Walkable Urban Thoroughfares: From Concept to Recommended Practice

THIS ARTICLE TAKES A LOOK AT SOME OF THE APPLICATIONS OF THE ITE RECOMMENDED PRACTICE *DESIGNING WALKABLE URBAN THOROUGHFARES: A CONTEXT SENSITIVE APPROACH.*

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INTRODUCTION

In 2003 a small group of practitioners active in the new urbanist and smart growth movements met in San Francisco to discuss how the differences between the traditional goals of highway design could be reconciled with a broader set of societal goals, specifically the design of major urban streets to be a more supportive part of communities. This meeting was the first step on a seven-year journey that culminated in the adoption of the new Institute of Transportation Engineers' recommended practice *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*.

The goal of the recommended practice is to bridge the gap between conventional geometric design of streets and highways and design that supports the complex multiple functions of traditional urban streets. The guidance in the recommended practice is narrowly targeted at the design of thoroughfares in dense compact mixed-use urban places where walking is a desirable and efficient mode of transportation.

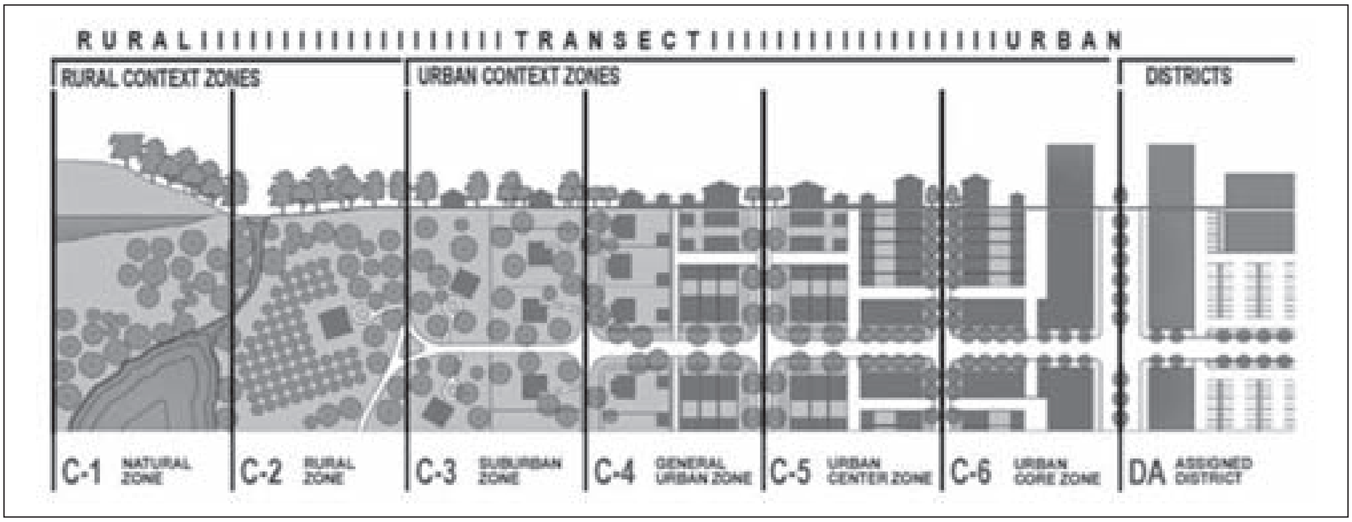
The challenge was developing an approach to design that integrated multimodal transportation function with facilities that support the human and economic activities associated with adjacent and surrounding land uses. Achieving such integration required an interdisciplinary approach that wedded the professions of engineering, planning, urban design, and landscape architecture. Thus was born a partnership between the Institute of Transportation Engineers and the Congress for the New Urbanism, sponsored by the Federal Highway Administration (FHWA) and the Environmental Protection Agency (EPA), to collaboratively develop design guidance for walkable urban thoroughfares founded on the principles of context sensitive solutions (CSS).

This article starts with an overview of the new content in the final version of the recommended practice (RP). The benefit of using the RP's guidance is demonstrated with two brief case studies that are examples of CSS as both a process and an outcome. The case studies are followed by a discussion of the critical elements of design that affect safety and how walkable thoroughfares benefit safety. This article concludes with the various ways the RP is being used and a summary of an FHWA-sponsored outreach program promoting the RP and context sensitive solutions.

