

**CENTRAL SQUARE IMPROVEMENTS PROJECT
MASTER PLAN REPORT**

**City of Cambridge
Community Development Department**

Central Square Committee

Prepared by: Carr, Lynch, Hack and Sandell

In association with: John Lees and Jeffery Dawson Assoc.
Ripman Lighting Assoc.
Rizzo Associates Inc.

May 1995

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Chapter 1: Summary

Overview

For most of Cambridge's long history, Central Square has been its governmental center and main commercial district: the place where all of the City's people meet and rub elbows.

Cambridge is a proud multi-cultural and increasingly multi-national city with people of widely ranging incomes and life-styles. Central Square is still the place to experience this diversity and the democratic urban vitality that accompanies it. This major improvement project intends to create the public space setting that will complement Central Square as the heartland of Cambridge.

A Vision for Central Square

The proposed urban design plan will dramatically change the public space of Central Square. Massachusetts Avenue through the Square will be transformed from a commercial strip dominated by automobiles and trucks to a vital marketplace that welcomes pedestrians and bicyclists. It will be known for its broad, comfortable, tree shaded sidewalks, teeming with life drawn from the surrounding neighborhoods and from its unique and colorful small businesses.

The present overly wide and unrelieved traffic corridor will be narrowed and articulated by a

rhythmic series of block-length street spaces, lying between short, well-marked pedestrian crossings. It will be a much safer environment for pedestrians. Sidewalks and crossings will be beautifully illuminated at night. There will be a new, coordinated system of public signs.

The streets leading into the Avenue will be pleasant, tree shaded and well lit. Municipal parking lots will also be enhanced with landscaping, lighting and low fences. Gateways to the Square will be announced by colorful plantings at City Hall, Lafayette Square and the raised island in front of the police station. Carl Barron Plaza will become a vibrant and colorful focal point.

Goals and Benefits of the Plan

The goals of the plan are to make Central Square a destination that encourages pedestrians and cyclists to feel welcome and safe, that supports and enhances its commercial function, and that better enables and expresses its multi-cultural life. The benefits of realizing these goals are many. First and foremost, the Square will be better used with increasing foot traffic to support its businesses. People will no longer need to fear crossing the street or be so tempted to jaywalk. Cyclists will be able to use the area without putting either themselves or pedestrians at risk.

People will come to the Square not only to do

errands or have a meal, but also because it is pleasant, fun place to be. The many ethnic restaurants and available entertainment, in good weather, will be able to spill out into the public space. Increasing use by a broad mix of people will provide opportunities for new business as well as for expansion of existing businesses. The commercial life of the Square will continue to revive and be broadened to include a greater variety of family-oriented stores that will contribute to its attractiveness.

Management and Maintenance

Physical improvements to the Square are essential to meeting these goals and achieving these benefits. They will help to change the image of Central Square, as well as how it functions. However, many older commercial areas and town centers across the country have found that physical improvements alone are not enough to compete successfully with the shopping centers. Many cities have learned from the shopping centers that active public space management can make the difference between immediate improvement and lasting success. Such management involves cooperation between the City and the business community and is usually jointly funded.

The Process to Date

The process that has produced this plan can be, in many ways, a model for urban revitalization and improvement in Cambridge. For many years, Central Square has been of concern to the City, the business community, and the residents who live in the adjacent neighborhoods. In 1993, the Mayor formed the Commission to Promote and Enhance Central Square Now! and in October of that year, the Commission presented its findings to the City Council. The Commission made a series of recommendations to the City Manager and to the Central Square Neighborhood Coalition for implementation.

Work began in earnest in January, 1994 with the creation of the Central Square Committee. This eighteen-member group, drawn equally from the four neighborhoods surrounding the Square and the Central Square Business Association, and staffed by the Cambridge Community Development Department, has met intensively since that time to consider how best to achieve these broad goals. The design team, led by Carr, Lynch, Hack and Sandell, was selected in October 1994 and proceeded to develop this plan with the guidance of the Committee and the cooperation of all relevant City departments.

At the joint initiative of the City and the Committee, ideas leading to the final plan were brought to a larger public and extensively

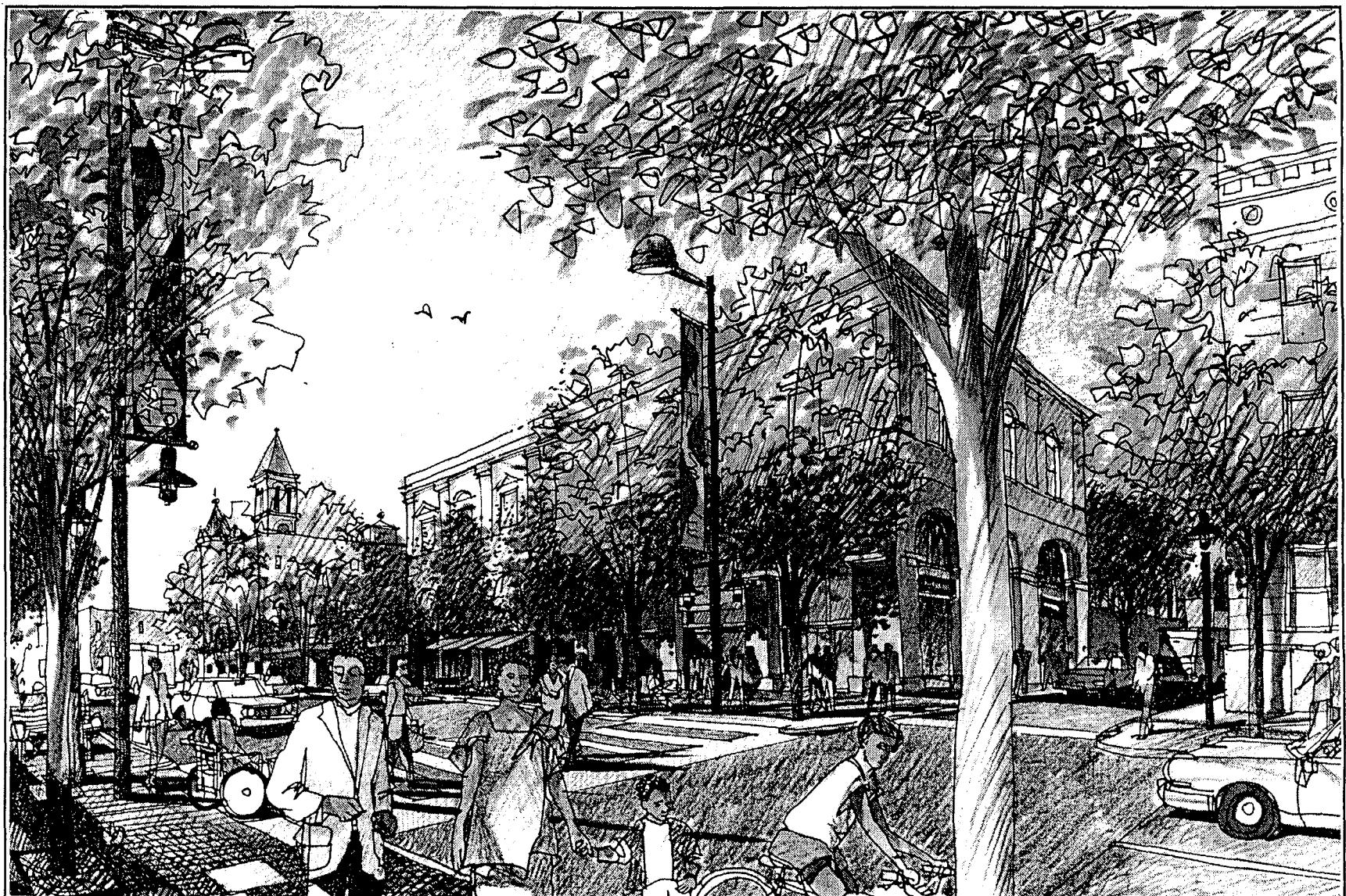
reviewed. An open public workshop in early January reviewed the preliminary alternatives (see Appendix C). A diverse group of interested citizens focused the design work on the key user concerns. Follow-up meetings were held in the adjacent neighborhoods, including special meetings for senior citizens and teenagers. The plan was also reviewed by the Central Square Business Association at two stages in its development. Each of these many meetings identified new issues and opportunities and helped to refine the design approach. As a result, this plan addresses the concerns and aspirations of a broad cross-section of the Central Square community.

Implementation

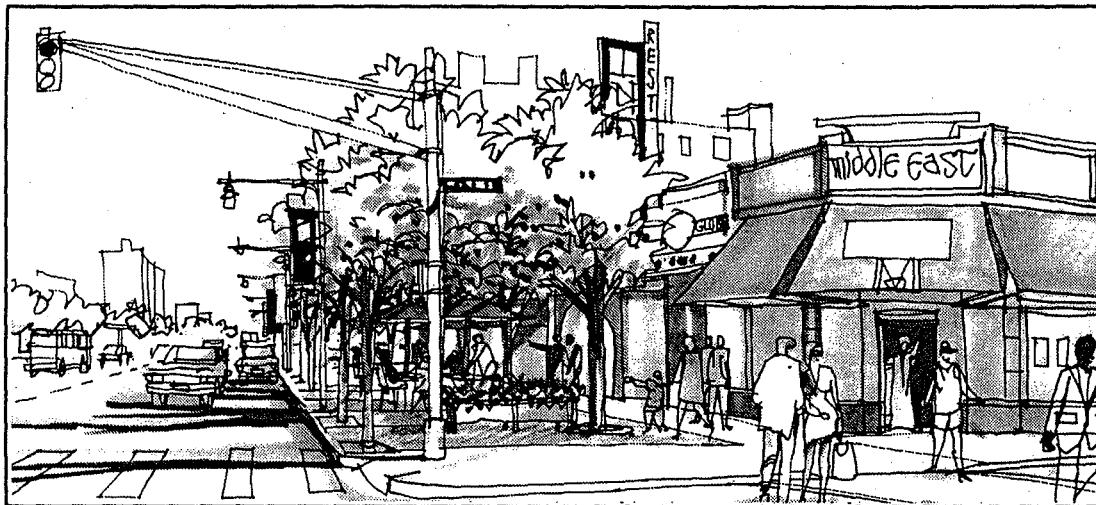
Implementation will be carried out in phases over the next two years. The City Council has approved a construction budget of \$3.2 million. The first phase of work, expected to cost about \$300,000, has been designed and documented in the summer of 1995, with construction to take place in the fall. Work will include improvements to the two principal municipal parking lots on Bishop Allen Drive (Lots 5 and 6). Reconstruction of these lots will provide additional parking spaces, which will be available during construction of the Massachusetts Avenue improvements. These parking lots will become pleasant landscaped entries to Central Square.

During this construction period, final design and documentation will be carried out for the remainder of the Square. Massachusetts Avenue improvements, anticipated to cost about \$2.5 million, will be constructed between early spring and fall of 1996, being completed prior to the holiday season. Work on the side streets, expected to cost about \$400,000, will include the addition of new trees, lighting and sidewalk widening where appropriate and possible.

Disruption to businesses will be held to a minimum because the existing concrete sidewalks directly adjacent to businesses will not be disturbed. Construction work will be done in the twenty foot strip between the existing concrete sidewalks and the three new travel lanes. One positive focus of this construction can be Carl Barron Plaza, designed as a lasting symbol of the multi-cultural identity of Central Square. Bishop Allen Walk, connecting Parking Lot 5 to Massachusetts Avenue will be a second focal point with its light and color splashed photomontage tying the Square's past into its present diversity.



The Temple Street Crossing



Restaurants on the wide sidewalks

Chapter 2: Goals and Criteria

A Destination

The principal goal of the urban design plan is to *enhance Central Square as a destination for people*. While physical character is only a part of what makes any commercial area a destination, public space improvements can contribute significantly to achieving this goal. Public space provides the setting for the public life of the Square. This setting must serve the functional needs of that public life as well as appeal to the users and potential users.

To become a destination for people, Central Square must connect with the users' lives in many

dimensions. First, it must provide the commercial and public services that people need and desire. Repeated functional visits, if they are pleasant, will encourage a sense of connection. When the setting offers comfortable and safe meeting places, that will also strengthen connections to other people and engender a desire to return. Celebrating the history and life of the Square will also contribute. Special activities and numerous events, like the World's Fair, can dramatically alter one's sense of a place. The presence of natural elements and features which suggest connections to the larger natural and social environment will also contribute. The design of Central Square must respond to each of these dimensions that together create a sense of destination.

User Needs for Safety and Comfort

A second primary goal of the plan is to better serve the functional needs of people in Central Square. In particular, pedestrians and cyclists needs for greater safety, access, and comfort must be addressed. Central Square must serve users' active needs for shopping, interaction with others, participation in street life, cycling, driving, parking and loading. A safe way to cross the street is a basic and crucial need to be satisfied, day and night, along with improved access from the neighborhoods for residents walking to the Square.

At the same time, the Square should provide for a new level of comfort and relaxation. People need to feel safe at all times, to be able to see each other at night, to enjoy the respite offered by sheltered places for sitting, and to find small natural sanctuaries within the constant commercial flow. People with various disabilities must feel that the Square is accessible and welcoming to them as well.

Finally, in the earnest effort to serve people better, basic human needs for discovery and joy can sometimes be forgotten. A great Central Square will create opportunities for new experiences, new vistas that excite, educate and delight. It will be a place for people of all ages and backgrounds to hang out and have fun.

Enabling and Celebrating Diversity

Central Square is one of Greater Boston's most democratic and culturally diverse local shopping areas. The proposed improvements must do nothing to diminish that diversity and, indeed, should celebrate it. In public space, freedom of access and use for all people is a basic right which design can protect and enhance.

Physical, visual or symbolic barriers can limit the real or perceived availability of public settings and must be avoided. Access must be maintained for the vehicular users, including bicyclists.

Efficient and safe traffic flows must be guaranteed, even as the balance is being shifted toward pedestrians. Public transportation users must be encouraged and cared for. Those coming to the Square to make deliveries must also be accommodated at current or higher levels of service.

Once there, people's freedom to use Central Square must also be protected. Protecting these rights involves a reconciliation among competing interests, rules and regulations, often best accomplished through a combination of official enforcement and social pressure. The physical design of Central Square can and should minimize these conflicts by creating the proper space for various uses. A new organization to manage the resulting public space of Central Square could mediate disputes ending competing



World's Fair in Central Square

interests to insure these essential freedoms.

When these fundamentals have been accomplished, the design should go on to celebrate the multi-cultural diversity of Central Square. One way to do this will be through interpretive works, like the photomontage which will be in Bishop Allen Walk. Another will be the collaboration between the designer and the artist, Ritsuko Taho for Carl Barron Plaza. Beyond these specific symbolic gestures there is

the opportunity to make Central Square a better setting for community events, like the bi-annual "World's Fair," which make the social diversity visible. On a day-to-day basis, increased places for people to simply sit and enjoy the passing life, in or out of cafes, can help accomplish this.

Chapter 3: The Central Square Plan

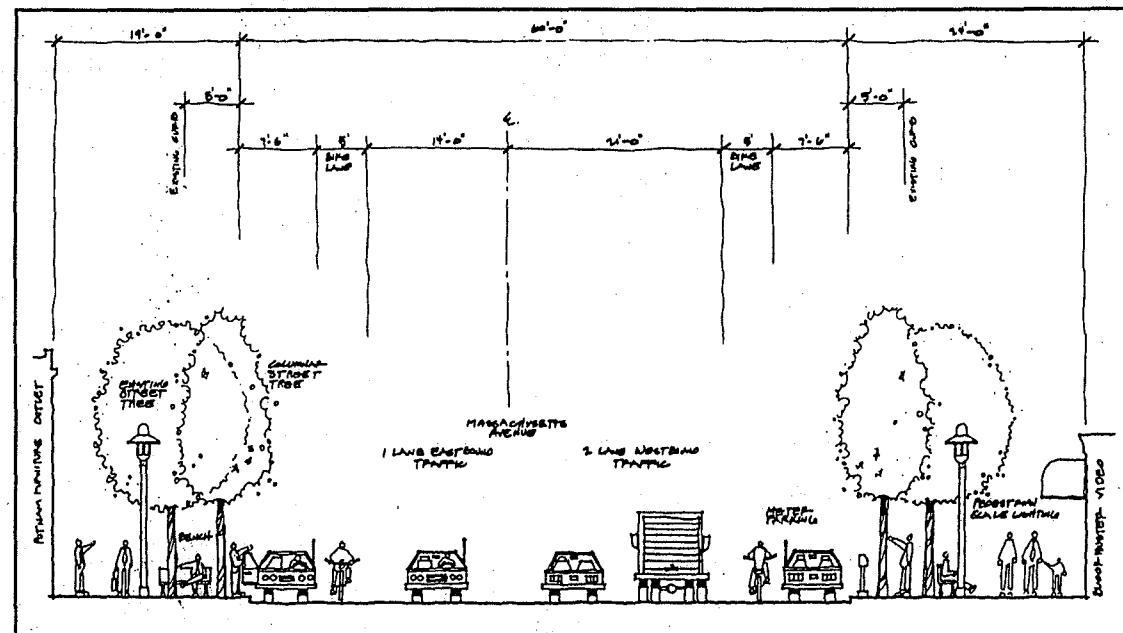
Parameters

The urban design plan for Central Square focuses on the dimensions of public space that together create its ambiance and organize its use. The most important proposed action is the reallocation of space among vehicles, pedestrians and bicyclists. This reallocation of space along Massachusetts Avenue will make possible wider, more useful sidewalks and greatly improved pedestrian crossings. The design plan also proposes visual gateways at the eastern and western ends of the square and a central focal point at Carl Barron Plaza.

Other key features of the plan include the treatment of the side streets between Green Street and Bishop Allen Drive, the proposed Bishop Allen Walkway and the reorganization and landscaping of the two large municipal parking lots along Bishop Allen Drive. This chapter also addresses the plan's recommendations on parking and loading zones, bus stops and taxis, and the management and usage of the new space.

