# Boston Complete Streets

Mayor Thomas M. Menino
City of Boston

Commissioner Thomas J. Tinlin
Boston Transportation Department

## Design Guidelines

2013

www.bostoncompletestreets.org


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OFFICE OF THE MAYOR
**THOMAS M. MENINO**

May 10, 2013

Dear Friends,

I am pleased to present Boston's Complete Streets guidelines, a new vision for the way we design our roadways and sidewalks. The guidelines combine the best of what works for our streets today with 21st century thinking on how to make our streets more engaging, sustainable, and safe for all users. Creating a city where residents of every age feel safe on our streets will have a direct impact on public health, transportation, and the environment.

The guidelines include designs to rebalance the use of our streets so that walking, cycling and transit are as safe and convenient as driving a car. While the guidelines will now enable public agencies, developers and designers to work from a single framework, in practice, we have been following a Complete Streets approach for several years.

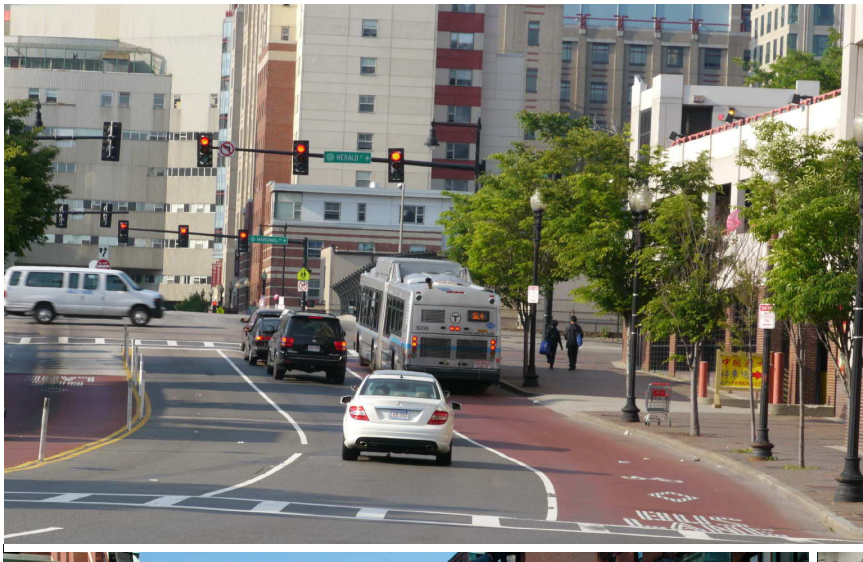
Many important programs are already in place. Boston is becoming a great bicycling city, with the success of Hubway and over 60 miles of a growing on-street network of bike facilities. We continue to build street-to-plaza conversions with an eye toward creating new public spaces in the neighborhoods. Pilot projects are demonstrating how clean storm water can be channeled directly into the ground. We are replacing our street lights with LED fixtures that are expected to last 10 years and that will dramatically reduce energy use. The latest technologies are being used to move traffic more efficiently. Food trucks have brought new vitality and healthy food options to our streets, and we have installed on-street public electric vehicle charging stations.

As we continue to celebrate new "firsts" in the city, I'd like to thank the Complete Streets Advisory Committee and all of our community partners for being open to change, keeping us honest, and sharing your ideas. With your help and with these guidelines, we will continue to create streets that support how we wish to live, travel, do business, and play in our city.

Sincerely,

Thomas M. Menino
Mayor of Boston


Hubway
Boylston St.
Berkeley St.
new balance

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P


COLUMBUS AVE
Bus Service (plan)
45 Franklin Park via Blue Hill Ave. 15
47 Central Square - Cambridge via Longwood & B.U. Medical Center 7
47 Broadway Station via B.U. Medical Center 7
CT2 Sullivan Station via Kendall/MIT - Limited Stops 26
CT3 Andrew Station (Limited Stops) 8
CT3 Beth Israel (Limited Stops) 18


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# Acknowledgements

Boston's Complete Streets initiative is a unique collaboration between policy makers, community leaders, neighborhood residents, city agencies, transportation advocates and professionals, and the public at large. Since 2009, participants have been conducting workshops and public meetings to assess existing design guidelines and processes, examine relevant national best practices, evaluate ongoing pilot projects, and explore new innovations in street designs. These Guidelines are the result of their hard work and dedication.