CONTENT EXPANDED TO REFLECT CURRENT PRACTICE

The proposed RP was circulated amongst, and used by, design professionals for more than a year. The experiences and opinions of these initial users generated nearly 1,000 individual comments, most of which have been integrated into the adopted RP. As a result the guidance has been updated, expanded, and substantially improved.

The RP continues to be organized around an introduction to the guidance, planning, and design. The planning section provides guidance on the role of walkable thoroughfares in the project development process and network and corridor planning. It ends with the framework of context zones (see Figure 1) and thoroughfare types that form the procedures of the RP's design section. The design section starts with the fundamental design process and the use of design controls in walkable urban thoroughfare design. The remainder of the RP provides design guidance, considerations, and recommended practices for the three components of thoroughfares: the streetside, traveled way, and intersections. Reflecting the authors' responses to the many comments received, the adopted RP includes the following new or substantially improved topics:



Source: Duany Plater-Zyberk and Company

Figure 1. The transect categorizes the infinite spectrum of the natural and built environment into four discrete zones that are used in the RP to guide certain design parameters.

- Creating quality main streets;
- Design guidance for multiway boulevards;
- Designing thoroughfares for transit;
- Thoroughfare speed management;
- Urban form and network planning;
- Emergency vehicle operations;
- Special considerations with stormwater management; and
- Pedestrian and bicycle features at signalized intersections.

BENEFITS OF USING THE RECOMMENDED PRACTICE

Confidence in the Validity of the Guidance

As an ITE recommended practice, *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* contains the Institute's recommendations for best practices in designing context sensitive streets. The content of the RP is based on the experience of numerous practicing transportation professionals and on the latest research. Seven years in the making, *Designing Walkable Urban Thoroughfares* has been reviewed by hundreds of design professionals and has gone through comprehensive reviews by the FHWA and EPA staff. ITE's rigorous procedure for adoption ensures the practitioner that the guidance has been thoroughly vetted by members of the transportation profession.

A Resource for Implementing Complete Streets

With complete streets policies and legislation adopted by the federal government, 24 states, and nearly 250 municipalities, it is important to have multiple resources for design guidance from respected and trusted sources. *Designing Walkable Urban Thoroughfares* is one of the primary resources for designing complete streets and integrating land use and transportation.

A Design Approach with Demonstrated Success

The application of the principles of context sensitive solutions (CSS) in the planning and project development processes has been proven effective time and time again. The RP's design framework incorporates the principles of CSS and advocates a collaborative, interdisciplinary approach in developing a solution. Using the approach outlined in the RP and heeding the lessons learned that have been documented in case studies, it is likely the resulting solution will meet the transportation purpose and need, be compatible with and supportive of the surrounding context, address the concerns of stakeholders, and meet the objectives of the community.

CASE STUDY EXAMPLES

Two examples of recently completed CSS thoroughfare projects have been summarized here to demonstrate how the principles and guidelines in the RP are used. In reviewing these and other case studies, it is important to remember that each project has its own set of unique objectives and underlying conditions. Hence, few if any projects will use all guidelines in the RP, but a good CSS project will follow those that apply for the project. The two projects described here are very different and in different contexts. The resulting designs are also quite different.

Case Study 1: Lancaster Avenue, Ft. Worth, Texas, USA

Lancaster Avenue is located in the southern end of downtown Fort Worth. Lancaster had once been one of Fort Worth's main, connective thoroughfares. In the 1950s, Lancaster's median was widened and an overhead freeway was built in the median. The structure was considered a physical and visual barrier between downtown and key historic and cultural locations south of Lancaster such as the historic Texas & Pacific (T&P) railroad terminal building and warehouse, the main post office, and the Fort Worth Water Gardens Park.

As part of an expansion of the freeway, the Texas Department of Transportation (TxDOT), following a CSS process, realigned the freeway, removing it from the Lancaster Avenue median. Construction of the new alignment was completed in 2000; removal of the old alignment followed. That left surplus right of way (ROW) along the Lancaster Avenue corridor (Figure 2). This opened the way for the city of Fort Worth to use the Lancaster corridor and surrounding area as a catalyst to encourage development in the surplus ROW, preserve historic structures, and promote economic development.