Space Allocation on Massachusetts Avenue

The overall strategy for space allocation on Massachusetts Avenue is based on a reduction and reorganization of traffic lanes to better accommodate current and future traffic demands.



Typical proposed street cross section

An in-depth analysis of the volumes of vehicles in the study area has shown that there is no need now or in the foreseeable future for the current four and five lane alignments on Massachusetts Avenue through Central Square.

This conclusion is based not only on existing traffic but also on future volumes when "background" traffic in the larger area has grown by 10 percent and University Park is fully developed. Based on this analysis, the plan proposes three lanes—one eastbound and two westbound—which will amply accommodate vehicular traffic on Massachusetts Avenue.

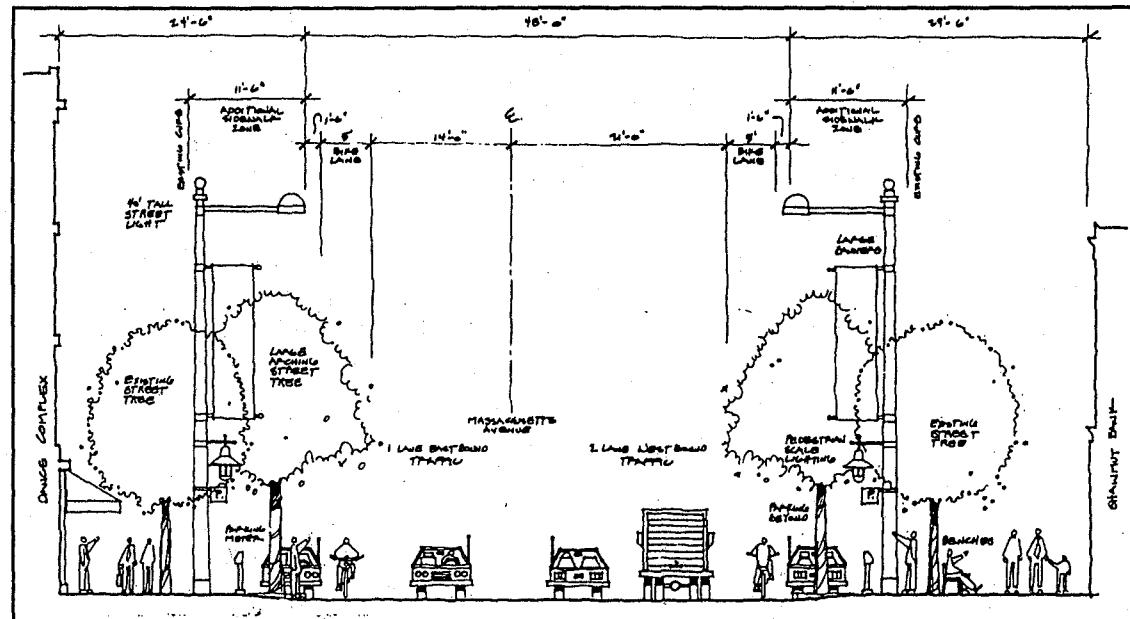
Planned improvements to Lafayette Square and the Waverly and Sidney Street one-way pair, to be carried out after the Central Square improvements, may allow a reduction to one lane in the westbound direction as well. When all these improvements are completed, another analysis of traffic conditions in the Square can be made to test this projection.

The proposed reduction of moving traffic lanes from four and five to three, provides additional space for other uses such as bicycle lanes and wider sidewalks. Sidewalk width can be increased by approximately five feet on both the

north and south sides of Massachusetts Avenue. Five foot wide bike lanes will also be incorporated within the new traffic layout and will be organized to provide safer bicycle travel in relation to through and turning traffic, bus stop and lay-by areas, curb side parking spaces and reconfigured intersections. This reallocation of the street space will provide for the design of a pedestrian friendly Central Square, with new amenities such as benches, bike racks, new trees and pedestrian scale lighting. It will also create a much safer Central Square for pedestrians, bicyclists and drivers.

Crossings and "Rooms"

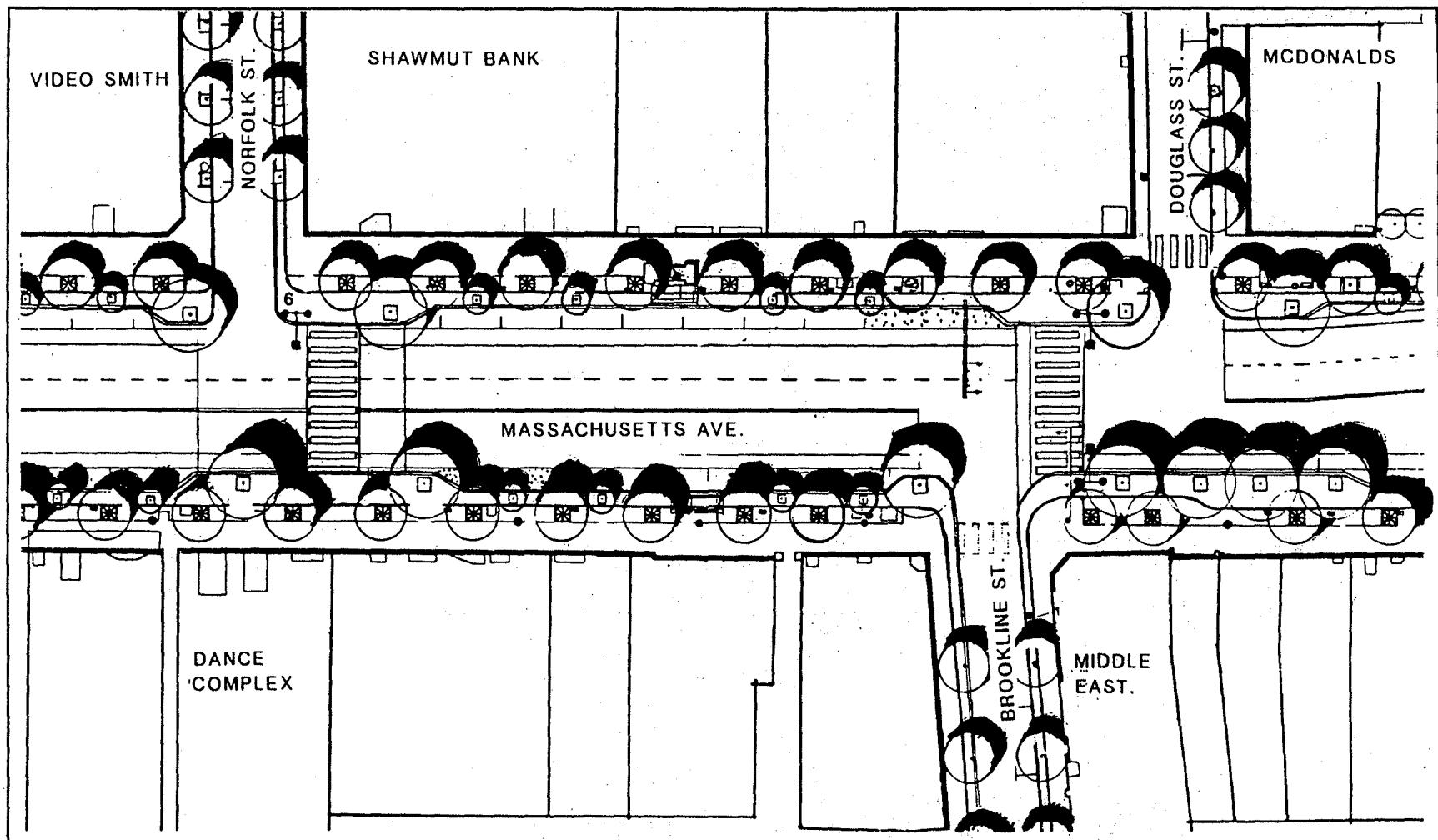
After reducing the space given to traffic, the major change in the Massachusetts Avenue corridor will be the creation of a sequence of outdoor rooms. Overall, the street will appear as a narrower tree-lined avenue or boulevard. To overcome the sense of a long corridor, which still emphasizes the traffic flow, a series of smaller street spaces will be created, generally fronting on the blocks of buildings and located between crosswalks. These "street rooms," emphasized by new trees with roadway narrowing and higher levels of lighting at crosswalks, create a natural rhythm of spaces from City Hall to Lafayette Square, making Massachusetts Avenue more visually manageable, crossable and appealing for pedestrians as well as drivers.



Street cross-section at a pedestrian crossing with sidewalk "flares."

On the ground, these rooms are defined by eliminating parking and widening sidewalks adjacent to the crosswalks. This typical condition occurs at all intersections, as well as mid-block crossings. In these zones the sidewalk is widened by twelve feet. These "flares" create mini-plazas with a variety of uses and decrease roadway width at the crossings from seventy feet to forty-eight feet. The sidewalk flares also provide the opportunity to plant trees and locate high-mounted lights within Massachusetts Avenue corridor, further defining the rooms between.

These trees and lights will help signal each upcoming crossing for the driver, adding to the increased safety of reduced crossing distances. The flares will also give the opportunity for additional pedestrian amenities such as sitting areas, planters and potential outdoor cafes. These crossing zones will be made even safer by altering the cycle of the traffic lights to reduce pedestrian waiting time from 75 to 60 seconds. This will encourage people to cross at the lights and reduce jaywalking. All new crosswalks will be marked by "zebra" stripes and will be accessed by ramps which meet the design standards recommended by the Americans with Disabilities Act.

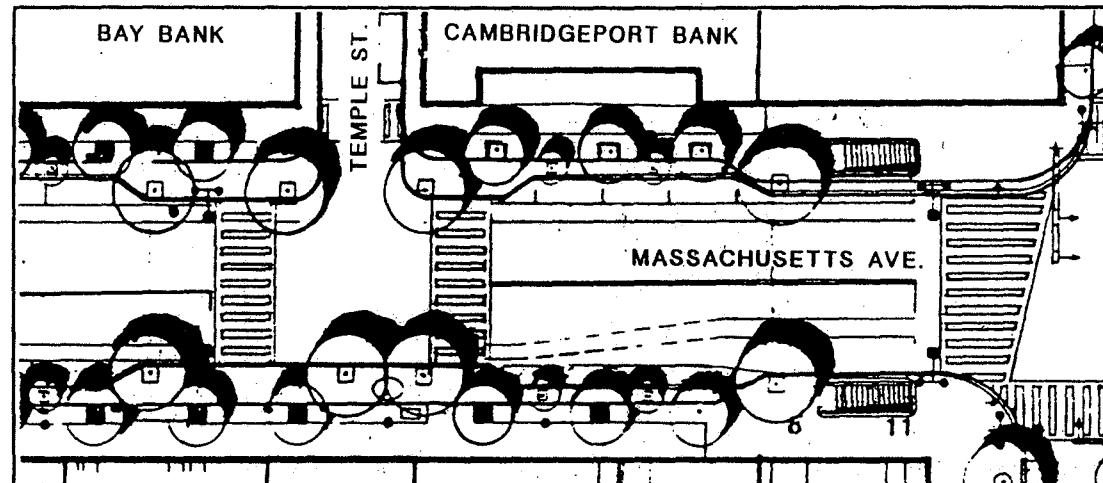


Partial plan: Crossings and Rooms

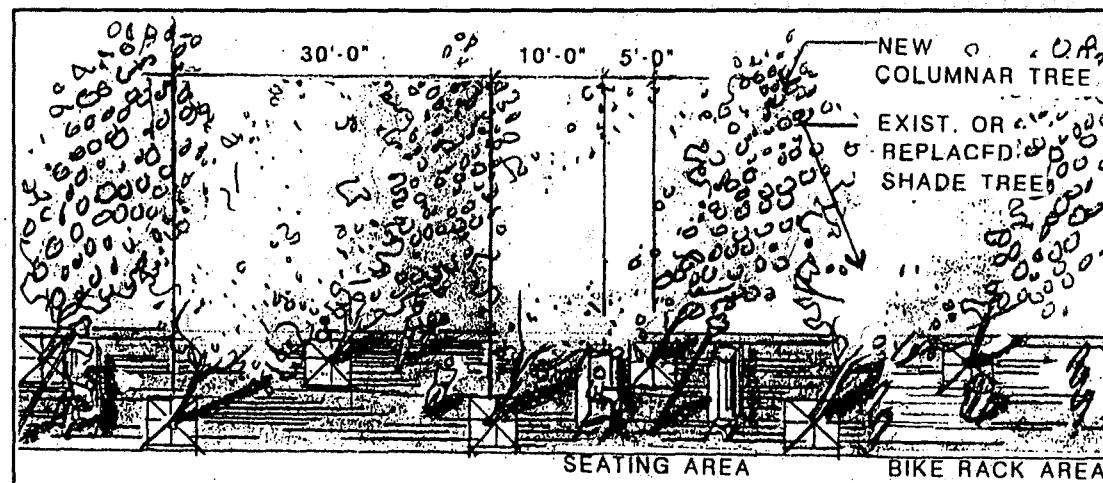
Sidewalks

The urban design plan calls for the sidewalks to be widened by five feet. This expanded brick buffer zone further separates walkers from cars and creates the opportunity to better organize street furniture and install new amenities such as benches. New street trees will also be located in this five foot zone, together with irrigation and drainage that will benefit both new and existing trees. New lower height pedestrian lights will be located between existing trees, on the line between the concrete walkways and the brick buffer zone. This will provide maximum light for the sidewalk and sitting areas, avoiding the problem of tree shadows.

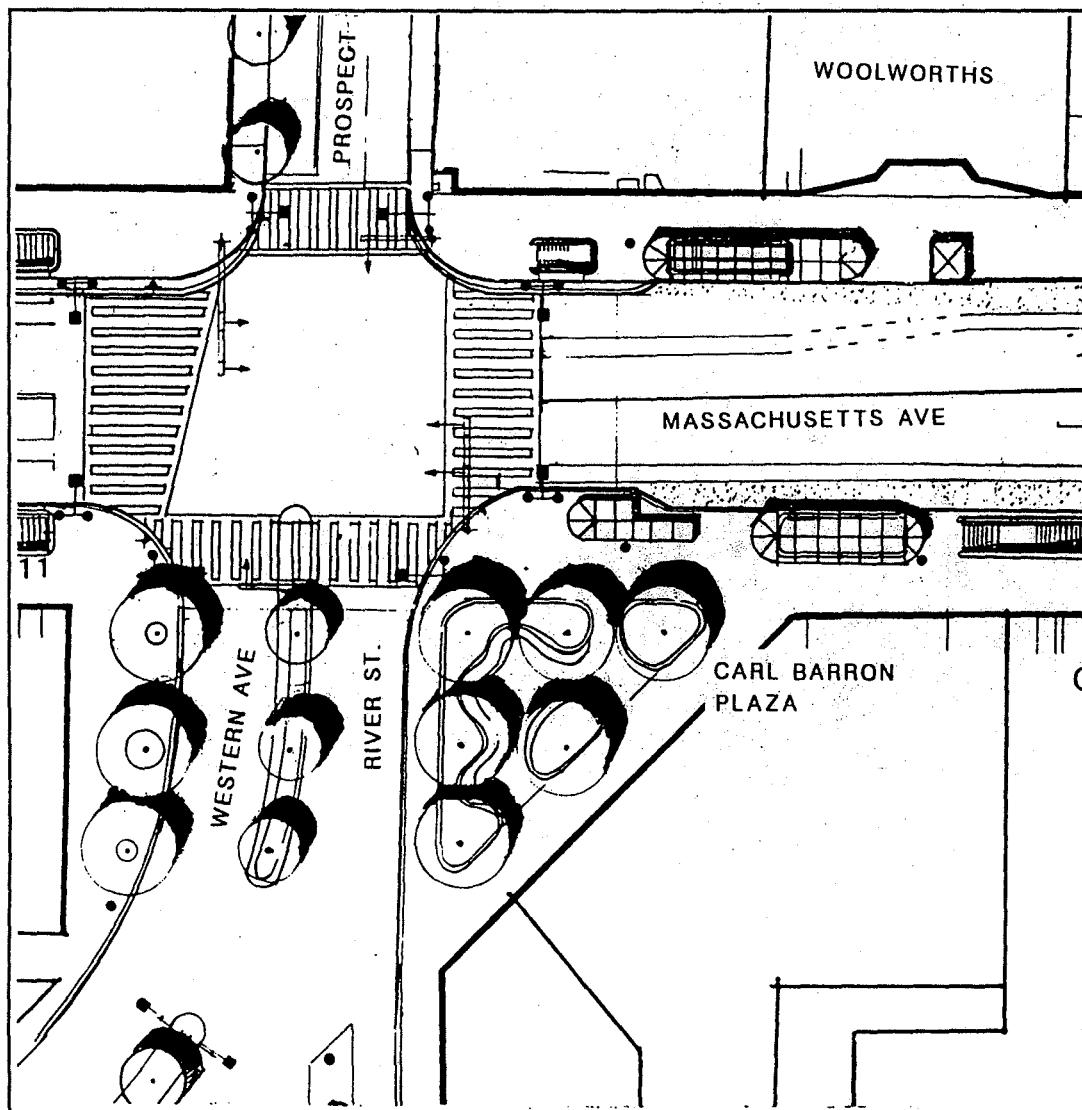
The new sidewalk spaces will be organized in relation to the existing land uses throughout Central Square. The widened sidewalks will provide space for tables and chairs serving adjacent cafes and restaurants. Bicycle racks will be strategically placed to provide the best opportunity for riders to park and lock their bicycles near high frequency destinations, while not interfering with other amenities. Benches will generally be placed face-to-face, perpendicular to the flow of pedestrian traffic, and grouped with pedestrian lights to create comfortable eddies for social exchange as well as relaxation.