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All photographs have been taken in the City of Boston except where specified elsewhere. Photographs have been provided by Kathy Lynch, Paige Mazurek, Jessica Mortell, Nick Jackson, Charlotte Fleetwood, Vineet Gupta, Kris Carter, and Jessica Parsons.

# Vision



# Street Types



# Sidewalks



# Roadways

# Intersections



# Smart Curbsides



# Implementation


DO NOT
ENTER


PUMA
new balance
Hubway
new balance

# Vision

**Boston's Complete Streets initiative aims to improve the quality of life in Boston by creating streets that are both great places to live and sustainable transportation networks. The Complete Streets approach places pedestrians, bicyclists, and transit users on equal footing with motor vehicle users, and embraces innovative designs and technologies to address climate change and promote active healthy communities.**

**Boston's streets have evolved over centuries of growth and development. Winding streets in the North End and Dorchester contrast with the 19th century gridiron pattern of streets in the Back Bay and South Boston. Historic parkways and tree-lined boulevards link downtown with neighborhoods and main street districts. The result is a patchwork of iconic streets and squares, and an eminently walkable city. Framed by a mix of historic and modern architecture, and brought to life each day by a diverse population, each street in**

**Boston has a distinctive flavor. This legacy of vibrant, walkable public spaces provides an ideal platform to explore new innovations in street design.**

**Boston's Complete Streets guidelines establish new standards for street design and reconstruction projects. Respecting the past and responding to contemporary values and needs, they are driven by the following imperatives:**

## Multimodal

Streets are designed for pedestrians of all ages and abilities,bicyclists, transit users and motor vehicle drivers. Multimodal designs ensure Boston's streets are safe and shared comfortably by all users.

## Green

Streets are energy efficient, easy to maintain, and include healthy trees, plants, and permeable surfaces to manage storm water. Design features encourage healthy, environmentally friendly, and sustainable use of Boston's street network.

## Smart

Streets are equipped with the physical and digital information infrastructure required to move all modes of transportation more efficiently, support alternatives such as car and bicycle share, and provide real-time data to facilitate trip planning, parking, and transfers between modes of transportation.

# Boston's Complete Streets

**Bus Lanes and Transit Prioritization** at intersections improve the reliability of routes with high passenger volumes. Shelters with amenities and next bus information improve convenience for passengers.

**Intelligent Signals and Traffic Cameras** manage traffic flow in real-time. They facilitate vehicle progression and reduce wait times, improving fuel efficiency and reducing GHG emissions.

**Electric Vehicle Charging Stations** support the adoption of a new generation of clean-fuel vehicles. Linked to smart electric grids that use alternative energy sources such as solar and wind, they will help reduce dependence on fossil fuels and combat climate change.

**Ease of Maintenance** informs the design of roadways and sidewalks, favoring durable materials and maintenance agreements for special features to enhance the life and upkeep of Boston's streets.

**Accessible Surfaces** with smooth, slip-resistant materials for sidewalks and crosswalks create comfortable walking environments that make streets welcoming for people of all ages and abilities.