Source: City of Ft. Worth

Figure 2. Interstate-30 on left just after realignment from former alignment in center.

Source: TTI

Figure 3. Reconstructed Lancaster with rehabilitated T&P lofts building, new loft building, pedestrian lighting, and median light sculpture.

The reconstruction of Lancaster was an unusual chance to accomplish a number of objectives for the city and stakeholders. It was apparent to all concerned parties that collaboration with stakeholders early in the process should be a primary interest. The two sponsoring agencies for the project were the city of Fort Worth and TxDOT.

A steering committee (SC) was convened consisting of agency and private stakeholders. Early in the Lancaster Avenue project, the SC held a three-day workshop to discuss needs, issues, and concerns. From this workshop the SC was able to reach a strong consensus for a final vision and project objectives, purpose and needs:

- Create a great, pedestrian-friendly street;
- Create a walkable link between the medical district and the south side of downtown Fort Worth;
- Promote infill mixed-use development along the corridor; and
- Create a showcase area for existing historical buildings.

The SC met monthly throughout the planning and design development phases of the project. The design team produced several alternative design concepts for the SC's consideration that included a four-lane boulevard with median lighting designed as art sculptures, sidewalk bulb-outs and contrasting pavers for pedestrian crossings, wide sidewalks, and other streetscape features to make Lancaster a walkable thoroughfare. Flexible design criteria were used to help achieve the multiple corridor objectives. The project is consistent with at least 36 guidelines contained in *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. The two sponsoring agencies were the city of Fort Worth and TxDOT.

The city of Fort Worth created a Lancaster corridor tax increment finance district in conjunction with the street's reconstruction. In the first five years, district valuation increased by about $230 million through both new development and redevelopment. This included conversion of the old T&P terminal building to loft condos (Figure 3), a new condo building, renovation of one hotel, and construction of another. The local transit authority also extended its Fort Worth-Dallas commuter rail line to a new station at the T&P Lofts building.

The new Lancaster Avenue (construction completed in 2008) is a successful example of a street that created a new environment and spurred redevelopment. This example of agency-stakeholder collaboration and creative flexible design demonstrates how the process and design guidelines described in *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* can benefit agencies, communities, stakeholders, and users.

Case Study 2: Contra Costa Transit Village, Pleasant Hill, California, USA

This case study provides two simple examples of using CSS to resolve an impasse. One example illustrates the use of CSS principles in the planning process where traditional methods had failed over and over again, and the second example is the resolution of a challenging design issue that might have significantly affected the quality of the pedestrian environment.

The Contra Costa Centre Transit Village is a transit-oriented-development dis-

Source: Contra Costa County Redevelopment Agency

Figure 4. The Pleasant Hill BART Station and surrounds in approximately 2000.

trict surrounding the Pleasant Hill Bay Area Rapid Transit System (BART) station. The station is located approximately 30 miles northeast of San Francisco in a pocket of unincorporated Contra Costa County. The San Francisco Bay Area has a population of nearly 8,000,000 people, of which about 11 percent reside within walking distance of BART. Figure 4 shows the station area circa 2000.

The station area presented several challenges to redevelopment. Having the most parking spaces in the BART system, easy freeway access, and trains that initiate service at the station established it as a commuter park-and-ride that attracted riders from a wide area. In this role, the area around the station was dominated by vehicular traffic destined to the station's large surface parking lot.

Treat Boulevard, the station's primary access, is a major six-lane arterial that connects the station area's uninviting surface parking lot to the freeway. As a result, the pedestrian and bicycle environment was uninviting and perilous despite sidewalks connecting to nearby development (Figure 5).

Integrating Context Sensitive Solutions (CSS)

By 1998, the specific plan area was nearly fully developed with 2,405,000 square feet of commercial, 2,200 multifamily residential units, and a 423-room hotel. The last remaining challenge to completing the transit village was the redevelopment of the BART station's surface parking lot. For years, stakeholders had disputed the type and scale of development on the BART-owned property and the impasse was forestalling any proposal from going forward. Using conventional iterative planning processes, plan after plan fell through when they either failed to satisfy community concerns regarding traffic competition with downtown retail or were not economically feasible.

