

## **APPENDIX D**

---

# DESIGN GUIDELINES FOR PARKING FACILITIES IN DOWNTOWNS



# Appendix D Design Guidelines for Parking Facilities in Downtowns

## Edges

Parking garages should not present blank walls to the street. The best solution is to wrap the garage with commercial or residential uses. An alternative is to locate retail on the ground floor of the garage.

## Driveways

Sidewalks should take priority over driveways as drivers are legally required to yield to pedestrians on sidewalks. The driveway should ramp up to sidewalk level at the curb; the sidewalk should not ramp down to meet the driveway.

**Figure 1** Kansas City, MO – Note how the walls limit visibility.



**Figure 2** Washington, D.C. – Note the yellow curb across the sidewalk – a trip hazard.



**Figure 3** Colorado Springs, CO – Curb extension with driveway - the design provides a place for drivers to wait for a gap in traffic without blocking pedestrians.



**Figure 4** Arlington County, VA – Note the double stop signs, one at the sidewalk and one at the street.



### Through Passage

Parking garages and lots should not block through passage. In fact, garages and lots can enhance pedestrian mobility by providing mid-block access and allow people to shorten their journey. The routes can be enhanced by trees, retail, arcades and other features.

### Bicycle Parking

Parking for cyclists should be included in all garages and lots. This is an inexpensive way to increase use, as one can fit about 10 bikes for every one car. Bike parking should be located near the entrance in a visible location. Cyclists will ride through the vehicle entrance and then walk out as pedestrians, similar to other garage users.

**Figure 5** Arlington County, VA – Bicycle parking facilities inside a parking garage. Note the additional security offered by the chain link fence. It is also located near the attendant's booth.



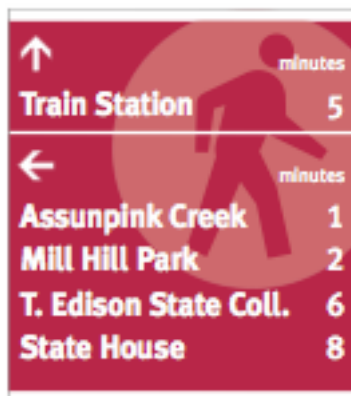
## Wayfinding

After parking, people need direction to destinations. Wayfinding for those on foot includes a variety of information options: directional signage, maps and kiosks. We recommend signs which give not only distance information, but also travel time.

**Figure 6 Alexandria, VA – Wayfinding sign for pedestrians with number of blocks to destination.**



**Figure 7 Wayfinding sign for pedestrians with walking time to destination (Studio L'Image)**



# **APPENDIX E**

---

## **CASE STUDY – BOULDER, CO**





## Appendix E

### Case Study – Boulder, CO



Boulder's public garage wrapped in retail and office

#### Introduction

Boulder's downtown business district, having recovered from near-death in the 1970's, today comprises some 700 businesses and more than 7,500 employees. Faced with a shortage of parking for customers, the city developed a program that combines restrictions on downtown parking with aggressive demand management. These initiatives have been introduced through a special district – the Central Area General Improvement District (CAGID), which was established in the 1970s. The Board of CAGID, which makes the final decisions on issues such as new parking construction, is comprised of the City Council. However, considerable power over decisions such as parking charges is held by the Downtown Management Commission (DMC), which is made up of local businesses and property owners, although its actions are subject to City Council review.<sup>1</sup>

1. For more details, see Boulder Municipal Code, Title 2, Chapter 3-5.

The program was set up in conjunction with the design of the Pearl Street pedestrian mall. The intention was to provide parking on a district-wide basis on the periphery of the mall, avoiding the need to provide on-site parking for each business. It was seen as a tool for economic revitalization and promoting a good pedestrian environment, with the two going hand in hand.

Key characteristics include a desire to create a walkable, vibrant community, with a focus on a high quality of life. In addition, Boulder (at least at present) is dependent on bus transit to meet its public transportation needs. It should be noted that Boulder had very little transit at the time that CAGID was established; bus service improvements have arrived subsequently. The City of Boulder has a population of around 96,000 people.