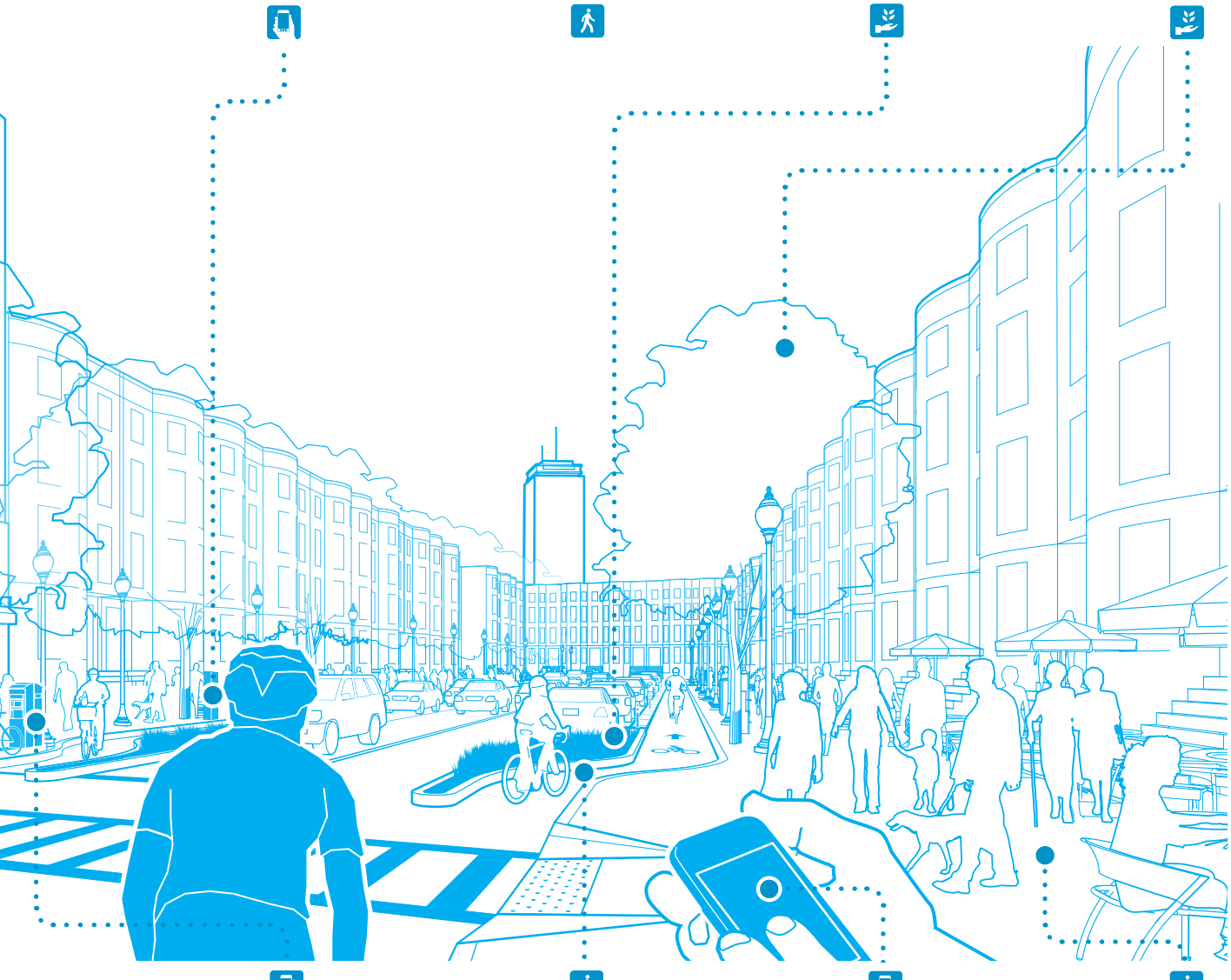
**Permeable Surfaces** for roadways and sidewalks help reduce flooding and erosion and preserve capacity in storm drains and combined sewers.

**Bicycle and Car Share Stations** provide the convenience of personal transportation, low costs, and energy savings without the need for car ownership.

**Minimum Lane Widths** assist in the accommodation of pedestrians and bicyclists when the available public right-of-way is limited in width. Narrower roadways also result in safer vehicle speeds.

**Rain Gardens** and other greenscape elements at key locations divert stormwater directly to the soil. Maintainable rain gardens can filter pollutants, improve air quality, and provide greenery on the street.

**Street Trees** with sufficient rooting volume to thrive provide shade and beauty; support wildlife habitat and reduce air pollution; and energy consumption.



**Smart Meters** that accept prepaid cards, payment by mobile phones, and allow for variable pricing facilitate more efficient use of limited curbside space.

**Bicycle Lanes and Cycle Tracks** create a citywide network that increases safety and encourages more people to bicycle.

**Digital Tags and Information Panels** integrated with street furniture and building facades enable wayfinding, community bulletin boards, trip planning, and place-based social networking.

**Wide Sidewalks** with unobstructed accessible pathways encourage walking. When combined with proper lighting, street trees, and vibrant street walls they are inviting, safer, and contribute to placemaking.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# Why Streets Matter

1. Streets define the character of Boston's neighborhoods. Great streets for walking, bicycling, and activities are great places for everyone.