In 2000, a breakthrough of the stakeholder impasse was achieved when a new planning tool at the time—the charrette—was used to plan the development of the parking lot. The county held an intensive six-day public design charrette with more than 500 participants taking part in the process. Participants addressed the future development on the BART property, pedestrian and cyclist issues, the need for a bus transit center, parking for BART patrons, and new services and facilities for area residents. Participants articulated a desire for mixed-use developments with ground floor retail/restaurants and attractive streetscapes. The result of the collaboration was a conceptual plan for which there was near-unanimous support.

Source: Contra Costa County Redevelopment Agency

Figure 5. Before the BART property was redeveloped, it was a surface parking lot for BART commuters.

The charrette incorporated principles of CSS in its approach. It was led and facilitated by a planning and architectural consultant with an interdisciplinary team of engineers, economists, transportation planners, retail and housing specialists, and public financing experts. Literally starting with a blank sheet of paper, stakeholders and the community integrated their values with the conceptual plan from the beginning. The charrette approach quickly earned support from other community leaders and set the stage for a meaningful and inclusive process. A process guided by the station area's vision and following the principles of CSS is listed below:

- Elected official's commitment to a participatory process;
- An interdisciplinary team working with stakeholders to develop a plan;
- Involvement of a full range of stakeholders;
- Open and transparent process with regular and frequent communication;
- No predetermined outcome at the process initiation (guided by the vision developed 30 years earlier);
- A clearly defined purpose and timeline for developing the plan;
- A facilitated assessment of alternatives to seek consensus on plan elements when they are in conflict;
- Flexibility and innovation in design and financing;
- Formation of partnerships to achieve the vision;
- Process that coordinated transportation and land use decisions; and
- A full range of communication and visualization tools to inform stakeholders, encourage dialogue, and increase credibility of the process.

The resulting plan transformed the BART parking lot into a mixed-use, walkable urban neighborhood with shops, office space, and residential units. New internal streets access underground parking for residents and provide on-street parking for the retail stores and restaurants in the ground floor of the buildings fronting the streets. Sidewalks on the new streets connect directly to a town square and the BART station fare gates. The plan includes affordable housing indistinguishable from market-rate dwellings. The land use program is designed to result in a balance of jobs and residents when fully occupied. Construction of the first stage of development was completed in 2010. Figure 6 shows a completed mixed-use building.

Innovative Solutions and Design Flexibility: Transforming a Major Arterial into a Walkable Thoroughfare

Creating a walkable thoroughfare along the adjacent major arterial was one of the most challenging aspects of the project.

Source: Arup

Figure 6. The phase I buildings were completed in 2010 and are 98% leased as of spring 2011.

Source: Arup

Figure 7. The Treat Boulevard buffer space not only allows vehicles to maneuver into parking spaces without impeding traffic flow but further separates the pedestrian from moving traffic while conducting activities along this busy street frontage.

Treat Boulevard is a six-lane facility in a corridor of arterials that conveys more than 125,000 vehicles per day. Although posted for 35 miles per hour (mph), the prevailing off-peak speeds exceed this limit. The speed of the traffic and the importance of Treat Boulevard as a critical regional traffic conduit amplify the challenge to balance multimodal objectives and create a walkable thoroughfare.

In addition to its role as an important pedestrian connection to the BART station, Treat Boulevard was envisioned with a comfortable, intimately scaled streetscape that, combined with ground floor retail, cafes, and locally serving shops, encourages pedestrian activity. The street standards for the station area mandated "human-scaled elements at the street level" including street trees, wide sidewalks with space for commercial activity, on-street parking, benches, and pedestrian-scaled lighting.

The pedestrian-oriented, ground floor retail frontage specified for Treat Boulevard is an exceptional treatment for a high-speed six-lane arterial with traffic volumes that rival some freeways. The design and implementation of on-street parking along the Treat Boulevard retail frontage required innovation, design flexibility, and a process of building consensus amongst stakeholders.