Sidewalk Plan: Condition at Proposed Flares



Sidewalk view showing trees and furniture groupings

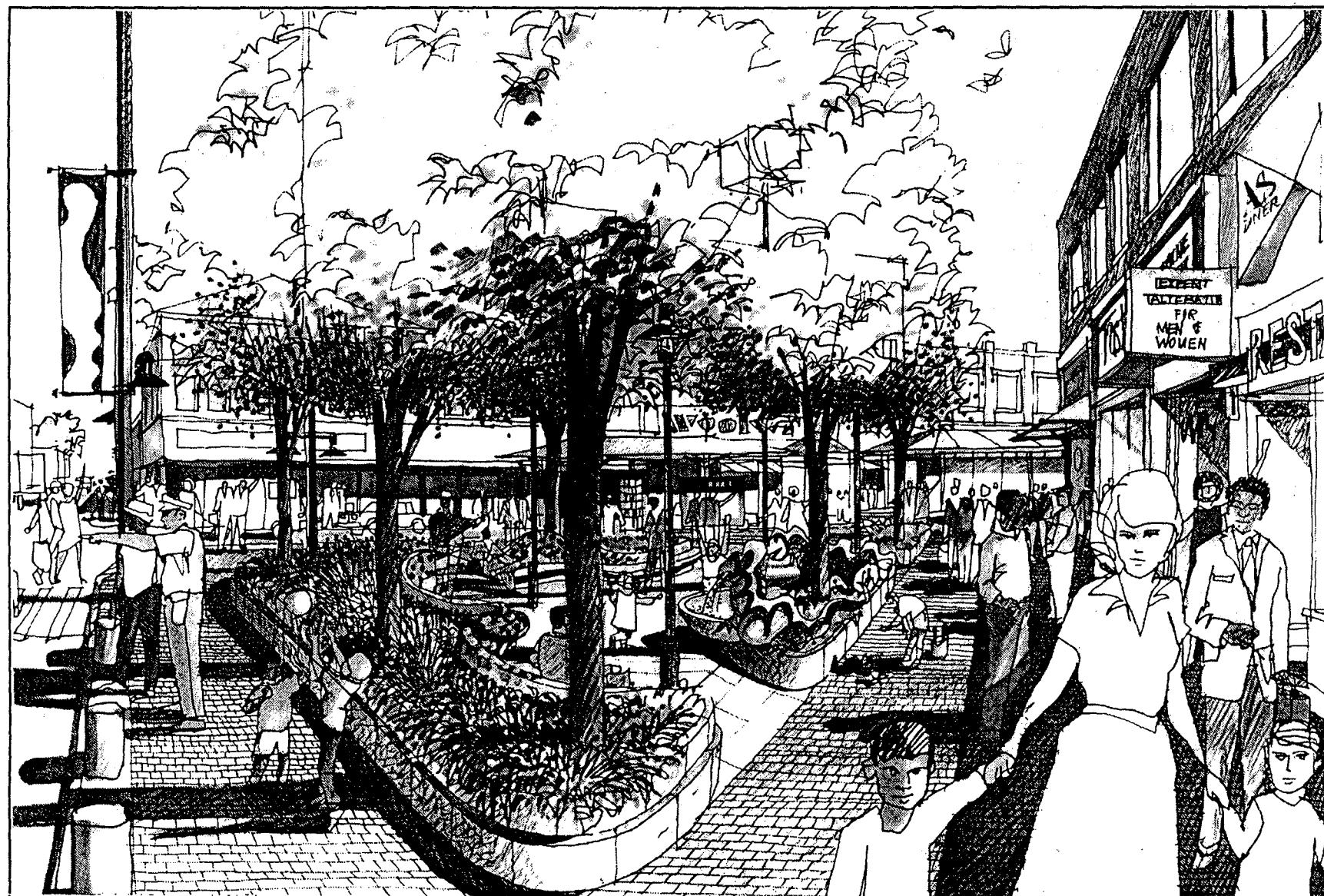


Conceptual plan of proposed Carl Barron Plaza

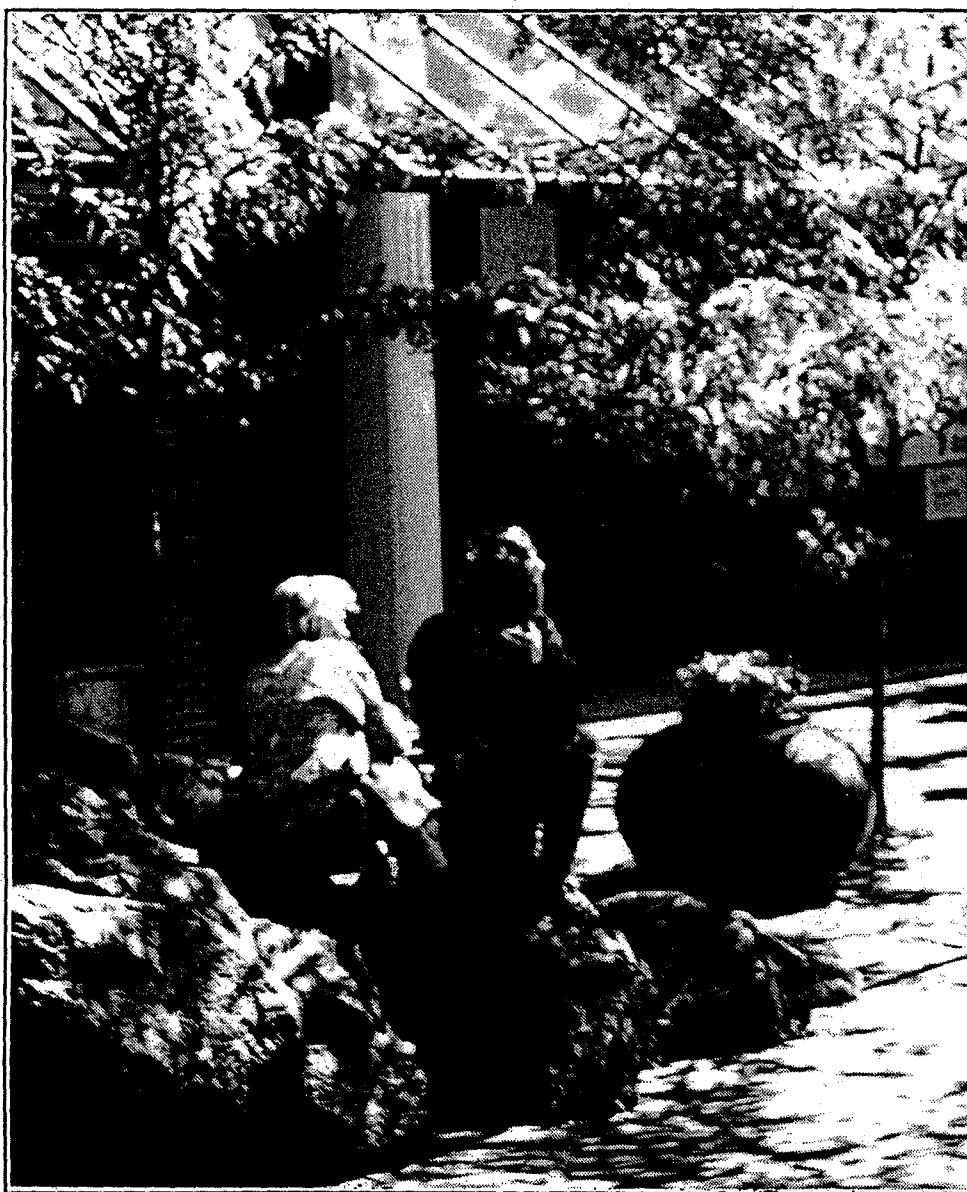
Carl Barron Plaza

The ill-defined space called Carl Barron Plaza is the largest pedestrian space in the Square and will become its central focal point. The new plan eliminates the existing right turn lane and utilizes a smaller turning radius at the Massachusetts Avenue corner of the space. This new radius will still be more than adequate for the largest trucks and will result in an increase in the size of the Plaza. The shortened crosswalk length will create a safer condition at the crossings of River Street/Western Avenue and at Massachusetts Avenue.

The new plaza design employs a series of colorful raised landscaped planters. This plaza arrangement will provide a partial sanctuary from the street traffic and from the heavy pedestrian traffic in this area. This new passive space for sitting and relaxing will be small enough to be comfortable for one or two people and large enough to allow an occasional street musician to perform for a few people, but not a crowd. The proposed deciduous canopy trees will provide shaded relief in the summer months. The understory plantings will consist of a combination of plant material including evergreen shrubs, flowering shrubs, colorful perennials and a hardy ground cover for year-round visual interest.



Perspective view of proposed new Carl Barron Plaza. View looking North



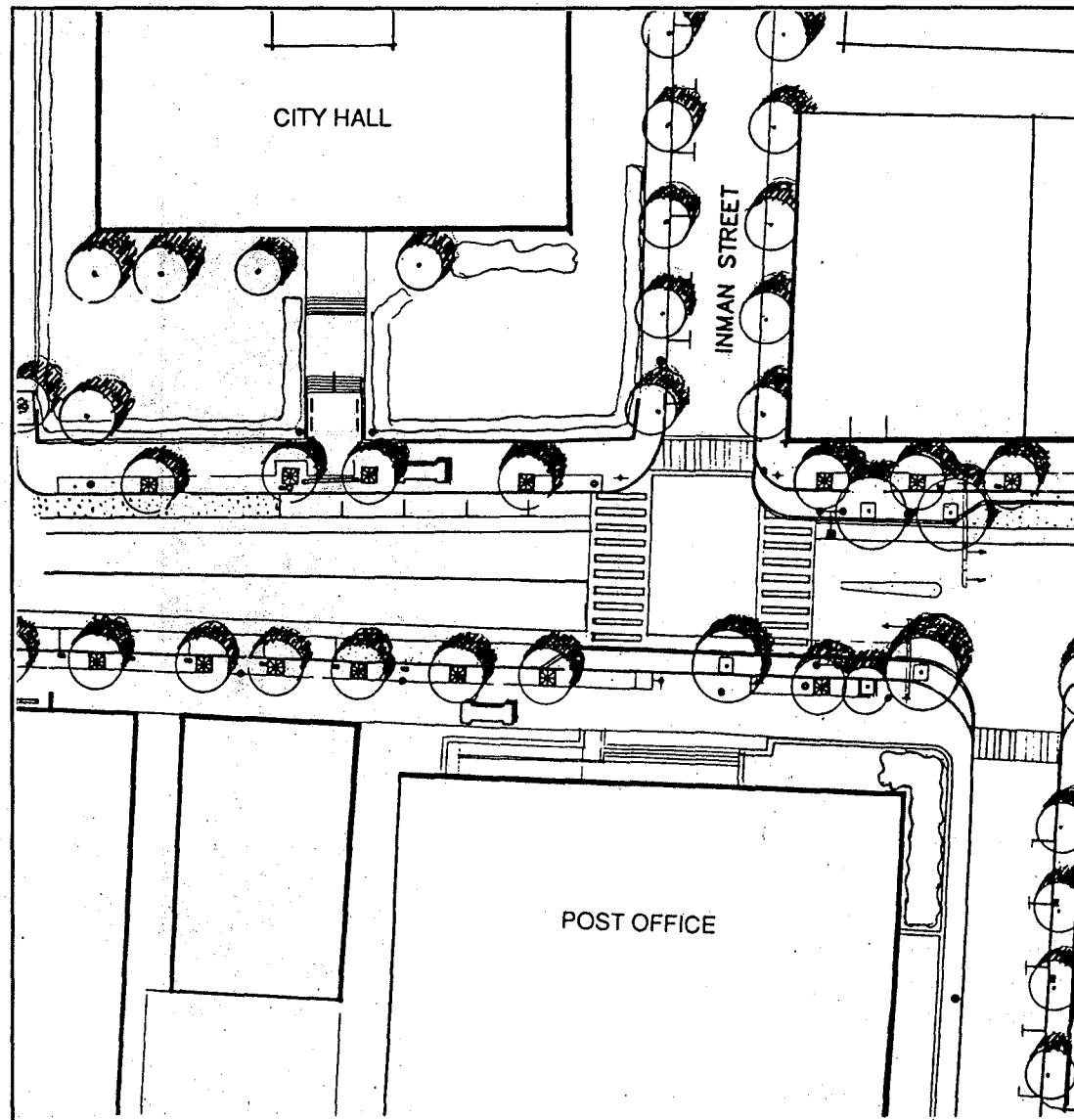
Large boulders in the Church Street Marketplace, Burlington, Vermont

The final design of Carl Barron Plaza will be done in collaboration with the artist, Ritsuko Taho. The art work will have a multi-cultural theme and involve community participation in its development and execution. Existing granite planters will be recycled and reassembled into a new semi-enclosed space where small-scale performances can take place. The space will be punctuated by boulders and enriched by sand blasted words and images suggested by the people of Central Square.

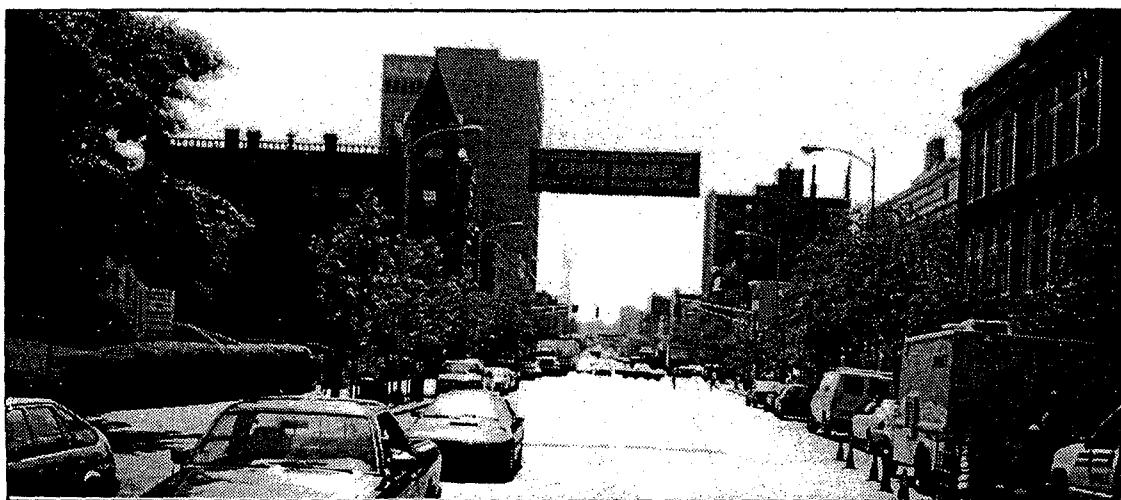
The schematic design for Carl Barron Plaza identifies a potential location for an information kiosk, in the new sidewalk flare between the subway exit and the Massachusetts Avenue crosswalk. A kiosk located here would be out of the way of the foot traffic flow, but close enough to catch the attention of passers by. The new kiosk would feature an informational map and possibly a business directory.

Gateways

In addition to the existing raised green island between the Baptist Church and the police station, there are two other locations in the Study area which can act as gateways to Central Square. The future development of Lafayette Square will create the eastern gateway. It is important for the design of Lafayette Square to include a landscaped area which will relate to the character of the other gateways. The western gateway will have a civic orientation and be related to the Cambridge City Hall, Post Office, YMCA and the new Senior Center. Again, the design theme of colorful landscape material should be incorporated into future improvement projects in this area so that the sense of gateway can be realized. The result will be three key areas of green open space in Central Square which will all have a similar appearance, including not only colorful plant material but also other site elements such as lighting and signage. The potential location of Central Square identity signs at these three locations will help to reinforce the sense of entrance into the Square.



Plan at west gateway to Central Square in front of City Hall



View of Massachusetts Avenue: Gateway from the West

Side Streets

While much of the Central Square Master Plan has focused on the design of Massachusetts Avenue, the study area also includes a number of streets which intersect it. In the analysis stage of the project, the design team evaluated these streets for traffic, safety, lighting, planting and parking. Numerous locations for new street tree plantings have been identified along several side streets, sometimes requiring sidewalk widening and sometimes not. These new street trees will add a visual amenity for the approach to Central Square from the adjacent neighborhoods and will also provide shade on sidewalks during the hot and humid summer months.