#### Parking Tools

Boulder is most notable for its integrated approach, that allows CAGID to invest in the optimum mix of transit, demand management and parking supply to improve downtown access. The following specific parking strategies have been employed in Boulder:

- **No parking requirements.** The City has no parking requirements for non-residential uses within the CAGID area. Developers are allowed to build as much or as little parking as they choose, subject to design standards in the zoning code, and to manage it as they see fit. If they choose to build less parking, they can purchase permits for public lots and garages from the DMC for resale to their employees. This is usually a much cheaper strategy than building parking on-site. Public garage permits cost \$213 per quarter (\$852 per year), and surface lot permits (for which there is a waiting list) \$134 (\$536 per year). Residential minimum parking requirements are set at one space per unit, although these have had little impacts since developers have tended to provide two spaces per unit given market demands.

- **Funding of public parking.** Shared public parking facilities are constructed and operated by CAGID, and funded through CAGID's general obligation bonds. This debt is supported primarily by revenue from parking charges (including meters), and secondarily by property and other taxes paid by property owners (providing 16% of revenue). The DMC currently manages 202 spaces in non-metered surface lots, 2,209 spaces in five structures, and 871 metered spaces, 61 of which are in a surface lot (2004 figures).
- **Demand management.** On-street meter revenue is used to provide all employees with benefits such as a free universal transit pass (called an Eco-Pass); Guaranteed Ride Home; ride-matching services; bicycle parking; and a number of other benefits. In 2002, these programs cost just under \$325,000 (Figure 1).<sup>2</sup> This focus was prompted by the reality of limited street capacity to handle more traffic, and simple economics. "CAGID realized that the economics of parking garages are dismal," according to James Bailey, a former planner who helped establish the system. The DMC determined that demand management was a cheaper strategy than building new parking alone. These TDM programs are not directly managed by CAGID, but through the City's Downtown and University Hill Management Division.
- **Curb parking.** All downtown parking meter revenue – more than \$1 million per year – is transferred to CAGID from the City's General Fund. This responsibility, together with the fact that local businesses and property owners comprise the DMC, gives it a strong incentive to create new curb parking. One of its first moves was to create more curbside, metered parking through converting parallel spaces to diagonal.
- **Parking garage design.** Boulder's original concept, which has largely been implemented, was to begin with surface

2. Eco-Pass costs were projected to rise significantly from \$257,550 in FY2002 to \$320,000 in FY 2003 and 2004.

lots, and transition to structured parking as downtown grew. All DMC-run garages are mixed-use. For example, the new garage at 15th and Pearl Streets is wrapped in street-level retail and second-floor offices on two sides. The garage has received several design awards from architectural, planning and parking institutes, including a Charter Award from the Congress for the New Urbanism. The Zoning Code also has specific design requirements for downtown parking, which must be wrapped in retail, restaurant or other pedestrian-oriented uses for a depth of 20-30 feet on the first floor. Parking must also be wrapped on the second floor, although this may be with any permitted use and the required depth is lower.<sup>3</sup>

- **Reduced parking requirements.** Outside of the CAGID area, the City has also experimented with lower, more flexible parking requirements in mixed-use districts. A single parking requirement for all non-residential uses allows the use to change freely. For example, an office use can be converted into a restaurant, without the barrier of having to add new parking. There are also low parking requirements for residential uses in many parts of the city.
- **Residential Permit Parking.** Neighborhood Permit Parking initiatives have been introduced to prevent overspill parking from commuters trying to avoid parking restrictions and charges downtown. Commuters are eligible, however, to buy on-street parking permits for \$60 per quarter – another example of the integration of on-street and off-street management. Commuter permits are limited to four per block face, on blocks where average occupancy is lower than 75%. This RPP program is designed to be revenue neutral, and so commuter fees cross-subsidize low annual resident fees of \$12 per year (Figure 2). Sophisticated enforcement is used, with license plates entered into a handheld commuter, meaning that motorists cannot evade the restrictions by simply moving their cars every few hours.

3. See Boulder Municipal Code, Title 9, Chapter 3.4-21.

- **Discounted validated parking.** Downtown businesses can bulk-purchase meter tokens or validated stamps, in order to offer free parking to their customers. A common practice in many downtowns with parking charges, it avoids the risk of customers turning to other retail destinations in order to avoid parking charges.

