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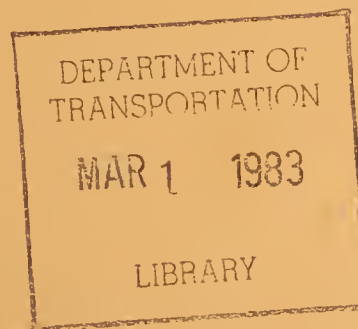
U.S. Department  
of Transportation

**Urban Mass  
Transportation  
Administration**

UMTA-MA-06-0049-82-3  
DOT-TSC-UMTA-82-21

# **Downtown Crossing: Auto Restricted Zone in Boston**

**Final Report  
July 1982**



**UMTA/TSC Project Evaluation Series  
Service and Management Demonstrations Program**

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15. Supplementary Notes *Under contract to:		US Department of Transportation Research and Special Programs Administration Transportation Systems Center Cambridge, MA 02142			
16. Abstract <p>The Downtown Crossing auto restricted zone, implemented in 1978, involved the elimination of all auto traffic from a zone of twelve blocks encompassing six different streets in Boston's central business district. Some of the blocks were pedestrian-only zones, some were originally a transitway and later converted to a pedestrian-only zone, and some remained open only for taxi access. A series of physical improvements, including bricking of the streets and the placement of benches, new lighting and information kiosks, was completed in 1979. Additional aspects of the project included the extension of local bus routes to better serve the auto restricted zone, and extensive promotion activities.</p> <p>The evaluation report examines conditions before, during, and after construction of the Downtown Crossing zone, including organizational arrangements and impacts on traffic movement, transit ridership, goods deliveries, pedestrian movement, air and noise quality, shopper behavior, and business conditions. The study found that pedestrian activity and store purchases increased following the closing of the streets, although most of the increase was attributable to midday trips by the large number of office workers nearby. There were also clear shifts from auto to transit as a mode of travel for both area employees and other shoppers. Expected increases in traffic congestion on nearby streets did not occur; in fact, there was a decrease in overall traffic volumes in the area due to both the mode shift among area visitors and the diversion of some traffic to streets much further away. Both businesses and pedestrians felt the program was helpful in improving downtown conditions.</p>					
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16. Abstract  The Downtown Crossing project was developed with the specific objective of improving the urban environment of Boston's downtown retail district through the implementation of an auto restricted zone (ARZ). The project involved much more than simply restructuring traffic patterns to reduce the impacts of the automobile. It also included elements to provide better pedestrian facilities, urban design features, and to encourage transit usage. The Downtown Crossing ARZ, implemented in 1978, involved the elimination of all auto traffic from a zone of twelve blocks encompassing six different streets in Boston's central business district. Some of the blocks were pedestrian-only zones, some were originally transitways and later converted to pedestrian-only zones, and some remained open only for taxi access. A series of physical improvements, including bricking of the streets, the placement of benches, new lighting, and information kiosks, was completed in 1979. Additional aspects of the project included the extension of local bus routes to better serve the ARZ promotion activities.  This evaluation report examines conditions before, during, and after construction of the Downtown Crossing zone, including organizational arrangements and impacts on traffic movement, transit ridership, goods deliveries, pedestrian movement, air and noise quality, shopper behavior, and business conditions. The study found that pedestrian activity and store purchases increased following the closing of the streets, although most of the increase was attributable to midday trips by the large number of office workers nearby. There were also clear shifts from auto to transit as a mode of travel for both area employees and other shoppers. Expected increases in traffic congestion on nearby streets did not occur. In fact, there was a decrease in overall traffic volumes in the area due to both the mode shift among area visitors and the diversion of some traffic to streets much further away. Both business and pedestrians felt the program was helpful in improving downtown conditions.					
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## PREFACE

This document was prepared by Cambridge Systematics, Inc. under contract to the Transportation Systems Center of the United States Department of Transportation, as part of the Service and Methods Demonstration Program of the Urban Mass Transportation Administration.

Glen Weisbrod was the Project Manager for the evaluation of project impacts and the development of this report; William Loudon was the Project Manager for the evaluation design and data collection phases, and compiled the project descriptions and history of Chapters 3 and 4. Major contributions to the report were made by Steven Pitschke (Chapter 9), Pamela Reid (Chapter 10), Brian Rittenhouse (Chapters 8 and 9) and Heather Hazard (Chapter 7). James Wojno coordinated data collection, developed the photographic documentation of project impacts, and prepared all of the graphics for this report.

Carla Heaton, the TSC Technical Monitor, played a continuing role in helping guide the evaluation design and analysis. Howard Slavin of TSC and Howard Simkowitz (formerly of TSC) also contributed to the effort. Joseph Goodman was the UMTA project manager of this and other auto-restricted zone demonstrations.

The evaluation benefitted from the enthusiastic assistance of the Boston Redevelopment Authority, the Boston Traffic and Parking Department, the Boston Police Department and the Massachusetts Bay Transportation Authority. During the course of the project, the following people were helpful in contributing information about downtown Boston conditions and the design and operation of Downtown Crossing: Boston Redevelopment Authority--William McGrath, Mathew Coogan, Jane Algmin, Alf Howard, Dennis O'Brien, Kim Robinson, Barry Abramson, Ellen Collins, and Deborah Hanley; Boston Traffic and Parking Department--Emily Lloyd and Sue Clippinger; Massachusetts Bay Transportation Authority--Ron Tober, Nancy Shapiro, John Attanucci, and Rocco Mancini; and the Downtown Crossing Association--Bethany Kendall.

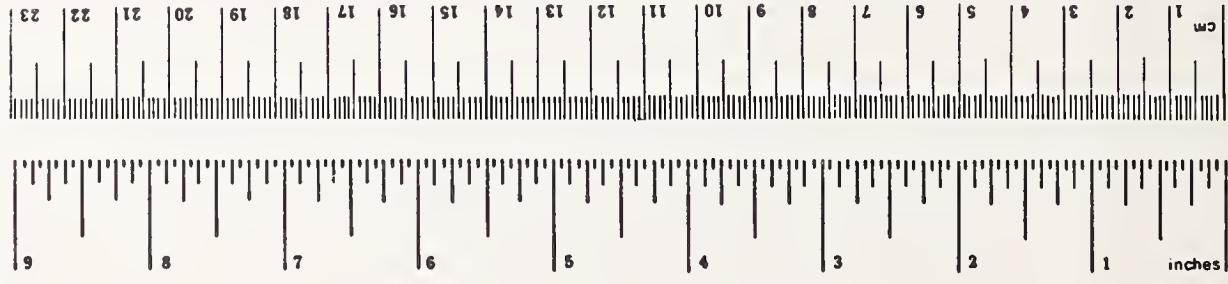
The extensive series of surveys of pedestrians, office workers, bus riders and parkers was conducted by the staff of the Boston Redevelopment Authority. Major recognition goes to Jane Algmin, and William McGrath for their roles in supervising and assisting in the data collection effort. A survey field office was provided by the Retail Trade Board of Boston.

The air and noise quality analysis was performed by Ming Chng and Patricia Gardner of Bolt Beranek and Newman, Inc.

Many Cambridge Systematics staff members contributed to the analysis process during the course of the project and to the preparation of this report. They include: Susan Billings, James Berkovec, William Byrne, Patti Kinnear, Melissa Laube, Philip Madsen, Richard Nestle, Wayne Pecknold, Sarah Sly, Carol Walb and David Welland.



# METRIC CONVERSION FACTORS

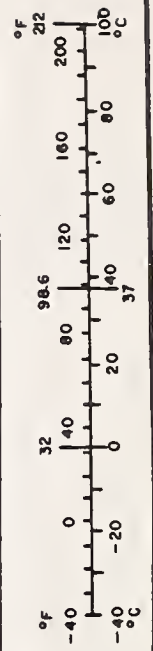


## Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
in ft yd mi	inches feet yards miles	<b>LENGTH</b>		
		2.5	centimeters	cm
		30	centimeters	cm
		0.9	meters	m
1.6	kilometers	km	km	
in <sup>2</sup> ft <sup>2</sup> yd <sup>2</sup> mi <sup>2</sup>	square inches square feet square yards square miles acres	<b>AREA</b>		
		6.5	square centimeters	cm <sup>2</sup>
		0.09	square meters	m <sup>2</sup>
		0.8	square meters	m <sup>2</sup>
		2.6	square kilometers	km <sup>2</sup>
0.4	hectares	ha	ha	
oz lb	ounces pounds short tons (2000 lb)	<b>MASS (weight)</b>		
		28	grams	g
		0.45	kilograms	kg
0.9	tonnes	t	t	
tsp Tbsp fl oz c pt qt gal ft <sup>3</sup> yd <sup>3</sup>	teaspoons tablespoons fluid ounces cups pints quarts gallons cubic feet cubic yards	<b>VOLUME</b>		
		5	milliliters	ml
		15	milliliters	ml
		30	milliliters	ml
		0.24	liters	l
		0.47	liters	l
		0.95	liters	l
		3.8	liters	l
		0.03	cubic meters	m <sup>3</sup>
		0.76	cubic meters	m <sup>3</sup>
°F	Fahrenheit temperature	<b>TEMPERATURE (exact)</b>		
		5/9 (after subtracting 32)	Celsius temperature	°C

## Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
mm cm m km	millimeters centimeters meters kilometers	<b>LENGTH</b>		
		0.04	inches	in
		0.4	inches	in
		3.3	feet	ft
1.1	yards	yd	yd	
0.6	miles	mi	mi	
cm <sup>2</sup> m <sup>2</sup> km <sup>2</sup> ha	square centimeters square meters square kilometers hectares (10,000 m <sup>2</sup> )	<b>AREA</b>		
		0.16	square inches	in <sup>2</sup>
		1.2	square yards	yd <sup>2</sup>
		0.4	square miles	mi <sup>2</sup>
		2.5	acres	acres
g kg t	grams kilograms tonnes (1000 kg)	<b>MASS (weight)</b>		
		0.035	ounces	oz
		2.2	pounds	lb
1.1	short tons	short tons	short tons	
ml l l m <sup>3</sup> m <sup>3</sup>	milliliters liters liters cubic meters cubic meters	<b>VOLUME</b>		
		0.03	fluid ounces	fl oz
		2.1	pints	pt
		1.06	quarts	qt
		0.26	gallons	gal
36	cubic feet	ft <sup>3</sup>		
1.3	cubic yards	yd <sup>3</sup>		
°C	Celsius temperature	<b>TEMPERATURE (exact)</b>		
		9/5 (then add 32)	Fahrenheit temperature	°F



1 in = 2.54 (exactly). For other exact conversion units and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10.286.



## TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY	xiii
1. INTRODUCTION	
1.1 The Auto-Restricted Zone Concept	1-1
1.2 Opportunities and Objectives of the Project	1-5
1.3 Project Design, Operation and History	1-8
1.4 Evaluation Overview	1-13
2. SITE SETTING--BASELINE CONDITIONS	
2.1 The Regional Context of Downtown Boston	2-1
2.2 Employment and Business Characteristics	2-3
2.3 Transportation Characteristics of the Downtown Area	2-13
2.4 Summary of Important Conditions in Downtown Boston	2-20
3. PROJECT DESCRIPTION	
3.1 Overview	3-1
3.2 Transportation Circulation Changes	3-1
3.3 Operational Support and Physical Improvements	3-12
3.4 Organizational Roles	3-17
3.5 Project Costs and Funding	3-21
4. PROJECT EVOLUTION	
4.1 Overview	4-1
4.2 Previous Auto-Restriction and Downtown Improvement Efforts in Boston	4-1
4.3 Development of the Plan for the Boston Auto Restricted Zone Demonstration	4-7
4.4 Implementation and Construction	4-15
4.5 Promotion and Business Organization	4-28
4.6 Post Implementation Changes and Ongoing Development	4-35
4.7 Summary of Events	4-37
4.8 Summary of Findings from the Planning and Implementation Process	4-41

## 5. TRAFFIC AND PARKING IMPACTS

5.1	Description of Road Restrictions	5-1
5.2	Traffic Diversion	5-4
5.3	Peak Period Traffic Congestion	5-10
5.4	Parking Supply Changes	5-13
5.5	Parking Demand Changes	5-18
5.6	Characteristics of Parking Trips	5-22
5.7	Parking and Traffic Enforcement	5-24
5.8	Impacts on Goods Deliveries	5-28
5.9	Impacts on Taxis	5-33
5.10	Summary	5-34

## 6. TRANSIT CHANGES

6.1	Bus Route and Service Modifications	6-1
6.2	Ridership Impacts	6-9
6.3	Travel patterns and User Characteristics	6-12
6.4	Revenue and Cost Impacts	6-16
6.5	User and Business Benefits	6-21
6.6	Summary	6-22

## 7. PHYSICAL ENVIRONMENT FOR PEDESTRIANS

7.1	Issues	7-1
7.2	Pedestrian Circulation	7-1
7.3	Pedestrian Amenities and Street Design	7-3
7.4	Crime	7-10
7.5	Attitudes of Area Users and Merchants	7-14
7.6	Air and Noise Quality	7-16
7.7	Summary	7-28

## 8. BEHAVIOR OF SHOPPERS, EMPLOYEES AND OTHER AREA USERS

8.1	Data Collection and Timing	8-1
8.2	Volume of Visitors and Role of Downtown Employment	8-9
8.3	Mode of Travel	8-19
8.4	Purpose of Visits to Downtown Crossing	8-26
8.5	Frequency and Duration of Visits	8-28
8.6	Walk Trip Length	8-33
8.7	Characteristics of Downtown Pedestrians and Area Employees	8-38
8.8	Shopping and Retail Expenditure Patterns	8-45
8.9	Summary of Survey Findings	8-49

9.	BUSINESS IMPACTS	
9.1	Survey of Business Involvement and Attitudes	9-1
9.2	Impacts on Business Cost, Retail Sales and Business Mix	9-5
9.3	Perceived Impacts on Business and Downtown Conditions	9-12
9.4	Land Values and Redevelopment Impacts	9-17
9.5	Summary	9-22
10.	CONCLUSIONS	
10.1	Auto-Restricted Zone Design and Operations	10-1
10.2	Transportation Impacts	10-4
10.3	Economic Impacts	10-9
10.4	Transferability of Findings	10-9
11.	BIBLIOGRAPHY	11-1
APPENDIX A.	Survey Instruments	A-1
APPENDIX B.	Report of New Technology	B-1

## LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Page</u>
1-1 Auto Restricted Streets	1-10
2-1 Activity Centers in the Downtown Area	2-2
2-2 Population and Employment in Central Boston	2-4
2-3 Distribution of Private Office Space	2-5
2-4 Retail Sales in the Boston CBD (Adjusted for Inflation)	2-7
2-5 New Land Development Projects	2-12
2-6 Traffic Congestion, 1977	2-15
3-1 Traffic Impact Area	3-2
3-2 Streets Affected by Auto Circulation and On-Street Parking Changes	3-3
3-3 Bus Route Extensions	3-5
3-4 Streets with Pedestrian Improvements	3-8
3-5 Delivery Access	3-10
3-6 Taxi Circulation and Stands	3-11
3-7 Washington Street, 1980	3-13
3-8 Summer Street, 1980	3-14
3-9 Winter Street: 1980	3-14
3-10 Filenes Park	3-16
3-11 Boston Five Park	3-16
3-12 Roles of Major Actors in Project Planning and Implementation	3-18
3-13 Organizational Structure and Major Responsibilities	3-19
4-1 Gruen Plan for Pedestrian Malls	4-3
4-2 Gruen Plan for Downtown Improvements	4-4
4-3 BRA 1973 Proposal for Auto Restricted Zone	4-8
4-4 Boston Street Closings--Completed and Planned	4-10
4-5 Consultant Recommendation for Traffic Circulation (Scheme F)	4-13
4-6 The Adopted Traffic Circulation Plan (Scheme G)	4-16
4-7 Washington Street at Winter/Summer Intersection: 1921	4-29
4-8 Washington Street at Winter/Summer Intersection: 1978	4-29
4-9 Washington Street at Winter/Summer Intersection: 1979	4-30
4-10 Washington Street at Winter/Summer Intersection: 1980	4-30



5-1	Patterns of Major Traffic Circulation Before September 1978	5-2
5-2	Patterns of Major Traffic Circulation After September 1978	5-3
5-3	Change in Traffic Volumes: 1978-1980	5-5
5-4	Locations of Streets Referenced in Tables 5-1 and 5-2	5-8
5-5	Change in Travel Time (Morning Peak), 1978-1980	5-12
5-6	Change in Congestion (Evening Peak), 1978-1980	5-14
5-7	On-Street Parking Eliminated	5-16
5-8	Off-Street Parking Facilities	5-17
5-9	Off-Street Facilities in the Parking User Survey	5-20
5-10	On-Street Locations of Returned Parking User Surveys (1980)	5-21
5-11	Number of Vehicles Towed per Month	5-25
5-12	Parking Tickets Issued per Month	5-25
5-13	Franklin Street Entrance Sign	5-27
5-14	Daily Delivery Volumes by Block, 1976	5-29
6-1	Bus Routes: Before September 1977	6-2
6-2	Bus Routes: September 1977-December 1980	6-3
6-3	Bus Loop: September 1977-April 1978	6-6
6-4	Bus Loop: April 1978-December 1980	6-6
7-1	Pedestrian Congestion and Conflict, 1977	7-2
7-2	Sidewalk Activity in Front of Woolworths	7-8
7-3	Information Kiosk	7-8
7-4	Multipurpose Planter	7-8
7-5	Rate of Crimes Against Persons	7-12
7-6	Rate of Thefts from Business Property	7-12
7-7	Rate of Crimes Against Business Property	7-12
7-8	Rate of Illegal Activities	7-13
7-9	Rate of Auto Theft	7-13
7-10	Location of Air Quality and Noise Measurement Sites	7-17

7-11	Frequency Distribution of Hourly CO Concentrations (1978 and 1980)	7-21
7-12	Frequency Distribution of Hourly NO Concentrations (1978 and 1980)	7-23
7-13	Frequency Distribution of Hourly NO <sub>2</sub> Concentrations (1978 and 1980)	7-25
8-1	Location of the Study Area and Pedestrian Interview Sites	8-3
8-2	Location of Employment Survey Sites	8-6
8-3	Daily Volume of Visitors in the Downtown Crossing Area	8-10
8-4	Weekday Pedestrian Volumes at Study Area Boundaries	8-12
8-5	Weekday Pedestrian Volumes by Block	8-13
8-6	Pedestrian Volumes by Time of Day	8-16
8-7	Employment Status of Visitors to Downtown Crossing	8-18
8-8	Mode of Access to the Downtown Crossing Area	8-20
8-9	Mode of Travel to Downtown Boston	8-23
8-10	Purpose of Visits to the Downtown Crossing Area	8-27
8-11	Purpose of Midday and After-Work Trips by Area Employees	8-30
8-12	Distribution of Walk Distances for Trips Ending in the Downtown Crossing Area	8-36
8-13	Home Location of Pedestrians	8-40

## LIST OF TABLES

		<u>Page</u>
2-1	Previous Retail Trends in the CBD, City and SMSA, 1972-1977	2-9
3-1	Summary of Project Funding Sources: 6/78-12/81	3-25
4-1	BRA Downtown Auto Restricted Zone Proposals (1976)	4-11
5-1	Daily Traffic Flow Before and After Implementation of the Auto Restricted Zone	5-7
5-2	Changes in Travel Time (Morning Peak)	5-11
5-3	Utilization of Selected Parking Garages, 1972-1980	5-20
5-4	Delivery Patterns on Streets Affected by Goods Movement Restrictions	5-32
6-1	Bus Routes Serving Downtown Crossing	6-4
6-2	Changes in Bus Passengers Visiting Downtown Crossing	6-10
6-3	Trip Characteristics for Bus Riders Boarding in Downtown Crossing	6-13
6-4	Changes in Travel Characteristics for Bus Riders Boarding in Downtown Crossing	6-14
6-5	Increases in Frequency of Bus Use	6-15
6-6	Previous Mode of Travel for Bus Passengers Travelling More Frequently Since Extension of Bus Routes	6-17
6-7	Age and Income of Bus Riders Boarding in Downtown Crossing	6-17
6-8	Analysis of Changes in Fares Collected	6-18
7-1	Attitudes of Pedestrians Toward project Components (1980)	7-15
7-2	Attitudes of Merchants Toward Project Components (1980)	7-15
7-3	Measured Ambient Air Quality: Comparison of 1978 and 1980	7-19
7-4	Measured Ambient Noise Levels: Comparison of 1978 and 1980	7-26
8-1	Zone of Weekday Store Visits in the Downtown Crossing Area	8-15
8-2	Mode of Travel to Work	8-25
8-3	Prioritized Classification of Purpose Visiting the Downtown Crossing Area	8-29

8-4	Frequency of Visits to the Downtown Crossing Area	8-32
8-5	Walking Distances to Downtown Crossing	8-37
8-6	Household Income Profile of Downtown Crossing Visitors and Area Employees	8-42
8-7	Age Profile of Downtown Crossing Visitors and Area Employees	8-44
8-8	Value of Expenditures in Downtown Crossing	8-48
9-1	Responses to the Business Survey	9-2
9-2	Participation of Area Businesses in Planning and Promotion of Downtown	9-3
9-3	Attitudes of Area Business Towards the Auto-Restricted Zone Project	9-6
9-4	Changes in Costs of Area Businesses Between 1977 and 1979	9-8
9-5	Changes in Sales of Area Businesses Between 1977 and 1979	9-9
9-6	Entrances, Exits and Planned Moves, 1978-1980	9-11
9-7	Perceived Effect of Project on Individual Businesses	9-13
9-8	Perceived Effect of Project Elements on Individual Businesses	9-15
9-9	Perceived Effect of Project on Downtown Conditions	9-16
9-10	Floorspace Rents in Downtown Boston	9-18
9-11	Building Permits Issued in Downtown Area	9-20



## EXECUTIVE SUMMARY

### PROJECT OVERVIEW

The Downtown Crossing project was developed with the specific objective of improving the urban environment of Boston's downtown retail district through the implementation of an auto restricted zone. The project involved much more than simply restructuring traffic patterns to reduce the impacts of the automobile, however; it also included elements to provide better pedestrian facilities and urban design features, and to encourage transit usage.

During the past two decades, over 100 US cities of varying sizes have instituted some form of auto restricted zone. The technique most frequently implemented has been the closure of the main downtown shopping street and its conversion to either a pedestrian mall or a transit mall. The Downtown Crossing project, in the true sense of an auto restricted zone, was an effort to move a step beyond present programs in the US which have tended to be somewhat piecemeal in nature, and address the issues of environmental improvements and traffic restriction in a coordinated and comprehensive way over a major segment of the city center.

The auto restricted zone includes an area of 12-blocks, affecting 6 different streets in the core retail area. Auto traffic was banned on three blocks of the main retail street, Washington Street. This street section was originally a transit mall, but much of it is now a fully pedestrianized zone. Another major retailing street which intersects Washington Street is Winter Street/Summer Street, which was also closed to auto traffic and converted to a pedestrian zone. Auto restrictions were also implemented on sections of four other streets.

The project was planned and implemented in a relatively short time period. The consultant feasibility study and alternatives analysis was conducted as part of the Urban Mass Transportation Administration's Service

and Methods Demonstration (SMD) program, and was completed in February 1977. Within the following year and a half, the final design plan was developed, an implementation strategy was agreed upon, funding was secured and construction for the special bus lanes was completed. The auto restricted zone and transportation circulation policies were officially implemented in September 1978. Physical improvements, such as bricking of the street surfaces and the placement of benches, new lights and other pedestrian amenities were done the next summer and essentially completed by September 1979. Total capital costs were \$3 million, of which slightly over half was funded by FHWA and UMTA, and the rest by the City of Boston. An additional \$2 million of UMTA Service and Methods Demonstration funds paid for non-capital elements including promotion, parking and traffic enforcement, maintenance and new bus operations.

#### PROJECT OBJECTIVES

The primary goals of the auto restricted zone project were to address three classes of problems:

##### 1. Travel

Travel within the central business district was characterized by vehicular congestion on the streets, pedestrian congestion on the sidewalks and a high level of pedestrian/vehicle conflicts. The Downtown Crossing project separated vehicular traffic from the main shopping streets that had high pedestrian volumes, and widened sidewalks on other streets to help create a more safe and pleasant walking environment. Transit usage was encouraged through the addition of bus service circulating within the downtown area. Automobile traffic flow was improved through development of a more direct pattern of primary streets and elimination of on-street parking in the area.

##### 2. Physical Environment

The image of the retail area was unattractive. Much of the area was made unpleasant by crowding, conflict with autos, noise, pollution, and a neglected physical environment. The project sought to attract more people to the area

and to encourage those already there to stay longer. To achieve this, the project included physical improvements such as mini-parks and bench areas, and programs for improved police enforcement, maintenance services and management of activities in the area.

### 3. Economic Revitalization

Together, the transportation system changes and the physical environment improvements were intended to support and expand the market for downtown retail activities, and to add impetus to the preservation, enhancement and revitalization of the downtown area.

#### KEY PROJECT FEATURES

Auto Circulation. Auto traffic was eliminated from a zone of ten contiguous blocks in the core retail area, plus segments of two other nearby streets were also closed. Some of the auto restricted blocks, however, remain open for taxis. The traffic circulation plan also involved the reversal of one-way traffic on several streets, and the elimination of all on-street parking in a large area around the auto restricted zone.

Pedestrian Space. The plan provides increased space for pedestrians on the more congested shopping streets. The pedestrian zones received new brick paving, lighting, plantings, information kiosks and bollards. Benches were also placed on some of the blocks off of Washington Street. There were also major sidewalk widenings on several other streets, and segments of two streets were converted into park space.

Transit Circulation System. For the first two years, six local bus routes and four express bus routes were extended into the Downtown Crossing area, lengthening each of the routes from one-half to one mile in length. A transit priority route pattern was developed, utilizing a combination of exclusive transitways and contra-flow bus lanes to permit the buses to operate primarily on traffic-free routes, and hence, to serve the heart of the retail core with minimal interference from other traffic. The bus route was revised over time, due in part to problems of pedestrian-bus conflicts in the auto restricted zone.



Service Access. Service vehicles have been allowed on all the pedestrian and bus streets before 11 AM with the exception of a one block of Summer Street where there are no delivery requirements. After 2 PM, the streets are open only to time-sensitive goods vehicles, such as the US mail, newspaper deliveries, etc.

Taxi Access. Taxis are allowed access to certain streets all day for pickups and drop-offs, and a number of new taxi stands were provided within the area. Taxis are now also allowed on the other pedestrian zone blocks in the evening.

Signing System. A signing system to orient and inform the motorists of the new rules was implemented as part of the traffic circulation system. A system of pedestrian signs and information kiosks provides publicity and information and helps orient pedestrians to the whereabouts of retail shops, bus stops and taxi stands.

Ongoing Support Elements. The project plan included special funding for: (1) enforcement of parking restrictions and assignment of additional officers at key intersections, (2) upgraded maintenance of the area, (3) programs to promote the area, and (4) a subsidy to cover the operating expenses of ten bus route extensions into the area.

## EVALUATION OF PROJECT DESIGN AND IMPLEMENTATION

### Design and Operation

The Downtown Crossing design is notable in that, in contrast to other pedestrian and transit malls, it involves only a minimal amount of street furniture. While Downtown Crossing features decorative street lights, newly bricked street surfaces, and several mini-parks, there are no trees, no fountains, no bandstands and only a small number of bushes. There are benches on a few sidestreets but none on the main shopping street. The uncluttered design was desired by the merchants so as not to impede pedestrian movement, and is to some extent called for by the relatively narrow nature of the streets and the very high pedestrian volumes there. The success of the Downtown



Crossing project in increasing pedestrian volumes and strengthening retail activity (summarized later) demonstrates that a large amount of street furniture and decoration is not always necessary when there is already a significant base of pedestrian activity taking place.

Use of the middle street space has remained an issue. Curbs were eliminated on Winter and Summer Streets, and pedestrian usage of the middle street space is relatively high. By contrast, relatively fewer pedestrians walk in the center of Washington Street, due in part to the existence of curbs delineating the sidewalk from the street space, the presence of occasional delivery vehicles in the street at various times of the day, and the lack of any benches or street sales to orient pedestrian movement toward the street.

Lastly, enforcement of the auto restricted zone was found to be necessary. With a large number of possible entry points into the auto restricted zone, continuation of a high level of traffic and parking enforcement was required to keep unauthorized vehicles out of the zone and to maintain space reserved for taxis and deliveries.

### Implementation

The project demonstrated the value of an incremental approach to the implementation of an auto restricted zone. Initially, the streets closings, traffic pattern changes, and bus route extensions were implemented without any physical improvement to the area. Bricking of the street and sidewalk areas, and the placement of benches, planters, new lighting and information kiosks did not occur until one year later.

While the delay in physical improvements was not intentional, in retrospect, it helped provide flexibility for changes in the nature of the auto restricted zone. During the first year, one street (Temple Street) was reopened because of merchant dissatisfaction and low levels of pedestrian activity there. Two other blocks (Hawley Street and part of Summer Street) were allowed to function as an "escape valve" for the small number of cars not previously diverted before the auto restricted zone entrance on Franklin Street. Subsequently, two blocks of Washington Street were changed from a transit mall

into a pedestrian mall, ultimately because it was found that bus movements conflicted with the high pedestrian volumes there. The buses were rerouted to a parallel street. Additional subsequent changes included the restoration of loading zones on several peripheral streets and the expansion of goods movement and taxi access to the auto restricted zone in evening hours. The incremental approach to implementation of the auto restricted zone made it possible to demonstrate the value of the auto restrictions to the merchant community before many of the permanent construction changes were made. The flexibility of the City of Boston in modifying the project design over time and the responsiveness of the staff members to merchant problems were critical factors in assuring continued acceptance of the Downtown Crossing project.

#### Institutional Issues

The institutional arrangements and roles of parties affected by an auto restricted zone can have a profound effect on the way in which the project is received by the public and the merchants in the area. Included are issues of project organization and administration, interagency cooperation and arrangements for continuing operation of activities within the zone.

The Downtown Crossing project was planned and implemented in a relatively short time period. While the concept of auto restrictions has been discussed for many years previously, the auto restricted zone officially opened two years after completion of the consultant feasibility study. The rapid process of final design, setting up an implementation strategy, securing funding and constructing the special bus lanes is particularly notable because the project required participation from a wide range of city, regional and state agencies including the Boston Redevelopment Authority, the Boston Department of Traffic and Parking, the Boston Police Department, the Boston Public Works Department, the Massachusetts Bay Transportation Authority, and the Massachusetts Department of Public Works. The successful implementation of the project required considerable organization and administration from the BRA as the lead agency (for most of the project) in coordinating activities of construction, traffic regulation, transit operation, promotion, maintenance, data collection and

evaluation. In particular, there was close cooperation between members of the BRA and the Traffic and Parking Department.

Equally important is the involvement of area merchants in supporting and promoting the auto restricted zone. Promotion was recognized as an integral part of the retail revitalization effort, and funding for promotion activities was provided as part of the UMTA demonstration grant. The city held frequent meetings with the merchants during the planning and implementation stages.

While a special assessment district was recognized to be not politically feasible at the time, it was recognized by both the BRA and many of the merchants that some of the responsibility for the future direction and management of Downtown Crossing would have to be taken up by the private sector. As a step in that direction, the Downtown Crossing Association, a voluntary merchant association, was organized in 1980 with assistance from the City. The association aims to coordinate and arrange activities in Downtown Crossing and act as primary merchant and business community liaison with the city regarding continued operation of the auto restricted zone.

#### Problems Remaining

Surveys of pedestrians and merchants found that both groups were very positive about the Downtown Crossing project, including the street closing and the bricking of the streets. Both groups were negative most about the levels of area maintenance and crime, although even for those subjects most survey respondents were neutral about the importance of these issues. In general, deficiencies in maintenance and trash collection become particularly noticeable in a pedestrian zone. Pickup of trash has remained a problem, due both to a lack of suitable trash receptacles and to an insufficient level of maintenance activity. There were also significant increases in reported crimes against persons, although some of this is attributable to the higher volume of pedestrians on the street and a higher level of enforcement. With increasing constraints on the city budget, future sources of supplemental funding for area maintenance and crime enforcement are uncertain. Another issue was the need for larger signs at entry points into the auto restricted zone.



## FINDINGS ON PROJECT IMPACTS

Whereas previous evaluations of impacts of auto restricted zones have been limited by a lack of comparable pre- and post-project data, the Downtown Crossing evaluation effort included the collection of information on the implementation process and conditions in the study area before implementation (June 1978), during construction (June 1979), and after project completion (June 1980). The data collection included over 11,000 surveys in each of the three years, with separate surveys of pedestrians, area employees, bus riders, parking lot users and merchants. In addition, traffic counts, pedestrian counts, shopper counts and transit passenger counts were made at a total of 120 locations around the project area. The data collection effort also included measurement of air quality and noise levels; inventories of business establishments, floor space area and land values; crime and accident reports; and photographic records.

### Effects on Pedestrian Activity

The primary objective of the Downtown Crossing project was to encourage pedestrian activity and ultimately strengthen the retail economy of the area. Following a historical trend of decreasing patronage of the core retail district, the project clearly succeeded in increasing pedestrian activity levels. The number of pedestrians entering the Downtown Crossing area increased following the restriction of automobile traffic in 1978 and continued to increase even more for the daytime periods following the bricking of the street and placement of pedestrian amenities (in 1979). Only for the evening shopping period was there no continued increase in pedestrian between 1979 and 1980. Overall, the number of visitors increased 11 percent for weekdays and 10 percent for Saturdays.

The increases in pedestrian volumes were not evenly distributed. The northern blocks, which are located closest to the government and financial office districts, had increases in sidewalk volumes exceeding 15 percent, while the southernmost blocks actually experienced decreases in pedestrian volumes. In fact, the largest increase in pedestrian volumes occurred on a



block which had sidewalk widening and restricted vehicular access, rather than on the blocks which were fully bricked and totally pedestrianized. This outcome shows that the location of the block relative to activity generators can be as or more important than the form of auto restriction in determining changes in pedestrian volumes.

The observed increases in pedestrian volumes are to a large extent attributable to the presence of a large office workforce nearby. About 120,000 persons are employed in office buildings within one-half mile of the auto-restricted zone, and another 8,000 are employed in retail stores. While downtown employees accounted for less than half of all weekday visitors, they accounted for nearly two-thirds of the 1978-1980 increase in visitors. This was mostly attributable to increases in visits from an existing employment base, as there was little growth in downtown office employment during this period. Much of the total increase in weekday pedestrian volumes occurred at lunchtime; there was a 17 percent increase in the lunchtime pedestrian volumes between 1978 and 1980, compared to only a 6 percent increase in volume for the rest of the weekday.

The continued increases in pedestrian volumes are especially significant because they have occurred in the face of new competition nearby. The Faneuil Hall Marketplace opened in stages in 1976-1978 (preceding the Downtown Crossing project) and features two hundred restaurants and specialty shops, located within a mile of Downtown Crossing and closer to many of the office buildings. In fact, a survey of selected office buildings located near both retail areas showed a relative decrease in the proportion of midday visits to Downtown Crossing and a relative increase in visits to Faneuil Hall Marketplace. In spite of this trend, total pedestrian volumes and the total number of employees visiting Downtown Crossing continued to rise.

#### Changes in Mode of Travel

In the face of extreme traffic congestion and levels of transit ridership to the area which were declining over 1970-1977, the Downtown Crossing project was successful in contributing to a substantial switch away from use of the automobile on both weekdays and Saturdays.

The auto-restricted zone and associated policies were expected to have a substantial impact on mode of access to the area for several reasons. The auto-restricted zone did make traffic access to the immediate area more circuitous. In addition, the elimination of on-street parking and the shift of parking capacity to locations a few blocks away translated into longer walks from parking facilities to the retail district. There were also substantial extensions of local bus service into the area.

Auto travel always accounted for a relatively small proportion of trips to the Downtown Crossing area. However, the completion of the auto restricted zone was accompanied by dramatic decreases in auto trips, with corresponding increases in the walk trip proportion and a slight overall increase in transit usage on weekdays. The 1978 to 1980 change in the weekday walk and transit mode distributions actually reflect two offsetting trends. For those employed in Boston, there was a continued increase in walk trips relative to other modes of travel, while for those not employed (i.e., housewives, students, out-of-town visitors, etc.), there was a relative increase in transit usage. Both groups had substantial decreases in reliance on the auto.

The observed shift away from auto travel is clearly attributable to far more than just the auto restricted zone. In fact, there was also a clear shift from auto to transit as to the mode-to-work among downtown office workers, although that shift was proportionally smaller than the overall mode shift observed for Downtown Crossing visitors. The mode-to-work shift among the office workers occurred even though the auto restricted zone had only a minor impact on vehicular access to the major office building district, and overall capacity of facilities for long-term parking did not appreciably change between 1978 and 1980. The mode-to-work change as well as some of the mode change for Downtown Crossing visitors is presumably attributable to the dramatic increases in fuel prices in 1979, and possibly also to the local bus circulation improvements, rising parking prices, a freeze on new parking facilities, and the opening of a new rapid transit route extension.

## Traffic, Parking and Goods Delivery

During the planning of the auto-restricted zone, there was serious concern about the extent of expected increases in traffic on nearby streets. All on-street parking was eliminated from the expected diversion routes and new traffic signals were installed to facilitate greater capacity and smoother traffic flow on those streets. In fact, the predicted increases in traffic on nearby parallel streets did not occur, and most of the streets near the zone actually experienced decreases in traffic volumes. Much of the traffic was instead diverted to alternative routes further away. There was a 5 percent overall decrease in volumes in the area around the auto restricted zone in the 1978-1980 period. This traffic decrease is partially attributable to the shifts from auto to transit among both area office workers and other Downtown Crossing visitors, and to auto trips avoiding the entire area.

As a result of the decrease in traffic volumes in the surrounding area, congestion was also relieved. The benefit was greatest for Tremont Street, a major arterial which had no change in traffic volumes but experienced improved traffic flow due to the elimination of intersecting traffic from side streets now subject to auto restriction.

Supporting the finding of an overall decline in auto trips to downtown in general and the Downtown Crossing area in particular, surveys and counts of parkers at selected on- and off-street facilities in 1978 and 1980 showed a 22 percent decrease in vehicles entering between 10 AM and 4 PM. The decrease was particularly sharp for those who had destinations in Downtown Crossing, among whom the number of vehicles parked at the surveyed sites decreased 37 percent and the number of persons coming by auto decreased 29 percent. At the same time, auto occupancy for parkers visiting Downtown Crossing increased among both those travelling to work (from 1.29 to 1.76) and among shoppers (from 1.72 to 1.98). The particularly sharp decrease in Downtown Crossing parkers can be related to the disproportionate reduction in on- and off-street capacity within two blocks of the auto-restricted zone (even though there was little change in total capacity at parking lots and garages), as well as the observed shift toward transit usage among Downtown Crossing visitors.



The reductions in general traffic and elimination of all on-street parking (which previously blocked curbside space for loading) also helped facilitate goods deliveries. Despite initial concerns that the restriction of deliveries to hours before 11 AM and after 6 PM would cause substantial hardship to merchants, most deliverers were able to shift to make earlier deliveries.

#### Bus Service Changes and Impacts

The extension of six local bus routes and four express bus routes into the auto-restricted zone was originally felt to be an integral part of the Downtown Crossing project and an important means of maintaining accessibility in the face of restricted auto access. Attitudes changed over time; buses were moved off of Washington Street after the initial experience of bus-pedestrian conflict on Washington Street convinced many merchants that the street would be better off as a fully-pedestrianized area.

Counts and surveys both indicated that the number of bus riders bound for destinations in Downtown Crossing had increased 26-30 percent following extension of the bus routes. These increases were substantially greater than the 9 percent increase that had originally been forecasted, but over half of the new riders represented trips shifted from other transit lines. Those who shifted from other transit lines enjoyed substantial time and cost savings, as most of them were saved a transfer to the subway. In addition, businesses directly beside the bus stops reported significant gains in shopper volumes. Nevertheless, passengers shifted from other routes meant no additional revenue and those saved a transfer to the subway meant a loss of revenue to the MBTA. As a result, the total increase in revenue to the MBTA system (net of inter-route shifts and transfer losses) amounted to just 5 percent of the cost of the route extensions. On that basis, the MBTA eliminated all of the bus route extensions at the end of 1980, 27 months after they were initiated and 15 months after UMTA's demonstration subsidy ended. (This service was restored in May 1982.)



## Retail Impacts

The Downtown Crossing auto restricted zone covers the major shopping streets which account for most of the sales in the downtown retail district. While Boston's downtown retail district has fared better than many downtown shopping areas, it was showing signs of decline in the 1970's. Downtown retail sales had been declining in constant dollars (controlling for retail price inflation) since the end of World War II, and over the 1972-77 period, it declined 15 percent. While the downtown retail area declined, retail sales over the entire metropolitan area increased 8 percent between 1972 and 1977, after controlling for price inflation.

Results from the pedestrian interview surveys showed that, in contrast to prior trends, the number of purchases in establishments in the Downtown Crossing area increased substantially following initiation of the auto restricted zone and other physical improvements. As a result of both increases in pedestrian volumes and an increase in per-capita purchase rates, the number of total weekday purchases was up 26 percent in 1980, compared to the level in 1978. There was a slight decline in the total amount spent per pedestrian over 1978-1980, which reflects the disproportionate growth in lunchtime pedestrian activity. Overall, the pedestrian surveys indicated that the increase in retail expenditures over 1978-1980 was nearly the same as the Boston-area price inflation for apparel and upkeep goods over the two-year period (12 percent).

The observed changes in weekday establishment visits and retail sales between 1978, 1979 and 1980 indicate a substantial turnaround from the historical trend of accelerating losses. They also support the finding that there was no adverse impact on retail activity during mall construction, and that downtown retail activity has in fact continued to strengthen since implementation of the auto restricted zone and the associated upgrading of the area's image. The lack of any observed adverse impact from the street reconstruction process can be attributed to both the existence of a strong market of nearby downtown employees together with the completion of construction in a relatively short period of time.

Books/records/cards, services, fast food restaurants and other quick stop types of businesses particularly benefitted from the increased foot traffic. Stores located on the streets with physical improvements reported a substantially greater increase in sales than those on other nearby streets.

Since reported costs and sales figures are subject to inflation and fluctuations independent of the downtown improvements, managers of area businesses were asked to evaluate the impact of the Downtown Crossing project on the profitability of their establishment. While most of the businesses (72 percent) had a favorable attitude toward the project's impacts on the downtown image, just 39 percent thought that it actually helped their business. Of the remainder, 46 percent concluded that the project had no effect on their establishment and only 15 percent felt that it had hurt their business.

#### Air and Noise Quality

As expected, there were dramatic reductions in air pollution associated with the Downtown Crossing project. Between 1978 and 1980, maximum carbon monoxide levels fell 67 percent in the auto-restricted zone and 41 percent in an area adjacent to (but outside of) the zone. Despite concerns about nitrogen dioxide from the increased bus service, overall background levels of nitrogen dioxide in the area also decreased. Measured noise levels within the auto-restricted zone also decreased noticeably, as the sound of traffic was replaced by that of people and music.

#### Downtown Development Impacts

Immediate impacts of the project on store space improvements and filling of vacant store space have been negligible. At the same time, there are several very large retail, hotel and apartment developments under construction within the auto-restricted zone. The decisions to proceed with these projects were, however, made before completion of the Downtown Crossing project.

In evaluating the impact of an auto restricted zone or any other downtown improvement project on downtown business investment, it is critical that the distinction between "revitalization projects" and "redevelopment projects" be understood. Commercial revitalization projects, such as pedestrian and transit malls, rely upon improvements in the physical amenity and esthetic image of an area to increase the attraction of currently-existing downtown shopping districts. Depending on the condition of the buildings in the area, a revitalization project may not necessarily call for any immediate corresponding private sector investment in renovations or new construction. This in contrast to commercial redevelopment projects, which are based on new construction or conversion of existing buildings to create commercial activity where it did not previously exist; such projects by their very nature require substantial private sector involvement in developing, filling and promoting the new center.

It is not reasonable to expect that the pedestrianization of a few blocks and the placement of benches and bushes there will in itself dramatically expand retail sales or spur immediate new private investment in downtown commercial expansion. However, when an auto restricted zone is accompanied by other private investment downtown, as is occurring in Boston, it can represent an important contributing factor to an overall program of downtown economic development.

#### IMPLICATIONS FOR OTHER SETTINGS

While substantial increases in pedestrian volumes and a measurable improvement in the retail sales trend have occurred since implementation of the Downtown Crossing project, some other pedestrian and transit malls have experienced little or no such improvements. It must be recognized that the positive impacts observed for the Downtown Crossing Project depended critically on the existence of appropriate conditions in downtown Boston.

A key element of the Boston project which may have aided its success was the nature of the auto restricted zone as a network of streets intended to



link several different activity centers: the Government Center complex and nearby waterfront to the north, the office district to the east, and Boston Common to the west. The concept of an areawide network of auto restricted streets is in contrast to the usual strip form of pedestrian and transit malls.

Downtown Crossing, like other successful downtown auto restricted zones, had a high level of pedestrian activity and a substantial (albeit declining) base of economic activity even before implementation of the auto restricted zone. The presence of a large concentration of office employees nearby, together with the proximity of a number of government offices and entertainment and tourist activities, provided a large base of potential midday visitors to the area. Most of the increase in pedestrian volumes accompanying the Downtown Crossing project was in fact attributable to lunch time trips by area office employees and visits from nearby residential neighborhoods. As with other downtown auto restricted zones, there was little or no increase in the number of visitors coming in from suburban areas.

Another important element in the Downtown Crossing project was the high level of transit service provided into and within the area. With the reduction of auto accessibility to the area, it was essential that a convenient transit service alternative be available. In the case of the Downtown Crossing area, there already was a high level of convenient subway service converging upon the area from all directions. This was initially supplemented by additional local bus service to the area and may soon be supplemented by a downtown area shopper shuttle service. While these services may be helpful, walking and the subway have always been the primary modes of access for the vast majority of Downtown Crossing visitors, which is one reason why the auto restrictions and parking limitations were not a major concern for most visitors to the area.

The positive retail impacts of the project may also be attributable to the generally positive perception of the downtown area as a place where physical improvements and substantial new development was already starting to occur. In this sense, the success of the Downtown Crossing project benefited from the multi-faceted nature of the project. The extensive promotional



program for Downtown Crossing, the improvements in police presence and traffic enforcement, and the improvements in the physical image of the area were important aspects of the project, in addition to the auto restrictions. The Boston experience thus showed that, under appropriate conditions, an auto restricted zone project can be an important activity contributing to the growth of the economy of the central business district.



## 1. INTRODUCTION

### 1.1 THE AUTO RESTRICTED ZONE CONCEPT

#### 1.1.1 Background

In the past three decades, the dominance of the automobile and the associated decentralization of urban activities have become facts of life in metropolitan areas throughout the United States. The residential development of outlying areas and the resulting dilution of the Central Business District (CBD) retail market has led to the migration of business to the suburbs and the consequent deterioration of the CBD economic base.

In recent years, there has been increasing attention directed toward the preservation and enhancement of existing urban centers, and evidence of some shift from further development of outlying areas to more dense development of existing areas. In the case of center city areas, the poor quality of the physical environment is commonly recognized as a serious impediment to potential opportunities for revitalization. The development of an active program to enhance existing attributes and improve the deteriorated image of the center city is clearly a first step in providing the catalytic force required to generate other development programs and actions.

Concurrent with the development of downtown revitalization efforts, concern over environmental issues and energy consumption has challenged the unrestrained role of the automobile in dense urban areas. An increasing amount of redevelopment and new construction of commercial, industrial, and residential areas are now being designed to exclude, restrict, or better manage traffic within specified areas in order to minimize both the incompatibility of traffic with human activities and its effect on the quality of the urban environment.

This evaluation report examines the specific issue of improving the urban environment of Boston's downtown retail district through the implementation of an auto restricted zone. The Downtown Crossing project involved much more than simply restructuring traffic patterns to reduce the impacts of the auto-

mobile, however; it also included elements to provide better pedestrian facilities and urban design features, and to encourage transit usage.

### 1.1.2 Definition

The term "Auto Restricted Zone" (ARZ) refers to a geographic area in which physical or regulatory factors restrict vehicular traffic. The concept of restricting traffic is not new. Traffic has always been subjected to a variety of controls which have, in fact, become increasingly restrictive over time. European cities have made significant advances toward restricting traffic within segments of their urban centers. On a generally more limited scale, the downtown pedestrian and transit malls built in US cities during the last two decades created auto restricted zones. Current interest in an auto restricted zones in urban centers represents an effort to move one step beyond present programs in the US which have tended to be somewhat piecemeal in nature, and address the issues of environmental improvements and traffic restriction in a coordinated and comprehensive way over a major segment of a city center.

The degree of auto restriction which can be instituted in an area varies over a wide range of opportunities, ranging from parking bans up to the total exclusion of autos, and includes (roughly in order of descending restrictiveness):

- 1) permanent closure of all streets
- 2) major street closures with circulation controls
- 3) pedestrian malls
- 4) transit malls
- 5) street width reductions
- 6) circulation controls
- 7) peak period street closures
- 8) preferential transit lanes
- 9) prohibition of all on-street parking
- 10) off-peak street closures
- 11) truck routes
- 12) peak hour on-street parking prohibitions

At present, more than 100 U.S. cities of varying sizes have instituted some form of auto restricted zone. The technique most frequently implemented



during the 1960s and early 1970s was the closure of the main downtown shopping street and its conversion to a pedestrian mall, with a high degree of emphasis placed upon improved urban design features (trees, fountains, etc.). Such pedestrian malls were developed in Fresno, Pomona (CA), Miami Beach, Louisville, Memphis, Trenton and dozens of other cities. The traditional form of these schemes has been a long linear element with only limited closure of selected streets intersecting the mall. The results generally represent an effort to improve the pedestrian environment on a selected street with only a minimal effect on overall traffic.

An alternative approach which has been receiving increasing emphasis since the late 1960s is the conversion of the downtown shopping street to a transit mall. In this case, a principal shopping street is typically closed to automobiles, but with transit vehicles continuing to use the street. This scheme is generally characterized by widening of sidewalks with some improved pedestrian facilities (e.g., benches, bus shelters) and urban design features (e.g., plantings). Transit malls exist in Minneapolis, Chicago, Madison (WI), Portland (OR) and Philadelphia, as well as other cities.

A lesser form of auto restriction is the semi-mall, in which sidewalks are widened and the roadway is narrowed, but through auto traffic is reduced although still allowed. As with the transit mall, sidewalk widening is typically associated with improved pedestrian facilities and urban design features. Semi-malls are very common; examples include Allentown (PA), Oakland, San Francisco and Washington, DC.

The concept of auto restricted zones takes on an added dimension of size and sophistication within the European context. Most European cities have had pedestrian shopping streets for many years; more recent attention has been directed towards a comprehensive zonal approach to restructuring the balance between auto and non-auto modes within the central cities. In many cities, the system of pedestrian and transit-only streets has expanded to divide the core area into several separate "traffic cells" with few or no through connections. Examples include Munich, Essen, Copenhagen, Gothenburg and Nottingham, among others.

### 1.1.3 Objectives

The primary goals of auto restriction policies in central business districts are typically: (1) to add impetus to the preservation, enhancement, and revitalization of established urban centers; (2) to encourage the use of walking and transit as the most efficient modes of travel within the center city; and (3) to improve the environmental quality in urban centers. Most of the auto restricted zones in Europe have been motivated largely by goal #2, as a response to the inability of the narrow street system to effectively handle growing traffic volumes. By contrast, pedestrian and transit malls in the United States have primarily been implemented as a means of helping revitalize downtown areas.

It is incorrect to assume that efforts to reduce traffic congestion, increase transit usage, improve pedestrian circulation, and improve the environmental quality of the area are adequate in themselves to reverse the economic decline experienced by many city centers. Other significant factors which have substantial impact on the vitality and economic potential of city centers include metropolitan growth, local redevelopment policies, area market potential, public and private investment, downtown image and function. The strongest downtown areas thrive in spite of the negative impacts of auto traffic and a poor physical environment. In the weakest downtown areas, major emphasis on the environment, transit and traffic is not likely to have significant effect by itself. It is in those numerous city centers in the middle of this spectrum that improvements in environmental quality and transit service, coupled with reductions in the negative impacts of automobile traffic, produce the highest potential for achieving the goals and objectives of auto restricted zone policies.

The full set of primary and secondary objectives which can apply to an auto restricted zone project include:

#### 1) Transportation Objectives

- Reduce congestion on streets
- Reduce travel times
- Maintain accessibility
- Improve transit services

Maintain service for goods movement  
Encourage shift to non-auto travel modes  
Reduce parking requirements  
Reduce energy requirements  
Reduce accidents.

2) Economic Objectives

Stimulate market potential  
Encourage private investment  
Enhance tax base structure  
Minimize public service costs  
Reduce roadway construction and maintenance costs.

3) Social Objectives

Create perceptible improvements in the environment  
Stimulate community cohesion  
Improve perception of personal security  
Increase public use of areas.

4) Functional and Physical Objectives

Stimulate mutually reinforcing mix of facilities and activities  
Enhance pedestrian space  
Encourage re-use and preservation of physical resources  
Encourage a diversity of activities  
Improve air, noise, and visual qualities.

## 1.2 OPPORTUNITIES AND OBJECTIVES OF THE PROJECT

### 1.2.1 Opportunities for Improvement of the Pedestrian Environment

While retail activity was declining substantially relative to outlying shopping areas, the Washington Street retail area in the years prior to the Downtown Crossing project remained alive with activity. Nevertheless, much of the area was made unpleasant by crowding, conflict with autos, noise and pollution, and a physical environment that was not particularly attractive. This problem was composed of a number of related aspects:

- 1) The overall image of the area was not very attractive, especially on the older streets not touched by recent renewal.



- 2) Activities such as window shopping, socializing, people-watching, recreation and street vending were substantially eliminated by the crowding on these streets. If ample space and facilities were provided, such activities would attract more people to the area and induce those already there to stay longer.
- 3) The elderly and handicapped were even more severely affected by the crowding and pedestrian-vehicle conflicts than the average user. The numerous elderly particularly experienced aggravation and discomfort in their efforts to walk around downtown.
- 4) The physical environment was severely affected by noise and air pollution. Measurements on Washington Street indicated that carbon monoxide levels greatly exceeded Federal standards and that emissions would have to be reduced by 60 percent to meet EPA requirements.

#### 1.2.2 Opportunities for Improvement of Transportation Accessibility

Although the regional public transportation system provided a very high level of service for regional trips into the CBD, the radial nature of the system provided very little circulation within the CBD. Each of the four major subway lines had at least two stops within or near the downtown study area, yet the subway system provided little circulation service between activity centers in the area. Similarly, bus routes provided service to and from the periphery of the study area, but provided little circulation within the study area. In fact, severe traffic congestion and unpredictable operating conditions within the study area had previously prevented the extension of bus routes into the area considered for auto restriction.

The circulation within an auto restricted zone in the primary commercial district of downtown Boston also raised the issue of maintaining accessibility to the auto restricted zone for those tripmakers for whom transit was not available or who would choose not to come downtown if auto accessibility were not maintained. For some auto drivers, the implementation of the auto restricted zone could mean finding new parking locations further from their desired destinations. The existing transit system offered little service between peripheral parking locations and the centers of activity, particularly the main commercial district.



### 1.2.3 Local Objectives

The Downtown Crossing Project was developed with the general objective of encouraging the continued physical and economic revitalization of downtown Boston. The plan sought to set up a more balanced circulation framework, make the streets more attractive through specific urban design improvements, and the creation of new programs for the management and utilization of downtown resources. The specific objectives related to these goals were:

- 1) Economic Vitality--The project area is, above all, the commercial center of the Boston metropolitan area. Any consideration of traffic restraint and street improvements was thus to be directed at supporting and expanding markets and opportunities for the downtown economy. The project was a means of encouraging the growth of retail sales, as well as the expansion and diversification of this already bustling activity area.
- 2) Pedestrians--A primary objective of the project was to provide better access for pedestrians within the area and from activity areas on the periphery of the retail district. This was to be accomplished by: (1) developing a continuous pedestrian circulation network within the retail and financial districts to connect the primary activity areas: concentration of offices, stores, residences, and tourist/recreational areas; and (2) allocating adequate space to create a comfortable, safe, and pleasant walking environment along this network. This involved minimizing conflicts with vehicular traffic, improving pedestrian crossings of major streets, and reducing perceived walking distances by the design of this network. Amenities in the area were to be improved by creating pedestrian-oriented public places, such as shopping streets, small resting areas, special historic sites, and primary open spaces where these are appropriate to the adjacent activities. The project was intended to demonstrate a public commitment to the design, furnishing, and maintenance of the physical setting, and the management of activities in these places.
- 3) Public Transit--A third local objective was to improve accessibility to and within the downtown retail core by improving the service by public transit modes. This included improving service on the existing local and express bus routes by improved routing, coordinated stops and schedules, and allocating exclusive street space for transit use as a means of improving their travel speeds downtown.
- 4) Delivery, Emergency, and Service Vehicles--It was seen as essential to maintain all necessary access for these vehicles and to establish scheduled delivery hours for downtown service at times when conflict

with pedestrians and other traffic can be minimized. Exclusive use of certain streets by delivery vehicles must also be allowed at these times. For the future, it was recognized that major new developments must provide off-street loading facilities.

- 5) Private Auto Traffic and Parking--In order to achieve the goals of improving transit and pedestrian flows, it was seen as necessary to restrict or eliminate private auto traffic on streets in the retail district where it seriously interfered with the other circulation elements. The goal was to develop a simplified auto circulation system that clearly identifies primary auto circulator streets and secondary auto access streets. The primary streets would continue to serve destinations in as well as outside the district. The secondary access congestion impacts could be mitigated through improvement of intersections, proper traffic enforcement, and elimination of parking search and superfluous circulating traffic.
- 6) Image and Environment--Finally, an overall objective of the project was to improve the general image and attraction of the older downtown streets by creating a physically comfortable street environment free of noise and pollution, and equipped with pedestrian amenities. This involved encouraging a more varied and balanced street life with excitement and comfort for all different types of street users, as well as the preservation and reuse of older buildings. Most important, it was hoped that the project would lead to a physical and institutional framework for improved environmental management and ongoing urban design within the district.

### 1.3 PROJECT DESIGN, OPERATION AND HISTORY

The project design and operation is briefly summarized below and is described in more detail in Chapter 2. The project plan can be described in terms of: (1) a new circulation framework for buses, pedestrians, cars, taxis and delivery trucks; (2) street improvements to enhance the pedestrian environment; and (3) special programs to improve maintenance, promotion, enforcement and bus operations.

#### 1.3.1 Project Overview and History

The auto restricted zone directly affects six different streets in the core retail area. Auto traffic was banned on three blocks of the main retail street, Washington Street. This street section was originally a transit mall,

but much of it is now a fully pedestrianized zone. Another major retailing street which intersects Washington Street, Winter Street/Summer Street, was also closed to auto traffic and converted to a pedestrian zone. Auto restrictions were also implemented on nearby Franklin, Bromfield, School and Hawley Streets. A total of eleven blocks were closed to auto traffic, in addition to one block previously closed.

The project was planned and implemented in a relatively short time period. The consultant feasibility study and alternatives analysis was completed in February 1977. Within the following year and a half, the final design plan was developed, an implementation strategy was agreed upon, funding was secured and construction for the special bus lanes was completed. The auto restricted zone and transportation circulation policies were officially implemented in September 1978. Physical image improvements, such as bricking of the street surfaces and the placement of benches, new lights and other pedestrian amenities, were done the next summer, and essentially completed by September 1979.

### 1.3.2 Auto Circulation

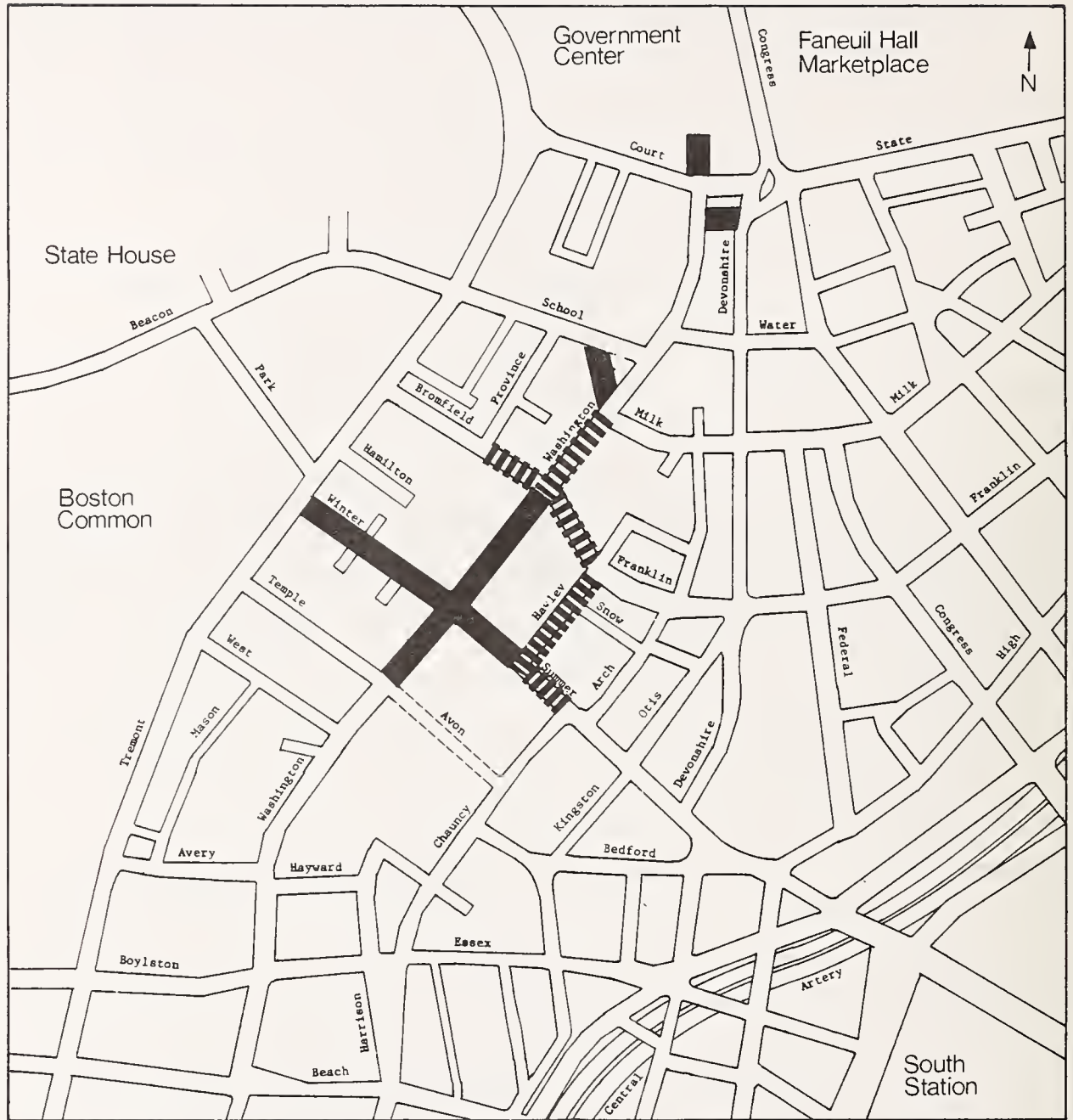
As shown on Figure 1-1 auto traffic was eliminated from a zone of ten contiguous blocks in the core retail area, and a separate segment of a nearby street was also closed. (Another block at the end of Washington Street had previously been closed to traffic). Some of the auto restricted streets (shown by dashed lines on the map) remain open for taxis only.

The traffic circulation plan also involved the reversal of one-way traffic on the Chauncy Street/Arch Street route, the elimination of all on-street parking in a large area around the auto restricted zone, and the de-facto change in the nature of lower Washington, Temple, Bromfield, and Province Streets from major circulation routes to local access routes.

### 1.3.3 Pedestrian Space

The plan provides increased space for pedestrians on the more congested shopping streets. The improvements extend to Boston Common (at the west), and





Closed to traffic  
 Closed to general traffic but open to taxis .

FIGURE 1-1. AUTO RESTRICTED STREETS



part of the way to the major activity areas at Government Center (at the north), the Financial District (at the northeast) and South Station (at the east).

The street space gained through auto restriction allows complete use by pedestrians on Winter Streets, Summer Street and portions of Washington Street. These pedestrian zones received new brick paving, lighting, plantings, information kiosks and bollards. Benches were also placed on Summer Street. In addition, there were major sidewalk widenings on other portions of Washington, Milk, and Franklin Streets. Segments of nearby School Street and State Street were converted into park space.

#### 1.3.4 Transit Circulation System

For the first two years, five local bus routes were extended into the Downtown Crossing area, lengthening each of the routes from one-third to one mile in distance. An express bus loop was also extended into the area to accommodate four express routes and one other local route.

To accommodate these revised routes, special transit priority systems were developed. A combination of exclusive transitways and contra-flow bus lanes permitted buses to operate primarily on traffic-free routes, and to serve the heart of the retail core without the interference from present traffic. Originally, Washington Street between Bedford and Milk was predominantly a transit mall, with limited delivery access. A special exclusive bus lane was constructed on the south side of a widened Bedford Street, and contra-flow exclusive bus lanes were delineated for the southbound streets. Other parts of the transit loop were protected from general traffic by physical barriers.

After eight months of operation, the bus loop was modified to move the buses off of Washington Street during reconstruction and bricking of that street. Upon completion of that construction, it was decided not to reinstate the bus lane on Washington Street due to the earlier experience of pedestrian-bus conflicts there.

#### 1.3.5 Service Access

Service vehicles have been allowed on all the pedestrian and bus streets before 11 AM with the exception of a section of Summer Street where there are no delivery requirements and the street space is blocked by benches. After 2 PM, the above streets are open only to special goods vehicles, such as the U.S. mail, newspaper deliveries, etc.

#### 1.3.6 Taxi Access

Taxis are allowed access to certain streets for pickups and drop-offs (Temple, Hawley, Bromfield, and Franklin Streets), and a number of new taxi stands were provided within the area. In the evening taxis are also allowed to proceed up Washington to Franklin/Bromfield and on Winter.

#### 1.3.7 Signing System

A comprehensive signing system which orients and informs the motorist of the new rules was implemented as part of the traffic circulation system. A system of pedestrian signs and information kiosks also provides publicity and information about on-going development of the area and daily events, and helps orient the pedestrian to the whereabouts of retail shops, bus stops and taxi stands.

#### 1.3.8 Ongoing Support Elements

The project plan included special funding for:

1. enforcement of parking restrictions and assignment of additional officers at key intersections
2. upgraded maintenance of the area
3. programs to promote the area
4. a subsidy to cover the operating expenses of ten bus route extensions into the area.

#### 1.4 EVALUATION OVERVIEW

The Boston Auto Restricted Zone Demonstration tested the innovative concept of a zonal system of auto restricted streets, linked with major changes in bus service to the area. The major functions of this evaluation of the demonstration project are twofold: (1) to describe and assess the process of planning and implementation, and (2) to assess the extent to which the project has achieved its objectives. These objectives associated with the project include increasing pedestrian activity and retail sales, increasing transit ridership and transit productivity, and improving environmental quality. Of equal importance, however, is the translation of the results of the Boston experience into information useful to other urban areas considering the implementation of similar projects.

This report is one of a series of demonstration evaluations completed under the UMTA Service and Methods Demonstration (SMD) program. In addition to Boston, auto restricted zone demonstration projects are currently in progress in Providence, Memphis and New York City. Each include an UMTA Section 6 grant to the local implementing agency, and a separate in-depth evaluation effort conducted under the direction of the U.S. DOT Transportation Systems Center. The Boston demonstration project is the first of these four to be completed and evaluated. The SMD program also previously sponsored brief evaluations of other transit mall projects (see Edminster and Koffman, 1979).

For the Boston project, the impacts of most interest for evaluation are those related to:

1. the perception of the downtown retail core as a shopping area
2. changes in shopping activity and the general business climate
3. pedestrian level of service and pedestrian volumes
4. traffic congestion around the auto restricted zone
5. changes in parking cost and accessibility as a result of the elimination of on-street spaces downtown

6. changes in transit service levels, costs, reliability and ridership related to the extension of bus routes into the auto restricted zone and along special bus lanes
7. changes in delivery costs resulting from changes in loading regulations and location of legal loading zones
8. changes in air quality and noise control

Objective achievement is measured by analyzing impacts in six major areas that are directly related to the objectives:

1. transportation impacts--traffic, transit and goods movement circulation changes
2. impacts on pedestrians--safety, aesthetic environment, and level of activity
3. travel impacts--trip characteristics
4. economic impacts--retail sales, land use
5. impacts on providers of transportation services--reliability, productivity, service area
6. institutional impacts

Information on project impacts was collected primarily at three points during the project: before implementation (June 1978), during construction (June 1979), and after project completion (June 1980). The data collection involved a combination of surveys, counts, inventories, interviews, records and observations. This included over 11,000 surveys in each of three years, covering pedestrians, area employees, bus riders, parking lot users and merchants. Traffic counts, pedestrian counts, shopper counts and transit passenger counts were made at a total of 120 locations around the project area. The data collection effort also included measurement of air quality and noise levels, inventories of business establishments and floor space area, crime and accident reports, photographic records, and interviews with pedestrians, merchants and public officials.



## 2. SITE SETTING--BASELINE CONDITIONS

### 2.1 THE REGIONAL CONTEXT OF DOWNTOWN BOSTON

Boston is the principal urban center of New England and one of the oldest and most densely developed urban areas in the United States. The city population is approximately 562,000 persons (1980 Census), while the SMSA has an estimated 3 million persons. Population density within the city is over 11,000 persons per square mile.

Economic activity is also heavily developed in the city, as the citywide density of employment is nearly 11,000 jobs per square mile. Boston is a strong regional and national center for banking, insurance, manufacturing, government, and education. Nearly over half of the city's workforce of 535,000 works within a 3.6 square-mile area of downtown Boston (BRA, 1976).

The Downtown Crossing auto restricted zone project was focused on revitalizing the heart of the downtown, the oldest developed area in the city. Figure 2-1 shows the locations of various concentrations of activity in downtown Boston. The entire area in the map (and slightly more on the West and South) is often referred to as "downtown" or sometimes as "Boston proper" (as it roughly represents the original city in the 19th century). The area referred to as the "study area" in this report is substantially smaller, but is similar to the US Census definition of the "central business district" (except that it excludes the Faneuil Hall Marketplace area). This area encompasses the retail core (where the "Downtown Crossing" auto restricted zone is located) and the adjacent financial district (also affected by the traffic pattern changes). On the north is Government Center, with the city hall and state and federal office buildings. Boston Common is the western boundary, and to the northeast is the Faneuil Hall Marketplace and the revitalized waterfront. The study area includes an employee population of approximately 126,000.