2. Streets and sidewalks make up 56% of city-owned land. How we use this land reflects how we want to live.

3. Streets and public spaces are responsible for making Boston a premier walking city. Approximately 30% of all trips within the city and 75% of all trips within a neighborhood are made on foot.

4. Streets can help reduce climate change by encouraging sustainable modes of travel. As transportation currently contributes 27% of greenhouse gas emissions, Boston has a goal of reducing vehicle miles travelled by 7.5% by 2020.

5. Streets with bicycle lanes and cycle tracks create a welcoming, friendlier and safer city. Boston has installed 60 miles of bicycle facilities since 2009 with a goal of installing 20 miles per year for the future.

6. Streets that move traffic efficiently without speeding are safer for all. Boston has installed over 200 traffic management cameras, and supports 25 mph speed limits and 15 mph safety zones.

7. Streets can encourage the use of transit by providing bus lanes and welcoming station environments. In 2012, public transportation ridership in the Boston area was the highest since 1946.

8. Streets can help people make healthy decisions by supporting walking, bicycling, and transit. The Boston Moves for Health campaign has set an annual goal of logging 10 million miles citywide. A recent survey counts 23% of all Bostonians as obese.

9. Streets lined with healthy trees provide beauty, shade, and improved air quality. Boston is working to increase its green canopy 20% by 2020.

10. Streets are Boston's primary stormwater conduit. With more than 50% of city being impervious, Boston has a goal of recharging 1" of rainfall in groundwater conservation districts and providing 25% of the Greenscape/Furnishing Zone with vegetated areas.

# Using the Manual

## Purpose

The City of Boston has developed the Boston Complete Street Design Guidelines (the Guidelines) to provide policy and design guidance to governmental agencies, consultants, private developers, and community groups on the planning, design, and operation of roadways and sidewalks in Boston. The Guidelines are intended to ensure that Boston's streets are safe for all users, and to foster an efficient project development and review process.

Street design in the City of Boston is a complex endeavor and designs must respond to varied local conditions and site constraints. Design decisions require flexibility to balance the use of available guidance and engineering judgment with innovations in street design and technological advances. These Guidelines have been developed to supplement existing manuals and standards including the Manual on Uniform Traffic Control Devices (MUTCD), and guidance issued by the National Association of City Transportation Officials (NACTO) and the American Association of State Transportation Officials (AASHTO).

The development of the Guidelines is rooted in the experience of innovation and experimentation in street design in Boston and around the world. As such, the guidelines are intended to evolve and adapt to incorporate new treatments and techniques as they are developed and put to use.

## Street Types

The new Street Types form the basis of Boston's Complete Street Guidelines. They have been developed to supplement the functional street classifications and to provide additional guidance during the selection of design elements. They can serve as models or as options when communities need to make informed choices in the visioning process of a corridor redesign project. Taking into consideration the type of street will help ensure that land use contexts are reflected in the design and use of Boston's streets.

## Chapter Layout

The layout and design of each chapter is organized in a hierarchy to guide readers from high level design principles to individual design treatments. The principles are framed using the three themes of Boston's Complete Streets—Multimodal, Green, and Smart. Public agencies responsible for review and/or approval of design elements are highlighted in grey at the beginning of each Chapter or main section, and in boldface text for individual treatments as appropriate.

## Individual Treatments

The discussion of individual treatments in each chapter is organized within the following three sections:

- **Overview:** Provides a definition and general description of the individual treatment.
- **Use:** Describes under what conditions the treatment is appropriate and provides specific design guidance.
- **Considerations:** Provides guidance to help tailor the use of individual treatment for varying contexts.