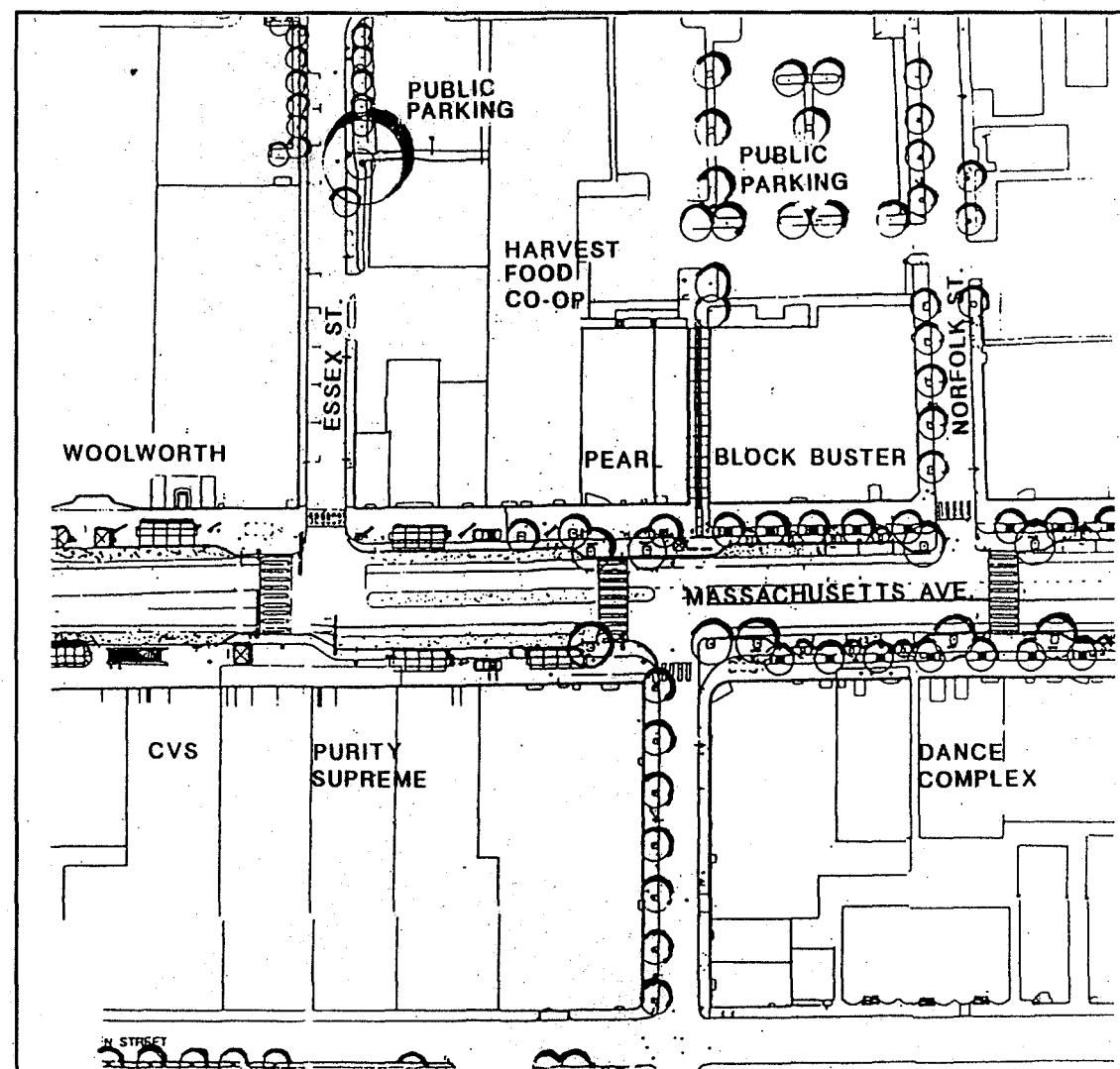
View of existing conditions of Lafayette Square: the Eastern Gateway

New street lighting is also proposed for these side streets. New lighting will not only provide a safer environment for vehicles and pedestrians but will also help to spread the effect of the streetscape improvements beyond Massachusetts Avenue.

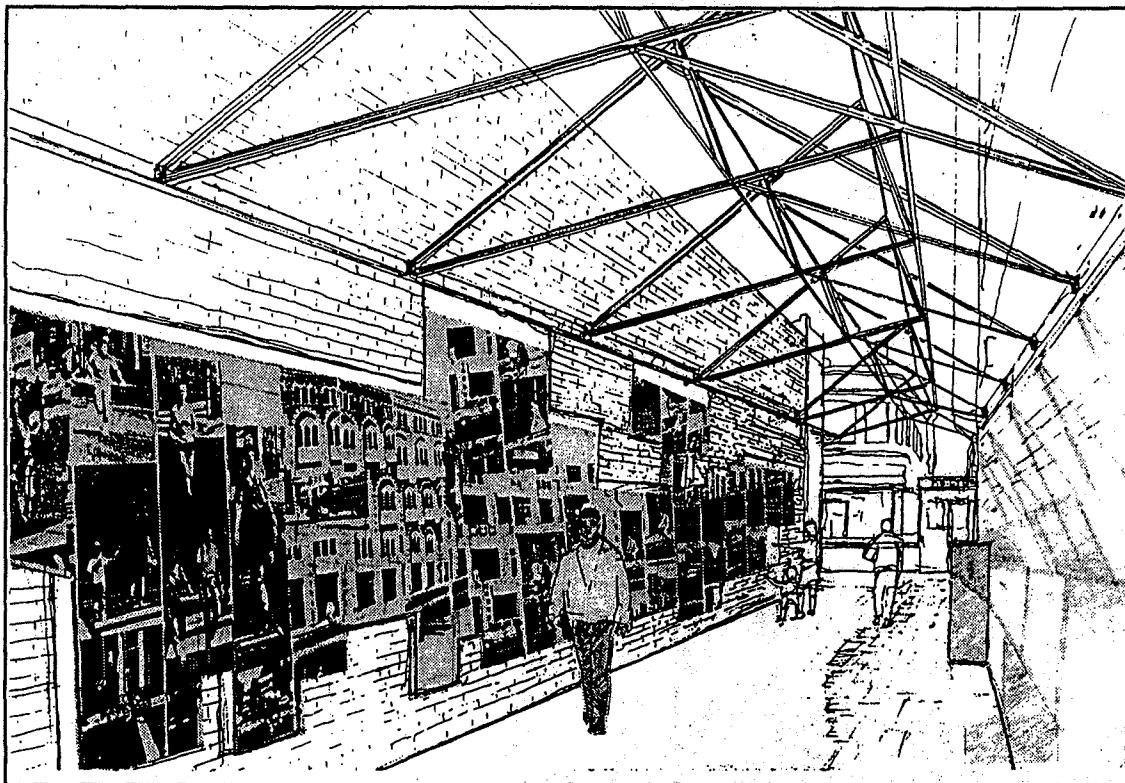
One especially important block is Prospect Street between Bishop Allen Drive and Massachusetts Avenue, where columnar trees might be located on the western side of the street paired with new lighting on the eastern side of the street to create a visual rhythm.

Some curb realignments will occur in order to make room for trees or provide for more efficient movement of vehicles into Central Square.

Directional and identification signage also will be incorporated into the improvements on these streets to help organize the traffic through, into and out of Central Square. Parking will be increased by reducing the length of parking bays to the new City standard of twenty feet.



Plan showing side streets leading into Massachusetts Avenue



Perspective view toward Massachusetts Avenue from the interior of the proposed Bishop Allen Walk

passage not only a safer place to move through, but also a very enjoyable and interesting experience. A partially glazed overhead structure is proposed in order to provide a sense of shelter and comfortable scale. Within this overhead structure, colored and reflective glass will catch the sun and cast changing colored light on the walls and floors of the space.

A second major design element within the new Bishop Allen Walk will be a photographic

montage which will interpret the history and character of Central Square, old and new, in an exciting format. Unlike many historic panels and markers which simply show images with accompanying text, the photographic montage will be a dynamic way to display images of Central Square. Included will be pictures of current people and places as well as significant historic and contemporary views and quotes. The montage will be displayed on nearly

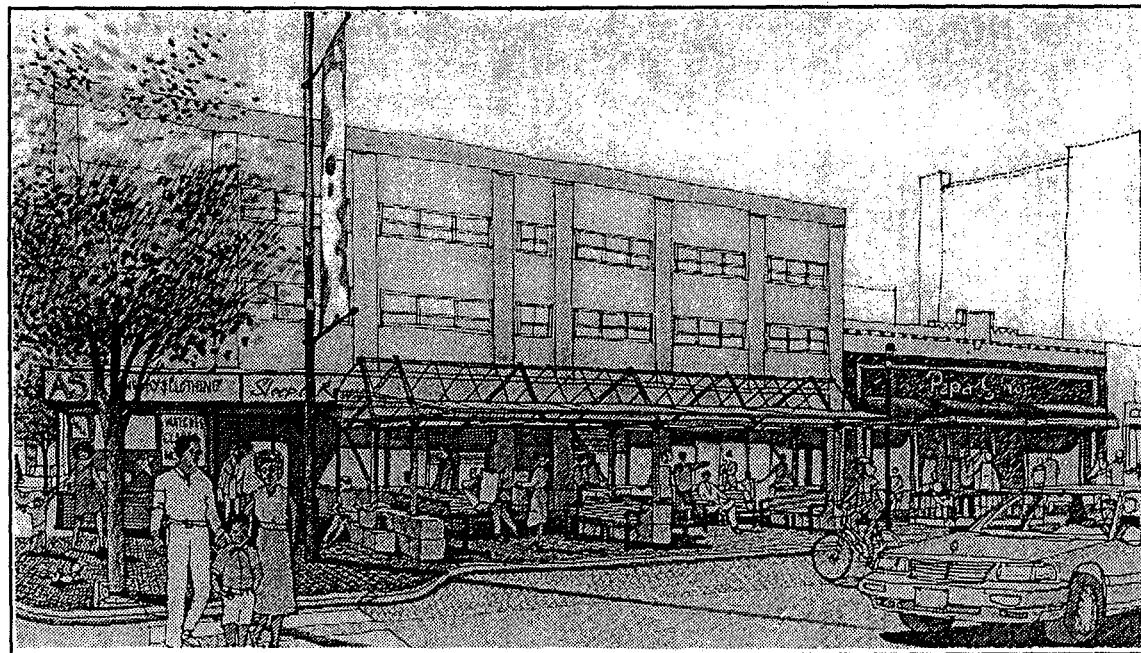
indestructible porcelain enamel panels and will allow for future change in content as the Square evolves over time.

Parking and Loading Zones

An important component of the urban design plan is its provisions for parking. Both the total number of spaces and the location of these spaces are important. The distribution of parking spaces in Central Square includes three general locations: Massachusetts Avenue metered spaces, public lots with metered spaces and several side streets which provide both metered and resident parking spaces.

While the number of spaces on Massachusetts Avenue will decrease by nine or ten spaces, the total number of spaces in public lots #5 and #6, adjacent to Bishop Allen Drive, will increase by seventeen. In addition, the relocation of parking meters on side streets from a twenty-five to a twenty foot spacing will add approximately ten spaces. The net result will be an overall increase in public parking in Central Square of seventeen or eighteen spaces.

All present loading zones will be retained and new loading zones will be provided in several locations to better facilitate service to businesses in Central Square. This will also help prevent traffic congestion caused by vehicles which stop and unload merchandise in the through traffic lanes. This has been a special problem in the vicinity of Purity Supreme and the subway entrance, where a large new loading zone is proposed. The new urban design plan identifies



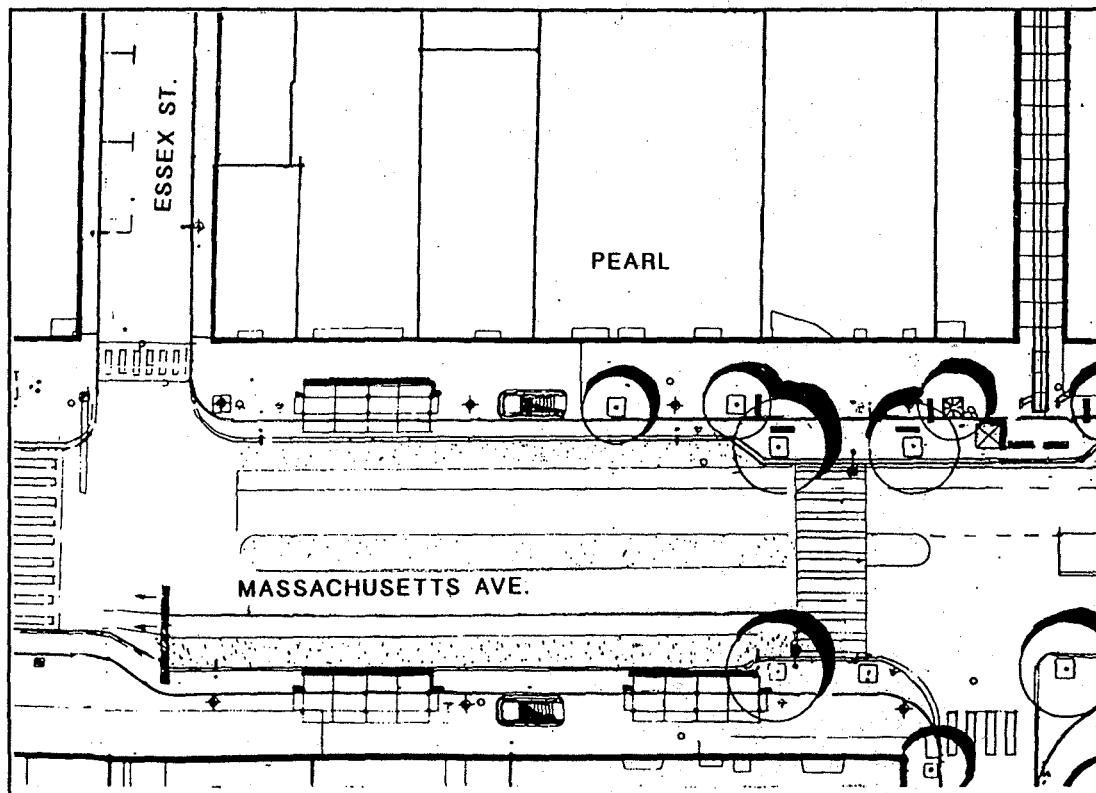
Perspective view of proposed bus shelter at Pearl Street and Massachusetts Avenue

five large loading zones for drop-off and pick-up of goods and items related to the stores that front Massachusetts Avenue. Many of the businesses along Massachusetts Avenue also commonly use side streets for delivery and this will be continued.

Buses and Taxis

The urban design plan will maintain the current number of taxi stand spaces with some modifications to their locations and configuration. The total number of bus stop locations will also

remain the same. The current bus stop location on Massachusetts Avenue at the corner of Prospect Street going westbound will be moved back toward Essex Street in order to mitigate conflicts which currently occur due to vehicles trying to make right-hand turns onto Prospect from Massachusetts Avenue.



Partial plan of bus and taxi drop-off areas between Essex Street and Pearl Street

The City's Traffic and Parking Department, working with the design team, has made a recommendation to the MBTA regarding bus stop/layover circulation and routing in the area of Central Square. Currently several bus routes have layovers in Central Square. These layovers often have negative impacts in the Square, including added congestion and pollution. The City and the design team will continue to work closely with

the MBTA to ensure proper service and a better environment in Central Square.

The plan recommends the following bus stop/layover configuration:

- | | |
|------------------|--|
| Route 1 | No layover. Stops are eastbound Massachusetts Avenue at Pearl Street. Westbound at Massachusetts Avenue just after Essex Street. |
| Route CTI | Layover on Green Street just before Magazine Street. Stop on Massachusetts Avenue at Purity Supreme. |
| Route 47 | Layover/stop on Massachusetts Avenue east of Purity Supreme |
| Route 64 | Layover/stop in bus berths north of Green Street |
| Route 70 and 70A | Layover/stop on Magazine Street just before Green Street
70A would no longer use Massachusetts Avenue |
| Route 83 | Layover/stop in bus berths north of Green Street |
| Route 91 | Layover/stop in bus berths north of Green Street |

Space Management and Usage

Physical improvements will advance Central Square toward becoming the place that its business-people and users want it to be. How the resulting space is used and managed will, in the long run, be as important as these improvements. While public space management has not been included in the scope of this urban design plan, the designer nonetheless has some recommendations for the consideration of the City and the Central Square Committee.

The new organization of physical space and amenities in the Square will transform it from a standard street and sidewalk arrangement to a more complex balance and interweaving of pedestrian, vehicular and bicyclist space. To the degree possible, visual clues and markers will be built in to tell people how the new space is intended to be used. Some, like the traffic lane marking, will be familiar and easily understood. Others, like sidewalk flares, while not uncommon, are seldom used to the extent proposed here.

Increased traffic enforcement will be required to discourage parking or vehicular standing along the flares. The same enforcement will be needed for those who would double park or unload in the bike lanes. The roadway design will allow the area to function even with some double parking or other violations. However, to support the new design, the area that the ticket writers have to

cover will need to be reduced so that enforcement is more frequent and short time violations are discouraged. Likewise, enhanced enforcement of existing City ordinances prohibiting bicycle riding on sidewalks in retail districts is essential if this plan is to work.

While every effort will be made in the final design to keep maintenance requirements at a reasonable level, new pedestrian amenities will require increased maintenance. There will be new plantings to be maintained, benches and lights to be cleaned and painted and, with increased use, trash receptacles to be more frequently emptied. While the widened sidewalks will allow for increased short-term snow storage, the public space will not function as designed unless snow is removed. The increased enforcement, snow removal and maintenance will increase City costs to support the Central Square Area.

Beyond increased enforcement and maintenance lies the larger challenge of public space management. Shopping centers have been able to compete so successfully with older shopping areas partly because of their access and parking but also because of their management. Unified management can not only provide the mix of stores and services that people want, but also create attractions to draw and entertain shoppers. Some cities like Burlington, Vermont have gone far in creating such management, including maintenance, supported by businesses and the

city; while others like Boston's Downtown Crossing have dealt with specific aspects, such as encouraging and managing street vending.

One key issue for the success of Central Square as a place for people was not able to be finally resolved in the plan for reasons of cost and available space. Public toilets will be provided on a provisional basis with "Port-a-Sans" in Parking Lot 5. Signage will help direct people to existing public facilities in City Hall, at the public library branch on Pearl Street and at the police station. However, a new management entity, working with the City, could find a location and the funds to create a proper public restroom in the Square. If this entity does not come to pass then the City and the Central Square Business Association should seek a joint solution to this vexing but important need.

A joint effort by the City, the Central Square Business Association and the Neighborhood Coalition to create and fund a public space management entity for Central Square could go far toward enhancing the short and long term success of this capital investment in improvements. A dynamic public space management entity, structured and funded to deal with all of these issues and opportunities, and more, would be instrumental in making and keeping Central Square the lively and engaging place that the new physical setting will make possible.

Chapter 4: Site Elements

Introduction

The Urban Design Plan, once the outlines were set, was followed by more detailed schematic design study of the curb alignment, lighting types and locations, signage, shelters, furniture, planting and paving. All of these site elements will require further study in the development and costing of the final design. Initial recommendations which have been reviewed by the Committee and the City are presented in this chapter, together with the criteria on which final design and selections will be based.

Lighting

New lighting for Central Square is intended to address several key issues and help realize the vision of the Square as a thriving commercial area where pedestrians, bicyclists and commercial traffic all share the space. The new lighting should meet the following criteria:

- Deliver an overall light intensity at least as high as current levels, with increased uniformity and no areas of threatening shadow, using a minimum of lamp types.
- Use pedestrian scale fixtures (14' high) that mitigate the tree conflict for more even

sidewalk lighting and serve as visible light sources in the pedestrian zone, adding greatly to the sense of welcome and security.