Retailing is the principal activity within the area, anchored by the presence of several major department and variety stores. Despite a 15 percent constant dollar decline in total sales volume reported for the 1972-1977

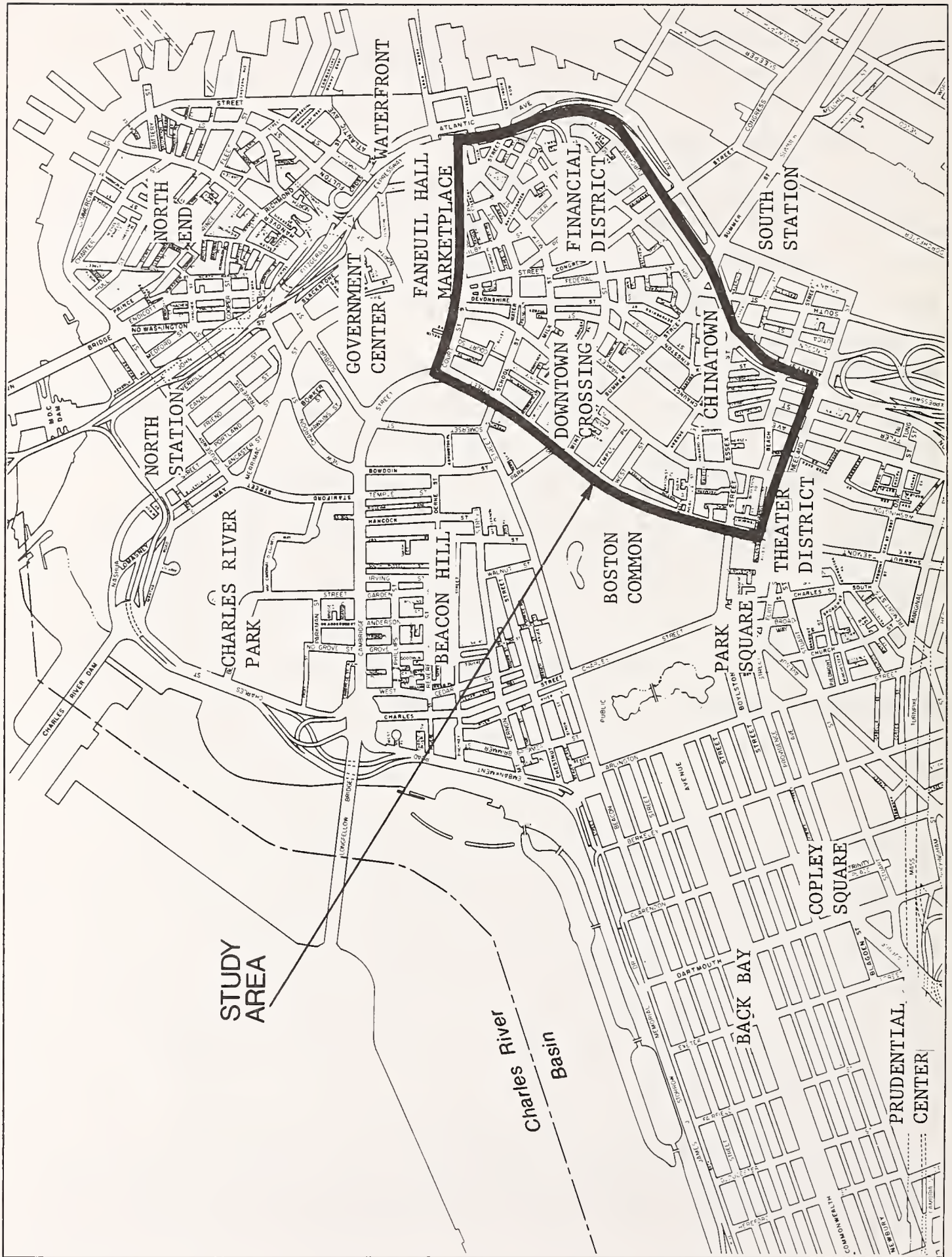


FIGURE 2-1. ACTIVITY CENTERS IN THE DOWNTOWN AREA



period, the retail environment prior to the Downtown Crossing project had remained moderately strong. Vacant retail ground floor space was minimal. Major retail establishments were showing future commitment to downtown with reconstruction of facilities and continued support of downtown outlets. Other retail activity in downtown included clothing, shoes, cameras, records and books. In recent years, branch banking had grown considerably in use of ground floor space.

Besides the large base office employment, the downtown retail area benefits from the existence of a substantial residential population in the nearby areas of Beacon Hill, Charles River Park, the North End, Chinatown, Back Bay and the South End. The population and employment characteristics of various areas in the downtown area are shown in Figure 2-2.

## 2.2 EMPLOYMENT AND BUSINESS CHARACTERISTICS

### 2.2.1 Employment

The downtown employment base is predominantly white collar. Of the 272,000 workers in Downtown Boston, 54 percent (147,000) work in privately owned office space, (Matrullo, 1979). Another 8 percent (23,000) work in government office buildings. Most of the office workers are employed by firms in the area of finance, insurance, professional services, transportation or communications, or by government.

Downtown Boston had undergone a significant transformation in the 1970's in terms of new office space. A 1977 office building inventory (Matrullo, 1977) revealed that downtown Boston has over 44 million gross square feet of office building space. Approximately 6 million square feet of this are government owned and occupied offices. Of the privately owned office space, 40 percent (15.6 million gross square feet) is new (Class A) space, and over two-thirds of that space (10 million gross square feet) has been brought onto the market since 1971. Figure 2-3 shows the distribution of private office

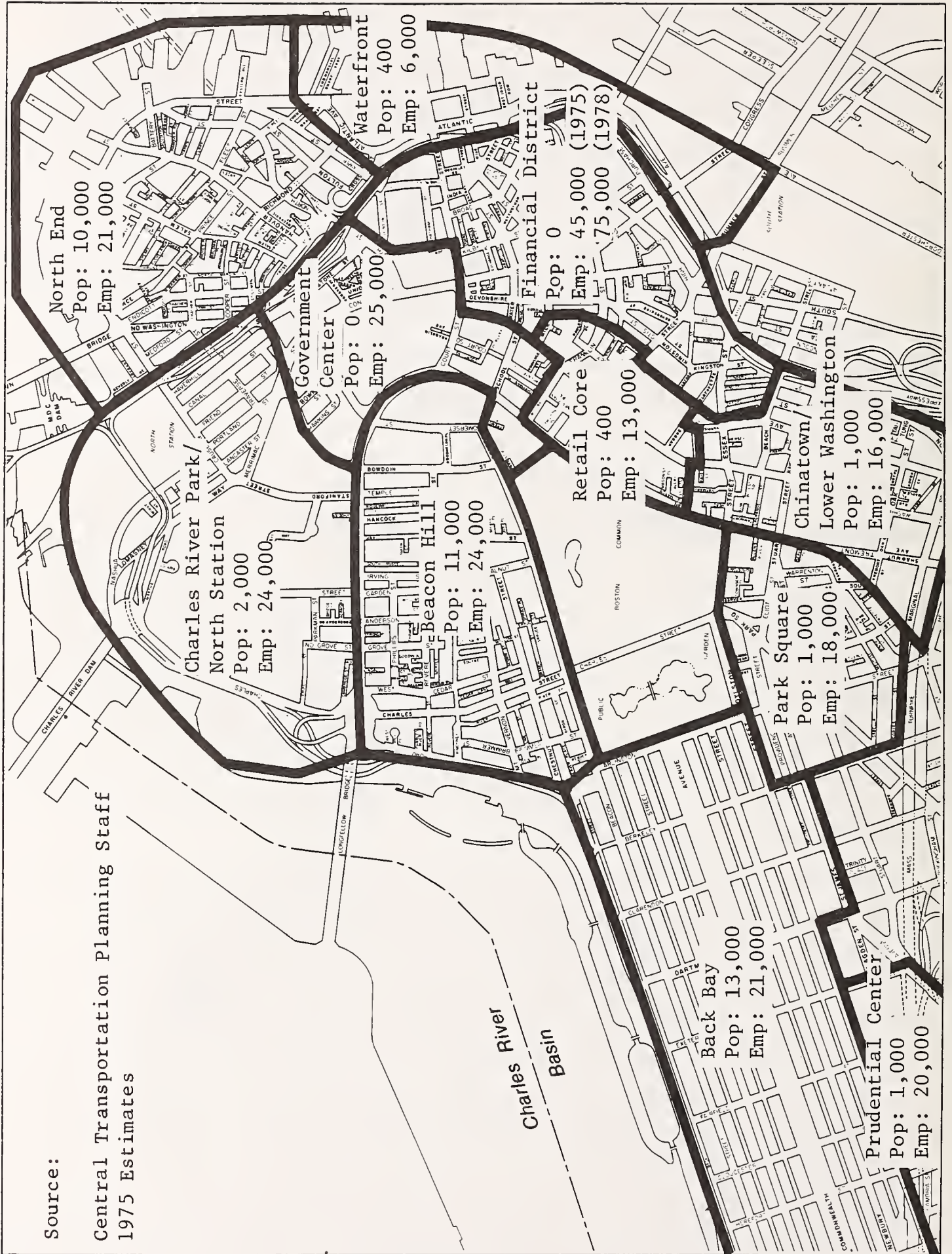


FIGURE 2-2. POPULATION AND EMPLOYMENT IN CENTRAL BOSTON





Source:  
Boston Redevelopment Authority, 1977

FIGURE 2-3. DISTRIBUTION OF PRIVATE OFFICE SPACE

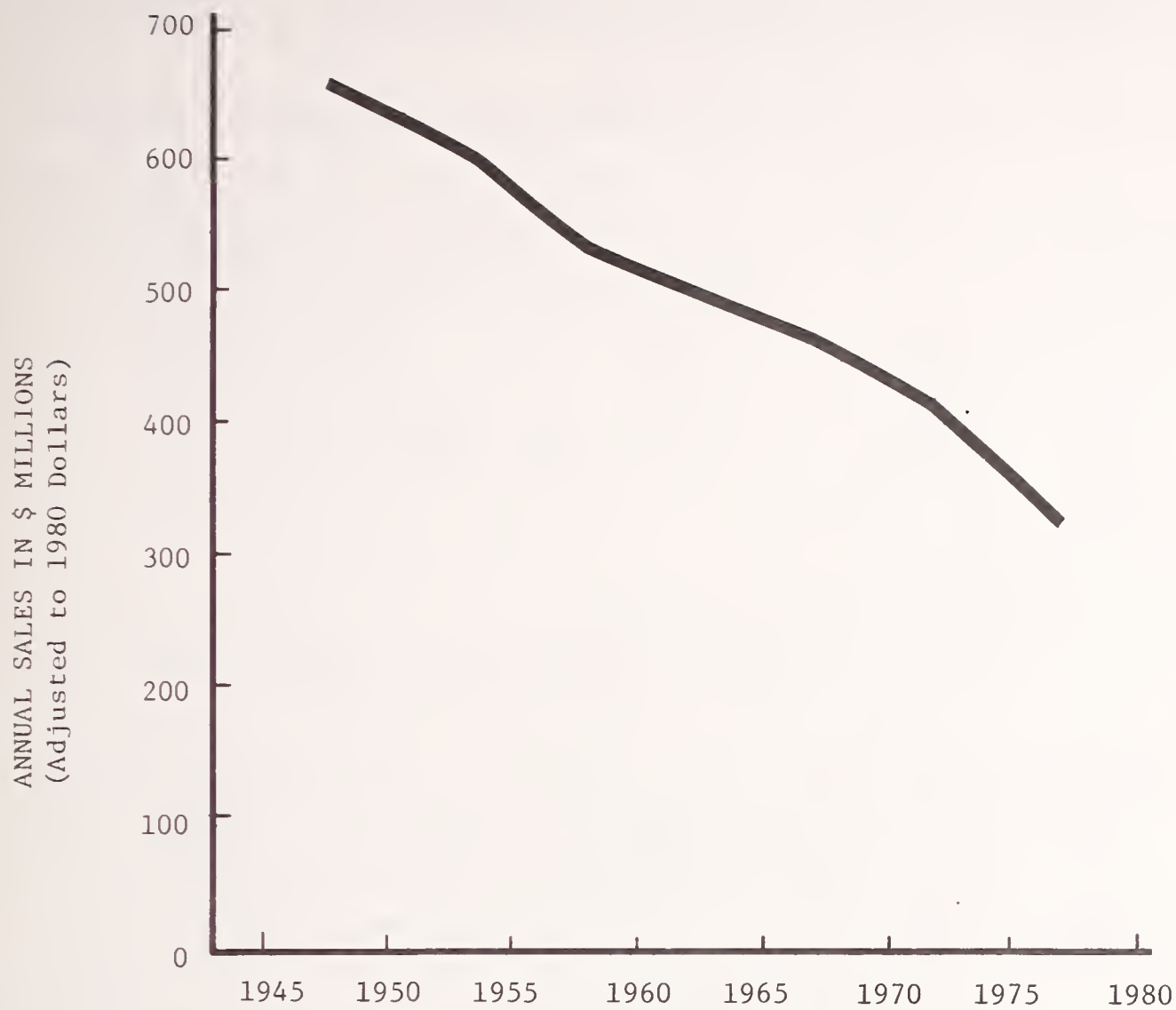
space for the major areas of employment. The financial area, most of the Midtown area, and most of the Government area (as defined in Figure 2-3) are within a comfortable 15 minutes walking distance of the Downtown Crossing and contain almost 80 percent of the downtown office space. It is estimated that there are about 116,000 office employees in the Downtown Crossing study area.

The retail sector accounts for over 14,000 employees in 938 retail stores in the full central business district (1977 Census of Retail Trade). Focusing on the retail core area, it was separately estimated that the ground floor stores on Washington, Winter, Summer and Bromfield Streets employ 7,000-8,000 persons, the majority of whom are accounted for by the large department stores.

### 2.2.2 The Retail Environment

The Downtown Crossing auto restricted zone includes the major shopping streets in Boston's downtown retail core, and accounts for at least three-quarters of all retail sales in the US Census-defined "Central Business District" (CBD). While the downtown Boston retail district had historically fared better than most downtown shopping areas, it had been showing signs of decline prior to the Downtown Crossing project. Annual retail sales for the CBD were reported at \$464 million (in current dollars) in 1977, which appears as a 7 percent increase in dollar volume from the 1972 level, but actually represents a 15 percent decline in sales after controlling for inflation in retail prices (US Census of Retail Trades, 1977). In fact, downtown retail sales had been declining in constant dollars since the end of World War II (see Figure 2-4). The decline in sales was most severe in "shopper goods" (i.e., general merchandise, apparel and accessories), primarily due to new suburban shopping centers. While the downtown retail area declined, retail sales over the entire metropolitan area increased 8 percent between 1972 and 1977, after controlling for price inflation.

Boston's Central Business District (CBD) is characteristic of CBDs of many cities. Sales volume in the CBD now accounts for only a small proportion of total sales in the urban area--about 25 percent of city sales and only



SOURCE: Census of Retail Trade

FIGURE 2-4. RETAIL SALES IN THE BOSTON CBD  
(Adjusted for Inflation)



5 percent of sales in the SMSA. Among "shopper goods" (general merchandise, apparel and accessories), the CBD accounts for 58 percent of all sales in the city and 13 percent of such sales in the SMSA.

Two major department stores (Jordan Marsh and Filene's) have traditionally formed the core of downtown retail. They have recently gone through some consolidation and reconstruction of facilities as a part of a continuing commitment to the downtown area. A modern four-floor Woolworth's department store built in 1970 represents a third anchor store. Four other major downtown anchor stores closed during 1972-1978: Raymond's Department Store (1972), Gilchrist's Department Store (1977), R.H. Stearn's (1977), and Kennedy's (1978). The first three closings occurred before the Downtown Crossing project began, and were due to chain-wide bankruptcy; the fourth closing was attributable to a large-scale chain consolidation and shift in merchandising strategy not affected by the Downtown Crossing Project. The remaining general merchandise stores still account for 42 percent of all downtown retail sales. The differences in type of sales among the CBD, the city, and the SMSA is apparent in Table 2-1(A). Relative to other areas, the CBD is strongest in stores selling "shopper goods"--department stores, apparel stores and shoe stores. The other shops in the downtown retail core consist primarily of specialties such as cameras, records and books, and service establishments.

As total CBD sales declined in real terms between 1972 and 1977, the number of establishments in the CBD decreased by almost 8 percent. Table 2-1(C) shows that the largest percentage decreases in number of stores occurred in the general merchandise and apparel sectors. General merchandise stores were the hardest hit, with almost half of the stores closing between 1972 and 1977. The number of apparel stores decreased by 18 percent. The sales losses in these sectors were much less than the number of closings would imply, indicating that the stores remaining picked up part of the sales from the other stores that closed.

In recent years, two other retail districts have emerged in downtown Boston to compete with the traditional retail core. The Back Bay



TABLE 2-1. PREVIOUS RETAIL TRENDS IN THE CBD, CITY AND SMSA: 1972-1977

	CBD	City	SMSA
<b>A. <u>Distribution of Retail Sales, 1977</u></b>			
General Merchandise	41.7%	14.0%	14.2%
Apparel	8.6	7.4	5.6
Shoes	2.6	1.6	1.0
Restaurants & Bars	18.2	17.8	10.9
Miscellaneous Retail Sales	<u>28.9</u>	<u>59.2</u>	<u>68.3</u>
TOTAL RETAIL SALES	100.0%	100.0%	100.0%
<b>B. <u>Percent Change in Retail Sales, 1972-1977</u></b> (not adjusted for inflation)			
General Merchandize	-11.0%	- 9.4%	28.7%
Apparel	12.1	14.9	32.8
Shoes	0.3	15.1	21.5
Restaurants & Bars	50.3	38.9	50.3
TOTAL RETAIL SALES	<u>7.2</u>	<u>12.8</u>	<u>35.8</u>
<b>C. <u>Percent Change in Number of CBD</u></b> <u>Establishments, 1972-1977</u>			
General Merchandize	-47.0		
Apparel	17.6		
Shoes	2.4		
Restaurants & Bars	<u>- 4.3</u>		
ALL RETAIL ESTABLISHMENTS	-7.8		

Source: U.S. Census of Retail Trade, 1972 and 1977.

area--including Prudential Center and Newbury Street--(refer to Figure 2-1) represents the prestige retail center, focusing on clothing and restaurants. The Prudential Center mall on Boylston Street was completed by the early 1970's and includes two department stores, Lord & Taylor and Saks Fifth Avenue. Nearby Newbury Street features high quality apparel stores such as Bonwit Teller and Brooks Brothers. Altogether, the Back Bay area features 250 stores, 1.2 million square feet of retail space and 1979 retail sales of \$139 million. The most recent competing retail district in the downtown area is the Faneuil Hall Marketplace. Opened in stages over 1976-1978, the Marketplace features 150 small food and speciality shops with 220 thousand square feet of retail space and 1979 sales of \$57 million. Although sales in both areas are smaller than the \$500 million sales volume of the traditional CBD area (Downtown Crossing), they represent increasing competition.

### 2.2.3 New Land Development

Many highly visible improvements had already occurred in downtown Boston in the previous fifteen years. Numerous major new office buildings were constructed in the Financial District during the 1970's. Government Center was constructed at the head of Washington Street in the late 1960's, and the Faneuil Hall Marketplace and waterfront renewal was recently completed (opening in 1976-78). In addition to spurring new development and revitalization, these projects had previously created significant new pedestrian areas.

While there were no major land or building development activities completed in the area around Downtown Crossing during the 1978-1980 project evaluation period, there are a great many new projects in or near the Central Business District that are about to begin construction or in the active planning stage. These future developments will provide significant further revitalization to the downtown area. The planning of these developments all preceded Downtown Crossing project, and it is generally felt that the possibility of a downtown pedestrian zone was not a major contributing factor in these investment decisions. From the point of view of the Downtown Crossing area in

the long term, however, these projects should all provide a larger base of activity in terms of shoppers, employees and visitors than what already exists in the area. A description of these and their status as of 1981 follows (See also Figure 2-5):

In the Vicinity of Downtown Crossing

1. Lafayette Place--a \$100 million mixed use development adjacent to Jordan Marsh on Washington Street, featuring a 500-room Intercontinental hotel; 200,000 square feet of retail; and a 1,200 space underground garage. (under construction)
2. Devonshire Towers--a \$30 million high-rise luxury apartment complex on Washington Street between State and Water Street, featuring 480 apartment units; 40,000 square feet of retail on two floors; and 10,000 square feet of office space. (under construction)
3. Stearns Building Conversion--\$5 million conversion of the former R.H. Stearn department store on the corner of Temple and Tremont Streets into 140 apartment units of elderly housing and 7,700 square feet of retail space.

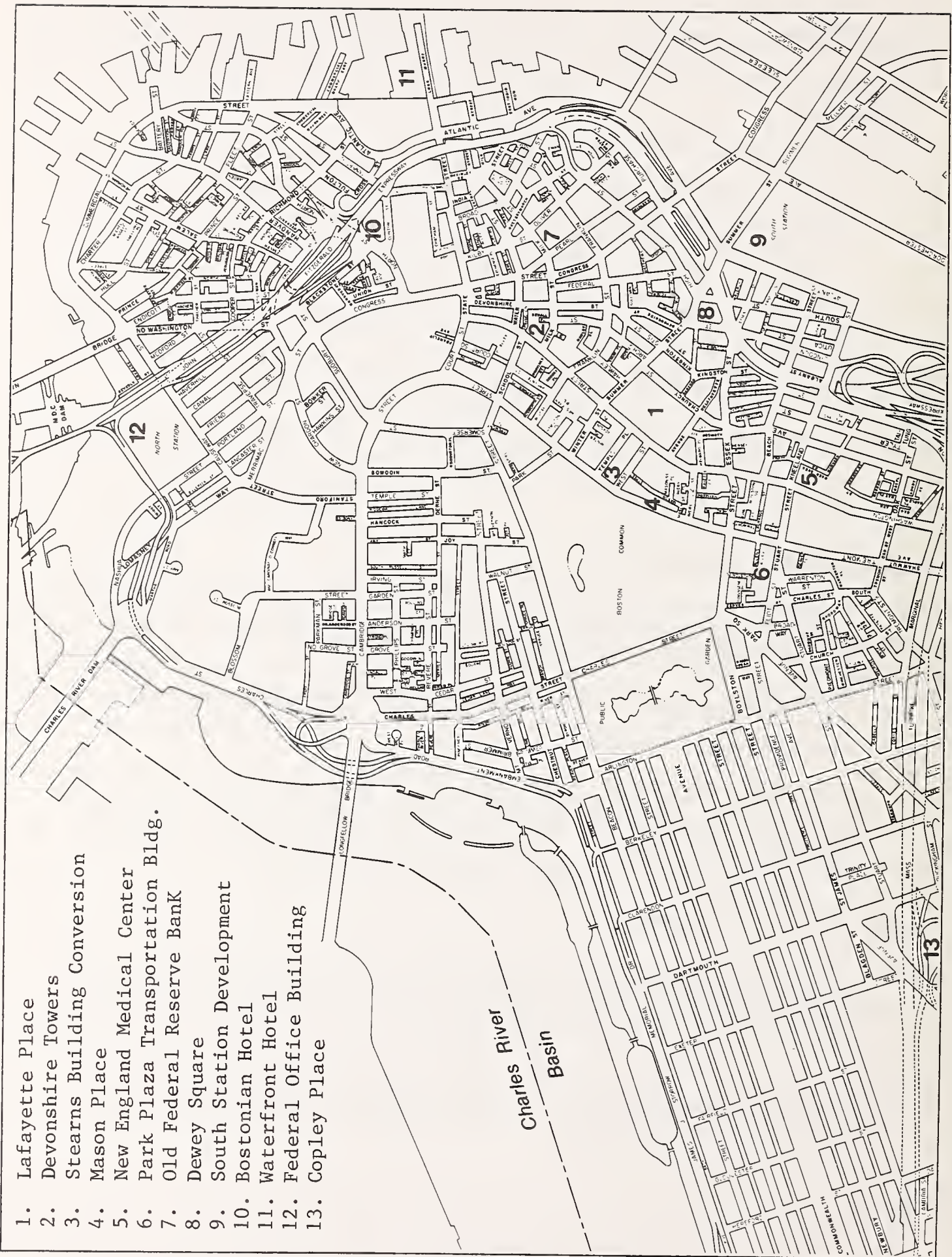
South of Downtown Crossing

4. Mason Place--\$3 million conversion of the Blue Cross/Blue Shield office building on Mason Street between Washington and Tremont Street to 129 apartment units of elderly housing.
5. New England Medical Center and Nutrition Research Center--\$65 million, 480,000 square foot medical complex on Washington Street at Stuart Street. (under construction)
6. Park Plaza Transportation Building--a new \$57 million state office building located on Stuart and Kneeland Streets, near the adult entertainment district; featuring 600,000 square feet of offices and 2,000 square feet of retail. (under construction)

East of Downtown Crossing

7. Old Federal Reserve Bank site--a \$65 million project on Pearl and Franklin Streets in the Financial District, including the luxury 300-room Meridian Hotel, a 750,000 square feet office building and a 350 car garage. (under construction)
8. Dewey Square Office Tower--an \$80 million project, including 1 million square feet of new office space at South Station (in advanced planning stages)





1. Lafayette Place
2. Devonshire Towers
3. Stearns Building Conversion
4. Mason Place
5. New England Medical Center
6. Park Plaza Transportation Bldg.
7. Old Federal Reserve Bank
8. Dewey Square
9. South Station Development
10. Bostonian Hotel
11. Waterfront Hotel
12. Federal Office Building
13. Copley Place

FIGURE 2-5. NEW LAND DEVELOPMENT PROJECTS



9. South Station development--reconstruction of train station facilities, new bus terminal, 500-room hotel, 500,000 square feet office building and 1,400 car parking garage (station and terminal under construction; rest in planning stages)

#### North and Northeast of Downtown Crossing

10. Bostonian Hotel--a \$9 million, 160-room European style hotel located in the Blackstone Block, near City Hall and Faneuil Hall Marketplace (under construction)
11. Waterfront Hotel--a 395-room Marriot hotel with 10,000 square feet of retail, located at Long Wharf near the Faneuil Hall Marketplace and the Waterfront Park. (under construction)
12. Federal Office Building--960,000 square feet office building for the General Services Administration, at North Station (in advanced planning stages). This is to be the anchor for a 50 acre multipurpose development designed by Moshe Safdie. (in early planning stages)

#### West of Downtown Crossing

13. Copley Place--a \$300 million (UDAG funded) mixed use development at Copley Square, including two major hotels totalling 1,670-rooms; 512,000 square feet of retail (including a Neiman-Marcus department store); 2,000 parking spaces, two office towers totalling 730,000 square feet; and 100 units of mixed income housing. (under construction)

Given the substantial downtown renewal in past years and the continuing development underway, it is clear that the Downtown Crossing auto restricted zone is but one of a series of elements contributing to the overall revitalization of downtown Boston.

## 2.3 TRANSPORTATION CHARACTERISTICS OF THE DOWNTOWN AREA\*

### 2.3.1 Street Capacity

The downtown Boston Street System dates back to the 18th century, and by 1810 the network resembled the pattern that exists today. The street pattern

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\*Portions of this section are drawn from material published in: Alan M. Voorhees & Associates, Cambridge Systematics, Moore-Heder and A. T. Kearney: Auto Restricted Zones, Technical Appendix: Boston, 1977.

today appears as a maze of narrow, non-continuous one-way streets. The narrow one-way streets (most have only two traffic lanes) and the complex intersections in the study area contributed to produce traffic congestion throughout much of the day.

Despite the congestion, traffic volumes were never excessive by the standards of other major cities. Evening peak hour volumes on streets in the study area (in 1977) averaged 700 vehicles/hour, and ranged to over 1,000 vehicles on Court Street. A major problem was that the congestion was exacerbated by a lack of traffic regulation enforcement. Street capacity was significantly reduced by the presence of illegally-parked vehicles, and by the existence of vehicles cruising in search of an on-street parking space. Double parking, illegal parking and illegal use of loading zones were quite commonplace, and combined with heavy pedestrian volumes to produce congestion throughout the day. At locations where a significant difference existed between the actual and theoretical intersection quality of flow, it was determined that lack of proper traffic regulations enforcement reduced capacity an average of between 35 and 45 percent.

Another source of traffic congestion in the retail core area was the existence of several critical intersections on the fringe which acted as bottlenecks on traffic leaving the area. These critical intersections represented the major gateways for traffic destined for the retail core. Of specific note were the intersections along the Kneeland/Stuart Street corridor on the south, and along Court and State Streets on the North. Other specific congestion areas to the south were noted at the intersections of Tremont and Boylston, Tremont and Beacon, Congress at Atlantic, and Dewey Square (refer to Figure 2-6).

The excessive backups from these congested collar intersections had a severe impact on operations within the area presently known as Downtown Crossing. For example, according to existing volumes, intersections along Tremont Street north of Boylston should have functioned well. However, due to excessive congestion at the intersection of Boylston and Tremont, a queue resulted in the southbound flow of Tremont Street, backing up traffic to the point where all the northerly intersections functioned poorly.





The capacity analysis indicated that streets within the study area had sufficient additional capacity to accommodate interior street closures and changes in the circulation pattern, provided that focal point intersections are not created. The capacity analysis further indicated that almost every access/egress point in the retail core area was controlled by an existing critical intersection, so that without major changes in parking and traffic enforcement, any auto restricted zone would cause at least some increase in congestion. A key factor for the success of the auto restricted zone thus became the need for effective enforcement of existing and new parking regulations, as well as implementation of needed street and signal improvements.

Traffic circulation impacts of the Downtown Crossing auto restricted zone are examined in Chapter 5.

### 2.3.3 Parking

Automobile parking in the study area created many of the problems in traffic circulation described above. In the entire Boston CBD, it was estimated that one-fourth of the vehicles, as many as 20,000 cars, were illegally parked on a typical weekday. The demand for convenient and inexpensive on-street parking far exceeded the limited supply, but enforcement of parking regulations was not rigorous enough to transfer this excess demand to the existing off-street parking supply.

The supply of parking within the study area has been a focus of controversy in recent years. The 1973-75 Environmental Protection Agency's transportation control plan for the Boston area created a moratorium on new parking facilities and a ban on on-street parking within the City's core. Despite apparent strong demand for auto parking and constraints on supply, some surplus capacity has existed in off-street lots and garages even during periods of maximum accumulation. The 1978 survey of parking garage usage found a total of almost 1,400 vacant parking spaces in 8 parking garages located within the study area and the adjacent financial district at the time of maximum parking accumulation (12 noon). There appeared to be an effective



parking garage surplus of 800 spaces immediately adjacent to the auto restricted zone impact area.

Parking supply and demand changes associated with the Downtown Crossing project are discussed in Chapter 5.

### 2.3.3 Pedestrian Facilities

Because the study area comprises the core of the extremely active and densely developed retail and financial district, pedestrian travel volumes have been among the highest in the city and the nation. These heavy pedestrian volumes have served to compound other circulation problems related to inadequate streets, heavy vehicular traffic, and widespread illegal parking. Pedestrians and vehicles were in a state of conflict throughout the day as they both attempted to cope with inadequate facilities.

During peak hours, pedestrian volumes on Washington, Tremont, Winter-Summer, and Franklin Streets were in the 5,000 to 9,000 range; sidewalks were congested throughout the downtown area. Heaviest congestion occurred on the links between Government Center, the Financial District, the Retail District and subway and bus stops. On the major shopping streets, Washington and Summer/Winter, the high level of pedestrian congestion rarely abated through the afternoon shopping period.

Sidewalk obstructions served to reduce the effective sidewalk width available for pedestrian movement by 40 to 60 percent on streets within the area. On Washington and on Franklin, an array of mailboxes, light poles, sign poles, parking meters, trash cans, loading doors and subway grates set into the sidewalk (over which few pedestrians chose to walk) reduced a 9-10 foot average sidewalk to an effective width of 5-6 feet. Such obstruction reduced the effective sidewalk width on the north side of Winter Street from 9 feet to 4 feet, and on Summer Street from 12 feet to 6 feet. The greatest degree of sidewalk obstruction, however, occurred at street corners where the various poles, mailboxes, and trash cans were concentrated at the areas of greatest pedestrian flow and congestion.

Pedestrian/vehicular conflict at corners was heaviest along Tremont, Court, Washington, Franklin and Winter-Summer. Pedestrians overflowed onto the roadway due to heavy levels of corner congestion. Vehicles inevitably moved into the intersection on yellow lights and when the traffic light changed to the WALK phase, pedestrians were forced to pick their way through a mass of cars. On the major shopping streets, Washington and Winter-Summer, pedestrians often crossed streets in mid-block to get from store to store on opposite sides of the street. The narrow nature of the streets and the very slow movement of the traffic encouraged such actions. Pedestrian/vehicular conflicts were undoubtedly an irritant to the pedestrian experience downtown.

Impacts of the Downtown Crossing auto restricted zone on pedestrian circulation are discussed in Chapter 8.

#### 2.3.4 Transit

The Boston metropolitan area has one of the most extensive systems of public transportation in the United States. Available modes include subway, local bus, shuttle bus and commuter rail. As of 1977, approximately 40 percent of all trips to the CBD and 62 percent of trips to the study area were made by using one of these modes of public transportation.

Public transportation service to the area is as follows:

Rapid Transit - Due to the high level of street congestion, the MBTA has relied almost exclusively on the subway system rather than buses to serve the CBD. The subway system consists of four major lines (with additional branches) which extend radially from the CBD. The six subway stations within the study area provide access to all the four regional lines. Daily patronage as of 1978 was estimated to be over 190,000 trips per day to and from the study area, accounting for over 90 percent of all transit trips there.

Local Bus Routes - The MBTA has operated four local bus routes that travel to the fringe of the study area (still within walking distance of the retail center). During the first two years of the Downtown Crossing project, bus routes were extended to the auto restricted zone on an experimental basis; this service was subsequently eliminated for financial reasons.

Express Commuter Bus Routes - Four commuter express bus routes have connected the suburbs to the city's core.

Commuter Rail - The MBTA operates 12 commuter rail lines which connect the more distant suburbs to the CBD via South Station at the southeastern corner of the study area, or North Station about one mile north of the study area.

Transit service changes associated with the Downtown Crossing project and their ridership impacts are discussed in Chapter 6.

### 2.3.5 Taxis

Taxi service in the core area is an integral part of Boston's internal downtown circulation and feeder system. There were 55 full-time taxi stands in the study area as of 1978. It has been estimated that 17 percent of all Boston daytime taxi trips and 8 percent of night trips start or end in the study area. In a typical day, this amounts to about 4,000 passenger trips by taxi beginning or ending downtown; although that still amounts to just 1 percent of all trips.

As a rule, most taxis in the downtown do not cruise; they are either carrying passengers, delivering packages, or driving empty to a taxi stand. However, Franklin Street, Washington Street, and parts of Summer and Tremont Streets were used for cruising. A 1976 survey of taxis at various locations in downtown Boston found that half of the taxis were observed to be empty (Cambridge Systematics, Inc., 1976).

Impacts of the auto restricted zone on taxis are discussed in Chapter 7.

### 2.3.6 Goods Movement

Approximately 600 potential delivery points exist within the study area; serving retail stores (400), office buildings (100), banks/financial institutions (45), restaurants (40) and parking lots and garages (15). Very few businesses in the downtown study area have backdoor or alleyway access. Thus, most deliveries are made through front doors of businesses, with the delivery vehicle parked (often double-parked) in the street. Off-street loading docks are available for delivery to the larger retail stores and most high-rise buildings, but even these are often fully occupied, resulting in delivery vehicles waiting on the street to use the facilities.



On-street parking and loading in downtown Boston has been heavily restricted, although there traditionally has been little enforcement of these regulations. Available legal loading zones in downtown Boston totals about 685 linear feet, equivalent to about 23 legal truck loading spaces. In reality, the effective usable loading zone space was much less due to illegally parked (but unticketed) private vehicles. Off-street loading facilities in the downtown area include a few underground loading docks and several completely within buildings.

More than one-third of all deliveries consist of retail goods. An additional one-third of the deliveries are goods-related service calls, with armored express, parcel services, mail, vending, textile rental, and newspapers being the most prominent. The offices and high-rise buildings make heavy use of these services, although the generally active nature of the entire area accounts for a large amount of these urban-oriented activities. The 40 restaurants (about 7 percent of the total number of business establishments) account for a disproportional 20 percent of total deliveries owing to the large number of different suppliers servicing each restaurant. Service calls of a repair/maintenance nature account for most of the remaining deliveries in the area.

Prior to the Downtown Crossing project, half of all deliveries were made after 11 a.m. The Downtown Crossing project subsequently restricted deliveries on the auto restricted streets to before 11 a.m. Impacts of the auto restricted zone on delivery vehicles are discussed in Chapter 7.

#### 2.4 SUMMARY OF IMPORTANT CONDITIONS IN DOWNTOWN BOSTON

In considering the transferability of results from the Boston experience to other sites, it is important to note important characteristics of the setting in downtown Boston which may differ from potential project locations in other cities. These include the following:

- 1) The traditional downtown retail district (where the auto restricted zone is located) is immediately adjacent to the high-rise office district and the locations of city, state and federal government

buildings. There are about 120,000 office workers within a 3,000 foot walking distance of the auto restricted zone. The presence of these office employees, together with the proximity of a number of tourist activities, provides a strong base of activity in the area.

- 2) Boston has a particularly compact downtown. Walking distances between activities in the downtown area are relatively short. The Boston Common, Government Center, Faneuil Hall Marketplace, the Waterfront, the Financial District, Chinatown and the Theater District are all within easy walking distance. Even in inclement winter weather, there is still much pedestrian activity on the streets. Unlike some other cities in cold climate areas, there are no major "skywalks" or sheltered pedestrian walkways to keep people off of the streets.
- 3) There is a high level of transit service to and within downtown Boston, including a variety of bus routes plus four subway lines that have stations located very close together. At the same time, the layout of the street system and narrow width of the streets act to make traffic movement within the area difficult. As a result of all of these factors, most travel to the project area has always been by transit.





## 3. PROJECT DESCRIPTION

### 3.1 OVERVIEW

The plan for the auto-restricted zone (ARZ) was based on the specific objective of improving the quality of the environment within the downtown retail area. The physical plan reallocated scarce street space to more appropriately serve the needs of pedestrians, transit services, goods movement, taxis and private autos. The main feature of the project was a new distribution of the total street right-of-way among various elements including sidewalks, open space, bus stops, taxi stands, loading zones, parking and travel lanes. The area of transportation impact is shown in Figure 3-1.

To further support the downtown environment and retail sales, the project plan included major provisions for pedestrian-oriented aesthetic improvements on Winter, Summer, and Washington Streets, and the construction of several mini-parks. In addition, the project included development of a full-time promotion effort and limited-term programs to subsidize increased bus operations, provide special maintenance and enforcement efforts, and evaluate project impacts.

This chapter presents a detailed description of the Downtown Crossing project features for readers who desire more information than the overview contained in Section 1.3. The transportation circulation elements of the auto-restricted zone plan are described in Section 3.2. The physical amenity improvements and operations support efforts are described in Section 3.3. Organizational roles and project costs are then summarized in Sections 3.4 and 3.5, respectively.

### 3.2. TRANSPORTATION CIRCULATION CHANGES

#### 3.2.1 Auto Circulation

Simplification of the existing maze-like pattern of traffic circulation within the area was identified as the key to reducing the adverse impacts of auto traffic on the area. Streets affected by the auto-restricted zone traffic circulation plan are shown in Figure 3-2. Auto traffic was eliminated



FIGURE 3-1. TRAFFIC IMPACT AREA








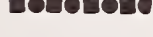
-  Street closed to cars
-  Street eliminated as major circulation route
-  Street direction reversed
-  Legal on-street parking space eliminated

FIGURE 3-2. STREETS AFFECTED BY AUTO CIRCULATION AND ON-STREET PARKING CHANGES



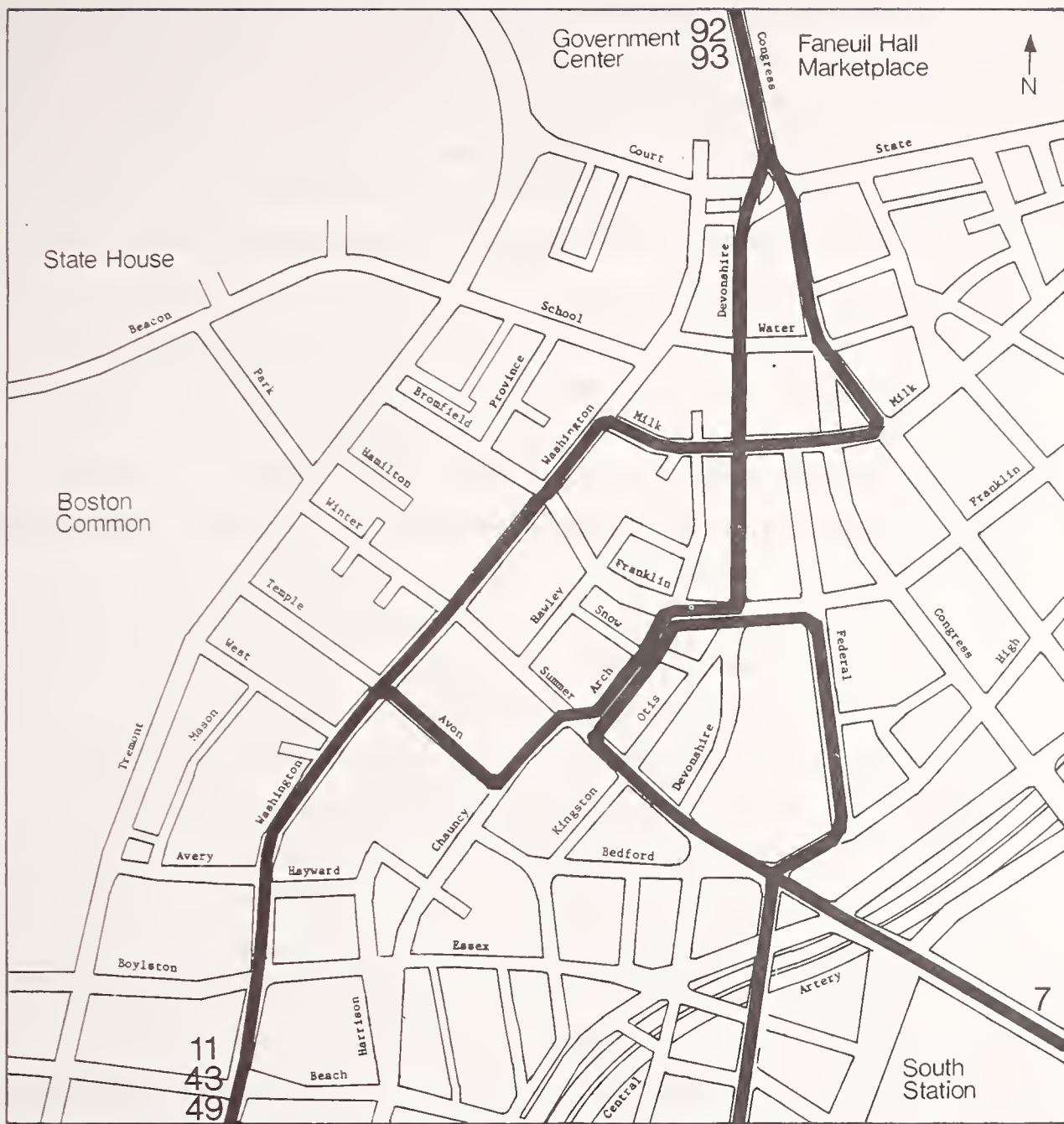
from 11 blocks in the retail core, affecting Winter, Summer, Washington, Franklin, Bromfield, Hawley, and School Streets. Auto traffic was also eliminated from Temple Place during the first six months of the project. Since Washington Street was closed, the parallel route of Chauncy Street/Arch Street was reversed to carry the northbound traffic as far as Milk Street, where it continued westbound to Washington Street or eastbound to Post Office Square. School Street traffic heading east was diverted from Milk Street to Water Street, allowing Milk Street to run westbound from Arch to Washington, and for a short section of School Street at Washington Street to be closed. Franklin Street from Arch to Hawley Streets was closed except for parking garage access and for taxis. Traffic flow patterns are further discussed in Chapter 5.

In order to facilitate traffic diverted from the auto-restricted streets, a total of 240 on-street parking spaces were eliminated from Chauncy, Arch, West, Bedford, Federal, School, and Water Streets. The location of these parking spaces is also illustrated in Figure 3-2. In addition, the Downtown Crossing eliminated an estimated 360 illegal on-street parking spaces that were regularly used in the area. Enforcement of parking regulations was thus recognized as a critical part of the total project. The plan provided for parking regulation enforcement by: (1) assigning tow trucks to guarantee immediate towing of illegally parked cars, and (2) assigning officers at major entry points into the auto-restricted zone. See Chapter 5 for a further discussion of parking and traffic enforcement aspects of the program.

### 3.2.2 Bus Circulation

The transit element of the demonstration program included both physical and operational improvements. The operational changes included revised route patterns for both local and express bus service.

Prior to the Downtown Crossing project, all MBTA buses (both express and local) stopped at the periphery of the area. Passengers had to transfer to the subway or walk to their destinations. During the first year of the demonstration, five existing local bus routes were extended into the Downtown Crossing district. The original routing is shown in Figure 3-3. The local bus routes from the south (11, 43, 49) travelled through the auto-restricted



Original bus loop patterns  
 7 Bus route number

FIGURE 3-3. BUS ROUTE EXTENSIONS

zone via Washington Street (which was thus a "transitway"). The bus then continued to loop around the downtown area, in exclusive bus lanes along Milk, Devonshire and Franklin Streets, in an exclusive contra-flow lane on Arch--Chauncy Streets and in general traffic on Bedford Street. These three bus routes then returned from the loop using an exclusive southbound contra-flow lane on Washington Street (from Bedford to Stuart Streets). The local bus routes from the north (92, 93) entered this same loop via Devonshire Street and returned north via Congress Street.

This original bus route pattern lasted only eight months. Buses were moved off most of Washington Street in May, 1979, and a revised loop pattern was adopted. This change was originally a temporary measure to allow for the bricking of Washington Street, but was later made permanent to eliminate what had been significant conflicts between pedestrians and buses when the buses were running on Washington Street.

Four rush-hour bus routes and one other local bus route (7) were also extended as part of the Downtown Crossing project. As shown in Figure 3-3, these buses formerly terminating at South Station were continued via a second loop pattern, travelling along South Street, Church Green, High Street and Federal Street. Turning onto Franklin, these routes overlapped with the other bus loop along Arch Street and then to a bus lane along Summer Street.

Additional funds were allocated for special information signs directing people to bus stops, and for the construction of bus shelters, benches and other aids for waiting bus patrons. This included a bus passenger island in the middle of Franklin Street between Devonshire and Arch Streets, and a bus shelter on Summer and Kingston Streets. Due to cost considerations, all local bus service within the Downtown Crossing area was eliminated after December 1980, at which time the bus routes returned to their original termination points. Bus routing changes and transit impacts are discussed in detail in Chapter 6.

### 3.2.3 Pedestrian Circulation

The plan provided increased space for pedestrians on all the congested shopping streets. This included full pedestrianization of Winter Street and



of Summer Street from Washington to Hawley. The congested segment of Washington Street from Winter to Bromfield originally became a transit mall, and became a full pedestrian mall when buses were removed from the street five months later. In addition, sidewalks were widened on Washington Street from Bromfield/Franklin to Milk, and on Franklin from Arch to Washington Street. The Boston Five Park was extended across what was a section of School Street.

The creation of a pedestrian area on Winter Street was designed to strengthen the link from the retail core to the Boston Common, a major downtown resource, and to the Park Street Rapid Transit Station, one of the principal stations on the Green Line and a major generator of pedestrian trips within the CBD. North of the main project area, construction of the State House Park out of a portion of State street, and the previous completion of a pedestrian mall on Washington Street north of Court Street, both served to strengthen the pedestrian connection between the retail core and the Government Center/Faneuil Hall Marketplace area.

Figure 3-4 illustrates the location of the pedestrian circulation improvement projects. Specifically, the elements of the pedestrianized system were:

1. Winter Street (21,000 sq. ft.) - Old curbing was removed and mountable curbing placed at both ends of the street. Brick paving, from building face to building face was installed. Staggered lighting and concrete bollards were placed at the curb line to separate before-11 AM service vehicles from pedestrians.
2. Summer Street (18,000 sq. ft.) - Old curbing was removed from Washington to Hawley Street. Brick paving, from building face to building face was installed.
3. Franklin Street (10,000 sq. ft) - Sidewalks were widened with new curbing. Surface differentiation for MBTA bus boarding was provided.
4. State Street - Old State House Park: granite pavers for the surface, new lighting, benches and bollards were provided.
5. Washington Street (14,000 sq. ft.) - The easterly side of the sidewalk was widened by ten feet, and brick paving was installed along sidewalk and street space from Summer to Milk Street.
6. School Street (4,300 sq. ft.) - The existing Boston Five Park was extended to the bank, covering a portion of what had been School Street.

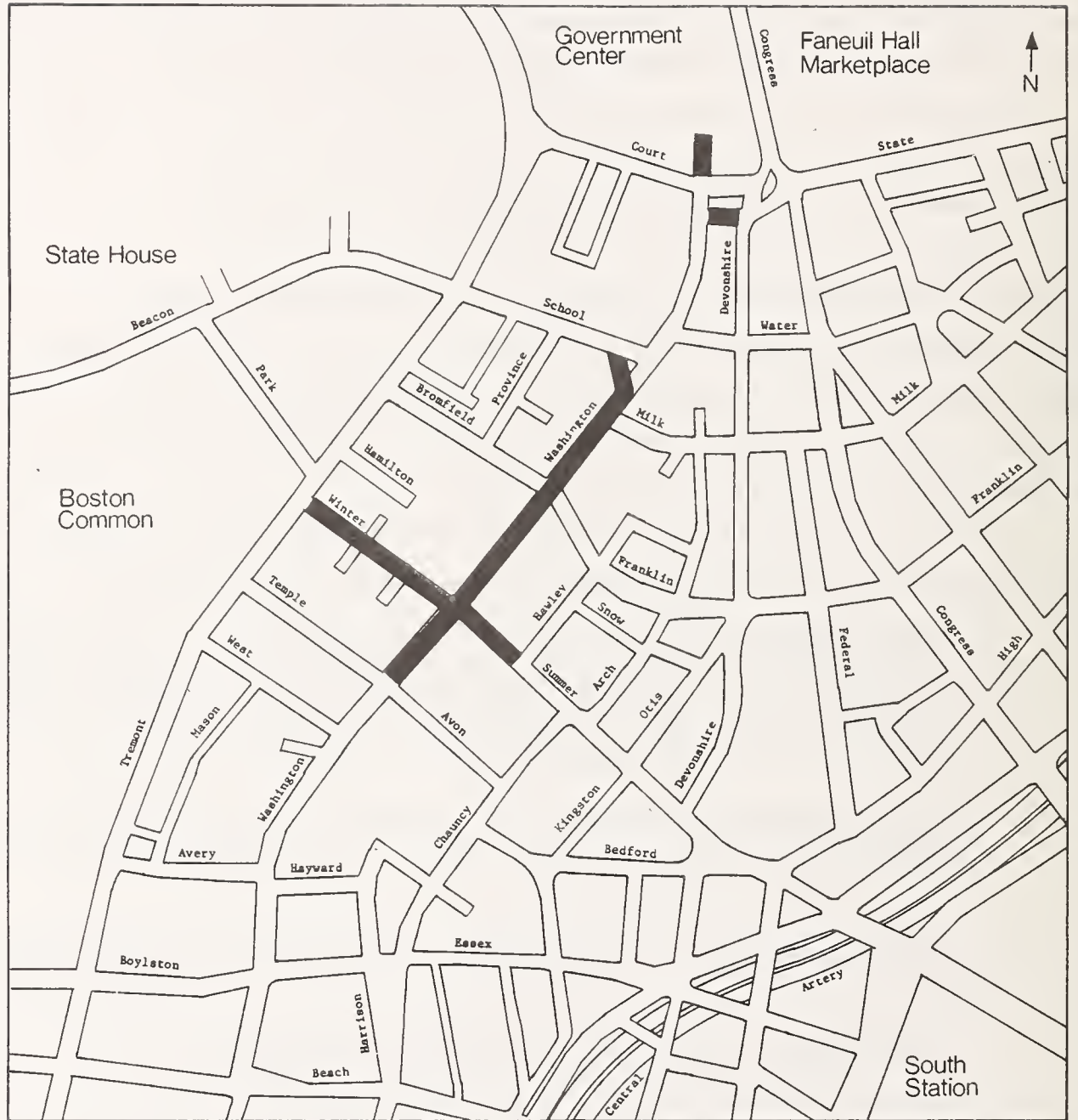


FIGURE 3-4. STREETS WITH PEDESTRIAN IMPROVEMENTS

Pedestrian amenities are described in Section 3.3, below, and the pedestrian circulation is discussed in detail in Chapter 8.

#### 3.2.4 Goods Movement

The goods movement system involves both vehicle circulation and loading facilities. Since most of the downtown stores lack any alley access, the project preserves delivery access on the regular auto streets, as well as on street segments which are closed to autos.

Figure 3-5 displays the circulation plan for goods movement vehicles. It differs from the auto circulation plan in the following ways:

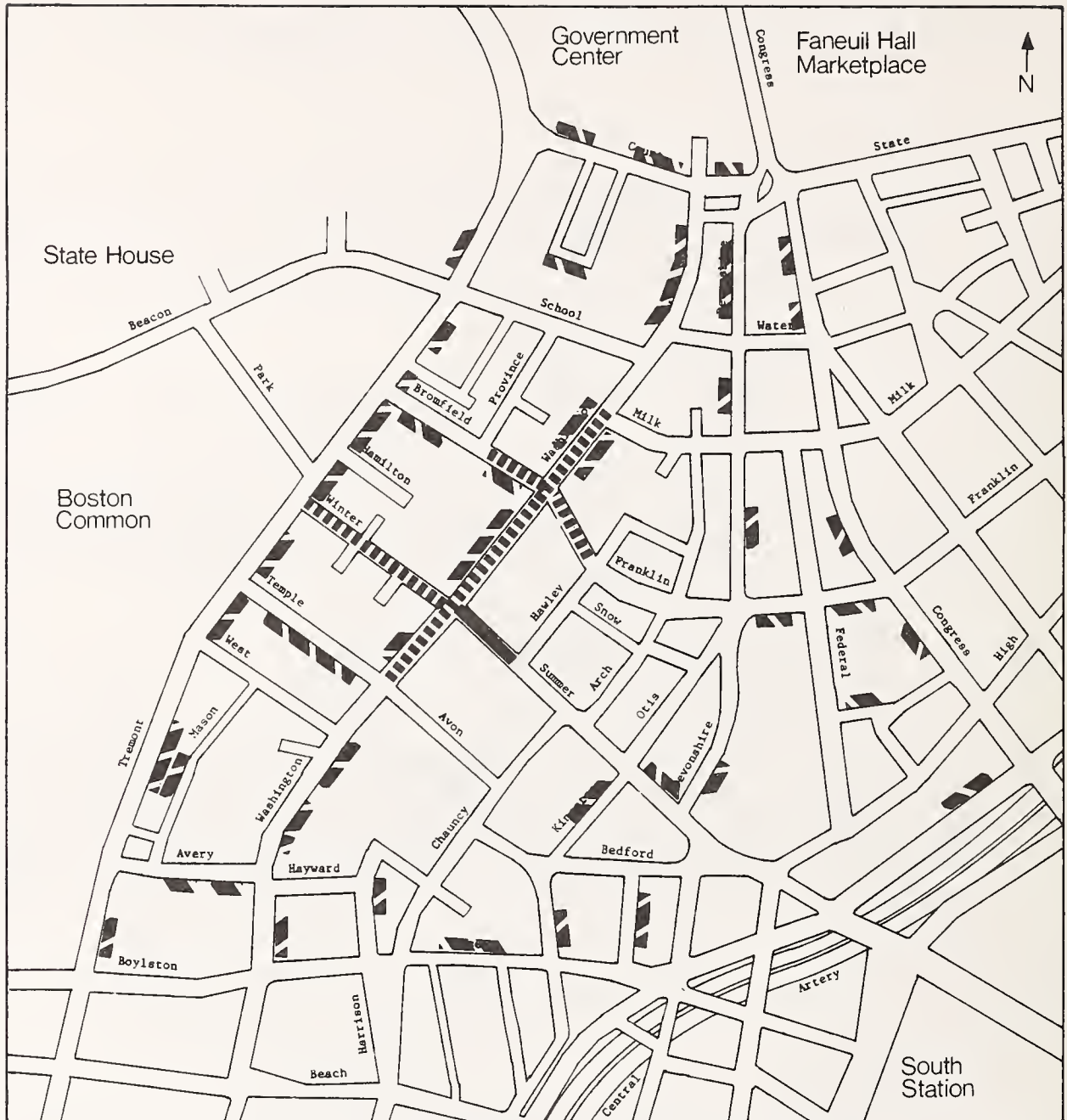
1. Before 11 AM, delivery vehicles are allowed on all of the streets which are otherwise fully closed to traffic, with the exception of the block of Summer Street for which no store access is required. Specifically, pre-11 AM goods movement is allowed on:
  - Washington Street from Temple to Milk.
  - Winter Street from Washington to Tremont.
  - Franklin/Bromfield from Hawley to Province.
2. For certain time-sensitive goods haulers which require special allowances, circulation is allowed on the above streets after 2:00 PM. These special goods haulers include armored cars, U.S. mail, newspaper delivery, air freight forwarders, and parcel delivery services. Delivery pattern impacts of these policies are discussed in Chapter 9.

Delivery pattern impacts of these policies are discussed in Chapter 9.

#### 3.2.5 Taxi Circulation

The Downtown Crossing project provided for five major taxi stands on the periphery of the retail core, on streets open to taxis but closed to private automobiles. In addition to using all auto streets, taxis are allowed to use the restricted sections of Franklin and Bromfield Streets for access to taxi stands (Figure 3-6). Temple Street, during the six months that it was closed, had a similar status. In the evenings (after 7 PM), taxis are also able to use Winter Street and the section of Washington Street from Temple to Bromfield/Franklin.









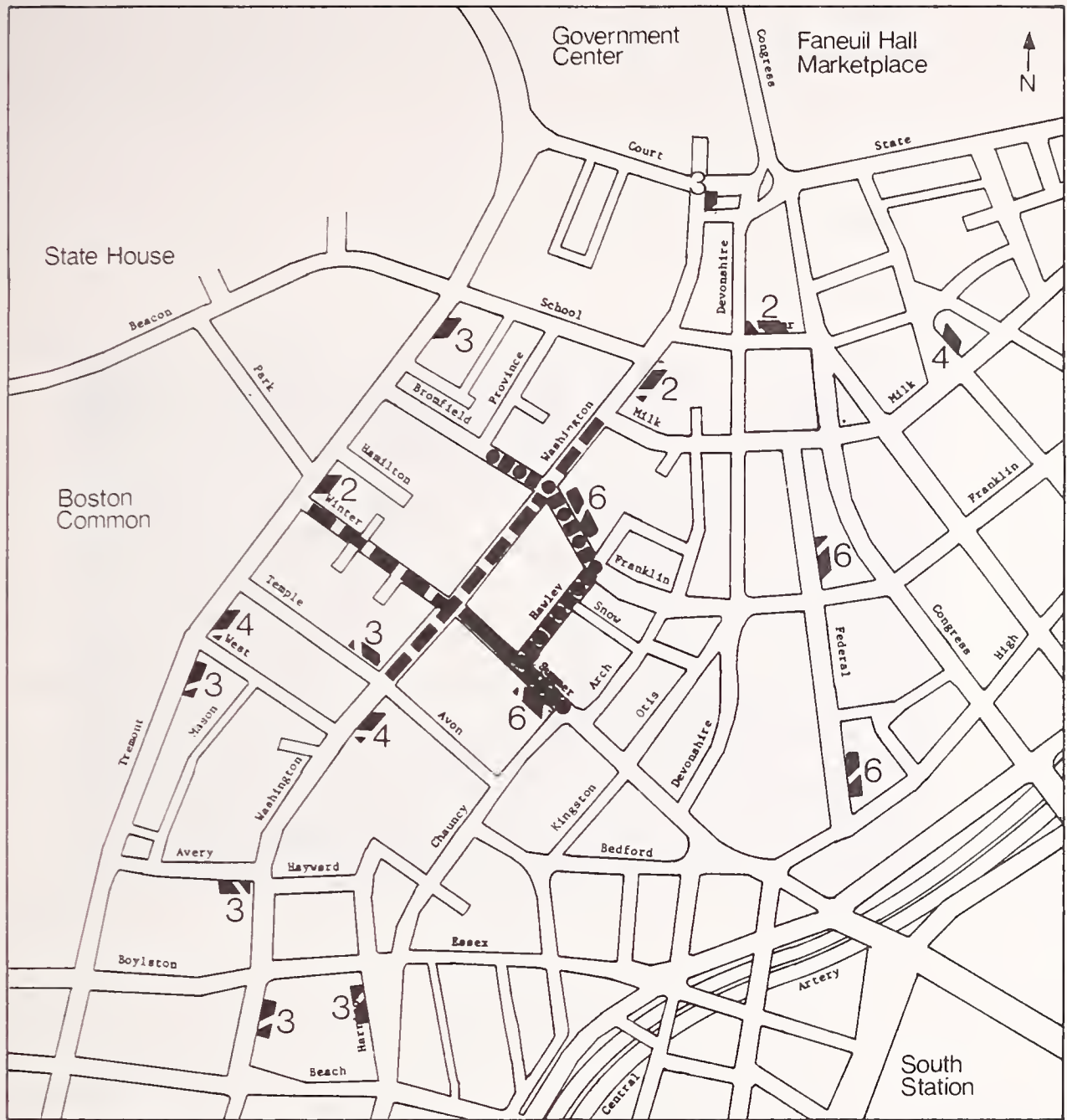
-  Closed to service vehicles
-  Open to service vehicles only before 11am
-  Open to service vehicles all day
-  Loading zone

FIGURE 3-5. DELIVERY ACCESS



- Closed to taxis
- ▬ Open to taxis after 7pm (closed to autos all day)
- ▨ Open to taxis all day (closed to autos)
- Open to all vehicles all day
- ▧ Taxi stand (and number of taxis)

FIGURE 3-6. TAXI ACCESS AND STANDS

The location and number of taxi stands has been improved and increased. Of particular importance are the two 6-cab stands on Franklin and Summer Streets, and the two smaller stands near the corner of Washington and Temple.

### 3.3 OPERATIONS SUPPORT AND PHYSICAL IMPROVEMENTS

#### 3.3.1 Pedestrian Amenities

Improvement of the pedestrian environment was a key objective of the Downtown Crossing project. Yet the narrow streets, the need to maintain street space for delivery and service vehicles, and the already substantial pedestrian volumes meant that there was little room for trees, fountains, or even benches. The pedestrian-oriented amenity improvements were made to Winter, Summer, and Washington Streets, and included: (1) uniform bricking of the streets from storefront to storefront; (2) replacement of the street lights with a distinctive cluster lighting; and (3) placement of information display kiosks with maps of the auto-restricted zone. A large number of benches were placed in the middle of Summer Street on the only block which had no delivery access requirements. Concrete planters with bushes as well as trash receptacles were placed along Washington Street and in Summer Street. An iron and plexiglass canopy over the sidewalk on two blocks of Washington Street had been installed a few years earlier as part of the previous Washington Street mall project (described further in Section 4.1B). Views of Washington, Summer and Winter Streets after completion of the Downtown Crossing project are shown in Figures 3-7, 3-8 and 3-9.

In addition to improvements along pedestrian circulation routes, four mini-parks were associated with the Downtown Crossing. A tiny park in a triangular traffic island at the intersection of Washington and School Streets was greatly enlarged by the closing off of the School-to-Milk Street connector lane. The enlarged "Boston Five Park" was supplied with removable benches by the adjacent Boston Five Cent Savings Bank. One block north of the main auto-restricted zone and adjacent to the old state capitol building, one block of State Street was closed off and converted to be "Old State House Park," with bricked paving, new lighting, benches, and bollards to exclude motor





FIGURE 3-7. WASHINGTON STREET: 1980



FIGURE 3-8. SUMMER STREET: 1980



FIGURE 3-9. WINTER STREET: 1980

vehicles there. Also, apart from the main auto-restricted zone is the Washington Mall, a pedestrian area converted out of what was formerly one block of Washington Street north of Court Street. A fourth pedestrian park area is "William Filene Park," an area of benches and trees adjacent to the Filenes department store along Franklin Street (between Hawley and Washington). Both the Washington Mall and the Filenes Park existed before the start of the Downtown Crossing Project. An addition park planned along Franklin Street (between Arch and Otis) was never built due to insufficient funds. Views of the Filene's Park and the Boston Five Park are shown in Figures 3-10 and 3-11. Project impacts on the physical environment for pedestrians are discussed further in Chapter 7.

### 3.3.2 Promotion and Merchant Organization

Recognizing the important role of the Downtown Crossing image, the development of a promotion program was a key element of the overall project. Prior to the Downtown Crossing Project, there was no downtown merchant association to promote the retail area there. The project funding during 1978-1979 provided for a site office and a full-time public relations director to develop leaflets, advertising, media coverage, special events and other activities to encourage people to use the area. This included both maximum publicity before initiation of the auto-restricted zone and continued promotion during the first months of operation. This staff person also had primary responsibility for responding to inquiries and complaints, and for organizing the area's merchants for a unified promotional effort for the Christmas shopping season. This promotion included Christmas lights and special tabloid sections in the local papers, funded by contributions by the area merchants.

A merchants organization, the Downtown Crossing Association, was subsequently formed in 1980. A full time director was hired. The organization took over responsibility for central promotion of the area and for communications of merchant concerns to the City. The project extension funding covered a 50 percent subsidy of the Downtown Crossing Association for its first year.





FIGURE 3-10. FILENES PARK



FIGURE 3-11. BOSTON FIVE PARK

### 3.3.3 Enforcement

Because of the recognized importance of enforcement of parking and traffic restrictions, funds were provided to cover the costs of additional police towing of illegally parked cars and the assignment of officers at the major entry points into Downtown Crossing and at intersections which require traffic officers. Traffic enforcement issues are discussed in Chapter 5.

### 3.3.4 Bus Service Subsidy

The extension of bus routes into the Downtown Crossing area, while increasing accessibility to the area, also resulted in increased operating costs for the MBTA. The MBTA has an operating policy which requires each regular line service route in the system to recover at least 30 percent of the cost of operating the route. Recognizing that it might take some time to promote the new bus route extensions, a one-year operating subsidy was provided under the UMTA demonstration grant to allow time to build increased ridership on the extended routes. After the first year, the MBTA assumed all costs and subsequently eliminated those route extensions. Bus ridership levels, costs and benefits are discussed in Chapter 6.

## 3.4 ORGANIZATION ROLES

There have been many agencies involved in stages of development of the downtown auto-restricted zone. Figure 3-12 lists each of the agencies or organizations and summarizes their degree of involvement during the prehistory, application for grant, planning, and implementation stages. Most of the parties involved in planning continued to be involved in the implementation stage. Figure 3-13 attempts both to lay out the organizational roles in a more structured way and to define responsibilities for the implementation phase of the project.

Agencies with major roles in the project development and operations were:

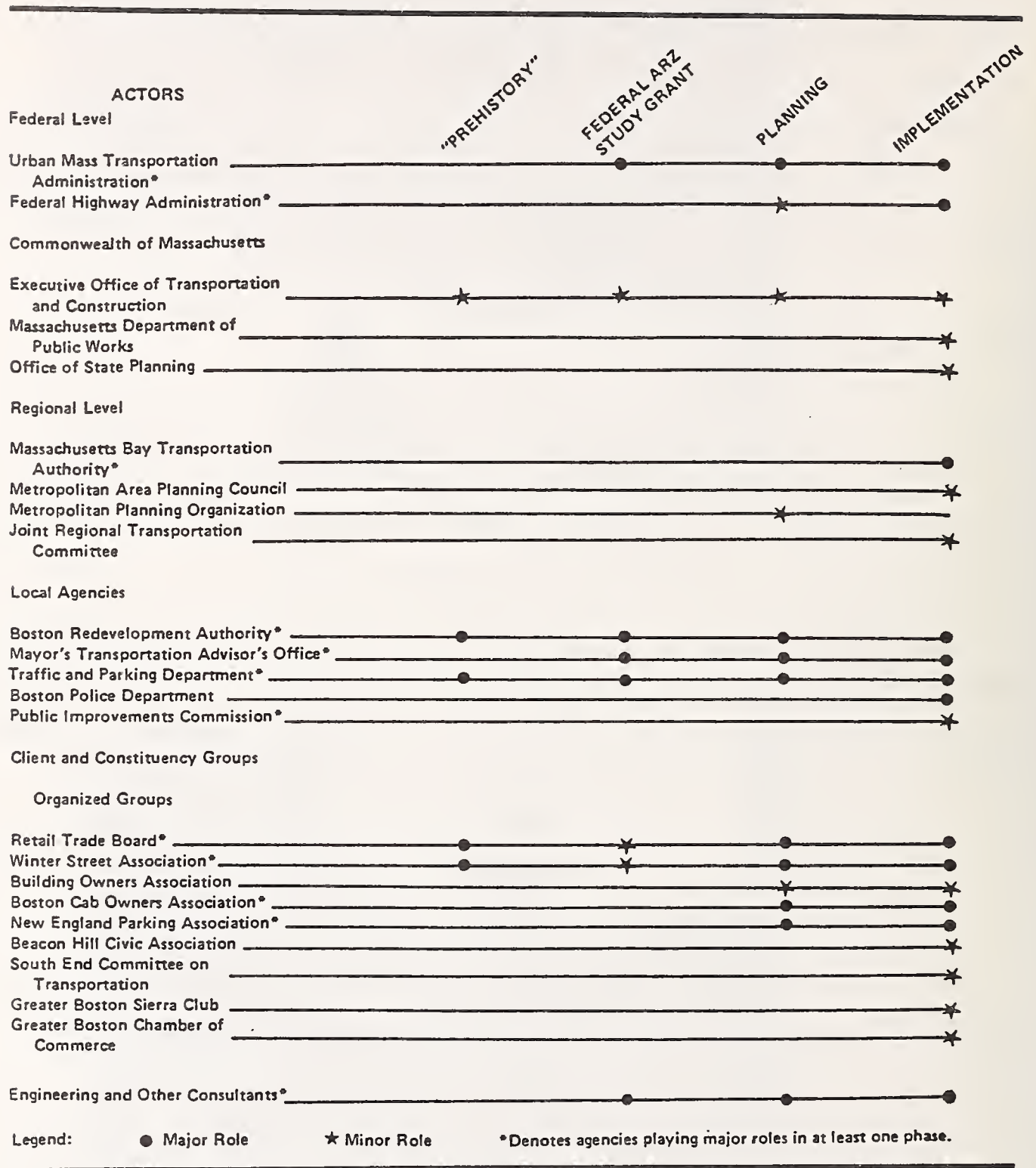


FIGURE 3-12. ROLES OF MAJOR ACTORS IN PROJECT PLANNING AND IMPLEMENTATION



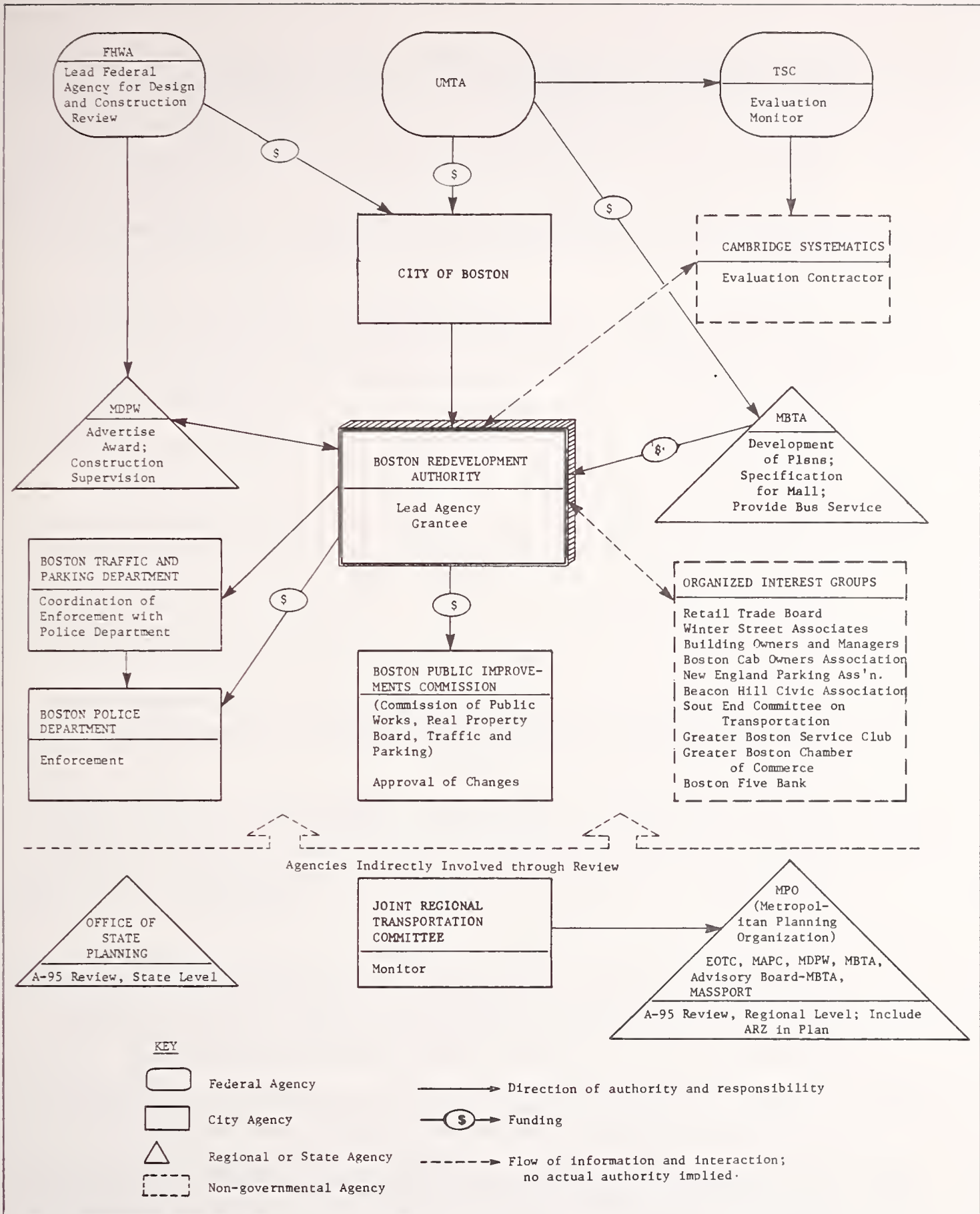


FIGURE 3-13. ORGANIZATIONAL STRUCTURE AND MAJOR RESPONSIBILITIES

1. The Boston Redevelopment Authority (BRA) is technically an autonomous authority created by the state legislature. It operates as the city planning agency for the City of Boston and has been responsible for the planning and implementation of most public improvements to the downtown. The BRA was designated as the lead agency in both the planning and the (Phase I) implementation of the Downtown Crossing project. It has maintained responsibility for the overall management, promotion, direction and coordination of the demonstration project.
2. The Boston Traffic and Parking Department (BTPD) handles traffic operations (routing, signing, and signalization) and on-street and public lot parking policies. It also handles ticketing for standing violations in coordination with the Police Department. The BTPD was responsible for instituting the traffic circulation and on-street parking changes, for modifications to these plans during the demonstration period, and for ongoing coordination of enforcement with the Police Department.
3. The Massachusetts Bay Transportation Authority (MBTA), a regional authority, operates rapid transit (subway), buses and commuter rail services. The MBTA was responsible for implementing the transit scheduling and operations changes. It was also the lead agency for the engineering contract to develop plans and specifications for the mall and special bus lanes.
4. The Massachusetts Department of Public Works (MDPW) carries out highway construction, and was responsible for supervising the Phase I traffic-related construction.
5. The Boston Public Works Department (BPWD) carries out maintenance and reconstruction of streets, and has also shared some of the responsibility for planning and design of the downtown street improvements. The BPWD was responsible for design and engineering of the Phase II construction and physical improvements.
6. The Mayor's Office of Transportation establishes transportation policies for the city. The Mayor's Transportation Advisor was the local coordinator for the consultant design analysis and played a lead role in the organizing effort to gain cooperation from merchants and other interest during the planning process.
7. The Boston Police Department has been responsible for enforcing parking restrictions, traffic regulations, and towing.
8. The Urban Mass Transportation Administration (UMTA) initiated the concept of auto-restricted zone demonstrations within its Section 6 Service and Methods Demonstration program. It provided Section 3 funds directly to the City of Boston for construction, and Section 6

funds for capital improvements such as traffic geometrics and non-traffic-related information systems. It also provided Section 6 non-capital funds directly to the MBTA to subsidize increased operating costs from extending the bus routes, and to the City of Boston for enforcement, maintenance, promotion, evaluation data collection, and management of the overall project.