Engineers in the county's public works department were concerned with safely incorporating on-street parking on Treat Boulevard. On-street parking on a thoroughfare with speeds greater than 40 mph violated all design practices, including the guidance in *Designing Walkable Urban Thoroughfares*. Concerns centered on the hazards caused by vehicles maneuvering into and out of parking spaces and drivers exiting their vehicles adjacent to high-speed traffic and by parking maneuvers impeding traffic flow on an arterial where traffic flow is a critical regional priority.

The solution was the creation of space within the traveled way that buffered the parking lane from moving traffic. This 12-foot-wide buffer serves as a safe refuge for drivers waiting to park and provides maneuverability without impeding traffic flow (Figure 7). The buffer also benefits pedestrians by increasing the distance between the streetside and moving traffic—best practices on the design of pedestrian facilities universally agree that distance from moving traffic is an important factor in pedestrian comfort. The buffer also provides benefits for streetside activities such as outdoor dining, reducing the noise, and exhaust of high-speed traffic.

CSS AND SAFETY FOR WALKABLE URBAN THOROUGHFARES

CSS makes extensive use of design flexibility. Some designers contemplating first-time use of design flexibility—creating designs based on multiple needs, constraints, and tradeoffs rather than simply uniform design standards—may ask about the safety implications. Two factors are key to urban thoroughfare safety: managing speed and managing conflicts.

Speed

The conventional approach to addressing traffic safety seeks to minimize the consequences of driver error through design of roadway elements such as lane widths, shoulders, and fixed-object offsets. However, this design approach can have a mixed effect on crash frequency and severity on urban streets, and it could unexpectedly facilitate higher speeds (Ewing, Dumbaugh, 2009; Swift et al, 2006).

Vehicle speed is a major determinant of crash severity and is critical when a vulnerable user such as a pedestrian, bicyclist, or motorcyclist is involved in a crash. Furthermore, the nature of the urban environment—with its visual surrounds and multimodal context—is such that lower target speeds are most appropriate. Higher vehicle speeds increase the amount of force to be absorbed in a crash. Especially for pedestrians and bicyclists, minor increases in speed can profoundly affect the crash-survival rates (Figure 8).

In some situations, vehicle speed also influences crash frequency. Crash avoidance sometimes requires drivers to brake quickly in response to another driver entering the street. Higher vehicle speeds increase stopping sight distances (distance a vehicle travels from time a driver first observes a potential conflict on the street to where he or she can stop the vehicle).

CSS for walkable urban thoroughfares includes creating a safe environment in which the street features and surrounding area encourage the driver to operate at lower speeds, according to the American Association of State Highway and Transportation Officials' *A Guide to Achieving Flexibility in Highway Design*. The RP recommends keeping the target speed between 25 to 35 mph for major thoroughfares. This speed range can improve the driver's perception of the street and better allows for, and creates, a safer environment and accommodates maneuvers associated with constrained, multimodal urban places.

Design should start with selection of a target speed. Among features that can help reduce speeds when used in combination are some of the following:

- Signal timing and progression speed;
- Narrower travel lanes;
- Fewer travel lanes;
- Curb extensions and medians to narrow the traveled way;
- Curb parking or visually enclosing the street with buildings, streetscaping, and so forth to create side friction;
- Smaller curb return radii;
- Paving material texture;
- Proper use of speed limits and warning signs; and
- Conflicts.

Conflicts

Most conflicts occur at intersections and vehicle access points (e.g., driveways and pedestrian crossings). Users of all modes expect to pass these points safely, with minimal delay and with few conflicts. On walkable urban streets, users need to take turns with other modes in a slower and more vigilant manner. Successful design needs to

- Minimize conflicts between modes within blocks and at intersections;
- Phase and time signals to accommodate and separate modal crossings as needed;
- Provide appropriate level of service for all modes;
- Provide good visibility for all users (motorist and nonmotorist);
- Keep pedestrian crossing distances short;
- Design for low speeds at pedestrian-vehicle conflict points such as short radius curb returns;
- Keep intersections simple and operations fully comprehensible;
- Make facilities accessible for all users through visual, audible, and tactile methods; and
- Make crossings highly visible.