- Use roadway scale fixtures (35' - 45' high) at crossings to assure adequate roadway lighting levels, provide more concentrated light at intersections and help define the "rooms" between crossings.
 - Arrange the lighting fixtures in simple consistent patterns that visually reinforce the logic of the layout of sidewalks, roadways and intersections and which support, wherever possible, other functions (such as traffic signals and signs) in order to minimize the number of poles used in the square.
 - Add feature lighting for buildings and/or areas that would significantly contribute to the image of Central Square, including City Hall and the new Bishop Allen Walk.
- To meet these criteria the plan recommends:
- 1) In general, high pressure sodium (hereafter HPS) has a warmer appeal than that of metal halide (hereafter MH), although its orange cast obscures some colors, especially the green of foliage. MH renders colors more accurately but can feel harsh and "cold" and is more expensive to maintain. HPS will be used for the pedestrian lighting, where the warmth is especially desired, and MH for the roadway lighting, which will render the foliage green. The resultant blend of the two will give generally improved color along the sidewalks and facades.
 - 2) 150 watt HPS pedestrian fixtures will be located approximately 60' on center, generally in opposed pairs across the street. They will be located between the existing trees, at the outer edge of the concrete walkway portion of the sidewalk. Thus, there will be no tree shadows. Intended mounting height for the luminaires is 14'.
 - 3) 400 watt MH roadway fixtures will be located in opposed pairs at the crosswalks, close to the sidewalk line, with the intended luminaire height at 40'.
 - 4) The poles at crosswalks will provide an excellent vantage for the mounting of large banners of seasonal and/or Square-wide significance.
 - 5) The Massachusetts/Prospect/Western/River intersection will have "L" pairs of roadway fixtures on a single pole at each "corner", forming a square and raising the light levels beyond the new average. Pedestrian fixtures will highlight Carl Barron plaza.

Massachusetts Avenue therefore will be illuminated by a combination of roadway fixtures at the crosswalks and pedestrian lighting down the sidewalks, all typical as described above. Design lighting levels for the sidewalks are for a minimum of 1 Foot candle (Fc), with an average of 3 Fc. Design lighting levels for the crosswalks are for a minimum of 3 Fc, with an average of 5 Fc. Design lighting levels for the roadway other than at crosswalks are for a minimum of .1 Fc, with an average of 2.5 Fc.

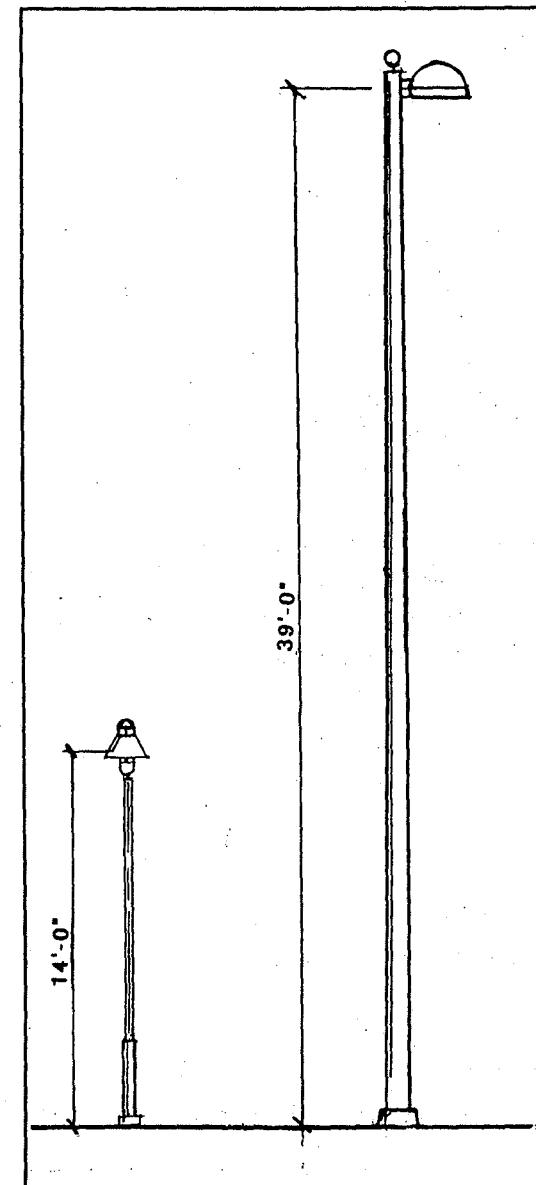
Side streets will be illuminated by pedestrian fixtures in a staggered arrangement.

Photometrics are under study to determine if raising the luminaires slightly will improve the uniformity. Design lighting levels for the sidewalks are for a minimum of 1 Fc, with an average of 3 Fc.

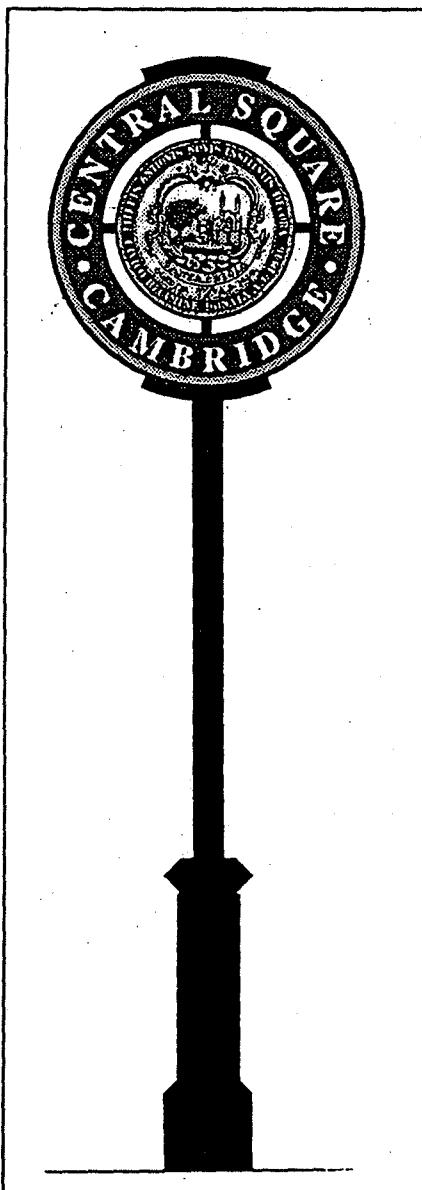
Parking lots will be illuminated primarily by roadway type fixtures on 25' poles, mounted at the perimeters, lighting inward to minimize intrusion for residents and incorporating house-side shields as well. Pedestrian fixtures will be located at all entrances and at any significant walking paths.

Feature lighting is proposed for City Hall, the Bishop Allen Walk and the new park at Lafayette Place, which will collectively add significantly to the character and importance of the Central Square district.

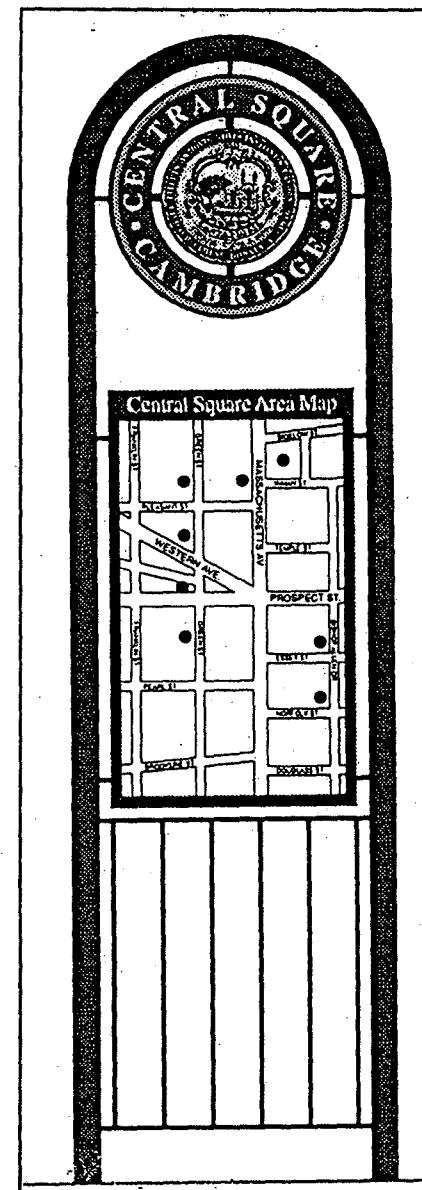
Specific luminaire samples have been reviewed by all parties and continue to be under consideration within the guidelines as described above. They are graphically represented here, but without manufacturer specific information.



Left: Pedestrian Lightpole, Right: Roadway Light



Identity Marker



Pedestrian Marker

Public Signage

The recommended Central Square Public Signage program consists of a relatively simple system of signs—few in number and focused on graphic clarity. The redesign of traffic directional signs and signs to control curbside usage are part of this program and will be integrated into the overall public signage system.

The traffic control signs must follow the federal Manual on Uniform Traffic Control Devices. The proposed system, however, will make every effort to:

- Reduce the cacophony of messages and sign clutter for traffic control and regulation and determine the minimum number of signs required to aid traffic flow and help ensure pedestrian safety.
- In so far as possible, integrate warning and regulatory signs at street corners with traffic lights, or street lighting poles to minimize visual clutter.

For curbside usage signs, the final design will explore new graphic layouts combining parking regulation, taxi stand, bus stop, handicap messages, etc., into an integrated design format—as illustrated in principle in this report.

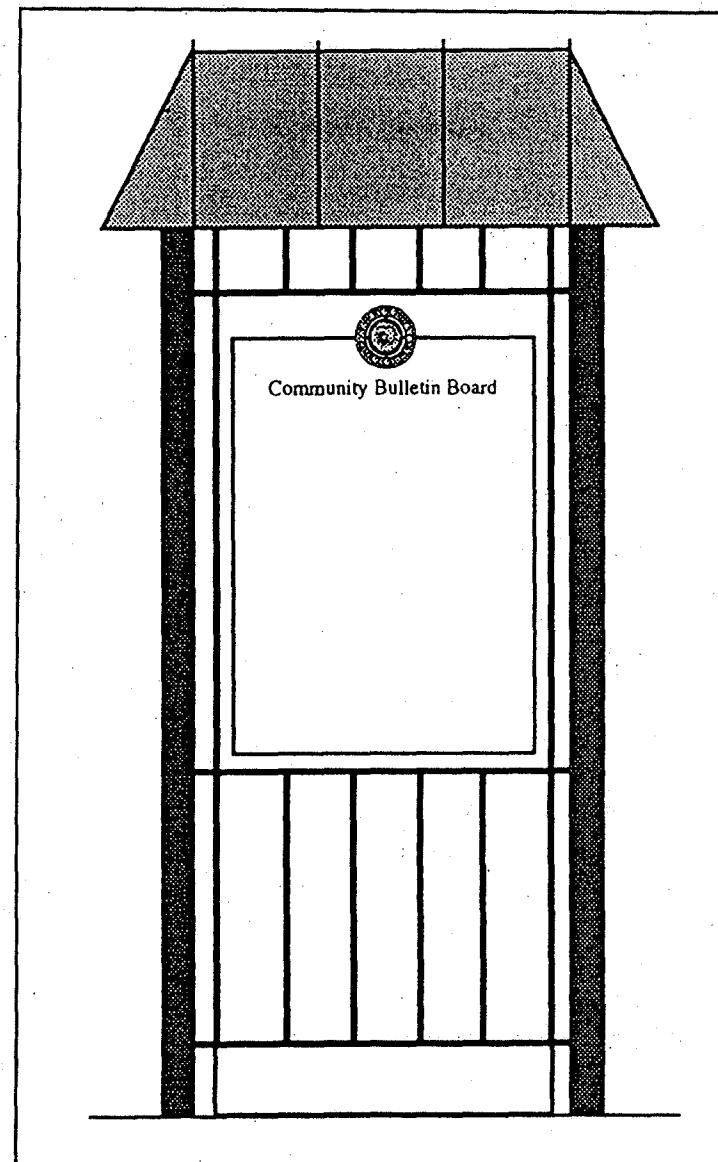
Traffic directional signs should include only the most important destinations: e.g. Boston (Beacon Hill), Boston (Back Bay), Harvard, MIT, the Mass Pike, Storrow Drive, etc. Parking trail-blazer signs and parking lot identification are an integral part of the directional signage system.

The nodal points of the City of Cambridge are its "squares". These squares are important orientation points for both pedestrian and automobile traffic and should be appropriately identified. The system includes a Central Square identity marker to be used at Carl Barron Plaza and, potentially, at the two Massachusetts Avenue gateways: Lafayette Square and the Civic area.

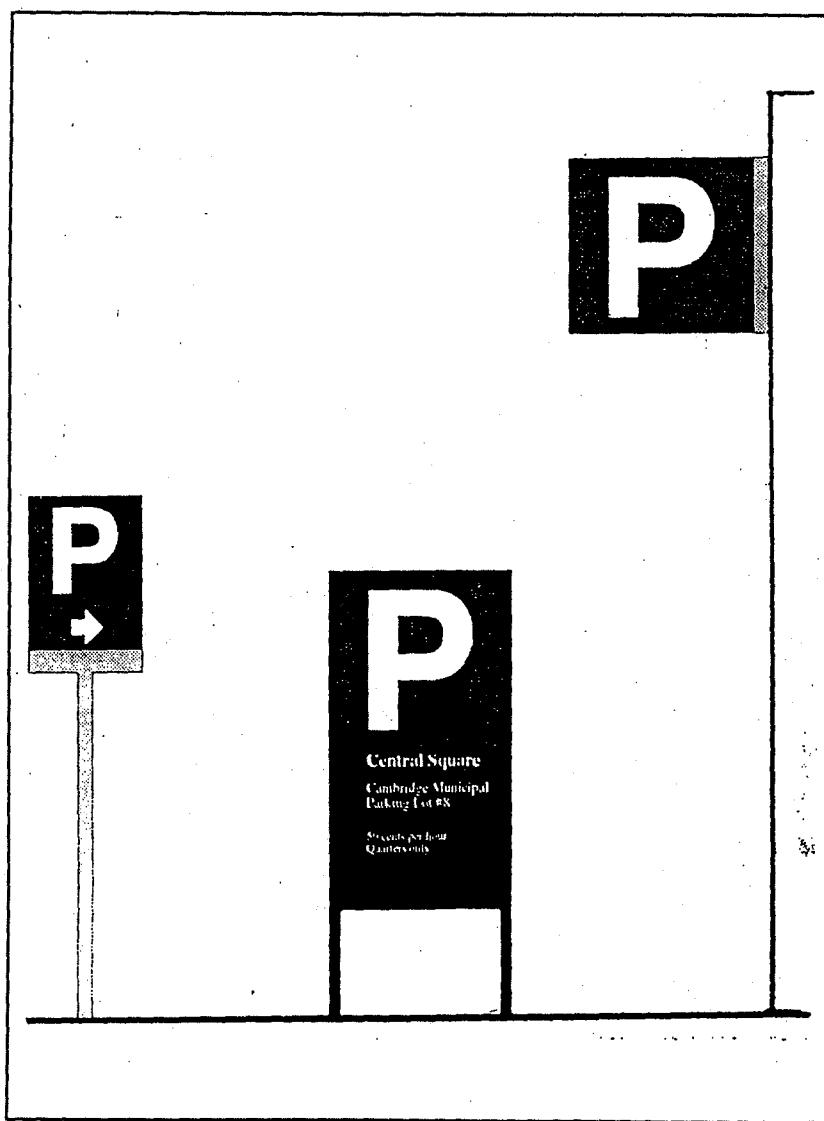
For pedestrian signage the plan recommends:

- A map locating places of interest and services (toilets, police) and, possibly, a changing business directory.
- A community bulletin board for the posting of messages of community interest
- Historic markers for a few key locations

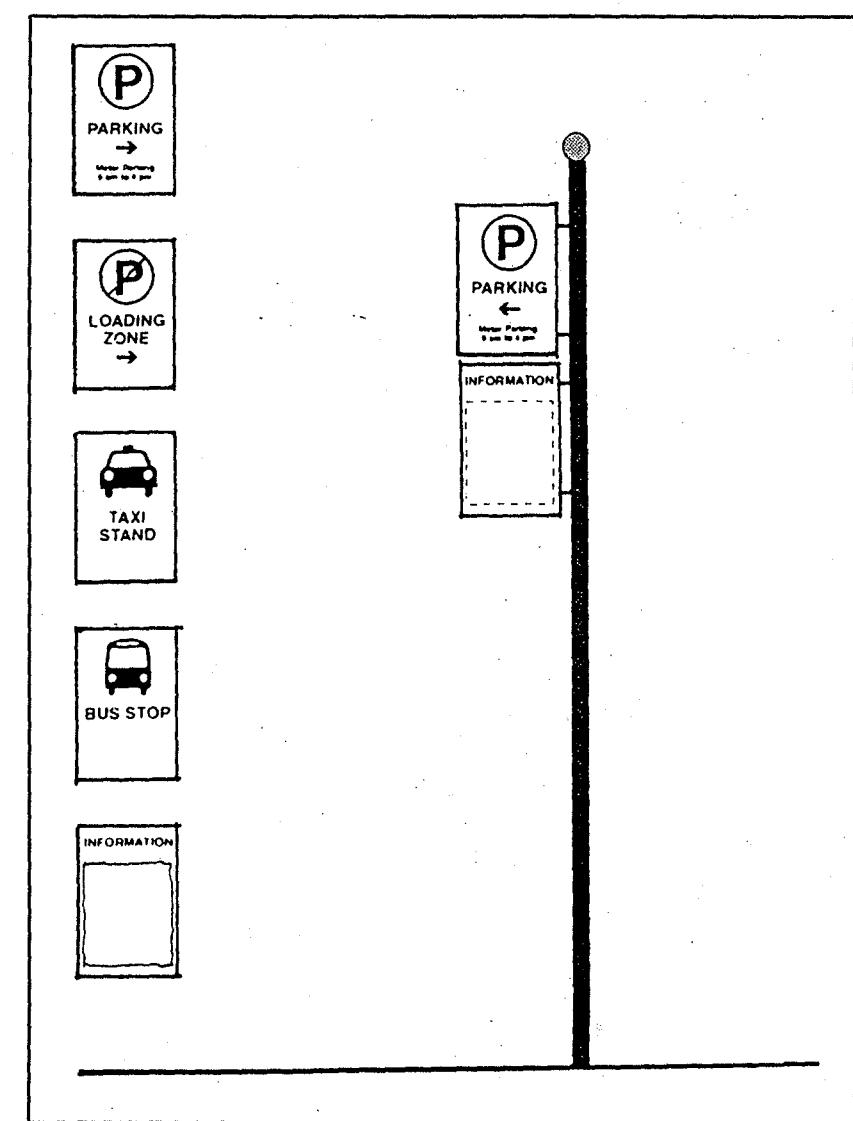
For the Farmers' Market, the proposed sign will act as a permanent identification marker and can advertise market tenants, and market days and times.