9. The Federal Highway Administration (FHWA) provided Federal Aid Urban Systems funds for construction of pedestrian areas and non-transit related signals and timing.
10. Organized interest groups who played a major role in the planning process were: (a) Winter Street Association, (b) Retail Trade Board, (c) Boston Cab Owners Association and (d) New England Parking Association.
11. The Downtown Crossing Association, formed in 1980 after the completion of all construction of the auto restricted zone, now serves as a liason between the downtown businesses and the city on continuing issues of traffic, street improvements, maintenance and sanitation, and security.

### 3.5 PROJECT COSTS AND FUNDING

The Downtown Crossing project was funded by the City of Boston and three federal programs: UMTA Section 3, UMTA Section 6, and FHWA Urban Systems. The important catalyst for the City's ability to implement the project at the time was the existence of the demonstration funds. The usage of the various funds are described below, and the funding sources are then summarized in Table 3-1 at the end of this Chapter.

#### 3.5.1 UMTA Section 3

The MBTA had a \$12 million two-phased "Transit Efficiency Capital Grant" which had received partial UMTA funding approval. One component of the transit efficiency program was the design of exclusive bus lanes. The MBTA committed \$795,300 of this capital grant for the design and construction of the downtown bus loops. This included \$636,240 of UMTA funds and a local match of \$159,060. The specific projects included under this funding were:



1. <u>Franklin Street</u>	\$ 68,000
Construction of a bus passenger island in the middle of Franklin Street between Devonshire and Arch Streets	
2. <u>Bus Route Signals</u>	\$239,000
Adjustments to the existing signals and later new signal controllers for more sophisticated signalization	
3. <u>Bus Route Geometrics</u>	\$152,000
Painting, pavement markings, cones, mountable barriers, realignment of corners, and the widening of Bedford Street for the bus lane.	
4. <u>Bus Route Amenities</u>	\$ 90,000
Shelters, signing, benches and other aids for waiting bus patrons	
5. <u>Bus Route Engineering</u>	\$174,000
6. <u>Contingencies</u>	\$ 72,300
<u>UMTA Section 3 Total</u>	<u>\$795,300</u>

### 3.5.2 Federal Aid Urban Systems (FAUS)

The Federal Highway Administration's Federal Aid Urban Systems (FAUS) program funded most of the construction of pedestrian areas and all non-transit related signals and signing. This grant to the city of Boston included a federal share of \$811,200 and a local match of \$202,800. Specific elements funded were:

1. <u>Winter Street</u>	\$ 189,000
Removal of old curbing; new brick paving, lighting and bollards	
2. <u>Summer Street</u>	\$ 150,00
Removal of old curbing; new paving, new lighting, and benches	
3. <u>Old State House Park</u>	\$ 165,000
Construction of Old State House Park with granite paving, new lighting, benches and bollards	
4. <u>School Street Extension</u>	\$ 56,000
Extension of existing park with granite paving	
5. <u>Washington Street</u>	\$ 95,000
Widening east sidewalk between Summer and Milk, identification of bus stops, and provision of amenities	
6. <u>Traffic Related Information Systems</u>	\$ 359,000
Signing and pavement markings, non-transit related signals and signing.	
<u>Federal Aid Urban Systems Total</u>	<u>\$1,014,000</u>

### 3.5.3 UMTA Section 6

All non-capital elements to support the operation of the auto restricted zone were funded under a grant from the UMTA demonstration program. In addition, informational signs and supplementary bus lane marking were funded under the demonstration grant.

1. <u>Traffic Geometrics</u>	\$ 10,000
Painting or channelization not covered by the MBTA's capital grant work	
2. <u>Non-traffic Related Information Systems</u>	\$ 40,000
Signing to direct people to the taxi stands and bus stops, informational kiosks, and peripheral signing to encourage people into the project area	
3. <u>Contingencies</u>	\$ 200,760
<u>Total UMTA Section 6 Capital</u>	<u>\$ 250,760)</u>
4. <u>MBTA Operating Subsidy</u>	\$ 709,792
One-year operating subsidy for extension of the MBTA bus routes, to allow time to build increased ridership on the lines	
5. <u>Enforcement and Towing</u>	\$ 134,403
Costs of upgraded police towing of illegally parked cars and the assignment of traffic control officers at entry points into the auto-restricted zone and at other nearby intersections	
6. <u>Maintenance</u>	\$ 30,000
Funding for a private contractor to maintain the area to supplement the Public Works Department's normal maintenance work	
7. <u>Promotion</u>	\$ 75,000
Establishment of a site office with a full time person to develop promotional materials, media coverage, and special events	
8. <u>Evaluation</u>	\$ 200,000
Collection of information by the City and MBTA to measure the impact of the program, in terms of retail sales, transit ridership, pedestrian and traffic circulation	
9. <u>Project Management</u>	\$ 117,000
Coordination and supervision of the engineering and operation of the project. Of the capital budget, 6 percent was set aside within the Section 6 grant to fund the project's management for two years, based on a standard UMTA allocation for management costs. These costs were not provided for in either Section 3 or the FAUS budgets	
<u>Total UMTA Section 6 Non-Capital--First Grant</u>	<u>\$1,266,195</u>

A subsequent second phase grant was awarded under the Section 6 program for further (1981) support of the project management, operations, and the future vitality. Specifically, this grant included:

1. <u>Enforcement and Towing</u>	\$ 150,000
Continuation of supplemental police enforcement of traffic restrictions at entry points into the auto-restricted zone	
2. <u>Promotion</u>	\$ 30,000
Matching funds for activities of the Downtown Crossing Association, to create a smooth transition of responsibility for promotion from the city to the merchant organization.	
3. <u>Project Management and Contingencies</u>	\$ 200,000
Funding of BRA project staff to provide liaison with merchants and the operating agencies and to coordinate the Lafayette Plaza development with Downtown Crossing	
4. <u>Marketing and Development Studies</u>	\$ 195,000
Subcontracts used to examine seven components affecting the operation and potential for expansion of the auto restricted zone: (a) crime and security, (b) street use, (c) parking, (d) traffic, (e) landscape, (f) urban design, (g) marketing and land use.	
<u>Total UMTA Section 6 Non-Capital--Extension Grant</u>	<u>\$ 575,000</u>
 <u>TOTAL UMTA SECTION 6</u>	 <u>\$2,091,955</u>

#### 3.5.4 City of Boston

The City of Boston funded the Phase II construction improvements, which were in addition to the Phase I (FAUS funded) construction described in Section 3.5.2.

1. Washington Street  
Bricking the sidewalk/streetspace from Temple Place to Milk Street
2. Temple Place, West Street, Bromfield Street  
Conventional sidewalk and street reconstruction; new lighting



TABLE 3-1

SUMMARY OF PROJECT FUNDING SOURCES: 6/78-12/81

	Federal Share	Local Share	TOTAL
UMTA Section 3	\$ 636,240	\$ 159,060	\$ 795,300
FWHA Federal Aid Urban Systems	811,200	202,800	1,014,000
UMTA Section 6 Capital Grant	250,760	0	250,760
City of Boston	<u>0</u>	<u>1,200,000</u>	<u>1,200,000</u>
TOTAL CAPITAL COSTS	\$1,698,200	\$1,561,860	\$3,260,060
UMTA Section 6 Non-Capital Grant	\$1,841,195	\$ 0	\$1,841,195
TOTAL COST	\$3,539,395	\$1,561,860	\$5,101,255



## 4. PROJECT EVOLUTION

### 4.1 OVERVIEW

This chapter contains a detailed description of the process of initiation, planning, implementation, and ongoing management of the auto-restricted zone project, for readers who desire more detailed information than the overview in Chapter 1. Section 4.2 describes the historical development of downtown improvement efforts in Boston, Section 4.3 describes the planning process, and Section 4.4 describes the project implementation and construction.

Since completion of the construction, the operation of the auto restricted zone has undergone continuing development and some modification. Section 4.5 summarizes subsequent changes in traffic circulation and bus operations, the formation of a downtown merchant association, and ongoing efforts to improve the quality and function of the Downtown Crossing. Section 4.6 presents a chronological summary of events.

The review of the implementation process and ongoing project coordination demonstrate that the efforts of certain individuals and agencies, the continuous evaluation and refinement that occurred, the cooperation among agencies, and the timing of actions by various parties were all as important to the success of the project as the specific characteristics of the project itself.

### 4.2 PREVIOUS AUTO RESTRICTION AND DOWNTOWN IMPROVEMENT EFFORTS IN BOSTON

#### 4.2.1 Earlier Plans for Auto Restriction

The concept of auto restriction in downtown Boston was not new. A 1914 Chamber of Commerce study recommended the widening of sidewalks on Washington Street. The study noted that:



"There can be no doubt about the advantages to traffic generally that such a widening of the sidewalks on Washington Street would bring about. Under present conditions, the sidewalks on both sides of the street are inadequate for pedestrian traffic during the major portion of the day, so that ... pedestrians are often compelled to use the street in order to make decently rapid progress."

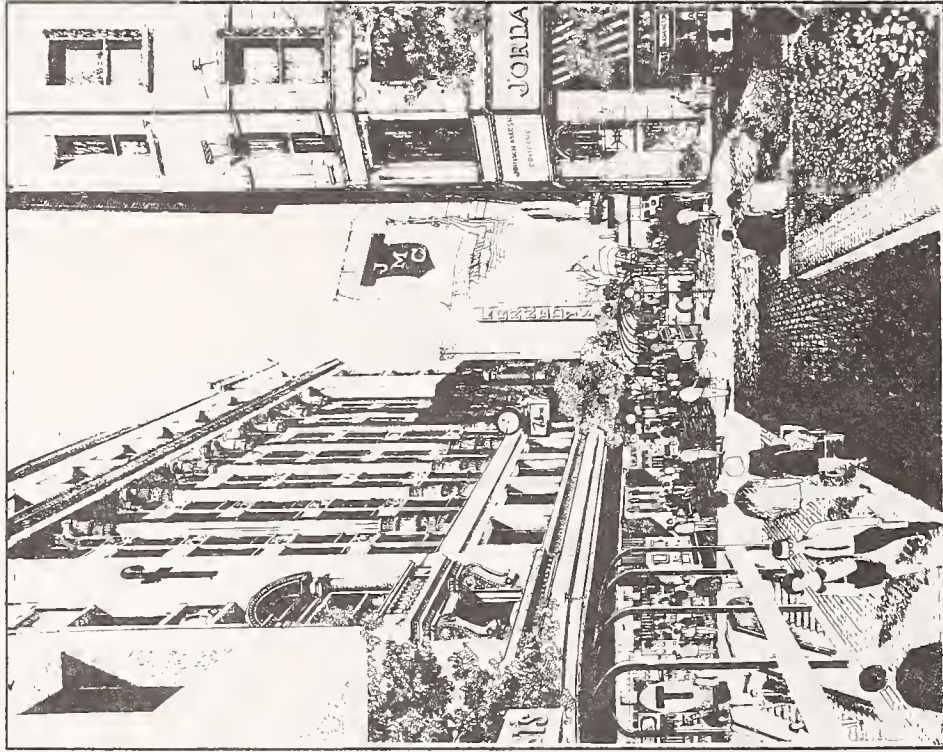
In 1960, the Boston City Planning Board prepared A General Plan for the Central Business District, which considered the separation of pedestrians and vehicles to be fundamental to CBD planning and recommended pedestrian malls on Washington, Winter, and Summer Streets. In 1962, The Committee for the Central Business District, Inc. (CCBD), a group of over 75 businesses and downtown interests, was formed when the then-Mayor John F. Collins called upon the business community to take an active role in planning for the needed revitalization of downtown Boston. The CCBD and the Boston Redevelopment Authority (BRA) together contracted with the firm of Victor Gruen Associates to prepare a plan for the redevelopment of the Central Business District.

The Gruen plan for the CBD, completed in 1967, again called for the construction of major pedestrian streets and shopping malls on several downtown streets as shown in Figure 4-1 (Victor Gruen Associates, 1967). The artist renderings in Figure 4-2 (A-D) illustrate some designs of the Gruen Plan for Washington, Winter, and Summer Streets. The plan called not only for surface improvements, but also for a subsurface shopping mall below Winter and Summer Streets and a dome to be developed at a second-story level of Summer Street. The plan required considerable demolition and new construction as part of its strategy to restructure the downtown pedestrian and traffic networks. This included the construction of a new through route parallel to and between Tremont and Washington Streets.

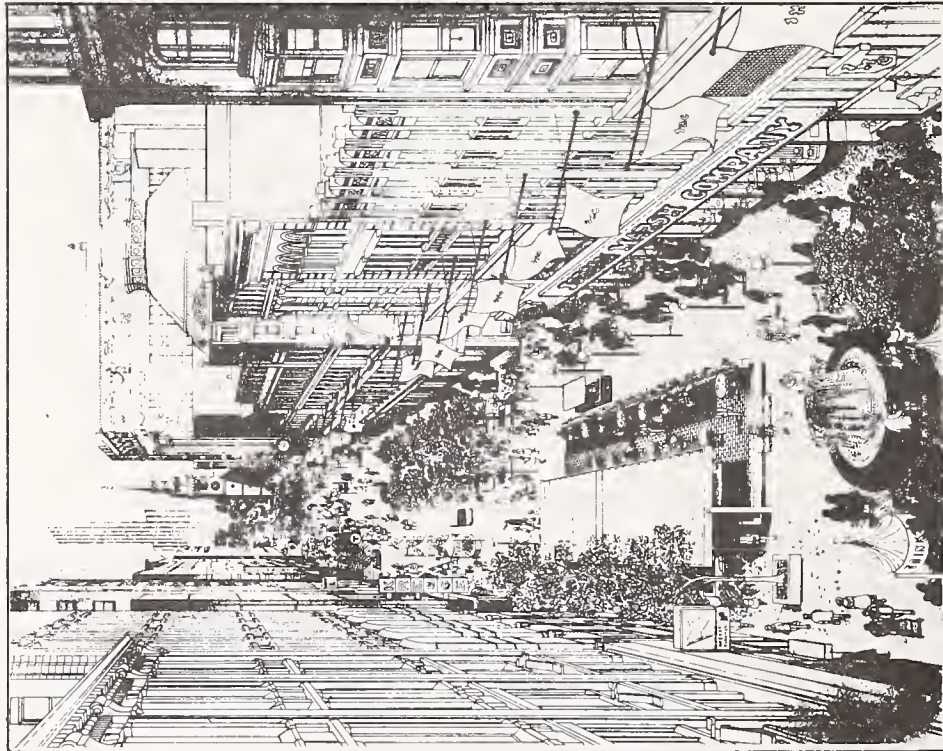
The Gruen Plan was met with strong opposition from several influential groups and largely as a result of that opposition, the plan was not implemented. Primary among the opponents of the plan were the two largest department stores in the area (Jordan Marsh Company and Filene's) and the CCBD, who objected to both the proposed auto restriction on the major retail street and to the major demolition and reconstruction called for. In







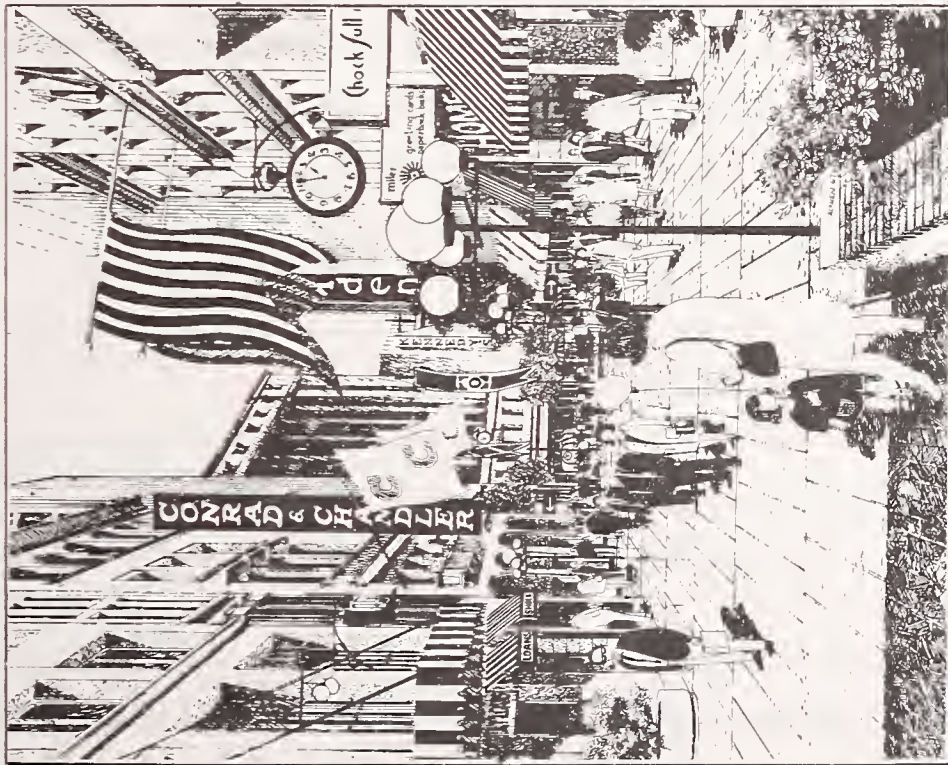
B. Winter Street and Summer Street



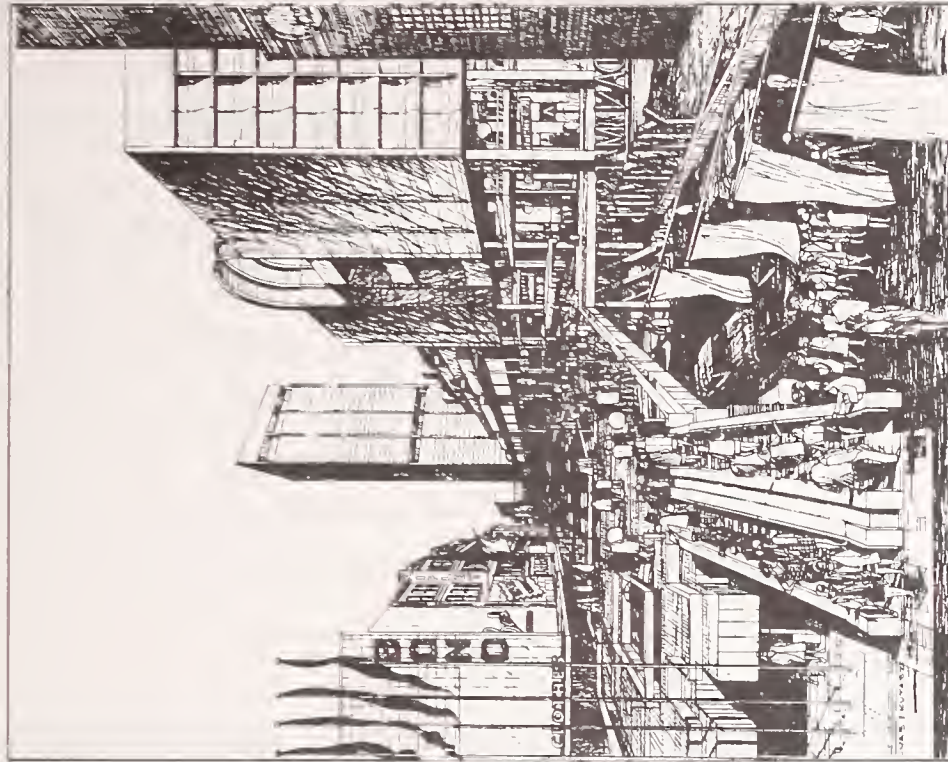
A. Washington Street

FIGURE 4-2. GRUEN PLAN FOR DOWNTOWN IMPROVEMENTS





C. Winter Street



D. Summer Street from Chauncy to South Station

FIGURE 4-2. GRUEN PLAN FOR DOWNTOWN IMPROVEMENTS (cont.)

addition, the then-City Commissioner of Traffic and Parking maintained that traffic on the major arterials such as Washington and Summer Streets could not be restricted without serious adverse traffic impacts on surrounding streets. Hope of implementation of even parts of the plan vanished when the U.S. Department of Housing and Urban Development indicated that there would be no federal funds available for implementation.

Despite the rejection of the Gruen Plan, support still remained for some type of improvement to the pedestrian environment in the downtown shopping area, particularly along Washington Street. In 1971, an experimental closing of Washington Street on a Saturday was tried, but the attempt was considered to be less than successful because of adverse traffic impacts. The failure, due largely to poor management and a lack of advance publicity, served to further reinforce merchant and traffic department opposition to the ARZ concept.

#### 4.2.2 The Washington Street Mall: Precursor of the Downtown Crossing Project

In 1973, the BRA proposed the idea of a "semi-mall" on Washington Street, maintaining vehicular traffic, but reducing the width of Washington Street to one traffic lane. The plan included the extension of the sidewalk by a lane on both sides of Washington Street and a canopy over the sidewalk on the west side of the street for the two blocks between Winter and Milk Streets.

The auto-restriction concept received considerable support from the proprietor of a small card shop in the area, who organized the small merchants and banks on Winter Street to form the Winter Street Merchants Association. In addition to the Winter Street merchants, the BRA plan was also supported by the various smaller merchants on Summer and Washington Streets. The plan found strong opposition, however, from the two largest department stores and the City Traffic and Parking Commission. They feared that the auto restriction would cause massive traffic problems and send many of the shoppers out to suburban malls.

In an effort to convince merchants of the plan's merit, the BRA conducted several informal studies to demonstrate the need for auto restriction. Using



counts of automobiles and pedestrians on Washington Street, it was shown that the sidewalks represented only one-fourth of the existing right-of-way but carried eight times as many people as did the street. It was thus argued that devoting more space to the pedestrian would increase the capacity of the system and would allow more potential customers to pass by the stores along Washington Street. During this time, the BRA held meetings with the City Public Works Department (which is responsible for street construction and maintenance), the City Traffic and Parking Department, the Police and Fire Departments, and the City Law Department.

To reduce opposition to the plan, the BRA eventually agreed to modify the Washington Street mall design to include two lanes of traffic rather than one, and special pull-out bays for deliveries. It was also agreed to implement only a temporary canopy, one that could be disassembled if the Mall as not successful. With the changes, the Retail Trade Board, which represented the large department stores, endorsed the project. The Mayor's office agreed to allocate \$500,000 from a bond issue for general capital improvements in the downtown that the City Council had earlier approved.

The BRA then commissioned detailed designs for the Washington Mall, and these were completed in the spring of 1976. Following approval by the City Public Improvements Commission (which consists of the Commissioners of Public Works, Traffic and Parking, and Real Property and Building), construction contracts were put out to bid. The Washington Street Mall project was completed in mid-1977.

#### 4.3 DEVELOPMENT OF THE PLAN FOR THE BOSTON AUTO-RESTRICTED ZONE DEMONSTRATION

##### 4.3.1 UMTA Study Grant

Even before the struggle over the Washington Street Mall issue was resolved and the plan implemented, the city became interested in pursuing further auto restriction in the Washington Street area. As early as 1973, the BRA had internally given serious consideration to the possibility of closing



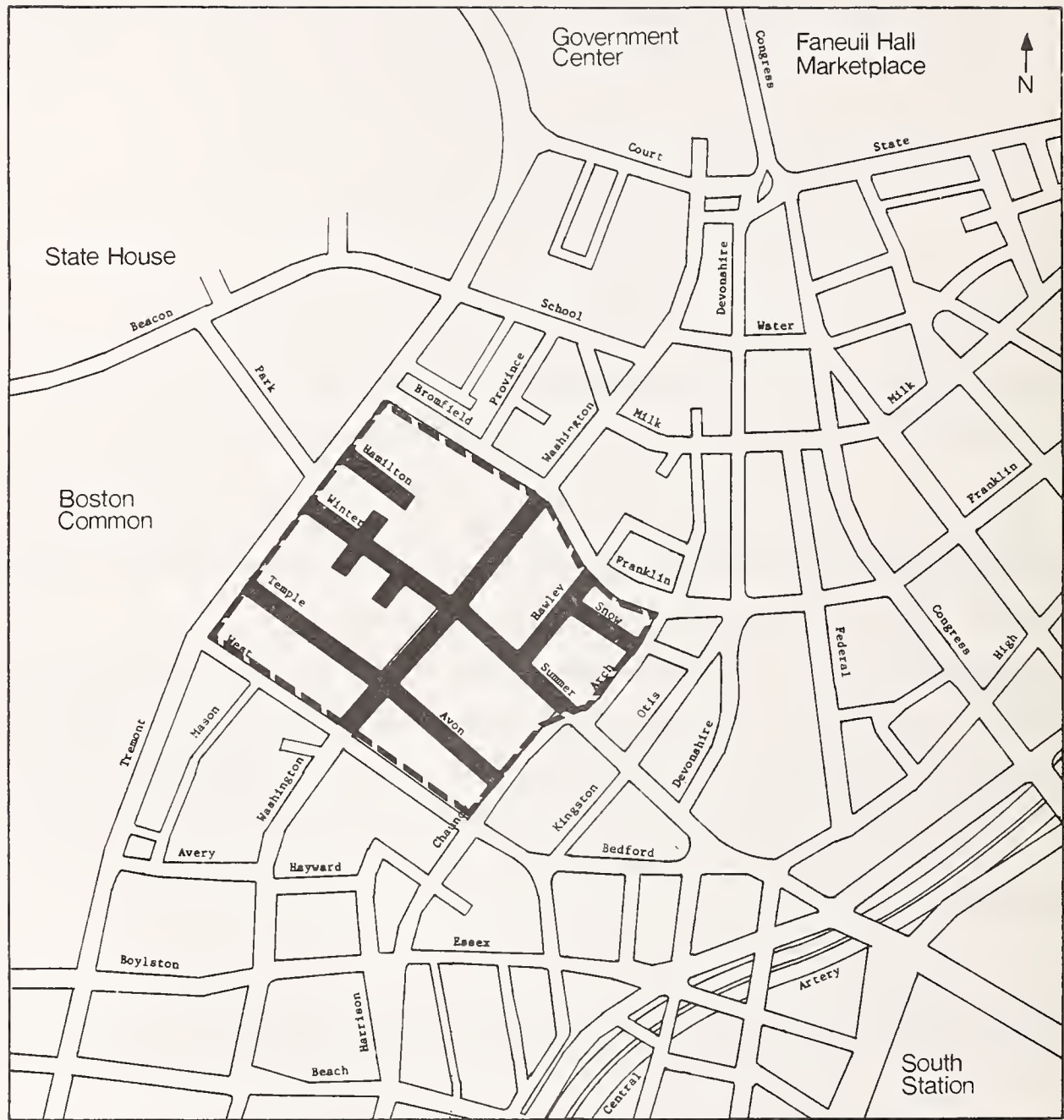
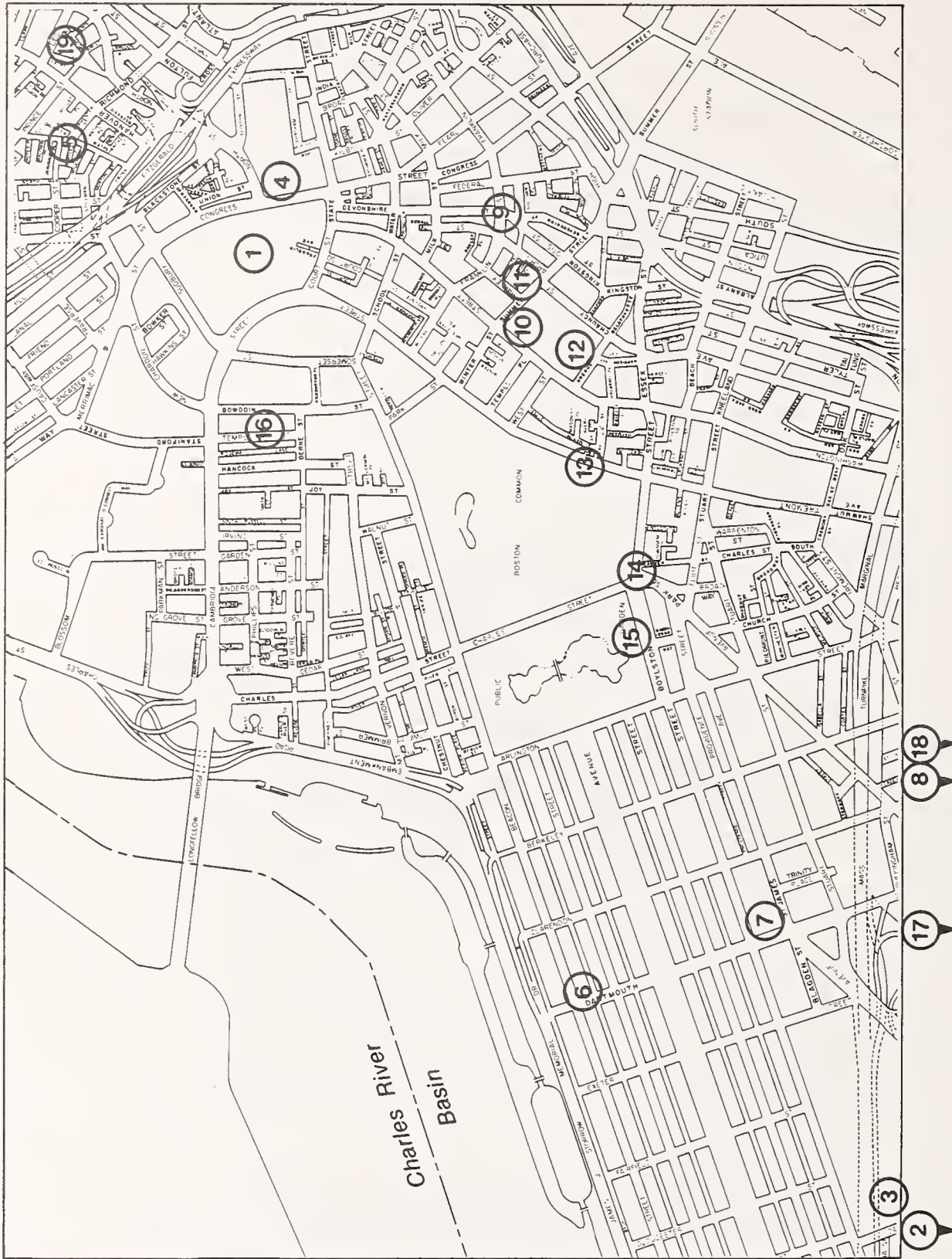


FIGURE 4-3. BRA 1973 PROPOSAL FOR AUTO RESTRICTED ZONE

certain streets to automobile traffic entirely. In intra-departmental memoranda in 1973, the BRA Transportation Department proposed a wide area auto-restricted zone, as shown in Figure 4-3. This particular proposal remained dormant until August 1975, when the Mayor's office was contacted by an UMTA consultant team consisting of the firms of Alan M. Voorhees and Associates, Inc.; Cambridge Systematics, Inc.; and Moore-Heder, Architects. The UMTA consultant team wanted to ascertain the City's interest in participating in an UMTA-funded study to design an auto-restricted zone demonstration, to be implemented within two years. Initially, it was anticipated that at least two of the five cities selected would ultimately receive federal demonstration funds.

The initial contact by the UMTA consultants came at the time when the Winter Street Merchants Association, organized by a local card shop proprietor, were lobbying the City to close their street to auto traffic and inject some new capital to improve the area. Partially in response to this interest by the Winter Street merchants, the Mayor's Transportation Advisor asked the BRA to proceed with an application describing the potential for an auto-restricted zone in the city of Boston. The particular area proposed for auto restriction was the same area suggested by the BRA's Transportation Department in 1973. The application, which was completed in October 1975, stressed the strong history of planning oriented to auto restriction and pedestrianization. The fact that nine street closings had already been implemented in various parts of Boston was cited as evidence of the City's and the BRA's commitment to restricting auto use. The names and locations of these projects are shown in Figure 4-4, along with other proposed street closing projects.

Following a site visit by UMTA representatives and the team of consultants in January 1976, the BRA formulated a set of specific proposals, summarized in Table 4-1. The BRA prioritized its proposals and anticipated that staging of the various elements within the area would be necessary. Certain elements of the proposal did become part of the final ARZ plan.



- 1. Government Center
- 2. Christian Science Center
- 3. Prudential Center
- 4. Quincy Markets
- 5. Salem Street
- 6. Dartmouth St. Mall
- 7. Copley Plaza
- 8. South End Bus Lanes
- 9. Winthrop Square
- 10. Washington St. Mall
- 11. Downtown Plazas and Sidewalk Widening
- 12. Lafayette Place
- 13. Tremont St. Narrowing
- 14. Park Plaza
- 15. Boylston St. Narrowing
- 16. Temple St. Mall
- 17. Tremont/Columbus Redesign
- 18. Clarendon St. Closing
- 19. North Square

FIGURE 4-4. BOSTON STREET CLOSINGS COMPLETED AND PLANNED



TABLE 4-1

BRA DOWNTOWN AUTO RESTRICTED ZONE PROPOSALS (1976)  
(Listed in Order of Priority)

- 1) Washington Street - Phase I Mall, restricting the street to 2 moving lanes and service pull-offs, to be completed by Fall 1976. Chauncy-Arch should be reversed to accommodate Washington Street traffic.

Proposal: to restrict one lane to taxis and buses and establish a downtown bus route connecting Washington Street retail area with Back Bay retail areas.

- 2) Winter Street - will be influenced by two private store renovations and creation of an underground MBTA tunnel connection between Park Street and Washington Stations.

Proposals: to close the street completely to auto traffic, to prohibit deliveries between 7-9:30 a.m., 12-2:30 p.m. and 4:30-6:00 p.m., to provide new lighting and widen sidewalks, or to completely repave the street to accommodate pedestrians and service vehicles only.

- 3) Summer Street - will be influenced by improvements to Kennedy's store, and MBTA improvements to Washington Station.

Proposals: to treat the street exactly as Winter Street or to close the street completely to all vehicles between Washington and Hawley, providing for open surface level connections to the MBTA station mezzanine in the current street right-of-way.

- 4) Temple Place - is of primary importance neither as a traffic nor as a pedestrian route. Land use is primarily small business.

Proposal: to treat the street in the same way as Winter Street.

- 5) Avon Street - will be completely absorbed into the Lafayette Place project.

- 6) Hamilton Place, Wesleyan Place, Music Hall Place, Winter Place, Jackson Place, Snow Place and Bussey Place - are all private ways which are not under the City's jurisdiction.

Proposals: to coordinate, provide design assistance, and where possible, provide financial assistance to private projects for street and sidewalk pavement and lighting to make the streets more pleasant pedestrian ways, and to assist abutters in scheduling deliveries.

SOURCE: Boston Redevelopment Authority, "Suggested Proposals - Auto Restricted Zone" (Boston, MA.: Feb. 4, 1976).

In April 1976, UMTA approved Boston as one of the five auto-restricted zone study cities. The other four cities chosen were Memphis (TN), Providence (RI), Tucson (AZ), and Burlington (VT). By 1981, Providence and Memphis had remained as active sites, while the plans for Tucson and Burlington were dormant. New York had been added as an additional auto-restricted zone demonstration site.

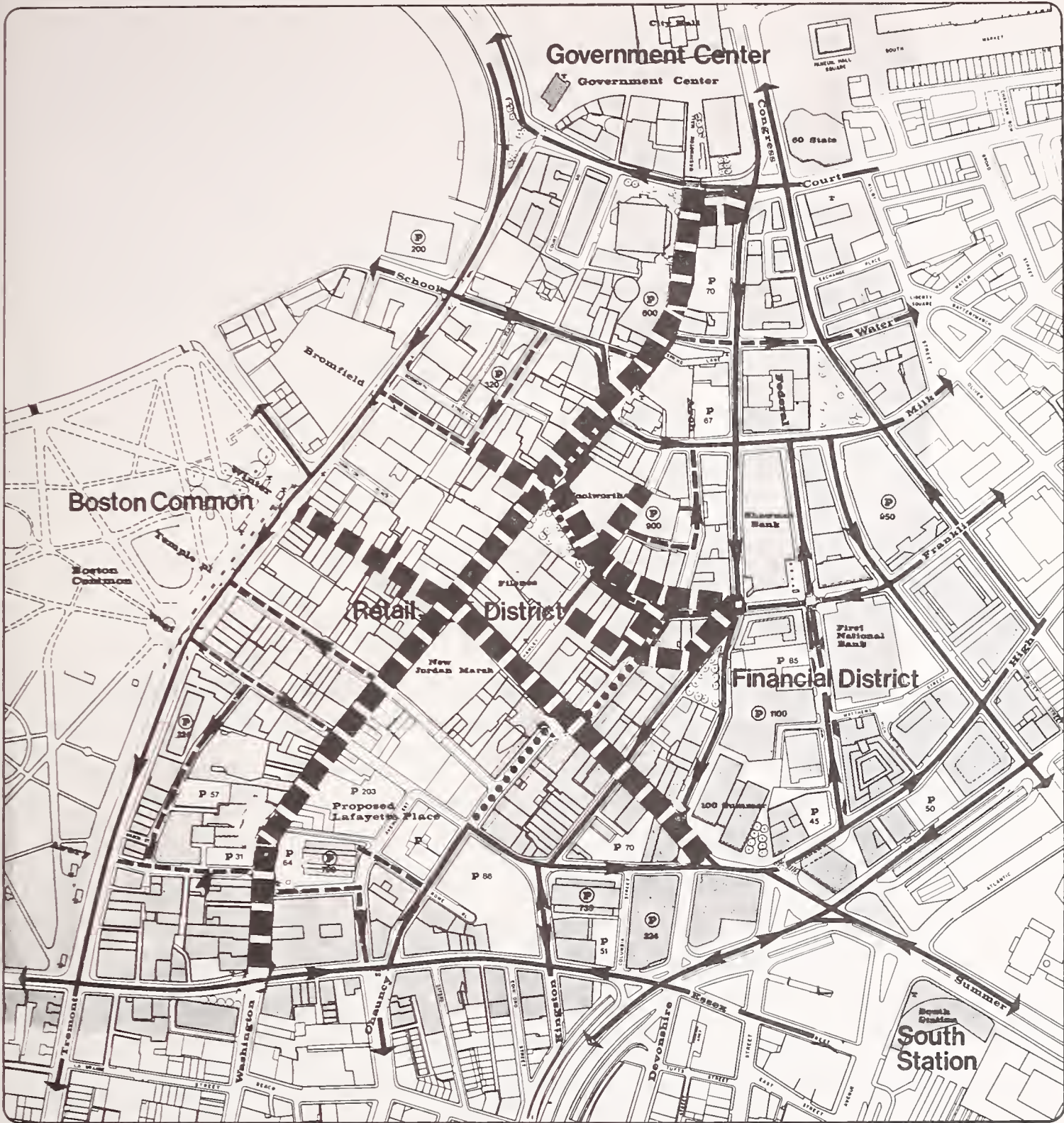
#### 4.3.2 Detailed Planning

Detailed planning for the Boston Auto-Restricted Zone demonstration was conducted primarily by a team of four UMTA consultants (Alan M. Voorhees and Associates, Cambridge Systematics, Inc., Moore-Heder Architects, and A.T. Kearney), with assistance from the City (Boston Redevelopment Authority, Traffic and Parking Department and Mayor's Office), the Metropolitan Planning Organization's Central Transportation Planning Staff, and overall direction from UMTA. The Mayor's Office was designated as the coordinator of formal communications with responsibility to provide the consultants with policy inputs, while the BRA provided technical support and was responsible for day-to-day working contacts with the consultants.

Three auto-restricted zone proposals were initially considered by the consultants. At one extreme was the "Tremont-Purchase Alternative," which would have restricted auto traffic throughout the entire CBD. It was quickly dropped from consideration because of its political infeasibility. The most modest proposal was the so-called "Devonshire Congress Alternative," which channeled traffic to the periphery of the retail district.

The modest Devonshire-Congress Alternative was chosen as a point of departure for the development of further traffic circulation alternatives. Three variations on this alternative were studied by the consultants, with each subsequent iteration resulting in a smaller area of auto restriction. The plan produced at the end of the consultants' four and a half month planning study, "Traffic Scheme F", called for Summer, Winter, Washington, Hawley, and portions of Chauncy Street to be closed to auto traffic. (See Figure 4-5)





- ➔ Proposed auto circulation
- - - Proposed parking and drop-off access
- ..... Proposed bus circulation
- ||||| Proposed pedestrian way

FIGURE 4-5. CONSULTANT RECOMMENDATIONS FOR TRAFFIC CIRCULATION (Scheme F)



The consultants also produced a "Transit Plan D," included along with "Traffic Scheme F" in the consultant's final report, which recommended changes in the MBTA bus system as well as the provision of a new shuttle bus system. The changes recommended for the MBTA centered around increasing local and express bus penetration into the Central Business District. The recommended shuttle system was to improve accessibility from outlying parking garages to the retail and financial districts and to improve access among activities in and around the retail and financial district.

The consultants' consideration of traffic circulation, transit routing alternatives, and possible shuttle bus schemes included a detailed assessment of the impact of each scheme in such areas as:

1. travel times and costs by mode of travel
2. pedestrian levels of service
3. congestion on the street system
4. frequency of travel to the area
5. choice of travel mode
6. goods movement costs.

Numerous counts and surveys were conducted to determine the existing conditions and to enable the consultants to make projections of the impacts of the proposed changes.

Although the City of Boston viewed the consultant's final plan as essentially accurate, developments occurring after the consultants completed their final plan induced the City to further reduce the scope of the project. Downtown merchants were becoming increasingly wary of major changes in the retail district, particularly after Gilchrist's department store and R.H. Stearn's department store closed in 1977. The construction of Phase I of the Washington Street Mall took longer than anticipated and caused some controversy about further disruptions to the street system. Funding possibilities for the Auto-Restricted Zone project were lessened when the City failed to receive Public Works funds from the Economic Development Administration (EDA) and found it could not use a local urban renewal bond issue. Strong political trends for economizing in city government caused further pressure for cutting the scope of the project.

Because of these difficulties, the City proposed a smaller-scale auto restricted zone scheme. Working with assistance from the consultants, the City proposed "Scheme G" as shown in Figure 4-6. This is the plan which was constructed, beginning in July, 1978. Under this plan, Chauncy and Arch Streets carry northbound traffic to Milk Street, Milk becomes westbound only from Arch to Washington; Washington Street remains open to northbound circulation north of Milk; School Street traffic heading east is diverted to Water Street; and a short section of School Street next to the Boston Five Cent Savings Bank is closed.

#### 4.4 IMPLEMENTATION AND CONSTRUCTION

##### 4.4.1 Gaining Cooperation from Merchants and Other Area Interests

The most important client group for the Mayor's Office to persuade was the merchants. UMTA, in fact, insisted on solid merchant support before any demonstration funds would be awarded. A slide show was prepared and retailers from successful establishments on Philadelphia's Chestnut Street Mall were brought to Boston. Although downtown retail interests (and particularly the major department stores) had previously prevented implementation of auto-free zones in the Boston CBD, the merchants were increasingly concerned about the highly successful auto-free zone opened in the Faneuil Hall Market area in 1976. Faced with a declining sales volume in the downtown retail district (e.g., sales in real dollars declined by 15 percent between 1972 and 1977), many of the smaller merchants became enthusiastic supporters of the proposed auto-restricted zone (ARZ). Merchants began selling the ARZ concept to each other, reinforcing support for the plan. The Boston Redevelopment Authority maintained consultation and meetings with merchants throughout the development of the project.

The major retailers agreed not to stand in the way of the demonstration project for a variety of reasons. Jordan Marsh had for almost ten years been planning a major hotel/retail development involving its property in the





- ← Proposed auto circulation
- - - Proposed parking and drop-off access
- Proposed bus circulation
- ||||| Proposed pedestrian way

FIGURE 4-6. THE ADOPTED TRAFFIC CIRCULATION PLAN (Scheme G)



adjacent block along Washington Street. Its support for the BRA-proposed ARZ plans was viewed as helping to maintain BRA support for the Lafayette Place urban renewal project. Filene's and Kennedy's also agreed to not stand in the way of the demonstration project partly because they had become enticed by the possibility that MBTA buses on Washington Street could bring in three times as many people as automobiles on the same street and the restricted street would still allow more pedestrian space.

The Mayor's Office also approached taxi, downtown parking, and neighborhood associations during the summer of 1977. All generally supported the project. The taxi operators lobbied unsuccessfully for access to Washington Street, citing the needs of its elderly and handicapped clientele. The parking operators were generally satisfied with the project due to the extensive towing operations planned.

#### 4.4.2 Securing Other Funding Sources

It was clear that even with over \$1.5 million in UMTA Section 6 (demonstration) funds, further funding was necessary. In July, 1977, the Mayor's Office asked the MBTA to participate in the auto restricted zone project. In January, 1977, the MBTA had applied for a \$12 million transit efficiency grant for exclusive bus lanes under the UMTA Section 3 Program. The MBTA subsequently agreed to support the project and offered to commit \$795,300 of the transit efficiency grant for the design and construction of downtown bus lanes. However, since the MBTA's Service Policy sets a minimum standard (30 percent) for the proportion of operating costs that must be covered by revenue, the City agreed to subsidize the MBTA from demonstration funds for one year to allow time to build increased ridership. The grant was approved by UMTA in June, 1978.

Additional funding was particularly necessary to support the physical improvements planned for the pedestrian areas. In August 1977, the Mayor's Office requested that the Massachusetts Department of Public Works (MDPW) approve the use of \$962,000 of Federal Highway Administration Urban Systems Funds for construction related to the project. The request was approved the next month, and an application was submitted to FHWA for approval.

#### 4.4.3 Multi-Agency Cooperation

Two conditions on the support given to the demonstration by the major retailers in the area had been that the project be implemented in the summer of 1978 and that the construction be completed by October 10, at the beginning of the Christmas shopping season. Many of the supporters of the project feared that the merchant cooperation was so tenuous that failure to adhere to the schedule would result in a loss of that cooperation and cancellation of the demonstration. While the BRA, the Mayor's Office of Transportation, the Massachusetts Bay Transportation Authority, the Massachusetts Department of Public Works, and UMTA were all anxious to see the project implemented, most recognized that implementation in one year's time would require planning, design, review, approval, and construction with speed never before experienced in the Boston area. The review and approval of Federal and Urban Systems funds by FHWA alone normally required two to three years from start to finish. The State Executive Office of Transportation and Construction assisted in expediting MDPW review of the design.

While the Mayor's Office had played the lead role in the design process and coalition of support from various groups, it was not able to continue primary responsibility for implementation. Its small transportation staff (three persons) was already taxed by other responsibilities, including planning of a shoppers shuttle bus and a road pricing demonstration. The Boston Redevelopment Authority was therefore asked to assume responsibility for project coordination.

While the BRA had primary responsibility for project coordination, a steering committee was formed to coordinate all of the activities necessary for final planning and implementation of the project. The Steering Committee, which began meeting in October, 1977, consisted of representatives from:

1. Boston Redevelopment Authority (BRA)
2. Office of the Mayor
3. Boston Traffic and Parking Department (BTPD)
4. Boston Public Works Department (BPWD)
5. Massachusetts Bay Transportation Authority (MBTA)

In addition, representatives from the utility companies, the Boston Water and Sewer Commission and the various consulting and construction firms involved in the project were also included on occasion.

A letter of agreement between the Mayor's Office, the BRA, and the MBTA was signed on March 20, 1978 to establish the consensus needed to proceed with project engineering. Since the MBTA had approval to spend \$66,000 in engineering money at that time, the MBTA was designated the lead local agency for project engineering. Nevertheless, the MBTA's budget was \$42,000 short of the total amount required for project engineering (\$108,000). To rectify this problem, BRA agreed to finance the remaining portion of the engineering, until the FHWA funds were approved and the difference could be funded from that source.

A Memorandum of Understanding articulating the roles, responsibilities, and funding commitments of the City of Boston, the BRA, the MBTA, the Massachusetts Department of Public Works, and the Boston Traffic and Parking Department was drafted on May 23, 1978. The Memorandum officially designated the BRA as the lead agency for the auto-restricted zone projects. Other provisions of the memorandum included:

1. Designation of the MBTA as the lead for the engineering contract for development of plans and specifications for the mall;
2. Designation of the Massachusetts DPW as responsible for advertising, awarding, and supervising construction of the project;
3. Traffic and Parking Department responsibility for coordination of enforcement with the Police Department;
4. BRA responsibility for reimbursing Police Department for added personnel costs necessary for enforcement;
5. BRA responsibility to arrange for satisfactory maintenance of area with Boston Public Works Department;
6. BRA responsibility for obtaining written agreement with TSC on evaluation methodology;
7. MBTA, BRA, Traffic and Parking Department to consult in selection of full-time promotion person; and



8. MBTA and BRA to enter into a separate third-party operating agreement specifying MBTA level of service, reimbursement, schedule, etc.

#### 4.4.4 Physical Design and Engineering

The design and engineering of the physical improvements included the following elements:

1. street excavation and reconstruction
2. bricking
3. construction of bus lanes
4. signalization and signing
5. design of bus shelter

The Phase I physical improvements which were federally funded included: (a) bricking and improvements to Winter and Summer Streets, (b) expansion of the Boston Five Park out of a portion of the School Street/Washington Street intersection, and (c) construction of the Old State House Park out of State Street between Washington Street and Devonshire Street. (Physical improvements on Washington Street were not included in the federal funding program, but were undertaken as part of a locally funded "Phase II" discussed in Section 4.4.9, below).

From November 1977 to June 1978, the Mayor's Office of Transportation and the BRA sponsored a series of five merchant meetings to discuss design details of the auto-restricted zone. A total of 130 businesses were included on the mailing list for each of the meetings. Primary attendees included members of the Winter Street Merchant's Association and representatives of Jordan Marsh and Filenes. Particular areas of concern among the attending merchants were drainage, bricking, and benches. The consensus of the meetings was that there should be distinctive lighting, bricking of Winter Street from building face to building face, and a minimum amount of street furniture.

The engineering firm of Tibbetts Abbett McCarthy Stratton (TAMS) was selected in February 1978 to head a team which also included Arrowstreet (to design the signs), Moore-Heder Architects (to design the bus shelter) and Carol Johnson Associates (to design a park on Franklin Street). In addition, the BRA's own design department became actively involved in the design of all the project's elements.

Considerable controversy soon developed over several aspects of the designs. TAMS, at the urging of the BRA design staff, had recommended a "trench" type of drain system on Winter and Summer Street which would allow the reconstruction and bricking of those streets at sidewalk level. Due to concern over potential flooding, the Boston Public Works Department (BPWD) preferred the curb-and-gutter type of drainage system which already existed on all of the area streets. This curbing and drainage issue led to a heated controversy in the merchant design meetings. Due to the primary role of the BRA and the limited involvement of the BPWD in the project, the BRA plan for trench type drains and a sidewalk-level design of the streets prevailed. The drainage issue was eventually resolved in the merchant meetings with all merchants but one supporting the "no curb" design for Winter and Summer Streets. This issue arose again later for the design on Washington Street (discussed in Section 4.4.9, below) and is discussed further in Chapter 8.

Disagreement also arose over the design of bus shelters. The design consultant recommended numerous variations on a design which would reflect the character of the area and be consistent with the new improvements being made. The MBTA, however, was uncomfortable with the new designs and feared higher maintenance costs. As a result of the disagreement between the MBTA and the design consultant over the shelter design, no design was approved and no shelters were constructed until early in 1980, when a standard MBTA shelter was placed at the corner of Summer and Kingston Streets.

Another point of particular controversy arose over the location of bus bays and shelters near the First National Bank. After numerous meetings between the BRA and the bank officials, the plan was revised to reduce the number of bus bays, eliminate a planned bus shelter and keep a taxi stand which originally was to have been moved. The compromise appeased the bank management, and a bank representative later spoke in favor of the project at a public hearing.

The controversy over project details also included the design of street signs and the construction of the Franklin Street Park. The park had been included in the original plans for the ARZ, but it was soon decided that the

funds available would not be sufficient to cover the park and that element was dropped from the plan.

#### 4.4.5 Steps Toward Approval of Federal Funds

In addition to the organizational and funding arrangements previously described, a variety of other procedural barriers were met and passed in the process toward implementation of the auto-restricted zone. Many of these steps are common to federally-funded transportation projects. These steps are:

1. Public Hearing. A federally-funded public hearing on the project was held on January 5, 1978. The hearing was advertised in Boston's daily newspapers and the major black and Spanish papers. Twenty-two people testified in support of the concept both from the business community and the neighborhoods that would be affected by the bus routes. There was no dissent voiced at the hearing.
  
2. Environmental Requirements. The federal environmental requirements for the project were met with a Negative Declaration submission to UMTA on January 25, 1978. On February 2, 1978, an UMTA representative visited Boston to ask the BRA staff specific questions regarding environmental impacts. An all-day hearing was held, as a result of which bricking on part of Washington Street was struck from the plan for safety reasons. UMTA was also concerned with the relative increase in traffic on each street, which led the BRA to produce new traffic diversion projections later in the month. In the UMTA approval of the MBTA's amendment to its transit efficiency application (on June 15, 1978), it was noted:  
  
"The environmental and socioeconomic impacts of the project cannot be fully known at this time. Based upon present projections, we believe that they will not be significant. Therefore, during the project the MBTA and the Boston Redevelopment Authority must analyze its effects. If the environmental and socioeconomic impacts associated with this project are determined to be significant, the project shall be modified to avoid such impacts."
  
3. Transportation Improvement Program On February 10, 1978, the City of Boston requested inclusion of the "Auto Restricted Zone Transit-way" as part of the 1978 Boston urbanized area Transportation Improvement Program (TIP), to meet federal planning requirements for the project. This was done.



4. Labor Protection and Union Requirements. On April 4, 1978, the Boston Redevelopment Authority, through the use of consultant attorneys referred by the MBTA, negotiated an agreement with the Amalgamated Transit Union (ATU) which satisfied the labor protection requirements of Section 13(c) of the UMTA Act. The U.S. Department of Labor approved 13(c) certification for the project on May 26, 1978.
5. Right-of-Entry Approval from Abbuters. The Massachusetts Department of Public Works (MDPW) is responsible for the programming of FHWA Urban Systems Funds in the state. In May, 1978, the MDPW notified the Boston Traffic and Planning Department that approvals for rights of entry during construction would be required from all 104 abutters in the area before a construction contract could be awarded. Many parcels of property were held in trust by more than one person and some from people living outside the Boston area. Nevertheless, the necessary signatures were obtained by June 8, and construction bid-awarding proceeded.

The first approval of federal funds for construction came on June 8, 1978, when FHWA approved \$1,200,976 (of which \$840,683 was Federal Aid Urban Systems funds) to be used for construction-related expenses of the auto-restricted zone. On June 15, UMTA approved the final plans of the transit efficiency grant requested by the MBTA and on June 21, UMTA formally approved the Section 6 demonstration grant.

The construction bids were finally opened on July 10 and the contract for Phase I construction was awarded to a team headed by the Reynolds Construction Company of Canton, Massachusetts.

#### 4.4.6 Project Site Name and Promotion

As soon as the BRA received approval of the demonstration grant, the process of organizing a promotion effort began. A marketing and promotion director was hired and began work on July 24, 1978. Office space was provided by the Retail Trade Board, which leased space in a building in the project area. A series of weekly meetings of the merchants and other business persons in the project area were immediately organized. The meetings provided the opportunity for the merchants and business people to discuss the plans, recommend changes and have some input into the final form of the project.

One of the first items of business considered by the group was an official name for the area. Neither the City's original name for the program, the "Transit and Transit Improvement Program, nor the technical name given to the demonstration project by UMTA, "The Boston Auto-Restricted Zone," were considered to be appropriate official names for the area. The latter name was also considered to have negative connotations. A BRA name for the improvements to Washington Street, "The Washington Mall" was rejected as the focus of the demonstration project included Winter, Summer and other streets.

Recognizing the need for a less technical and more easily marketable name for the area, the Traffic and Parking Department staff and the BRA agreed on the name "Freedom Mall," and contracted to develop a logo and a promotional package to support the name. Substantial merchant dissatisfaction with the name, however, led to the hiring of a new advertising firm to develop an alternative name. The name finally suggested by the firm and agreed to by the merchants, the BRA, the BTPD and the Mayor was the "Downtown Crossing."

The new name and logo were immediately introduced into all of the promotional efforts, which included leaflets, newspaper advertisements, a media packet, posters, and television and radio interviews. In the final week before the implementation of the new routing plans, over 200,000 leaflets were distributed, announcing the coming of the new traffic patterns, the new transit routings, the elimination of on-street parking, and the intention of towing all illegally parked cars. Also in August, 673 letters were mailed to businesses and goods movement firms describing the changes that would take place in September. To further promote the new project, a ground-breaking ceremony with the Mayor was held on August 17, 1978.

Corresponding closely to the start of construction and the ground-breaking ceremony was the opening of The Corner, a collection of stores located in the building formerly owned and occupied by Gilchrist Department Store. Three levels of the building had been renovated for reuse and parts had been occupied since earlier in the summer, but on September 21, 1978, an official grand opening was held.

Further promotion activities are discussed in detail in Chapter 10.

#### 4.4.7 Implementation of Traffic and Parking Restrictions

During the month of August 1978, the construction contractor focused on those improvements necessary to allow rerouting of traffic to avoid the restricted streets and to allow for the routing of buses through the area. Construction included: (a) the implementation of bus lanes on Milk, Arch, Chauncy, and Washington Streets; (b) the widening of Bedford Street; (c) widening of the sidewalk on Summer Street for a bus stop; (d) the construction of a bus island on Franklin Street; and (e) the installation of signalization and signing for communicating the new traffic pattern and parking restrictions.

With assistance from the BTPD, the Police Department had prepared a film to assist in the training of patrol officers assigned to the Downtown Crossing. Development of the film was funded by the demonstration grant. The MBTA had also held internal training sessions for bus drivers assigned to the new Downtown Crossing routes.

On Sunday, September 5, 1978, the traffic operational changes were implemented (See Chapter 5 and Figure 5-1 for more detail). September 5 had been selected as the date for implementation because this would allow two relatively "quiet" days of operation (September 6 was Labor Day) before the project was tested with the normal traffic conditions.

Largely due to extensive enforcement of parking restrictions and traffic control officers placed at all of the points where traffic had to be diverted, the full first week of operations saw very few traffic problems. Slow movement of traffic diverted from Washington Street onto West Street resulted in some back-up of traffic on Washington Street, and confusion about the restrictions on Franklin Street made enforcement there difficult. In general however, the new traffic pattern was implemented without the major traffic congestion feared by many in the early planning stages of the project.

The MBTA delayed the official rerouting of the buses until Thursday, September 9. Although the bus routes for the most part were popular among the patrons, conflicts between bus and pedestrians on Washington Street were evident from the very beginning.

The meetings between the City and the merchants continued and took on a new character after the implementation of the new traffic circulation pattern,



bus routings and parking and delivery restrictions in September 1978. Although the general reaction to the project among the merchants was overwhelmingly positive, merchants adversely affected by the restrictions became quite vocal in the merchant meetings. Particularly vocal in their complaints were merchants from the peripheral streets designated as primary traffic diversion routes. The complaints of these businesses were not related to any increase in traffic, but rather to the elimination of curbside parking and delivery space. Other concerns were dissatisfaction with bus operations and the violation of traffic restrictions by taxi operators.

#### 4.4.8 Phase I Physical Improvement

Construction of the pedestrian ways (bricking of Winter and Summer Streets) had been delayed primarily due to delays in shipment of bricks and other materials. By mid-September (1978), it was clear that the bricking work could not be completed by the October 15 deadline agreed to by the merchants, the BRA, the BTPD and MDPW. It was at about this time that the decision was made to postpone the construction on the pedestrian-ways until the spring of 1979. On October 10, all surface construction was halted until after the Christmas shopping season.

In January of 1979, the newly formed Boston Water and Sewer Commission announced that it would be necessary for them to replace water mains under Winter Street before the bricking of the street could proceed. The replacement of the water mains ultimately resulted in a delay of about two months in the construction of the pedestrian ways on Winter Street. The actual construction of pedestrian ways on Summer and Winter Street did not begin until April, although excavation of Winter Street necessary for the replacement of the water main did begin in March.

By mid-June, much of the foundation work was completed on Winter and Summer Streets and on June 19, a ceremony was held to celebrate the laying of the first brick. Bricking by the contractor continued through June, July and August and was virtually complete by the first anniversary of the street closings in September (1979).

#### 4.4.9 Phase II Design and Physical Improvements

In January of 1979, before construction of the Phase I improvements began, the Boston Traffic and Parking Department began to consider an extension of the physical improvements to include Washington Street Temple Place, West Street, and Bromfield Street. These improvements included: (a) bricking Washington Street, and (b) conventional sidewalk and street reconstruction along with new lighting on the other streets. A majority of the merchants that had been involved in the weekly meetings were satisfied with the progress being made under the project and supported the extension of physical improvement. The Boston Public Works Department and the BRA began immediately to design and engineer the Phase II improvements. Again, some of the same design issues emerged as in Phase I (discussed in Section 4.4.4, above). In this case, however, the BPWD rather than the BRA was in full control of the design process. Consistent with the BPWD position, a curb-and-gutter drain design (rather than the "trench" type drains) was adapted for Washington, with all bricking on the street at a level below the sidewalk. The resulting design, which also included a widening of the sidewalk on the east side of Washington Street from Bedford Street to Milk Street, left a single traffic lane with service bays similar to the design originally recommended for the Washington Street Mall. The plan differed from the earlier Mall design only in the degree to which traffic was restricted and the additional bricking of the street right-of-way as well as the sidewalks.

The preparations for Phase II construction moved very quickly; on March 29, 1979, Mayor White formally announced the plans for a Phase II which would be totally City engineered and funded and built simultaneously with Phase I. Bids for construction of Phase II were advertised on April 23 and the contract was awarded on May 3 to the Bay Corporation. The Phase II plans were subsequently presented to the merchants on May 25, and construction began on June 3, 1979.

All scheduled construction activities on both Phase I and Phase II were completed by October of 1979. Items such as lights, benches and the steel grates (to cover the drainage trenches on Winter and Summer Street) were

installed in the last two months. Only the location of information kiosks and bus shelters remained uncompleted. The kiosks were installed in November 1979 and one of the two bus shelters planned for the area was installed in February, 1980.

#### 4.5 PROMOTION AND BUSINESS ORGANIZATION

##### 4.5.1 Early Promotion Efforts by the City

Promotion of the new Downtown Crossing was recognized early on as an integral part of the retail revitalization effort. A promotions budget and a promotion direction were included in the preliminary application for the UMTA demonstration grant. The major goals of the promotion position were to:

1. Inform the public of the changes occurring in the downtown retail district and publicize the advent of the new mall
2. Cultivate a more relaxed, attractive atmosphere in the Downtown Crossing by bringing in cultural activities and festivities.
3. Set up regular merchants meetings and encourage communications among the merchants and city officials to maintain the private-public partnership in project design and operation.

A promotion director and an assistant were hired separately for this effort, and they worked out of an on-site office donated by the Retail Trade Board of Boston.

The first goal of the promotion effort was to publicize the changes in traffic circulation and bus routes. The traffic changes were heavily publicized on radio and TV news broadcasts, public service announcements, traffic reports and talk shows. The bus route changes were publicized through leaflets and maps distributed at city offices, area stores, subway stations and on buses, and through the transit pass program. Flyers illustrating the traffic changes were distributed on sidewalks, subway stations, and at expressway exits, tunnels and bridges. Over 140,000 leaflets were distributed to motorists, pedestrians and taxi operators during August and September, 1978.





FIGURE 4-7. WASHINGTON STREET AT WINTER/SUMMER INTERSECTION: 1921



FIGURE 4-8. WASHINGTON STREET AT WINTER/SUMMER INTERSECTION: 1978





FIGURE 4-9. WASHINGTON STREET AT WINTER/SUMMER INTERSECTION: 1979  
(The street is closed to all traffic except buses, but physical improvements have not been completed)



FIGURE 4-10. WASHINGTON STREET AT WINTER/SUMMER INTERSECTION: 1980  
(The street is fully pedestrianized and features new bricking, street lighting and information displays)

The new street space created opportunities for privately sponsored outdoor activities. One week before traffic was permanently eliminated from the streets, a celebration was held for the opening of "The Corner," a 37-shop retail complex in the former Gilchrist department store building at Washington and Winter Streets. Traffic was rerouted while a giant hot-air balloon was launched, the Mayor spoke, and dancers performed. In the month following the closing of the streets, an Italian festival was sponsored by the Jordan Marsh store and the Boston Artists' Council organized a week of art displays.

A major goal was to organize the downtown merchants to participate in promotion of the Downtown Crossing area. For the first time in years, the downtown merchants were joined together to promote Christmas shopping in the area. They contributed nearly \$14,000 for decorations and promotion, which was supplemented by \$5,000 from the project promotion budget. Two 16-page tabloids in the local daily papers promoted the area as a convenient place for Christmas shopping. A 40-foot Christmas tree was placed in Summer Street. At a cost of over \$16,000, a series of 13 "stellar snowflakes" representing the Downtown Crossing logo were suspended over Washington, Winter, Summer, Temple, and Hamilton Streets. The snowflakes were each over 400 square feet in size and consisted of over 1,000 lights. A variety of musicians and singers performed outdoors during the four weeks of the Christmas period.

Promotion efforts on the part of the city and the merchants continued during the 1979 construction period. A series of 12 banners, each 21 by 7 feet in size, were hung above the streets in May 1979. That same month, a construction theme was featured in the window displays of many area stores. Also, in May, a small group of merchants was organized to coordinate promotional activities. The group consisted of representatives from Filene's, Jordan Marsh, Woolworth's, the Winter Street Merchants' Association and the Retail Trade Board. This smaller group was responsible for the development of promotional plans for the remainder of the demonstration project.

Another major activity was the operation of "The Shuttle," a tour bus which stopped at 14 points of interest in the central city. The Shuttle was privately operated from June to October 1979. A contribution of \$1,700 of



demonstration funds provided for the inclusion of Downtown Crossing on the tour, advertising of Downtown Crossing on the exterior of the buses, and for a description of the area to be included in the pamphlet distributed to all tour passengers.

Continuing outdoor activities involving the area merchants which occurred during the latter half of 1979 included:

1. June: Charlestown Savings Bank Anniversary Festival, including a Dixieland band, string quartet, and performances by mimists and jugglers.
2. August: Opening of the Old State House Park, including a swing and Dixieland combo, fife and drum militia and an outdoor play.
3. September: Celebration for the First Anniversary of Downtown Crossing and the completion of all major construction, a four-day festival including a ceremony for dedication of the "Builders of the New Boston" medallion (a ten-foot medallion), placed at the intersection of Washington and Summer Streets; bank performances, a play, clowns, jugglers, and musicians; and a free raffle for merchant gift certificates.
4. September: "Overture to Fall," sponsored by Jordan Marsh and featuring classical music concerts and fashion shows in the middle of Summer Street.
5. September: music and performances by Bobby's Roll-a-Way Disco Team, featuring 100 roller disco dancers.
6. November: opening of the holiday season, with illumination of the Stellar Snowflakes, placement of over 200 wreaths, a 45-foot Christmas tree, a 6-foot mistletoe bell, and newspaper ads. Opening day festivities included a marching band parade, ballet performance, and band concert. Nearly \$15,000 was raised by 101 merchants.

#### 4.5.2 Formation and Operation of the Downtown Crossing Association

From the beginning, city officials recognized that the long-term success of Downtown Crossing would depend on a positive response from the business community and the formation of an organization to sponsor further improvement and maintenance of the area. Starting in November 1978, the BRA staff began researching the formation and operation of downtown associations throughout

the U.S., and subsequently encouraged the merchants to consider such an association.

In January, 1980, the group of five merchant representatives that had been active in planning and promotion over the past year formed an association called the Downtown Crossing Association. This group included representatives of the three large stores on Washington Street. A statement of the Association's purpose was prepared, official By-Laws for the organization were developed and a full-time executive director for the Association was hired in March, 1980. The association is a private, non-profit organization primarily focused on the civic and economic development of the Downtown Crossing area. Its major objectives are to coordinate activities, arrange seasonal and special events, promote the Downtown Crossing, and to act as a liaison between public and private sectors on such issues as redevelopment activities, traffic and sign control, street improvements, maintenance, security, zoning, licensing, and sanitation.

Since May, 1980, the Association has been governed by a nine-member board of directors, including the original five merchants plus representatives of four other businesses. An Executive Director and an assistant were hired and an office was set up in the area. The first year of operation of the Association has been funded by a matching grant from the UMTA demonstration extension, which provides up to \$30,000 to match funds raised from the merchants.

In addition to its activities as a conduit for communications between the merchants and the City, the merchants have agreed that all outdoor special events, fund raisers, musical performances, exhibits and even outdoor sales on private property would be subject to approval by the Downtown Crossing Association. The Association has also coordinated continuing newspaper and magazine advertising and all Christmas decorations and activities.

Membership in the Downtown Crossing Association is open to anyone interested in the Downtown Crossing area. Membership dues for retail establishments and restaurants are based upon gross annual sales and range from \$50 to \$3,000. Membership fees for service businesses (tailors, dry

cleaners, beauty salons, etc.) range from \$15 to \$75, based upon the number of employees. Property owners and major financial institutions are assessed on an individual basis. Residents of the area may join for a \$10 fee. These dues are used to fund special events (including the annual Christmas promotion) as well as salaries and office expenses.

As of December 1980, nearly 100 businesses, including almost all of the major merchants, were members of the Downtown Crossing Association. While all 1,300 businesses in the area were invited to join the Association, that number includes a large number of doctors, lawyers, beauty salons, services and offices on upper floors. The retail merchants are the group for which the Downtown Crossing Association is most relevant. The Association's goal is to get 500 to 700 members. The current membership has a strong representation among the categories of restaurants and bars, general merchandise, jewelry, books and cards. Still, many of the jewelry, fur, shoe, and camera shops have not yet joined, and there are few members among the wholesale and service sectors. To date, some of the chain clothing stores have also resisted joining; the local managers of some chain stores have shown less of an interest in involvement in local issues and promotions, although additional work to track down the regional managers have often resulted in their joining.

The raising of funds for promotion and operation of the mall and other activities of the merchant association has not been easy. Unlike the downtowns of some other cities, the large financial institutions in Boston are not located right in the retail district and so have not provided significant financial support for activities and promotion of that area. Also, the very high tax rate in Boston and the high costs of doing business in the downtown area have made fund-raising alternatives such as a legally mandated special assessment district politically infeasible. While the success of a voluntary membership organization remains to be seen, the establishment of a Downtown Crossing Association represents a major step toward funding ongoing activities, promotion and physical improvements to the area by the merchants.



## 4.6 POST IMPLEMENTATION TRAFFIC AND TRANSIT POLICY CHANGES

### 4.6.1 Changes in Traffic Circulation

In the fall of 1978, after the traffic restrictions were imposed but before the construction of physical improvements, several concerns emerged from the merchant meetings. Merchants on Temple Place expressed unhappiness with the way the auto restrictions on that street was working out. Temple Place had been designated as a primary street for goods movement where deliveries could be made throughout the day unencumbered by automobile traffic. The merchants on Temple Place felt that the traffic restrictions had resulted in a loss of exposure for the street and had made the street a parking lot for delivery vehicles.