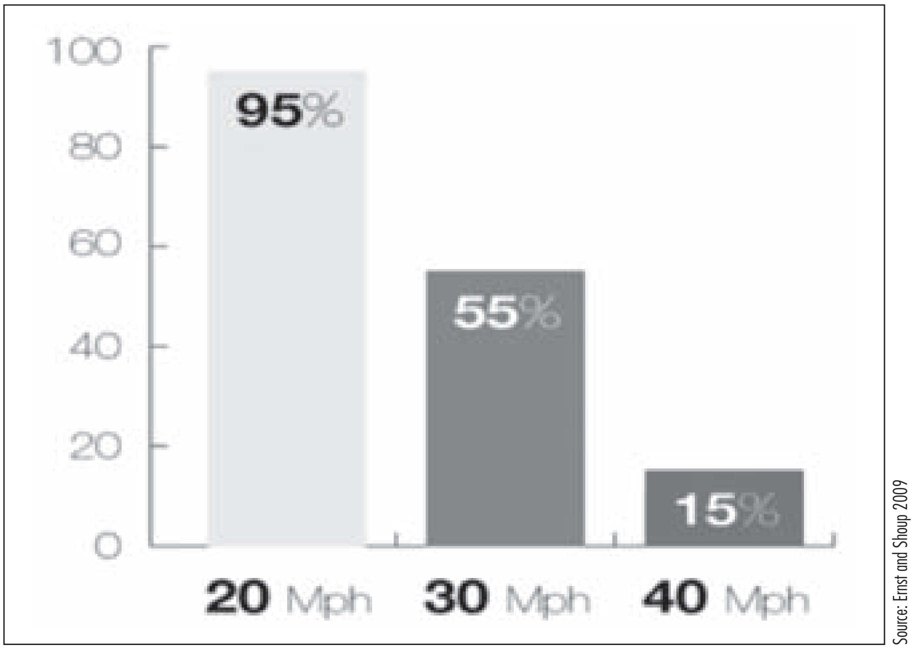


Figure 8. Pedestrian survival rate by vehicle impact speed.

Safety Benefits of Walkable Thoroughfares

Walkable urban thoroughfare principles can enhance urban traffic safety. One study by Dumbaugh in 2006 compared the safety effects of pedestrian-oriented, "livable" street treatments with those of conventional arterial street treatments. The study reported 40 percent fewer total crashes per vehicle-mile traveled with "livable" street treatments, 27 percent fewer injurious crashes, and the near elimination of traffic fatalities. Similarly, a study by Ossenbruggen, Pendharkar, and Ivan in 2001 of rural villages in Maine found that streets with pedestrian-oriented streetscape treatments had half the rate of crashes as those with more conventional design treatments.

These safety benefits are the result of a strong emphasis on multimodal accommodations that lead to truly walkable urban thoroughfares.

THE RECOMMENDED PRACTICE AND COMPLETE STREETS

Some agencies have adopted "complete streets" laws and policies to ensure that their roads and streets are routinely designed and operated to provide safe access for all users, including motorists, freight movers, bicyclists, pedestrians and transit riders, as outlined in the RP. In communities with complete streets policies, the objective is for these users of all ages and abilities to be able to safely move along and across an urban street.

The recommendations of the RP should be used to design and implement thoroughfare projects to achieve complete streets policies.

CONCLUSION

A significant effort by a large number of dedicated professionals led to the adoption of *Designing Walkable Urban Thoroughfares* as a recommended practice. It is the goal of the Institute of Transportation Engineers, Congress for the New Urbanism, FHWA, EPA, and the RP's authors and management team to promote and advocate for the adoption of the publication as a resource, official guidance, or as a standard by state departments of transportation, metropolitan planning organizations (MPOs), and cities and municipalities. With the momentum of cities and states adopting complete streets policies and legislation, some agencies are already adopting the RP.

Some examples of entities that have adopted the RP include the following:

- Texas DOT has incorporated the RP by reference into its project development manual as an approach to be used for planning and designing roadway projects;
- The state of Minnesota has included the RP as one of only two resources for technical guidance in its complete streets policy (Bill HF2801);
- The city of El Paso, Texas adopted the RP as guidelines for design of thoroughfares in all city projects;
- Broward County (Florida) MPO adopted by resolution for roadway projects to receive higher-priority funding if the RP used in planning and design;
- The RP is required reading or a textbook in university-level civil engineering / transportation courses.

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