Pedestrian Information Posting



Parking Lot Signs

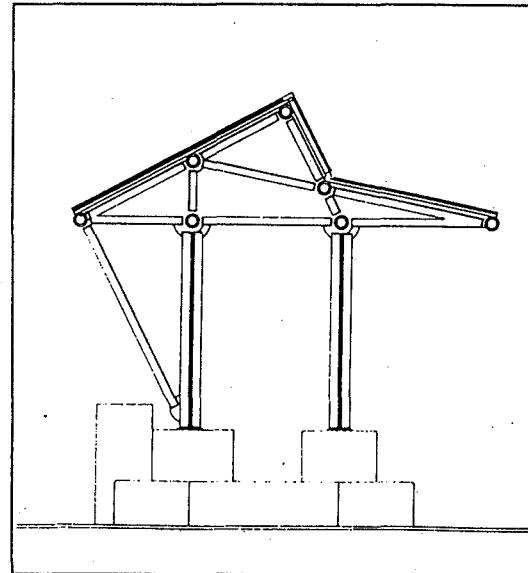


Regulatory Signs

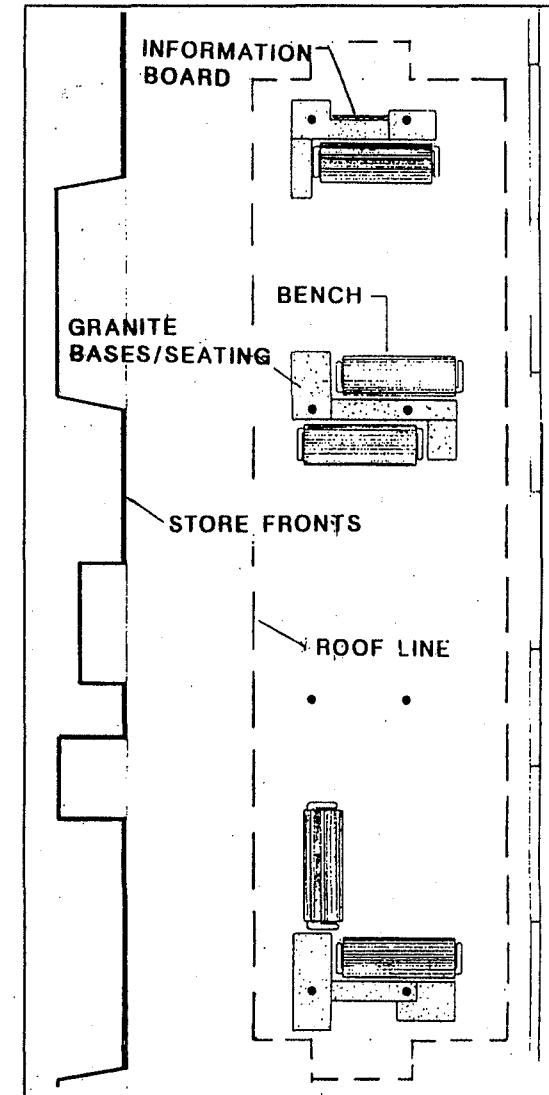
Shelters

One component of the streetscape on Massachusetts Avenue will be the introduction of new shelter structures. These will have a variety of purposes. The design and materials used for the construction of all new shelters will be compatible with existing MBTA structures and with the overhead shelter in Bishop Allen Walk. New waiting shelters will be located at the corner of Essex Street and directly across the Street near Purity Supreme, which is the major bus stop. Along with the additional sidewalk width, the new bus shelters will accommodate the large numbers of people who wait here for public transportation. These structures will provide sheltered seating within a protective setting of large granite blocks.

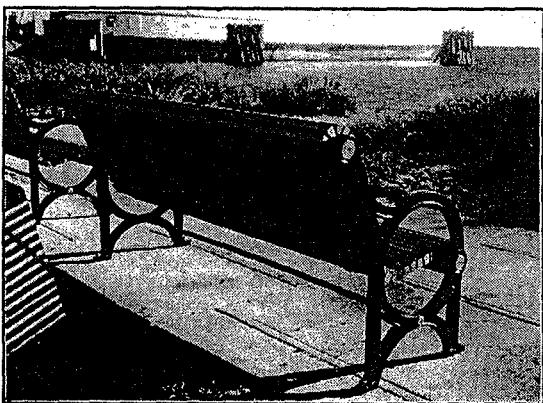
In addition to bus shelters, the Master Plan incorporates several new structures including an information kiosk adjacent to Carl Barron Plaza and the steel and glass structure which runs along the length of Bishop Allen Walk. Similar design features will be incorporated in all the new shelters to help create a continuity of site elements throughout the Square. All other streetscape elements, such as benches, lighting and signage will also match the character of the shelters to create an exciting vocabulary of features to enhance the physical character of Central Square.



Section through proposed bus shelter



Plan of shelter with benches and granite blocks.



Proposed Central Square Bench

Furniture

One of the most evident changes in Central Square will be the introduction of benches along Massachusetts Avenue, in Carl Barron Plaza and at the new bus shelters. Currently, due to the restricted width of the sidewalks along Massachusetts Avenue, benches could not be comfortably placed. The new design for the widened buffer zone will provide the opportunity for benches at right angles to the pedestrian and traffic flow, creating comfortable seating areas.

It is important to organize benches in such a way that they are user friendly. Benches that are placed alone and oriented parallel to the flow of pedestrian traffic are not usually successful. It is better to locate benches in pairs and to have them

face each other to create a social environment for sitting and relaxing.

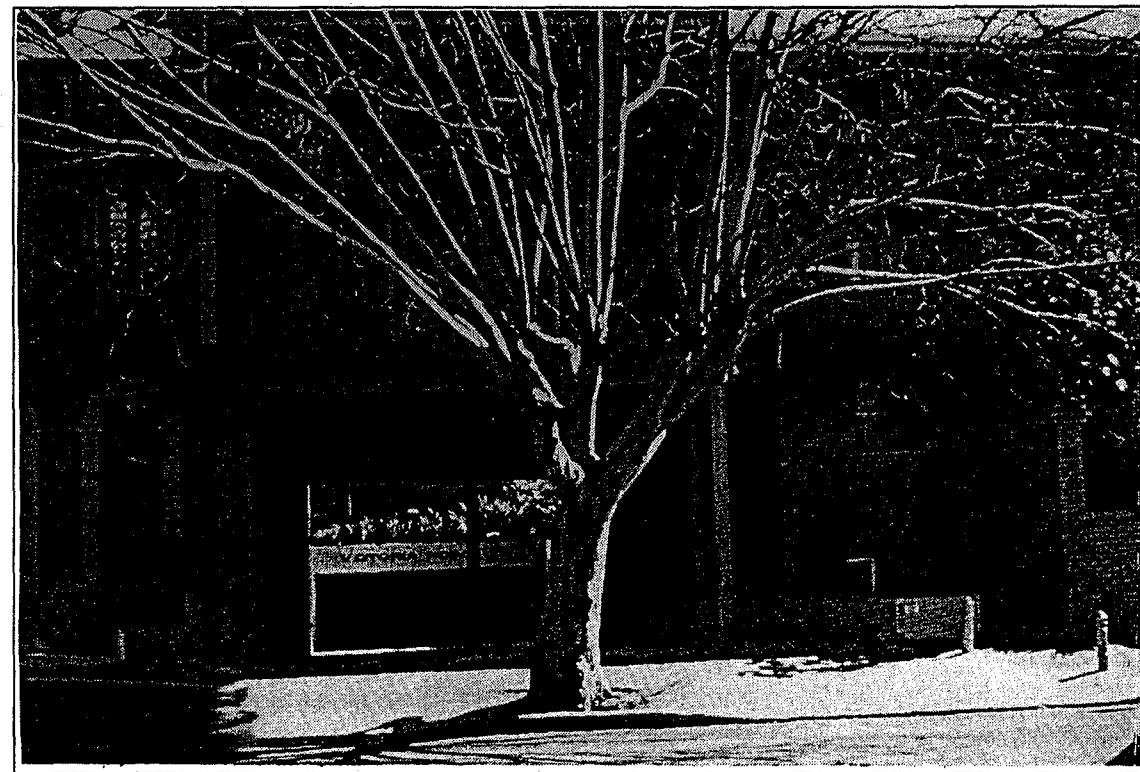
The design character of benches should be consistent with the character of the other site elements, such as lighting and trash receptacles. Materials of the bench should be strong and durable to withstand the urban conditions of Central Square. The bench supports should be steel and the seats themselves wood for comfortable all-season sitting. They should be six feet long for two to sit comfortably and all should have backs.

Other site furnishings should be organized and placed in an efficient and attractive manner. Items such as mailboxes, newspaper boxes, telephones and drinking fountains should be placed so as not to interfere with the flow of pedestrian traffic, yet be handy. Elevated concrete pads or granite bases for such items can also act to create a vocabulary of design materials and provide a strong foundation for attachment to the ground. Bicycle racks will be provided in Central Square in much greater numbers than are currently available. Many of these will be provided by the City standard post and ring, integrated with the parking meters.

Planting and Planters

An important goal of the design has been to introduce more attractive plant material into the urban environment of Central Square. The intent is to not only use the most appropriate plants and the best quality but also to provide the best possible growing conditions. The planting design will use the latest construction techniques for planting both street trees and also shrubs and perennials in raised planters. Critical planting support systems will include irrigation, drainage material, quality planting soil and compaction preventing paving systems. These improvements should also create a healthier environment for existing trees. The planting in Central Square must be done in such a way that trees and shrubs have the opportunity to thrive in this harsh urban environment.

The selected street trees will have to be incorporated into the framework of the existing plantings currently on Massachusetts Avenue. The plan calls for a columnar variety of street tree which will be located closest to the street and between the existing trees, which have an overall branching habit spherical in form. The existing trees, while not all thriving, do provide some shade and visual relief to Massachusetts Avenue. A program should be implemented to replace these trees over time as they die. A more appropriate species of tree will be selected, better

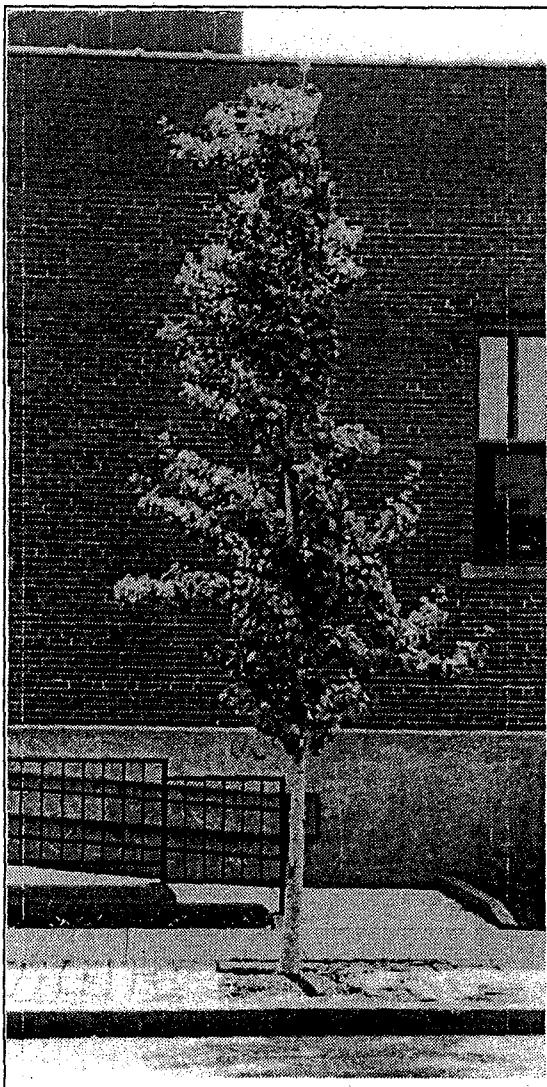


Potential Crossing Shade Tree: Sycamore

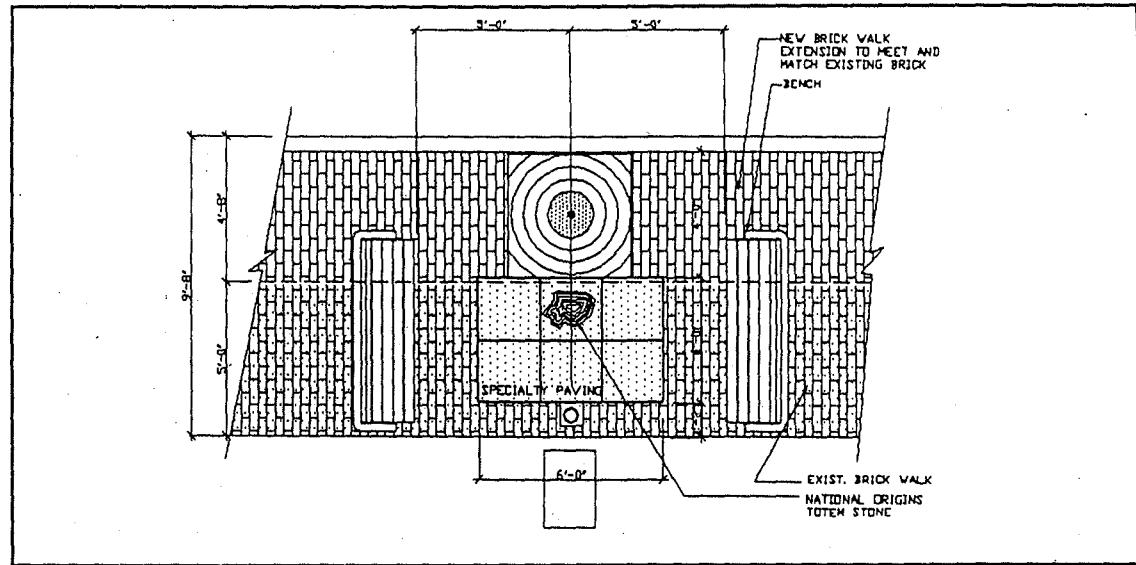
adaptable to urban conditions but providing the same spherical shape as the existing trees.

Planters should be constructed to provide the best opportunity for shrubs and perennials to thrive in the Square. Planters should be designed with irrigation and good drainage. Abundant planting soil should be provided for both street trees and

raised planters. Unlike traditional five foot by five foot pits for tree plantings, the new street trees should be planted in linear trenches which provide better opportunity for root growth. A paving system must be developed to span over the trench for street trees.



Example of smaller columnar tree proposed between existing trees at sidewalks: Ginkgo.



Plan of bench cluster with bluestone "rug"

Paving

Brick pavers will be the predominant system in the improvements for Central Square. The current brick pattern in the five foot band between the concrete sidewalk and the roadway is laid out in a running bond, perpendicular to the flow of sidewalk pedestrian traffic. The new area of sidewalk along each side of Massachusetts Avenue should be designed in the same running bond brick pattern, using matching bricks.

Sitting areas will be located within this new area. Bluestone "rugs" will be set between the face-to-face paired benches. Together with the pedestrian

light and columnar tree, this will help create an eddy of rest in the flow of people and cars. There may also be a special stone, marked with an engraved image, to celebrate the participation of different cultural groups in the life of Central Square.

If budget allows, special paving may also be located within the flared section of the sidewalks and can help to define these mini-plazas as special places. Crosswalks will be marked by "zebra" striping with, perhaps, special pavers in between.

APPENDIX A: SITE ANALYSIS

Appendix A: Site Analysis

The Condition of Public Space

While Central Square is a dynamic social mixture of people of differing cultures, the constraints of public space throughout the Square do not support full enjoyment of this environment. The scale and character of most physical features are oriented to vehicular traffic and use, rather than to pedestrians.

Many existing sidewalks seem narrow in relation to the volumes of pedestrians and they do not provide a good buffer from traffic. The roadway itself is wider than necessary for the volume of traffic. Crosswalks are long (seventy feet) and are not always well marked. This distance, combined with signal waiting times, encourages dangerous jaywalking. Cyclists are not accommodated and often use the sidewalks. Open space, such as Carl Barron Plaza, has not been designed to provide relief and delight for pedestrians. Lighting is oriented to roads rather than walkways. Signage is currently disorganized and does not provide significant orientation information for either pedestrians or bicyclists.

Sidewalks and Streetscape

Current sidewalks in much of Central Square consist of nine or fourteen foot scored concrete store-front walkways and five foot brick paved

buffer zones adjacent to the parking lanes. The sidewalk on the north side of Massachusetts Avenue has the wider storefront walkways. On the South side the walkway ranges from nine to ten feet in width. In the central area, where the subway station was recently reconstructed, the sidewalks are brick surfaced from storefront to curb. Within this zone, there is a choke point for pedestrians on the South side of Massachusetts Avenue in the area around Purity Supreme and the adjacent bus stop.