A related area of concern regarded the violation of traffic restrictions by taxi operators. The original routing plans allowed private automobile traffic on Washington Street only as far north as West Street, but allowed taxis to continue one block further to Temple Place. Police officers were stationed at West Street to divert private automobile traffic, but no patrols were stationed at Temple to insure that taxis and delivery vehicles turned at Temple Place. Merchants on Washington Street were reporting numerous violations of the restrictions by taxi operators. Because of the importance of the first Christmas shopping season to the reception for the project among the general public, extra policy patrols were assigned to the Downtown Crossing. The number of police officers necessary for the enforcement of the traffic and parking regulations had, in general, been significantly more than originally anticipated.

On March 21, 1979, the Boston Traffic and Parking Department instituted traffic circulation changes which responded to the concerns of the Temple Street merchants and the problems of enforcing auto, taxi and delivery vehicle restrictions. Washington Street was reopened between West Street and Temple Place, and Temple Place was reopened to westbound traffic. This change allowed police officers enforcing the traffic restrictions to move up Washington Street to Temple Place, where all traffic was to be diverted. This

permitted stricted enforcement and at the same time placed traffic back on Temple Place as had been requested by the street's merchants. The reduction in the role of West Street as a traffic diversion street also allowed for a replacement of loading zones on one side of that street.

#### 4.6.2 Changes in Bus Routes

Conflicts between pedestrians and buses on the auto free portions of Washington Street were a problem from the initiation of service on that street in September 1978. Eventually even the merchants became dissatisfied with the operation of buses on Washington Street. Thus, an element of the plan which at one point was viewed as critical for the approval of the merchants now was viewed as a physically unaesthetic element and a threat to pedestrians. In May, 1979, in preparation for the bricking of Washington Street (between Temple and Franklin Streets), buses that were travelling on that street were rerouted to Chauncy/Arch Streets. That routing was shortly thereafter made permanent, because of the earlier pedestrian-bus conflicts on Washington Street.

The bus route extensions to serve the Downtown Crossing Area were funded by UMTA only as a one-year demonstration ending in September 1979. The MBTA had agreed to continue operation of the routes after that date if an evaluation demonstrated that the extensions were generating sufficient ridership to satisfy the MBTA's service standards. Using on-board surveys as well as boarding and alighting counts, Cambridge Systematics prepared an evaluation which showed that the six local routes had each generated a significant Downtown Crossing-bound ridership and that the extension of the routes represented a considerable benefit for a large population. Unfortunately, it was discovered that much of the new bus ridership was due to passengers staying on the buses to save the cost of transferring to the rapid transit lines, and it was determined that the additional revenue received from the route extensions were less than the MBTA's standards. (This issue is discussed in detail in Section 6.)

Following considerable controversy and merchant concern, the MBTA agreed to continue bringing five of the local routes into the Downtown Crossing through the end of the year. Route 43, the most heavily patronized route, had earlier been temporarily shifted to its original, pre-Downtown Crossing routing to avoid the construction on Washington Street. As a result of the evaluation, the MBTA decided to make the shifting of Route 43 a permanent change. All extensions of local bus routes to serve Downtown Crossing were subsequently eliminated as of December 31, 1979 (although they were reinstated in 1982).

#### 4.6.3 Ongoing Improvements

An application for a new demonstration extension grant from UMTA was prepared in June 1979, although the required public hearing and formal submission were delayed until after the November mayoral election. The new grant became effective January 1980, and covered the following elements:

1. continuation of police enforcement of traffic restrictions
2. matching funds to support the Downtown Crossing Association
3. support for BRA staff supervision of the auto restricted zone operations and coordination with other new development projects
4. marketing and development studies concerning security, street use, traffic, retail development and land use.

#### 4.7 SUMMARY OF EVENTS

##### Initiation, Planning and Implementation of the Boston Auto Restricted Zone Demonstration

##### Historical Development

<u>1914</u>	Chamber of Commerce study recommends widening of sidewalks on Washington Street
<u>1960</u>	General Plan for the Central Business District (CBD) recommends pedestrian malls on Washington, Winter and Summer Streets
<u>1967</u>	Victor Gruen Associates prepare plan for the CBD which includes pedestrianization of Washington, Winter and Summer Streets



- 1971 An experiment with street closing on a Saturday on Washington Street proves unsuccessful
- 1973 Boston Redevelopment Authority (BRA) internal memorandum proposes area-wide Auto Restricted Zone (ARZ)
- BRA proposes "Washington Street Mall" sidewalk widening project
- Local Merchant Alvin Schmertzler suggests auto restriction on Winter Street in letter to Mayor
- August 1975 UMTA solicits proposals for ARZ demonstration sites
- October 1975 BRA initial application to UMTA; ARZ Potential in the City of Boston
- April 1976 Deputy Mayor approves the Washington Street Mall project. BRA commissions design plans (construction began in summer of 1976 and was completed in summer of 1977)
- UMTA approves Boston as one of five ARZ study cities.

#### Demonstration Planning

- April 1976 First working meeting between City of Boston and UMTA-funded consultants meet with City of Boston and begin feasibility analysis
- September 1976 UMTA consultants present results of initial feasibility study and impact assessment for preferred alternative
- February 1977 UMTA consultants present a new impact assessment based on an alternative traffic circulation scheme suggested by the Mayor's office of Transportation
- Retailers, developers and city planners from Chestnut Street Mall in Philadelphia attend merchants meeting in Boston
- July 1977 Massachusetts Bay Transportation Authority (MBTA) is invited to participate in the ARZ project through use of UMTA Transit Efficiency funds
- August 1977 Mayor's Office requests the use of Massachusetts Department of Public Works (MDPW) participation through Federal Highway Administration Urban Systems funds

September 1977 BRA assumes primary responsibility for implementation of the auto-restricted zone demonstration at the request of the Mayor's Office

October 1977 Inter-agency Steering Committee is established to coordinate planning and implementation

January 1978 Public hearing held on UMTA demonstration grant application

March 1978 MBTA designated lead agency in engineering. MDPW designated lead agency in construction. Final BRA grant application to UMTA.

May 1978 BRA designated lead agency for coordinating auto-restricted zone projects

June 1978 Funding Approval: FHWA Federal Aid Urban Systems Funds, UMTA Transit Efficiency Grant, and UMTA Demonstration Funding  
Construction bids are advertised

July 1978 Promotional Director is hired

August 1978 Weekly merchant meetings begin  
Construction contract is awarded  
Construction begins; Ground breaking ceremony held

First Year of Demonstration

September 1978 Downtown Crossing opens: new traffic circulation scheme is implemented and new MBTA bus routings are implemented

October 1978 Construction is postponed for the Christmas shopping season, to be resumed in the spring of 1979

January 1979 A portion of the Route 43 bus route is shifted back to original routing in response to complaints from patrons  
Planning for Phase II improvements begins

March 1979 Construction begins on Old State House Park  
Temple Street is re-opened to traffic  
City announces funding of Phase II

April 1979 Construction bids for Phase II are advertised  
 Construction of Phase I pedestrian ways begins

May 1979 Application for extension of the UMTA demonstration grant  
 Boston Five Cent Savings Bank purchases movable furniture for Boston Five Park  
 MBTA bus routes are altered to avoid major portions of Washington Street. All Route 43 buses are returned to pre-ARZ routing

June 1979 Construction of Phase II elements begins on Washington Street  
 Ceremony is held to celebrate the laying of the first brick on Winter and Summer Streets

Second Year of Demonstration

September 1979 First Anniversary Celebration is held with the dedication of the "Builders of the New Boston" plaque and a week of activities  
 Benches are installed on Summer and Winter Streets, lights are installed on Washington and Winter Street and bricking is completed on Washington, Summer and Winter Streets  
 Old State House Park is dedicated

October 1979 Lights are installed on Summer Street

November 1979 Public Hearing for demonstration extension grant application

January 1980 The Downtown Crossing Association is formed  
 Delivery regulations are changed to allow deliveries after 6 PM

March 1980 Downtown Crossing Association hosts first meetings for area merchants and businesses; Executive Director of the State Street Mall Council of Chicago meets with Boston Merchants

August 1980 Second UMTA Demonstration Grant Awarded



## 4.8 SUMMARY OF FINDINGS FROM THE PLANNING AND IMPLEMENTATION PROCESS

### 4.8.1 Time Frame

As is typical in many cities, the concept of closing certain streets to traffic within the retail core area had been discussed at times over a period of many years. Yet once the decision was made to actively pursue this idea, the Downtown Crossing project was developed and implemented relatively rapidly. Nineteen months after completion of the feasibility and project design study, the Downtown Crossing opened--i.e., the auto restriction policies and new bus routings were implemented. Physical improvements (bricking of the street, benches, planters, lighting) were all installed the next summer. The Boston experience showed that even with a complex division of public authority for downtown conditions among a variety of local agencies, project planning and implementation can proceed rapidly. Coordination difficulties were minimized through an environment led by the active support of the Mayor and strong cooperation among a group of key persons in the different city departments.

### 4.8.2 Merchant Roles

The Boston experience showed that attitudes of the merchants towards auto restrictions are not necessarily uniform or fixed, and that there can be major differences in attitudes between small and large stores. In Boston, it was a group of small store merchants that initially lobbied for auto restrictions and physical improvements in the area, while the department stores continued to oppose such plans. Early on, the city initiated a series of merchant meetings in which design details of the project could be discussed. Over time, compromises were reached with the merchants regarding the nature of the physical improvements and traffic changes to be made. The larger businesses subsequently became very active in planning and promotion of the Downtown Crossing area. The merchant-city meetings also continued after implementation of the auto restricted zone, which allowed the merchants to voice complaints and suggest improvements in project design and operating policies.

#### 4.8.3 Project Flexibility

The Downtown Crossing project demonstrated the usefulness of remaining flexible about modification to the physical design and operation of the auto restricted zone even after it opens. Major changes made during the first year of the auto restricted zone included the reopening of two blocks of the ARZ back to regular traffic, and the rerouting of the bus loop to take buses off of two blocks of Washington Street. Changes were also made in access rules for taxis and delivery vehicles.

The project also demonstrated the value of an incremental approach to implementation, in which the streets were closed to traffic nearly a year before the permanent physical improvements were made. While this delay was not intended as part of the implementation plan, it did allow merchants to view the street closings as an experiment which could be cancelled if it did not work out well. In this way, it was possible to demonstrate the value of the auto restrictions to the merchant community before most of the permanent construction changes were made. The flexible attitude taken by the City in modifying the project and the responsiveness of the staff members to merchant problems was felt to be a critical factor in assuring continued acceptance of the Downtown Crossing project.

#### 4.8.4 Problems

Even with a relatively well-organized planning and review process, the Boston experience showed that significant design issues and operational problems can crop up and remain several years after implementation. There was controversy over the design of special bus shelters and one of the mini-parks, neither of which were built. The form of signing at entry points to the ARZ and the placement of benches on Summer Street remained ongoing issues, as did the levels of staff for traffic enforcement at entry points, maintenance, trash collection and crime control.

## 5. TRAFFIC AND PARKING IMPACTS

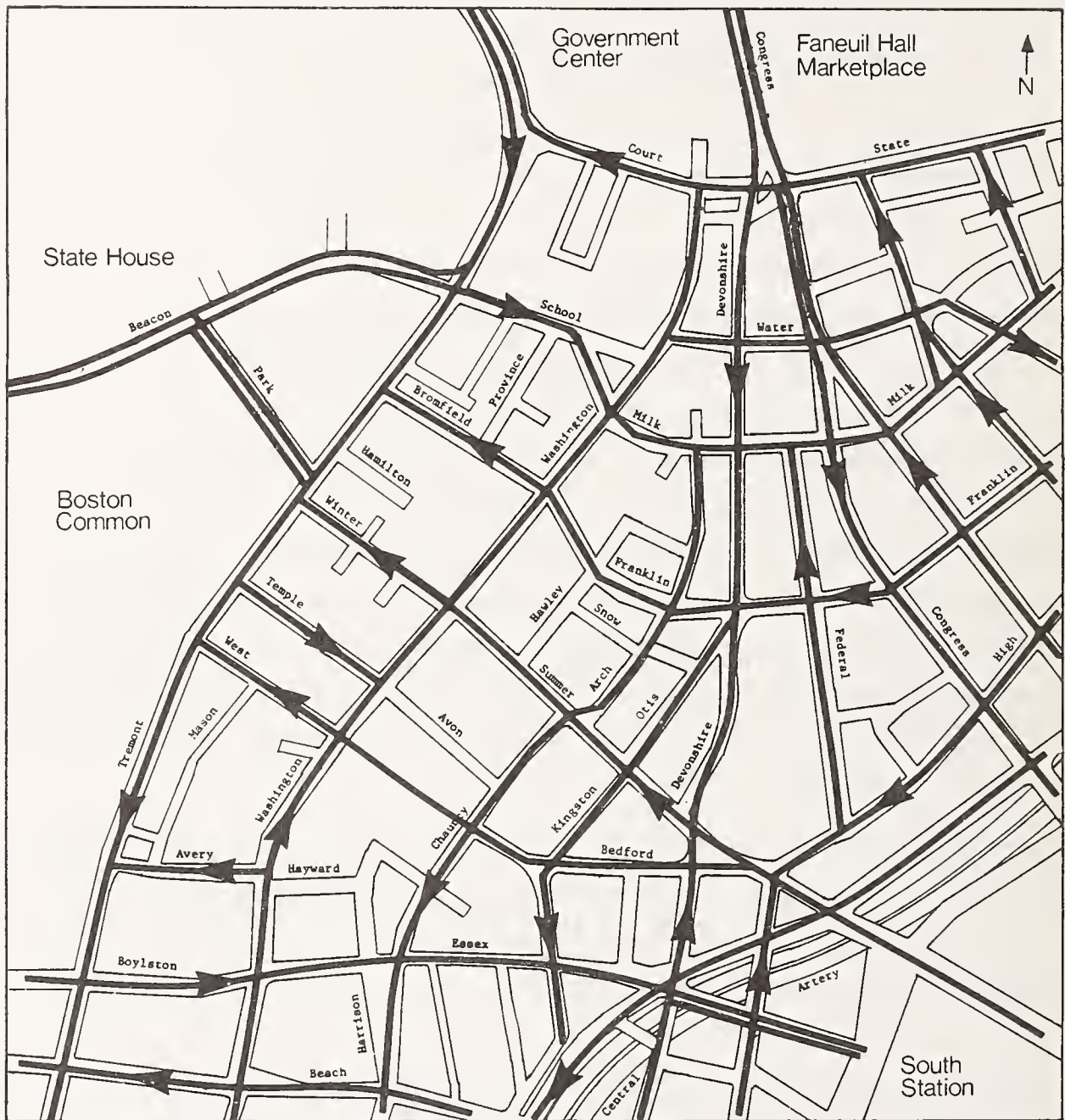
### 5.1 DESCRIPTION OF ROAD RESTRICTIONS

The downtown Boston street network is an anachronism in this automobile age. The maze of narrow, non-continuous streets was not designed for movement of high volumes of motor vehicle traffic, but rather for a compact 18th century city where walking was the most common travel mode. The performance of the street system in accommodating downtown traffic reflected its origins in another era. Although traffic volumes were not excessive for a major urban area, the narrow streets and complex intersections in the area produced traffic congestion throughout much of the day. The pattern of major traffic flows prior to September 1978 is shown in Figure 5-1.

Simplification of the existing maze-like pattern of traffic circulation, elimination of on-street parking and improved enforcement within the area were identified as the keys to reducing the extent of auto congestion in the area. The traffic circulation pattern after implementation of the auto-restricted zone is illustrated in Figure 5-2. The major changes in traffic circulation implemented in September 1978 were:

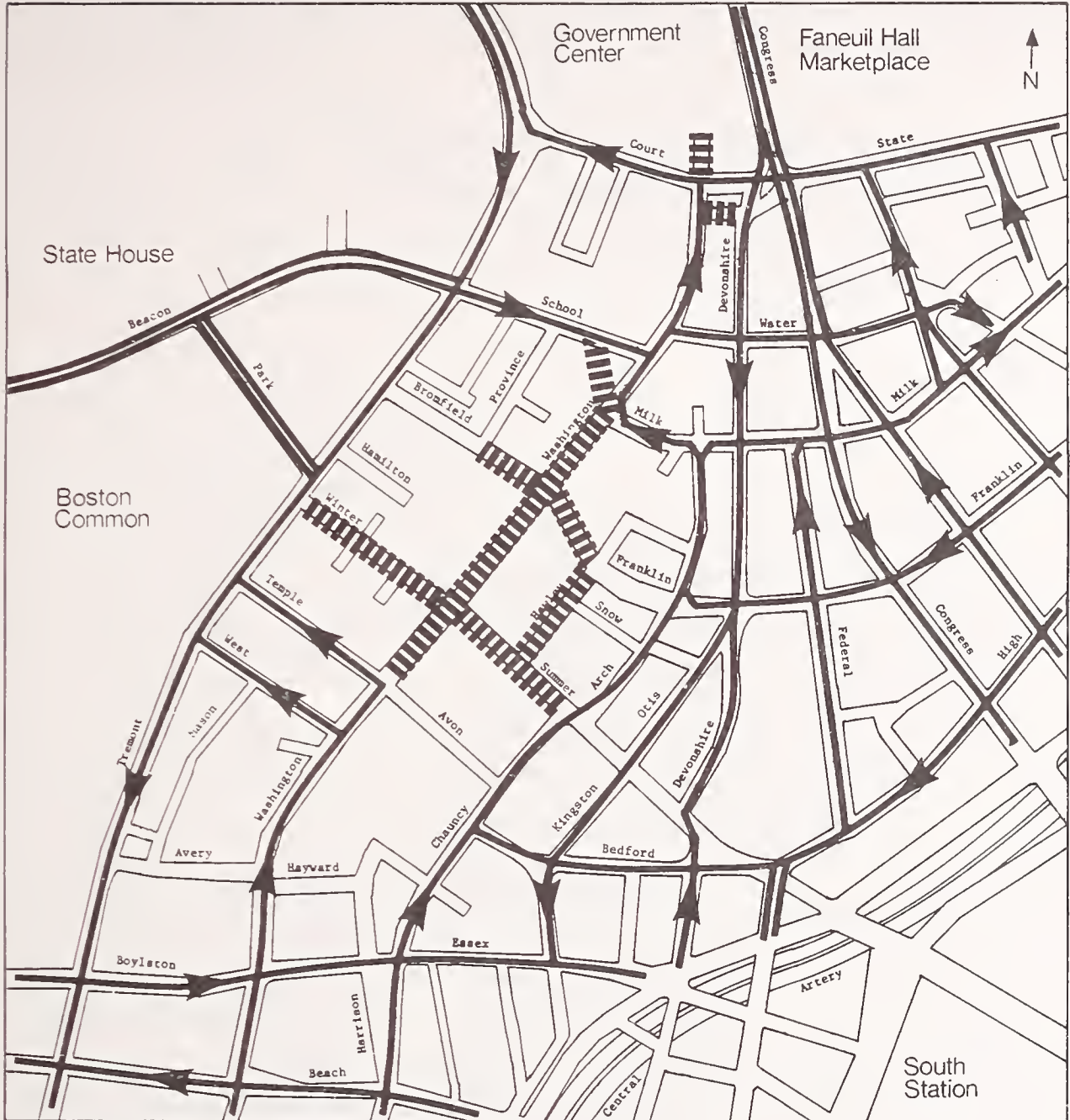
1. Elimination of all traffic on Washington Street (from Temple to Bromfield), Winter and Summer Streets (from Hawley to Tremont), the School to Milk Street connector, and State Street (between Devonshire and Washington). Early morning deliveries and late night taxis are still allowed on Winter and Washington Streets. Originally, buses ran on the above-referenced Washington Street segment, but they were taken off it in March 1979.
2. Elimination of auto traffic on Franklin Street (from Hawley to Washington), Bromfield (from Washington to Province) and Washington (from Bromfield to School Street). These streets remain open all day for taxis and delivery vehicles only. Temple Street and a portion of Washington Street (from West to Temple) were originally also closed to auto traffic in this way, but those blocks were reopened to general traffic in March 1979. Originally buses also ran on the Franklin Street and Washington Street segments, but they were eliminated on those blocks after December 1980. Hawley Street and Summer Street (from Hawley to Arch) were also designated as auto restricted, but autos are in fact now allowed on these streets as an "escape valve" for vehicles travelling up Franklin Street to the auto restricted zone.





→ Main circulation route

FIGURE 5-1. PATTERNS OF MAJOR TRAFFIC CIRCULATION BEFORE SEPTEMBER 1978





 Closed to general auto traffic  
 Circulation route

FIGURE 5-2. PATTERN OF MAJOR TRAFFIC CIRCULATION AFTER SEPTEMBER 1978

3. Reversals of street direction on the Chauncy Street/Arch Street route, on Milk Street (from Arch to Washington), and on Temple Street. Summer Street east of Hawley, previously one-way westbound, was also opened to eastbound traffic.

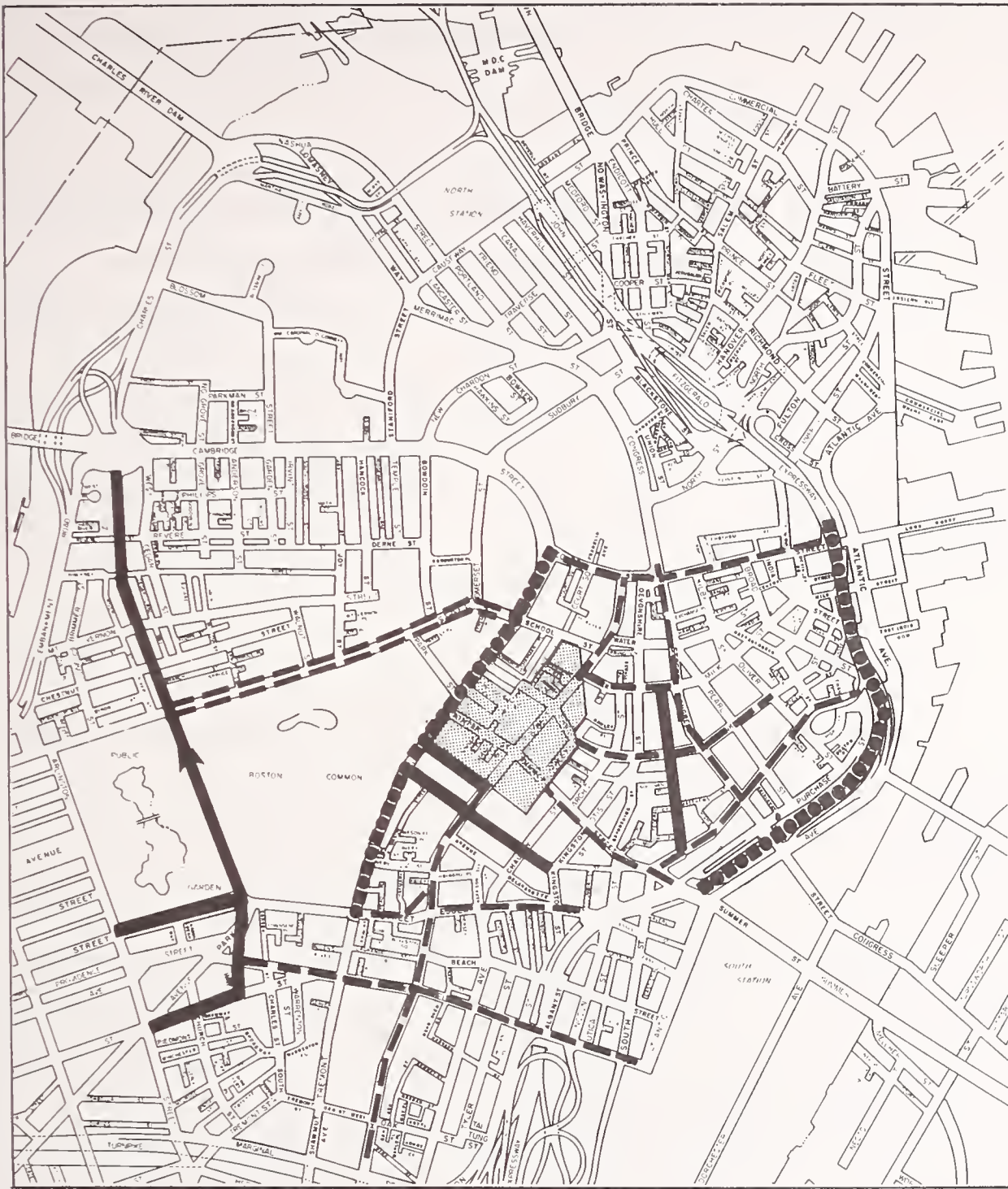
The circulation plan also had the effects of reducing Franklin Street (from Arch to Hawley), Bromfield Street (from Tremont to Province) and Province Street to use only as local access routes for parking garages and dropping off passengers.

## 5.2 TRAFFIC DIVERSION

A major concern of those involved in the planning of the auto-restricted zone was the impact that traffic limitation on major downtown streets, such as Washington, Winter and Summer, might have on traffic conditions on other already heavily utilized streets. The reversed direction of the Chauncy to Arch to Milk Street route was designed to accommodate northbound traffic diverted from Washington Street. Additional northbound traffic was expected to be diverted to Charles Street (on the western side of Boston Common--off the map), the expressway (east of the study area), the Devonshire to Arch Street route and the Federal to Congress Street route. The elimination of the connection from School Street to Milk Street eastbound would shift traffic travelling on School Street to continue on Water Street. The elimination of the westbound Summer-Winter Street route was expected to increase some local traffic on Bedford and West Streets. All on-street parking was eliminated from the diversion routes to facilitate greater capacity and smoother traffic flow on those streets. A total of 240 on-street parking spaces were eliminated on Chauncy, Arch, Federal, Water, West and Bedford Streets. Strict enforcement of these new parking regulations was a critical part of the total plan.

To measure the impacts on the auto-restricted zone on area streets, all-day traffic counts were conducted on nearly every block in the study area during the summer of 1978, the summer of 1979 and the summer of 1980. Overall project impacts on traffic diversion are summarized by Figure 5-3, which outlines the major traffic routes as of 1978 and distinguishes between those that experienced increases and those that experienced decreases in





- Increase in traffic volumes
- - - -** Decrease in traffic volumes
- .....** No major change in traffic volumes
- ▨** Auto restricted zone

FIGURE 5-3. CHANGE IN TRAFFIC VOLUMES: 1978-1980

traffic volumes in the 1978-1980 period. Detailed traffic counts for selected blocks are presented in Table 5-1 and discussed below; the locations of these streets are shown in Figure 5-4.

Comparison of the traffic counts taken since initiation of the project (summers of 1979 and 1980), with the counts taken prior to the project (summer of 1978), indicates that there were decreases rather than increases in vehicular traffic on most of the local streets near the auto-restriction zone. Some of the northbound traffic and the westbound traffic (the directions in which travel was most significantly restricted) can be traced to alternative routes further away. The rest of the decrease in travel levels is attributable to shifts from auto to transit for Downtown Crossing visitors and area employees. The extent of the traffic diversion and mode shifts are discussed below.

#### 5.2.1 Northbound Traffic Diversion

The major northbound route which was closed was Washington Street. Pre-project traffic counts indicated that the 11-hour volume (7 AM to 6 PM) on Washington Street in the retail core was as high as 7,200 vehicles. After implementation of the traffic restrictions, vehicular travel was virtually eliminated in that section. The diversion of traffic can, to a certain extent, be identified by counts taken at alternative northbound routes. As predicted, the most significant diversion of traffic was to Charles Street, on the opposite (west) side of the Boston Common. "Before" and "after" counts on Charles Street indicate an increase in northbound traffic of roughly 40 percent (5,700 vehicles) over the same 11-hour period. There has also been an increase of roughly 1,000 northbound vehicles daily on Federal Street, located two to four blocks east of Washington. Counts on three other northbound routes--Chauncy to Arch to Milk, Devonshire to Arch, and the Surface Artery--did not, however, show any of the predicted increases in volumes.

#### 5.2.2 Westbound Traffic Diversion

Approximately 5,100 vehicles of westbound traffic were diverted because of traffic restrictions--3,100 from the Bromfield/Franklin corridor and 2,000

TABLE 5-1. DAILY TRAFFIC FLOW BEFORE AND AFTER IMPLEMENTATION OF THE AUTO-RESTRICTED ZONE

(Average Number of Vehicles Daily 7 AM to 6 PM)

Location in Fig. 5-3	Street	Before Summer 1978	After Summer		Location in Fig. 5-3	Street	Before Summer 1978	After Summer	
			1979	1980				1979	1980
<u>North-South Routes Subject to Auto-Restriction</u>					<u>East-West Routes Subject to Auto-Restriction</u>				
<u>North-South Diversion Routes</u>					<u>East-West Diversion Routes</u>				
A	Washington Street (Northbound)				I	Franklin/Bromfield (Westbound)			
	Boylston/Essex to Avery/Hayward	7916	3554	2645		Congress to Federal	2549	2303	NA
	Avery to West	5228	2745	NA		Federal to Devonshire	3049	2412	NA
	West to Temple/Avon	4901	1628	1940		Devonshire to Arch	6280	5219	5605
	Temple/Avon to Winter/Summer	5961	(closed)	(closed)		Arch to Hawley	NA	2638	2704
	Winter/Summer to Bronfield/Franklin	7171	(closed)	(closed)		Hawley to Washington	3569	(closed)	(closed)
	Bromfield/Franklin to Milk	7614	1139	1472		Washington to Province	3099	(closed)	(closed)
	Milk to School/Water	5056	2646	1665		J1 Winter/Summer (Westbound)			
	Water to Court/State	6138	4483	3256		Devonshire to Kingston/Otis	4739	1439	1369
						Kingston/Otis to Chauncy/Arch	4856	383	44
						Chauncy/Arch to Hawley	NA	106	24
						Hawley to Washington	2771	(closed)	(closed)
						Washington to Tremont	1924	(closed)	(closed)
						J2 Summer Street (Eastbound 1979+)			
						Hawley to Chauncy/Arch	(not poss.)	1085	975
						Chauncy/Arch to Kingston/Otis	(not poss.)	1535	1115
						Kingston/Otis to Devonshire	(not poss.)	1535	1130
						O1 Stuart/Kneeland (Eastbound)			
						Tremont to Washington	8024	7017	6902
						Washington to Harrison	7267	7256	5798
						O2 Stuart/Kneeland (Westbound)			
						Harrison to Washington	6353	5871	6254
						Washington to Tremont	5433	5355	5128
						P Court Street (Westbound)			
						Congress to Devonshire	6162	NA	4975
						Devonshire to Washington	5111	4764	NA
						Washington to Tremont	10537	8793	NA
						Q School Street (Eastbound)			
						Tremont to Washington	3704	5300	3630
						R Water Street (Eastbound)			
						Washington to Devonshire	2357	3513	1905
						S Milk Street (Eastbound)			
						Arch to Devonshire	5911	3148	2884

Source: Two- or four-day averages from Planning Engineering and Development, under contract to the City of Boston.



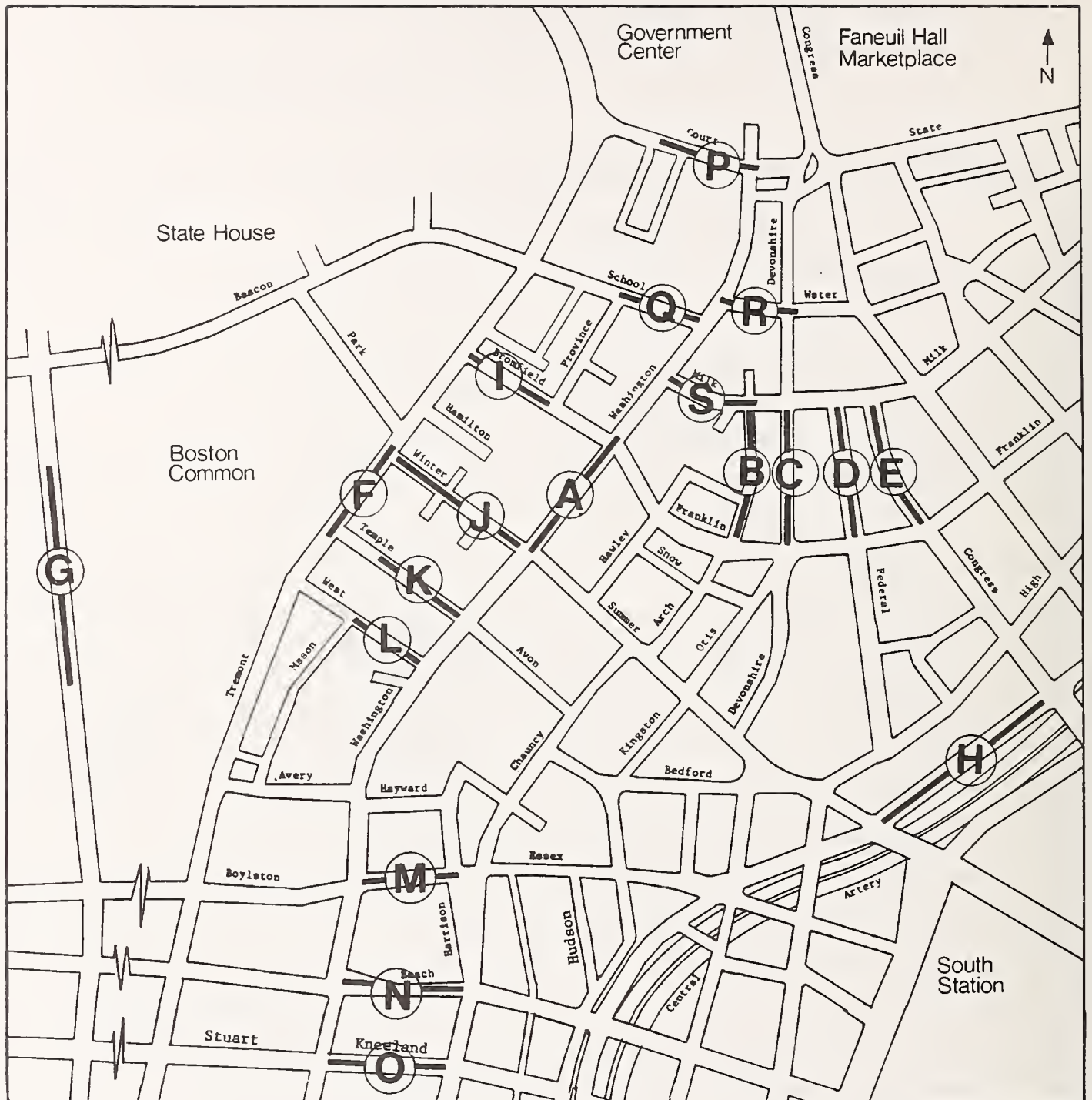


FIGURE 5-4. LOCATIONS OF STREETS REFERENCED IN TABLES 5-1 AND 5-2

from the Winter/Summer Street corridor. The majority of this traffic was diverted to Temple and West Streets one and two blocks away, which now carry roughly 3,700 more westbound vehicles than in 1978. (In 1978, Temple Street was one-way eastbound.) The diversion to West Street was predicted (Temple Street was originally to remain closed to all traffic). However, counts of westbound traffic on both the Stuart/Kneeland route (south of the auto-restricted zone) and on Court Street (north of the zone) failed to show any of the predicted increases in volume.

### 5.2.3 Total Traffic Volumes in the Area

There was a 5 percent overall decrease in area-wide traffic volumes in the 1978-1980 period. In the area shown in Figure 5-4, total daily traffic on all north/south routes decreased from 62,000 to 59,000, while traffic on all east/west routes decreased from 51,000 to 47,000.

There are two explanations for this decrease in areawide traffic volumes. Of this reduction in area traffic volumes of 7,000 vehicles daily, up to 6,000 can be attributed to the modal shift away from auto travel among Downtown Crossing visitors (discussed in Section 9.3). At the same time, the preceding analysis of diversion routes suggests that several thousand vehicles daily are avoiding the entire area. The increased traffic on Charles Street across the Boston Common accounts for much of the northbound traffic diverted from Washington Street, but there was a substantial diversion of east/west traffic not reflected by increases in volumes on other streets in the study area. It is likely that some travellers are now approaching destinations in the government complexes to the north of the Downtown Crossing from the north rather than travelling through the study area.

### 5.2.4 Circuitry

Given the primary diversion of northbound traffic from Washington Street to Charles Street and Federal Street and the primary diversion of westbound traffic from Bromfield/Franklin and Winter/Summer to Temple Street and West Street, it is estimated that the diversion of vehicles from the affected streets averaged 0.43 miles per vehicle per day. This applies to the 10,400

vehicles whose routes were diverted, out of the 106,000 vehicles travelling in the area daily. The total diversion thus totalled 4,400 vehicle-miles daily. Given average speeds through the area of 7 mph (from Table 5-2), the increased travel time for those whose routes were diverted averaged under 3.5 minutes per vehicle per day, although again, this applies only to the 10 percent of vehicles whose routes were diverted.

### 5.3 PEAK PERIOD TRAFFIC CONGESTION

Travel delays and traffic backups are a function not only of traffic volumes on a street, but also by the traffic patterns of cross streets and the volumes on them. Thus, it is possible for congestion to increase or decrease on a street without any change in the number of vehicles on that street.

Changes in travel speeds and delays associated with the auto-restricted zone were evaluated by comparing the travel times on selected streets in 1978 and 1980. These travel time measurements were conducted by a contractor for the City of Boston. Only the morning peak period travel times were measured in both years.<sup>1</sup> Figure 5-5 shows the locations of travel delay increases and decreases for all streets where they were measured. The travel times along the length of selected streets are shown in Table 5-2.

One of the most direct impacts of the auto-restricted zone on reducing congestion occurred on Tremont Street, a southbound route one block west of the auto-restricted zone. While Tremont Street had essentially no change in traffic volumes, travel speeds improved by over 40 percent between 1978 and 1980 due to the elimination of cross-street traffic on Bromfield and Winter Streets. Both Charles Street and Federal Street, the two major northbound diversion routes, showed small improvements in travel speeds despite increases in traffic volumes.

The two streets that experienced longer delays in 1980 than in 1978 were southbound Devonshire/Otis and westbound Kneeland/Stuart, both of which had small decreases in traffic volumes over the period. The added delay on Devonshire Street may be attributable to increased congestion at specific

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<sup>1</sup>The most critical congestion period was the evening peak period, but evening peak travel time measurements were available for 1979 and 1980 only.



TABLE 5-2. CHANGES IN TRAVEL TIME (MORNING PEAK)

Location in Fig. 5-3	Street	Distance	Travel Time (seconds)		% Change
			Summer 1978	Summer 1980	
<u>North/South</u>					
F	Tremont Street (Southbound) Beacon/School to Boylston	.55	157	94	- 40%
B	Chauncy/Arch (Northbound-1980) Bedford to Milk	.50	NA	116	NA
C	Devonshire/Otis/Kingston (Southbound) Water to Bedford	.30	125	225	+ 86
D	Federal (Northbound) High to Milk	.25	103	99	- 4
E	Congress (Southbound) Court to High	.35	110	122	+ 11
<u>East/West</u>					
Q-R	School/Water (Eastbound) Tremont to Congress	.20	144	113	- 22
P	Court Street (Westbound) Congress to Tremont	.15	56	49	- 12
M	Essex Street (Eastbound) Tremont to Kingston	.30	60	50	- 17
O	Kneeland/Stuart (Westbound) Kingston to Tremont	.35	86	205	+138

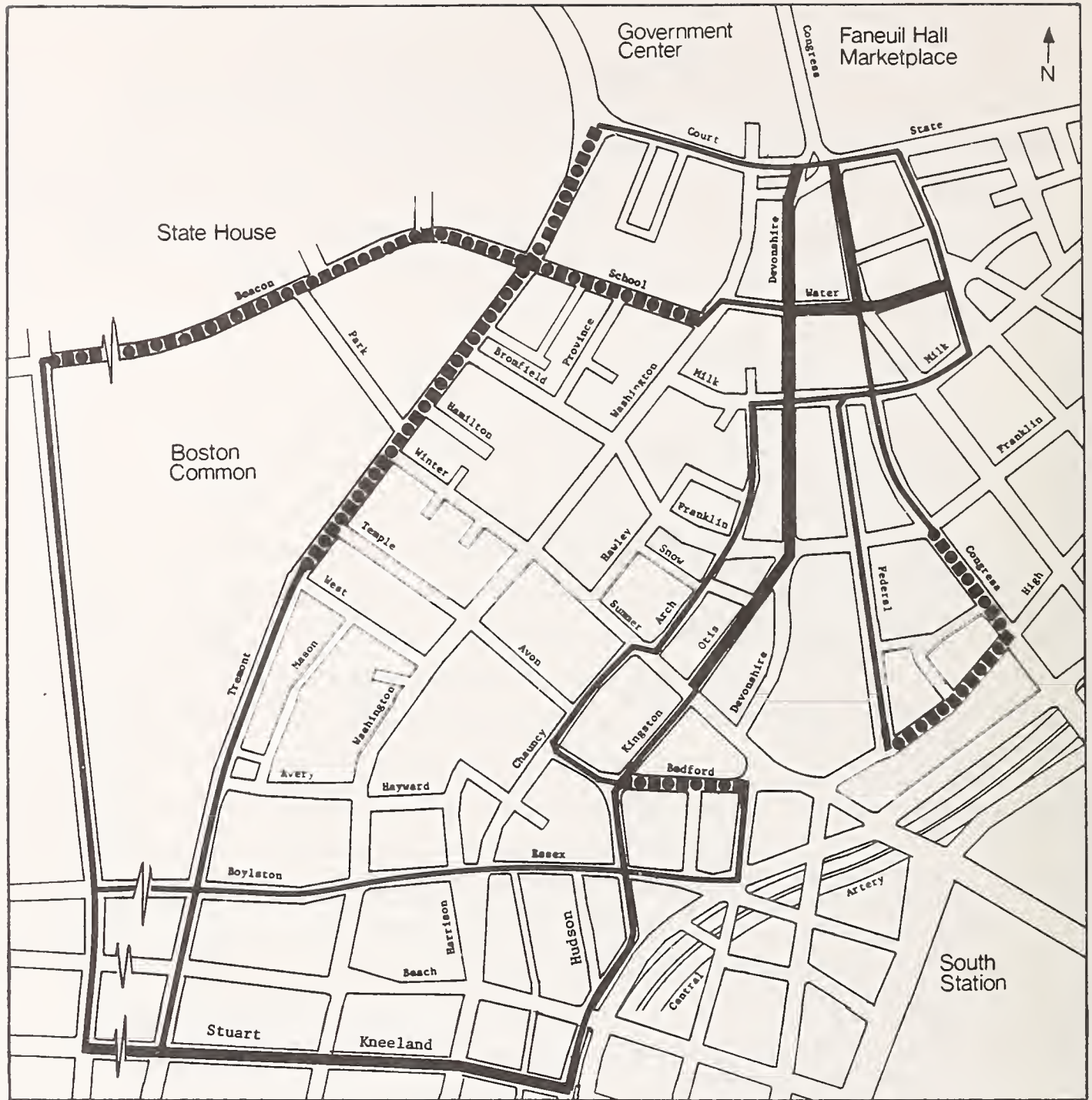


FIGURE 5-5. CHANGE IN TRAVEL TIME (MORNING PEAK), 1978-1980

intersections as traffic redistributed along new undulating east-west paths. The added delay could also be attributed to possible changes in traffic signal timing at those intersections or even to the occurrence of a delivery vehicle or stalled vehicle along the route on the day that travel times were measured. The existence of delivery vehicles blocking traffic lanes is particularly applicable to Kneeland Street, a two-way street through the busy Chinatown commercial district.

The extent of traffic backup and intersection congestion before and after implementation of the auto-restricted zone are shown in Figure 5-6. The Downtown Crossing project by design directly eliminated all vehicular congestion and backup along Washington Street and Bromfield Street. As predicted, there was some reduction of congestion at Tremont Street and Boylston Street due to a small reduction of traffic volumes on both streets. In general, the project had little impact on intersection congestion outside of the immediate auto-restricted zone.

#### 5.4 PARKING SUPPLY CHANGES

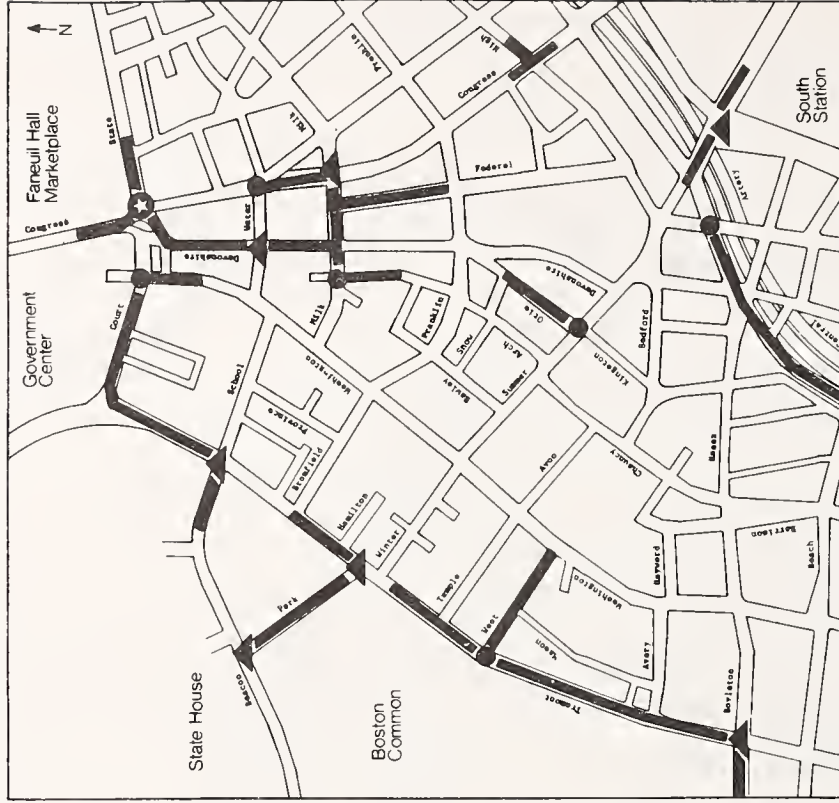
Automobile parking in the study area created many of the original problems of traffic congestion. It was estimated that one-fourth of the vehicles in the entire Boston CBD were illegally parked on a typical weekday (Voorhees et al., 1977). While the demand for convenient and inexpensive on-street parking exceeded the limited supply, enforcement of parking regulations was not rigorous enough to transfer this excess demand to the plentiful supply at off-street facilities.

##### 5.4.1 Capacity

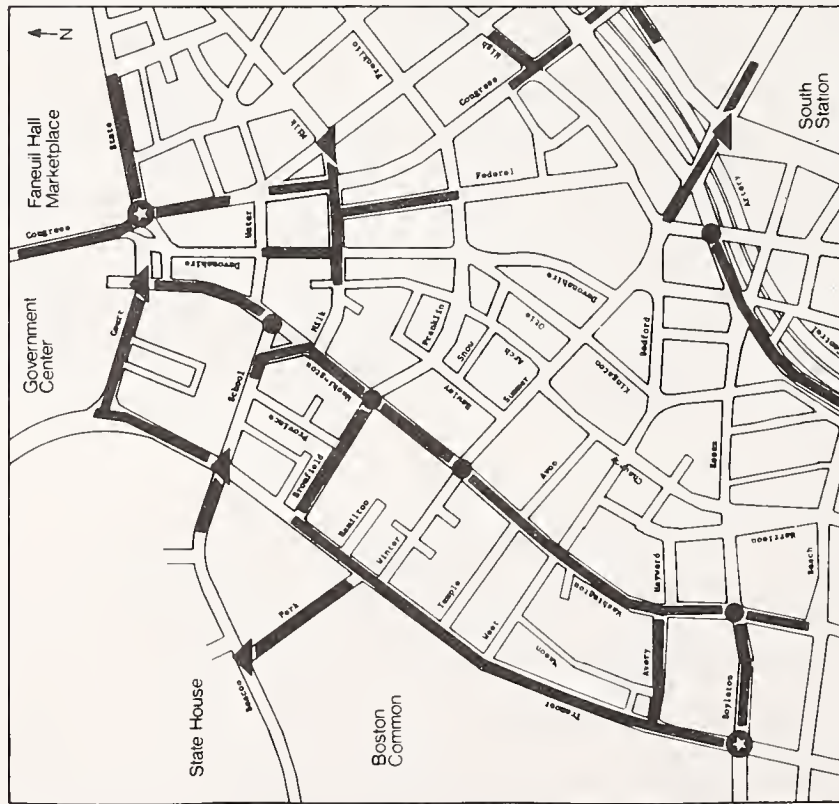
The supply of parking within the study area has been a focus of controversy for many years. The 1973-1975 Environmental Protection Agency's transportation control plan for the Boston area called for a moratorium on new parking facilities and a ban on on-street parking within the City's core. These policies were implemented in the years following. Figure 5-7 shows the location of legal on-street parking as of 1977. All on-street parking shown on that map was eliminated by September 1978 to facilitate anticipated additional traffic flow on streets near the auto-restricted zone. A total of



B. Evening Traffic Congestion, 1980



A. Evening Traffic Congestion, 1978



Source: Speed/delay runs and observations

- ★ Extreme congestion (avg. wait 4 minutes)
- ▲ Heavy congestion (avg. wait 2.5 minutes)
- Moderate congestion (avg. wait 1 minute)
- Traffic buildup

FIGURE 5-6. CHANGE IN CONGESTION (EVENING PEAK), 1978-1980

240 legal spaces were eliminated. In addition, stricter enforcement of no-parking regulations was designed to eliminate what had been an additional 360 non-legal parking spaces along the curbs of streets in the area within Figure 5-7. These 600 legal and illegal spaces were full 90 percent of the time.

The auto-restricted zone did not directly eliminate any off-street parking space, although there were some changes in off-street facilities during the 1978-1980 period. Figure 5-8 shows the location of major off-street facilities as of 1980. The parking facilities located within the parking catchment area shown account for approximately 38 percent of the 34,000 off-street spaces in the City of Boston. Within the study area, there were 57 facilities with 12,888 public spaces in 1978, and 53 facilities with 12,187 public spaces in 1980. While this represents only a small (5 percent) reduction in area-wide parking capacity, the area immediately adjacent to the Downtown Crossing was disproportionately affected. A total of 1,046 spaces were lost within two blocks of Downtown Crossing. New land development caused the elimination of the Allright lot (70 spaces) on Washington and Water streets north of the auto-restricted zone, and both the Hayward Place garage (700 spaces) and two lots (206 spaces) on Bedford Street south of the auto-restricted zone. The auto-restricted zone was at most only indirectly responsible for the removal of this parking capacity; at most it improved the development potential of those land parcels.

#### 5.4.2 Parking Rates

There was no evidence of any major change in the structure of parking rates at off-street lots and garages over the 1978-1980 period. As of January 1980, the average cost among all area parking facilities was \$1.50 for the first hour, with an average daily maximum of \$4.00. A survey of 13 off-street parking facilities that are nearest to Downtown Crossing and existed in both 1978 and 1980 showed that the average one hour rate increased from \$1.56 to \$1.92 over that period, while the average daily rate increased from \$4.42 to \$5.62. This is equal to a 23 percent increase in the one hour rate and a 27 percent increase in the daily rate. These increases are not out of line with

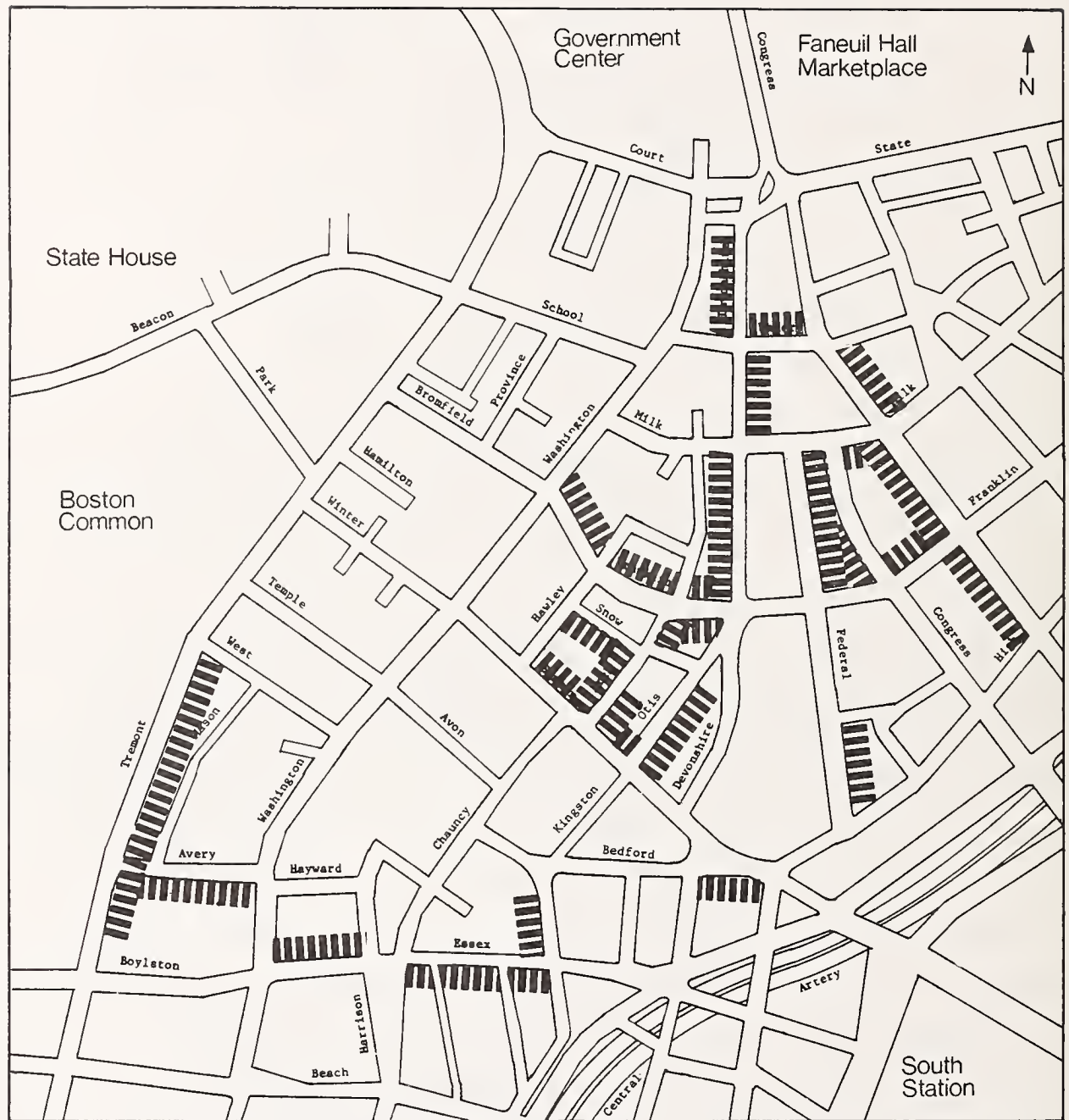
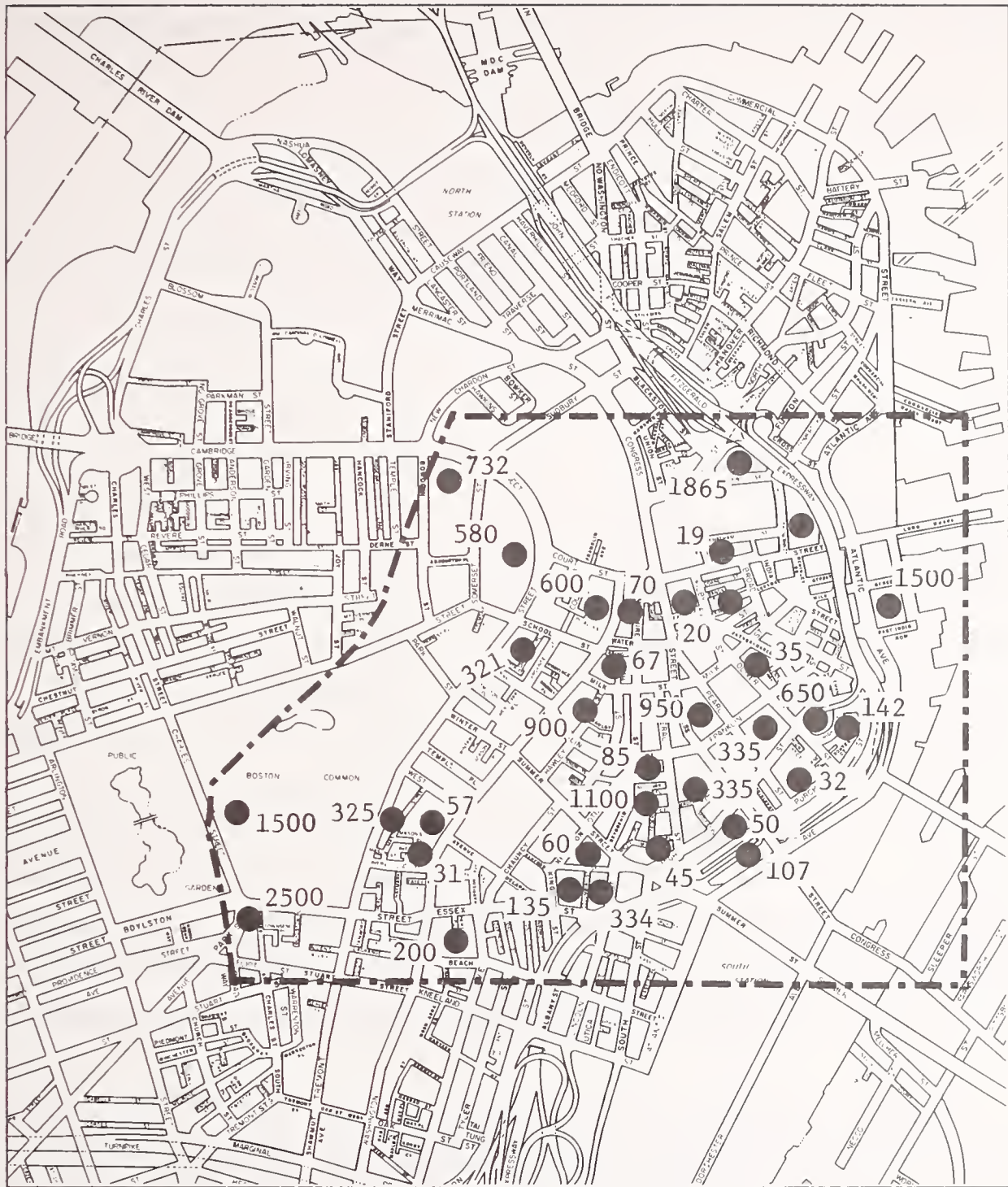


FIGURE 5-7. ON-STREET PARKING ELIMINATED





- Parking garages and lots with over 50 spaces
- Boundary of the area defined as the Downtown Crossing parking catchment area

FIGURE 5-8. OFF-STREET PARKING FACILITIES

the rate of inflation over the period. Eliminated after 1978, however, was free curbside parking and the low cost parking lot at Washington and Bedford.

#### 5.5 PARKING DEMAND CHANGES

Downtown Boston has long had significant excess capacity in off-street parking garages and lots. An examination of eight major parking garages in the study area in 1976 showed a surplus of 1,400 spaces (26 percent of capacity) at the time of maximum accumulation (12 noon).

For measuring impacts of the auto-restricted zone on parking demand, entrance counts were taken at 19 off-street parking facilities in 1978 and 14 off-street facilities in 1980 (see Figure 5-9). The sampled facilities in 1978 and 1980 had a total capacity of 7,639 and 7,095 spaces, respectively, representing 59.3 percent and 58.2 percent of the total area capacity in those years. Among those parking garages and lots, the number of total daily vehicles entering dropped from 6,212 in 1978 to 4,853 in 1980. This 20-percent reduction in parking demand is in general consistent with both the reduction in area street volumes and the shift from auto to transit usage among Downtown Crossing visitors. Probable causes include gas price increases, and ridesharing and transit promotions, as well as the street closings. Table 5-3 compares vehicle accumulations at selected parking garages and lots between 1972, 1976, 1978, and 1980. It clearly shows that there has not been any significant trend toward increasing parking over the time periods preceeding and after implementaion of the auto-restricted zone.

On-street parking usage continued on a reduced scale after implementation of the auto-restricted zone, and the increase in enforcement. The surveys and counts of on-street parking on selected streets (see Figure 5-10) shows a decrease from 1,490 vehicles parked per day in 1978 to 782 vehicles parked per day in 1980. Many of the on-street parking locations were legal in 1978, but all were illegal in 1980.

While the number of cars parked in off-street spaces declined 20 percent and the number of cars parked on-street declined 48 percent, average occupancy of the parked vehicles increased from 1.64 persons in 1978 to 1.74 in 1980.

TABLE 5-3. UTILIZATION OF SELECTED PARKING GARAGES 1972-1980

	Capacity	12 Noon Accumulation (Percent)				Exits 10AM-4PM	
		1972 <sup>A</sup>	1976 <sup>B</sup>	1978 <sup>C</sup>	1980 <sup>C</sup>	1978	1980
Woolworths	900	66%	78%	100%	68%	473	483
Hayward Place <sup>D,E</sup>	595	31	76	27	--	116	--
Bedford/Kingston	735	65	59	28	33	248	200
Beach Street <sup>D</sup>	500	53	69	67	38	137	135
Kilby Street <sup>D,E</sup>	700	35	71	NA	36	55	201
Fort Hill Square*	650	53	71	44 <sup>H</sup>	37	150	124
Harbor Towers	758 <sup>F</sup>	NA	81	80 <sup>H</sup>	65	800	507
Pi Alley	600	77	NA	73	58	184	219
Quincy Market Lot	204	NA	NA	56	87	333	438
Boston Common <sup>G</sup>	1500	NA	NA	100	95	819	573
Province St. Garage <sup>E</sup>	290	NA	NA	52	39	118	126

A 1972 Boston Parking Study, Wilbur Smith and Associates and Boston Redevelopment Authority

B 1976 Auto-Restricted Zone Study, Alan M. Voorhees and Associates, Cambridge Systematics, Moore-Heder and A.T. Kearney.

C Cambridge Systematics, Inc. and Boston Redevelopment Authority.

D owned by the City of Boston

E Mechanical garage--accumulation and exits are under-reported

F excludes private parking section

G Accumulations and exit counts are subject to significant measurement uncertainty.

H estimated





- Facility surveyed in 1978 and 1980
- Facility surveyed in 1978; not present in 1980
- ⊖ Facility surveyed in 1980; not present in 1978

FIGURE 5-9. OFF-STREET FACILITIES IN THE PARKING USER SURVEY

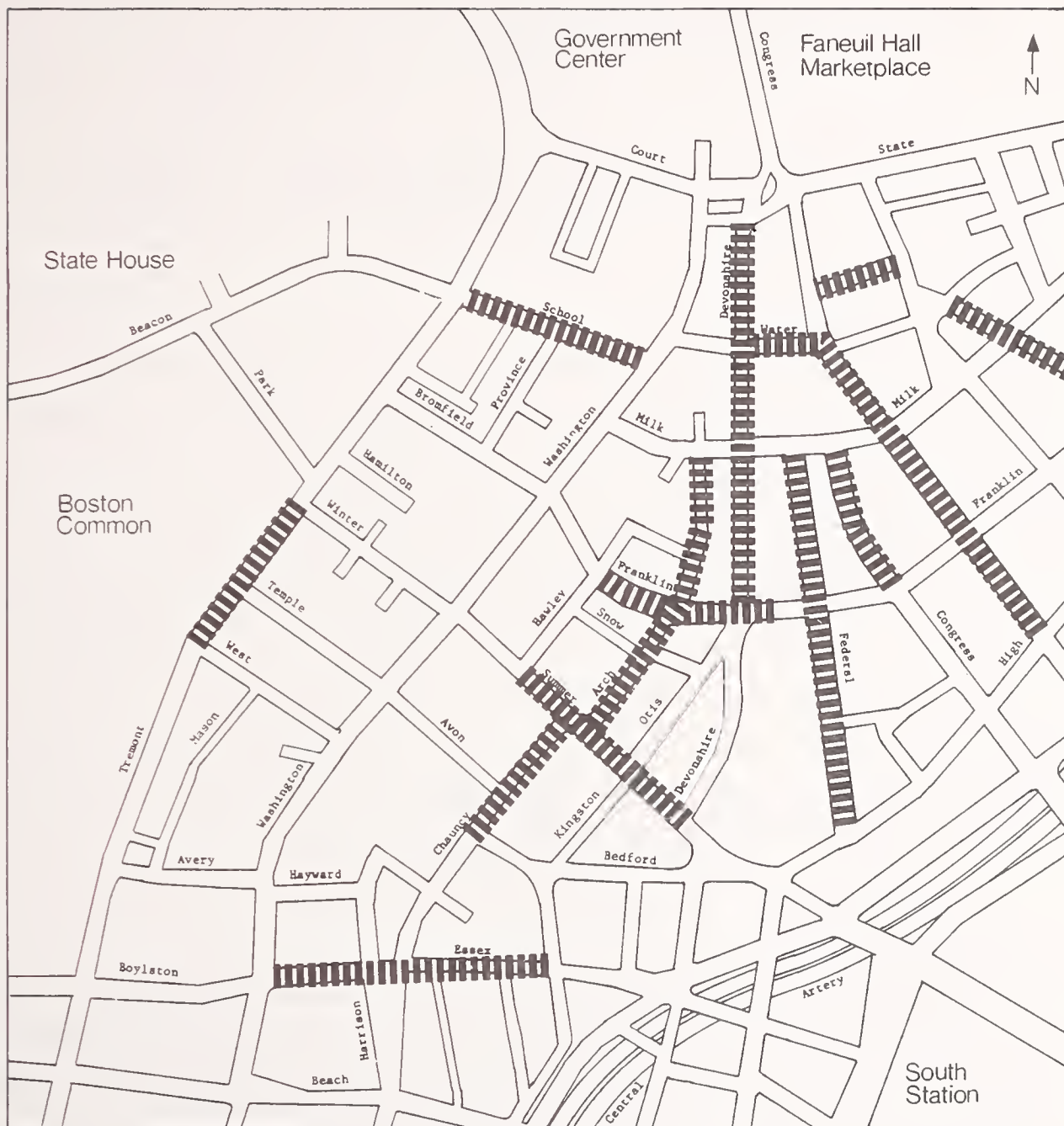


FIGURE 5-10. ON-STREET LOCATIONS OF RETURNED PARKING USER SURVEYS (1980)

Thus, there were 10,200 auto-users represented in the 1978 parking survey and 8,500 auto users represented in the 1980 survey. This represents a 16 percent overall reduction in the number of persons using those parking spaces.

## 5.6 CHARACTERISTICS OF PARKING TRIPS

### 5.6.1 Destination

As noted earlier, surveys and counts of parkers at selected on- and off-street facilities in 1978 and 1980 showed a 22 percent decrease in vehicles entering between 10 AM and 4 PM (from 6,212 to 4,853) and a 16 percent decrease in the total number of persons in those vehicles (from 10,199 to 8,517). The decrease was particularly large for those who had destinations in the Downtown Crossing area. For parkers with destinations in Downtown Crossing, the number of vehicles parked at the surveyed sites decreased 37 percent (from 2,229 to 1,415) and the number of persons in those vehicles coming by auto decreased 29 percent (from 3,793 to 2,675). This particularly large decrease in Downtown Crossing parkers can be related to the disproportionate reduction in on- and off-street capacity within two blocks of the auto-restricted zone, and the significant shift toward transit usage among Downtown Crossing visitors (as discussed in Chapter 9). The remainder of the analysis in this section focuses exclusively on the subset of parking facility users who visited destinations in Downtown Crossing.

### 5.6.2 Trip Purpose

The decrease in vehicles parked was particularly evident for shopping and other non-work purposes. Among parkers with destinations in Downtown Crossing, the number of work-related trips at the surveyed sites declined only 4 percent between 1978 to 1980, while the number of shopping trips declined 26 percent and the number of other-purpose trips declined 67 percent.

Further evidence that the reduction in parking capacity very close to Downtown Crossing particularly affected shoppers is shown by the response to the question: "Did you have any trouble finding a parking place?" Overall,



there was hardly any change in responses between 1978 and 1980, but for persons whose principal purpose was work, the "yes" responses dropped from 25 to 21 percent, while for persons whose principal purpose was shopping, the "yes" responses rose from 23 to 35 percent. The reason for these shifts may be related to familiarity with the changes that had occurred in downtown parking locations and the elimination of on-street parking most convenient to the retail district. Since workers travel downtown more frequently than shoppers, they would be more likely to know where parking is usually available and to adapt to changes in parking locations.

### 5.6.3 Trip Origin

The reduction in parking demand for both work trips and shopping trips was concentrated on shorter length trips. Among those with destinations in Downtown Crossing, the number of vehicle trips originating in locations in the City of Boston decreased 60 percent, while trips originating outside of Boston decreased only 21 percent. Among shoppers visiting Downtown Crossing destinations, the proportion living in Boston decreased from 30 to 22 percent over the 1978-1980 period.

## 5.7 PARKING AND TRAFFIC ENFORCEMENT

The increased enforcement of parking and traffic regulations was viewed as a key factor in the success of the auto-restricted zone. Project management realized that enforcement in the Downtown Crossing area would initially have to be visible and strong, particularly because of the prior lax enforcement of parking restrictions. The major objective of the parking enforcement program was to keep the auto-restricted streets clear, keep traffic around the area moving, and in the long run, create a self-enforcing program.

### 5.7.1 Police Presence

The Boston Police Department was responsible for enforcement of the traffic, parking and loading restrictions, as well as maintaining public safety. The initial UMTA grant proposal requested enforcement funds for four

additional police officers during the day and two at night to cover two major entry points to the auto restricted zone and other key traffic intersections. A subsequent review by lieutenants in the Boston Police Academy found this plan to be inadequate, and recommended an initial placement of five entry control officers, including officers to assist in diverting Washington Street traffic before it comes to the ARZ entry point. The adopted plan was to provide very heavy traffic control enforcement for the first month and then gradually taper it off. In the first month of the program (September 1978), 16 police patrol officers were assigned to Downtown Crossing on weekdays, mostly stationed to control key traffic intersections and entry points into the auto restricted zone. There were 17 officers on Saturdays and 4 on weeknights. The next month, the police presence was cut in half, and from November 1978 through January 1980, police patrol assignments in Downtown Crossing remained at 6 on weekdays and Saturdays and 2 on weeknights. The weekday and Saturday patrols were increased to 8 officers after February 1980. In addition to the patrol officers, the police presence usually included a captain, a detective, and up to 4 relief off-duty officers. The BRA paid the Boston Police Department \$144,500 in the first year for this supplementary police presence, and continued to fund an additional police presence at a cost of \$225,000 from the second phase grant.