# Acronyms



| | |
|---|---|
| APS | Accessible Pedestrian Signal |
| AASHTO | American Association of State Highway Transportation Officials |
| ADA | Americans with Disabilities Act |
| ADT | Average Daily Traffic |
| BCDC | Boston Civic Design Commission |
| BLC | Boston Landmarks Commission |
| BRA | Boston Redevelopment Authority |
| BTD | Boston Transportation Department |
| BWSC | Boston Water and Sewer Commission |
| BRT | Bus Rapid Transit |
| CTPS | Central Transportation Planning Staff |
| COBUCS | City of Boston Utility Coordination System |
| CCTV | Closed Circuit Television |
| CMR | Code of Massachusetts Regulation |
| CMP | Construction Management Plan |
| CLU-IN | Contaminated Site Clean-Up Information |
| DoIT | Department of Innovation and Technology |
| DC | Direct Current |
| EV | Electric Vehicles |
| EMS | Emergency Medical Services |
| FHWA | Federal Highway Administration |
| GHG | Green House Gas |
| GPS | Global Positioning System |
| HID | High Intensity Discharge |
| HOV | High Occupancy Vehicle |
| HCM | Highway Capacity Manual |
| ISD | Inspectional Services Department |
| LPI | Leading Pedestrian Interval |
| LOS | Level of Service |
| LED | Light-Emitting Diode |
| LRTP | Long Range Transportation Plan |
| MUTCD | Manual on Uniform Traffic Control Devices |
| MBTA | Massachusetts Bay Transit Authority |
| MassDOT | Massachusetts Department of Transportation |
| MIVIS | Massachusetts Interagency Video Information System |
| MONUM | Mayor's Office of New Urban Mechanics |
| MMLOS | Multimodal Level of Service |
| NACTO | National Association of City Transportation Officials |
| OPC | Office of the Parking Clerk |
| PS&E | Plans, Specifications, and Estimates |
| PMT | Program for Mass Transit |
| PIC | Public Improvements Commission |
| PROWAG | Public Rights of Way Accessibility Guidelines |
| PWD | Boston Public Works Department |
| QR | Quick Response |
| RFID | Radio Frequency Identification |
| ROW | Right-of-way |
| TMC | Traffic Management Center |
| TAPA | Transportation Access Plan Agreement |
| TIP | Transportation Improvement Program |
| VMT | Vehicle Miles Traveled |

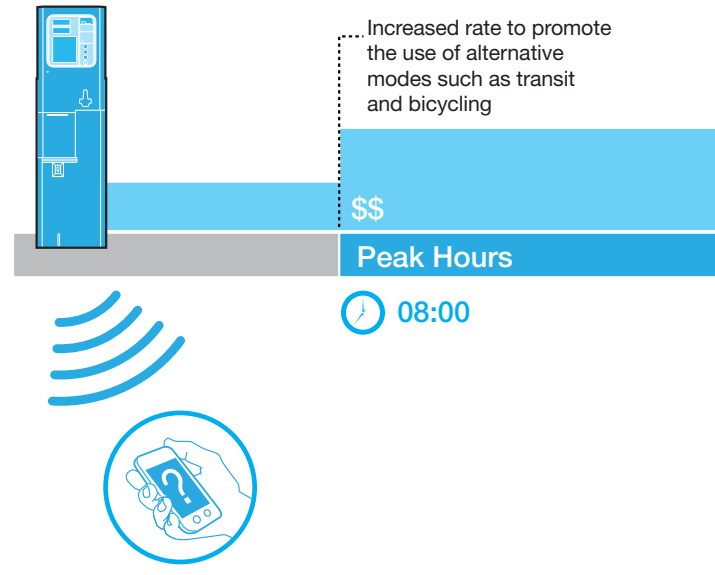
# Variable Pricing

## Overview

With the introduction of smart and multi-space meters on Boston's streets, parking pricing can be adjusted in response to parking demand. Variable pricing requires rates to be raised when spaces are difficult to find, for example along commercial corridors or during peak hours, and lowered when demand is low, such as in neighborhood business districts at off-peak hours or downtown during weekends. Variable pricing can also be used during special events to encourage people to take transit, walk, or bicycle. The goal of variable parking is to maximize efficiency of Boston's limited parking supply.

When combined with parking sensors, smart meters with variable pricing can provide real-time data as to the location of available parking spaces and their price; smart phone apps may be developed to direct drivers to available on-street parking by price and location. For events, smart meters can adjust pricing as well as time limits in response to the duration of the event.