The typical buffer zones include trees and roadway lights, which provide a somewhat regular rhythm. The existing trees have not done well in the harsh urban environment, they are not irrigated and have not been adequately maintained. The numerous signs, trash receptacles, traffic signal poles, parking meters, newspaper boxes, mailboxes and subway kiosks and shelters, and the barrel planters, all without much apparent organization, contribute to the feeling of a chaotic public realm, dominated by traffic. There is little existing opportunity to provide comfortably located pedestrian amenities such as benches.

Lighting

The lighting in Central Square creates a harsh, highway quality that favors vehicular traffic over pedestrians and bicycles. The starkly functional lighting, mounted at a high "vehicular" level,

does nothing to comfort pedestrians and bicyclists. The shadows, generated by luminaires that are all higher than tree canopies, create a sense of threat from pools of darkness within the otherwise bright, even lighting, making the Square feel underlit.

The entire length of Massachusetts Avenue in the Square is in fact adequately lit from a measured perspective. Levels range from 0.25 foot-candles to 12 foot-candles (hereafter Fc), although along the main stretch of Massachusetts Avenue the range is more typically 2.5 Fc to 9 Fc, in the roadway, with highs around 14 Fc at the Prospect Street intersection.

The street lighting fixtures in the area are all high pressure sodium (hereafter HPS), but there is a mixture of drop lens cobrahead fixtures and flat lens cutoff cobraheads. There is some logic and consistency to the use of these two types of fixtures, but much irregularity as well. They are not drastically different in appearance. Street lighting fixtures are arranged in opposed pairs along Massachusetts Avenue 60 feet on center, and in more broadly spaced staggered patterns down River Street and Western Avenue. Along the latter, levels are lower (0.25 to 8 Fc, averaging 1 to 2 Fc) and much less even. Side streets are much less highly illuminated, but except for the few areas where trees are a problem, they are adequately lit.

Definition of the River Street/Western Avenue juncture as it hits Massachusetts Avenue is lacking, nor is there any sense of a boundary to the square or of arrival from any approach. There are no well-illuminated landmarks that could contribute to a sense of place or of arrival.

Public Signage

Currently, public signage for traffic regulation is poorly designed and mounted, often in surprising quantities on separate poles and on lighting and traffic control poles. Pedestrian information is missing altogether.

There are hundreds of public messages within the study area, most of them telling drivers what they cannot do. An inventory of signs on Massachusetts Avenue, between Bigelow Street and Columbia Street, indicates many more than are needed. Some of the sign faces have five and more message components. Within the immediate vicinity of the Essex Street and Bishop Allen Drive intersection there are more than twenty individual traffic control or parking signs.

The number and redundancy of public signs adds visual clutter to the streetscape. Some signs are hard to understand. Others are virtually invisible. Many of the signs may have lost their effectiveness due to the difficulty of seeing them in all the visual competition. The Traffic, Parking and Transportation Department has

worked closely with the designers to analyze what signs are really necessary and to improve the clarity, appearance and placement of signs.

Commercial Signage/Store Fronts

The commercial nature of Central Square is based largely upon an eclectic collection of small businesses - some visible, others not so visible. The vast majority of these businesses have chosen a Central Square location primarily because of affordable rents. There are few places in the Boston area that offer affordable rents and a lively urban environment.

While not part of the scope of this effort, commercial signage could be seen as *unrealized potential* for the visual enrichment of the Square, rather than as a problem to be ignored or to be controlled by restrictive zoning.

Over the past several years, the steady growth of small restaurants, coffee shops and specialty stores has lead to the clean-up of a number of store and restaurant fronts in Central Square. Many of these facade improvements have made significant improvement, while others have fallen short of their potential of giving greater visual life and character to the Square.

In addition, some older commercial retail establishments display signs that are somewhat crude and out-of-scale with the signs of

neighboring stores and the streetscape in general (e.g. Pill's Hardware and CVS). Such signs are simply harsh and visually offensive in any environment, and they clash with the architectural and retail character of the streetscape.

These issues are not well addressed by restrictive zoning and "design standards" meant to clean-up commercial signage. Such an approach could destroy the genuine diversity and vital visual character of the commercial streetscape. Nor would a "graphic gentrification" program, as in Harvard Square, with its low-key approach to signage, or the slick and artificial gaiety of typical shopping mall graphics, be appropriate for Central Square.

Interesting and eclectic signs, window displays and the use of colorful canopies along with tables and sandwich boards on the sidewalk can add wit and visual flavor to the streetscape, as well as being appropriate to the business mix of the Square. A management entity for Central Square could work with owners to improve the quality and clarity of visual communication without suppressing its exuberance.

APPENDIX B: TRAFFIC ANALYSIS

Appendix B: Traffic Analysis

Existing Conditions

An extensive transportation data collection and analysis program was performed during fall 1994 in order to determine and evaluate alternative design concepts for Central Square. The study area encompassed Massachusetts Avenue between Clinton Street and Lafayette Square, with northerly extensions to Bishop Allen Drive and southerly extensions to Green and Franklin Streets. The traffic and transportation groups which use the Square and were studied include (1) pedestrians, (2) parkers, (3) truck loading, (4) MBTA buses, (5) bicycles, (6) taxis, and (7) vehicle traffic (automobiles and trucks). A summary of findings is as follows:

Pedestrians. Although there are 10 marked crosswalks across Massachusetts Avenue, over 40 percent of pedestrians cross at mid-block locations. This is especially prevalent between Clinton Street and Prospect Street. The highest pedestrian activity occurs at Massachusetts Avenue/Prospect Street/River Street, with a maximum of nearly 1,600 pedestrians during the peak 4:30 to 5:30 p.m. hour. Pedestrian activity along Massachusetts Avenue is also high. For the 12-hour period 7:00 a.m. to 7:00 p.m., nearly 14,000 pedestrians use the Massachusetts Avenue sidewalks, with a peak of 1,630 persons from 1:00 to 2:00 p.m.

Overall, Massachusetts Avenue is not designed to be conducive for safe pedestrian crossing. There is an insufficient number of crosswalks and many are poorly marked, particularly paving stone crosswalks which have poor visibility. In addition, at signalized intersections, lengthy cycle times require pedestrians to wait (often in excess of 75 seconds) and crossing intervals are too short.

Parkers. The 82 spaces on Massachusetts Avenue are heavily utilized, with an average mid-day occupancy exceeding 90 percent. Nearly 80 percent of these spaces have a metered one-hour time limit restriction. The meter fee is 50 cents per hour. Parking on the side streets, amounting to 63 spaces, has a mid-day utilization of approximately 80 percent. Nearly all of these metered spaces are restricted to two-hour parking. Approximately 470 municipal public spaces are located in five lots and the Green Street garage. Off-street parking is heavily utilized along Green Street; considerable reserve capacity exists in the lots on Bishop Allen Drive. Overall, Central Square provides sufficient parking within reasonable walking distances to meet existing demands. However, in high demand areas along Massachusetts Avenue, there is little or no reserve.

Truck Loading. There are four designated loading areas serving Central Square: on the north side of Massachusetts Avenue at Inman Street, between Essex and Norfolk and on

Main Street at Lafayette Square, on the south side of Massachusetts Avenue east of Pearl Street. Illegal truck loading activity occasionally occurs adjacent to the parking lane, as well as on the south side of Massachusetts Avenue in the block between River and Pearl Streets. The presence of double-parked trucks is a significant impediment to traffic flow and also creates hazards for crossing pedestrians by blocking visibility between pedestrians and moving vehicles.

MBTA Buses. MBTA bus routes in Central Square are depicted in Figure 1. There are seven bus routes, of which all but Route 1 have their terminus and layover within the Square. The layover activity is focused at the designated zone on Magazine Street at Green Street. There is also a layover around the corner on Green Street. The layover for Route 70 is on Massachusetts Avenue in front of Purity Square. In general, the bus system operates efficiently within Central Square. Principal exceptions are (1) the occasionally extensive layovers in the Purity Supreme area which, together with stopping buses and truck loading, results in vehicles extending into the travel lane and (2) the conflicts between westbound buses at Prospect Street and automobiles turning right onto Prospect Street.

Bicycles. There is a significant amount of bicycle traffic on Massachusetts Avenue through Central Square. During the 12-hour period 7:00 a.m. to 7:00 p.m., nearly 1,600 bicyclists use the corridor,

Future Background Traffic Growth Not Related to the Immediate Area.

Existing traffic volumes on Massachusetts Avenue were compared with 1985 volumes as given in the *Draft Environmental Impact Report (DEIR) University Park* (March 1986). The data indicates that there has been no significant change in traffic volume during the morning or afternoon peak hours from 1985 to 1994.

Nevertheless, as a conservative methodology and to reflect average traffic growth rates for arterials in other urbanized parts of the Boston metropolitan area, a background traffic growth factor of 10 percent has been applied to the existing volumes.

Future Traffic Growth Related to Development in the Immediate Area.

The development project which will predominantly influence traffic growth in the immediate area is University Park.

Based on information provided by the Cambridge Community Development Department (Memorandum by C. Woodbury to B. Pell, December 9, 1994), the University Park project could develop, in addition to existing space, another 252 residential units (including 77 units pending a building permit) and approximately 1.51 million square feet of nonresidential space. There is also a current vacancy of 36,000 square feet of existing space. The new non-residential

space may include a hotel (range of 200-250 rooms), 100,000 square feet retail space, and a cinema (1,200 seats).

The Traffic Mitigation Agreement caps the two-way afternoon peak hour trips generated at 1,700. The current development at University Park (148 residential units and $311,000 \pm$ square feet non-residential space) represents approximately 20 percent of total allowed development. As a conservative approach, this development had been equated to 10 percent of the associated 1,700 trip generation. Thus an additional 1,530 trips (1,700-170) could be generated by the University Park development.

The University Park *DEIR* predicts that approximately 17 percent of the development traffic may travel on Massachusetts Avenue to and from the west during the critical afternoon peak hour. This is equivalent to a volume of 208 westbound vehicles and 52 eastbound vehicles through Central Square.

Modifications to Other Streets Affecting Traffic Volumes on Massachusetts Avenue. There are two proposed roadway projects, both located in this area of Cambridge, which could affect the distribution of traffic volumes on Massachusetts Avenue. They are (1) Lafayette Square reconstruction, with direct connection of Main Street to Sidney Street and (2) one-way through street pairing of Sidney Street

(southbound) and Waverly/Landsdowne Streets (northbound). Both of these projects may affect the street route to/from Massachusetts Avenue and may shift turning traffic volumes to different intersections. The initial phase of the Central Square improvements assumes that these projects will not be in place.

Table 4 summarizes the three significant volume components which comprise the future design hour volume on Massachusetts Avenue in Central Square.

Note: Volumes are during critical afternoon peak hour.

Comparison of the total traffic projections for each direction of Massachusetts Avenue with a desirable service volume of 830 vehicles per lane per hour based on procedures adapted from the *Highway Capacity Manual* (Transportation Research Board, 1985) indicates that:

Eastbound Massachusetts Avenue should be designed with one through travel lane.

Westbound Massachusetts Avenue should be designed with two through travel lanes.

Two additional points are noted:

Currently, a significant volume of peak period traffic (250 to 300 vehicles per hour) turns left from westbound Massachusetts Avenue at Pearl

and safer allocation of space to accommodate the distinct operating characteristics of significant user groups. The general approach has been to analyze the minimum desirable lane requirements for motorized traffic and to then reassign the remaining width for other users.

The present Massachusetts Avenue cross section varies between two and five travel lanes. An analysis was performed to determine the peak hourly traffic volume demand in each direction of Massachusetts Avenue for a future design year. This volume will be the sum of four volume components:

1. Existing (1994)
2. Future background traffic growth not related to the immediate area
3. Future traffic growth related to development in the immediate area
4. Modifications to other streets affecting traffic volumes on Massachusetts Avenue

Existing (1994). Traffic volumes were counted on Massachusetts Avenue at Prospect Street and on Main Street during October and November 1994. The data indicates that during the highest volume (afternoon) weekday commuter hour, Massachusetts Avenue carries approximately 800 to 850 vehicles in the westbound direction and between 580 and 720 vehicles in the eastbound direction.

Table 3 Intersection Traffic: Massachusetts Avenue at River and Prospect Streets

Direction	Movement	AM Peak (8:00-9:00 a.m.)		PM Peak (4:45-5:45 p.m.)	
		Total Vehicles	Trucks	Total Vehicles	Trucks
Eastbound Massachusetts Avenue	Through	446	--	495	--
	Right	43	2	36	--
Westbound Massachusetts Avenue	Through	336	12	639	11
	Right	162	3	197	1
Northbound River Street	Through	606	1	865	2
	Right	261	10	229	7
Southbound Prospect Street	Through	403	3	403	--
	Right	43	--	51	--
TOTALS¹		2,354	32	2,927	21

1 Includes left turns (illegal), under 10 vehicles per hour

Table 4 Traffic Volume — Massachusetts Avenue

	Existing Traffic	Background Non-local Growth Trips	University Park Trips	Total Traffic
Eastbound	580	58	52	690
Westbound	830	83	208	1,121

Note: Volumes are during critical afternoon peak hour.

Inman Street, Temple Street and , when it is completed, at Lafayette Square. Crosswalks will have a width of 15 feet on Massachusetts Avenue and 10 feet on cross streets.

Traffic signals will be coordinated in conjunction with the city's master control system. A reduction in cycle length is proposed from 120 seconds to 90 seconds. This will enable an increase in the number of opportunities to cross Massachusetts Avenue from 30 per hour to 40 per hour. Signal timing will be modified so that pedestrian waiting time to cross Massachusetts Avenue is no greater than approximately 60 seconds (an improvement from 75 seconds presently). In addition, the following signal phasing change is recommended:

Inman Street/Pleasant Street. The present signal phasing enables a very short interval to cross Massachusetts Avenue, on a single crosswalk. The recommended phasing will provide (1) Massachusetts Avenue through, both directions (2) Massachusetts Avenue westbound, left turn only, and (3) Inman Street, right and left turns. A new crosswalk will be added on the west side of the intersection. Pedestrians will cross Massachusetts Avenue concurrently with the westbound left turn phase.

Proposed timings for the five Massachusetts Avenue signals have been determined for the morning and afternoon peak traffic demand periods. A "lag" left turn phasing is provided at

Inman and Main Streets. A "lead" left turn phasing is provided at Essex Street. The traffic signals at Brookline and Prospect Streets are two-phase with no left turn phases. The arterial progression program demonstrates "green band" widths ranging between 25 and 35 seconds, which represents good progression for traffic in both directions of Massachusetts Avenue.

Street. Thus, continuing west of this intersection the through volume on Massachusetts Avenue will decrease to approximately 850 vehicles, which is near the threshold warranting only one through travel lane.

The above recommendation pertains to the number of *through* travel lanes on Massachusetts Avenue. Additional vehicle *turning* lanes are required at the intersections at Pearl Street, Essex Street, Pleasant Street, and Prospect Street (right turn lanes).

Based on the volume of trucks and relative speed of through and turning traffic on Massachusetts Avenue, it is recommended that through lanes have a width of 11 feet and turning lanes have a width of 10.5 feet.

With these through lane and width parameters established, the remaining roadway width was analyzed in terms of providing for the needs of other users. On-street parking will generally be maintained and can be safely accommodated within a width of 7.5 feet.

As noted in the Existing Conditions findings, Appendix A, there is significant truck loading activity along Massachusetts Avenue, which occasionally occurs adjacent to the parking lane and blocks one travel lane. With the Master Plan's proposed reduction in the number of travel lanes, it is essential that sufficient street width be

provided to accommodate these trucks so that moving traffic is not forced around stopped trucks and into the opposing travel lane.

The proposed design acknowledges that this double-parked truck loading, albeit illegal, will continue to occur. For segments of Massachusetts Avenue where one travel lane is warranted, a lane width of 19 feet is proposed between the centerline and the parking lane. This width will permit safe passage of moving traffic around loading trucks.

There was much discussion about the most appropriate design for bicycle facilities in Central Square. Cambridge is unique in the Boston area in terms of the high percentage of commuter trips which occur by bicycle. The bicycle data collected for this study confirms the major use of Massachusetts Avenue as a bicycle travel route.

Alternative designs were evaluated for Massachusetts Avenue with and without specifically designated bicycle lanes. After considerable deliberation, the proposed Master Plan includes designated bicycle lanes for each direction of Massachusetts Avenue. These lanes are justified on Massachusetts Avenue for the following principal reasons:

1. Bicycle activity will be focused in separate lanes which do not conflict with or impede motor vehicle traffic and will offer riders a safer

alternative to illegally riding on sidewalks, threatening pedestrians.

2. With the busy array of transportation uses within Central Square, bicycle lanes will make other users aware of their presence, thereby reducing potential conflicts.
3. By enhancing provision for safe travel and acknowledging the needs of bicyclists, bicycle use will be promoted.

4. The provision of bicycle lanes on Massachusetts Avenue conforms with city roadway design guidelines and is consistent with bicycle lanes proposed on adjacent segments of Massachusetts Avenue.

In conformance with national design guidelines for on-street bicycle lanes, they will be located between the parking and travel lanes (or adjacent to the curb where parking is prohibited).

Proposed Design: Pedestrian Crosswalks

The Master Plan design significantly improves the pedestrian environment by the provision of widened sidewalks, reduced street crossing width, wider and better delineated crosswalks, and more frequent crossing intervals at traffic signals. The Master Plan increases the number of crosswalks on Massachusetts Avenue from 10 to 13. The new crosswalk locations are provided at

averaging over 130 bicyclists per hour. Wrong-way travel against traffic on Massachusetts Avenue accounts for between 11 and 15 percent. During this same 12-hour period, approximately 235 bicyclists have been recorded riding on the sidewalk, which is prohibited by City ordinance. Overall, the current environment is poor for bicyclists using Massachusetts Avenue through Central Square. This is principally due to bicycle conflicts with motor vehicles and pedestrians as a result of inadequate delineation of street uses.