#### 5.7.2 Towing

Initial enforcement activities involved a high level of ticketing and towing. The police tow unit was assigned full-time to the Downtown Crossing area during the first three months. A total of 1,079 vehicles were towed in September 1978 and 300-400 vehicles were towed in each of the following two months (refer to Figure 5-11). No exceptions were made to the towing policy and all illegally parked vehicles were towed. After December 1, almost all towing was done by a private contractor (with four tow trucks) so that the police tow unit could return to the "Tow and Hold" program aimed at vehicles with substantial unpaid fines outstanding. The number of vehicles towed increased to 600-700 per month during December 1978 to March 1979, which may have been particularly attributable to additional towing for snow

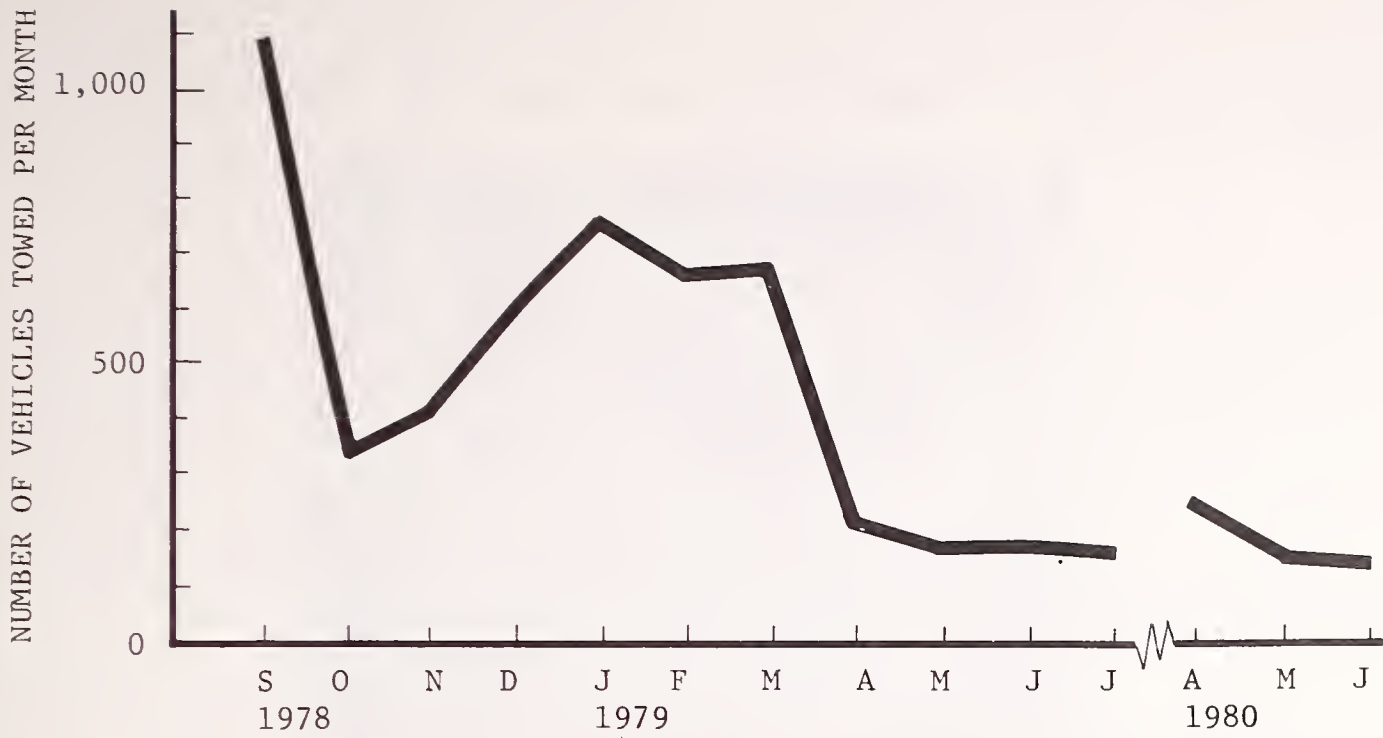


FIGURE 5-11. NUMBER OF VEHICLES TOWED PER MONTH

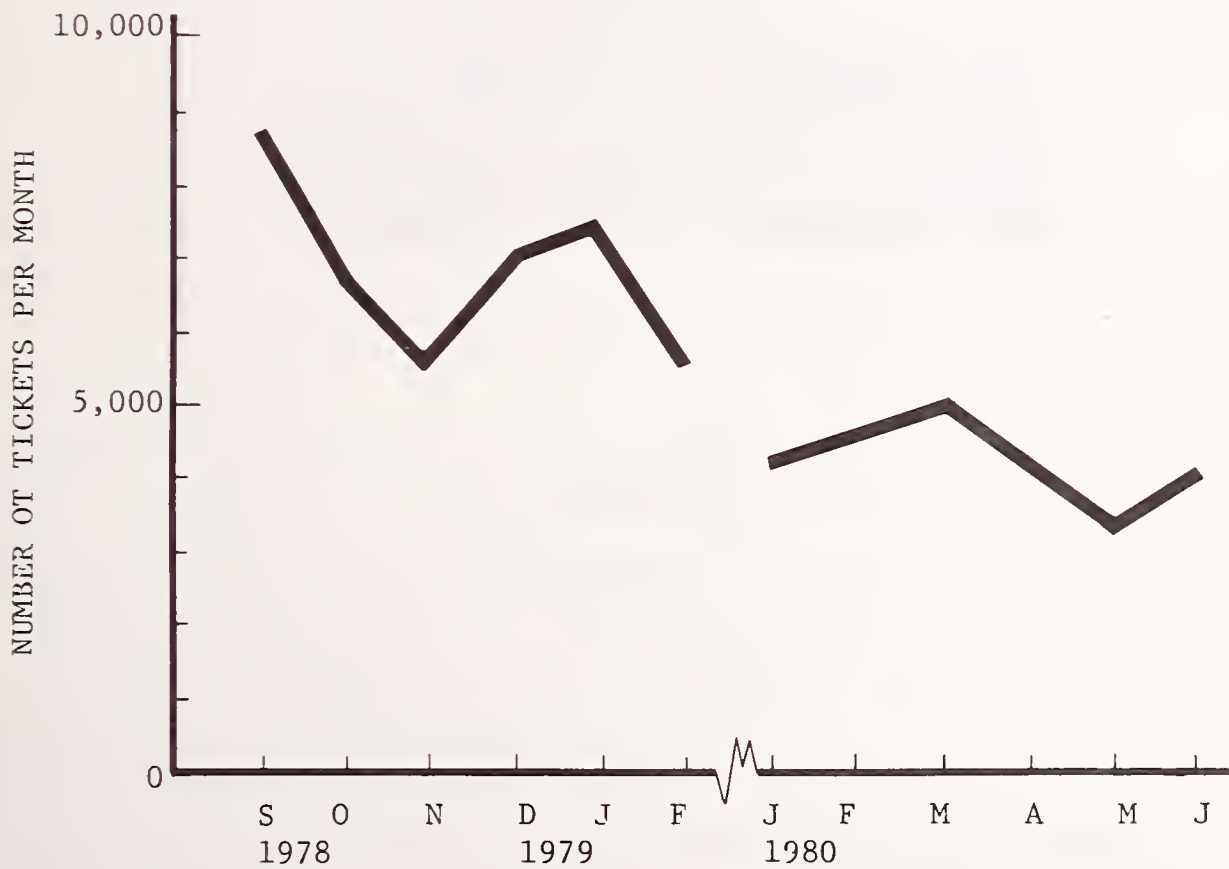


FIGURE 5-12. NUMBER OF PARKING TICKETS ISSUED PER MONTH



removal. Since then, towing in non-winter months has stabilized at 100-200 vehicles per month.

### 5.7.3 Ticketing

In addition to towing, a large number of parking tickets were issued. With the assistance of six meter maids on duty, a total of 8,821 tickets for illegal parking were issued in September 1978. The number of tickets issued decreased in the following two months to 6,732 and then 5,628. Since then, the number of parking tickets issued has declined to an average of 4,000 per month (see Figure 5-12).

### 5.7.4 Moving Traffic Control

It was hoped that the bricking of some streets, together with the placement of regulatory signs notifying motorists of the auto restrictions, would eventually make the streets self-enforcing and eliminate the need for a police presence at the entry points into the auto-restricted zone. In fact, the police presence at entry points was found to be necessary and was maintained until early 1980. At that time, the police patrol of entry points (which had been funded by the BRA using officers on overtime) ceased for a time as police officers stopped working overtime in response to city budget reduction layoffs.

Even without police patrols at entry points, the visual effect of bricking of the streets, together with the crowds present, helped discourage unauthorized cars from the fully pedestrianized blocks of Washington, Winter and Summer Streets. It is generally acknowledged that such self-enforcement would be more successful if there were larger or otherwise more noticeable traffic entry warning signs. The problem of unauthorized vehicles is more common on the auto-restricted streets that had no such physical improvements--principally the taxi and delivery-only blocks of Franklin, Hawley and Summer. The signs on those streets (see Figure 5-13) were also small and were not noticed by motorists unfamiliar with the area. A large wooden painted sign had been placed in the middle of the Franklin Street entry point, but it was eventually destroyed after being repeatedly knocked over by moving



FIGURE 5-13. FRANKLIN STREET ENTRANCE SIGN

vehicles. The need for more appropriate traffic signs has remained an issue for the Downtown Crossing area.

Aside from the difficulty keeping unauthorized vehicles out of the auto-restricted zone, moving traffic control in the surrounding area was not a problem. The number of citations for moving traffic violations in the area averaged 20-30 per month both before and after implementation of the auto-restricted zone.

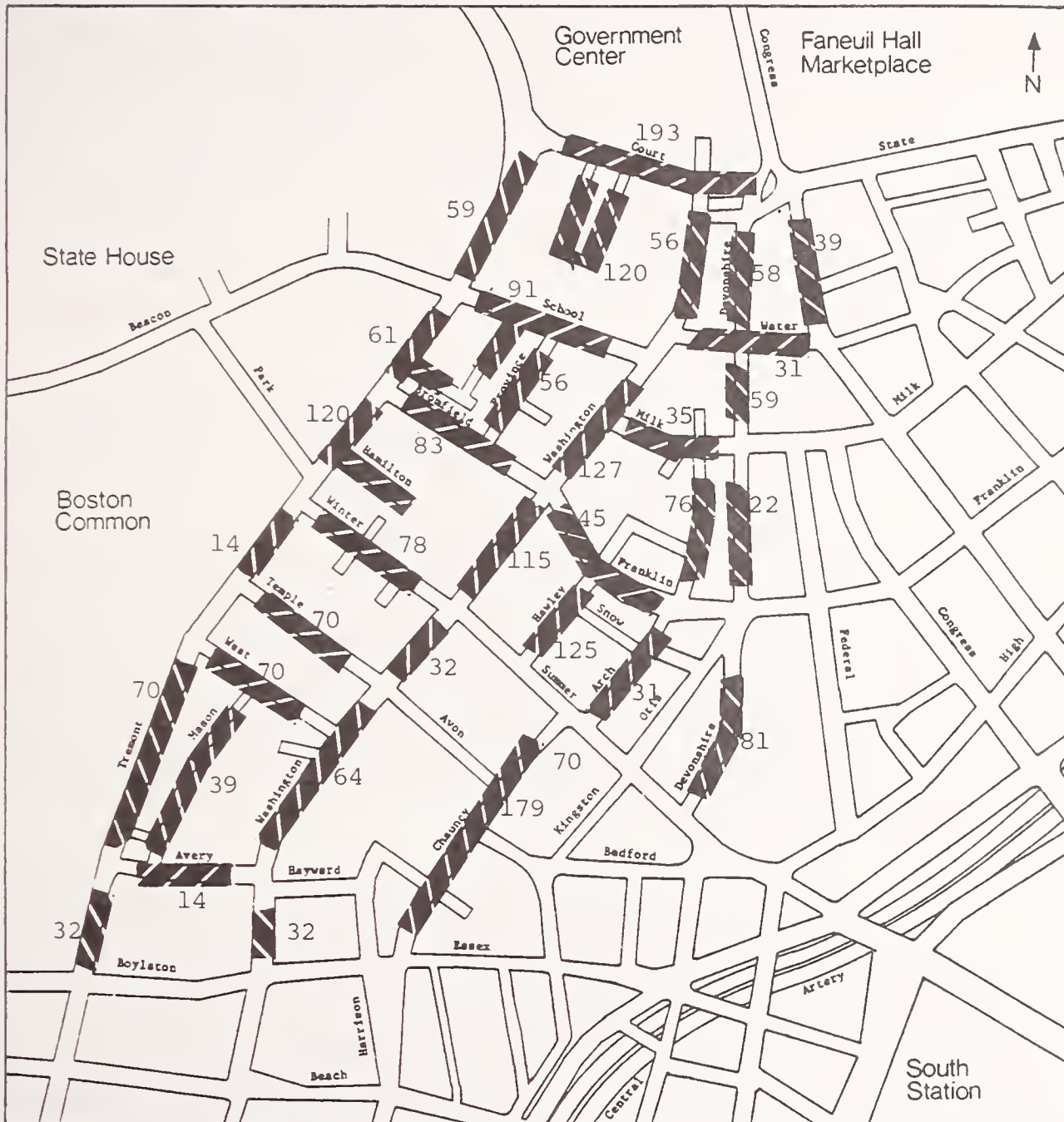
## 5.8 IMPACTS ON GOODS DELIVERIES

### 5.8.1 Overview of Downtown Conditions and Project Changes

There are very few alleys in downtown Boston, and so most deliveries are made through the front doors of businesses, with the delivery vehicle parked in the street nearby. Within the study area, only the three department stores and three of the larger office buildings have off-street loading docks. Since before the Downtown Crossing project, there were approximately 20 major legal truck loading spaces in the study area, although these were often blocked by illegally parked cars and private trucks, requiring legitimate delivery vehicles to double park in traffic lanes. There are approximately 600 delivery points within the study area, of which 400 are small retail shops. Figure 5-14 shows the average daily number of deliveries on each block as of 1976. Additional characteristics of deliveries in the study area are presented in Section 2.3.6.

With implementation of the auto-restricted zone, goods delivery on the auto-restricted streets were restricted to the hours of 1 AM to 11 AM. Only vehicles with commercial plates or special permits are allowed in. Subsequently, further compromises have been made. Time sensitive and unavoidable deliveries such as newspapers, mail, air freight forwarders are also allowed after 2 PM (refer to Figure 3-5). In addition, the delivery restrictions were changed in January 1980 to allow unlimited deliveries after 6 PM. The specific changes are described more fully in Section 3.2.4.





Source: A. T. Kearney Truck Activity Survey

FIGURE 5-14. DAILY DELIVERY VOLUMES BY BLOCK, 1976

### 5.8.2 Project Impacts

The initial pre-project feasibility study of goods movement found the existing volume of deliveries to seriously exceed the available space even before the addition of further delivery restrictions associated with the auto-restricted zone. The 1976 consultant study found that slightly over half of all deliveries were made after 11 AM, a percentage substantially higher than that observed in many other cities and surprising in light of the preferences of restaurants and many retailers for early morning deliveries. Interviews with carriers revealed that the large extent of deliveries made after 11 AM was primarily attributable to congestion and time spent waiting or looking for loading space. The consultant feasibility study found that almost every block in the study area had inadequate loading zone space and that overall, seven times the current on-street loading zone space would be necessary to satisfy the demand for morning deliveries. Without additional capacity, restrictions on deliveries after 11 AM would be difficult to satisfy.

By eliminating all cars within the auto-restricted zone and all on-street parking in areas around the zone, the Downtown Crossing project is believed to have helped relieve the difficulty of insufficient curbside loading space for morning deliveries. Additional on-street loading zones were designated within Downtown Crossing and the surrounding area and utilization of loading zones in the surrounding area was increased as a result of greater enforcement of illegal parking regulations.

During the first six weeks of the auto-restricted zone and delivery restrictions, the Boston Traffic and Parking Department received 61 complaints and inquiries concerning deliveries. Most of these phone calls were requests for permits to allow vehicles without commercial plates into the auto-restricted zone to make deliveries (especially for jewelry and flower shops), or for armored vehicles into the zone after 11 AM for pickup and delivery of cash at stores and banks. Other requests for after 11 AM deliveries came from parcel delivery services. Many of the complaints made by merchants located outside of the auto-restricted zone concerned the need for legal delivery space in front of their store, since illegal parking restrictions were now being more strictly enforced.

While the restrictions on deliveries after 11 AM was a cause of initial concern by many Downtown Crossing merchants, most deliverers were able to complete their deliveries within the morning hours and those that could not were generally able to get a special permit. The subsequent issuance of special permits allowing a variety of delivery vehicles into the auto-restricted streets during afternoon hours (including mail and parcel delivery services), and the designation of additional loading zone space around the area effectively eliminated most of the complaints. Unfortunately, however, the continued existence of delivery vehicles in Winter and Washington Streets (which are otherwise closed to all vehicles) has reinforced the tendency of pedestrians to avoid walking in the central street space (see Section 8).

To measure changes in delivery patterns since implementation of the auto-restricted zone, deliveries on each block within the zone were observed during 10 AM-5 PM in June of 1978 and 1980. For each delivery, the location, time of day, and type of delivery were noted. Table 5-4 compares characteristics of deliveries before (1978) and after (1980) implementation of the auto-restricted zone delivery time restrictions. Results of a 1976 study, which more completely covered early morning hours, are also shown. Comparison of changes between 1978 and 1980 show no significant change in the number of deliveries on the affected blocks, but a dramatic shift from afternoon to morning deliveries, so that almost all deliveries are now being made before 11 AM.

A separate survey of merchants in both Downtown Crossing and the surrounding area conducted in 1978 and 1980 indicated similar shifts in delivery patterns. The average number of consignments (shipments) received per week for the responding businesses declined slightly, from 22 in 1978 to 18 in 1980. At the same time, the percentage of deliveries occurring between 6 AM and 11 AM increased from 46 percent to 68 percent over that period, although just 21 percent of the businesses reported that their delivery patterns had changed significantly since the Downtown Crossing project was implemented. The survey also showed that attitudes toward the delivery restrictions have changed little since implementation of the Downtown Crossing



TABLE 5-4. DELIVERY PATTERNS ON STREETS AFFECTED BY  
GOODS MOVEMENT RESTRICTIONS

	1976 <sup>A</sup> (7 AM-4 PM)	1978 (10 AM-4 PM)	1980 (10 AM-4 PM)
<u>Number of Deliveries</u>			
Washington Street (Temple to Winter)	32	14	25
Washington Street (Winter to Bromfield)	115	29	16
Washington Street (Bromfield to Milk)	70	30	24
Winter Street	124	40	47
Bromfield Street	45	24	35
Franklin Street	4	16	17
*(Temple Street)	NA	(36)	(78)
*(Summer Street (Chauncy to Hawley))	NA	(14)	(33)
<u>Type of Delivery</u>			
Retail Goods and Goods-Related Services	68%	56%	51%
Food	20	10	7
Service	11	37	22
Other	<u>1</u>	<u>3</u>	<u>20</u>
Total	100%	100%	100%
<u>Percent of Deliveries Before 11 AM</u>			
Washington Street (Temple to Winter)	53%	40%	88%
Washington Street (Winter to Bromfield)	49	29	92
Washington Street (Bromfield to Milk)	46	22	82
Winter Street	43	31	92
Bromfield Street	53	27	67
Franklin Street	100	34	74
*(Temple Street)	NA	(37)	(46)
*(Summer Street (Chauncy to Hawley))	NA	(24)	(54)
Retail Goods and Goods Related Services	--	36	77
Food	--	38	60
Service	--	33	69
Other	<u>--</u>	<u>9</u>	<u>88</u>
Total	--	29	83

<sup>A</sup>Source: A.T. Kearney truck survey

\*Streets not subject to goods movement restrictions

NA -not available

project. In both 1978 and 1980, a core of 16-17 percent of the merchants perceived the delivery restrictions to be detrimental to their business, while 61-63 percent of the merchants were neutral toward the restrictions and 21-23 percent perceived these restrictions to actually be helpful to business. Since the first couple of months of operation of Downtown Crossing, goods movement has not been a major issue in the continuing operation of the auto-restricted zone.

## 5.9 TAXIS

### 5.9.1 Overview of Downtown Conditions and Project Changes

Taxis are an important element of travel to and within Boston's central business district. Pedestrian surveys showed that over 1,000 persons travelled to Downtown Crossing by taxi each weekday. Most taxis do not cruise, but rather wait for passengers at cab stands.

The Downtown Crossing project closed Washington and Winter/Summer Street to taxis, except after 7 PM. The other streets which were closed to automobiles all remained open to taxis all day long. Additional taxi stand capacity was added at the periphery of the streets closed to taxis, most notably new space for six taxis at Franklin Street and at Summer Street (refer to Figure 3-6 and Section 3.2.5 for further description of the locations of the taxi access routes and taxi stands).

### 5.9.2 Project Impacts

The street closings had only a minimal impact on taxi users. Principally affected were persons who formerly were able to hail cabs cruising on Washington Street, who now have to walk up no more than one block to a taxi stand. For many taxi riders, the increase in number of taxi stands in the area has meant shorter walking distances. A pre-project survey found that fewer than 30 percent of the taxi trips beginning or ending in Downtown Crossing used routes that were to be closed to taxis. The addition of taxi movement on Washington and Winter Streets after 7 PM were in part responses to the desires of Winter Street restaurant operators. In response to other

complaints, taxis making parcel deliveries were allowed to stop in loading zones, cab stands or no parking zones, provided that they leave their flashers on.

Counts of taxis stopping at each block in the Summer of 1978 and 1980 (from 10 AM - 4 PM) primary show a very substantial increase in taxis standing on Franklin Street near Washington (from 3 to 203 daily), accompanying a drop in taxis at the taxi stand on Summer Street near Chauncy (from 119 to 52). Overall, the pedestrian survey found no significant change in the number of persons visiting Downtown Crossing by taxi since the auto-restricted zone began.

#### 5.10 SUMMARY

Traffic. During the planning of the auto-restricted zone, there was serious concern about the extent of expected increases in traffic on nearby streets. In fact, most of the streets near the zone actually experienced decreases in traffic volumes. The traffic decrease is attributable to significant shifts from auto to transit among area office workers and Downtown Crossing visitors, and to auto trips avoiding the entire area.

Congestion. As a result of the decrease in traffic volumes in the surrounding area, congestion was also relieved. The benefit was greatest for Tremont Street, a major arterial which had no change in traffic volumes but experienced improved traffic flow due to the elimination of intersecting traffic from side streets now subject to auto restriction.

Parking. Off-street parking capacity in the area was not significantly reduced by the Downtown Crossing project, but usage of these parking facilities did decrease, particularly among shoppers.

Enforcement. Continuation of a high level of traffic and parking enforcement was found to be important to keep unauthorized vehicles out of the auto-restricted zone and to maintain space reserved for taxis and deliveries.

Goods deliveries. Goods movement in the auto-restricted streets was restricted to hours before 11 AM and after 6 PM. Despite initial concerns that this policy would cause substantial hardship to merchants, most deliverers were able to shift to make earlier deliveries, now that general



traffic was eliminated and curbside space for loading (previously blocked by parked cars) was now freely available.

Taxis. Project impacts on taxi ridership were minimal, in part because taxis were allowed continued all-day access on many of the streets closed to all other vehicles, and additional taxis stands were set up at locations along the periphery of the auto-restricted zone.



## 6. TRANSIT CHANGES

### 6.1 BUS ROUTE AND SERVICE MODIFICATIONS

#### 6.1.1 Pre-Project Conditions

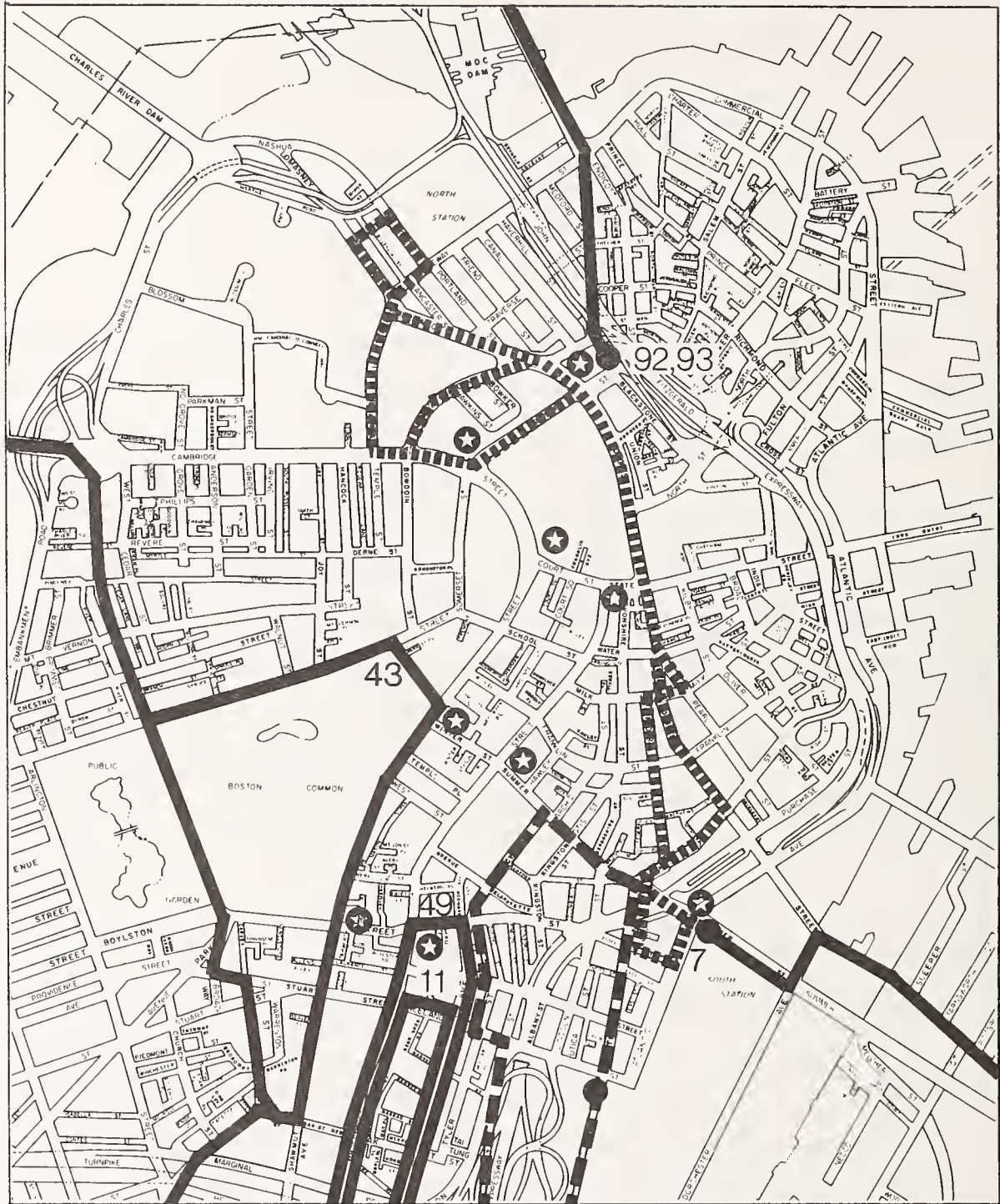
Boston has one of the most extensive systems of public transportation in the nation. The downtown is the hub of the MBTA regional transit network that offers subway, local bus, express bus and commuter rail services. Due to the narrow and congested street conditions, however, the MBTA relied almost exclusively on the subway system to serve the Central Business District. Within the study area are six subway stations, including the major transfer points between all four major subway lines. Local bus routes to the downtown area all terminated at subway stations on the periphery of the central retail, and office district (see Figure 6-1). From there, most bus riders continued to their final destinations by subway or by walking. There are no free transfers in the MBTA system; bus and subway fares through 1981 were 25 cents per ride.

#### 6.1.2 Project Improvements--Original Configuration

The major transit service improvements were the extension of six local bus routes and four express bus routes into the auto-restricted zone. A combination of exclusive transitways and contra-flow bus lanes permitted buses to serve the retail core with little interference from other traffic. The six local routes all originated at either the Charlestown section of Boston to the north or the inner city neighborhoods to the south. The four express routes served areas to the west. Another bus not affected by the route changes was the South Station to North Station rush-hour shuttle service. The trip time and frequency of each route serving the area is shown in Table 6-1.

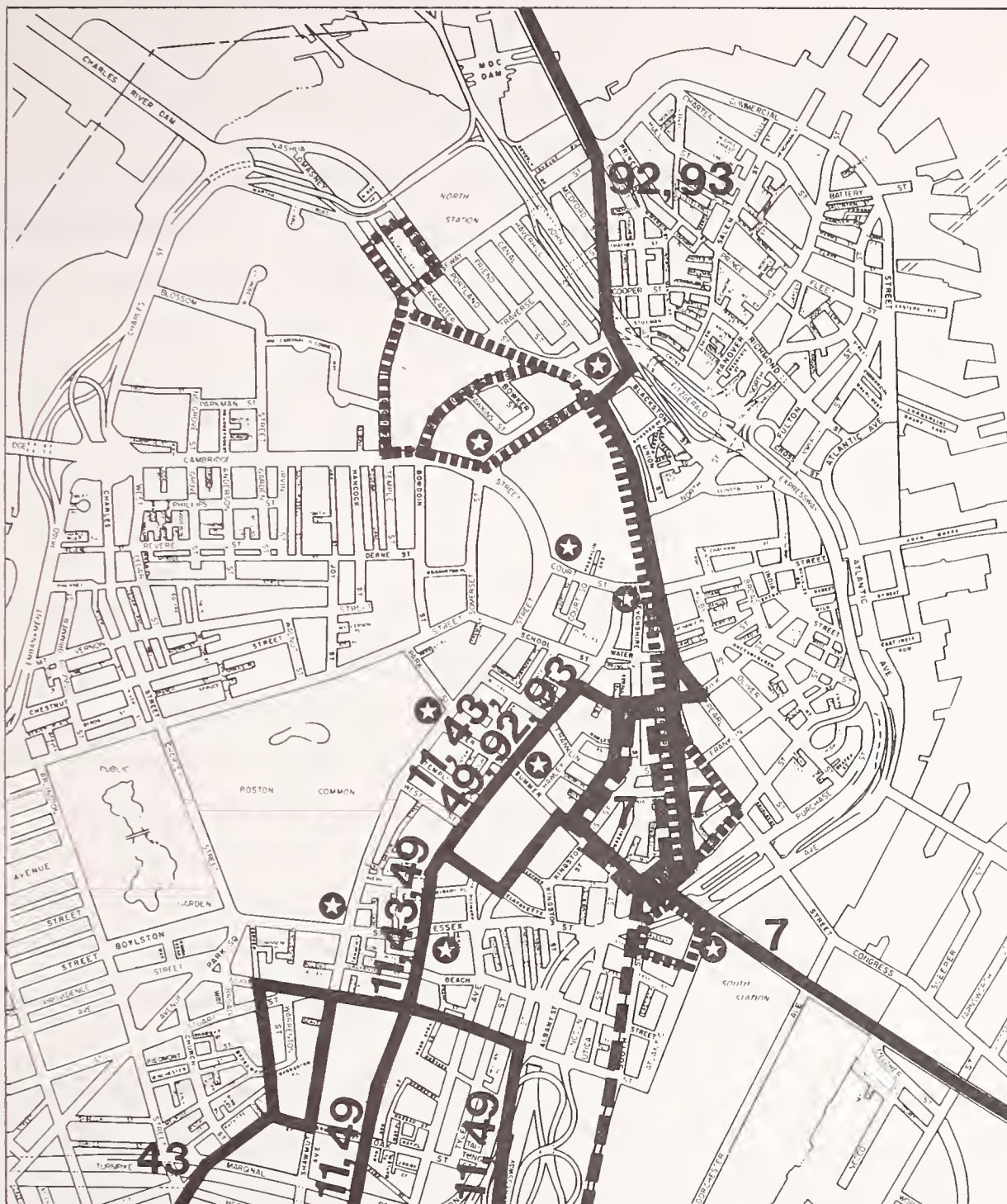
The original configuration of the bus route extensions, which took effect on September 5, 1978, are shown in Figure 6-2. Five local bus routes (11, 43, 49, 92, 93), which formerly terminated at either the Essex subway station in





- Local bus routes
- Express bus route (#300, 301, 304, 305)
- ..... Rush hour - only local bus route (#2)
- ★ Subway Stations

FIGURE 6-1. BUS ROUTES: BEFORE SEPTEMBER 1977



- Local bus routes
- ▬ Express bus route (#300, 301, 304, 305)
- ▨▨▨▨ Rush hour - only local bus route (#2)
- ★ Subway station

FIGURE 6-2. BUS ROUTES, SEPTEMBER 1977 - DECEMBER 1980  
 (SEE FIGURE 6-4 FOR MODIFICATIONS AFTER MAY 1978)



TABLE 6-1. BUS ROUTES SERVING DOWNTOWN CROSSING

Route No.	Serving	Trip Time	Frequency (minutes)	
			Rush Hours	Rest of Day
2	Shuttle: South Station to North Station	15	7-11	--
7	South Boston (City Point) to Downtown	14	11	20
11	South Boston (Bay View) to Downtown	20	7	15
43	Roxbury (Egleston) to Downtown	22	7-8	12
49	South End (Northhampton) to Downtown	12	30	30
92	Charlestown (Sullivan Sq.) to Downtown	15	15	30
93	Charlestown (Sullivan Sq.) to Downtown	14	7-8	20
301	Express: Brighton to Downtown	24	5-7	--
302	Express: Watertown to Copley Sq.	18	10-12	--
304	Express: Watertown to Downtown	19	5-7	17
305	Express: Waltham to Downtown	25	15-20	--



the south or the Haymarket subway station in the north, were extended. These buses travelled through the auto-restricted zone via a common loop pattern through the central retail district. The loop pattern was northbound on the Washington Street transit mall, eastbound on a separated bus lane in Milk Street, southbound in general traffic on Devonshire Street, a short section westbound in general traffic on Franklin Street, continuing southbound in a separated contra-flow bus lane on Arch/Chauncy Street, and then westbound in general traffic on Bedford Street to rejoin Washington Street.

One local route (7) which formerly terminated at South Station and four express bus routes were extended along another loop pattern to the east of the primarily local bus loop. The bus loop patterns are further discussed and illustrated in Section 3.2-2.

#### 6.1.3 Revised Bus Loop

On May 15, 1979, the bus loop was modified to move the buses off of Washington Street. This change was necessary at the time as a temporary action while Washington Street was reconstructed and bricked. However, the eight months of bus operations on Washington Street had been characterized by continuing pedestrian-bus conflicts. Merchants, the City and the MBTA subsequently agreed to make the bus loop modifications permanent, and buses never returned to Washington Street. The original and revised bus loop patterns are shown in Figure 6-3 and 6-4.

#### 6.1.4 Further Bus Service Modifications

As early as November 1978, shortly after the initiation of the new Downtown Crossing bus routings, a group of patrons from Route 43 complained collectively about the new pattern. Most of the complaining passengers formerly rode the bus to destinations at or near the State House north of Boston Common, which was far better served by the old routing. Many of the protesting passengers were members of the South End Committee for Transportation, a well-organized group that was originally formed over issues concerning relocation

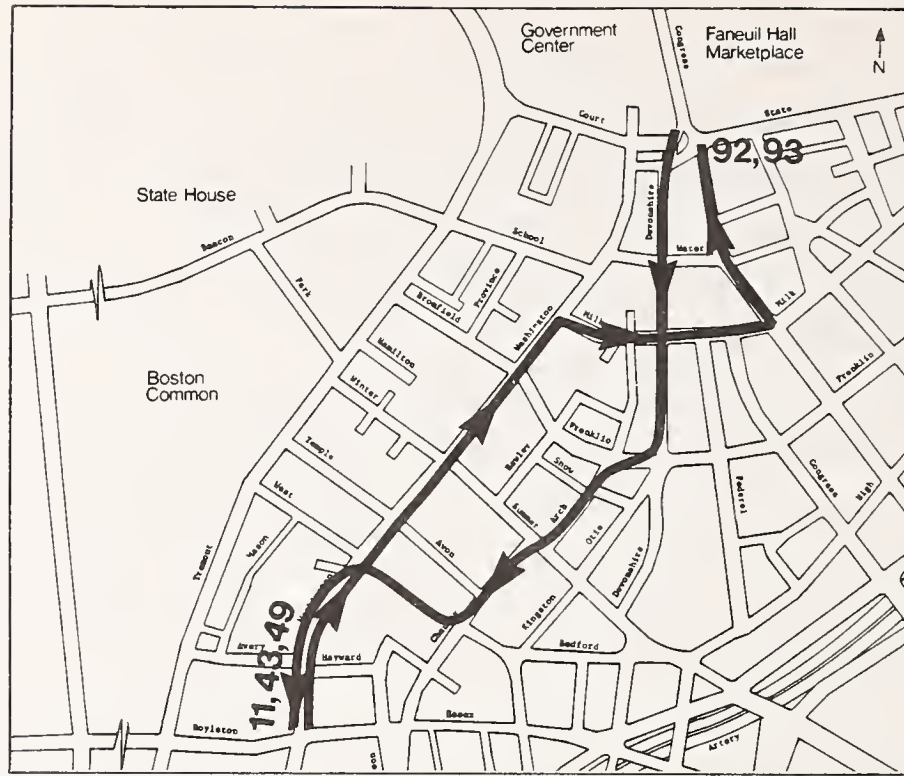


FIGURE 6-3. BUS LOOP: SEPTEMBER 1977 - MAY 1978

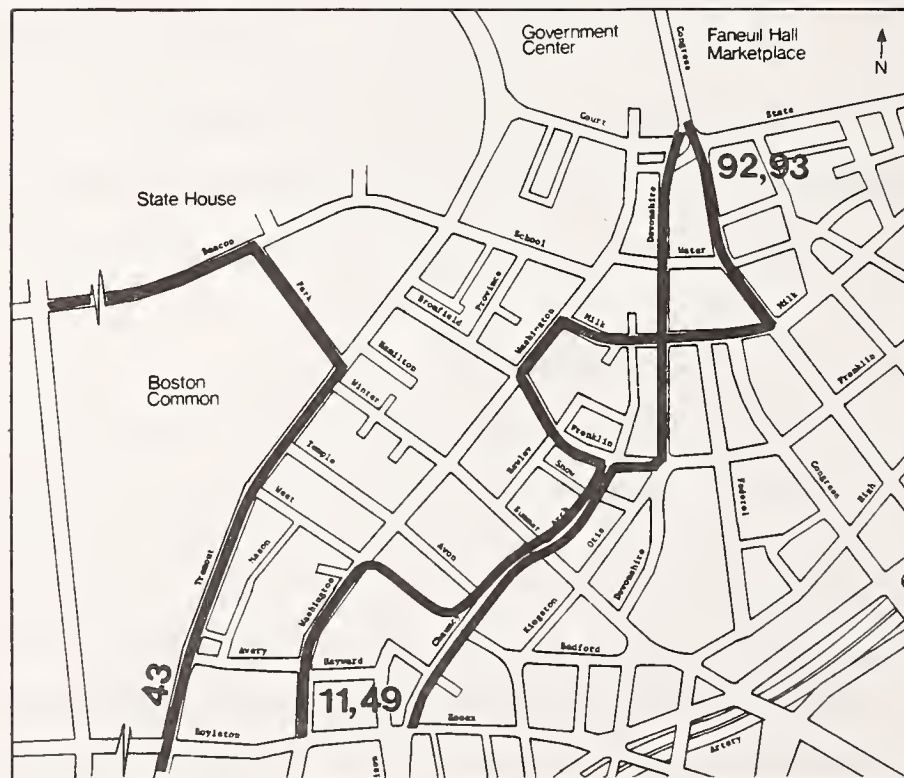


FIGURE 6-4. BUS LOOP: MAY 1978 - DECEMBER 1980

of the Orange Line rapid transit route. The MBTA responded by conducting a series of passenger surveys. The first was a postcard survey that simply asked patrons to register their preference for either the old or new routing. The results were inconclusive. The second survey was a more objective assessment of the characteristics of the ridership and their desired origins and destinations. The results of that survey demonstrated significant demand among the ridership for both the old and new routings. Starting in January 1979, the MBTA split the peak hour buses on that route, bringing half of them into the Downtown Crossing and routing the other half over the old route around Boston Common. All Route 43 buses returned to their original route pattern in May 1979, when buses were moved off of Washington Street.

Yet another change in the bus routing pattern occurred at the end of December 1979. At that time, Bedford Street was closed and subsequently eliminated to make room for construction of the Lafayette Place mixed-use development. Only Routes 11 and 49, the two routes from the south, were affected. They were rerouted to continue on Chauncy Street to Harrison Street.

Funding of all of the bus route extensions changed in October 1979. At that time, the one year funding of the route extensions from UMTA demonstration funds ended. The MBTA decided to at least temporarily continue the service at its own expense, but reduced the frequency of routes 7, 43 and 49. The City of Boston initiated an unsuccessful legal challenge of these and other service reductions within Boston.

In the spring of 1980, the MBTA initiated a review of the cost-effectiveness of continuing the bus route extensions. It was concluded that while the route extensions did attract more riders, none of them satisfied the MBTA minimum service standard of recovering 30 percent of the operating cost through passenger fares. (See Section 6.4 for further details on that analysis.) The MBTA also has a special service standard, which allows bus routes to continue with fares contributing as little as 15 percent of the operating cost if either: (a) 75 percent of the ridership has no auto available, or (b) 200 vehicle-miles of travel are saved for every hour of bus service. Further analysis also found that neither of those two conditions applied.



Due to severe financial pressure on its budget, the MBTA in July 1980 announced its plan to eliminate all bus route extensions into Downtown Crossing, effective September. Following a public hearing and pressure from the Mayor's Office, Boston Redevelopment Authority and the Downtown Crossing Association, the MBTA agreed in August to continue the service at least through December 26. A remaining concern for the MBTA had been the slow movement of the buses due to stop lights and blockage by parked cars and delivery vehicles along Devonshire and Chauncy Streets. It was hoped that the city's traffic control plan for greater parking enforcement, revised signal timing and greater police presence to improve traffic flow would lead to improved bus movement and increased ridership. After December 26, 1980, however, all bus routes returned to their pre-September 1978 routings. (These route extensions were restored in May 1982.)

#### 6.1.5 Downtown Shuttle Bus Service

Various forms of shuttle bus services to support Downtown Crossing activity were planned throughout the project's history. The initial feasibility study had proposed a series of three internal circulator routes to link the core retail blocks with parking lots further out, and to assist travel by foot. These routes were to serve Government Center and Haymarket Station on the north, the Waterfront on the east, and loop around Boston Common and Park Square on the west. They were not included in the City's final Downtown Crossing plans. One of the principle problems they were meant to address, that of insufficient parking capacity at nearby lots and garages, never occurred.

During its planning for Downtown Crossing, the city of Boston proposed a shopper-oriented shuttle service to link Faneuil Hall Marketplace, Downtown Crossing, and the Back Bay/Prudential Center shopping districts, and the major parking facilities near them. A slightly different dinner/theater routing, which included the Theater District, was proposed for evening hours. The MBTA did not wish to operate such a shuttle service, however. The Boston Redevelopment Authority and the Traffic and Parking Department then researched the costs of private operation of the shuttle and the expected revenues from 50-cent fares and on-board advertising. It was found that the shopper shuttle

service could be profitable after initial startup. The merchants were contacted to take over the financial and organizational responsibility for implementing the shuttle. The greatest degree of support came from the Back Bay Association. After two years of delay, a privately-operated shopper shuttle service has been organized and the route has been approved by the City Council. It is now scheduled to begin day time (10 AM-4 PM) operations with double-decker English buses in 1982.

Not to be confused with the shopper shuttle was the sightseeing service known as "The Shuttle" operated by the Grayline Company. For a fare of \$2 (later raised to \$3.50), passengers receive a tour of major Boston attractions with commentary, plus the right to get off at each of the 14 stops and get back on a later shuttle coming by. Of the 30,000 passengers carried by The Shuttle in the summer of 1979, 21 percent got off at Downtown Crossing. Downtown Crossing was included in the shuttle tour for that year following a subsidy from the project demonstration funds. (See also Section 10.2.3.)

## 6.2 RIDERSHIP IMPACTS

Since the cost of the local bus route extensions was supported from demonstration grant funds for just one year, evaluation of their ridership and revenue impacts was performed in June 1979 to assist the MBTA in its decision concerning continuation of the routes. Changes in ridership on the local routes extended into Downtown Crossing were estimated on the basis of two sources: (1) a spring 1979 survey of changes in ridership frequency among bus passengers, and (2) counts of bus boardings and alightings for periods before and after the route modifications were made.

The average weekday number of passengers boarding and alighting the local bus routes from Downtown Crossing are shown in Table 6-2. The May 1978 period represents the pre-project route configuration, the April 1979 period represents the eighth and last month of bus routes using the Washington Street transitway, and the May 1979 period represents the first month of the revised bus loop configuration. Since no buses actually entered the Downtown Crossing zone prior to September 1978, the "count" listed for May 1978 actually

TABLE 6-2. CHANGES IN BUS PASSENGERS VISITING DOWNTOWN CROSSING

Daily Passenger Counts (Both Directions)	Bus Route						Total
	7	11	43	49	92	93	
<u>Pre-Project</u> May 1978 Count	590	1,575	4,458	135	374	970	8,202
<u>Original Extension Route</u> April 1979 Count	699	2,152	4,859	415	753	1,751	10,629
Change from May 1978 (% Change)	+9 (+1%)	+577 (+37%)	+401 (+9%)	+280 (+207%)	+379 (+101%)	+781 (+81%)	+2,427 (+30%)
<u>Survey Estimate</u> Change Spring 78- Spring 79 (% Change)	+159 (+29%)	+585 (+37%)	+289 (+6%)	+159 (+118%)	+377 (+100%)	+599 (+52%)	+2,168 (+26%)
<u>Revised Extension Route</u> May 1979 Count	707	1,874	3,073	309	678	1,672	8,313
Change from April 1979 (% Change)	+8 (+1%)	-278 (-13%)	-1,786 (-37%)	-106 (-26%)	-75 (-10%)	-79 (-5%)	-2,316 (-22%)

Source: 1978 and 1979 MBTA Boarding and Alighting Counts; and 1979 Bus Passenger Survey



represents an estimate of the number of bus passenger bound for Downtown Crossing. This estimate was made for each route by first counting the number of people boarding or alighting at the termination point on the route and at any other points of intersection with the MBTA subway system in May 1978. From these counts, the April 1979 count of passengers continuing to board and alight at those stops even though the route continued on into Downtown Crossing was subtracted.

The count-based estimates of ridership change and the survey-based estimates were in general agreement. Overall, they indicated a ridership increase of 26-30 percent (2,200-2,400 persons) attributable to extension of the bus routes into Downtown Crossing. All affected routes experienced increases, although the increases on the various individual routes varied from 6 percent to 207 percent. It is notable that the ridership increases (even after netting out shifts from other subway and bus lines) were slightly higher than those forecasted in the original consultant feasibility study.<sup>1</sup>

The bus counts for May 1979, the first month of the revised bus loop routing, showed a 22 percent decrease from the prior month, although total ridership was still higher than the pre-project level. This drop can be attributable to combined effects of: (a) the shift of the bus routing away from two of the blocks of Washington Street, (2) the construction activities in Downtown Crossing, and (3) passenger uncertainty following bus routing changes.

Changes in ridership on the four express routes were estimated on the basis of counts taken before and after the local bus routing changes were made. The counts indicated no significant changes in ridership for any of the four routes. This finding is not surprising in light of the fact that only minor changes were made to the express routes.

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<sup>1</sup>The consultant study (Cambridge Systematics, Inc. 1976) forecasted a 9 percent increase in ridership for routes 11, 43 and 49, while the actual net increase on those routes was 14 percent. The extension of Routes 7, 92 and 93 were not anticipated at the time of those forecasts.

### 6.3 TRAVEL PATTERNS AND USER CHARACTERISTICS

Travel patterns of bus riders boarding in Downtown Crossing were measured through the spring 1979 on-board survey.

#### 6.3.1 Trip Characteristics

Table 6-3 shows the access mode and trip purpose of bus riders using the route extensions into Downtown Crossing. Nearly half of the riders used the bus for travelling to and from work, while shopping and personal business downtown were the next most frequent category of purpose, together accounting for one-quarter of the trips. Most of the bus riders walked to and from the bus, but nearly 19 percent reported transferring with another bus or the subway for each of the downtown end and non-downtown end of the trip. The destination locations of the bus riders predominantly reflect their home locations in the lower-income north and south sections of Boston served by the bus routes.

#### 6.3.2 Changes in Travel Characteristics

Changes in the frequency and mode of travel since the extension of the bus routes are shown in Table 6-4. Most of the bus users rode the extended bus routes every day. Just 16 percent reported that they never rode the bus prior to the route extension. Among those that did ride the bus before the route extensions, there were clear increases in the percent riding 3, 4, and 5 or more days a week. Altogether, 25 percent reported that they were now visiting their destination more often than before the route extensions, while under 12 percent reported that they were now visiting it less often. Half of the bus users reported that they formerly reached their destination by means other than the bus they currently use; this was predominantly by means of the subway, another bus or by walking.

The extent of increases in ridership frequency for the individual bus route extensions are shown in Table 6-5. Overall, 38 percent of the bus passengers (1859 persons) reported that they were using the local bus routes more frequently than before September 1978, when the routings were changed. These persons accounted for a total increase of approximately 2,168 one-way

TABLE 6-3. TRIP CHARACTERISTICS FOR BUS RIDERS  
BOARDING IN DOWNTOWN CROSSING

A. Activities Before Boarding and After Leaving Bus

	Before Boarding	After Leaving
Work	48.7%	7.7%
Shopping	20.3	2.2
School	8.1	1.0
Personal Business <sup>1</sup>	3.1	5.4
Home	15.6	83.2
Other	1.8	3.3

Note: Percentages sum to more than 100% due to multiple responses.

B. Means of Getting to the Bus and Travelling from the Bus

Walk	83.3%	80.1%
Car	2.0	2.4
Another Bus	9.6	17.5
Rapid Transit/Trolley	9.0	1.4
Commuter Train	1.9	0.4
Taxi, Other	0.5	1.3

C. Destination Location

Central Boston	5%
North: Charlestown	18
Somerville, Everett	4
South: South End	12
South Boston	27
Roxbury	13
Jamaica Plain, Dorchester, Mattapan	9
Other	12

Note: Percentages sum to more than 100% due to multiple responses.

Source: 1979 Bus Passenger Survey

<sup>1</sup>Personal business includes medical/dental trips.



TABLE 6-4. CHANGES IN TRAVEL CHARACTERISTICS FOR  
BUS RIDERS BOARDING IN DOWNTOWN CROSSING

A. Frequency of Travelling on this Bus

	At Time of Survey	Before September 1978 All Riders	(Excluding Non-Users)
Not on a regular basis	15.4%	20.4%	(24.3%)
1 day a week	3.6	5.7	(6.8)
2 days a week	3.2	6.9	(8.2)
3 days a week	11.6	5.8	(6.9)
4 days a week	7.2	4.6	(5.4)
5 or more days a week	59.0	40.4	(48.2)
Never	--	16.2	--
	<u>100.0</u>	<u>100.0</u>	<u>(100.0)</u>

B. Change in Frequency of Trips to the Destination Since September 1978

More Often	25.0%
Same	63.4
Less Often	<u>11.6</u>
	<u>100.0</u>

C. Means of Travel to the Destination Before September 1978

Same Bus	45.1%
Another MBTA bus	15.4
Rapid transit/trolley	39.4
Car	8.1
Taxi	3.9
Walk	11.3
Other	0.4
Did not make the trip	6.3

Note: Percentages sum to more than 100 percent due to multiple responses

Source: 1979 Bus Passenger Survey

TABLE 6-5. INCREASES IN FREQUENCY OF BUS USE

	Bus Route						Total
	7	11	43	49	92	93	
Downtown Crossing Passenger Count (Each Direction)	378	1,054	1,971	249	396	871	4,919
Passengers with Increased Frequency	130 (35%)	471 (45%)	530 (27%)	103 (41%)	215 (54%)	410 (47%)	1,859 (38%)
Additional One-Way Trips per Weekday	159	585	289	159	377	599	2,168

Source: 1979 Bus Passenger Survey

TABLE 6-6. PREVIOUS MODE OF TRAVEL FOR BUS PASSENGERS TRAVELLING MORE FREQUENTLY SINCE EXTENSION OF THE BUS ROUTES

	Bus Route					
	7	11	43	49	92	93
Did not make the trip	22%	16%	9%	0%	5%	17%
Same bus	14	26	17	6	13	12
Another MBTA bus	27	22	22	16	13	9
Rapid transit/trolley	25	39	53	62	75	60
Car	14	12	19	15	8	8
Taxi	8	2	12	16	3	2
Walked	6	10	9	6	13	15
Other	4	1	0	0	2	3

Note: Percentages sum to more than 100 percent due to multiple responses.

Source: 1979 Bus Passenger Survey.

trips per weekday on those local routes. Among the subset of users that reported using the local bus routes more frequently than before, their mode of travel prior to September 1978 is shown in Table 6-6. Overall, just 12 percent of them did not make the trip before, while over half of them formerly used the subway or another bus.

### 6.3.3 Socio-Economic Characteristics

The age and income characteristics of the new riders served by the bus route extensions are of particular interest, as they indicate the extent to which the route changes were serving young, elderly and/or low-income riders among whom transit dependency is generally higher. The distribution of age and income for the new riders and other riders of the route extensions are shown in Table 6-7.

In general, the characteristics of the new riders were not very different from the rest of the riders. The new riders were slightly less likely to be elderly and a little more likely to be young than the other riders, and slightly more of them were in the very lowest income group. Differences between new riders and others on the individual routes also tended to be small. Only Route 93 had an increase in low income riders; 53 percent of the new riders had incomes under \$10,000, compared to 44 percent of the other riders.

## 6.4 REVENUE AND COST IMPACTS

### 6.4.1 Revenue

The bus passenger survey results on previous mode can be used to determine whether each case of increased ridership on the routes under study represented an additional fare, no change in fare, or a loss in fare to the MBTA (see Table 6-8). Altogether, 2,168 additional fares were collected each weekday on the routes under study. Of these fares, however, just 868 represented trips not formerly made and thus actual increases in fare collections for the MBTA. Another 1,026 of these additional fares represented trips



TABLE 6-7. AGE AND INCOME OF BUS RIDERS BOARDING IN DOWNTOWN CROSSING

	New Riders (riders using the bus more often)	Old Riders (riders with no increase in frequency)	All Riders
<u>Age:</u> Under 16	3.1%	2.8%	2.9%
16-24	27.1	26.4	26.7
25-44	35.2	31.5	32.9
45-59	20.4	19.7	20.0
60-64	4.5	7.3	6.2
65 or older	<u>9.6</u>	<u>12.2</u>	<u>11.2</u>
	100.0	100.0	100.0
<u>Income:</u> \$0-5,999	21.4%	19.3%	20.1%
\$6,000-10,999	21.4	27.0	24.9
\$11,000-15,999	23.5	21.6	22.3
\$16,000-26,999	26.5	23.3	24.5
\$27,900 or more	<u>7.2</u>	<u>9.0</u>	<u>8.3</u>
	100.0	100.0	100.0

Source: 1979 Bus Passenger Survey

TABLE 6-8. ANALYSIS OF CHANGES IN FARES COLLECTED

Changes in Daily Fares and Costs	Bus Route						Total
	7	11	43	49	92	93	
A. New Trips not Previously Made (Additional Fares)	88	281	104	504	105	235	867
B. New Trips Shifted from Other Routes (No Revenue Change)	54	223	142	88	214	303	1,024
C. Trips Shifted from Bus-Subway Combination to Bus Alone (Fares Lost)	17	18	43	17	58	61	277
D. Additional Fares Collected on Those Routes (A+B+C)	159	585	289	159	377	599	2,168
E. Net Number of Fares Gained for MBTA System (A-C)	17	200	61	37	47	174	590
F. Estimated Additional Cost	\$361	\$568	\$447	\$278	\$319	\$537	\$2,510
G. Additional Revenue/Additional Cost (D * .225/F)	.10	.23	.15	.13	.27	.25	.19
H. Net Additional Revenue/ Additional Cost (E * .225/F)	.04	.08	.03	.03	.03	.07	.05

shifted from the subway or other buses, which probably meant travel time savings for the riders, but no net change in revenues for the MBTA. The remaining 278 additional fares represented shifts from trips where transfers were involved. While these shifted trips represented savings in both time and cost for the users, they represented actual losses in fare to the MBTA. Hence, the net change in MBTA revenues attributable to the routing changes was an increase of 590 fares per weekday.

The average fare paid on the bus routes was estimated from the survey results to be 22.5 cents, reduced from the standard 25-cent fare due to the existence of monthly passes and reduced fares for children and senior citizens. Multiplying the average fare by the increase in the number of fares indicates that the increase in revenue collected on the six local routes was approximately \$488 per weekday, although the net increase in revenue to the MBTA system was just \$133 per weekday. The gains in net fares collected were lowest on Routes 7 and 49 and highest on Route 11.

#### 6.4.2 Net Cost

Estimating the additional net cost of extending each of six bus routes by one-half to one mile is complicated because of the complexities of the funding sources, and the interactions of the bus and subway systems. The grant application and subsequent funding was based on the expectation that operating costs net of increased revenue would be \$709,800 annually, or around \$2,000 per day. In the cost-benefit analysis performed for the MBTA, the cost of the route extensions was estimated on the assumption that the labor, fuel and maintenance costs per mile of route extension are the same as the per mile average costs for the entire route. Computed this way, the estimated total increase in cost for all six routes was approximately \$2,510 per weekday, minus the \$488 in additional revenue collected on the routes or the \$133 in additional revenue for the MBTA system.

Examining the additional revenues collected on the routes relative to the additional costs on those routes (as would be the normal MBTA evaluation procedure) yields an overall revenue/cost ratio of .19, varying between .10 and .27 for the individual routes. In this case, the bus rider survey



conducted as part of the Downtown Crossing evaluation project also made it possible to compute a ratio of net additional revenue for the transit system relative to the additional costs on those routes. In those terms, the net revenue/cost ratio for the route extensions was just .05, varying between .03 and .08 for the individual routes. These latter ratios are substantially below the .30 service standard for route retention by the MBTA, and were the basis for the decision to eliminate the route extensions.

The definition of the most appropriate benefit/cost measure has been subject to some discussion. While net revenue impacts are of primary importance for the operator, there are situations where the route-specific gross revenue/cost measure can be more appropriate. If a new bus route gains ridership largely at the expense of other bus routes, it can be desirable to keep the new route and rather cut back on the other routes that have lost ridership. The evaluation of that type of decision depends on changes in gross revenue collected on the specific routes rather than just on changes in net system-wide revenue (which may have been minimal). In the case of the Downtown Crossing bus route extensions, however, much of the shifted ridership was at the expense of the subway system, which represents a fixed investment. In deciding not to continue the route extensions, the MBTA also took into account the fact that area served by the the route extensions was already served by the subway system, although with service levels (i.e., costs, wait times, and walk times) that were different.

Estimated revenues and costs of the bus route extensions were subject to continuing change following completion of the June 1979 bus route evaluations described above. New estimates presented by the MBTA in August 1980 placed the net operating cost of the bus route extensions at \$500,000 a year, rather than the \$709,000 originally estimated.<sup>1</sup> This change would shift the route-specific and net system-wide revenue/cost ratios presented in Table 6-5 up by a factor of 45 percent. At the same time, subway fares had been increased from 25 cents to 50 cents early in 1980. This meant that the lost revenue from each trip shifted from riding a bus and then subway to riding the bus only became 50 cents rather than just 25 cents. This loss of revenue

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<sup>1</sup>"Downtown Merchants Object to Proposed Bus Route Cuts," by Alan P. Henry, Boston Herald American, August 14, 1980.

diminished the net system-wide revenue/cost ratios presented in Table 6-5 to more than cancelling out the positive effect of the cost estimate change.

## 6.5 USER AND BUSINESS BENEFITS

### 6.5.1 User Benefits

While revenue increases for the bus operator were relatively small, the bus route extensions brought significant benefits to users. An estimated 1,300 daily person-trips were shifted from the subway or other bus routes presumably because of increased convenience, savings in total travel time and savings in cost. While no information on measured travel time savings was available, it is estimated that for riders of Routes 11, 43, and 49 bound for Downtown Crossing, the bus route extensions saved about 4-6 minutes of walking from the original bus route terminus. For riders of Routes 92 and 93 bound for Downtown Crossing, the bus route extensions were estimated to have saved closer to 10 minutes walking time. In addition, the bus route extensions shifted an estimated 277 person-trips from riding a bus and then the subway to riding the bus alone. Those persons saved an additional 25-cent subway fare for each trip, besides saving travel time. Altogether, the reduction in transfers from bus to subway made possible by the bus route extensions meant a user cost savings of about \$62 per day.

Impacts of the 1980 subway fare increase from 25 cents to 50 cents were dramatic for many persons served by the bus route extensions. Before extension of the bus routes, the round trip cost of taking the bus and subway from Charlestown (in the north) or South Boston to the middle of the retail district was \$1 (two bus rides and two subway rides at 25 cents each). When the bus lines were extended, the round-trip cost dropped to 50 cents (two bus rides at 25 cents each). Following the subway fare increase, the subsequent elimination of the route extensions meant that the round trip cost for those riders would suddenly triple from 50 cents to \$1.50 (two bus rides at 25 cents each and two subway rides at 50 cents each). Overall, after increase of the subway fares, the bus route extensions had brought user cost savings of about \$132 per day.

### 6.5.2 Impacts on Business

While bus passengers accounted for just 5 percent of the visitors and the shoppers in Downtown Crossing, merchants viewed the bus service into the area as an important means of strengthening the area's attraction for residents of Boston's neighborhoods. The merchants, through the Downtown Crossing Association, also argued that the bus service represented an integral part of the ongoing revitalization effort.

The area most affected by the bus route extensions was the block of Washington Street from Franklin to Milk. The bus stop in front of the Woolworth's Department store on that block accounted for 1,400-1,600 persons boarding and alighting daily. The Woolworth's store, which had experienced increasing volumes of shoppers over the 1978-1980 period, reported a 7.7 percent drop in shoppers (compared to the same period the year before) immediately following the elimination of the bus service in January 1981. The loss was highest among the food departments catering to area residents (down 11 percent) and among users of senior citizen discounts (down 21 percent).

### 6.6 SUMMARY

The extension of six local bus routes and four express bus routes into the auto-restricted zone was originally felt to be an integral part of the Downtown Crossing project and an important means of maintaining accessibility in the face of restricted auto access. Attitudes changed over time; buses were moved off of Washington Street after the initial experience of bus-pedestrian conflict on Washington Street convinced many merchants that the street would be better off as a fully-pedestrianized area.

Ridership on the extended segments of the bus routes was high. There was no significant difference in age and income between the new riders on the route extensions and the usual bus passengers, many of whom were travelling to work rather than to shop. Much of the ridership were persons who formerly continued on into the area by transferring to the subway, and were now able to continue directly by bus to their destination. The bus route extensions brought significant benefit for these riders, who were saved the additional time and cost of a transfer, and for the businesses located near the bus



stops. For the MBTA, however, many of these shifted trips meant an overall loss of revenue for the system. While the net increase in ridership (excluding the trips shifted from other transit routes) met the initial levels forecasted, the MBTA felt that the net revenue/cost ratio was not sufficient to meet its service standard. Consequently, the route extensions were all eliminated in December 1980, 15 months after the special UMTA operating subsidy for those routes had ended. (Note: This service was restored in May 1982.)



## 7. PHYSICAL ENVIRONMENT FOR PEDESTRIANS

### 7.1 ISSUES

The Downtown Crossing project was designed to make the central retail district a more pleasant place to visit and shop. Before implementation of the project in 1978, the area was characterized by crowded sidewalks, significant conflict between pedestrians and vehicles and a neglected physical environment. The sidewalk crowding, together with a lack of places to stop and rest, made it an uncomfortable place to shop. The physical environment was seriously affected by air pollution and high noise levels, both attributable to the vehicular congestion in the area. Additional concerns about the shopping environment included visual appearance, maintenance, and crime levels.

### 7.2 PEDESTRIAN CIRCULATION

Pedestrian volumes in Boston's central retail district are high even among major cities in the nation. On Washington, Winter-Summer and Franklin Streets, peak period pedestrian volumes reached 5-9,000 per hour. Sidewalk widths on these streets were just 9-12 feet to begin with, but the presence of obstructions such as light poles, sign poles, trash cans, loading doors, mailboxes and subway ventilation grates acted to reduce the effective sidewalk width for pedestrians by 40-60 percent. The greatest degree of sidewalk obstruction occurred at street corners.

Using a measure of pedestrian congestion developed by Fruin (1971), level of service on these streets ranged from C to E, indicating conditions where crossing, reverse movement and passing of slower pedestrians are difficult, and where conflicts between pedestrians are likely (see Figure 7-1). The estimated amount of additional sidewalk width required to achieve reasonable pedestrian freedom of movement (level of service B) ranged up to 21 feet on some blocks. Pre-project pedestrian circulation conditions are also discussed in Section 2.3.3.



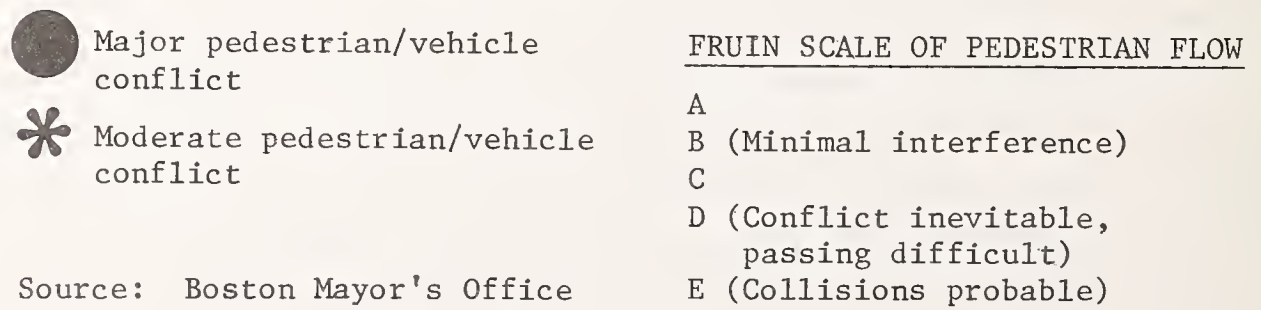
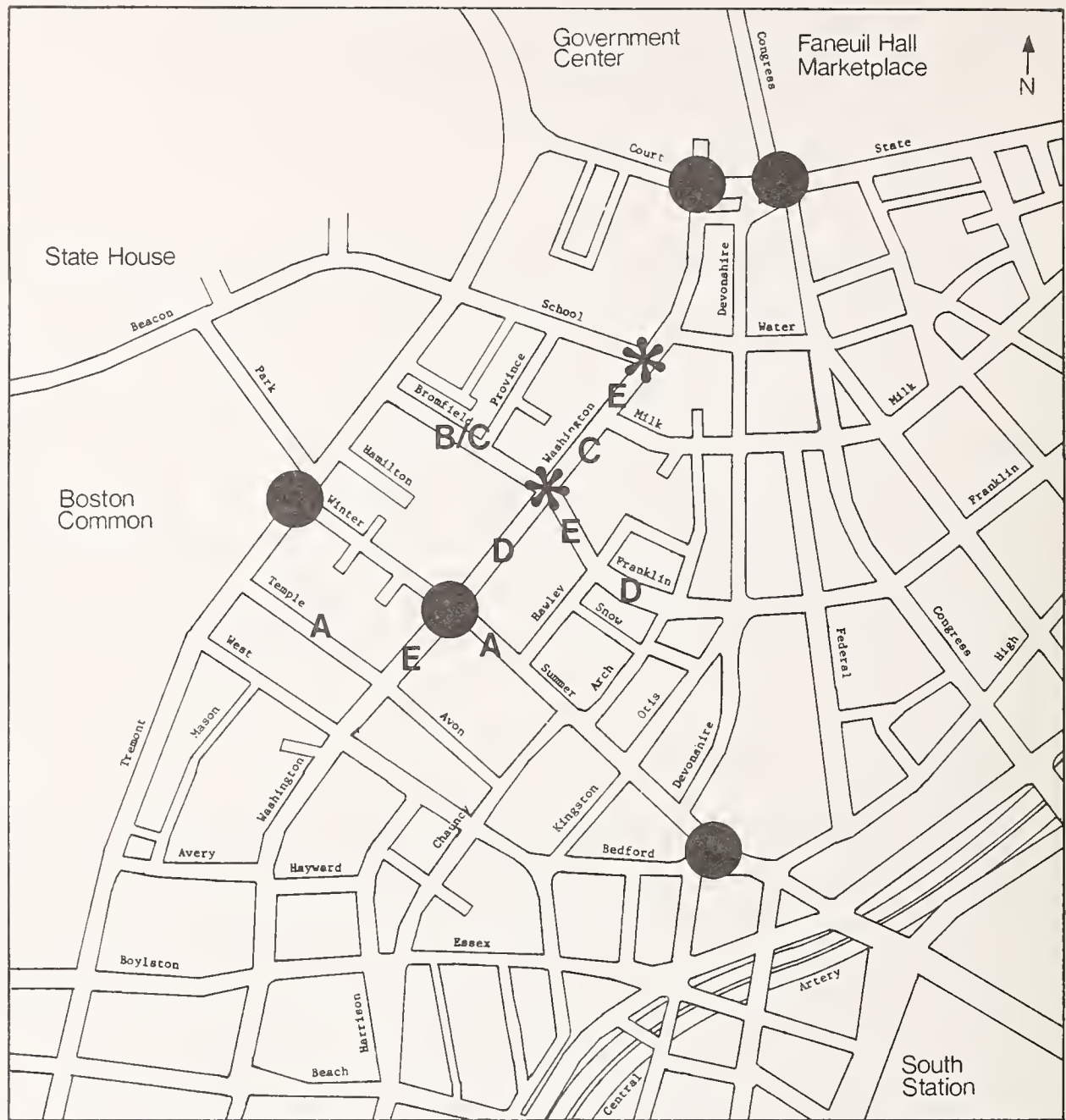


FIGURE 7-1. PEDESTRIAN CONGESTION AND CONFLICT, 1977

The Downtown Crossing project provided increased space for pedestrians on all the congested shopping streets. The full width of the street was opened to pedestrians on sections of Washington, Winter and Summer Streets. There were further sidewalk widenings on Franklin Street and other sections of Washington Street (as shown in Figure 3-4). These improvements served to eliminate sidewalk congestion on these streets and to eliminate the pedestrian/vehicle conflict along Washington Street at the intersections of Winter/Summer, Bromfield/Franklin and School/Milk (as indicated in Figure 7-1). Elements of the pedestrian improvements are fully described in Section 3.2.3.

The appropriate placement of planters, trash barrels, postal boxes and other street fixtures has remained as a design issue. The original pre-project analysis by Moore-Heder (Alan M. Voorhees et al., 1977) found that these fixtures acted to increase pedestrian conflict especially at corners, and suggested that they be moved away from there. A post-project (1980) analysis by Project for Public Space, however, found that pedestrian flow was most impeded by midblock street fixtures, and recommended relocation and grouping of amenities, seating and information displays at the street corners. These two evaluations together indicate that street fixtures and amenities can be an impediment to movement at any location where pedestrian flow is concentrated. At issue is the extent to which pedestrian movement in an auto-free street is concentrated along the sides of the street; this issue is discussed further in the context of curb design and street activity in the following section.

### 7.3 PEDESTRIAN AMENITIES AND STREET DESIGN

#### 7.1.3 Planning and Evaluation

The rapid process of planning, design and approval for the auto restricted zone project in 1978 had allowed for the specification of only the most basic details of the plan--the elements necessary to close the streets and accommodate re-routed traffic, and the elements necessary for the reconstruction and bricking of the streets. Details for such street amenities as

benches, planters and waste receptacles were delayed. In August 1978, the noted architect and City Planner, William Whyte,<sup>1</sup> visited Boston at the request of the MBTA. Mr. Whyte toured the area with representatives of the city agencies involved and made a presentation to the area merchants on the potential of the Downtown Crossing as a pedestrian-oriented shopping zone. Many of his suggestions guided the selection and location of amenities in the area.

While the merchants were solidly in favor of bricking the streets and installing distinctive lighting, they were for minimizing the amount of street furniture. The concern was that articles such as benches, fountains and trees would interfere with pedestrian flows and discourage window shopping, given the narrow nature of the streets. This concern was particularly applicable for narrow Winter Street.

Analysis of the pedestrian amenities in this section is based on three sources: (1) opinions expressed at merchant-city design meetings, (2) attitudes expressed in the Business Attitude Survey, and (3) a 1980 evaluation of Downtown Crossing performed by Project for Public Space.

### 7.3.2 Benches

From the beginning, benches were felt to be an important part of the street furniture that would eventually be put in certain place in the auto-restricted zone, but there were concerns about how the benches would be funded and concerns by the merchants about the design, number, and arrangement of the benches. Initially (1978), neither the city nor the BRA were willing to pay for the benches until there was some demonstration of success by the project and additional funding was available from the UMTA demonstration grant or the FHWA grant. The MBTA stepped forward with the necessary funding for the benches. The following summer (1979), benches were placed at Winter Street (near Tremont) and all along Summer Street (from Washington to Hawley).

The benches on Winter and Summer Streets, like the street lights which were installed, are of an old-fashioned wrought-iron design intended to

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<sup>1</sup>William Whyte has written many books and articles on urban design and pedestrian spaces, including The Last Landscape, New Life for Plazas, and more recently, The Social Life of Small Urban Spaces.



coordinate with the Washington Street sidewalk canopies and the general area image. The large number of benches on Summer Street were placed in parallel rows, oriented diagonally to the street and placed along both sides of the street (See Figure 7-2). The benches were placed where the curb used to be-- away from both the building walls (so as to facilitate window shopping) and the middle of the street (so as to allow emergency vehicles through).

The Summer Street benches have been criticized by the department stores on Summer Street on aesthetic grounds, as their alignment in parallel rows resembles "a train station." It has been argued by the city that the alignment of the benches was constrained by the need to anchor them to materials below the street bricks and the existence of supporting beams and utility connections beneath the road (which is above the subway station concourse). In any case, the analysis by Project for Public Space concluded that the presence of the benches and their orientation toward the middle of the street was successful in helping make the full street area heavily used by pedestrians. That study also recommended that benches be added next to the curb on Washington Street, facing both the street and sidewalk to encourage pedestrian use of both spaces.

The Summer Street benches are heavily used all day long, from 8 AM (before the stores open) to well after 6 PM (after the stores close). The location on Summer Street, away from the greater pedestrian flows on Washington and Winter Streets, makes it a more pleasant place to sit and rest. Unlike the general pedestrian population, the users of these benches are predominantly senior citizens who often stay for an hour or more, people watching or talking to their companions. The benches at the Hawley Street end of the block, away from the prime pedestrian and retail activity, have been subject to use by a few vagrants.

