Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

Traditional urban centers and cores often comprise grids or networks of boulevard and avenue thoroughfares. Within these highly urbanized mixed-use contexts, these thoroughfare types accommodate a mix of pedestrians, bicycles, transit and automobile traffic. Urban cores, including the central business districts of large cities, experience higher concentrations of pedestrians than any other context. Designers of these truly multimodal thoroughfares are challenged with balancing multiple, often conflicting needs within restricted rights-of-way.

Definition of Boulevard

In highly urban areas, boulevards can be "grand boulevards"—streets that help form a city's identity, a formal street designed to beautify and be a primary public space, a promenade. Boulevards can also serve as the urban core's spine, a major commercial corridor served by rail or bus transit having a primary mobility role (see **Figure 1**). Boulevards are moderate speed (35 miles per hour (mph) or less) divided arterial thoroughfares that serve multimodal movement. They serve a mix of regional and local traffic and important transit routes,

Figure 1 A multi-way boulevard in a higly urban mixed-use context. Source: Kimley-Horn and Associates, Inc.

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 in the roadside.

Definition of Avenue

In urban centers and cores, avenues make up the majority of thoroughfares comprising the network. Avenues are moderate speed (30 to 35 mph) urban arterial or collector thoroughfares, generally shorter in length than boule-vards. 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.

Definition of Highly Urban Contexts

As used in this report, highly urban contexts are based on the transect developed by Duany Plater-Zyberk & Co. Urban centers (C-5) consist of higher density mixed-use buildings that accommodate retail, offices, rowhouses and apartments. This context zone has a compact network of streets and blocks, with wide sidewalks, uniform street tree plantings and buildings set close to the frontages. Urban cores (C-6) consist of the highest density, with the greatest variety of uses and civic buildings of regional importance. This context zone may have larger blocks, uniform street tree plantings and buildings set close to the frontages. In both contexts, parking is typically located in structures or behind buildings. **Figure 2** further describes the characteristics of these context zones.

Overview

The CSS publication was developed to provide planners and designers with guidance and information for using flexibility in existing American Association of State Highway and Transportation Officials (AASHTO) policy and information for context sensitive solutions (CSS) in design of major urban thoroughfares (arterials and collectors). The report was a joint effort between the Institute of Transportation Engineers and the Congress for the New Urbanism, sponsored by the Federal Highway Administration and the Environmental Protection Agency.

The publication describes:

- The importance of integrating the principles of CSS in urban roadway improvement projects,
- How CSS principles can be used in the transportation planning and project development processes, and
- Specific guidance on thoroughfare cross-section and intersection design.

The publication, published as an ITE Proposed Recommended Practice to supplement existing AASHTO policies and information, provides the user community an opportunity to use the new guidance and information, then to provide suggestions for improvements to be incorporated into the final ITE recommended practice.

Characteristics of Thoroughfare Design in Highly Urban Areas

Of all contexts, highly urban areas have the largest share of transit and walking modes of travel. Therefore, boulevards and avenues in these areas emphasize transit and pedestrian facilities. Key design elements are shown in **Figure 3** and discussed below:

- Target speed: Low to moderate (30 to 35 mph).
- Design vehicle: Bus along transit routes and single-unit truck

Context Zone	Distinguishing Characteristics	General Character	Building Placement	Frontage Types	Typical Building Height	Type of Public Open Space
C-5 Urban Center	Attached housing types such as townhouses and apartments mixed with retail, workplace, and civic activites at the community or sub-regional scale.	Predominantly attached buildings landscaping within the public right of way substantial pedestrian activity	Small or no setbacks, buildings oriented to street with placement and character defining a street wall	Stoops, dooryards, storefronts, arcaded walkways	3 to 5 story with some variation	Parks, plazas, and squares, boulevard median landscaping
C-6 Urban Core	Highest-intensity areas in sub-region or region, with high-density residential and workplace uses, entertainment, civic, and cultural uses	Attached buildings forming sense of enclosure and continuous street wall landscaping within the public right of way, highest pedestrian and transit activity	Small or no setbacks, building oriented to street, placed at front property line	Stoops, doorways, forecourts, storefronts, arcaded walkways	4+ story with a few shorter buildings	Parks, plazas, and squares, boulevard median landscaping

(Based on transect zone descriptions in SmartCode V-6.5, Spring 2005 Credit: Duany Plater-Zyberk & Company.)

Figure 2 Characteristics used to identify highly urban context zones (C-5 and C-6).