**Figure 1 CAGID Revenue and Expenditure, 2002**

Revenue	
Taxation (inc. property/owner/TIF tax)	\$775,293
Short Term Fees	\$925,757
Long Term Fees	\$1,302,507
Meter Revenue <sup>1</sup>	\$1,026,820
Meterhood and Tokens <sup>2</sup>	\$106,777
Interest	\$70,751
Rental Income	\$380,766
Mobility Center Grant	\$84,969
Miscellaneous	\$25,779
<b>Total Revenue</b>	<b>\$4,699,419</b>
Expenditures	
Parking Operations	\$737,928
Major Parking Maintenance	\$50,569
Downtown & University Hill Management Division <sup>3</sup>	\$924,565
Eco-Pass Program	\$257,550
Major Maintenance to Pearl Street Mall	\$942,158
Debt Service	\$1,964,028
Other Expenditure	\$159,560
<b>Total Expenditure</b>	<b>\$5,036,358</b>

<sup>1</sup> Meter revenue is transferred from the City's General Fund.

<sup>2</sup> Meterhoods are paid for by contractors, special events, utility companies, etc. to use a curb parking space. Tokens are purchased by businesses to provide parking validation for their customers, or others who prefer tokens to quarters.

<sup>3</sup> Includes all costs that are not directly related to parking facility and meter maintenance and revenue collection. Includes \$392,000 for personnel, \$65,000 for Transportation Demand Management, and \$62,000 for planning for a new structure.

Source: City of Boulder

**Figure 2 Boulder Neighborhood Permit Parking Program Revenue and Expenditure, 2002**

Residential Permit Sales	\$26,395
Commuter Permit Sales	\$69,936
Citation Revenue	\$239,231
Administrative Costs (excluding enforcement)	\$70,027

Source: City of Boulder. Staff estimate that Neighborhood Parking Program enforcement accounts for 60% of the City's enforcement resources (11 officers) while generating 13% of citation revenue.

## Impacts of Parking Policies Development Feasibility

Initially, developers and property owners were skeptical of the proposals to create CAGID, but according to local planners and developers, they have been convinced by its success in catalyzing economic development. According to James Bailey: "In the 1970s, downtown was dying. They had to do something. This was a pretty pragmatic approach."

Already, rapid growth has brought Boulder close to the population and employment levels that in 1996 were projected for 2020. The downtown pedestrian-oriented "Pearl Street Mall" has tripled in length in the past decade, as automobile-oriented parcels at either end have been redeveloped. There are numerous examples of new developments that have taken place in recent years, such as the 300,000 square foot One Boulder Plaza under construction at present. Pearl Street is one of the only examples of a successful pedestrian mall in the United States.

According to local planners, a small mixed-use zone on East Pearl Street, close to the city's downtown, was established in the 1980s but barely used for more than a decade, at least partly due to high parking requirements. A reduction in requirements adopted in 1997 to one space per 400 square feet of non-residential development (one

space per 500 square feet if commercial makes up less than 50% of the development) has been a key to encouraging recent development.

### Traffic and Parking

According to the Downtown Management Commission, there has been an increase in available parking, partly due to the construction of new garages, but also due to more employees taking transit. Commuting in multiple occupancy vehicles increased from 35% in 1993 to 47% in 1997. The Eco Pass program alone has reduced commuter parking demand by 850 spaces, the DMC states.

While new development is not required to incorporate on-site parking, some projects have done so due to market demands – but only to the point where it is economic. At the 400,000 square foot One Boulder Plaza, for example, two stories of underground parking are provided, equivalent to 1.2 spaces per 1,000 square feet. However, site constraints meant that about half the parking for employees is provided off-site through CAGID. The cost to the individual of these off-site permits is about \$50 per month cheaper per employee.

According to one local developer, the biggest problem with CAGID has been the historical reluctance of City Council (which comprises CAGID's Board) to build more parking, largely due to traffic concerns. However, this has recently been addressed after long pressure from local businesses, and has led to new garages such as 15<sup>th</sup> and Pearl, and the 10<sup>th</sup> and Walnut structure opening in summer 2004. The decision to build new parking is based both on feasibility studies demonstrating the need for additional supply, and the financial viability of a bond election.

The developer suggests that this may be largely a political problem unique to Boulder. However, he suggests it shows the need for strong business representation when making these decisions (for example, through the creation of a separate parking district not under City

Council control), and/or the adoption of strong guidelines that can be used to determine when new parking is needed.

According to City staff, the Neighborhood Permit Parking program has also had success in preventing spillover, and ensuring space is available for residents. At the same time, the sale of commuter permits has contributed to the efficient use of curb space.