The small number of Winter Street benches, by contrast, are used predominantly by shoppers during prime shopping hours. The high volumes of pedestrians moving along Winter Street make it less pleasant to sit there for a long period of time, and hence explain the high turnover on the benches there.

Benches were also placed at the Boston Five Park, encompassing the portion of School Street which was closed to traffic. At the encouragement of

the BRA and the MBTA, the Boston Five Cent Savings Bank in May 1979 spent \$20,000 for park benches and furnishings. Two benches were also donated by the Bench Manufacturing Company. A key aspect of the park furnishings was the placement of moveable tables and chairs to allow use of the space in front of the bank as an outdoor eating area. The moveable furniture is designed to be put out each day and removed in the evening. A user survey found that the Boston Five Park was well-liked by its users, specifically because of its clean, uncluttered appearance. The popularity of the moveable chairs is also consistent with the findings of William Whyte (1980), that people prefer chairs over benches.

### 7.3.3 Drainage Curbs

Curbs are a traditional separator between vehicle travel lanes and sidewalks, in addition to their drainage function. In developing the plan for reconstruction and bricking of the auto-free streets, the possibility arose of unifying the street space to be even with the sidewalk level.

The engineering firm for Winter and Summer Streets, at the urging of the BRA design staff, had recommended for those streets a "trench" drain system covered by a flat grate, so as to allow the sidewalk and street surfaces to be even. The Boston Public Works Department (BPWD) opposed the trench drains because of a fear that the drains would become blocked by snow and ice during harsh winters, resulting in the possible flooding of stores and basements when snow was followed by rain. The BPWD instead preferred to keep the normal curb-and-gutter type of drainage system, which allowed the street themselves to serve as a drainage system when the gutters become blocked by snow and ice. The design suggested by the BPWD would, however, require that the street remain at a level lower than the sidewalks.

The level pedestrian surface with covered trench drain was the design adopted for Winter and Summer Streets, because the BRA was principally responsible for the first phase of the project, and the traditional curb-and-gutter design was adopted for Washington Street, because the BPWD was principally responsible for the second phase of the project.

Experience to date has found no flooding problem from either type of drainage design. It is clearly evident, however, that pedestrians tend to

crowd onto the sidewalk space on Washington Street and avoid the middle street space there except during peak times. This is true even though the street space is supposed to be closed to all vehicles after 11 AM, and the street and sidewalk spaces are uniformly bricked. In fact, the presence of a curb differentiating street and sidewalk levels, together with the continued occasional presence of taxis and delivery vehicles on the street space all day long, act to discourage pedestrian use of the central space. The central space is much more heavily used on Winter and Summer Streets, which do not have curbs, although the presence of store window displays and the occasional presence of unauthorized delivery vehicles (on Winter Street) keep more pedestrians to the side of the street.

#### 7.3.4 Maintenance

Maintenance has been an issue throughout the Downtown Crossing project. At the beginning, construction barrels used to mark traffic restrictions were quickly filled with trash and no single agency appeared responsible for emptying the cans. The BRA acted quickly by ordering 132 plastic trash barrels, each marked with the Downtown Crossing name and logo. The selection of the inexpensive plastic barrels was based primarily on the recommendation of William Whyte, who claimed that there were no functional waste receptacles for downtown areas and so one might as well go with the cheapest barrels available.

The plastic barrels, unfortunately, were not anchored to the street and most were eventually stolen or destroyed. The need for more waste recepticals and the issue of what type to get has remained an issue for the Downtown Crossing. In the meantime, large concrete and wooden planters with undersized bushes in them have provided convenient places for pedestrians to put trash (see Figure 7-4).

#### 7.3.5 Control Over Use of the Street Space

In some pedestrian malls (e.g., Memphis, Madison), street vendors are an important source of activity in the street space. In downtown Boston, merchants expressed strong opposition to street vendors from the beginning,





FIGURE 7-2. SIDEWALK ACTIVITY IN FRONT OF WOOLWORTHS

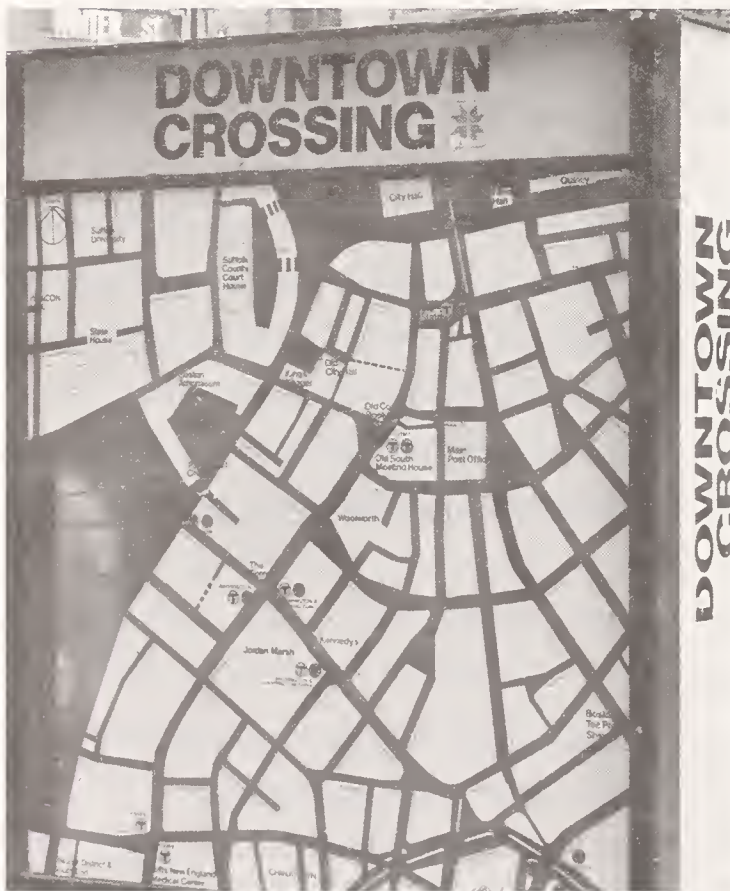


FIGURE 7-3. INFORMATION KIOSK



FIGURE 7-4. MULTIPURPOSE PLANTER  
(Notice the complementary uses  
of trash can and foliage pot)

and they have not been allowed to operate in any of the pedestrian streets. Street musicians have been allowed, with permission of the City.

One criticism of Washington, Summer and Franklin Streets has been the lack of commercial extension into the sidewalk and street areas. The evaluation by the Project for Public Space recommended that midblock retail and pedestrian activity be encouraged through store-sponsored outdoor displays, and by encouraging the major stores to open their storefronts onto the sidewalk and add merchandising in the streets. Winter Street is acknowledged to be too narrow and its pedestrian volumes too high to allow merchandising and displays in the street.

Sidewalk retail activity has been functioning on a limited scale. Fruit stands have been operating on two locations along Washington Street--on store-owned space in front of the Woolworth store, and in the front space of an abandoned movie theater (see Figure 7-2). A new bakery on Washington Street features a suburban mall-type open front. In addition, fashion shows, musical performances and temporary cafe events sponsored by Jordan Marsh Company have been held on occasion along Summer Street (these were described in Section 4.5). It has been recommended that a permanent performance area and an outdoor cafe could be established in Summer Street.

Control over activities on Summer Street has remained an issue, since the Washington to Hawley block has only two businesses on it--the sides of the two major department stores. In September 1978, the BRA began negotiations with the legal counsel from Filene's and Jordan Marsh over a maintenance agreement to govern the pedestrian area on Summer Street. The issues that emerged as most important in the negotiations were:

1. Responsibility for the installation and maintenance of lighting benches and planters
2. Responsibility for trash bin maintenance and pickup
3. Responsibility for sweeping and washing the area
4. Control of hawkers, peddlers, vendors, and musicians
5. Responsibility for maintenance of the brick work
6. Responsibility for snow removal



## 7. Regulation of commercial activities of the two stores on the common area

Generally, the BRA sought an assumption of the maintenance responsibilities by the stores, and the two stores sought control of the commercial and entertainment activities permitted on the street. Despite numerous meetings and extensive negotiations, no agreement had been reached two years later.

### 7.4 CRIME

#### 7.4.1 Police Presence

While the Downtown Crossing area never suffered from high crime, the image of safety from crime was seen by merchants as an important issue, particularly in relation to the environment at competing suburban shopping areas. After the first two months of operation of the auto-restricted zone, the police presence was maintained at approximately six patrols on weekdays and Saturdays, and two on weeknights. In addition, there was usually a captain and a detective. Additional off-duty officers were paid by the BRA to assist in keeping traffic out at entrances to the auto-restricted zone (this is discussed further in Section 5.7).

Due to several incidents of crimes in the fall of 1979 in Downtown Crossing, merchants expressed growing concern about safety in the area, particularly at night and on Saturdays. In response to this concern, police patrols were increased during the 1979 Christmas season and a lieutenant was assigned specifically to Downtown Crossing for November and December. Budget problems prevented a continuation of these additional patrols in January 1980. Starting in February, however, the number of weekday officers stationed in Downtown Crossing was increased from six to eight. In addition, an effort was made to respond to merchant concerns through a program of continuing police visits to each merchant in the area to talk about enforcement and crime programs. An average of 300 merchant visits per week were reported for the period through June 1980 (no information is available after that date). As will be discussed in Section 7.5, merchant response to the upgraded police presence was generally positive.



#### 7.4.2 Crime Counts

Counts of police reports (calls, arrests and citations) in Downtown Crossing and the surrounding area over time were collected from the Boston Police Department. For this study, the following categories of crimes were examined:

1. Crimes Against Persons: Homicide, Rape, Robbery, Aggravated Assault and Simple Assault
2. Theft from Business Property: Breaking and Entering, and Larceny
3. Other Crimes Against Business Property: Vandalism and Arson<sup>1</sup>
4. Illegal Activities: Prostitution and Vice, and Drugs
5. Auto Theft

The extent of the types of crimes listed above are important because of their magnitude, their seriousness as a reflection of the atmosphere of the area for visitors, and their influence on the desirability of locating a business in the area. For these same reasons, white-collar crimes such as embezzlement were not examined.

Crime statistics were available on a quarterly basis for January 1977 through June 1980, and were organized by type of crime, time of day (12 AM-6 PM, 6 AM-6 PM, and 6 PM-12 AM), and day of the week (Mondays, Saturdays and all days). Unfortunately, the measurement zone for these statistics includes an area which is larger than just the auto restricted zone, roughly encompassing the downtown business district. Total counts of crime reports over time are presented in Figures 7-5 through 7-9. In general, there were no further discernable differences in the trends over time by time of day or by day of the week.

Most notable are the discernable increases in the counts of reported crimes against persons and illegal activities, which are the two categories most relevant for pedestrian visitors to the area. Comparing the first half of 1980 with the first half of 1978 (which preceded the Downtown Crossing project), reported crimes against persons increased 34 percent (from 193 to

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<sup>1</sup>There were only four cases of arson during the 3 1/2 year period examined.

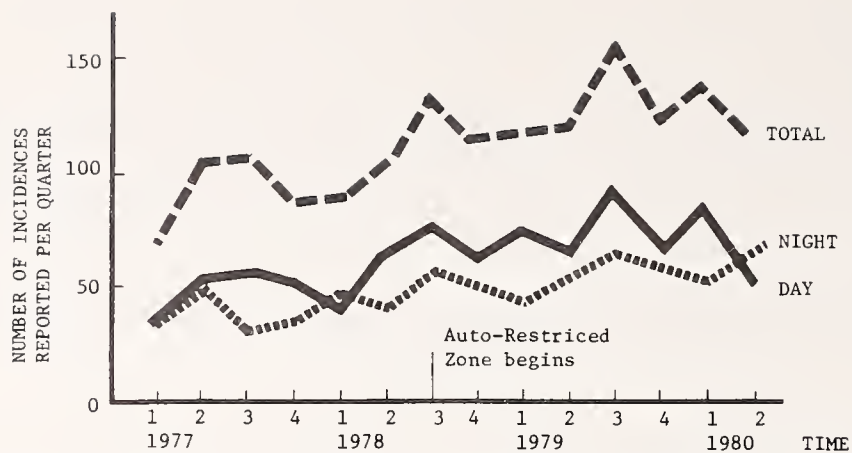


FIGURE 7-5. RATE OF CRIMES AGAINST PERSONS (HOMICIDES, RAPES, ROBBERIES, AGGRAVATED ASSAULTS, SIMPLE ASSAULTS)

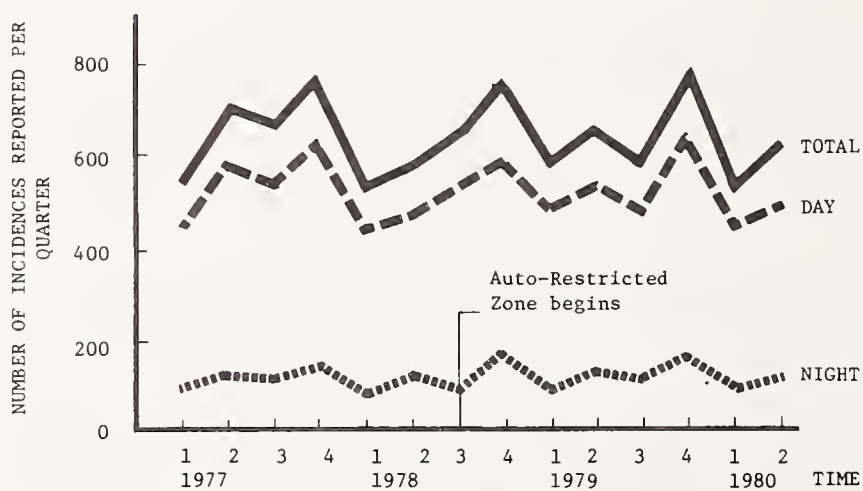


FIGURE 7-6. RATE OF THEFTS FROM BUSINESS PROPERTY (BREAKING AND ENTERING, LARCENY)

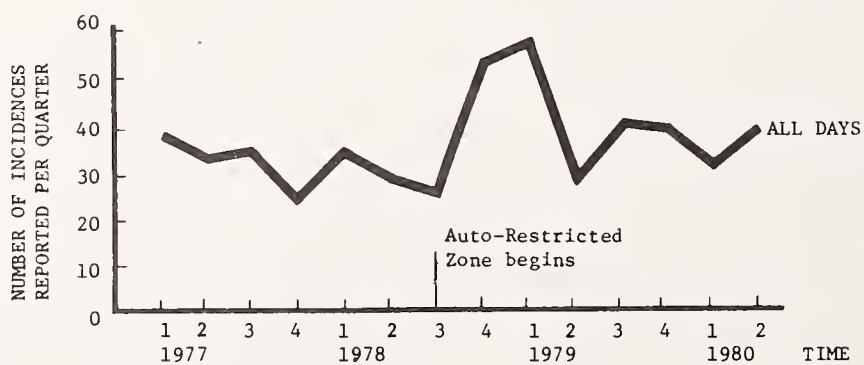


FIGURE 7-7. RATE OF CRIMES AGAINST BUSINESS PROPERTY (VANDALISM, ARSON)

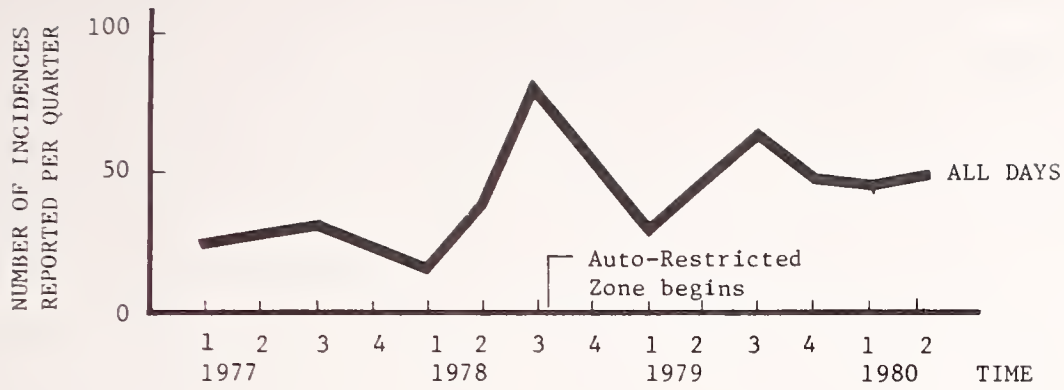


FIGURE 7-8. RATE OF ILLEGAL ACTIVITIES (PROSTITUTION, VICE, DRUGS)

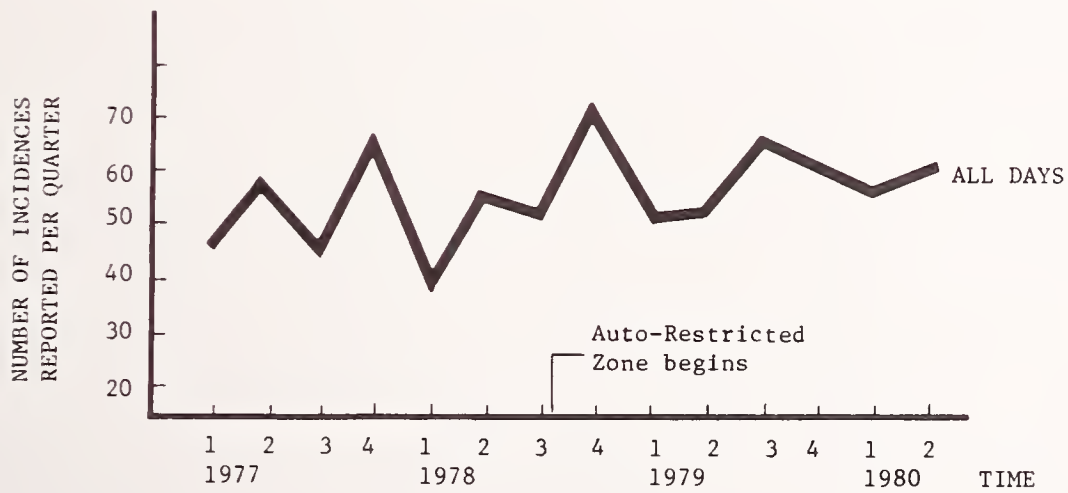


FIGURE 7-9. RATE OF AUTO THEFTS



259) and reported illegal activities increased 76 percent (from 54 to 95). These crime report increases could be partially attributable to the 11 percent overall increase in the number of people in the area, but are most likely largely attributable to increases in the number of police patrols in the area and a police attempt to counter these specific crime activities in order to upgrade the image of the Downtown Crossing area. Changes in conditions in other parts of the downtown area (including the nearby adult entertainment district) and overall crime rate trends throughout the City of Boston also affect these observed downtown trends. Overall, there were no apparent long-term increases or decreases over time in the rates of theft from businesses, other crimes against property, or auto theft. (There was a higher rate of reported crimes against property only during the period of extra police presence at the start of the auto restricted zone program).

A number of area merchants have continued to report that the pedestrianization of the streets has brought about some increase in shoplifting, purse snatching and in the number of youths hanging around the area and loiterers along Summer Street.

#### 7.5 ATTITUDES OF AREA USERS AND MERCHANTS

The acceptance of the Downtown Crossing project by area users and merchants is reflected by their expressed attitudes towards the various components of the project, as shown in Table 7-1 and 7-2.

In general, both merchants and pedestrians were overwhelmingly positive about the Downtown Crossing project. The pedestrians were most positive about the closing of the streets, the installation of benches and the bricking of the streets, followed by the entertainment activities and the new plantings. Merchants were most positive about the cosmetic improvements--the new street lights, the benches, and the plantings, followed by the bricking and the closing of the streets. Both merchants and pedestrians were most negative about the state of area maintenance and the police presence, with pedestrians most unhappy about maintenance and the merchants most unhappy about the police presence. In both cases, these negative ratings were reported by only about

TABLE 7-1. ATTITUDES OF PEDESTRIANS TOWARD PROJECT COMPONENTS (1980)

	% Positive	% Neutral	% Negative	Total
Closing of streets	88%	6%	6%	100%
Bricking of Streets	76	12	12	100
Street lights	64	31	5	100
Benches	83	12	5	100
Plantings	69	23	9	100
Maintenance	55	24	21	100
Bus service	31	58	11	100
Entertainment	69	23	8	100
Police presence	64	24	12	100

Source: 1980 Pedestrian Interview Survey, question: "What has been your reaction to the following components of the Downtown Crossing Project?"

Note: Neutral includes "No Opinion" responses.

TABLE 7-2. ATTITUDES OF MERCHANTS TOWARD PROJECT COMPONENTS (1980)

	% Positive	% Neutral	% Negative	Total
Closing of streets	67%	21%	12%	100%
Bricking of Streets	70	22	7	100
Street lights	80	17	3	100
Benches	74	20	6	100
Plantings	73	25	2	100
Maintenance	57	26	17	100
Promotion	33	59	8	100
Entertainment	45	43	12	100
Police presence	45	25	29	100
Merchant organization	18	75	8	100

Source: 1980 Business Attitude Survey, question: "What has been your reaction to the following components of the Downtown Crossing Project?"

Note: Neutral includes "No Opinion" responses.

one-quarter of the respondents. The maintenance problem is related to the acknowledged lack of appropriate waste receptacles as well as to the level of service provided by the City. The level of police presence has been limited by budget constraints and limitations on police overtime activities.

An in-depth survey of pedestrian attitudes, completed during the Summer 1979 construction period, probed further for the attitudes about the image of Downtown Crossing. When asked to compare the Downtown Crossing to the Faneuil Hall Marketplace and to suburban shopping centers, twice as many people gave positive responses as gave negative responses. The primary positive comments described Downtown Crossing as having more variety and better prices than either the Faneuil Hall Marketplace or suburban shopping centers, and a nicer atmosphere than the suburban malls. The primary negative comments described Downtown Crossing as having a less pleasant physical appearance than the Faneuil Hall Marketplace and less parking than the suburban shopping centers.

## 7.6 AIR AND NOISE QUALITY<sup>1</sup>

### 7.6.1 Overview

The reduction of air pollution and noise levels downtown were goals of the auto restricted zone project. In particular, it was felt that poor air quality and high noise levels contributed to discouraging shopping downtown. In addition, measurements at Jordan Marsh on Washington Street around 1971 had indicated that carbon monoxide levels (largely attributable to auto exhaust) would have to be reduced by 60 percent to meet EPA requirements.

To assess project impacts, air quality and noise levels in Downtown Boston were monitored both before and after implementation of the auto restricted zone. Three sites were monitored. The geographic locations of these sites are shown in Figure 7-10. The Winter Street site was selected to represent a location of maximum reduction in auto traffic due to the auto

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<sup>1</sup>The measurements described in this chapter were performed by the firm of Bolt, Beranek and Newman.





FIGURE 7-10. LOCATIONS OF THE AIR QUALITY AND NOISE MEASUREMENT SITES

restricted zone, the Arch Street site was selected to represent a location along the bus route loop, and the Post Office site was selected to represent an area of high congestion which would not be improved by the project. Air and noise quality was monitored for two-week periods during the middle of July in both 1978 and 1980. For the 1980 monitoring, the Post Office site was discontinued because of dust and noise associated with an ongoing construction project in close proximity of this site.

Monitoring of all environmental factors was performed on a continuous basis. The data that were recorded on strip charts or on data tape were digitized to produce hourly averages. The reduced data were then screened for validity and subject to various statistical tests for impact assessment determination.

#### 7.6.2 Carbon Monoxide Impacts

Carbon Monoxide (CO) is the most commonly occurring urban air pollutant. The primary source of CO is transportation activities. The effect on health is well documented; exposure to levels of 5 parts per million (ppm) for 20 minutes are sufficient to affect human reflex reactions, and concentrations of 10-13 ppm can affect a person's ability to estimate time intervals. The Environmental Protection Agency has set a standard of 20 ppm as the maximum for a one hour average, and 9 ppm as the maximum 8-hour standard. The average level of CO in most large cities is 5-10 ppm (Greiner Engineering Sciences, 1976).

Carbon monoxide levels in downtown Boston before and after implementation of the auto restricted zone are summarized in Table 7-3. Maximum levels generally occurred during evening hours. In 1978, the 8-hour average CO levels at the Winter Street location exceeded the EPA standard on seven different occasions during the two week observation period. The Post Office site had less of an air quality problem; its CO levels violated the 8-hour standard on just 3 occasions. Levels of CO at the Arch Street location remained well within the EPA standard.

TABLE 7-3. MEASURED AMBIENT AIR QUALITY: COMPARISON OF 1978 and 1980

	Arch Street		Winter Street		Post Office
	1978	1980	1978	1980	1978
<u>Carbon Monoxide</u>					
Max. 1-hour ppm	15.7	6.4	26.3	12.0	20.2
No. of times exceeding standard	0	0	0	0	0
Max of 8-hour ppm	7.4	4.4	15.2	5.0	11.6
No. of times exceeding standard	0	0	7	0	3
<u>Nitric Oxide</u>					
Max 1-hour ppm	0.140	0.151	NM	NM	NM
<u>Nitrogen Dioxide</u>					
Max 1-hour ppm	0.080	0.065	NM	NM	NM
No. of times exceeding standard	0	0	--	--	--

NM--not measured



The impact of the project on Winter Street CO levels was dramatic. The maximum 1-hour CO level fell from 26.3 to 12 ppm, while the maximum 8-hour average level fell from 15.2 to 5.0 ppm--a 67 percent decrease. The improvement in the ambient CO environment at Winter Street is again evident from the frequency distributions shown in Figure 7-11. The 98th percentile in 1980 was about 5 ppm, which is well below the corresponding percentile of 22 ppm observed in 1978. Equally significant differences are observed for all other percentiles. The dramatic improvement at Winter Street reflects its change from a heavily automobile-congested street in 1978 to an auto-free pedestrian mall in 1980.

These reductions in CO levels associated with the elimination of traffic on Winter Street are consistent with the findings of an experiment in June 1971. As part of the traffic closing experiment at that time, average CO levels at the 100 percent corner of Washington and Winter/Summer were found to have dropped from 19 ppm to under 4 ppm.

Carbon monoxide levels at the Arch Street site were never in excess of the EPA Standard even in 1978. The auto restricted zone did not directly affect Arch Street, although buses were added on that street and the Chauncy to Arch Street route was expected to emerge as a diversion route for traffic avoiding Washington Street. Despite these factors, CO levels also fell dramatically at Arch Street. Between 1978 and 1980, the maximum 1-hour level fell from 15.7 to 6.4 ppm and the maximum 8-hour CO level fell from 7.4 to 4.4 ppm--representing a 41 percent reduction.

Plotting the frequency distribution of hourly CO values at Arch Street, the improvement in ambient CO levels is again readily apparent (Figure 8-8). The 98 percentile for 1980 was only 5.5 ppm, which represents a 28 percent reduction from the corresponding 1978 value of 7.6 ppm. Similarly, the 90th percentile for 1980 is about 39 percent less than the corresponding percentile for 1978. The reductions in measured CO concentrations appears to be significantly greater than the anticipated reduction that might be attributed to the mandatory federal program for exhaust emissions control, and in fact reflects the areawide decrease in vehicular traffic (as discussed in Section 5.2).

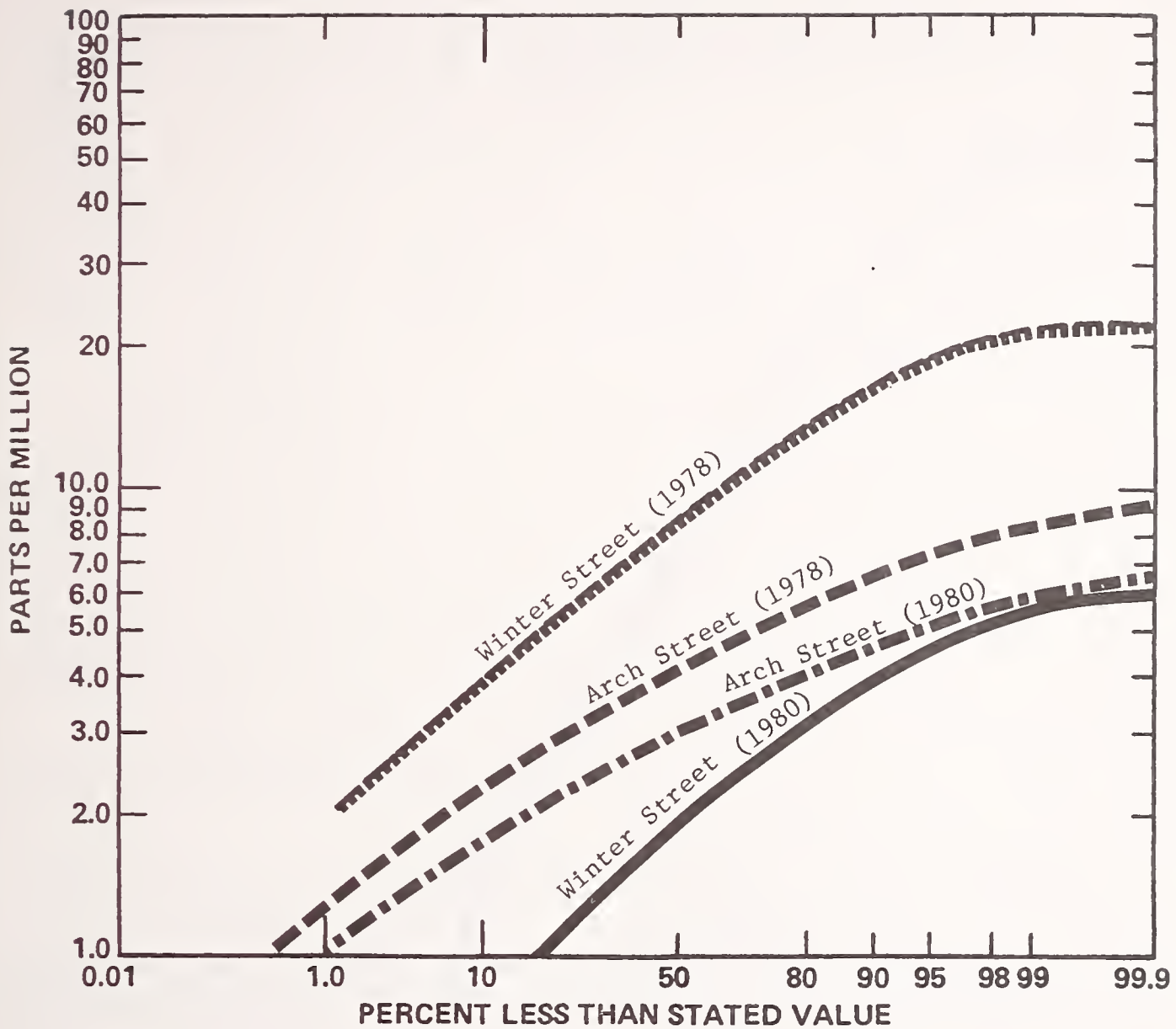


FIGURE 7-11. FREQUENCY DISTRIBUTION OF HOURLY CO CONCENTRATIONS (1978 AND 1980)

### 7.6.3 Oxides of Nitrogen

Nitric oxide (NO) is itself a relatively harmless gas formed in internal combustion engines. There is no current or proposed standard for maximum acceptable concentrations, but it is of interest because it correlates with diesel emission from buses and trucks. NO can also oxidize into the more toxic nitrogen dioxide (NO<sub>2</sub>) in photochemical reactions involving hydrocarbons. NO<sub>2</sub> is of particular concern because it produces nose and eye irritation and can increase susceptibility to respiratory diseases. Levels of 0.1 ppm can affect breathing for asthmatics, and concentrations of 0.25 ppm are considered the limit of acceptability for coloration effects in metropolitan areas. Short-term NO<sub>2</sub> standards have not been set at this time, although EPA has proposed a one-hour standard to be between 0.25 and 0.50 ppm.

Levels of NO and NO<sub>2</sub> were measured only at the Arch Street site. Results are summarized in Table 7-3 (shown earlier). For NO, the maximum one hour concentration measured in 1980 was 0.15 ppm, which is 8 percent greater than the corresponding 1978 maximum. However, when the 1-hour NO results were first plotted as frequency distributions, the 1980 levels were everywhere lower than the corresponding 1978 levels. This was surprising in view of the re-routing of buses into the area and the fact that buses are generally high emitters of NO, which would suggest an expected increase in ambient NO levels. Much of this trend was, however, attributed to higher average winds speeds in the 1980 measurement period.

An attempt was made to "remove" the wind speed effect on the 1978 and 1980 results by normalizing the NO results to an assumed 1-mph base and then plotting the resulting hourly NO concentrations as frequency distributions, as before. The adjusted results are shown in Figure 7-12, and indicate that the adjusted 1980 levels were in fact higher than the corresponding levels in 1978 for the higher percentile (peak level) end. The higher percentile (peak) levels are influenced more by event-oriented episodes such as passing buses or congestion, so it is not surprising to see that their 1980 levels were generally higher than the baseline conditions. For low percentile (background) levels, there was some improvement in NO observed in 1980.



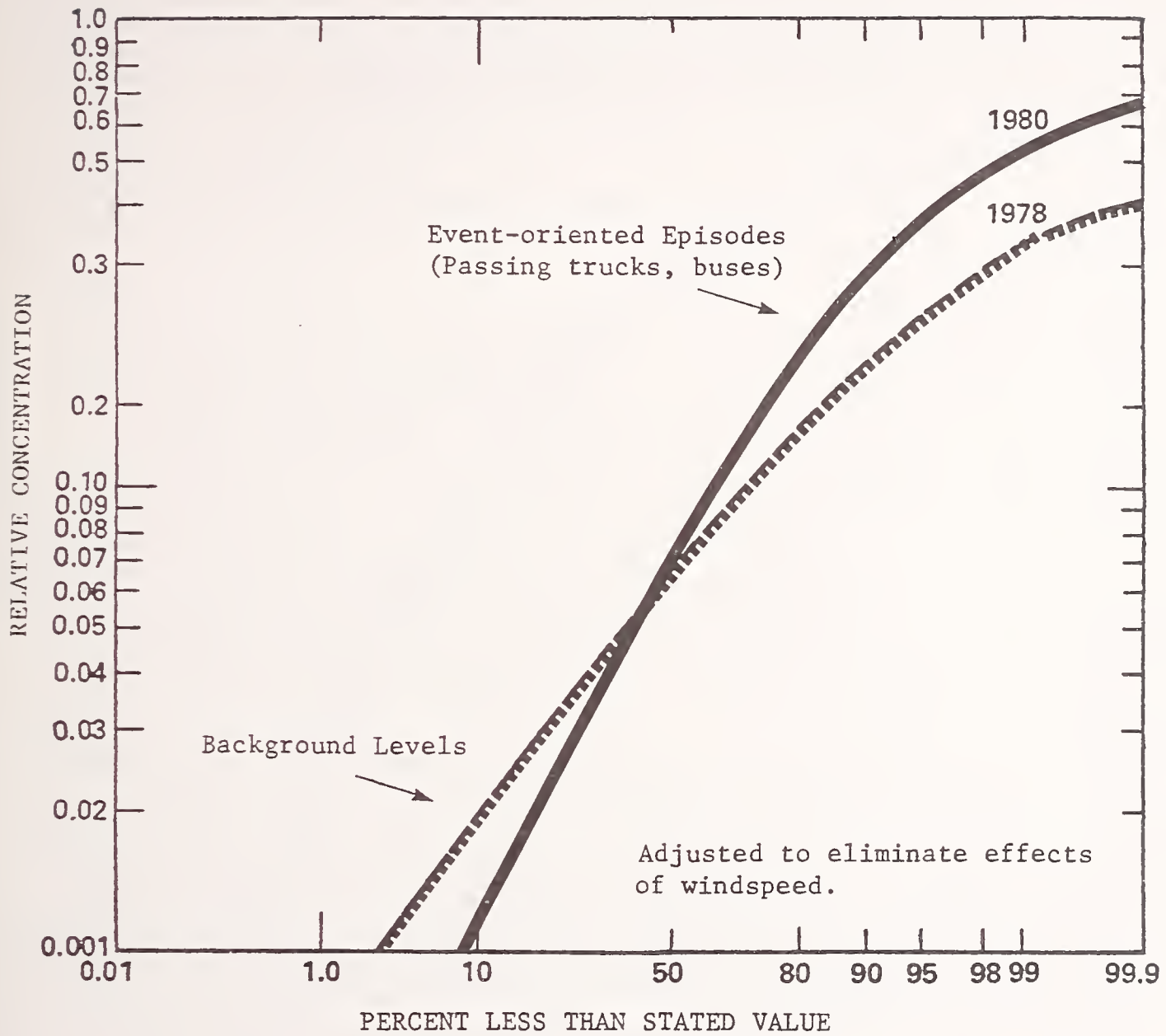


FIGURE 7-12. FREQUENCY DISTRIBUTION OF HOURLY NO CONCENTRATIONS (1978 AND 1980)

For Nitrogen Dioxide, the maximum 1-hour concentration measured in 1978 was 0.08 ppm, well below the proposed EPA standard range. The 1980 maximum was just 0.065 ppm, a decrease of 19 percent from the 1978 level. Hourly  $\text{NO}_2$  concentrations for both 1978 and 1980 were again normalized to 1 mph to remove the effects of observed differences in wind speed, and the results were plotted as frequency distributions as shown in Figure 7-13. An examination of these distributions indicates that the measured  $\text{NO}_2$  levels in 1980 were lower than the corresponding 1978 levels for the lower 60 percent of the readings, which encompass background levels. For percentile levels greater than 60 percent (representing peak occurrences), no measurable differences were observed between 1980 and 1978 results.

#### 7.6.4 Noise Level Impacts

Noise levels are typically reported both in terms of hourly  $L_{eq}$  and daily  $L_{dn}$ . The hourly  $L_{eq}$  is a measure of the average noise energy over a period of 1 hour. The  $L_{dn}$ , or the day-night sound level, is a 24-hour equivalent sound level that included a 10 decibel (dB) penalty for nighttime noise. A comparison of the measured noise levels in 1978 and 1980 shown is Table 7-4. Four different descriptors are used the maximum hourly  $L_{eq}$ , the maximum daily  $L_{dn}$ , the weekday average  $L_{dn}$  and the weekend average  $L_{dn}$ . These are logarithmic averages of all weekdays and all weekend days, respectively.

There are presently no applicable noise standards for a commercial/retail environment such as the Downtown Crossing. In the absence of a standard, information on noise levels related to outdoor speech interference can be used as a measure of impact. This information, which was compiled by EPA, suggests that for a 1-meter separation, about 95 percent sentence intelligibility can be communicated in a "normal" voice if the steady A-weighted ambient noise level does not exceed 66 dB. (A 95 percent sentence intelligibility means that 95 percent of the key words in a group of sentences would be correctly understood). For "raised-voice" conversation at the same 1-m separation, the 95 percent intelligibility cutoff is 72 dB. (US. Environmental Protection Agency, 1974).

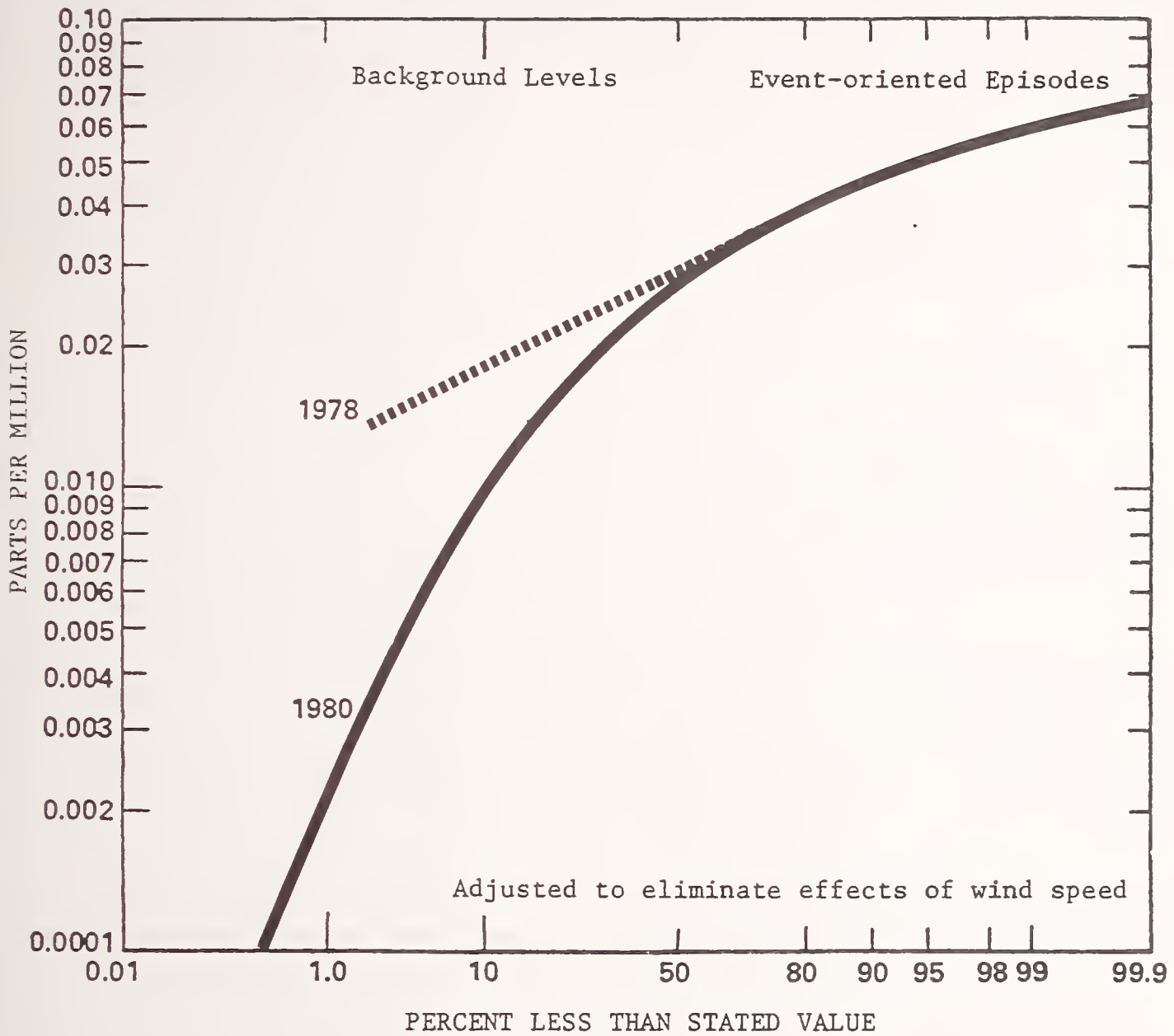


FIGURE 7-13. FREQUENCY DISTRIBUTION OF HOURLY NO<sub>2</sub> CONCENTRATIONS (1978 and 1980)



TABLE 7-4. MEASURED AMBIENT NOISE LEVELS: COMPARISON OF 1978 AND 1980

	Arch Street		Winter Street		Post Office
	1978	1980	1978	1980	1978
Maximum One Hour $L_{eq}$ (dBA)	81	74	83	76	77
Maximum Daily $L_{dn}$ (dB)	74	72	79	75	75
Percent of Daytime <sup>A</sup> One hour $L_{eq}$ :					
Over 66 dB (normal voice intelligibility)	47%	54%	89%	59%	68%
over 72 dB (raised voice intelligibility)	7%	3%	17%	2%	10%
Average Weekday $L_{dn}$ (dB)	72	71	76	73	
Average Weekend $L_{dn}$ (dB)	69	67	74	70	

<sup>A</sup> Daytime is defined as 7 AM-10 PM

The daily average noise level ( $L_{dn}$ ) at the three sites in 1978 ranged from day to day between 68dB and 79dB, the lower levels occurring on Sundays and the higher levels occurring on weekdays. The hourly average noise levels ( $L_{eq}$ ) ranged from 54dBA to 83 dBA. Ambient noise levels were highest at the Winter Street site, in the heart of the retail district. Although the sound levels at all three sites were high and indicate interference with normal conversation much of the time, they were not out of the ordinary for a large city downtown.

After implementation of the auto restricted zone, there was a small improvement in the noise level at Arch Street and a larger improvement at the Winter Street site in the heart of Downtown Crossing. The average daily noise level ( $L_{dn}$ ) decreased between 1978 and 1980 by 2dB at Arch Street and by 4dB at Winter Street (see Table 7-4). When making noise level comparisons, one should remember that a change of 3 dB is just detectable by the human ear; a change of 5 dB is considered a significant change; and a 10-dB decrease would sound half as loud as the original level. The maximum hourly noise level ( $L_{eq}$ ) fell by 7 dbA at both sites. The extent of sound levels exceeding 72 dB--the raised voice intelligibility standard--fell significantly at both sites and particularly at Winter Street.

It is notable that the maximum daily noise level ( $L_{dn}$ ) at Arch Street decreased by 2 dBA in spite of the increased presence of buses, which are generally more "noisy" than automobiles. Because most of the buses were operated during the nonpenalty hours (between 7 AM and 10 PM), however, their impact on  $L_{dn}$  was minimal.

The above noise analysis has only assessed the impact from the standpoint of changes in noise levels. There is another aspect of the noise environment that cannot be quantified and that is especially applicable to the Winter Street site. The character of the noise has changed. In 1978, the noise sources were predominantly cars and trucks. In 1980, the sources were human voice, hawkers, trucks (in the AM only), and music. To enhance the enjoyment of the pedestrian mall, concerts by small bands of musicians were frequently observed during the 1980 monitoring period. The sound from the musical in-

struments does contribute to the measured noise levels (i.e., increasing the  $L_{eq}$  and the  $L_{dn}$ ), which cannot differentiate between sounds from the musical instruments and noise from automobile traffic.

## 7.7 SUMMARY

Pedestrian Amenities: Due to the narrow width of the streets and the high pedestrian volumes, only a minimal amount of benches, plantings and street furniture were installed on most of the streets so as not to block pedestrian movement. The project did, however, include several mini-parks, a major bench area on Summer Street, and information kiosks throughout the area.

Pedestrian Movement: Curbs were eliminated on Winter and Summer Streets, and pedestrian usage of the middle street space is relatively high. By contrast, pedestrians seldom walk in the center of Washington Street, due in part to the existence of curbs delineating the sidewalk from the street space and the continued presence of delivery vehicles in the street throughout the day.

Problems Remaining: Surveys of pedestrians and merchants found that both groups were very positive about the Downtown Crossing project, including the street closing and the bricking of the streets. Both groups were negative most about the levels of area maintenance and crime. Pickup of trash has remained a problem, due both to a lack of suitable trash receptacles and to an insufficient level of maintenance activity. There were also increases in reported crimes against persons, although some of this may be attributable to a higher level of enforcement.

Air and Noise Quality: There were dramatic reductions in air pollution associated with the Downtown Crossing project. Between 1978 and 1980, maximum carbon monoxide levels fell 67 percent in the auto-restricted zone and 41 percent in an area adjacent to (but outside of) the zone. Background levels of nitrogen dioxide in the area also decreased. Measured noise levels within the auto-restricted zone decreased noticeably, as the sound of cars and trucks was replaced by that of people and music.



## 8. BEHAVIOR OF SHOPPERS, EMPLOYEES AND OTHER AREA USERS

While aesthetic improvement of the area and traffic flow impacts are certainly important in themselves, an ultimate objective of the Downtown Crossing project was to encourage pedestrian activity and strengthen the retail economy of the area. This chapter examines characteristics of trips to the downtown area, shopping behavior and socioeconomic composition of area users. The evaluation of these aspects of the Downtown Crossing project is particularly strong in that there were special surveys and corresponding counts of pedestrians, area employees and parking lot users covering periods before, during and after project construction. Findings from these three types of data sources have been integrated for the analysis in the chapter.

Section 8.1 describes the data collected, which is the basis for the rest of the chapter. Sections 8.2 through 8.5 respectively discuss pedestrian volumes and the mode of travel, purpose and frequency of trips to the area before and after implementation of the auto-restricted zone. Section 8.6 presents an analysis of the distribution of walk distances within the downtown area, its relationship to access mode, and its implications for the optimal size of an auto-restricted zone. Changes in the socioeconomic characteristics of downtown visitors and area employees are summarized in Section 8.7. Section 8.8 then analyzes project impacts on retail expenditure patterns. Findings from this chapter are summarized in Section 8.9.

### 8.1 DATA COLLECTION AND TIMING

#### 8.1.1 Timing of the Surveys

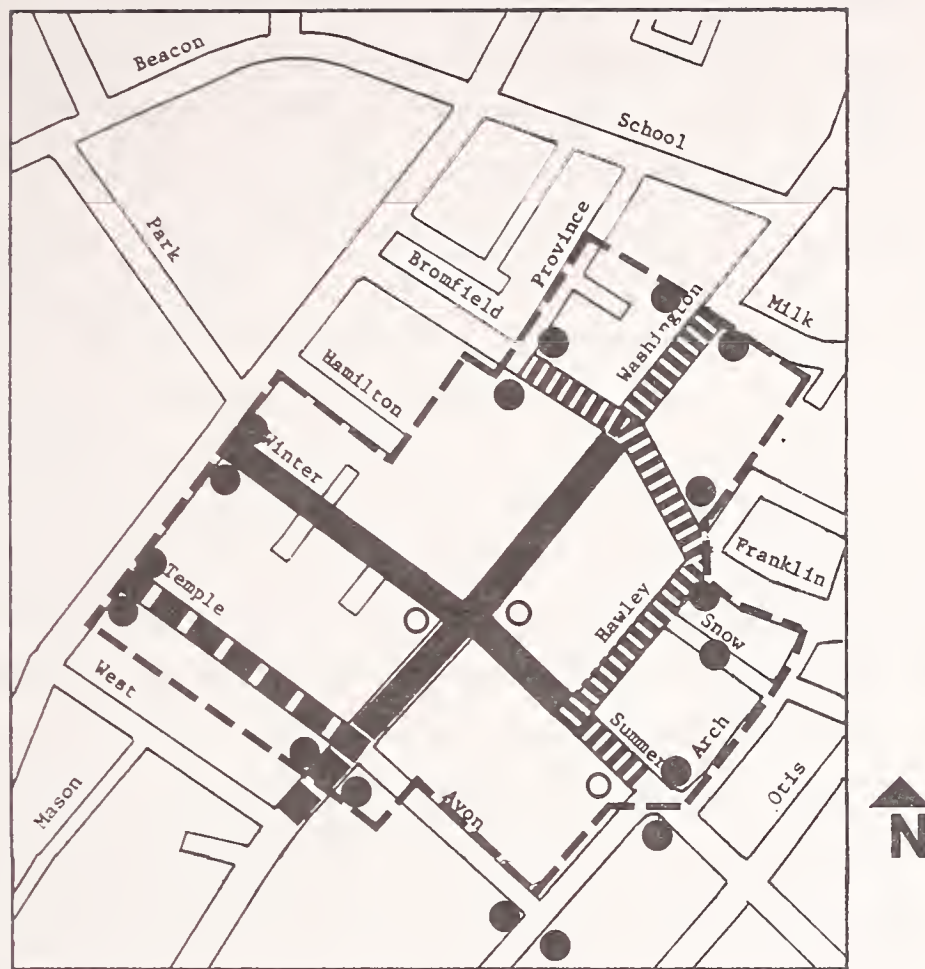
Pedestrian interviews were conducted during June of 1978, 1979 and 1980. Surveys of parking users and area employees were conducted during June of 1978 and 1980. In all cases, the respective survey instruments were of nearly identical content among the time periods. Since the closing of streets and extension of bus routes took place in September 1978, and the street bricking took place during April through September of 1979, the three survey periods

respectively characterize "pre-project," "construction period" and "post-project" conditions. The 1979 surveys took place during the peak of the construction period, during which sidewalks as well as street space were excavated in some areas and entrances to some stores along the street were provided by wooden or steel platforms. While the construction process itself may have had negative impacts on pedestrian use of the area, the 1979 survey period also represents a time ten months after initiation of the auto-restriction and bus route extension. During the intervening period, there was an opportunity for the greater pedestrian space and improvement of bus service to attract new pedestrian activity to the area and to affect patterns of travel and shopping. Thus, the 1979 data may reflect both short-term impacts of the auto-restriction policies and impacts of construction. The 1980 data then represents conditions two years after initiation of auto restriction and one year after completion of physical improvements to the area.

#### 8.1.2 Pedestrian Interview Survey and Counts

Pedestrian interview surveys were conducted during June of 1978, 1979, and 1980. The interviews asked nearly identical questions in all three years, pertaining to travel to the downtown area, places visited and shopping expenditures, as well as employment status, age, and income of the respondent. (The 1980 survey added questions about attitudes toward Downtown Crossing, which are discussed in Chapter 7.) The 1980 survey instrument is shown in Appendix A.

For all three years, interviewers were stationed at 12 points representing the complete perimeter of the auto-restricted zone, the three subway entrances, and the primary bus stop. The boundaries of the study area and interview locations are shown in Figure 8-1. The locations were selected to enable the interviewers to question respondents as they were leaving the area, thus making it possible to obtain a complete reporting of the respondent's activities while in the area. Counts of the total number of pedestrians coming out of the area at each interview location were taken and



- Boundary of the Downtown Crossing Study Area
- Streets closed to all traffic
- ||||| Restricted access; closed to auto traffic
- ..... Originally restricted access; now open to all traffic
- Pedestrian interview site at boundary of study area
- Pedestrian interview site at subway station entrance

FIGURE 8-1. LOCATION OF THE STUDY AREA AND PEDESTRIAN INTERVIEW SITES



recorded for each one-hour period in which the survey was conducted. These counts made it possible to weight the interview sample by location and by hour of the day to accurately represent the total population leaving the area during the survey period. The interviewers also recorded certain characteristics (such as sex and approximate age) of people who refused to respond to the survey, so that corrections could be made for apparent biases in the responses. Additional sidewalk counts of pedestrian volumes within the auto-restricted zone were made at 14 other locations, and store entrance counts were made at 14 stores (22 entrances) for each of 1978, 1979 and 1980.

The 1978 and 1980 surveys and sidewalk counts were each conducted over a period of four weekdays between the hours of 10 AM and 4 PM, two weekday evenings (when stores were open) between the hours of 6 PM and 8 PM, and one Saturday between the hours of 10 AM and 4 PM. The 1979 surveys and counts were more limited: these were conducted over two weekdays, one evening, and one Saturday. The hours of 10 AM to 4 PM and 6 PM to 8 PM were chosen to focus on shopping and personal business trips, which is where the project impacts would be expected to be greatest. Commuting times were specifically avoided to keep to a minimum the number of purely work-related trips captured in the interviews.

The pedestrian interviews (after weighting by location and time sampling rates) should represent an accurate sample of pedestrians in the study area, and the counts should represent nearly all of the volume of pedestrians in the zone. As there are no major office buildings or parking facilities in the auto-restricted zone, the only persons who could have been missed were employees of the stores and the small number of upper-story office workers in the zone, and then only those who did not take the subway and restricted their walks to the area between interview stations. Since the interview locations represent points of exit from the area, double-counting of pedestrians would be minimized. The total number of pedestrian interview surveys completed were as follows:

	1978	1979	1980
Weekday	1278	1175	1802
Weekday evening	224	173	260
Saturday	320	479	322

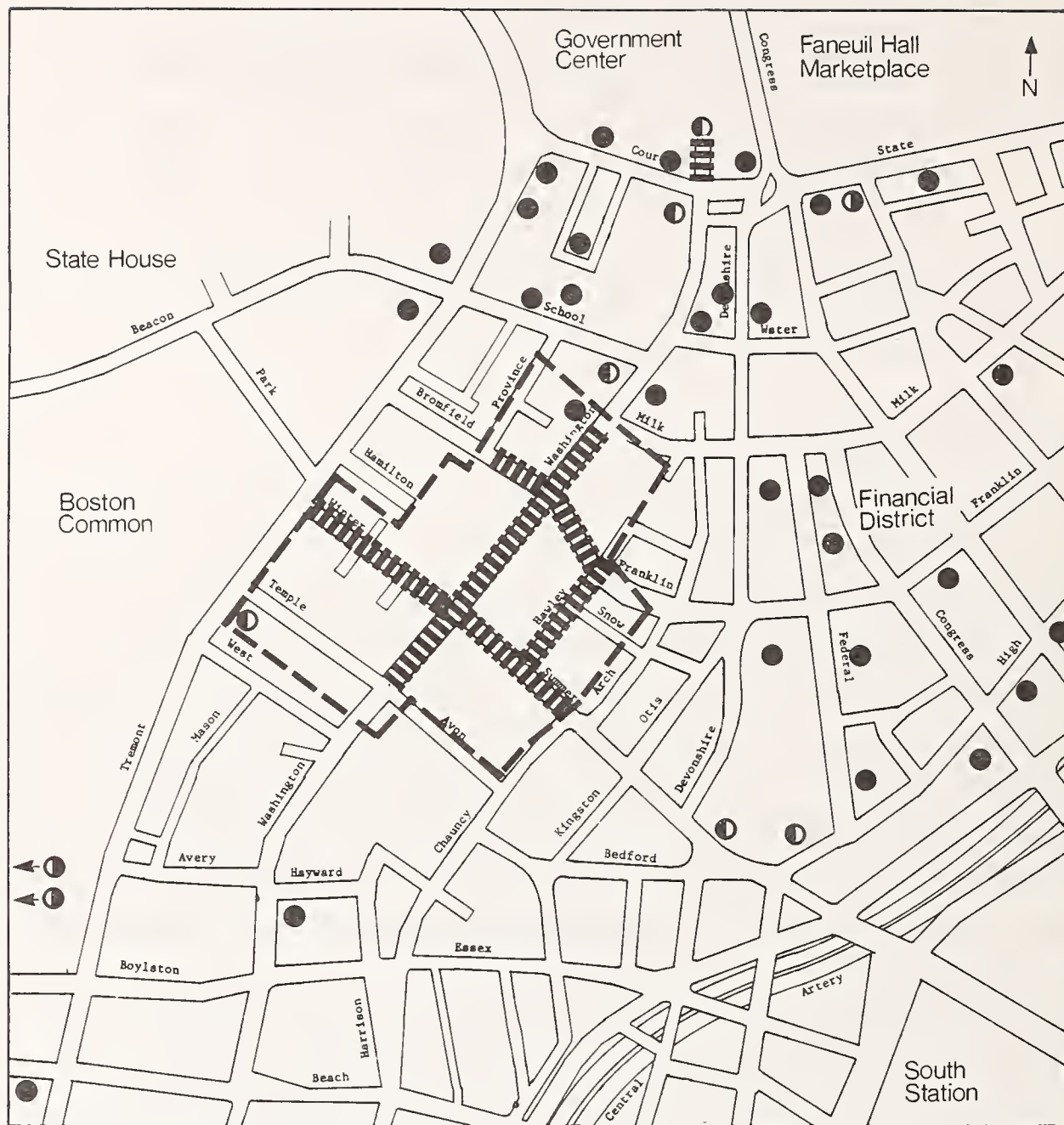
The total number of pedestrians, as determined by the pedestrian counts, are discussed in Section 8.2.

### 8.1.3 Employee Surveys

While there is limited employment on the auto-restricted blocks, employees in office buildings nearby constitute a considerable portion of the market for the Downtown Crossing area. If the Downtown Crossing project influenced the shopping and personal business habits of downtown area employees, the impact on businesses in the project area could be substantial. To measure the shopping habits and personal business trip characteristics of CBD employees, a survey was conducted specifically for that purpose. Since the Pedestrian Interview Survey includes interviews of area employees, the Employee Survey should be viewed as a supplementary instrument for obtaining additional information on the characteristics of midday and evening trips based from the office.

The Employee Survey was conducted during June of 1978 and 1980. The self-administered questionnaires contained questions about frequency and characteristics of trip-making, places visited and shopping expenditures, with emphasis on trips made during or after work. Occupation, age, and income of respondents were also asked. (As with the pedestrian surveys, the 1980 survey added questions about attitudes toward Downtown Crossing, which are discussed in Chapter 7.) The 1980 survey instrument is shown in Appendix A.

Questionnaires were distributed to a sample of the employees at 35 office buildings in 1978 and 39 office buildings in 1980, shown in the map in Figure 8-2. In 1978, 17,665 questionnaires were distributed and 5,449 were returned; in 1980, 17,844 were distributed and 5,498 were returned. The office buildings in the locations shown were chosen because they represented



- Boundary of Downtown Crossing Area
- ||||| Street closed to traffic or restricted access
- Office building with survey responses for 1978 and 1980
- Office building with survey responses only for 1978\*
- ◐ Office building with survey responses only for 1980\*

\* Not included for analysis

FIGURE 8-2. LOCATION OF EMPLOYEE SURVEY SITES



the major share of a market for which the Downtown Crossing area was in direct competition with other shopping and business areas. Retail employment was avoided because of difficulties in distributing and collecting questionnaires and because of the small share of the potential market constituted by retail employment relative to office employment.

For purposes of before and after comparison, analysis in this report is restricted to the 29 office buildings from which responses were received in both years. Surveys from each building were weighted to represent total employment at that building; thus, overall responses from the survey are adjusted for differential survey sampling and return rates at the different buildings. Still, it should be kept in mind that the employee survey represents a subset of office buildings in the central business district. The analysis sample of 29 buildings represents an employment of 43,940 of the estimated 116,000 downtown area office employees.<sup>1</sup> The buildings studied are congregated in the financial district and near Government Center. For many of these buildings, shopping opportunities in the Faneuil Hall Marketplace are actually closer than the Downtown Crossing area.

#### 8.1.4 Parking User Survey

Since the Downtown Crossing project involved major changes in auto access to the area and the location of parking facilities, persons driving to the area would be particularly affected. While the Pedestrian Interview Surveys included persons coming to the area by car, an additional survey of parking users was conducted to obtain further information on attributes of auto trips and use of different parking facilities.

The Parking User Surveys were conducted in June of 1978 and 1980. This supplementary survey, like the Pedestrian Interview and Employee surveys, contained questions pertaining to travel characteristics, shopping behavior and respondent characteristics, but with additional questions pertaining to

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<sup>1</sup>Office employment in the Government, Financial, and Midtown districts (and excluding Back Bay) as of 1978; Source: Matrullo (1979).

time of day, auto occupancy, trouble parking and garage location. (The 1980 survey added questions about attitudes toward Downtown Crossing and parking changes, which are discussed in Chapters 5 and 7.) As with the Pedestrian Interview surveys, the Parking User surveys were conducted between the hours of 10 AM and 4 PM to focus on shopping and personal business trips, which is where the project impacts would be expected to be greatest.

Parking user questionnaires were distributed at 19 off-street facilities and 6 on-street locations in 1978; for 1980 the surveys were distributed at 14 off-street facilities and 6 on-street locations. Differences in the places surveyed are due to the elimination of certain facilities and the creation of new parking space. Altogether, the surveyed facilities represent over 7,000 spaces, accounting for nearly 60 percent of the total parking capacity in the downtown parking study area. This study area and the locations and capacity of the various parking facilities are discussed in Chapter 5.

Approximately 3,800 parking questionnaires were distributed in each year, of which 744 and 585, respectively, were mailed back or returned. External counts of vehicles at each of the surveyed parking locations were also made, and these counts were used to weight the survey responses from each location. Thus, the weighted survey results are adjusted to correct for differential sampling and response rates at the different locations. The surveys thus represent 6,212 drivers counted entering the survey parking areas (between 10 AM and 4 PM) in 1978, and 4,853 drivers in 1980.

The parking user survey included facilities scattered within a radius of 3,200 feet from the Downtown Crossing. In fact, only 36 percent of the 1978 respondents and 29 percent of the 1980 respondents either worked in the Downtown Crossing area or reported visits to business establishments in that area; the rest were going to workplaces or other destinations elsewhere in the central business district. For purposes of analyzing characteristics and behavior of Downtown Crossing visitors in this chapter, the data analysis is limited to those parking users citing destinations in the Downtown Crossing area.

## 8.2 VOLUME OF VISITORS AND ROLE OF DOWNTOWN EMPLOYEMENT

### 8.2.1 Overall Volumes

From the initiation of the project in 1978 to mid-1980, the number of persons visiting Downtown Crossing gradually increased. Figure 8-3 shows the number of pedestrians during weekday, weeknight, and Saturday shopping periods for the years 1978, 1979 and 1980.

For all three years, it is first notable that there is a relatively low level of evening activity; the evening pedestrian volumes (for the two evenings in which area stores are open late) are considerably below a two-hour average for weekdays or Saturdays. It is also notable that the Saturday volume is over three-fourths of the weekday average despite the fact that there is little employment in the area on Saturdays. Between 1978 and 1980, the volume of visitors increased by 11 percent for weekdays (10 AM to 4 PM); 8 percent for the two evenings when the stores were open; and 10 percent for Saturdays.

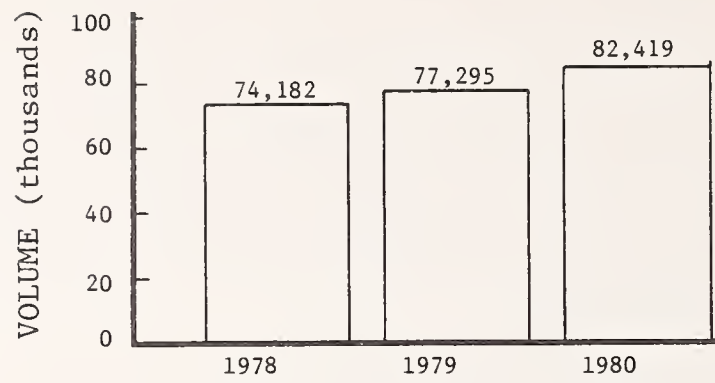
While the total number of visitors counted varied from day to day (depending on day of the week, weather conditions, etc.), there was a clear and consistent trend towards an increasing daytime volume of visitors from year to year. In general, the number of pedestrians increased following the restriction of automobile traffic (which occurred after the 1978 survey) and continued to increase even more for the daytime periods following the bricking of the street and placement of pedestrian amenities (which occurred after the 1979 survey). Only for the evening shopping period was there no apparent increase in pedestrians between 1979 and 1980, and the small differences in weeknight counts were not statistically significant.<sup>1</sup>

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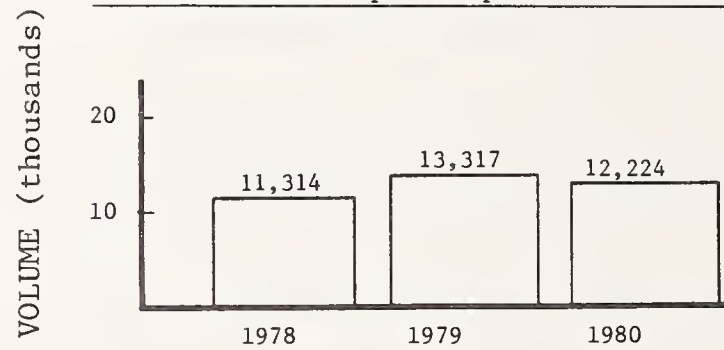
<sup>1</sup>The fluctuation in evening pedestrian counts may be related to changes in day of the week. The 1978 count is an average of Monday and Wednesday (the only evenings stores were open), the 1979 count is for Wednesday only, and the 1980 count is an average of Monday and Thursday (due to a change in the day of late store hours). The weekday counts are subject to less random fluctuations; the 1978 and 1980 counts are both averages of Monday, Tuesday, Wednesday and Thursday, while the 1979 count is an average of Monday and Wednesday.



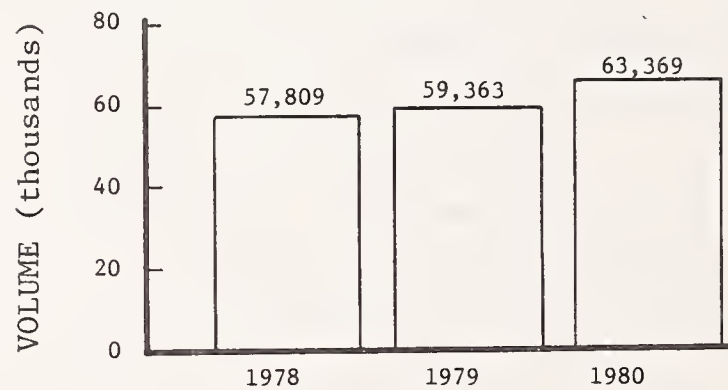
A. WEEKDAYS 10am - 4pm



B. WEEKNIGHTS 6pm - 8pm



C. SATURDAYS 10am - 4pm



SOURCE: 1978-1980 Pedestrian Counts

FIGURE 8-3. DAILY VOLUME OF VISITORS IN THE DOWNTOWN CROSSING AREA

### 8.2.2 Distribution by Block

The number of persons leaving Downtown Crossing at each location at the boundary of the study area is shown in Figure 8-4. Whereas sidewalk counts include persons retracing their steps on the same block, boundary exit counts more accurately reflect the number of persons visiting Downtown Crossing from areas outside it. Between 1978 and 1980, there were increases in the number of persons at each boundary location except for the two locations at the south: lower Washington Street and Chauncy Street. These decreases can be attributed to the nature of activity in that area, with construction of the massive Lafayette Place mixed-use development on the blocks adjoining those two counting locations, and the existence of the nearby adult entertainment district which is now undergoing transition. The decreases in pedestrian trips from the south simultaneous with increase from other directions can also reflect the fact that most of the government and financial offices are located to the northwest, north and east of Downtown Crossing.

Figure 8-5 shows the volume of pedestrians on each sidewalk block within the auto-restricted zone for an average weekday (10 AM to 4 PM) in 1980 and in 1978. These sidewalk counts represent two-way volumes measured during the same period as the pedestrian interviews (in June). The heaviest pedestrian volumes were on Washington Street, where volumes on the Bromfield to Milk block were 38,000 over the six-hour period in 1980, an average of 6,300 pedestrians per hour. During the midday peak period, the volume there were over 8,000 pedestrians per hour.

Comparison of sidewalk counts between 1978 and 1980 confirm evidence from the exit counts that the growth of pedestrian activity was concentrated in the northern part of the auto restricted zone. On the north, both the Bromfield to Franklin block of Washington Street and Franklin Street had 15 percent increases in sidewalk volumes. On the South, the Winter to Temple block of Washington Street and Temple Place had similar proportional decreases. There were small increases in the sidewalk counts on Winter and Summer Streets. These results are further indication that linkages to adjoining office and business activities help determine changes in pedestrian usage accompanying an auto restricted zone.

