PRP

The PRP is divided into three parts: introduction, planning and design. Early chapters address CSS in the planning and project development process, the design framework and the thoroughfare design process. Later chapters provide general design parameters, example designs, design controls and design guidelines for major urban thoroughfares with speeds up to 35 mph in areas with high levels of pedestrian, bicycle and transit activity. The guidance also provides design parameters and considerations for roadways intended to operate at 40 to 45 mph in areas of lower multimodal activity. Table 2 provides an overview of each chapter.

CSS VERSUS CONVENTIONAL DESIGN APPROACHES

Conventional thoroughfare design is typically driven by traffic demand and level of service (LOS) objectives. The first two design elements of a thoroughfare are determined early in the transportation planning process—functional classification and number of lanes. The outcome of this mobility-focused process influences the rest of the design process.

CSS thoroughfare design, advocated in the PRP, also begins during the transportation planning process with an emphasis on identifying critical factors and issues and community values before establishing design criteria. The applica-

tion of CSS principles in the design process stresses an interdisciplinary approach—working with a full range of stakeholders—in a process that seeks to identify core issues and problems, develop a spectrum of alternatives and select a solution that meets both transportation needs and community objectives.

The process may determine that LOS needs to be balanced with environmental, historic preservation, or economic development objectives in the community or it may conclude that vehicle mobility is a high priority. Regardless of the outcome, the process results in well thought out and rationalized design tradeoffs—the fundamental basis of CSS.

Table 3. Summary of key design issues.

Design Element	Issue
Relationship between design speed and target speed	The PRP recommends using a "target speed," the desirable operating speed for a particular context, to establish design criteria. Design speed, recommended as a maximum of 5 mph over target speed, is used to determine critical design elements such as sight distance and horizontal and vertical curvature.
Target speeds for each context and land-use combination	A narrow range of target speeds (between 25 and 35 mph) is established for urban context zones for walkable communities and also varies by functional classification and whether the adjacent land uses are predominantly commercial or residential. Higher speed facilities (greater than 40 mph) are addressed as a separate design issue. Concerns were raised that the range for urban context zones is too narrow to encompass all types of urban thoroughfares.
Lane widths	The PRP recommends consistency with AASHTO's range of lane widths for arterials and collectors (10–12 feet), but emphasizing widespread use of 11-foot lanes. Other viewpoints desired guidance using 10-foot and 9-foot-wide lanes for arterials and collectors, respectively.
Maximum number of moving traffic lanes for each thoroughfare type	The PRP suggests a maximum of six lanes for arterial thoroughfares but recommends a desirable four lanes for boulevards and avenues in urban walkable context zones. The section of the PRP on vehicle mobility priority facilities suggests eight-lane arterials where parallel capacity is unavailable. Similar to the issue surrounding speed, there is concern that the range of lanes is too narrow.
Design vehicle versus control vehicle	The intersection design guidance recommends the selection of a "design vehicle" if large vehicles must be regularly accommodated without any encroachment into opposing traffic lanes, or selection of a "control vehicle" if it infrequently uses a facility and must be accommodated, but encroachment into the opposing traffic lanes, multiple-point turns, or minor encroachment into the roadside is acceptable.
The role of level of service in design	Conventional thoroughfare design process uses traffic projections for a 20-year design period and strives to provide the "highest practical level of service" or at least meet established level of service standards. The PRP recommends considering traffic projections and level of service as important factors but stresses the need to balance the needs of all users. It also emphasizes the need to address traffic demand at the scale of the network as opposed to individual facilities.
Lateral clearances where vertical curbs are provided	The PRP recognizes the constraints in providing clear zones in urban areas and recommends, at a minimum, the use of an "operational clearance" (for example, to allow for car door swing) where vertical curbs are provided. The PRP does not suggest that vertical curbs can redirect errant drivers, but reflects the impracticality of clear zones in urban areas.
Mid-block pedestrian crossings	The decision to install mid-block crossings continues to be a controversial issue. The PRP provides criteria to assist in the decision to install mid-block crossings and design guidelines once the decision has been made.
Where bikes are desired, should each such thoroughfare have designated bike lanes?	Bicycle advocates involved in the review of the PRP supported a recommendation for bike lanes on all streets where bicyclists need to travel, raising the issue of trade-offs within constrained rights-of-way. The debate is whether bicycle facilities should have equal priority with other common design elements on urban streets.

THE DESIGN DEBATE—ISSUES IN DEVELOPING THE PRP

The development of the PRP brought together a diverse group of people involved in urban planning and transportation engineering, including engineers, planners, architects, urban designers, landscape architects and transit specialists. The individuals who wrote the PRP, reviewed its many drafts and managed and facilitated its preparation represent a spectrum of public agencies, private organizations and interests. Naturally, the diversity of viewpoints and objectives resulted in a healthy debate on a number of design issues.

Although the PRP attempts to maintain consistency with established design guidance such as the AASHTO Greenbook, several controversial issues remain. It is anticipated that users of the PRP will provide important feedback on these issues. The issues generating the greatest amount of discussion during the preparation of the PRP are summarized in Table 3.

CONCLUSIONS

An important objective of the PRP is to balance different viewpoints, priorities and interests. This diversity of objectives was necessary to develop guidance that would be useful to a wide spectrum of practitioners around the country. It is the author's belief that many of the competing interests have been reconciled in the PRP, but a number of outstanding issues remain that can be resolved only with feedback from users of the document. ITE encourages comments and suggestions as the PRP is considered for a recommended practice.

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