### References

- Interviews and e-mail correspondence with local developers, planners, and CAGID staff.
- City of Boulder (2003), *Transportation Master Plan*. Approved by City Council September 16, 2003.
- City of Boulder (2003), *Neighborhood Parking Program 2002. Annual Update*. Staff Report to City Council, February 24, 2003.
- City of Boulder (2004), *2004-05 Approved Budget*.
- Steuteville, Robert (2003), "Boulder: a model for excellence in mixed-use design," *New Urban News*, December 2003.
- US Environmental Protection Agency (undated), *Downtown Boulder. Best Workplaces for Commuters District*. [www.commuterchoice.gov/campaign/boulder.htm](http://www.commuterchoice.gov/campaign/boulder.htm)
- US Environmental Protection Agency (forthcoming), *Parking Spaces/Community Places*.

# **APPENDIX F**

---

## THE 511 TRAVEL INFORMATION SYSTEM



## Appendix F: The 511 Travel Information System

In 1999, The U.S. Department of Transportation (USDOT) requested that the Federal Communications Commission (FCC) designate a nationwide three-digit telephone number for traveler information. The 511 system was inaugurated in 2000. The system is an integral component of the nation's Intelligent Transportation System (ITS), which is designed to enhance mobility, improve safety, and increase the efficient distribution of freight. The 511 system relies on one of the most basic forms of communication, the telephone, to provide nationwide access to the wealth of information collected through the ITS system.

There are no federal requirements or mandated method to pay for the implementation of the 511. States and local agencies are responsible for the implementation of the program.

Recognizing the opportunities and challenges inherent in implementing a cohesive 511 program, the American Association of State Highway and Transportation Officials (AASHTO), in conjunction with many other organizations has established a *511 Deployment Coalition*.<sup>1</sup>

The coalition has established a national vision for 511 which states that:

511 will be a customer-driven, multi-modal travel information service, available across the United States, accessed via telephones, and other personal communications devices, realized through locally deployed interoperable systems, enabling a safer, more reliable and efficient transportation system.<sup>2</sup>

A Working Group of practitioners has been formed to support the Policy Committee. The Working Group has identified three major issues that need to be addressed by the Policy Committee. First, the working group is determining whether there should be a minimal level of content and quality of content in the 511 system. Secondly, the group is determining the level of consistency that should be in place among 511 services throughout the country. Finally, there is the issues of cost, namely should the 511 system be free to the end user, and if so, how should the system be financed.

Continued leadership and active participation from: the Advanced Traveler Information Systems (ATIS) industry; the USDOT; related industry associations; state, regional and local

---

<sup>1</sup> [http://www.its.dot.gov/511/511\\_Deployment\\_Coalition.htm](http://www.its.dot.gov/511/511_Deployment_Coalition.htm)

<sup>2</sup> <http://www.its.dot.gov/511/PDF/511ver2.pdf>

government agencies; and private firms will be essential in making the vision a reality and achieve the current and future goals.<sup>3</sup>

## **511.orgs**

Many states and local and regional areas have also developed websites to coincide with their 511 phone service implementation. Some of the better examples of such websites are reviewed below.

### **San Francisco Bay Area - [www.511.org](http://www.511.org)**

The San Francisco Bay area has one of the most comprehensive 511 systems in the country, an interconnected network of 511 systems serving the entire Bay area (nine-county area). The Bay area's 511 service is a free phone and web service that consolidates Bay Area transportation into a one-stop resource.

Timely information on driving conditions, traffic incidents, travel times, scheduling and other information for area public transportation services, non-motorized information, and car- and vanpool information are all included on this site.

The site is managed by a partnership of public agencies led by Metropolitan Transportation Commission, the California Highway Patrol, and the California Department of Transportation.

### **Sacramento Region - [www.sacregion511.org](http://www.sacregion511.org)**

511 provides access to information about all modes of travel: traffic conditions for commuters, bus and light rail information for more than 20 transit agencies, paratransit services for the elderly and disabled, ridesharing information and information on commuting by bike. The telephone service is available in English and Spanish.

Sacramento Region 511 serves El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba counties. The number also links callers to 511 services in the Bay Area, Nevada and Oregon, as well as Butte and Glenn counties.