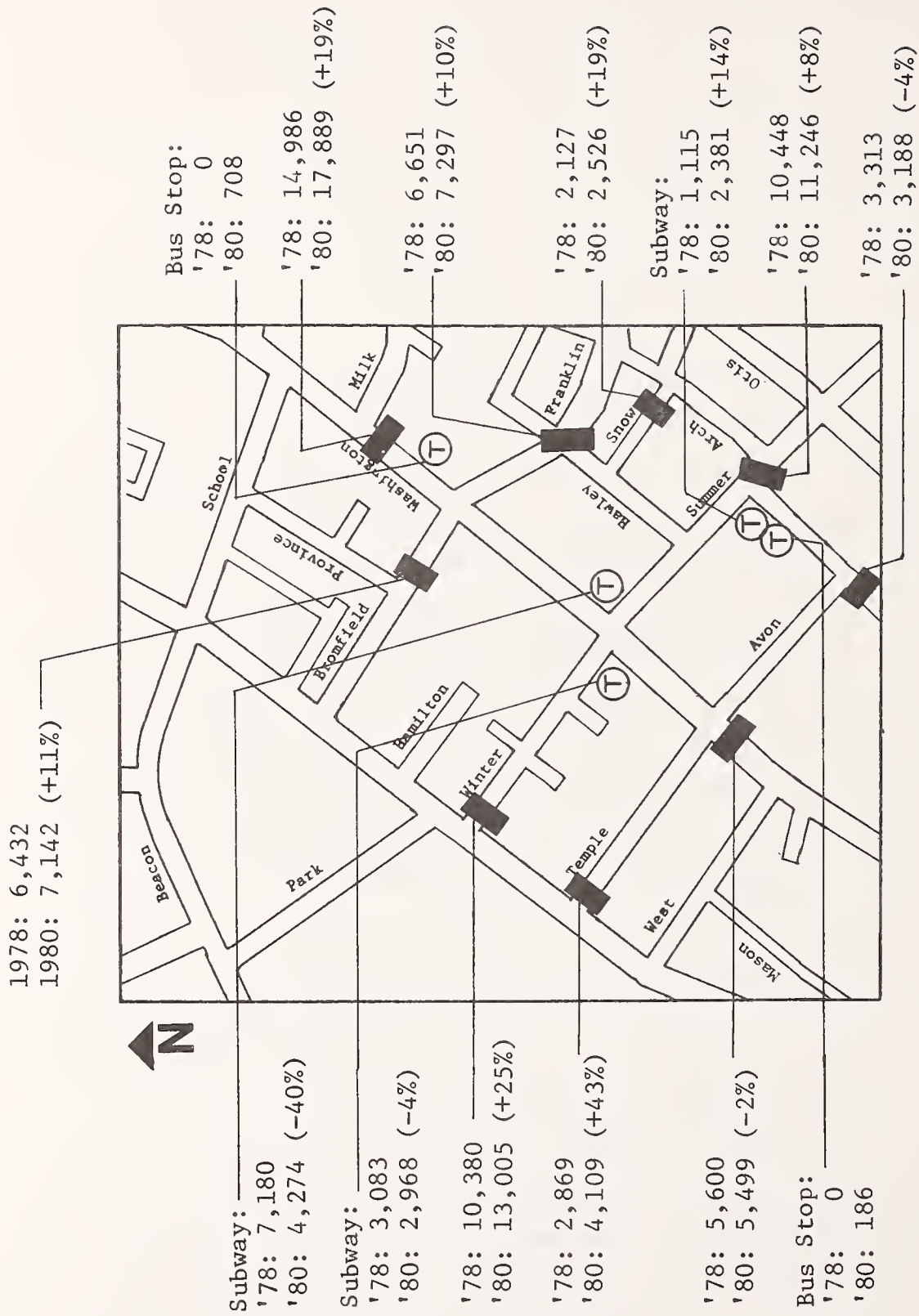
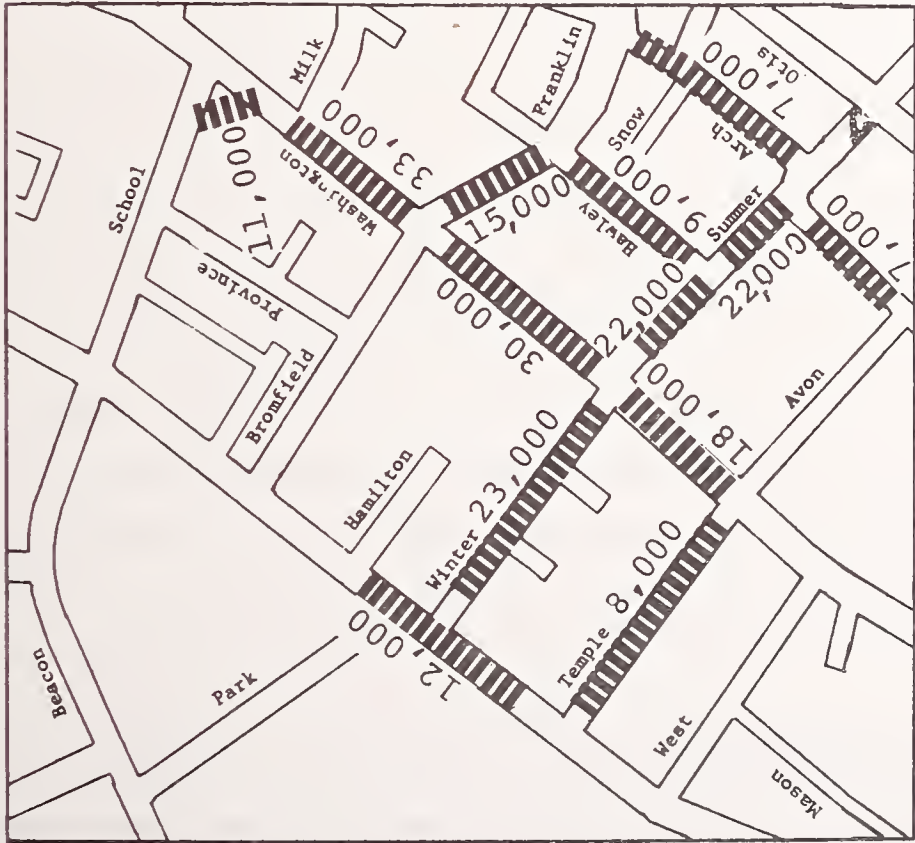


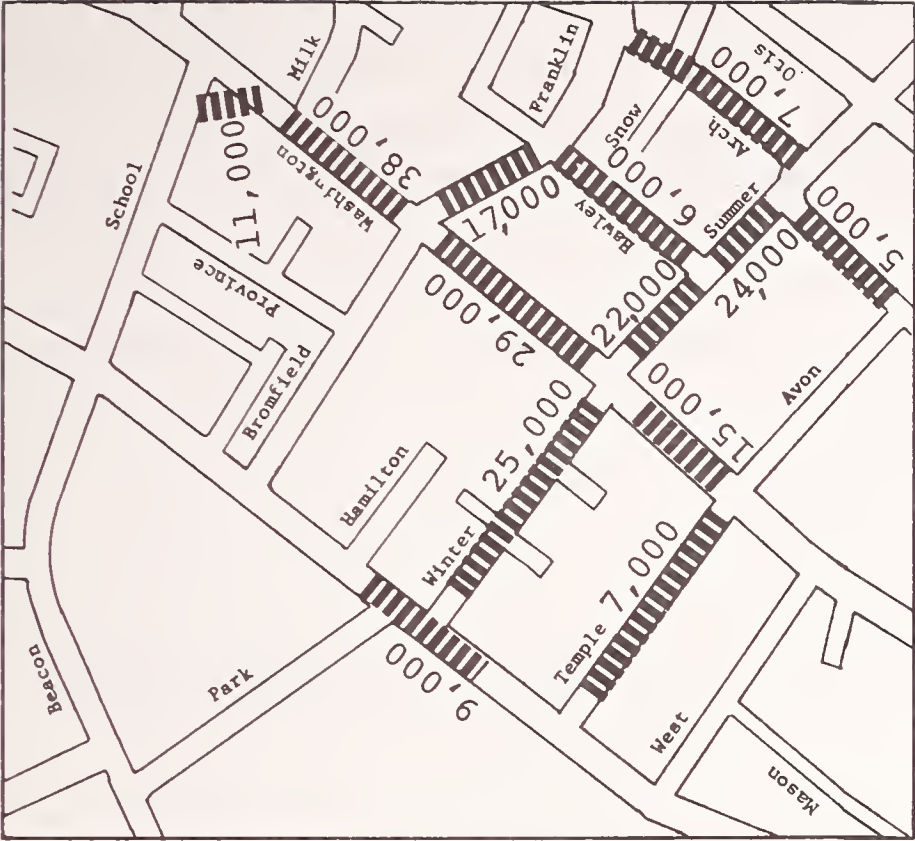
FIGURE 8-4. WEEKDAY PEDESTRIAN VOLUMES AT STUDY AREA BOUNDARIES  
(PERSONS EXITING THE STUDY AREA: 10 AM-4 PM)



A. 1978 Weekday Sidewalk Counts



B. 1980 Weekday Sidewalk Counts




 -Street segment  
 2,000 — Volume on this segment



FIGURE 8-5. WEEKDAY PEDESTRIAN VOLUMES BY BLOCK (2-WAY VOLUMES; 10 AM-4 PM)

The Pedestrian Interview Surveys included information on all business establishments visited in the Downtown Crossing area. It is notable that of the 74,494 Downtown Crossing area business visits reported in 1978 and the 89,005 business visits reported in 1980, over 65 percent were to stores on the two auto-restricted blocks of Washington Street, and approximately 20 percent more were to stores on the adjacent block of Washington Street between Bromfield and Milk Streets. Table 8-1 shows the distribution of store visits by street. Consistent with the pedestrian counts discussed above, it shows that there were increases between 1978 and 1980 in the number of store visits on Washington, Winter, and Bromfield Streets. Consistent with the sidewalk counts, there were decreases in the number of store visits to the adjacent blocks of Temple Place, Hawley and Tremont Streets. In addition, the largest proportional increase in store visits was on the Bromfield to Milk Street block of Washington Street, where sidewalks were widened but auto traffic was not banned.

#### 8.2.3 Time of Day

Figure 8-6 compares the distribution of pedestrian volumes by time of day in 1978 and 1980. The shape of the time-of-day distributions reflect the substantial contribution of downtown area workers. The clear peak between noon and 2 PM on weekdays can be attributable to the large number of workers entering the area during their lunch period. The less peaked time-of-day distribution on Saturdays reflects the corresponding lack of a large workforce downtown on that day. Much of the total increase in weekday pedestrian volumes between 1978 and 1980 occurred at lunchtime; between those years, the percentage of total weekday pedestrian volumes occurring between noon and 2 PM increased from 45.8 percent to 48.4 percent. This reflects a 17 percent increase in the lunchtime pedestrian volumes between 1978 and 1980, compared to only a 6 percent increase in volumes for the rest of the weekday.

#### 8.2.4 Role of Downtown Area Workers

Boston workers in general and particularly workers located within walking distance represent a major market for Downtown Crossing business. It is

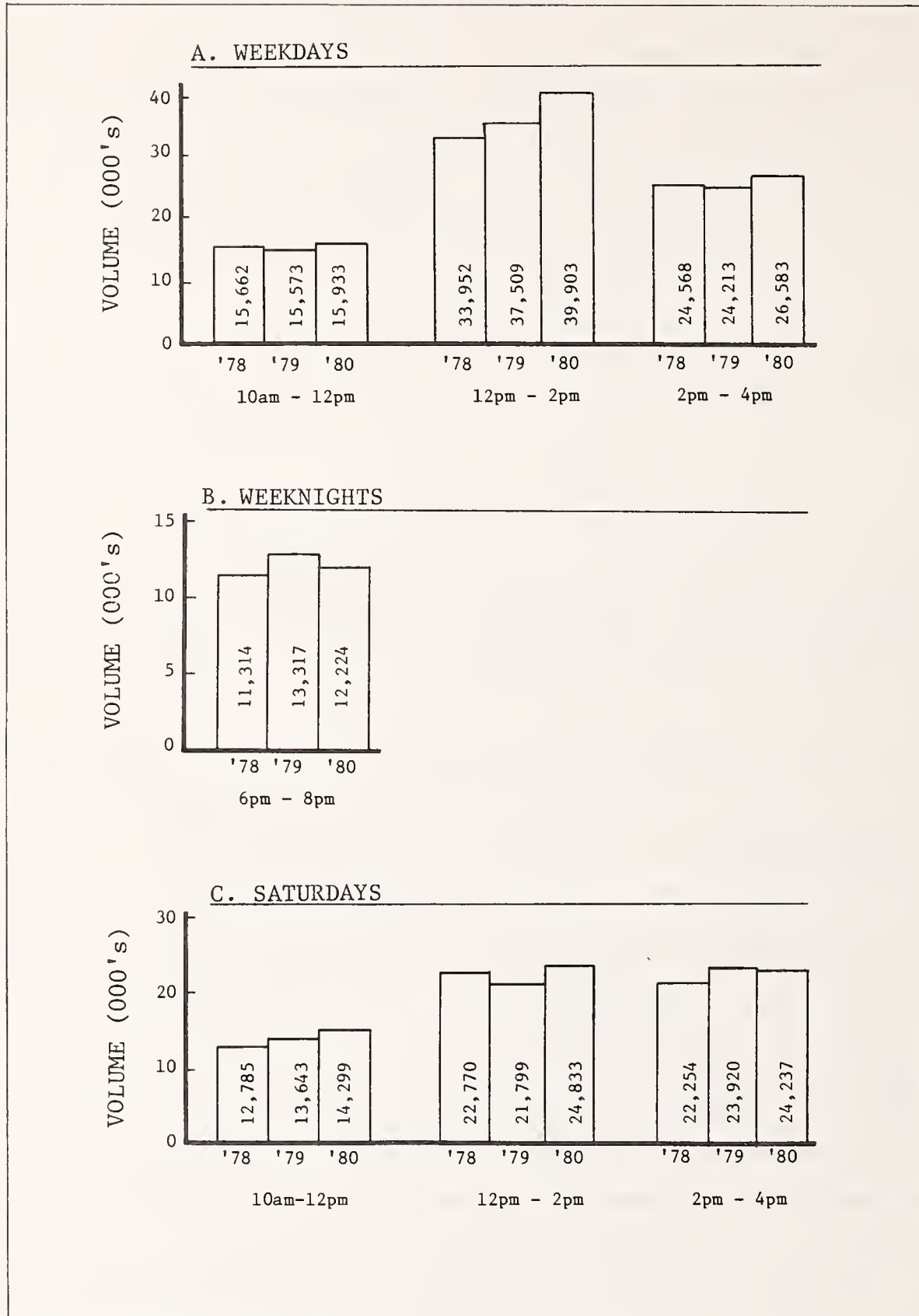
TABLE 8-1. ZONE OF WEEKDAY STORE VISITS  
IN THE DOWNTOWN CROSSING AREA

Zone	Percent of Pedestrians Reporting Visiting Each Zone	
	1978	1980
Washington Street: Temple to Bromfield (pedestrian mall; 2 blocks)		
West side: Jordan Marsh & Filenes	51%	50%
East side: miscellaneous stores	15	20
Washington Street: Bromfield to School (sidewalks widened; auto restricted)	17	24
Winter Street (pedestrian mall)	5	7
Bromfield Street (partially auto restricted)	3	6
Tremont Street: Temple to School (open to traffic; 3 blocks)	4	3
Temple Place (open to traffic)	3	1
Hawley/Snow/Summer (Hawley to Arch block)	4	2

Note: Percents sum to more than 100 percent due to trips with store visits in more than one zone

Source: Pedestrian Interview Surveys, 1978 and 1980.





SOURCE: 1978-1980 Pedestrian Counts

FIGURE 8-6. PEDESTRIAN VOLUMES BY TIME OF DAY

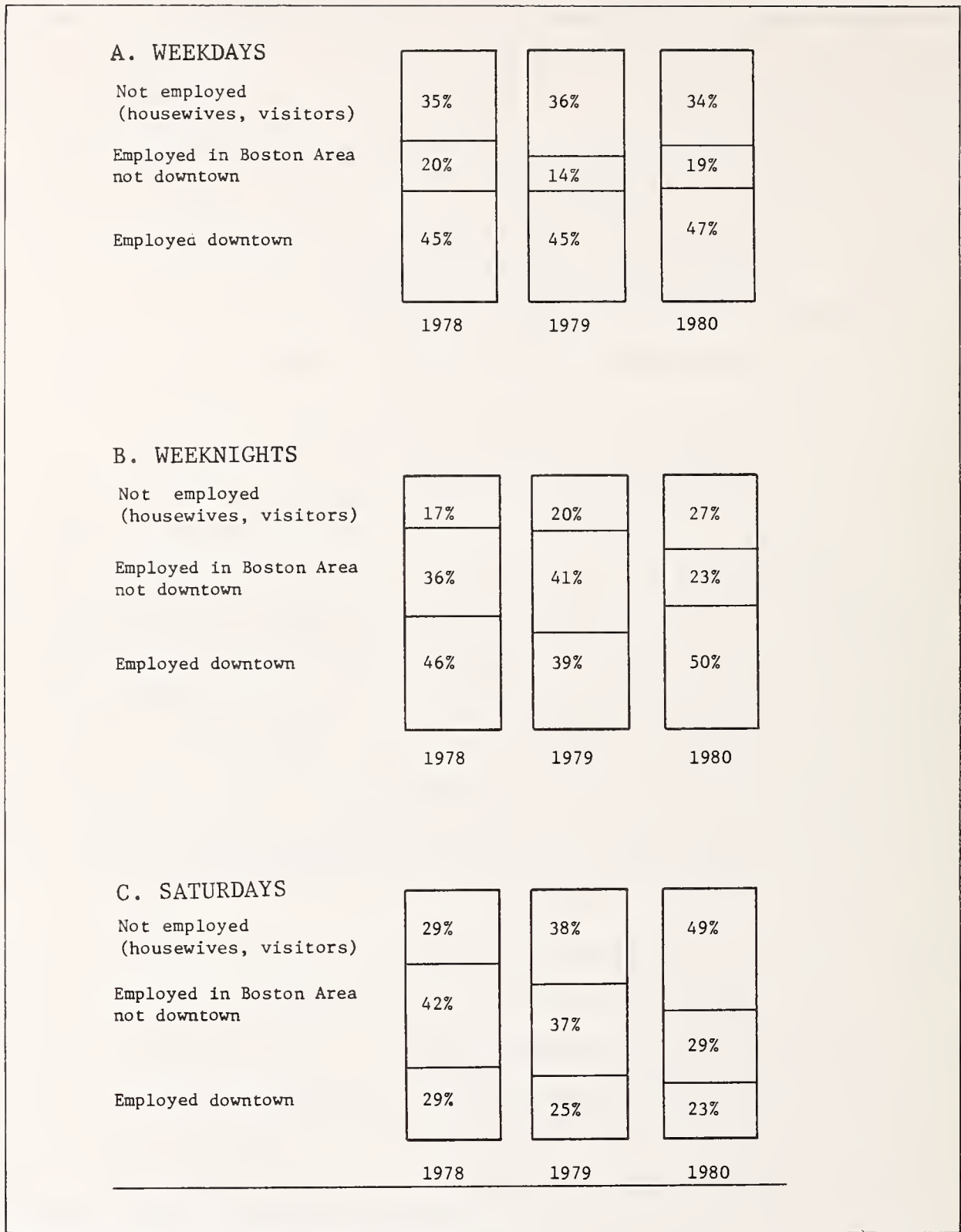
estimated that roughly 116,000 persons are employed in office buildings within one-half mile of the auto-restricted zone, and that another 7,000 are employed in area retail stores (computed from Matrullo, 1977 and CTPS, 1975). The pedestrian interview surveys allowed categorization of pedestrians into either: (a) employed in the downtown area, (b) employed elsewhere in metropolitan Boston, or (c) not employed in the Boston metropolitan area. Downtown area employment is here defined to include an area within around 3,000 feet of the Downtown Crossing area, including the financial district, South Station area, Government Center, and Beacon Hill, but excluding Back Bay (refer to Figure 2-1). (The "not employed" category could include people employed domestically at home, students and out-of-town visitors).

Figure 8-7 shows the employment status of pedestrians for weekdays, evenings and Saturdays in 1978, 1979 and 1980. The importance of area employment is demonstrated by the fact that for all three years, nearly half of all pedestrians in the Downtown Crossing on weekdays and evenings were persons working in Downtown Boston. Among persons coming to shop (i.e., not just to eat or for business reasons), however, the proportion working in the downtown area is approximately one-quarter. This compares closely with surveys of shoppers in the Back Bay and Faneuil Hall Marketplace areas in central Boston, which also found that these shopping areas get no more than one-quarter of their weekday shoppers from area workplaces (BRA, 1978; The Rouse Co., 1977).

Comparing shifts in the employment status of all pedestrians over the 1978 to 1980 period, several consistent trends emerge. First, the proportion of weekday pedestrians who are downtown workers has increased from 44.7 percent to 46.5 percent. This is further evidence of the growing contribution of area employees to weekday pedestrian volumes, and is consistent with the growing level of lunchtime pedestrian activity previously noted.<sup>1</sup> At the same time, very different trends have occurred for weeknight and Saturday

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<sup>1</sup>Additional evidence of the growing contribution of area employment is shown by the response to the Pedestrian Interview question of next destination after leaving the Downtown Crossing area. The proportion of trips going to work after visiting Downtown Crossing increased from 38 percent in 1978 to 43 percent in 1979 and 1980.



SOURCE: Pedestrian Interview Surveys, 1978-1980

FIGURE 8-7. EMPLOYMENT STATUS OF VISITORS TO DOWNTOWN CROSSING



shopping periods. For those periods, there have been substantial increases in the proportion of visitors who are not employees, such as housewives, students, etc. In real terms, the surveys indicate that there have been reductions in the total number of employed persons visiting on weeknights and Saturdays, so that any increases in pedestrian volumes for those periods (Figure 8-3) are essentially attributable to an influx of non-employed shoppers. Still, it should be noted that weeknight shopping periods attract a relatively small number of persons.

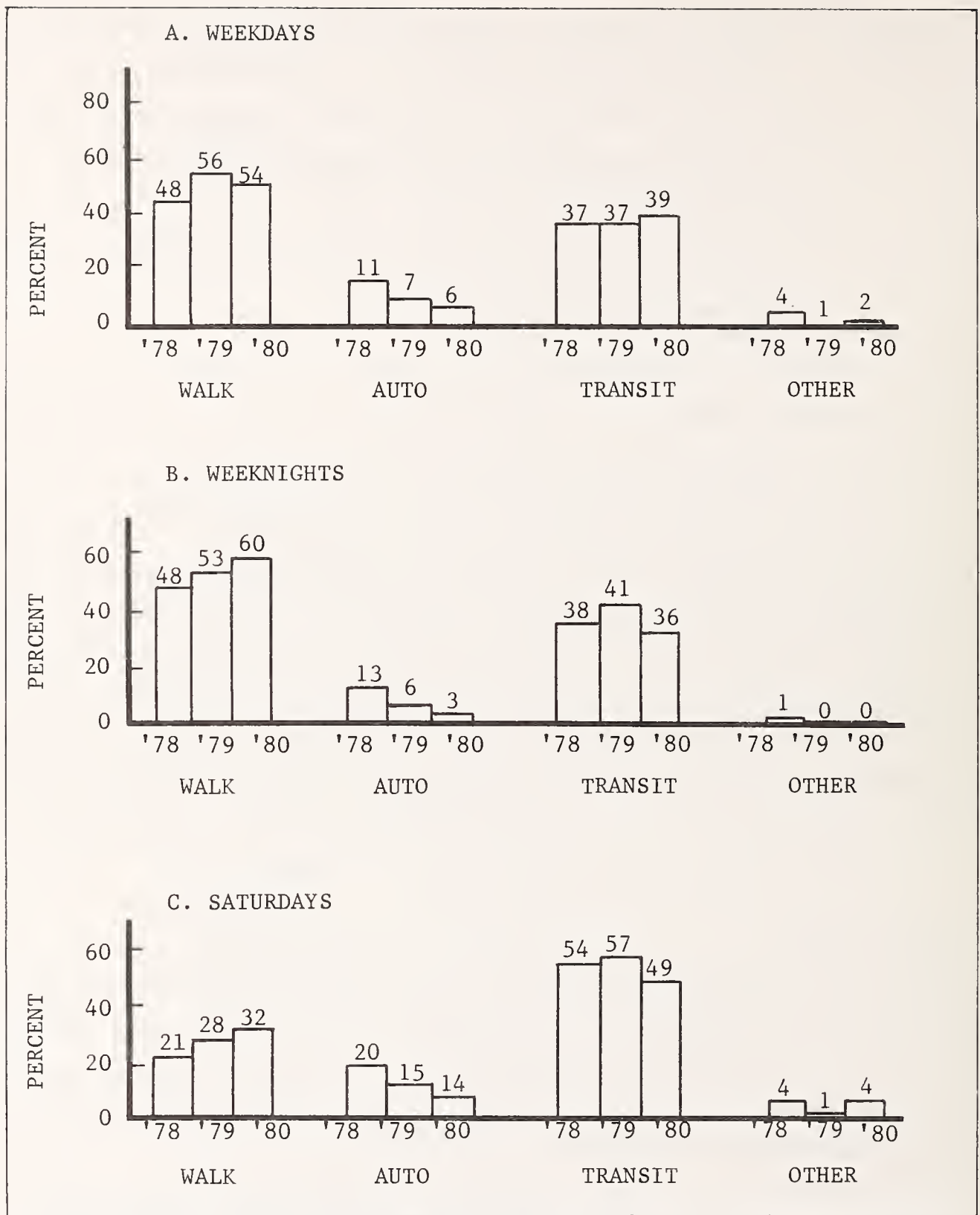
While the Pedestrian Interview survey indicates the growing importance of local employment as a generator of weekday pedestrian volumes, the Employee survey yields more mixed results. That survey does indicate a small increase in the frequency of midday trips out of the building (as discussed in Section 8.5), but also shows that the share of those trips going to the Downtown Crossing area has declined (from 47 percent to 41 percent) between 1978 and 1980. There were corresponding relative increases in the proportion of trips going to other locations in the traditional central business district (from 41 to 42 percent), to Faneuil Hall Marketplace (from 10 to 11 percent), and to other locations outside of the CBD (from 2 to 4 percent). Of course, the Employee surveys were limited in coverage to specific office buildings nearby and their results may not be fully representative of all area employees.

### 8.3 MODE OF TRAVEL

While the strengthening of downtown retail activity was the principle objective of the auto-restricted zone, another important goal was to reduce dependence on the automobile as a mode of access to the auto. The project was successful in causing a substantial switch away from use of the automobile on weekdays and Saturdays.

#### 8.3.1 Mode of Access to the Downtown Crossing Area

The means of travel used by pedestrian survey respondents to get to the Downtown Crossing area from their home or last previous activity is shown for the years 1978, 1979 and 1980 in Figure 8-8. While all respondents were



SOURCE: Pedestrian Interview Surveys, 1978-1980

FIGURE 8-8. MODE OF ACCESS TO THE DOWNTOWN CROSSING AREA

walking out of the zone when surveyed, and hence probably also walked into the zone, the interviewers specifically probed for vehicular modes. Anyone who said they walked to the area were asked if they walked from their car, a bus stop, subway station, or taxi. Only those who had walked from work, home, another shopping area or some other activity were recorded as having walked to the Downtown Crossing zone. Nevertheless, walking has been the predominant mode of travel to the area even before the auto-restricted zone, accounting for almost half (48 percent) of all trips in 1978. This, of course, reflects the large number of downtown area employees walking from work. Subway train was the second most popular mode of access with 35 percent of all trips (or 65 percent of the vehicular trips) and auto was next with 13 percent of total trips (or 25 percent of the vehicular trips) in 1978. MBTA buses then accounted for only 2 percent of all trips. Most of the rest were dropped off from someone else's car; and taxi accounted for less than one-half of 1 percent of all trips.

It would be expected that the auto-restricted zone and associated policies would have a substantial impact on mode of access to the area, for several reasons. First, the auto-restricted zone did make traffic access to the immediate area more difficult. In addition, the elimination of on-street parking and the shift of parking capacity to locations a few blocks away (as described in Chapter 5) translate into longer walks from parking facilities to the retail district for some people. In addition, there were substantial extensions of local bus service into the area. All of these changes tend to make auto travel less attractive and encourage shifts to transit for shopping trips.

Given the characteristics of auto-restricted zone and associated policies, it is not surprising that Figure 8-8 shows a dramatic decrease over time in the proportion of weekday and Saturday trips coming into the Downtown Crossing area by auto. For both days, most of the shift occurred between 1978 and 1979, following the closing of the streets and related parking changes. There was, however, also a continued decrease in auto usage between 1979 and 1980. There were corresponding increases in the walk trip proportion for both weekdays and Saturdays, and a slight overall increase in transit usage on



weekdays. The proportion of all trips coming directly by MBTA bus (without having also used subway or auto) increased from 3 percent in 1978 to 7 percent in 1980, while the subway share of all trips dropped slightly from 34 percent to 32 percent.<sup>1</sup>

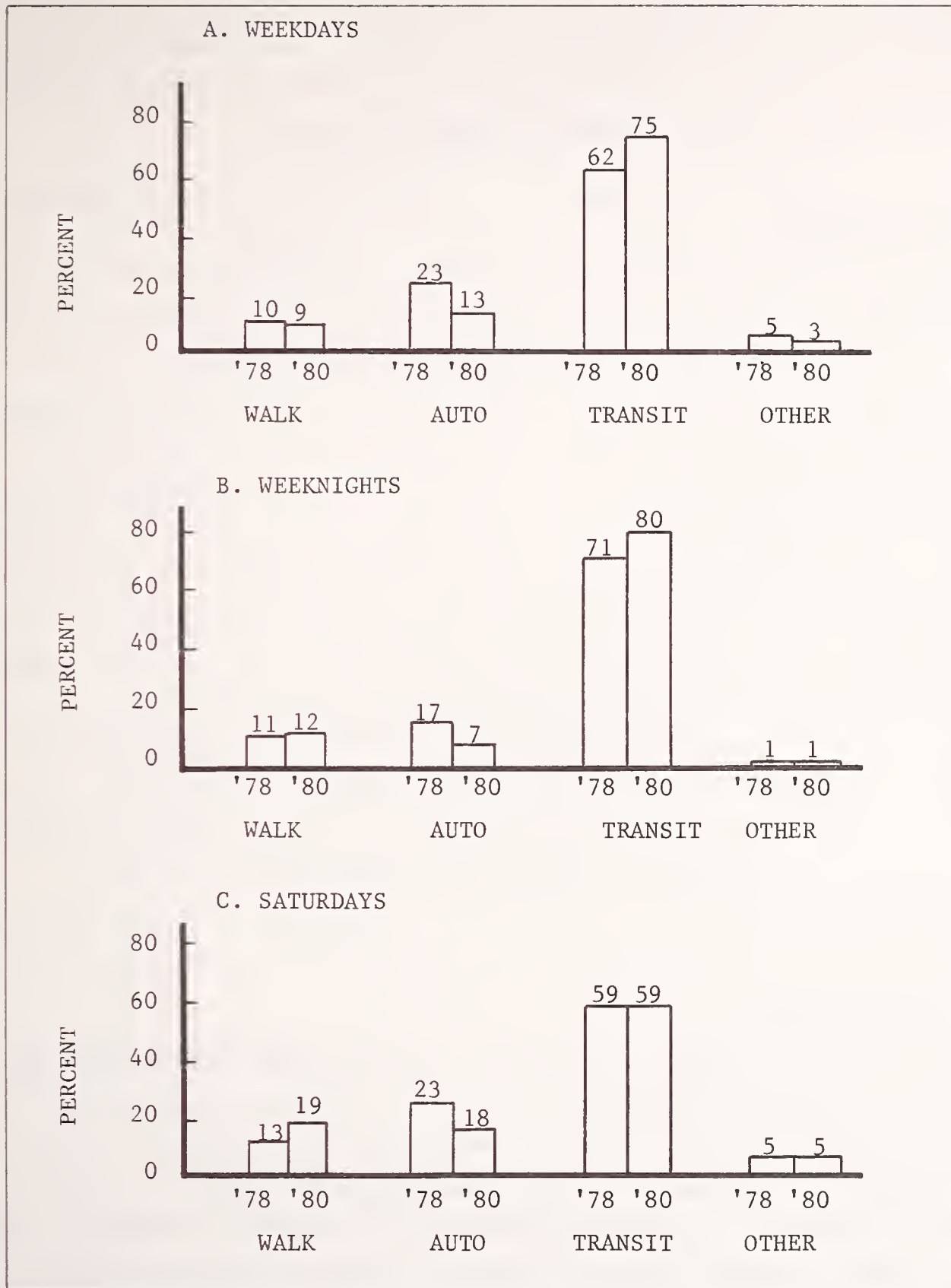
In fact, the 1978 to 1980 change in the weekday walk and transit mode distributions reflects two trends: an increase in walk trips from nearby offices and an increase in bus trips from neighborhoods beyond walking distance. For those employed in the Boston metropolitan area, there was a continued increase in walk trips (from 61 percent to 76 percent of all trips) and a correspondingly relative decrease in transit usage (from 27 percent to 19 percent of all trips). The exact opposite trend occurred for those not employed (i.e., housewives, students, out-of-town visitors, etc.). For that group, there was a continued increase in transit usage (from 56 percent to 70 percent of all trips) and a corresponding relative decrease in walk trips (from 22 percent to 18 percent of all trips). Despite these offsetting trends, both groups had in common substantial decreases in reliance on the auto.

### 8.3.2 Mode to Downtown

The Pedestrian Interview Survey attempted to identify the mode of travel to downtown Boston as distinguished from the mode of travel to the smaller Downtown Crossing zone. Whereas the mode to the Downtown Crossing area (discussed above) refers to the travel from the last previous activity (whether downtown or not), the mode to downtown Boston refers to travel from home or trip origin outside of downtown. For example, many area workers walked to Downtown Crossing from their workplace, but travelled to downtown by auto or transit. Figure 8-9 shows the distribution of mode to downtown. With this definition, walk trips accounted for only 10 percent of weekday trips to downtown, whereas transit trips account for the clear majority of the trips. Between 1978 and 1980, there was a dramatic decrease

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<sup>1</sup>These percentages are according to the Pedestrian Interview Surveys; the bus passenger surveys and alighting counts (see Tables 6-2 and 6-3) indicate that bus ridership directly to the auto restricted zone accounted for 5 percent of visitors in 1978 and 7 percent of visitors in 1979.



SOURCE: Pedestrian Interview Surveys, 1978 and 1980

FIGURE 8-9. MODE OF TRAVEL TO DOWNTOWN BOSTON

in the relative proportion of trips by auto and a corresponding increase in the transit share for both weekdays and evenings. For Saturdays, the proportional decrease in auto trips was compensated by a relative increase in walk trips rather than by a change in the transit share.

### 8.3.3 Mode to Work

It would be expected that the Downtown Crossing project would have only a minimal impact on travel to work. The exclusion of auto traffic in the retail district in itself had only a minor impact on vehicular access to office buildings elsewhere downtown, and overall capacity of facilities for long-term parking did not appreciably change between 1978 and 1980. There were substantial improvements in local bus circulation, although local buses only accounted for 11 percent of trips to work downtown. Nevertheless, Table 8-2 shows, from the Employee surveys, that there was a clear shift between 1978 and 1980 from auto to subway and bus as the mode of travel to work. This change is most likely attributable to factors such as ridesharing promotion programs, rising gasoline prices and/or rising parking prices, rather than to the Downtown Crossing project. While all of the office buildings surveyed are outside of the Downtown Crossing area, these findings suggest that shifts away from auto in the mode to downtown and the mode to Downtown Crossing may be at least partially attributable to factors which are exogenous to the auto-restricted zone.

### 8.3.4 Parking Demand

Supporting the funding of an overall decline in auto trips to downtown in general and the Downtown Crossing area in particular, the Parking User surveys indicate a reduction in the number of daily vehicles for which the driver visited the Downtown Crossing area, from approximately 2,700 in 1978 to 2,200 in 1980. Consistent with this, the percentage reporting "trouble finding a parking place" (among off-street parkers who visited the Downtown Crossing area) decreased from 33 percent in 1978 to 30 percent in 1980.

In fact, there was a decrease in reports of trouble parking for those travelling to work (from 28 percent to 20 percent), but an increase for



TABLE 8-2. MODE OF TRAVEL TO WORK

	% Share	
	1978	1980
Walk Only	5.4	5.7
Auto Only	23.7	16.7
Subway Only	25.5	28.0
MBTA Bus	9.5	10.9
Other Bus	5.4	5.1
Commuter Rail	10.2	10.0
Taxi	0.4	0.2
Bus to Subway	12.7	14.0
Rail to Subway	0.5	0.6
Auto to Subway	4.7	6.5
Rail to Bus	0.4	0.2
Auto to Bus	0.9	0.8
Bicycle and Miscellaneous	0.6	1.2
	100.0	100.0

Source: Employee Surveys, 1978 and 1980 (29 buildings surveyed in both years).

shoppers (from 23 percent to 38 percent). This latter finding reflects the fact that while there was little change in capacity at parking lots and garages, there were major reductions in legal on-street space and increases in enforcement of no-parking zones, both of which would tend to be frequented by short-term parkers for shopping or personal business trips. Auto occupancy for parkers visiting the Downtown Crossing area increased during this period, from 1.69 in 1978 to 1.82 in 1980. The increase was most dramatic for those travelling to work (from 1.29 to 1.76) but was also evident for shoppers (from 1.72 to 1.98). Again, these vehicle occupancy increases can be related to a variety of factors, including carpool promotion activities, gasoline prices and availability, and parking prices. More information on parking characteristics is contained in Chapter 5.

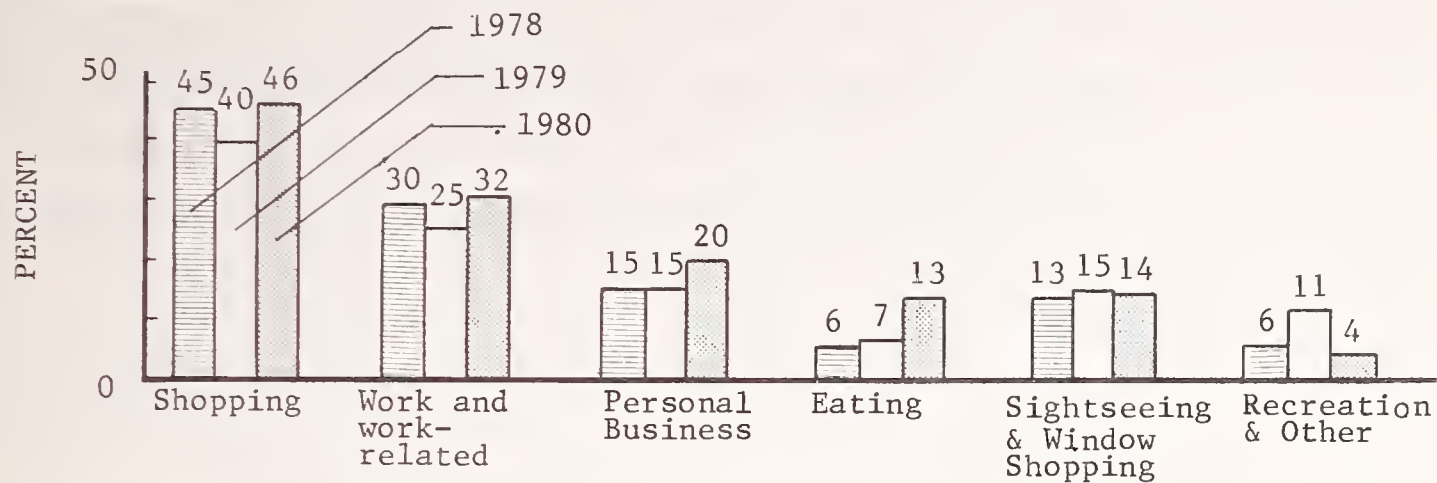
#### 8.4 PURPOSE OF VISITS TO DOWNTOWN CROSSING

##### 8.4.1 Purpose for All Trips

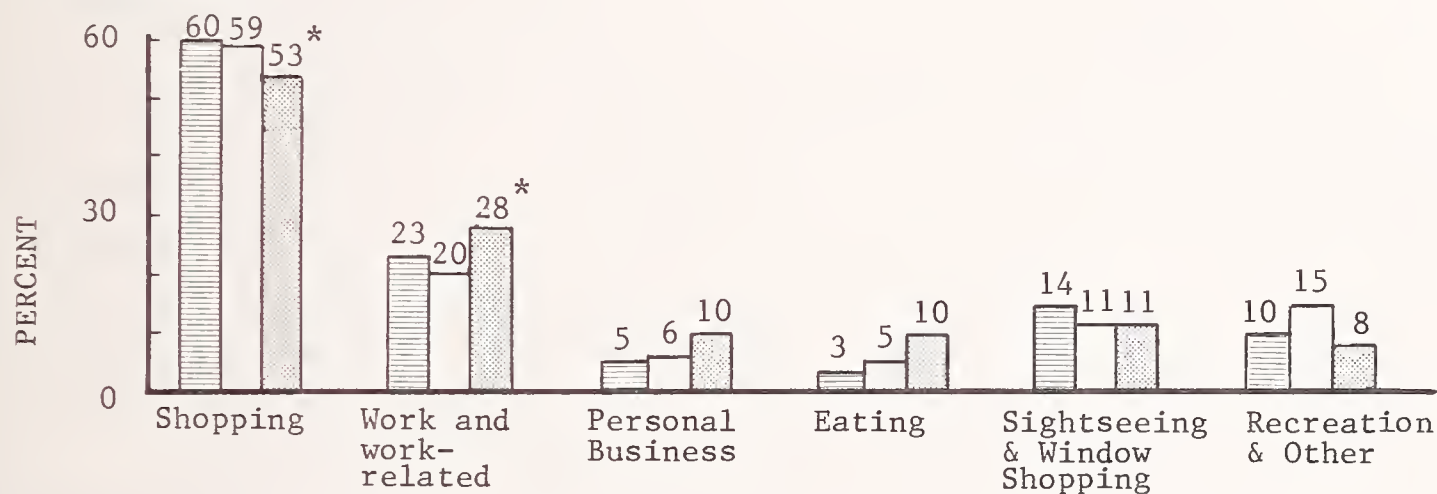
With increasing pedestrian volumes, a major issue is whether the increase is concentrated in shopping trips, work-related trips, or other trip purposes. The project appeared to have only minor impacts on trip purpose, and did not increase the dominance of shopping trips.

The pedestrian interview surveys asked respondents for the main purposes of the trip to the area. Multiple purposes were offered for 14 percent of all trips in 1978, increasing to over 25 percent in 1980. Shifts in the rate of multiple responses may indicate real increases in the extent of multiple purpose trip making, although it may also reflect unknown changes in interview or coding procedures. Figure 8-10 shows the percentage of trips in which each purpose category was offered as one of the primary purposes of the trip. Overall, shopping was offered as one of the reasons for being in the area nearly half of the time. While the relative percentage of trips for shopping on weeknights and Saturdays actually declined slightly, the total number of shopping trips was stable over time. The largest increases in proportion and number of trips occurred for personal business (all days) and eating activities (weekdays).

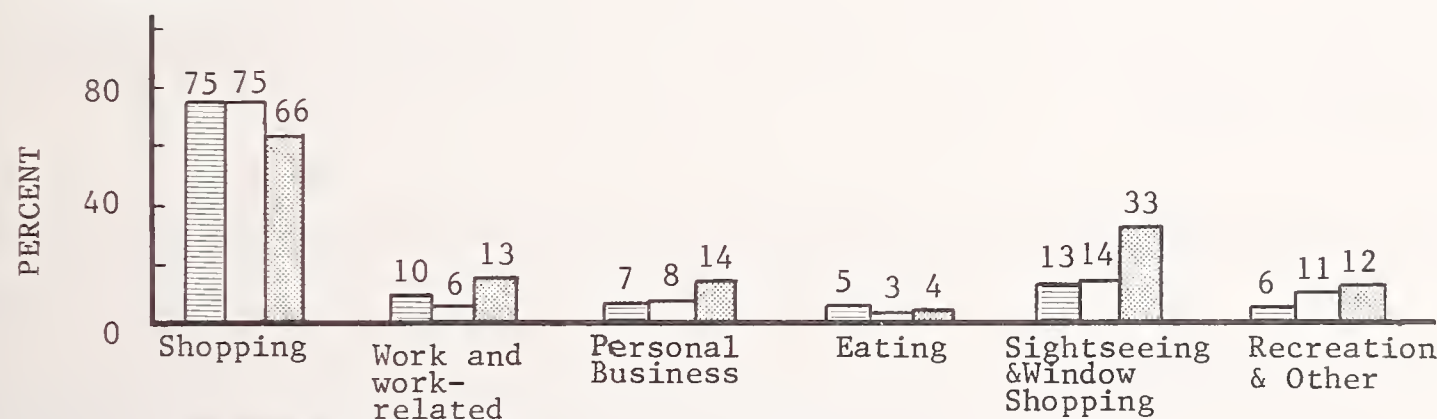
A. WEEKDAYS



B. WEEKNIGHTS



C. SATURDAYS



SOURCE: Pedestrian Interview Surveys, 1978-1980

NOTE: Percentages sum to more than 100% due to multiple purpose trips.

\*Estimated after correction for early evening sampling in 1980

FIGURE 8-10. PURPOSE OF VISITS TO THE DOWNTOWN CROSSING AREA (PERCENT OF TRIPS WITH EACH PURPOSE)



Perhaps a more accurate classification of trip purposes is to distinguish between discretionary and non-discretionary trips. Each trip can thus be characterized by its least discretionary or most important single purpose, and it can be assumed that work-related purposes take precedence over shopping, which in turn takes precedence over eating, sightseeing, and other purposes. Using this approach, Table 8-3 shows the distribution among work-related trips, non-work shopping trips, and other (not work or shopping) trips. Again, the results indicate the dominance of shopping trips, and are generally consistent with the findings from Figure 8-10.

#### 8.4.2 Work-Based Trips

The employee survey asked specifically about characteristics of trips made during the workday and after work. Figure 8-11 shows the distribution of reported trip purposes for those two types of trips. Consistent with the trends found in the pedestrian survey, there were small shifts from shopping to eating trips for both midday and after work trips by employees. However the employee surveys, unlike the pedestrian interviews, include trips made to areas other than the Downtown Crossing area. The increase in midday eating trips thus may reflect improved lunch time restaurant opportunities in Downtown Crossing and in the Faneuil Hall Marketplace. It is likely that the increase in after-work eating trips is predominantly to destinations out of the Downtown Crossing area. (See Chapter 9 for information on project impacts on restaurants).

### 8.5 FREQUENCY AND DURATION OF VISITS

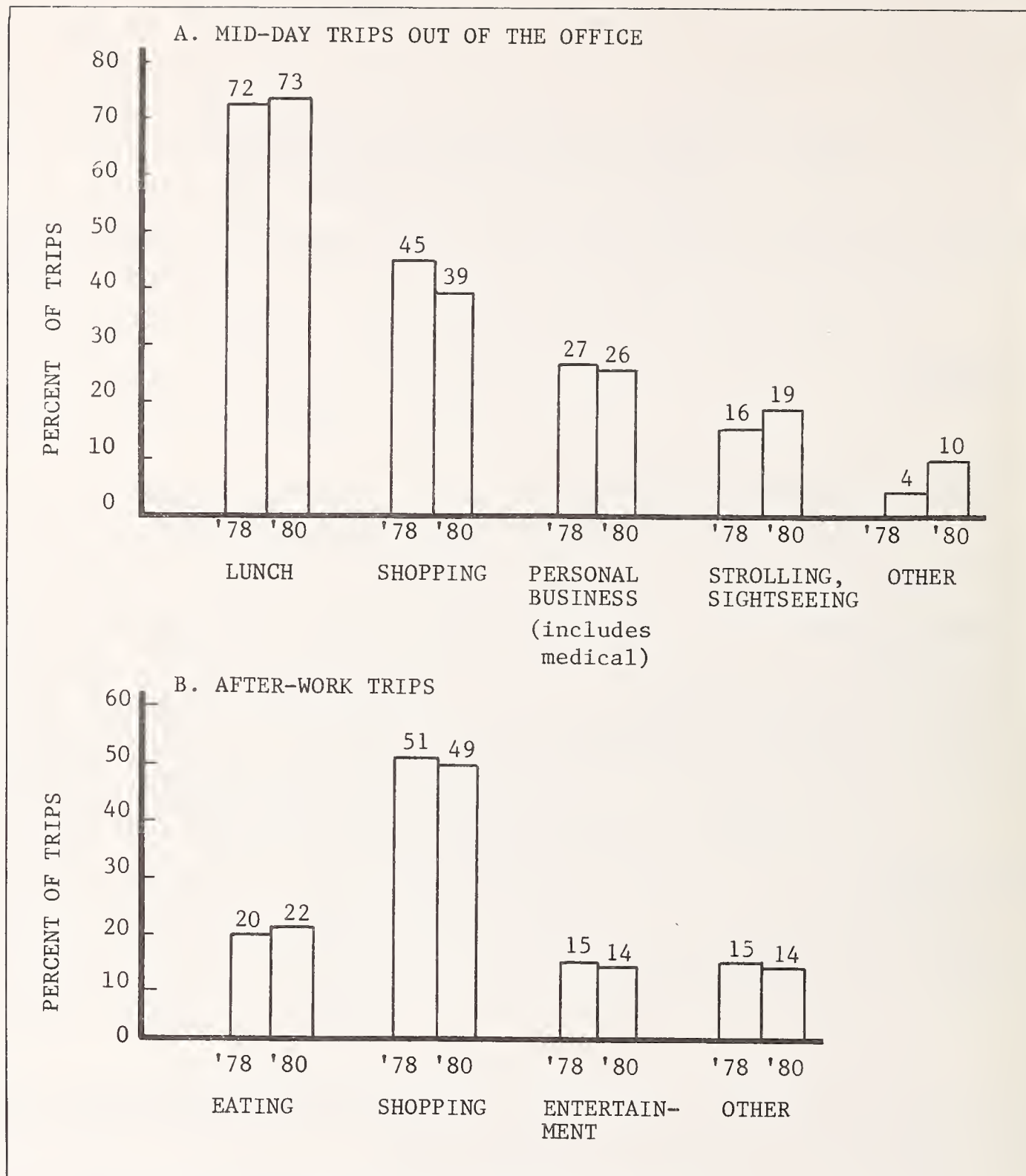
#### 8.5.1 All Pedestrians

The improvements in pedestrian circulation, pedestrian amenities and bus service, together with efforts to upgrade and promote area businesses, were all aimed at attracting more shopping activity, including more frequent trips to the retail district and longer stays in the area. Even before the auto-restricted zone, pedestrian volumes were largely made up of regular

TABLE 8-3. PRIORITIZED CLASSIFICATION OF PURPOSE  
VISITING THE DOWNTOWN CROSSING AREA

	1978	1979	1980
<b>A. Weekdays</b>			
Work-Related	30%	25%	32%
Shopping (Not Work-Related)	41	38	40
Other (Not Shopping or Work-Related)	<u>29</u>	<u>37</u>	<u>28</u>
	100	100	100
<b>B. Weeknights</b>			
Work Related	23	20	42
Shopping (Not Work-Related)	58	57	37
Other (Not Shopping or Work-Related)	<u>19</u>	<u>24</u>	<u>22</u>
	100	100	100
<b>C. Saturdays</b>			
Work-Related	10	6	13
Shopping (Not Work-Related)	75	75	62
Other (Not Shopping or Work-Related)	<u>15</u>	<u>19</u>	<u>26</u>
	100	100	100

Source: Pedestrian Interview Surveys, 1978-1980.



SOURCE: Employee Surveys, 1978 and 1980 (29 buildings surveyed in both years)

NOTE: Percents total to more than 100% due to multiple purpose trips

FIGURE 8-11. PURPOSE OF MIDDAY AND AFTER-WORK TRIPS BY AREA EMPLOYEES (PERCENT OF TRIPS WITH EACH PURPOSE)



visitors. The 1978 pedestrian interviews showed that 59 percent of respondents visited the Downtown Crossing area more than 5 times per month, and 35 percent visited it more than 20 times per month. The average number of visits per month was around 12. Table 8-4a compares 1978, 1979 and 1980 in terms of the mean number of visits per month and the percentages of respondents visiting less than once a month, and more than 12 times a month (i.e., 3 times a week). There was evidence of a reduction in the average frequency of visits during the construction period (1979) for weekdays, evenings and weekends. Since the total number of pedestrians increased between 1978 and 1979, however, this finding merely indicates that proportionally fewer persons were very frequent visitors. By 1980, the weekday and evening surveys showed a slightly higher rate of repeat trips and a slightly higher average number of trips per month than in 1978.

Table 8-4b repeats these statistics for only shopping trips, and again shows slight increases between 1978 and 1980 in the average number of trips per month for weekdays and Saturday shoppers. In contrast to the overall frequency of visits (discussed above), however, there was evidence that weekday and Saturday shoppers during the 1979 construction period were more likely to be frequent repeat shoppers than were those in 1978 or 1980.

Among all pedestrians, the median duration of visits to the Downtown Crossing area was nearly one hour. Only 35 percent of all trips were less than 30 minutes in length, while 41 percent were longer than 1 hour and 25 percent were longer than 2 hours. There was no significant change in duration of visits to the Downtown Crossing area between 1978 and 1980. The relatively long duration of many trips to the Downtown Crossing is consistent with the predominance of shopping activities. It is nevertheless because of the contribution of lunch time trips that the duration of visits to the area tend to be shorter than for other shopping areas. For example, the 1977 Back Bay Shoppers' survey found that 43 percent of the visits were longer than 2 hours (BRA, 1978).

#### 8.5.2 Downtown Employees

Regular midday trips out of the office are extremely common. The 1978 and 1980 Employee Surveys both found that 83 percent of respondents had made a

TABLE 8-4. FREQUENCY OF VISITS TO THE DOWNTOWN CROSSING AREA

		Mean Visits Per Month	% Visiting Less Than Once A Month	% Visiting At Least 3 Times/Week
<u>A. Visits for Any Purpose</u>				
Weekdays	1978	11.6	9	45
	1979	11.2	4	44
	1980	12.7	6	49
Weeknights	1978	12.1	6	47
	1979	11.8	1	43
	1980	15.5	6	61
Saturdays	1978	9.8	7	33
	1979	7.4	6	27
	1980	9.6	9	31
<u>B. Shopping Visits</u>				
Weekdays	1978	5.2	23	15
	1979	6.5	12	22
	1980	5.5	21	15
Weeknights	1978	5.5	15	17
	1979	5.2	9	17
	1980	5.2	22	13
Saturdays	1978	4.6	11	8
	1979	5.4	4	12
	1980	4.9	17	10

non-work-related trip out of the building during regular business hours on the previous workday.<sup>1</sup> Of those making a (non-work-related) midday trip, the proportion making more than one such trip during the day increased from 20 percent in 1978 to 22 percent in 1980. For those making single trips, these were predominantly during the lunch period. Altogether, about three-quarters of the midday trips were for lunch or shopping. It should be noted, however, that slightly less than half of these trips were to locations in the Downtown Crossing area (as was discussed in Section 8.2.4).

After work trips were less common than midday trips. The employee survey indicated that 23 percent of the office employees in 1978 and 25 percent in 1980 made a non-work-related trip after work but before going home. The increase in after work trips occurred only in the "eating" purpose category, however, which largely consists of trips to destinations outside of the Downtown Crossing area.

The duration of midday trips out of the building was typically short; 34 percent were less than 30 minutes and 81 percent were less than 1 hour long. There was little change between 1978 and 1980. This reflects the typical "lunch hour" and is in direct contrast to the longer trip lengths often encountered in the Pedestrian Interview Surveys.

## 8.6 WALK TRIP LENGTH

The observed pedestrian volumes depend in part on the distances people are willing to walk from places of employment, parking spaces, bus stops or subway stations. The distance that people are willing to walk may be a function of trip purposes, the value they place on their time, and their aversion to walking. It is crucial to understand the distance limits of walk trips insofar as it is an indication of the maximum desirable size of a pedestrian zone. This is not an easy issue to analyze, however, since the observed distances of walk trips reflect not only behavioral travel demand preferences, but also the geographic distribution of (and hence distance

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<sup>1</sup>Surveys were not distributed on Mondays.



between) potential walk trip origination points and the various shopping, eating and business opportunities. At the same time, it can also be argued that in the long run, the location of commercial activity is itself affected by the locations of previously existing office buildings, subway stations, parking garages, etc. Although cause and effect may not be clear, it can still be useful to observe the distance distribution of walk trips to the auto-restricted zone. This section examines the distance distribution of various classes of walk trips, as reported in the 1980 Pedestrian Survey and computed from a matrix of interzonal walk distances.

#### 8.6.1 Methodology

Although the Pedestrian Interview Survey did identify the place of origin and destinations visited for each respondent, it was not designed as a travel diary. Hence, while the locations of downtown trip destinations are known, there was no information about the scheduling order of each stop in a multiple-destination trip (or tour). The distance of each walk was thus measured as the street system distance from the walk trip origin to the furthest destination. The measurement of walk trip lengths depends on a zonal system which located origins and destinations in central Boston to within 100 feet of their true destination. Outside of central Boston, location zones were much larger and represented entire neighborhoods.

The analysis of walk trip distances excluded certain classes of trip purpose and access mode. For persons coming to the Downtown Crossing by transit, taxi, or by being dropped off (totalling 42 percent of all trips, as shown in Figure 8-8), it was not possible to positively determine the bus stop, subway station or drop-off location from which the walk trip originated. Thus, the analysis was limited to those persons who walked to identifiable downtown business establishments from a parking lot, place of employment or other activity in the downtown area. Trips to work were also excluded, as they are less discretionary than shopping, personal business and other trip purposes. Some observations were deleted for both reasons. Altogether, 42 percent of the trips to specific downtown business establishments were examined in the walk trip analysis.

### 8.6.2 Trip Length Findings

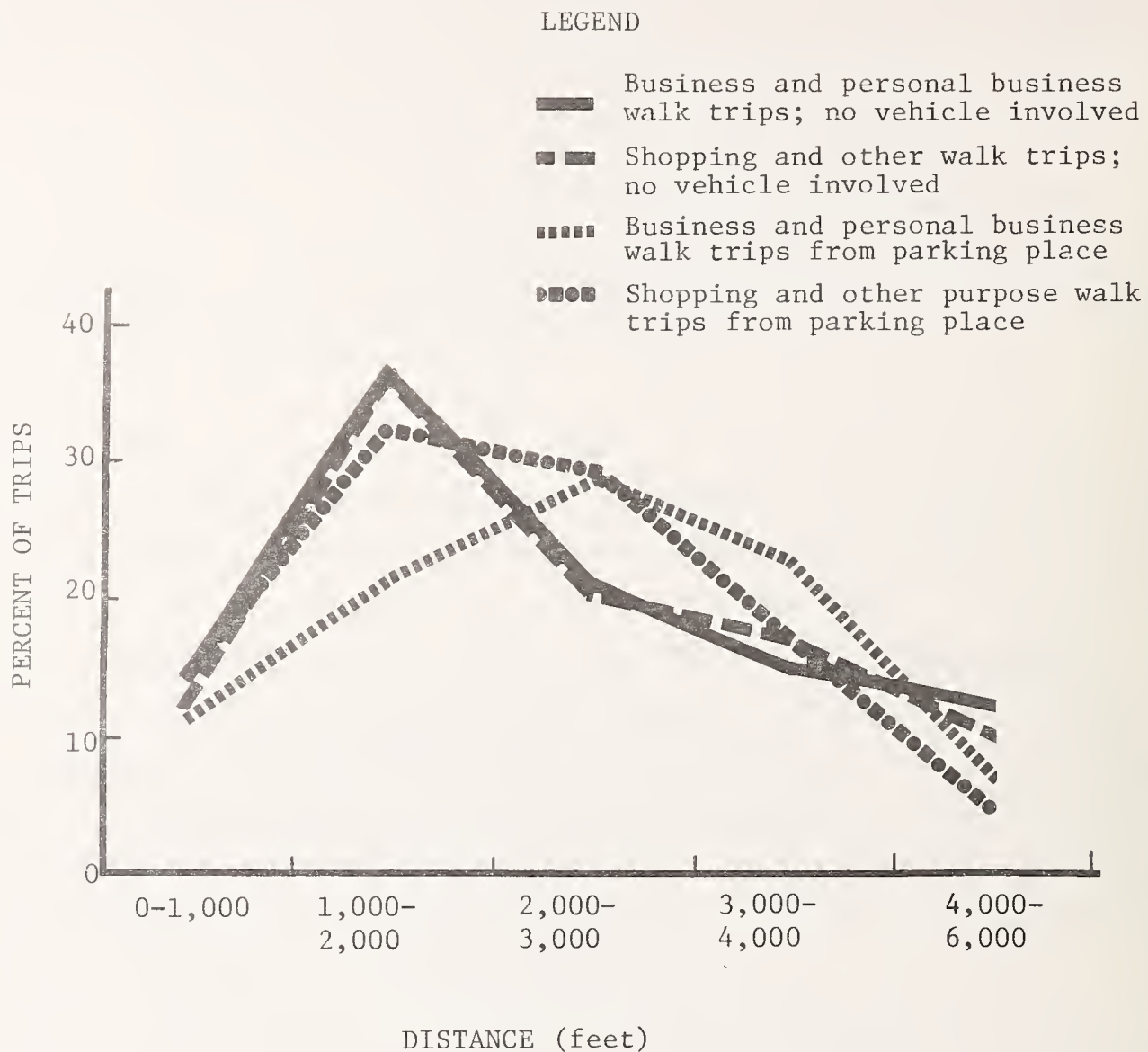
The distance of each walk trip was measured for all trips with origins in central Boston, encompassing an area of slightly over one mile in diameter. Trips coming in from further origins were also counted although their length could not be accurately measured. Figure 8-12 shows the distance distribution of walk trips from parking places and of trips that involved no vehicular mode (i.e., walking from workplaces and other activities). For both classes of walk trips, the majority were between 1,000 and 3,000 feet from origin to furthest destination visited. Trips that were walking from a parking location were more likely to be in the 2,000 to 3,000 foot range, while walk trips from other activities were more likely to be either in the 1,000 to 1,500 foot range (most likely office buildings) or to come from outside of the study area. There were no clear differences in walk distance between personal business trips and shopping trips.

### 8.6.3 Trip Length Conclusions

The general finding that most walk trips were in the 1,000 to 3,000 foot range is consistent with the fact that there are major office, commercial and residential activities located in that distance range from the Downtown Crossing area, as shown in Table 8-5. At the same time, there are also major residential and office activities, as well as parking facilities located further away. The Back Bay area (including Prudential Center), for example, represents a residential population of 14,000 and an office population of 31,000 located between 3,200 and 8,000 feet from Downtown Crossing. No more than 5 percent of the walk trips to Downtown Crossing come from that area for two reasons. First, there are major shopping opportunities available closer to that area, specifically Newbury Street, Boylston Street, and the Prudential Center Shopping Concourse. In addition, a variety of studies have indicated that walk trips tend to diminish and be replaced by vehicular travel modes for trips over half a mile.<sup>1</sup>

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<sup>1</sup>In a survey of two Manhattan office buildings, Pushkarev and Zupan (1975) found that 76 percent of the exclusively walking trips and of the walk trips from parking locations were less than 3,000 feet in length. This corresponds closely to the Pedestrian Interview Survey results in this study, which indicate that 71 percent of the exclusively walking trips and 70 percent of the walk trips from parking locations were less than 3,000 feet in length.



SOURCE: 1980 Pedestrian Interview Survey

FIGURE 8-12. DISTRIBUTION OF WALK DISTANCES FOR TRIPS ENDING IN THE DOWNTOWN CROSSING AREA



TABLE 8-5. WALKING DISTANCE TO DOWNTOWN CROSSING

	Distance to the Corner of Washington Winter/Summer
Government Center Offices	2,200 Feet
State Street Bank Building (financial district)	1,600
South Station (railroad station and offices)	1,900
Harbor Towers (waterfront apartments)	3,000
Chinatown	1,800
Tufts New England Medical Center	1,800
Faneuil Hall Marketplace	3,100
Back Bay at Arlington & Boylston Streets	3,200

It can be concluded that pedestrian trips to the downtown retail district come primarily from offices, parking lots and other activities located within a walking range of around 3,000 feet. The importance of walk trips to generate shopping activity is increased by the auto-restricted nature of the zone. Boston's Downtown Crossing area is fortunate in this respect, in that there is a substantial base of office employment close by.

## 8.7 CHARACTERISTICS OF DOWNTOWN PEDESTRIANS AND AREA EMPLOYEES

The restrictions on vehicular access, improvements in physical amenities and potential accompanying changes in retail merchandising may be expected to affect the type of person visiting the area. At the same time, a variety of exogeneous factors, such as the growing number of competing shopping areas and the changes in the composition of the downtown work force may also be responsible for shifts in the socioeconomic characteristics of Downtown Crossing pedestrians. There is no definitive way of separating the contributions of all of these various factors. Nevertheless, this section compares characteristics of pedestrians in 1978 and 1980, identifies significant trends, and suggests explanations for the observed changes. Since area employment accounts for a significant portion of the pedestrian volumes (as discussed in Section 8.2), the characteristics of downtown office employees are also examined. As noted earlier (Section 8.1), results from the Employee survey analysis are based on surveys at 29 office buildings representing only one-third of the downtown employment base. The results of the Pedestrian Interview Surveys, however, are truly representative of all pedestrians in the auto-restricted zone.

### 8.7.1 Home Location

The pedestrian interview surveys identified the community or neighborhood within Boston in which each person lived. Of most importance, though, is the question of whether the Downtown Crossing project has attracted more persons

in from suburban areas, where competing shopping centers are plentiful. Combining weekdays, evenings and Saturdays, the surveys show a consistent trend between 1978 and 1980, during which time the absolute number and relative percentage of pedestrians who live in the city of Boston increased (Figure 8-13). In 1978, 44.5 percent of all weekly visitors lived in Boston, compared with 50.6 percent in 1980. In absolute number, though, visits by suburban residents have remained fairly stable during these years. The results in Figure 8-13 indicate that the increases in weekday and evening pedestrian volumes between 1978 and 1980 are essentially attributable to Boston residents.

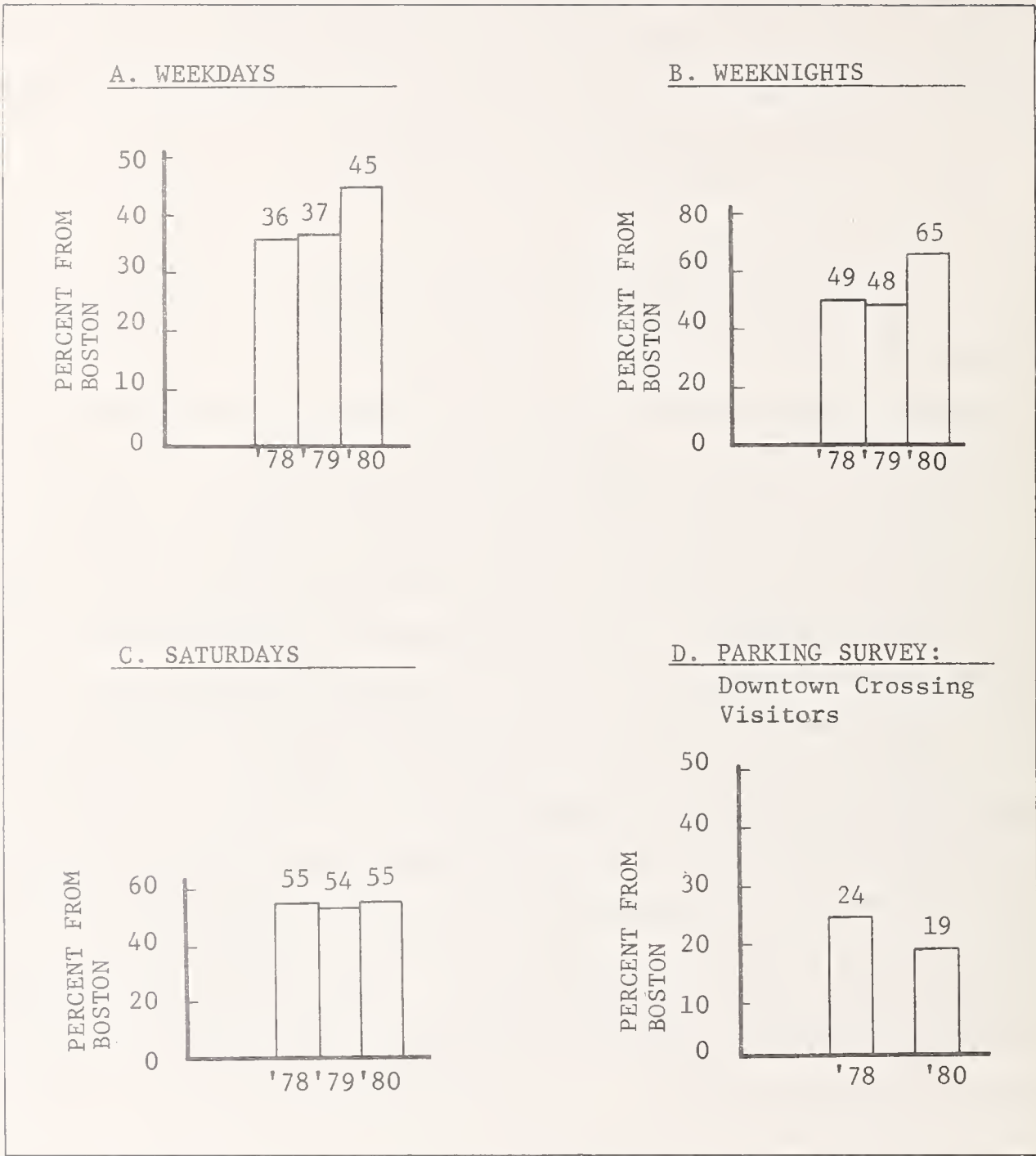
The parking surveys show very different trends in the home locations of those driving to visit Downtown Crossing. Not only have the total number of persons driving and parking declined, but so has the proportion of those persons who are Boston residents (see Figure 8-13). This is not really surprising, for while the Downtown Crossing improvements have made the area more attractive, the closing of streets and reduction of parking capacity near Downtown Crossing (discussed in Section 5.2) have made access by auto relatively more difficult. Since many Boston neighborhoods are better served by transit than are suburban communities, shifting to transit can be easier for some Boston residents than for suburbanites.

The changes in the home locations of Downtown Crossing pedestrians are attributable to shifts in shopping and business visitors and not to shifts in the characteristics of local employment. The 1978 and 1980 employee surveys showed no significant shift in home locations. In both years, approximately 25 percent lived in Boston, 35 percent in suburbs within the inner suburbs and 40 percent in the outer suburbs.

#### 8.7.2 Income

The income levels of visitors to the Downtown Crossing area have tended to be modest compared to those of nearby competing retail centers. The June 1978 Pedestrian Interview Survey showed the median income of Downtown Crossing area pedestrians on weekdays to be around \$16,000, compared to medians of \$19,500





SOURCE: A-C from Pedestrian Interview Surveys, 1978-1980;  
D from Employee Surveys, 1978 and 1980

FIGURE 8-13. HOME LOCATION OF PEDESTRIANS

for Back Bay shoppers (August 1977 survey; BRA 1978) and \$20,100 for Faneuil Hall Marketplace shoppers (November 1976 Survey; the Rouse Co., 1977).<sup>1</sup>

From the point of view of improving the retail environment, there was some hope that the auto-restricted zone project would help attract higher-income persons to the area. At the same time, the improvement of bus service and conditions for pedestrians would be expected to encourage visits from nearby residential areas. Table 8-6 compares the distributions of incomes of all visitors to the area in 1978 and 1980, small increases in the percentage of lower income visitors, after controlling for inflation. This finding is consistent with the fact that most of the new visitors attracted to the area came from the city of Boston rather than from suburban areas. Overall, the median incomes of 1980 pedestrians were \$17,400 for weekdays and \$15,800 for Saturdays.

The Employee Survey (also in Table 8-6) similarly showed no significant shift in incomes between 1978 and 1980. It is apparent, however, that area employees did tend to have significantly higher incomes than the average pedestrian. This is related to the finding that in both years, approximately 48 percent of the surveyed employees were executives or professionals, and 44 percent were clerical workers. For 1980, the median income of surveyed office employees was \$24,200. The higher income level of office employees is also the major reason why pedestrian incomes tend to be somewhat higher on weekdays than on Saturdays. Only the parking User Survey showed any discernable shift in incomes, and that survey showed proportional increases in both higher and lower income categories relative to the middle income groups.

In general, a variety of problems including coarseness of the income categories, the existence of non-responses, and adjustments for inflation all make it difficult to identify trends in the income distribution. For example, the 1978 survey income categories were re-defined for the 1980 survey to account for inflation. In fact, the upward shift in category definitions

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<sup>1</sup>To some extent, the difference can be related to the fact that the Back Bay and Faneuil Hall Marketplace surveys were oriented towards persons who appeared to be shoppers (i.e., carried shopping bags), rather than all pedestrians.

TABLE 8-6. HOUSEHOLD INCOME PROFILE OF  
DOWNTOWN CROSSING VISITORS  
AND AREA EMPLOYEES

Income Category		Pedestrians			Downtown Office Employees
Current Dollars	1980 Dollars*	Weekdays	Weeknights	Saturdays	
<u>A. 1978 Survey</u>					
\$ 0-4,999	\$ 0-5,877	12%	6%	15%	2%
\$ 5,000-9,999	\$ 5,877-11,754	15	21	16	12
\$10,000-14,999	\$11,755-17,631	22	33	22	18
\$15,000-24,999	\$17,632-29,386	28	19	28	27
\$25,000+	\$29,386+	23	22	20	41
		<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>
<u>B. 1979 Survey</u>					
\$ 0-4,999	\$ 0-5,444	16%	14%	13%	
\$ 5,000-9,999	\$ 5,444-10,886	12	19	22	
\$10,000-14,999	\$10,887-16,330	22	26	23	
\$15,000-24,999	\$16,331-27,217	23	27	24	
\$25,000+	\$27,217+	27	14	18	
		<u>100%</u>	<u>100%</u>	<u>100%</u>	
<u>C. 1980 Survey</u>					
\$ 0-5,999	\$ 0-5,999	15%	13%	12%	3%
\$ 6,000-11,999	\$ 6,000-11,999	14	15	19	14
\$12,000-17,999	\$12,000-17,999	24	28	30	19
\$18,000-29,999	\$18,000-29,000	26	20	20	27
\$30,000+	\$30,000+	22	23	18	37
		<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

\*category adjusted to 1980 dollars to account for average income inflation; according to the Bureau of Labor Statistics.

Source: Pedestrian Interview Surveys, 1978-1980; Employee Surveys, 1978 and 1980 (29 buildings surveyed in both years).



moved slightly greater than the overall rate of increase in Boston area salaries, so that the overall effect was to bias downward the proportion of persons in the higher income categories in 1980, relative to that in 1978.

### 8.7.3 Sex

Females traditionally have accounted for a majority of the weekday shoppers in most shopping areas. For instance, 57 percent of the shoppers in the Faneuil Hall Marketplace Survey and 60 percent of the shoppers in the Back Bay Shoppers Survey were female (BRA, 1978 and the Rouse Co., 1977). The corresponding percentage for the Downtown Crossing area has traditionally been lower due in part to the more major contribution of nearby office employees to the pedestrian volumes there.