	Suburban (C-3)		General Urban (C-4)		Urban Center (C-5)	
	Commercial Main Streets					
	Avenue	Street	Avenue	Street	Avenue	Street
Context						
Building Orientation (entrance orientation)	front, side	front, side	front	front	front	front
Maximum Setback	5'	5'	0'	0'	0'	0'
Off-Street Parking Access/Location	rear, side	rear, side	rear, side	rear, side	rear, side	rear, side
Roadside						
Recommended Roadside Width	15'	14'	16'	14'	19.5'	16'
Edge Zone	1.5' minimum for operational clearance. Use 2.5' if angled parking is considered. Ensure edge zone is wide enough to accommodate parking meters, utilities and signs.					
Furnishings Zone Width	6' tree well	5-6' tree well	6' tree well	5-6' tree well	6' tree well	6' tree well
	Consider wider furnishings zone to provide public spaces and if main street uses include the potential for street cafes.					
Pedestrian Throughway (min.)	6'	6'	6'	6'	9'	6'
Frontage Zone	2.5' to 3' minimum to accommodate commercial activity along building fronts. Consider wider frontage zone (6' or wider) if potential for street cafes or merchandise displays.					
Street Lighting	Intersection safety lighting, basic street lighting and retail pedestrian-scaled lighting.					
Traveled Way						
Target Speed (mph)	25	20-25	25	20-25	25	20-25
Design Speed	Design speed should be a maximum of 5 mph over the target speed.					
Number of Through Lanes	2-4	2	2-4	2	2-4	2
Lane Width	10-11'	10-11'	10-11'	10-11'	10-11'	10-11'
Parallel On-Street Parking Width	8'	8'	8'	8'	8'	8'
Minimum Combined Parking/Bike Lane Width	13'	13'	13'	13'	13'	13'
Medians	None	None	None	None	None	None
Bike Lanes (min./preferred width)	5'/6'	5'/6'	5'/6'	5'/6'	5'/6'	5'/6'
Access Management	Minimize driveways on main streets. Access land uses via cross streets and/or alleys.					
Typical Traffic Volume Range (vpd)	5,000-20,000	1,000-10,000	5,000-20,000	1,000-10,000	5,000-20,000	1,000-10,000

Figure 3 A multi-way boulevard in a highly urban mixed-use context. Source: Kimley-Horn and Associates, Inc.

elsewhere. However, because of the height of buildings in urban centers and cores, the width needs to accommodate larger fire vehicles (aerial ladder trucks with extended outriggers).

- Public spaces: Thoroughfares in C-5/C-6 contexts include public spaces in the right-of-way in the form of plazas, squares and the roadside.
- Travelway: Compact without excess pavement. Because target speeds are low to moderate, travel lanes may be narrow except on bus routes. Boulevards are generally two-way thoroughfares, but avenues may be part of a one-way system. Boulevards usually have landscaped medians or may contain exclusive transit rights-of-way. Bicycle lanes may be provided in the travelway.
- Transit: Can be high frequency transit corridors. Buses usually stop in the travel lane to maximize the roadside passenger waiting area and efficiency. Traffic signals may be part of a transit signal priority system or the corridor may serve bus rapid transit in exclusive bus lanes.
- On-street parking: The relative scarcity of parking in highly urban areas reinforces the importance of on-street parking to provide convenient short-term parking to serve adjacent land uses. On-street parking may be restricted during peak hours to increase capacity.
- Roadside: The roadside accommodates substantial pedestrian travel, waiting areas for transit users, public spaces and entries into buildings; serves the economic activity of the adjacent land uses; and contains aboveground and underground utilities. The roadside is one of the few opportunities for landscaping in urban areas. Roadsides need to be wide enough to support these many functions (see **Figure 4** for recommended dimensions and **Figure 5** for an example). Transit stops require wide areas to accommodate large numbers of passengers, shelters, seating and amenities.
- Intersections: More constrained than in suburban or general urban areas and may not provide multiple turning lanes. The network of thoroughfares disperses traffic and provides system-wide capacity. Intersections have crosswalks on all approaches and may use pedestrian-only signal phases at very active traffic signals. Usually, pedestrian signals are activated with traffic and pushbuttons are not required. Curb return radii are small to shorten crossing distances and because of constrained rights-of-way. Curb extensions may be provided on thoroughfares with on-street parking.

	Sidewalk Zone		C-6 and C-5		
Boulevard	Edge		1.5 feet 2.5 feet at diagonal parking	21.5 foot (recommended)	12 foot (constrained)
	Furnishings		7 feet (trees in tree wells)		
	Throughway		10 feet		
	Frontage		3 feet		
Avenue	Edge		1.5 feet 2.5 feet at diagonal parking	19.5 foot (recommended)	12 foot (constrained)
	Furnishings	With Parking	6 feet (trees in tree wells)		
		Without Parking	8 feet with buffer landscaping		
	Throughway		9 feet		
	Frontage		3 feet		

Figure 4 Recommended roadside dimensions in highly urban areas.

Design Constraints in Highly Urban Areas

Highly urban areas may be older areas of central cities, or redeveloping or new urban cores or town centers. These areas have established block systems and thoroughfare rights-of-way resulting in a need to balance between trade-offs. Addressing these constraints reinforces the benefits of using a multi-disciplinary design approach. Trade-offs include:

- Fewer lanes vs. wider roadsides and on-street parking
- Large vehicles vs. lane width and smaller curb return radii
- Exclusive transit lanes vs. number of travel lanes
- Accommodation of bicyclists vs. width of other design elements
- Provision of on-street parking vs. median and wider sidewalks
- Right-of-way acquisition to accommodate desirable features
- Parking restrictions during peak hours
- Roadside landscaping vs. utility vaults in roadside
- Efficiency/safety benefits of turn lanes and protected-only left-turn signal phasing vs. fewer lanes at intersections

Creating Quality Public Spaces

Figure 5 The roadside of an urban arterial needs to be wide enough to accommodate many functions. Source: Kimley-Horn and Associates, Inc.

Civic, economic and community functions require additional space to serve the activities of adjacent uses or to accommodate high pedestrian flows. Public spaces in the roadside are often used for these functions and are an important complement to the thoroughfare as a place. Public spaces include public plazas, squares, outdoor dining, transit stops and open spaces. Public spaces should be designed to serve functions that enhance the surrounding context, such as public gatherings, special events, farmers' markets, or quiet contemplation.

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