In conjunction with the phone service, this Web site can help users plan their daily commute, access transit providers, find a carpool partner, and learn about bicycling as a commute option. With the traffic information on this site, you can check your commute options and know the road before you go. Once behind the wheel, you can call 511 for traffic updates.

---

<sup>3</sup> <http://www.deploy511.org/>



## **Washington State - [www.wsdot.wa.gov/traffic/511](http://www.wsdot.wa.gov/traffic/511)**

By dialing 511, Washington State 511 users can get a variety of information on:

- Puget Sound traffic conditions
- Statewide construction & incident information
- Mountain pass conditions
- State's ferry system information
- 800 numbers for passenger rail and airlines
- Weather
- Connection to Oregon's 511 system

Washington's system is quite successful, with over 42,000 individuals calling 511 in April 2007. The system is very simple to operate. A user would dial 5-1-1 and say "traffic" to receive customized traffic information. Next say the road number, such as "5," and receive up-to-the-minute updates on the road segment the user plans to use.

Speech recognition technology permits callers to verbally tell the system what they want, The requested information is then "spoken" back to the user. Callers can use key words to quickly navigate the system to the specific road segment for the information sought.

## **Central Florida – [www.fl511.com](http://www.fl511.com)**

Called "My Florida 511", Florida's 511 service is a free service of the Florida Department of Transportation which offers travel information along personalized profiles the user chooses throughout the central Florida region. The user can create up to 10 different routes (profiles) that he or she regularly drives. The user can then get travel information along those routes by dialing 511 from a cell or landline phone. When calling 511, the system will recognize the user's phone number through Caller ID technology. The user will first hear about their profiles and will then be given full access to 511's full range of services in Central Florida. The user will then be given the opportunity to transfer to the statewide system.

## **Tennessee - <http://www.tn511.com>**

The Tennessee Department of Transportation (TDOT) has implemented 511 as a resource for travelers wanting information about road and travel conditions, incidents, and construction on state highways. 511 is part of the TDOT SmartWay program. Travelers have the option of accessing road and travel conditions using the Web at [www.TN511.com](http://www.TN511.com) or through the 511 phone service.

Tennessee 511 uses an automated voice response system, meaning callers are guided

through the menu through a series of requests. Callers can ask for specific roadways or regions, and the system will provide information about traffic incidents, closures and other important roadway conditions.

The Tennessee Department of Transportation provides Tennessee 511 as a public service to commuters and travelers in Tennessee.

## **New Hampshire - [www.511nh.com](http://www.511nh.com)**

Sponsored by the New Hampshire Department of Transportation, the New Hampshire 511 system allows commuters and travelers to access information regarding traffic incidents, road construction and weather-related travel conditions, via the Internet or by dialing 511 from any phone. Eventually, the system will include services such as Highway Advisory Radio and Dynamic Message Signs.

## **Highway Advisory Radio**

Highway advisory radio (HAR) or traveler's information systems (TIS) are low-power AM radio stations set up by local transportation agencies to provide traffic delay, parking, and other information to motorists.<sup>4</sup> They are often used in conjunction with variable message signs, which tell drivers where or when to tune to HAR.

HAR provides information on detours, vehicular operating restrictions, warnings about hazards, traffic conditions along short roadway segments, such as work zones, parking availability, public transit alternatives, and notices of events.

Although evaluations show that travelers are unlikely to switch off their normal radio stations to listen to traffic information reports, those who do tune in express high levels of satisfaction.<sup>5</sup>

One of the benefits of a HAR is that such a system can include more specific information than a commercial traffic report or a variable message sign. Its other advantage is that it can be available 24 hours a day. No additional equipment is needed to receive highway advisory radio broadcasts since most cars have AM radios.

However, keeping the information current is time and labor intensive. Placing, installing and maintaining antennas can be costly, as can staffing and equipping a central control facility to coordinate information from multiple agencies.

There are other challenges in implementing a HAR system. These include making travelers aware of the service since frequencies change frequently and cover small areas. Also, a message must be designed that is concise but also relays the necessary information.

---

<sup>4</sup> [www.wikipedia.org](http://www.wikipedia.org)

<sup>5</sup> ITS Decision, <http://www.calccit.org/itsdecision>

Many turnpikes, toll facilities (tunnels, bridges) and other systems such as airports, causeways and national parks use HAR. It is also used to broadcast changing conditions in long-term construction sites that have a large share of repeat visitors.