**BTD's Office of the Parking Clerk is investigating the use of variable pricing based on the experience of pilot programs such as SFpark in San Francisco.**



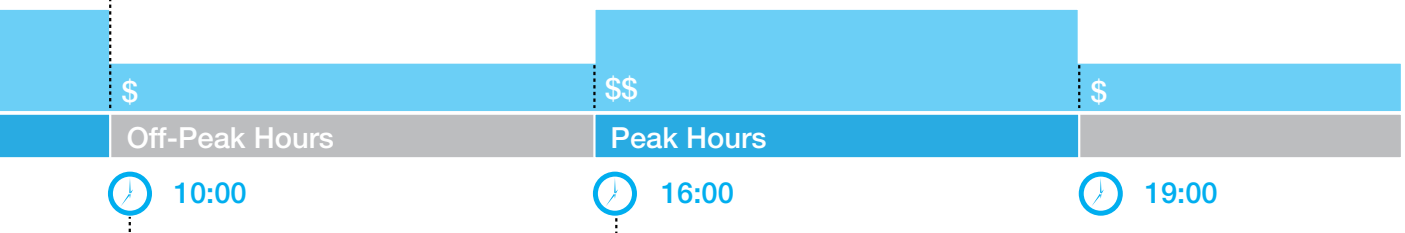

## Use

- Variable pricing should be considered when on-street parking rates are substantially lower than garage or off-street parking rates in the area to reduce the incentive for drivers to circulate and find the best deal.
- Meter parking rates should be set to find the right balance between making parking spaces easily accessible while pricing spaces to encourage the use of alternative modes such as transit and bicycling.
- Meter parking rates should not be adjusted too frequently to reduce confusion for the consumer and enforcement officers. For example, SFpark has different rates for off-peak and peak hours but keeps those rates fixed for several months at a time.
- New on-street parking meter rates should be adjusted in coordination with distributing information about the availability and pricing of parking in off-street lots that are permitted by BTD.
- To encourage visitors to stay for dining or entertainment in business districts, allowed parking in some areas should be extended from two hours to four hours after 6pm. Smart meters can be programed to accommodate this change.

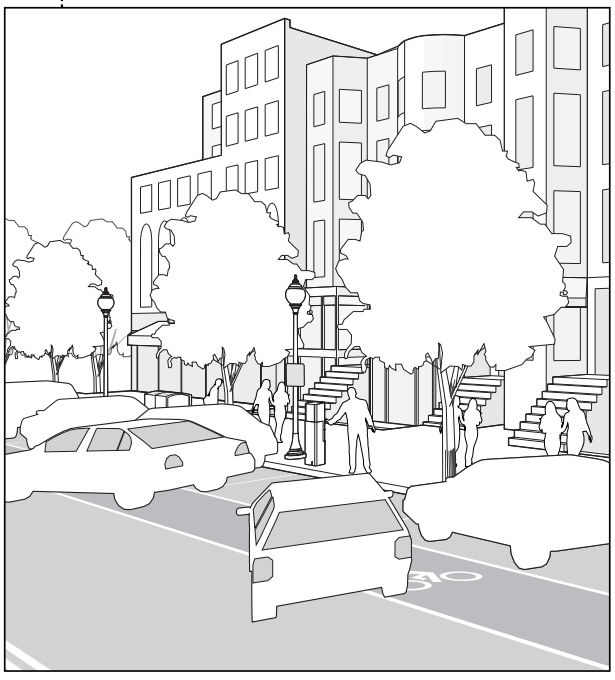
## Considerations

- Monitoring is important to verify that the variable pricing is producing the desired results. Regulations should consider how often rates can be adjusted.
- Pricing parking according to location and time of day can create unintended spillover into adjacent neighborhoods or districts if not implemented and managed properly. Parking policies may require coordination amongst adjacent districts to ensure community concerns of overflow parking are addressed.
- Variable pricing at metered spaces can be more effective when coordinated with rates for renting bicycles at Hubway stations and with Massachusetts Bay Transit Authority (MBTA) commuter rail, subway, and bus prices to make it possible for users to weigh alternatives and calculate the cost of an entire trip.
- Citation fines should also be coordinated with the use of variable pricing for parking. Fees when combined with variable pricing should ideally be greater than the price of short-term parking in nearby garages and lots to encourage turnover and for citizens to obey time limits.
- Variable pricing may have impacts on operating costs for BTD's Enforcement and OPC divisions.

Reduced rate in neighborhood business districts or downtown during weekends at off-peak hours




**Off-Peak Hours: Low Demand – Reduced Pricing**



**Peak Hours: High Demand – Increased Pricing**