Taxis. There are 14 taxi spaces on Massachusetts Avenue in Central Square; 9 in the westbound direction and 5 in the eastbound direction. Two of these spaces are available for nighttime use only. Occupancy of the 12 daytime spaces ranges from 9 to 11 taxis. In general, there is adequate provision for taxi activity in Central Square.

Vehicle Traffic. Massachusetts Avenue has a daily traffic volume in excess of 21,000 vehicles on weekdays and as high as 25,000 vehicles on Saturday. Peak flow occurs on weekday afternoons, totaling approximately 1,400 vehicles in both travel directions. Daily and peak hour volumes for Massachusetts Avenue and cross streets are given in Table 1. Traffic growth in Central Square during the period 1980 to 1994 has averaged under one percent annually. Truck volumes on Massachusetts Avenue represent approximately 4 percent of total traffic and are summarized in Table 2. Nearly 3,000 vehicles

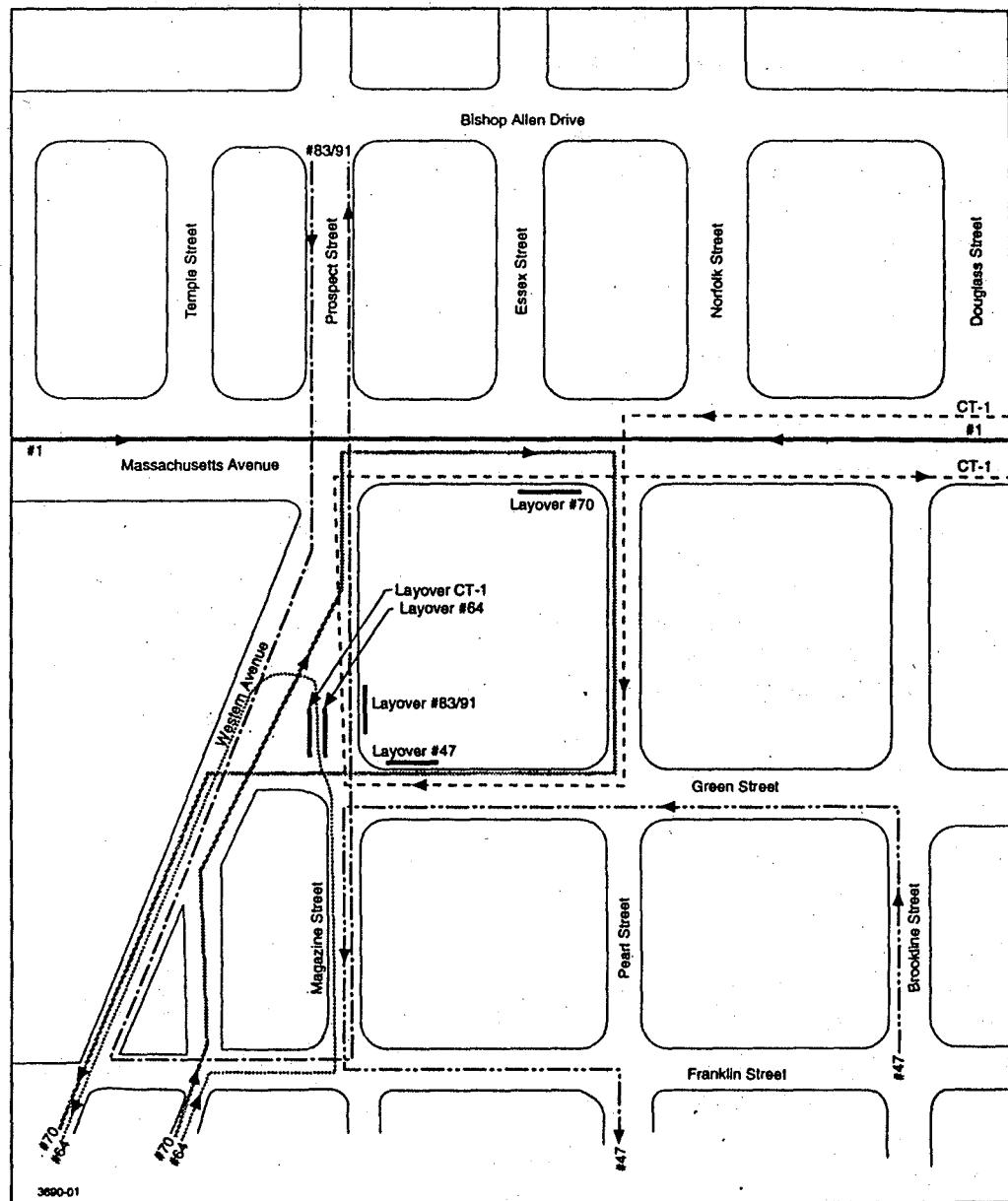


Figure 1: Existing Bus Service. Courtesy Rizzo Assoc.

Table 1 Traffic Volume Data

Location	Daily Traffic		Weekday Peak Hour Traffic					
	Weekday	Saturday	Am Peak Hour			PM Peak Hour		
			Hour (a.m.)	Volume	K ¹	Hour (p.m.)	Volume	K
Massachusetts Avenue, east of Sidney Street	18,780	20,310	8-9	1,000	5.3	5-6	1,310	7.0
Massachusetts Avenue, east of Prospect Street	21,900	25,050	9-10	1,210	5.5	5-6	1,480	6.8
Massachusetts Avenue, east of Bigelow Street	18,130	19,920	8-9	1,040	5.7	5-6	1,310	7.2
Main Street, north of Columbia Street	8,870	7,850	9-10	580	6.5	5-6	620	7.0
Prospect Street, north of Bishop Allen Drive	23,400	24,310	7-8	1,400	6.0	4-5	1,700	7.3
River Street, south of Auburn Street	15,040	14,130	9-10	1,020	6.8	5-6	1,190	7.9
Magazine Street, south of Auburn Street	3,880	3,590	8-9	330	8.5	5-6	300	7.7
Inman Street, north of Bishop Allen Drive	6,090	5,010	8-9	580	9.5	5-6	490	8.0
Pleasant Street, north of Franklin Street	6,460	5,740	8-9	510	7.9	5-6	470	7.3
Pearl Street, north of Auburn Street	4,810	4,180	8-9	340	7.4	5-6	410	8.9
Brookline Street, south of Auburn Street	7,830	6,760	8-9	580	7.4	5-6	670	8.6

¹ K = % of daily traffic

Note: Volumes rounded to nearest 10 vehicles

Table 2 Truck Traffic Volumes

Location	Westbound Traffic			Eastbound Traffic			Total Traffic		
	Total Vehicle s	Truck s	%	Total Vehicle s	Truck s	%	Total Vehicle s	Truck s	%
Massachusetts Avenue, east of Sidney Street	12,078	436	3.6	8,529	318	3.7	20,607	752	3.7
Massachusetts Avenue, east of Bigelow Street	8,419	302	3.6	8,456	371	4.4	16,875	673	4.0
Main Street at Bishop Allen Drive	3,922	349	8.9	4,286	432	10.1	8,208	781	9.5

travel through the intersection of Massachusetts Avenue, River Street, and Prospect Street during the afternoon commuter hour. Peak hour volumes at this intersection by each directional movement are given in Table 3 for the peak weekday morning and afternoon commuter hours.

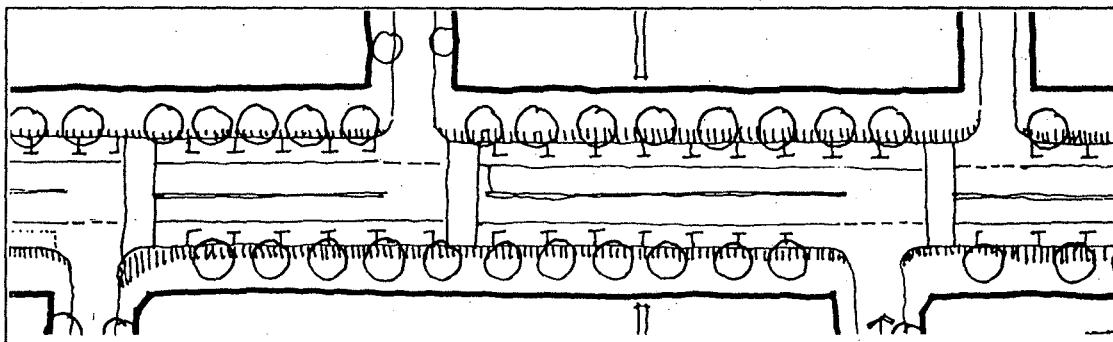
Traffic Signals

There are five intersection traffic signals on Massachusetts Avenue, located at Inman/Pleasant Streets, Prospect/River Streets, Essex Street, Brookline Street, and Main Street. Traffic signals operate with long cycles between 110 and 120 seconds, which results in high waiting times for pedestrians.

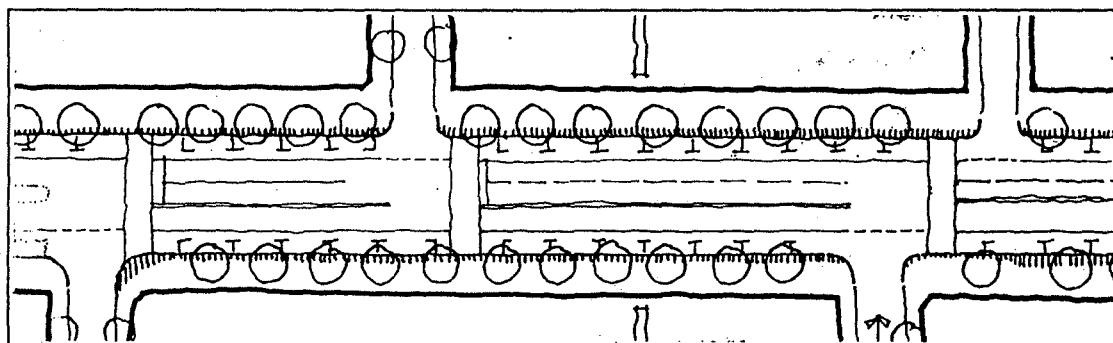
In summary, the Massachusetts Avenue corridor is intensively occupied on a daily basis by a number of different user groups, whose operating characteristics and needs are often dissimilar. The current design generally provides an inadequate response to serving these users in an efficient and safe manner. However, the corridor has sufficient width to enable modified allocation and better organization to achieve a significantly enhanced operation.

Proposed Design: Massachusetts Avenue Cross Section

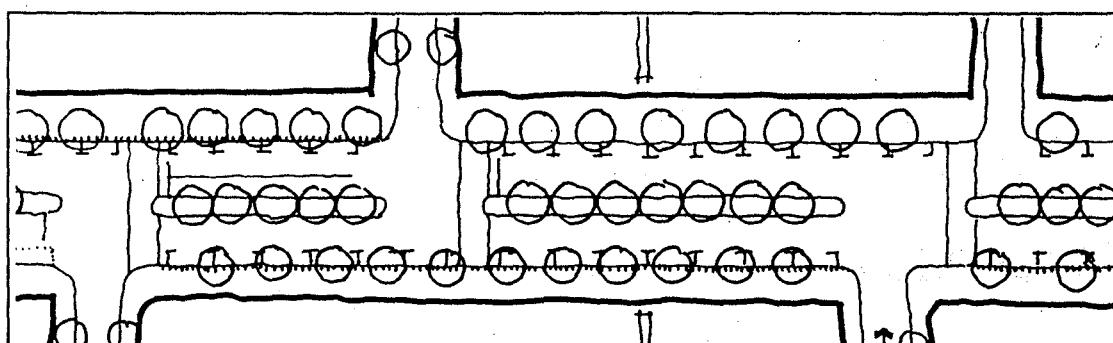
The objective of the redesign of the Massachusetts Avenue travelway is to provide a more efficient



Concept Diagram 1: typical plan condition



Concept Diagram 2: typical plan condition



Concept Diagram 3: typical plan condition

Appendix C: Options Considered

Process

The schematic design plan for Central Square, which is highlighted in this report, was the result of a process which consisted of several stages of design development. Each of these stages included public review, comment and modification. This process has been very successful and has enabled the design team to create a dynamic urban design plan which incorporates productive comments and criticisms from every public review.

Three Concept Diagrams

The initial design process followed site analysis and reconnaissance. The resulting three diagrams were refined over a period of time, with the help of both City agencies and the Central Square Committee. The three concept diagrams consisted of a two-lane solution which provided maximum sidewalk widening, a three lane solution which provided some sidewalk widening and a median solution which proposed a planting zone down the center of Massachusetts Avenue, with one lane of traffic each way and a small amount of sidewalk widening.

APPENDIX C: OPTIONS CONSIDERED

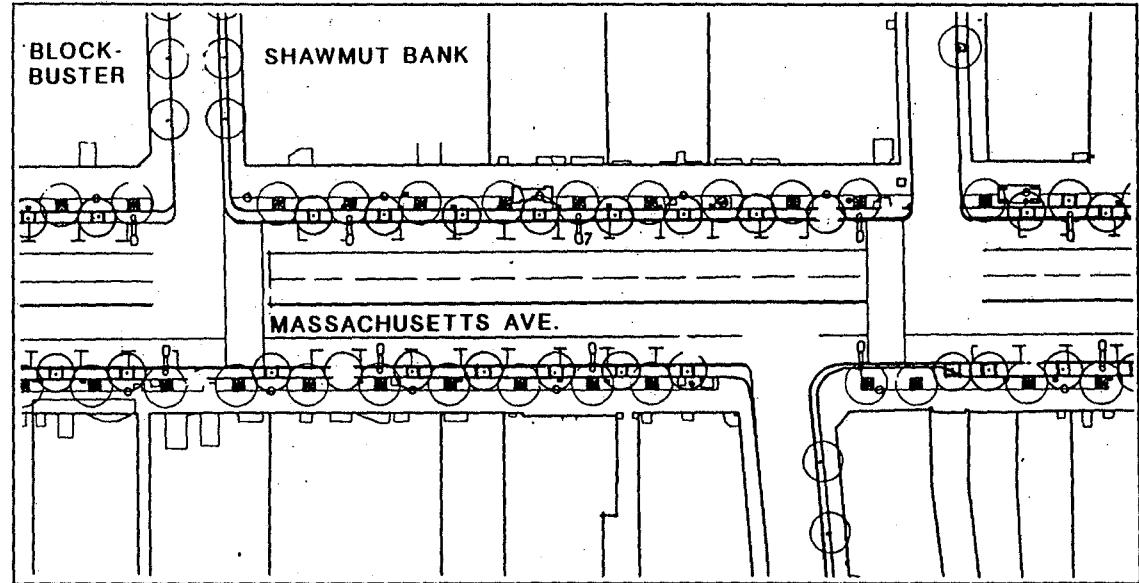
APPENDIX D: MASTER PLAN DRAWING

Two Design Schemes

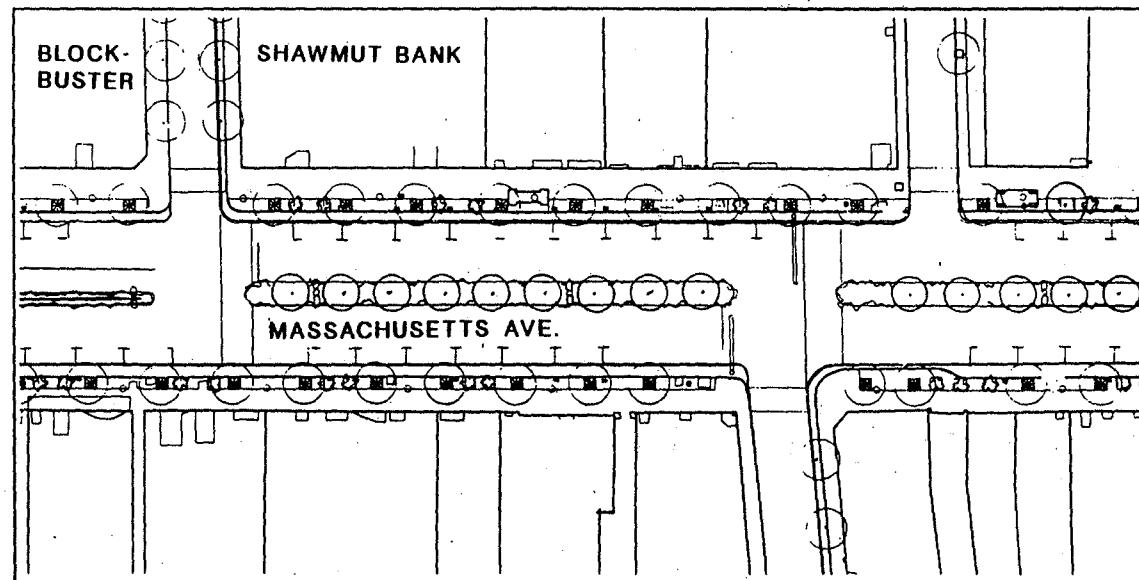
From these three, two were selected for further study. Scheme One suggests a plan which incorporates three lanes of through traffic and approximately five feet of additional sidewalk width on both the north and south sides of Massachusetts Avenue. Scheme Two further defines the median concept and incorporates tree plantings and approximately three feet of sidewalk widening on both sides of Massachusetts Avenue. After further study, it has been determined that a median could be incorporated into Scheme One at a later date, if traffic volumes, after completion of proposed Sidney and Waverly Street improvements, allow for an additional reduction to one lane west bound on Massachusetts Avenue.

Urban Design Plan

The major development from these preliminary schemes has been the introduction of flared sidewalk sections at pedestrian crossings. This makes crossing easier and creates a sequence of smaller scale "rooms" along Massachusetts Avenue rather than the previously emphasized boulevard effect.



Scheme 1: Typical plan condition



Scheme 2: Typical plan condition

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