The female percentage of pedestrians rose consistently between 1978, 1979, and 1980 for all shopping periods. Between 1978 and 1980, the female percentage of pedestrians on weekdays (10 AM to 4 PM) increased from 46 percent to 55 percent. This can be partially attributable to the growing female share of the local workforce. The Employee Surveys indicate an increase in the female percentage of office workers in 29 surveyed buildings from 55 percent in 1978 to 61 percent in 1980. The Parking User Survey also showed a similar increase in drivers during weekday shopping periods, from 44 percent to 52 percent. There were also increases in the female percentage of pedestrians during non-work periods from 51 to 55 percent for evening shopping periods and from 52 to 61 percent for Saturdays.

### 8.7.4 Age

There were similar shifts between 1978 and 1980 in the age distribution of pedestrians on weekdays, evenings and Saturdays, as shown in Table 8-7. There were proportional increases in the under-25 and over-64 age groups for all three shopping periods. There was also an increase in the proportion of persons in the 45-64 year age group on weekdays, but a proportional decrease in that age group on evenings and Saturdays. Altogether, these findings indicate that the increase in pedestrian volumes

TABLE 8-7. AGE PROFILE OF DOWNTOWN CROSSING VISITORS  
AND AREA EMPLOYEES

A. <u>Pedestrians</u>		<u>1978</u>	<u>1979</u>	<u>1980</u>
<u>Weekdays</u>	Under 16	1%	1%	2%
	16-24	28	26	30
	25-34	37	26	27
	35-44	15	16	13
	45-64	17	22	19
	65 and over	3	10	9
		<u>100%</u>	<u>100%</u>	<u>100%</u>
<u>Weeknight</u>	Under 16	2%	2%	1%
	16-24	29	21	35
	25-34	28	36	28
	34-44	16	14	12
	45-64	19	17	15
	65 and over	7	2	8
		<u>100%</u>	<u>100%</u>	<u>100%</u>
<u>Saturday</u>	Under 16	1%	2%	4%
	16-24	28	30	35
	25-34	31	29	29
	35-44	16	14	12
	45-64	17	17	12
	65 and over	7	8	8
		<u>100%</u>	<u>100%</u>	<u>100%</u>
 <u>B. Downtown Office Employees</u>				
	under 16	0%*		0%*
	16-24	18		20
	25-34	36		37
	35-44	17		16
	45-64	26		25
	65 and over	2		2
		<u>100%</u>		<u>100%</u>

Note: 0\* = less than 0.5 percent.

Source: (A) Pedestrian Interview Surveys, 1978-1980.

(B) Employee Surveys, 1978 and 1980 (29 buildings surveyed in both years).

since implementation of the auto-restricted zone has not been in the highest spending age groups.

The relative increase in pedestrians in the 16 to 24 age bracket may or may not reflect any change in students coming to the area, but is at least partly a reflection of the change in local office employment. Table 8-7 (B) shows the age distribution from the Employee Survey analysis, and indicates an increase in the proportion of office employees in the 16 to 24 age bracket. The proportional increases in young and female area employees may be related to the increase in clerical workers from 43.6 percent to 44.8 percent of the surveyed office workers.

Altogether, the median age of the Downtown Crossing area pedestrians on weekdays was 32 in 1978 and 31 in 1979. This is roughly comparable to the median age of 29 for shoppers in Back Bay and 33 for shoppers in Faneuil Hall Marketplace (BRA, 1978 and the Rouse Co., 1977).

## 8.8 SHOPPING AND RETAIL EXPENDITURE PATTERNS

One section of the pedestrian interview survey was designed specifically for the purpose of obtaining information about the respondents' shopping patterns while visiting the Downtown Crossing area. Respondents were asked to list each specific establishment visited and the amount of purchase (if any) made in each. Of primary interest was the measurement of how shopping patterns were affected by the 1979 street construction and subsequent completion of the auto-restricted zone.

### 8.8.1 Store Visits and Purchase Rates

The number of visits to stores in the Downtown Crossing area has increased largely as a result of the continual increase in pedestrian volumes (as was shown in Figure 8-3). Shopping behavior for the weekday (10 AM - 4 PM) period was remarkably constant between 1978, 1979 and 1980. In all three years, approximately 45 percent of the pedestrians made a purchase in Downtown Crossing, and another 20 percent stopped in a store but did not make any purchase. The average number of Downtown Crossing area business establishments visited per survey respondent has remained in the range between



1.1 and 1.2 in all three years. Overall, reported visits to stores for the weekday period were up 6 percent in 1980, compared to the level in 1978. The number of store visits resulting in purchases increased for the weekday period from an average of 0.57 per pedestrian respondent in 1978 and 1979 and 0.65 in 1980. As a result of both these increases in per-capita purchase rates and the increases in pedestrian volumes, it is found that the number of total weekday store purchases was up 26 percent in 1980, compared to the level in 1978. (There were 42,000 store purchases in 1978, 44,000 in 1979 and 53,000 in 1980.)

There were no increases in rates of store visits and purchases for the Saturday and evening shopping periods between 1978 and 1980. The number of evening and Saturday store purchases grew little over time (remaining around 55,000 on Saturdays and 10,000 on weekday evenings).

Store entrance counts were also conducted over the 1978-1980 period at 24 stores in the Downtown Crossing area. For the weekday period, 16 of the 24 stores surveyed experienced increases in visitors, supporting the contention that overall store visits increased. (The changes in store entrance counts were strongly correlated with the differential changes in pedestrian volumes on different blocks, as shown on Figure 8-5.) Of the 11 surveyed stores open on weekday evenings in both years, however, 9 experienced decreases in visitors during that period. This again is consistent with the evidence that the evening period was not particularly strong.

The employee survey of selected office buildings showed a drop in the proportion of workers who visited Downtown Crossing stores during work hours, from 44 to 39 percent (for a typical day). The proportion making a purchase in Downtown Crossing stores similarly dropped from 35 to 31 percent, while the proportion of making purchase elsewhere downtown rose from 26 to 28 percent. This is further evidence of the increasing competition from areas such as Faneuil Hall Marketplace, even though the total number of visits to Downtown Crossing by downtown area workers has continued to rise (as discussed in Section 8.2.4).

The observed increases in weekday store visits and purchases supports the finding that there was no adverse impact on retail activity during mall construction, and that downtown retail activity has in fact continued to grow

since implementation of the auto restricted zone in 1978. The lack of adverse impact from the street reconstruction process can be attributed to both the existence of a "captive market" of downtown employees and the completion of construction in a relatively short period of time. Overall impacts on downtown business activity are discussed further in Chapter 9.

### 8.8.2 Expenditures

A profile of the size of individual store purchases is shown in Table 8-8. (The amount of individual purchases was summed for each establishment visited). In all three years, nearly half of all store visits in which purchases were made were for less than \$5. There was little change in the value distribution of purchases between 1978 and 1980, but there was evidence of relatively fewer purchases in the higher-value (\$25-\$100) range during the 1979 construction period. The predominance of lower-value purchases on weekdays reflects the important role of lunchtime activities by area office employees. The value of Saturday purchases did tend to be greater than the weekday and evening levels, with relatively more purchases in the \$5-\$25 and \$25-\$100 ranges.

The total amount spent per pedestrian on weekdays declined slightly over the 1978-1980 period, reflecting the disproportionate growth in lunchtime pedestrian activity. Due to the substantial increase in store purchases (discussed in Section 8.8.1), however, the total level of retail expenditures indicated by the survey did increase at a rate nearly the same as the Boston-area price inflation for apparel and upkeep goods over the two-year period (12 percent).<sup>1</sup> In terms of magnitude of purchases, the average amount spent in Downtown Crossing (among persons making a purchase) was approximately \$20. This average was similar for both downtown area employees and for other shoppers. Overall, the average Downtown Crossing pedestrian (including those not making a purchase) spent \$12-13 in Downtown Crossing plus another \$3 in

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<sup>1</sup>The national consumer price index for all commodities (including housing, medical care, etc.) increased 25 percent over that same period.

TABLE 8-8. VALUE OF EXPENDITURES IN DOWNTOWN CROSSING

		Percent						
		No Purchase	\$0-5	\$5-25	\$25-100	\$100+	Total	
<u>A. Size of Individual Purchases Reported</u>								
Weekdays:	1978	--	47%	33%	17%	3%	100%	
	1979	--	50	34	13	3	100	
	1980	--	47	34	18	2	100	
Weeknights:	1980	--	50	37	13	0*	100	
Saturdays:	1980	--	42	38	19	1	100	
<u>B. Total Amount Spent in Downtown Crossing<sup>A</sup></u> (by pedestrians who visited stores in Downtown Crossing)								
Weekdays:	1978	34%	24%	25%	14%	3%	100%	
	1979	31	26	26	13	3	100	
	1980	27	25	24	20	3	100	
Weeknights:	1978	28	20	28	20	5	100	
	1979	27	15	25	28	5	100	
	1980	27	25	26	18	4	100	
Saturdays:	1978	22	19	28	26	5	100	
	1979	21	17	32	24	6	100	
	1980	24	19	26	29	3	100	
<u>C. Total Amount Spent During Office Hours<sup>B</sup></u> (by area employees who visited stores in Downtown Crossing)								
		1978	20%	34%	32%	12%	2%	100%
		1980	20	32	32	14	2	100

0\* = less than 0.5%

<sup>A</sup>Source: Pedestrian Interview Surveys, 1978-1980; not adjusted for inflation

<sup>B</sup>Source: Employee Mailback Survey, 1978 and 1979; not adjusted for inflation



stores elsewhere in the downtown area. Evening expenditure rates were similar to the daytime average. Saturday expenditures in Downtown Crossing tended to be higher--about \$25 per purchaser or \$18-20 per pedestrian. The evening and Saturday expenditure averages are particularly subject to fluctuation because they are based on small size samples and can thus be significantly affected by the existence of a few very large value purchases.

Among area office workers, the employee survey showed no discernable change in expenditure levels between 1978 and 1980. Altogether, area office employees (including those making no purchase) reported spending an average of \$9 per day during office hours. Those that visited Downtown Crossing spent about \$15 per person, although it is not known that all of this was spent at Downtown Crossing stores.

## 8.9 SUMMARY OF SURVEY FINDINGS

Major findings from the pedestrian counts, Pedestrian Interview Surveys, Employee Surveys and Parking User Surveys are:

1. Pedestrian Volumes - The number of pedestrians increased following the banning of automobile traffic and during the street reconstruction, and continued to increase after the bricking of the street and placement of pedestrian amenities. Between 1978 and 1980, the volume of weekday visitors to the area increased 11 percent.
2. Volumes by Block - Pedestrian volumes increased on all streets which were subject to some form of auto-restriction. In fact, the largest increase in pedestrians occurred on a block (Washington Street from Bromfield to Milk Street) which had sidewalk widening and restricted vehicular access, rather than on the blocks which were fully bricked and totally pedestrianized. This outcome indicates that the location of the block relative to trip origins can be more important than the form of auto restriction.
3. Role of Downtown Employees - The increase in pedestrian volumes was greatest among downtown employees and during lunch time. The 12-2 PM period accounts for nearly half of all visitors between 10 AM and 4 PM on weekdays, but accounted for nearly three-quarters of the increase in visitors between 1978 and 1980. Similarly, downtown employees account for slightly less than half of all

weekday visitors, but accounted for nearly two-thirds of the 1978-1980 increase in visitors.

4. Mode Split - Auto travel always accounted for a small proportion of trips to the Downtown Crossing area. However, the completion of the auto restricted zone was accompanied by dramatic decreases in auto trips, with corresponding increased in transit (as a means of getting downtown) and walking (as a means of getting to the Downtown Crossing area within downtown). Parking demand in area parking garages decreased during the 1978-1980 period.
5. Trip Purpose - Following completion of construction, there were relative increases in weekday trips for eating and personal business. On Saturdays, there were relative increases in sightseeing and recreation trips.
6. Frequency - Half of the weekday and evening visitors, and one-third of the Saturday visitors, come to the Downtown Crossing area at least three times a week. There was no consistent evidence of any shift in trip frequency between pre- and post-construction periods.
7. Duration - The median duration of visits to Downtown Crossing is slightly under one hour. There was no significant change in duration of visits since completion of the auto restricted zone.
8. Walk Distance - Most walk trips to Downtown Crossing area are between 1000 and 3000 feet from origin to furthest destination. This holds for both exclusively walking trips and walk trips from parking locations. (Walk lengths from public transit were not investigated).
9. Home Location - The increases in visitors to Downtown Crossing is primarily attributable to increases in persons who live in the City of Boston, rather than suburbanities.
10. Income - There was no discernable shift in income level of downtown visitors, after controlling for inflation.
11. Sex and Age - There was a relative increase in the proportion of visitors who are female. There was a relative increase in visitors age under 25 from all shopping periods, and also an increase in visitors age 45 or more on weekdays. It is not clear, however, that any of these trends are attributable to the auto restricted zone. The increases in younger persons and females is at least partially related to corresponding increases in those groups in the area employment base.

12. Store Visits - Rates of store visits per pedestrian remained stable over time, and the total number of store visits increased in direct proportion to the continual increase in pedestrian volumes.
13. Purchase Rates - The rate of purchases per store visit rose consistently during the construction and post-construction periods. As a result of increasing per-capita purchase rates and increasing pedestrian volumes, the number of weekday store purchases was 26 percent higher in 1980 than in 1978.
14. Retail Expenditures - Nearly half of all store purchases were for less than \$5, reflecting the existence of significant lunch-related activity. There was a slight decline in the value of purchases since completion of the auto restricted zone, reflecting the disproportionate growth in lunchtime pedestrian activity. Overall, the increase in retail expenditures over 1978-1980 was nearly the same as the Boston area price inflation for apparel and upkeep goods over the two year period (12 percent).





## 9. BUSINESS IMPACTS

### 9.1 SURVEY OF BUSINESS INVOLVEMENT AND ATTITUDES

#### 9.1.1 Business Survey Overview

A question was distributed to all area businesses both before and after implementation of the Downtown Crossing project in order to assess the attitudes of area businesses, their involvement in the design and operation of Downtown Crossing, and impacts of the project on business practices and sales. Approximately 1,200 questionnaires were distributed in each of 1978 and in 1980, of which 274 were returned in the earlier period and 337 were returned in the later period. Table 9-1 shows a breakdown of the survey respondents by merchandise type. While these responses do not represent a strictly random sample (e.g., jewelry business responses were proportionally low), all major types of businesses are represented. Altogether, two-thirds of the respondents in both years indicated that their establishment was not part of a store chain, and about 80 percent indicated that their business has been at the same location for 4 or more years. In fact, the average length of stay was 15 years.

#### 9.1.2 Involvement in Planning and Operation of the Auto-Restricted Zone

The 1980 business surveys indicate the extent to which local merchants participated in the planning and promotion of Downtown Crossing. Table 9-2 shows the percent of businesses that acknowledged being contacted to participate in the design of the auto-restricted zone. Overall, just one-fifth of the responding businesses firms acknowledged being contacted to participate in the development of the project. Shoe stores, banks, general merchandise stores, and restaurants & bars were the businesses that most frequently reported they were contacted. Larger stores and those that were part of a chain were more likely to acknowledge being contacted than were others.

TABLE 9-1. RESPONSES TO THE BUSINESS SURVEY

	<u>1978</u>	<u>1980</u>
Restaurants, Bars	39	30
Clothing	} 38	23
Shoes		11
General Merchandise, Department Stores	7	9
Banks, Insurance	29	20
Jewelry	20	38
Books, Records, Cards	19	18
Hair and Beauty	13	17
Wholesale, Manufacturing	21	45
Sporting Goods, Cameras	} 89	9
Services		41
Institutional, Government		16
Miscellaneous Sales	<u>        </u>	<u>60</u>
TOTAL	274	337



TABLE 9-2. PARTICIPATION OF AREA BUSINESSES IN PLANNING AND PROMOTION OF DOWNTOWN CROSSING

	Percent that Acknowledged being Contacted	Percent of Contacted Businesses that Actually Participated	Percent that Contributed To Promotional Activities
<u>Type of Establishment</u>			
Clothing	22	27	10
General Merchandise	33	100	67
Restaurant, Bars	28	89	26
Bank	33	73	29
Shoes	40	18	20
Jewelry	16	25	8
Books, Records, Cards	19	79	21
Hair and Beauty	11	55	0
Services	16	38	5
Sporting Goods or Cameras	10	90	0
Wholesale and Manufacturing	10	0	0
Miscellaneous Sales	20	70	12
<u>Size of Establishment</u>			
Small (1 to 5 employees)	9	44	7
Medium (6 to 25 employees)	23	65	18
Large (over 25 employees)	33	100	43
<u>Ownership of Establishment</u>			
Independent	15	47	7
Chain/Subsidy	30	60	25
<u>Location of Establishment</u>			
On an auto-free street	22	43	17
Near an auto-free street	18	61	10
<u>TOTAL</u>	19	53	12

Source: 1980 Business Establishment Survey

A further measure of involvement is the percent of businesses that actually participated in the planning after they were contacted. Of the responding businesses that acknowledged being contacted, 55 percent (35 firms) reported that they subsequently participated in the planning of the auto-restricted zone. Table 9-2 indicates that, of those contacted, 90 percent or more of the general merchandise stores, sporting goods/camera shops, and restaurants/bars participated. The lowest participation rates (25 percent or less) were among wholesale and manufacturing firms, shoe stores, jewelry shops, and clothing stores. Larger firms were more likely to participate than smaller firms, and chain stores were more likely to participate than independently owned stores. In general, the categories of stores that were most likely to acknowledge being contacted were also the types of stores that had the highest rates of participation.

In addition to assisting in the plan of the auto-restricted zone, many area merchants made financial contributions to the development of joint promotional activities of Downtown Crossing. Table 9-2 also shows the percent of businesses contributing to the initial promotions of the area. Overall, 12 percent of the responding businesses (40 firms) reported that they contributed funds to promotional activities during the period from September 1978 to June 1980. The highest contribution rate was among general merchandise stores, with two-thirds of the respondents contributing. These stores are also the largest stores in the area and form the core of downtown retail. The contribution rates of all the other types of establishments were under 30 percent. None of the hair and beauty shops, sporting goods and camera stores, or wholesale and manufacturing firms responding to the survey made a contribution. Just as they were more likely to participate in the planning process, large stores and chains were much more likely to contribute funds than smaller ones and independents (although the chain stores contributing funds include many small local chains). A higher percentage of businesses fronting on the auto-restricted streets contributed than did those located on other streets.

### 9.1.3 Attitudes of Area Businesses

Area businesses were surveyed in both 1978 and 1980 regarding their overall attitudes toward the Downtown Crossing project. The results of these surveys are shown in Table 9-3. As the project began in 1978, the area businesses generally had a positive view of the ARZ project, with 64 percent of the businesses responding favorably, 30 percent neutral or with no opinion, and just 6 percent with an unfavorable view. Large businesses and chain stores were more favorable than the average, with only 2 percent of these indicating an unfavorable attitude. Only two types of retail businesses--general merchandise stores and hair & beauty shops--had more than 10 percent of their respondents indicating unfavorable attitudes. General merchandise stores were the most unfavorable; 29 percent indicated a negative overall attitude.

Two years after the project began, area businesses were interviewed again, and attitudes were found to be even more favorable. Overall, 72 percent of the businesses responded favorably toward the project, 19 percent were neutral or had no opinion and 9 percent had an unfavorable view. As before, large stores tended to indicate more favorable and less neutral responses than smaller stores, while the unfavorable responses were low in each size category. Chain stores were again more in favor of the project than independently owned stores. In no category of stores was there any significant drop in favorability of their view toward the project.

## 9.2 IMPACTS ON BUSINESS COST, RETAIL SALES AND BUSINESS MIX

Given that the primary objective of the Downtown Crossing project was to improve retail activity downtown, impacts on business operations and profitability are a primary concern in evaluating the overall success of the project. Though businesses may report favorable attitudes, rising costs may offset any sales increases due to the project. Analysis of changes in costs, sales and business mix between 1977 and 1979 can thus better identify the characteristics of stores benefitting most from the project. Changes in costs



TABLE 9-3. ATTITUDES OF AREA BUSINESS TOWARDS THE AUTO-RESTRICTED ZONE PROJECT

	1978			1980		
	Percent Favorable	Percent Neutral	Percent Unfavorable	Percent Favorable	Percent Neutral	Percent Unfavorable
<u>Type of Establishment</u>						
Clothing	62	29	9	70	20	10
General Merchandise	43	28	29	67	22	11
Restaurants, Bars	67	33	0	72	24	4
Bank	70	30	0	95	0	5
Jewelry	70	30	0	66	24	10
Books, Records, Cards	44	56	0	83	13	4
Hair and Beauty	62	23	15	63	32	5
Services	62	30	8	78	12	10
Wholesale & Manufacturing	50	45	5	61	32	7
Miscellaneous Sales	20	9	73	16	11	76
<u>Size of Establishment</u>						
Small (1 - 5 employees)	61	33	6	63	22	14
Medium (6 - 25 employees)	64	30	6	78	15	7
Large (over 25 employees)	70	28	2	91	6	3
<u>Ownership of Establishment</u>						
Independent	59	33	8	67	22	11
Chain/Subsidiary	71	28	2	82	14	4
<u>Location of Establishment</u>						
On an auto-free street	-	-	-	69	19	12
Near an auto-free street	-	-	-	73	19	8
<u>TOTAL</u>	64	30	6	72	19	9

Note: "Neutral" includes "no opinion" responses

Source: 1978 and 1980 Business Establishment Surveys

and sales during this period may be attributable to exogeneous economic market factors as well as to the Downtown Crossing project.

#### 9.2.1 Business Costs and Operations

Table 9-4 shows the reported percentage change in total store costs. Changes in total costs reflect increases or decreases in all aspects of business costs including rents, inventory, labor, and advertising. Overall, area businesses reported that their total costs rose 27 percent between 1977 and 1979, with independently owned stores and those located on the improved streets showing the greatest increases. Cost increases were comparable for all sizes of establishments. The greatest increases in costs (30 percent or more) were reported by hair and beauty shops, wholesale and manufacturing firms, and other miscellaneous sales establishments. These are the same categories of firms which reported the least favorable attitudes toward the project. General merchandise stores showed the smallest cost increase--only 9 percent.

Additional questions asked about changes in rent costs and advertising outlays. Less than half of the businesses responded to these questions; of those that did, 87 percent said they rented their space, the average increase in rent over the 1977-1979 period was 40 percent and the average advertising outlay had remained stable at \$21 spent per \$1,000 of sales. Further questions asked about changes in merchandise mix, floor space usage, and marketing, but small returns prevent any conclusive findings.

#### 9.2.2 Sales Volume

Table 9-5 shows the average percent change in sales by type of store, and the numbers of businesses with increasing and decreasing sales. The total volume of sales for all stores responding to the survey questions increased by 27 percent from 1977 to 1979. This rate of increase excludes the major department stores, which helps explain why it is higher than the 12 percent increase in total shopping expenditures computed from the pedestrian surveys (see Chapter 8). Since the Boston-area price inflation for apparel and upkeep

TABLE 9-4. CHANGES IN COSTS OF AREA BUSINESSES BETWEEN 1977 and 1979

	Average Percent Increase in Costs per Store
<u>Type of Establishment</u>	
Clothing	23
Bank	9
Shoes	24
Jewelry	12
Books, Records or Cards	28
Hair and Beauty	17
Services	39
Sporting Goods or Cameras	18
Wholesale and Manufacturing	38
Miscellaneous	30
<u>Size of Establishment</u>	
Small (1 to 5 employees)	29
Medium (6 to 25 employees)	28
Large (over 25 employees)	29
<u>Ownership of Establishment</u>	
Independent	31
Chain	22
<u>Location of Establishment</u>	
On an auto-free street	31
Near an auto-free street	26
<u>TOTAL</u>	27

Source: 1980 Business Establishment Survey



TABLE 9-5. CHANGES IN SALES OF AREA BUSINESSES BETWEEN 1977 and 1979

	Percent Change in Total Sales Volume*	Number of Businesses Reporting Decreasing Sales	Number of Businesses Reporting No Change Sales	Number of Businesses Reporting Increasing Sales
<u>Type of Establishment</u>				
Clothing	7	1	0	12
General Merchandise	13	1	0	2
Restaurant or Bar	14	1	1	11
Shoes	20	0	0	7
Jewelry	39	0	0	18
Books, Records or Cards	48	1	0	11
Hair and Beauty	19	3	1	3
Services	46	0	1	6
Sporting Goods or Cameras	7	3	3	13
Wholesale and Manufacturing	19	1	2	10
Miscellaneous	13	5	0	18
<u>Size of Establishment</u>				
Small (1 to 5 employees)	25	12	7	53
Medium (6 to 25 employees)	29	6	1	48
Large (over 25 employees)	13	1	1	9
<u>Ownership of Establishment</u>				
Independent	28	10	8	84
Chain/Subsidiary	26	9	1	31
<u>Location of Establishment</u>				
On an auto-free street	33	4	3	37
Near an auto-free street	24	16	6	78
<u>TOTAL</u>	27	20	9	115

\* Not adjusted for price inflation, which averaged 8 percent for apparel, 13 percent for personal care products and 20 percent for restaurants.

Source: 1978 and 1980 Business Establishment Surveys

goods over the two year period was approximately 12 percent, it is nevertheless clear that the change in retail sales represents a sharp turnaround from the area's historical trend of declining sales (in real terms). All categories of stores reported increases in sales in current dollars. The types of stores showing a greater than average increase in total sales were books/records/cards; services; and jewelry stores. Clothing and sporting goods/cameras reported the smallest increase in sales. In general, sales volumes increased the most for medium-sized stores and least for large stores. Stores located on the improved streets had a substantial increase of 33 percent; whereas nearby stores increased 24 percent.

To some extent, changes in sales volume for merchandise such as jewelry reflects changes in market prices rather than true shifts in the amount of business. The proportion of businesses reporting decreasing sales was highest among store categories of hair and beauty; wholesale and manufacturing, general merchandise and sporting goods/cameras. Altogether, 80 percent of the responding businesses reported an increase in sales between 1977 and 1979, 6 percent reported no change, and 14 percent reported a decrease.

### 9.2.3 Business Mix

Changes in the types of businesses operated in the area are another indication of project impacts. Table 9-6 shows the number of stores entering and leaving the area by type. Overall, the results show an increase in the number of restaurants, and chain stores. The increase in eating and drinking places largely results from the conglomeration of fast food shops within "The Corner" shopping complex, but is nonetheless consistent with increases in the proportion of such establishments associated with the Chestnut Street Mall in Philadelphia (Edminster and Koffman, 1978, p. 193) and the Mid-America Mall in Memphis (Charles River Associates, 1980, p. 28). In general, "quick stop" types of businesses particularly benefitted from the increase in foot traffic; for example, a new bakery on Washington Street adopted a shopping center-style open front to increase accessibility to the sidewalk traffic.

TABLE 9-6. ENTRANCES, EXITS, AND PLANNED MOVES, 1978-1980

	Total Number of Firms	
	Exited Area 1978-1980	Entered Area 1978-1980
<u>Type of Establishment</u>		
Clothing	11	11
General Merchandise	0	2
Restaurants	15	18
Banks	0	1
Shoes	3	0
Jewelry/Furs	2	3
Books/Records/Cards	2	2
Hair and Beauty	3	2
Services	3	6
Sporting Goods/Cameras	1	1
Wholesale/Manufacturing	0	0
Miscellaneous	8	11
<u>Ownership of Establishment</u>		
Independent	36	39
Chain/Subsidiary	8	17
Not Known	4	1
TOTAL	48	57

Source: Boston Redevelopment Authority Records



A survey of 43 businesses entering the area since 1978 found that the Downtown Crossing project influenced the moving decision of 35 percent of the entering businesses. A survey of 6 businesses that moved out of the area found that the auto restricted zone was not a factor in any of their moves.

### 9.3 PERCEIVED IMPACTS ON BUSINESS AND DOWNTOWN CONDITIONS

#### 9.3.1 Overall Effect on Business

Since reported costs and sales figures are subject to fluctuations independent of the downtown improvements, managers of area businesses were asked to evaluate the impact of the Downtown Crossing project on their establishment. The results are shown in Table 9-7. Most merchants (46 percent) concluded that the project had no effect on their establishment. Another 39 percent thought the project had improved business, and just 15 percent felt that it had hurt their business. Comparing these results to the overall attitudes of businesses toward the project (discussed in Section 9.1.3), it is notable that while most of the businesses (72 percent) had a favorable attitude toward the project's impacts on downtown, only 39 percent thought that it actually helped their business.

The effect of Downtown Crossing on businesses varied by business size, ownership, and type. According to the perceptions of the merchants, larger businesses were hurt less and helped more by the project than were smaller ones. Chain stores were also hurt less and helped more than independently owned stores. These are the reverse of the sales trends reported in Table 6. The finding that smaller stores perceived less benefit from the project than did larger firms is very consistent with survey findings in Philadelphia's Chestnut Street Mall. There, 29 percent of the small (under 24 employees) stores reported increased business and 38 percent reported decreased business, while among larger stores, 42 percent reported increased business and only 20 percent reported decreased business (Edminster and Koffman, 1978, p. 192).

TABLE 9-7. PERCEIVED EFFECT OF PROJECT ON INDIVIDUAL BUSINESSES

	Percent Helped	Percent Unaffected	Percent Hurt
<u>Type of Establishment</u>			
Clothing	49	32	19
General Merchandise	60	10	30
Restaurant or Bar	58	24	18
Bank	50	45	5
Shoes	72	12	17
Jewelry	29	57	14
Books, Records or Cards	65	31	4
Hair and Beauty	32	52	16
Services	28	60	12
Sporting Goods or Cameras	55	36	9
Wholesale and Manufacturing	10	72	18
Miscellaneous	31	51	18
<u>Size of Establishment</u>			
Small (1 to 5 employees)	31	48	21
Medium (6 to 25 employees)	53	34	13
Large (over 25 employees)	50	41	9
<u>Ownership of Establishment</u>			
Independent	29	55	16
Chain	58	29	13
<u>Location of Establishment</u>			
On an auto-free street	41	45	14
Near an auto-free street	38	46	16
<u>TOTAL</u>	39	46	15

### 9.3.2 Effect of Specific Project Components on Business

Both before and after implementation of the Downtown Crossing project, area merchants were requested to make a further assessment of the (anticipated or perceived) effects of specific components of the demonstration project on their businesses. Table 9-8 distinguishes between the perceived effects of the transit improvements, the delivery regulations, and the automobile restrictions on business. Overall many merchants that expected the transit improvements and the physical improvements to help business later felt that these program elements had no real impact on business. On the other hand, more merchants perceived the automobile restrictions to have helped their business than originally expected them to.

The 1980 survey results show that the automobile restrictions had the most positive perceived effect on business, with 42 percent of the stores indicating that they were helpful, while 17 percent felt they were detrimental and 41 percent were neutral on the issue. The delivery regulations were the least popular. Only 21 percent of the stores indicated that the new delivery regulations associated with the project actually helped business, while 16 percent felt they hurt businesses and 63 percent were unaffected. The transit improvements had the least negative impacts among the three. Only 9 percent of the stores indicated that transit improvements adversely affected business.

### 9.3.3 Effect on the Downtown Image

The Downtown Crossing project affected not just businesses, but also general conditions in the downtown area. To determine the extent of these effects, area merchants were asked to estimate the effects the project had on the levels of area maintenance, traffic and parking enforcement, safety, and promotions. The results, shown in Table 9-9 indicate that the project was perceived by the majority of businesses to have improved downtown conditions along all four dimensions. The perception of negative impacts was greatest in the area of traffic and parking enforcement, and least in the area of promotions and special events. Examination of the responses by size and



TABLE 9-8. PERCEIVED EFFECT OF PROJECT ELEMENTS ON INDIVIDUAL BUSINESSES

	1978 Anticipated Effect			1980 Perceived Effect		
	Percent Helped	Percent Neutral	Percent Hurt	Percent Helped	Percent Neutral	Percent Hurt
Automobile Restriction	30	45	25	42	41	17
Transit Improvements	61	37	2	37	54	9
Delivery Restrictions	23	61	16	21	63	17
Physical/Pedestrian Improvements	64	34	2	53	41	6
Overall Project Impact	55	38	7	39	46	15

Note: Neutral includes "no opinion" responses

TABLE 9-9. PERCEIVED EFFECT OF PROJECT ON DOWNTOWN CONDITIONS

	Maintenance			Traffic and Parking Enforcement		
	Percent Positive	Percent Neutral	Percent Negative	Percent Positive	Percent Neutral	Percent Negative
	<u>Size of Establishment</u>					
Small (1- 5 employees)	67	17	16	47	23	30
Medium (6-25 employees)	66	27	7	54	21	25
Large (over 25 employees)	77	16	7	76	0	24
<u>Ownership of Establishment</u>						
Independent	61	24	15	48	25	27
Chain/Subsidiary	74	20	6	64	19	17
<u>Location of Establishment</u>						
On an auto-free street	67	21	12	58	26	6
Near an auto-free street	65	24	12	53	21	26
<u>TOTAL</u>	65	23	12	54	23	23

	Safety and Security			Promotions and Special Events		
	Percent Positive	Percent Neutral	Percent Negative	Percent Positive	Percent Neutral	Percent Negative
	<u>Size of Establishment</u>					
Small (1- 5 employees)	57	24	19	57	39	4
Medium (6-25 employees)	56	35	9	66	33	1
Large (over 25 employees)	71	13	16	74	26	0
<u>Ownership of Establishment</u>						
Independent	45	35	20	53	43	4
Chain/Subsidiary	72	21	7	73	25	2
<u>Location of Establishment</u>						
On an auto-free street	52	30	18	61	36	3
Near an auto-free street	56	30	14	59	37	4
<u>TOTAL</u>	55	30	16	60	36	4

\*"Neutral" includes "no opinion" responses

Source: 1978 and 1980 Business Establishment Surveys

ownership shows that, as with perceived business impacts and attitudes in general, larger stores and chain stores were more positive about the project than smaller stores and independents. Several specific types of stores showed very strong attitudes toward particular measures. General merchandise stores, restaurants and bars, and wholesale and manufacturing firms were the most negative about impacts on traffic and parking enforcement in the area. Jewelry stores were the most negative about impacts on safety and security.

#### 9.4 LAND VALUE AND REDEVELOPMENT IMPACTS

##### 9.4.1 Downtown Development Activities

The physical improvements in the Washington Street area associated with the Downtown Crossing project represents just one of a number of activities contributing to the growth of the economy of the retail district during the late 1970's and early 1980's. Other public and private investments taking place along Washington Street during 1977-1980 have included: construction of a sidewalk canopy unifying the storefronts along Washington Street; completion of a new \$35 million Jordan Marsh building; conversion of the former Gilchrist department store building into a 30 store shopping complex ("The Corner"); construction of "The Devonshire" apartment building; and construction of the \$100 million Lafayette Place hotel/retail development (see Chapter 2 for a further description of these projects). While the Downtown Crossing project did succeed in attracting more pedestrians and greater retail sales to the downtown retail district, it was not directly responsible for any of these private investments now occurring, as the decisions to proceed with those projects preceded the Downtown Crossing project.

##### 9.4.2 Land Values and Store Space Improvements

Typical rents for retail space in Downtown Crossing and office space in the surrounding area are shown in Table 9-10. Retail floorspace rents vary widely depending on location and size of the space (costs per square foot are highest for small spaces), and sometimes are also tied to gross sales volume,



TABLE 9-10. FLOORSPACE RENTS IN DOWNTOWN BOSTON

<u>Monthly Rent (\$/Square Foot)*</u>		
	<u>Existing Bldgs.</u>	<u>Bldgs under Construction</u>
<u>Downtown Area Office (Class A--Modern), 1977-1981</u>		
Spring 1977A	\$10.14	
November 1978A	12.49	
January 1981B	15.00	\$22.00
May 1981B	15.00	25.00
<u>Older Office Space, 1980C</u>		
Washington, Winter, Summer Streets	\$ 3-11	
<u>Retail (Ground Floor), 1978</u>		
Washington Street (Milk to Temple)	\$30-40	(highest near Winter)
Winter Street	\$25-40	(highest near Washington)
Summer Street	\$18-40	(highest toward Washington)
School Street	\$25-30	
Tremont Street	\$20	
Milk Street	\$10-12	
Jeweler's Building (above ground floor)	\$ 8	

\*includes heat

A Source: Boston Redevelopment Authority and survey of office building managers.

B Source: National Office Market Report, The Office Network, Houston, Texas.

C Source: Discussions with developers and building managers.

all of which makes it difficult to evaluate trends in rent levels. Overall, the survey of business establishments indicates that rents for retail space averaged \$13 per square foot in 1980 and had risen 40 percent over the 1978-1980 period, although some of this increase is attributable to inflation and tax increases. More consistent rent data is available for area office space, and indicated a 20 percent increase in office space rents over the 1978-1980 period.

While there has been some increase in rent levels, there has been no major store or building improvement in Downtown Crossing since implementation of the project in the Fall of 1978. New and renovated store spaces opening earlier in 1978 include The Corner (65,000 square feet), the new Jordan Marsh building (300,000 square feet), a major bookstore (20,000 square feet) and a major retail and drug store (40,000 square feet). There was, however, no new store space opened in the area in 1979 or 1980. In the future, however, the Lafayette Place project will add 200,000 square feet of new retail space along Washington Street and the Devonshire Tower will add another 40,000 of retail space.

Table 9-11 shows the number of building permits issued for renovation, remodelling and new construction activities (and the estimated cost of construction associated with those permits) for the area around Downtown Crossing in 1978 and 1979. The only permits issued for construction activities exceeding \$10,000 were for office and mixed use space on Essex, Franklin, and Milk Streets. The building permits for retail space on Washington Street included many minor interior alterations to existing stores. This is another indication of the low level of activity in building space improvement occurring in Downtown Crossing.

The lack of any real store space improvements on Washington Street can be attributed to the lack of need for such investment. Even prior to implementation of the Downtown Crossing project, there was little vacant ground floor retail space on Washington Street, and there was little need for storefront renovation (especially since the sidewalk canopies had already standardized storefront signs along two blocks of the street). Significant

TABLE 9-11. BUILDING PERMITS ISSUED IN DOWNTOWN AREA

(Number of permits issued and cost of construction  
for all permits issued for that street)

	July-Dec. 1978	Jan.-June 1979	July-Oct. 1979
	N (Total \$)	N (Total \$)	N (Total \$)
<u>Retail/Office Mixed Areas</u>			
Washington Street	6 (14,250)	1 ( 600)	4 (15,600)
Winter Street	1 ( 800)	0	0
Summer Street	2 (12,500)	1 ( 5,000)	0
Bromfield Street	0	1 ( 1,000)	0
Chauncy Street	0	1 ( 3,500)	1 ( 200)
Temple Place	0	0	0
Hawley Street	0	1 ( 500)	0
Tremont Street	2 ( 3,350)	1 ( 2,000)	1 ( 3,000)
Essex Street	0	2 (21,000)	1 ( 800)
Beach Street	1 ( 900)	1 ( 2,500)	0
School Street	0	1 ( 2,000)	0
Kilby Street	1 ( 4,500)	0	0
Stuart Street	0	2 (13,000)	0
Broad Street	0	1 ( 2,000)	0
<u>Primary Office Areas (Some Retail)</u>			
Franklin Street	1 ( 500)	2 (39,000)	3 (86,875)
Federal Street	0	2 ( 4,500)	0
Milk Street	1 (30,000)	1 ( 5,000)	0
High Street	0	1 ( 2,000)	0
State Street	4 (24,100)	1 ( 1,500)	0
Congress Street	3 ( 9,000)	2 ( 7,500)	0



vacant retail space did exist, however, on Hawley Street and on Summer Street from Hawley to Chauncy (including the large former Kennedy's building). This vacant space exists on streets that have been subject to auto restrictions but have not received physical improvements, and has not been filled since implementation of the Downtown Crossing project. More seriously, the search for a major anchor store for the Lafayette Place development is still ongoing. In addition, vacant upper floor space above retail activities has remained plentiful in the Downtown Crossing area.

#### 9.4.3 Conclusions Regarding Project Impacts on Downtown Economic Development

In evaluating the impact of an auto restricted zone project or any other downtown improvement project on downtown business investment, it is critical that the distinction between "redevelopment projects" and "revitalization projects" be understood. Commercial area redevelopment projects typically involve substantial new construction or conversion of existing buildings to create activities that were not previously existent at the site, and thus call for substantial private sector involvement in developing, filling and promoting the new center. Commercial area revitalization projects such as pedestrian and transit malls, by contrast, are usually limited to improvements in the physical amenity and esthetic image of an area, and are aimed at increasing the attraction of shopping areas that are already operational. Depending on the condition of the buildings in the area, a revitalization project may not necessarily call for any immediate corresponding private sector investment in renovations or new construction.

Downtown Crossing and the nearby Faneuil Hall Marketplace invite comparison in part because both projects involved substantial public funding for the creation of pedestrian streets, and were designed to encourage or facilitate new commercial activity. However, the Faneuil Hall Marketplace project involved the redevelopment of warehouse buildings into new commercial uses, while the Downtown Crossing project was merely an improvement to the pedestrian environment to encourage the economic revitalization of an existing commercial center. The \$12 million of Federal Urban Renewal Funds for the

Faneuil Hall Marketplace (and over \$24 million of private financing) considerably overshadows the \$5 million of public funding of the Downtown Crossing capital cost.

It is not reasonable to expect that the pedestrianization of a few blocks and the placement of benches and bushes there will itself necessarily spur substantial new private investment in downtown commercial expansion. However, when an auto restricted zone is accompanied by other private investment downtown, it can represent an important contributing factor to an overall program of downtown economic development. In the case of Boston, the Downtown Crossing project did succeed in attracting substantially more pedestrians and greater retail sales to the downtown retail district. It is thus most appropriately viewed as one of a number of activities contributing to the growth of the economy along Washington Street.

#### 9.5 SUMMARY

Business Conditions: While Downtown Boston remained as an important retail center, sales in constant dollars had been declining during the last three decades. Merchant support for the Downtown Crossing project followed concern about the decline of the central business district while retail activity was increasing in the Back Bay/Prudential area and at Faneuil Hall Marketplace, both nearby.

Promotion and Merchant Involvement: Promotion was recognized as an integral part of the retail revitalization effort, and funding for promotion activities was provided as part of the UMTA demonstration funding. Merchants continued to play a major role in the planning and operation of the auto-restricted zone, although participation was highest among the larger stores. Following implementation of the Downtown Crossing project, a downtown merchant association was organized with initial assistance from the City. The Downtown Crossing Association aims to coordinate and arrange activities in Downtown Crossing, promote the area and act as primary liaison between the merchants and the City regarding continued operation of the auto-restricted zone.

Sales Impacts: Surveys of area businesses showed that both sales and costs of doing business rose 27 percent between 1977 and 1979. Even after controlling for price inflation for shopper goods (approximately 10 percent over the two years), the sales increase represents a major reversal of the historical trend of declining sales in constant dollars. Books/recrods/cards, fast food restaurants and other quick stop types of businesses particularly benefitted from the increased foot traffic.

Perceived Impacts: While retail sales generally increased and 72 percent of the businesses felt that the project was good for the downtown area, only 39 percent thought that it actually helped their business, while most of the rest felt that it had no impact. Far fewer smaller businesses felt that they were helped by the project than did larger businesses.

Revitalization Impacts: Immediate impacts of the project on store space improvements and filling of vacant store space have been negligible. At the same time, there are several very large retail, hotel and apartment developments under construction within the auto-restricted zone. The decisions to proceed with these projects were made before completion of the Downtown Crossing project. Thus, Downtown Crossing is most appropriately viewed as just one of a number of public and private sector projects assisting the health of the central business district.





## 10. CONCLUSIONS

### 10.1 AUTO RESTRICTED ZONE DESIGN AND OPERATIONS

#### 10.1.1 Design

In contrast to many other pedestrian malls and transit malls, the Downtown Crossing project involved the elimination of all auto traffic within a wide zone, including six different streets. The project not only involved restructuring traffic patterns to reduce impacts of the automobile in the retail core, but also included elements to provide better pedestrian facilities and urban design improvements, and to encourage transit usage. It thus represented an attempt to address issues of downtown environmental improvements and traffic restrictions in a more coordinated and comprehensive manner.

The Downtown Crossing design is also notable in that, in contrast to other pedestrian and transit malls, it involves only a minimal amount of street furniture. The primary physical improvements are decorative street lights, newly bricked street surfaces, and several mini-parks. Unlike downtown street malls in some cities, there are no trees, fountains or bandstands, only a small number of bushes, and benches on a few sidestreets but none on the main shopping street. The uncluttered design was desired by the merchants so as not to impede pedestrian movement and is to some extent called for by the relatively narrow nature of the streets and the very high pedestrian volumes there. The success of the Downtown Crossing project in increasing pedestrian volumes and retail sales demonstrates that a large amount of street furniture and decoration is not always necessary when there is already a significant base of pedestrian activity taking place.

#### 10.1.2 Implementation

The project demonstrated the value of an incremental approach to the implementation of an auto restricted zone. Initially, the streets were closed

to traffic without any physical improvement to the area. Bricking of the street and sidewalk areas, and the placement of benches, planters, new lighting and information kiosks did not occur until one year later.

The delay in physical improvements, although not originally planned, was beneficial in that it provided flexibility for changes in the nature of the auto restricted zone. During the first year, one street (Temple Street) was reopened because of merchant dissatisfaction and low levels of pedestrian activity there. Shortly thereafter, two blocks of Washington Street were changed from a transit mall into a pedestrian mall because it was found that the high pedestrian volumes interfered with bus movement. The buses were rerouted to a parallel street. Additional subsequent changes were also made to allow expanded goods movement and taxi access in evening hours. The incremental approach to implementation of the auto restricted zone made it possible to demonstrate the value of the auto restrictions to the merchant community before many of the permanent construction changes were made. The flexibility of the City of Boston in modifying the project design over time and the responsiveness of the staff members to merchant problems were critical factors in assuring continued acceptance of the Downtown Crossing project.

### 10.1.3 Institutional Issues

The institutional arrangements and roles of parties affected by an auto restricted zone can have a profound effect on the way in which the project is received by the public and the merchants in the area. Included are issues of project organization and administration, interagency cooperation and arrangements for continuing operation of activities within the zone.

The Downtown Crossing project was planned and implemented in a relatively short time period. The auto restricted zone officially opened two years after completion of the initial consultant feasibility study. The rapid process of final design, setting up an implementation strategy, securing funding and constructing the special bus lanes is particularly notable because the project required participation from a wide range of city, regional and state agencies, including the Boston Redevelopment Authority, the Boston Department of Traffic



and Parking, the Boston Police Department, the Boston Public Works Department, the Massachusetts Bay Transportation Authority, and the Massachusetts Department of Public Works. The successful implementation of the project required considerable organization and administration from the BRA as the lead agency (for most of the project) in coordinating activities of construction, traffic regulation, transit operation, promotion, maintenance, data collection and evaluation. In particular, there was close cooperation between members of the BRA and the Traffic and Parking Department.

Equally important is the involvement of area merchants in supporting and promoting the auto restricted zone. Promotion was recognized as an integral part of the retail revitalization effort, and funding for promotion activities was provided as part of the UMTA demonstration grant. The city held frequent meetings with the merchants during the planning and implementation stages, although participation was highest among the larger stores.

While a special assessment district was recognized to be not politically feasible at the time, it was recognized by both the BRA and many of the merchants that some of the responsibility for the future direction and management of Downtown Crossing would have to be taken up by the private sector. As a step in that direction, the Downtown Crossing Association, a voluntary merchant association, was organized in 1980 with assistance from the City. The association aims to coordinate and arrange activities in Downtown Crossing and act as primary liaison between the merchants and the city regarding continued operation of the auto restricted zone.

#### 10.1.4 Problems Remaining

Surveys of pedestrians and merchants found that both groups were very positive about the Downtown Crossing project, including the street closing and the bricking of the streets. Both groups were negative most about the levels of area maintenance and crime, although even for those subjects most survey respondents were neutral about the importance of these issues. Deficiencies in maintenance and trash collection become particularly noticeable in a pedestrian zone. Pickup of trash has remained a problem, due both to a lack

of suitable trash receptacles and to an insufficient level of maintenance activity. There were also significant increases in reported crimes against persons, although some of this is attributable to the higher volume of pedestrians on the street and a higher level of enforcement. With increasing constraints on the city budget, future sources of supplemental funding for area maintenance and crime enforcement are uncertain.

## 10.2 TRANSPORTATION IMPACTS

### 10.2.1 Activity Levels

The number of pedestrians entering the Downtown Crossing area increased following the restriction of automobile traffic in 1978 and continued to increase even more for the daytime periods following the bricking of the street and placement of pedestrian amenities (in 1979). Only for the evening shopping period was there no substantial increase in pedestrians. Overall, the number of daytime visitors appear to have increased by 11 percent from 1978 to 1980.

The increases in pedestrian volumes were not evenly distributed. The northern blocks, which are located closest to the government and financial office districts, had increases in sidewalk volumes exceeding 15 percent, while the southernmost blocks actually experienced decreases in pedestrian volumes.

The observed increases in pedestrian volumes are to a large extent attributable to the presence of a large office workforce nearby. About 123,000 persons are employed in offices of stores within one-half mile of the auto-restricted zone. While downtown employees accounted for less than half of all weekday visitors, they accounted for nearly two-thirds of the 1978-1980 increase in visitors. Much of the total increase in weekday pedestrian volumes occurred at lunchtime; there was a 17 percent increase in the lunchtime pedestrian volumes between 1978 and 1980, compared to only a 6 percent increase in volume for the rest of the weekday. The lunchtime period

overall accounted for nearly three quarters of the total weekday increase in visitors between 1978 and 1980.

The continued increases in pedestrian volumes are especially significant because they have occurred in the face of new competition nearby. The Faneuil Hall Marketplace opened in stages in 1976, 1977 and 1978 and features several hundred restaurants and speciality shops, located within a mile of Downtown Crossing and closer to many of the office buildings. In fact, a survey of selected office buildings located near both retail areas showed a relative decrease in the proportion of midday visits to Downtown Crossing and a relative increase in visits to Faneuil Hall Marketplace. In spite of this trend, total pedestrian volumes and the total number of employees visiting Downtown Crossing continued to rise.

#### 10.2.2 Mode Split

While the strengthening of downtown retail activity was a principle objective of the auto-restricted zone, another important goal was to reduce dependence on the automobile as a mode of access to the area. It was hoped that the auto-restricted zone and associated policies would have a substantial impact on mode of access to the area. The auto-restricted zone did make traffic access to the immediate area more difficult. In addition, the elimination of on-street parking and the shift of parking capacity to locations a few blocks away lengthened the walk from parking facilities to the retail district for some people. In addition, there were substantial extensions of local bus service into the area.

Auto travel always accounted for a small proportion of trips to the Downtown Crossing area. However, the completion of the auto restricted zone was accompanied by dramatic decreases in auto trips, with corresponding increases in transit (as a means of getting downtown) and walking (as a means of getting to the Downtown Crossing area within downtown).

The shift away from auto travel cannot be entirely attributable to the auto restricted zone. In fact, there was also a clear shift from auto to transit among downtown office workers, even though the exclusion of auto



traffic in the retail district in itself had only a minor impact on vehicular access to office buildings elsewhere downtown, and overall capacity of facilities for long-term parking did not appreciably change between 1978 and 1980. Thus, the change may also be partially attributable to exogenous factors such as rising gasoline prices at that time.

#### 10.2.3 Traffic Diversion

During the planning of the auto-restricted zone, there was serious concern about the extent of expected increases in traffic on nearby streets. In fact, most of the streets near the zone actually experienced decreases in traffic volumes. There was a 5 percent overall decrease in volumes in the area around the auto restricted zone in the 1978-1980 period. Much of the traffic decrease is attributable to the shifts from auto to transit among both area office workers and other Downtown Crossing visitors, and to auto trips avoiding the entire area.

#### 10.2.4 Parking

Off-street parking capacity in the area was not significantly reduced by the Downtown Crossing project, but usage of these parking facilities did decrease, particularly among shoppers. Surveys and counts of parkers at selected on- and off-street facilities in 1978 and 1980 showed a 22 percent decrease in vehicles entering between 10 AM and 4 PM. The decrease was particularly sharp for those who had destinations in Downtown Crossing, among whom the number of vehicles parked at the surveyed sites decreased 37 percent and the number of persons coming by auto decreased 29 percent. At the same time, auto occupancy for parkers visiting Downtown Crossing increased among both those travelling to work (from 1.29 to 1.76) and among shoppers (from 1.72 to 1.98).

#### 10.2.5 Enforcement

Continuation of a high level of traffic and parking enforcement was found to be important to keep unauthorized vehicles out of the auto-restricted zone and to maintain space reserved for taxis and deliveries.

#### 10.2.6 Transit Ridership

The extension of six local bus routes and four express bus routes into the auto-restricted zone was originally felt to be an integral part of the Downtown Crossing project and an important means of maintaining accessibility in the face of restricted auto access. Attitudes changed over time; buses were moved off of Washington Street after the initial experience of bus-pedestrian conflict on Washington Street convinced many merchants that the street would be better off as a fully-pedestrianized area.

Counts and surveys both indicated that the number of bus riders bound for destinations in Downtown Crossing has increased 26-30 percent following extension of the bus routes. Much of the ridership were persons who formerly continued on into the area by transferring to the subway, and were now able to continue directly by bus to their destination. The bus route extensions brought significant benefit for these riders, who were saved the additional time and cost of a transfer, and for the businesses located near the bus stops. For the MBTA, however, many of these shifted trips meant an overall loss of revenue for the system. While the net increase in ridership (excluding the trips shifted from other transit routes) met the initial levels forecasted, the net revenue/cost ratio was not sufficient to meet the MBTA service standard. Consequently, the route extensions were all eliminated in December 1980, 15 months after the special UMTA operating subsidy for those routes had ended. (These route extensions were restored in May 1982.)

#### 10.2.6 Pedestrian Movement

Due to the narrow width of the streets and the high pedestrian volumes, only a minimal amount of benches, plantings and street furniture were installed on most of the streets so as not to block pedestrian movement. The

project did, however, include several mini-parks, a major bench area on Summer Street, and information kiosks throughout the area.

Curbs were eliminated on Winter and Summer Streets, and pedestrian usage of the middle street space is relatively high. By contrast, pedestrians seldom walk in the center of Washington Street, due in part to the existence of curbs delineating the sidewalk from the street space, the continued presence of delivery vehicles in the street throughout the day, and the lack of any benches or street sales to orient pedestrian movement toward the street.

#### 10.2.7 Goods Delivery

Goods deliveries in the auto-restricted streets were restricted to hours before 11 AM and after 6 PM. Despite initial concerns that this policy would cause substantial hardship to merchants, most deliverers were able to shift to make earlier deliveries, now that general traffic was eliminated and curbside space for loading (previously blocked by parked cars) was now freely available.

#### 10.2.8 Taxis

Project impacts on taxi ridership were minimal, in part because taxis were allowed continued all-day access on many of the streets closed to all other vehicles, and additional taxis stands were set up at locations along the periphery of the auto-restricted zone.

#### 10.2.9 Air and Noise Quality

There were dramatic reductions in air pollution associated with the Downtown Crossing project. Between 1978 and 1980, maximum carbon monoxide levels fell 67 percent in the auto-restricted zone and 41 percent in an area adjacent to (but outside of) the zone. Background levels of nitrogen dioxide in the area also decreased. Measured noise levels within the auto-restricted zone decreased noticeably, as the sound of cars and trucks was replaced by that of people and music.



## 10.3 ECONOMIC IMPACTS

### 10.3.1 Sales Impacts

Surveys of area businesses showed that both sales and costs of doing business rose from 1977 through 1979. Books/records/cards, fast food restaurants and other quick stop types of businesses particularly benefitted from the increased foot traffic. The reported increases in sales from 1978-1980, together with pedestrian survey data on shopping expenditures, indicate that the historical decline in downtown retail activity has been halted since implementation of the auto restricted zone.

### 10.3.2 Perceived Impacts

While 80 percent of the businesses reported increasing sales and 72 percent of the businesses felt that the project was good for the downtown area, only 39 percent thought that the project actually helped their business, while most of the rest felt that it had no impact. Far fewer smaller businesses felt that they were helped by the project than did larger businesses.

### 10.3.3 Revitalization Impacts

Immediate impacts of the project on store space improvements and filling of vacant store space have been negligible. At the same time, there are several very large retail, hotel and apartment developments under construction within the auto-restricted zone. The decisions to proceed with these projects were made before completion of the Downtown Crossing project. Thus, Downtown Crossing is most appropriately viewed as just one of a number of public and private sector projects supporting the health of the central business district.

## 10.4 TRANSFERABILITY OF FINDINGS

While substantial increases in pedestrian volumes and retail sales have occurred since implementation of the Downtown Crossing project, some other

pedestrian and transit malls have experienced little or no such improvements (Brambilla and Longo, 1976; Edminster and Koffman, 1979). A key element of the Boston project which may have aided its success was the nature of the auto restricted zone as a network of streets intended to link several different activity centers: the Government Center complex and nearby waterfront to the north, the office district to the east, and Boston Common to the west. The concept of an areawide network of auto restricted streets is in contrast to the usual strip form of pedestrian and transit malls.

Downtown Crossing, like other successful downtown auto restricted zones, had a high level of pedestrian activity and a substantial (albeit declining) base of economic activity even before implementation of the auto restricted zone. The presence of a large concentration of office employees nearby, together with the proximity of a number of government offices and entertainment and tourist activities, provided a large base of potential visitors to the area. Most of the increase in pedestrian volumes accompanying the Downtown Crossing project was attributable to lunch time trips by area office employees and visits from nearby residential neighborhoods. As with other downtown auto restricted zones, there was little or no increase in the number of visitors coming in from suburban areas.

Another important element in the Downtown Crossing project was the high level of transit service provided into and within the area. With the reduction of auto accessibility to the area, it was essential that a convenient transit service alternative be available. There was already a high level of convenient subway service converging upon the area from all directions, which was initially supplemented by additional local bus service to the area and which in the future will be supplemented by a downtown area shopper shuttle service. The substantial reliance on public transit among Downtown Crossing visitors minimized adverse impacts of the accompanying street closings and parking limitations. It is likely that the 1979 gasoline price increases helped further to strengthen this reliance on public transit as the primary vehicular mode to Downtown Crossing.

While the health of Boston's traditional downtown shopping district clearly benefitted from the auto restricted zone project, other factors also helped strengthen the area's economic position. Most notably, there was already a generally positive perception of the downtown area as a location for continued investment at the time that the Downtown Crossing project was initiated, with substantial improvements by the department stores and new office construction nearby recently completed. The Downtown Crossing project reinforced the positive climate by including an extensive promotional program as an integral part of the auto restricted zone implementation plan. This promotional effort, together with other past downtown investment activity, helped increase the positive economic impacts of the Downtown Crossing project.

Besides demonstrating the business and travel impacts of a downtown auto restricted zone, the Downtown Crossing project demonstrated the operational requirements accompanying the concept of zonal auto restriction. Traffic enforcement, police requirements and traffic signing near entrances to the zone all emerged as important issues in need of further attention.





## 11. BIBLIOGRAPHY

Abramson, Barry: "Preliminary Market Analysis of Central Boston Retail Sector," Boston Redevelopment Authority, draft, April 1981.

Algmin, Jane: "Boston's Downtown Crossing: Its Effects on Downtown Retailing," Transit Journal, Vol. 6, No. 2, Spring 1980.

Boston Chamber of Commerce: Street Traffic in the City of Boston; Boston, MA, 1914.

Boston City Planning Board: A General Plan for the Central Business District; Boston, MA, 1960.

Boston Redevelopment Authority: Boston: The Plan for the Central Business District; Boston, MA, 1967.

Boston Redevelopment Authority Research Department and the Public Information Office: Boston-A Special City, 1976.

Boston Redevelopment Authority: Boylston and Newbury Streets Shoppers' Profile, February 1978.

Brambilla, Roberto and Gianni Longo: Banning the Car Downtown: Selected American Cities; Institute for Environmental Action and Columbia University, US Government Printing Office, Number 0023-000-00375-9, December 1976.

Cambridge Systematics, Inc., "Final Report on Impacts on Boston's Taxi System," in Auto Restricted Zones Volume II: Demonstration Plans, Boston, October, 1976.

Cambridge Systematics, Inc., "Boston Auto Restricted Zone Study, Appendix B: Transit and Travel Demand," in Auto Restricted Zones-Technical Appendix: Boston, report UMTA-VA-06-0042-78-5, December 1977.

Charles River Associates: Evaluation of the First Year of Operation of the Memphis Auto Restricted Zone Demonstration, May 1980.

Chng, K.M., P.A. Gardner and M.J. Thorpe: Air Quality, Noise, and Wind Measurements in Support of the Boston Downtown Crossing Project, Bolt Beranek and Newman, Inc., Report 4494, October 1980.

Edminster, Richard and David Koffman: Streets for Pedestrians and Transit: An Evaluation of Three Transit Malls in the United States, Crain and Associates, report UMTA-MA-06-0049-79-1, 1979.

Fruin, John J.: Pedestrian Planning and Design, MAUDEP Press, Massapequa, NY, 1971.

Meiner Engineering Sciences: Fundamentals of Air Quality, Implementation Package No. 76-5, prepared for the Federal Highway Administration, Baltimore, MD, 1976.

Victor Gruen Associates: Boston Central Business District Planning Report; prepared for the Boston Redevelopment Authority and the Committee for the CBD, Boston, MA, 1967.

Heaton, Carla and Joseph Goodman: "Automobile Restrictive Measures in Central Business Districts: Some Recent Findings and Views," Transportation Research Record, No. 747, Transportation Research Board, 1980.

A. T. Kearney, Inc.: "Boston Auto Restricted Zone Study, Appendix D: Goods Movement," in Auto Restricted Zones Technical Appendix: Boston, report UMTA-VA-06-0042-78-5, December 1977.

Larsen, Frances and Gregory Perkins: "Retail Trade in Boston: Yesterday, Today and Tomorrow," Research Department, Boston Redevelopment Authority, draft, May 1981.

Loudon, William R., Wayne M. Pecknold and Clifford R. Kern: Boston Auto Restricted Zone Demonstration: Evaluation Plan, Cambridge Systematics, Inc., report UMTA-MA-06-0049-79-4, March 1979.

Matrullo, Michael: The Office Industry Survey: Interim Report, Boston Redevelopment Authority, September 1977.

Matrullo, Michael: The Office Industry Survey: Part II: An Analysis of Office Tenant Responses, Boston Redevelopment Authority, March 1979.

Moore-Heder Architects: "Boston Auto Restricted Zone Study, Appendix B: Transit and Travel Demand," in Auto Restricted Zones-Technical Appendix: Boston, report UMTA-VA-06-0042-78-5, December 1977.

Pushkarev, Boris S. with Jeffry M. Zupan, Urban Space for Pedestrian, MIT Press, Cambridge, 1975.

The Rouse Company: "Faneuil Hall Marketplace Survey: Selected Results," Boston, MA, January 1977.

US Department of Commerce: 1977 Census of Retail Trade, Washington, DC, 1977.

US Environmental Protection Agency: "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," EPA, 550/9-74-004, Washington, DC, March 1974.



Alan M. Voorhees and Associates, Cambridge Systematics, Inc. and Moore-Heder Architects: Auto Restricted Zones: Background and Feasibility, report UMTA-VA-06-0042-78-1, December 1977.

Alan M. Voorhees and Associates, Cambridge Systematics, Inc. and Moore-Heder Architects and A.T. Kearney, Inc.: Auto Restricted Zones: Plans for Five Cities, report UMTA-VA-06-0042-78-3, December 1977.

Alan M. Voorhees and Associates, Inc.: "Boston Auto Restricted Zone Study, Appendix C: Traffic and Parking," in Auto Restricted Zones-Technical Appendix: Boston, report UMTa-VA-06-0042-78-5, December 1977.

Weisbrod, Glen and William Loudon: "Downtown Auto Restricted Zones," PAS Memo No. 81-1, American Planning Association, January 1981.

Whyte, William H.: The Social Life of Small Urban Spaces, the Conservation Foundation, Washington, DC, 1980.



APPENDIX A: SURVEY INSTRUMENTS

1. Pedestrian Interview Survey (1980)
2. Office Employee Survey (1980)
3. Parking User Survey (1980)
4. Bus Passenger Survey (1980)
5. Business Establishment Survey (1980)



1980

PEDESTRIAN INTERVIEW SURVEY

6

TIME

1  LEFT    2  RIGHT    3  CENTER (SIDE OF STREET)

5

"Good morning (or afternoon). We are conducting a survey for the Boston Redevelopment Authority. Would you be willing to help us by answering a few questions about your visit to this area today?" (IF RESPONDENT REFUSES, ASK:)

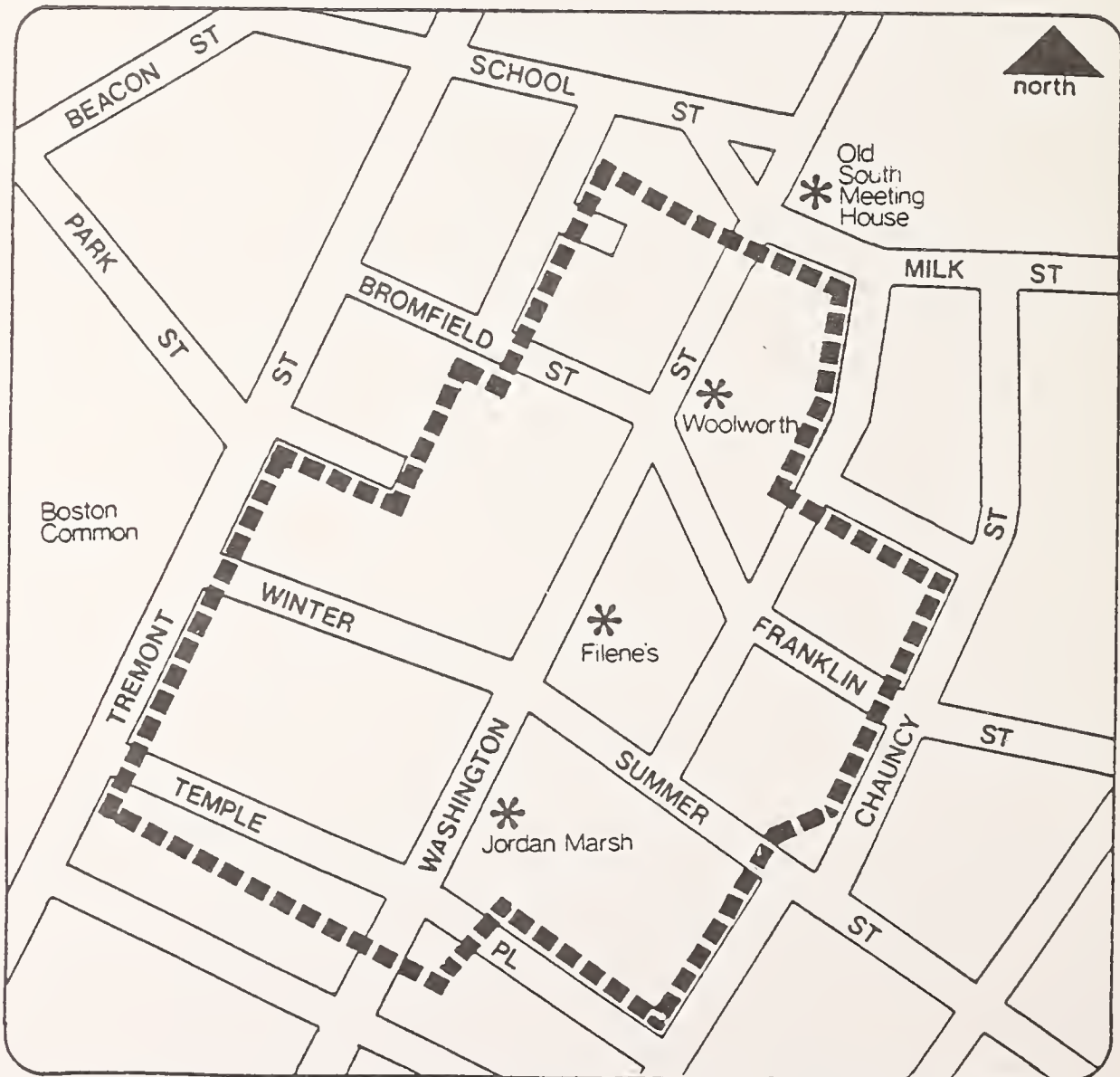
"May I at least ask if you are employed in downtown Boston?" (RECORD ON SEPARATE SHEET)

(SHOW MAP TO RESPONDENT AND POINT OUT YOUR LOCATION.)

"Will you be returning to the area surrounded by the dotted line within the next hour?"

(IF "YES," TERMINATE INTERVIEW AND THANK RESPONDENT.

IF "NO," CONTINUE WITH INTERVIEW.)



1. Are you presently employed in the greater Boston Area? <sup>1</sup>  YES <sup>2</sup>  NO  
[IF "NO", GO TO NEXT PAGE: QUESTION 7]

10

["EMPLOYED" ONLY]

2. In which city or town do you work?

- Boston (specify neighborhood) \_\_\_\_\_
- Cambridge \_\_\_\_\_ ZIP
- Somerville \_\_\_\_\_
- Brookline \_\_\_\_\_
- Other (please specify) \_\_\_\_\_

11

3. How did you travel to work today? [CHECK AS MANY AS APPLY]

- 1  Walked only
- 2  Private Auto
- 3  MBTA Subway or Trolley: What Line: \_\_\_ Red \_\_\_ Green \_\_\_ Blue \_\_\_ Orange
- 4  Taxi
- 5  MBTA Bus: What Route Name or Number? \_\_\_\_\_
- 6  Other Bus
- 7  Commuter Rail
- 8  Other (please specify) \_\_\_\_\_

14      16

4. Did you come to the Washington Street Area directly from your place of work?

- 1  YES
- 2  NO [IF "NO", From where did you come? READ LIST, CHECK ONE]
  - 1  Home
  - 2  Another Shopping Area
  - 3  Sightseeing
  - 4  Hotel
  - 5  Other (please specify)

18

Where is the place you came from located; the street address or nearest intersection?  
\_\_\_\_\_

19

5. How did you travel to the Washington Street area? [CHECK AS MANY AS APPLY]

- 1  Walked (from \_\_\_ Home \_\_\_ Work \_\_\_ Other Shopping \_\_\_ Parking \_\_\_ Bus \_\_\_ Subway)
- 2  Private Auto
- 3  MBTA Subway or Trolley: What Line: \_\_\_ Red \_\_\_ Green \_\_\_ Blue \_\_\_ Orange
- 4  Taxi
- 5  MBTA Bus: What Route Number or Name? \_\_\_\_\_
- 6  Other Bus
- 7  Commuter Rail
- 8  Other (please specify) \_\_\_\_\_

20

6. [IF BY PRIVATE AUTO OR WALKED FROM PARKING] Where did you park? [CHECK ONE]

- 1  Garage
- 2  Parking Lot
- 3  On-Street Parking
- 4  Dropped off

27

Could you give the name, address or nearest intersection?  
\_\_\_\_\_

25

[ SKIP THE NEXT PAGE; GO TO QUESTION 12.]

["NOT EMPLOYED" ONLY]

7. Did you come to the Washington Street area directly from home? [SHOW MAP, CHECK ONE]

- 1  YES [IF YES, GO TO QUESTION 10]
- 2  NO [IF NO] From where did you come? [READ LIST]
  - 1  Another business area
  - 2  Sightseeing
  - 3  Hotel
  - 4  Other (please specify)

Where is the place you came from located? (Address or nearest intersection.)

\_\_\_\_\_

8. How did you travel to downtown Boston today? [CHECK AS MANY AS APPLY]

- 1  Walked (from Home Work Other Area Parking Bus Subway)
- 2  Private Auto 1 2 3 4 5 6
- 3  MBTA Subway or Trolley: What Line: 1 Red 2 Green 3 Blue 4 Orange
- 4  Taxi
- 5  MBTA Bus: What Route Name or Number? \_\_\_\_\_
- 6  Other Bus
- 7  Commuter Rail
- 8  Other (please specify) \_\_\_\_\_

9. [IF BY PRIVATE AUTO OR WALKED FROM PARKING] Where did you park? [CHECK ONE]

- 1  Garage
- 2  Parking lot
- 3  On-Street Parking
- 4  Dropped Off

Could you give the name, address, or nearest intersection?

\_\_\_\_\_

10. How did you travel to the Washington Street area? [CHECK AS MANY AS APPLY]

- 1  Walked (from Home Work Other Shopping Parking Bus Subway)
- 2  Private Auto 1 2 3 4 5 6
- 3  MBTA Subway or Trolley: What Line: 1 Red 2 Green 3 Blue 4 Orange
- 4  Taxi
- 5  MBTA Bus: What Route Name or Number? \_\_\_\_\_
- 6  Other Bus
- 7  Commuter Rail
- 8  Other (please specify) \_\_\_\_\_

11. [IF BY "PRIVATE AUTO" OR "WALKED FROM PARKING"] Where did you park? [CHECK ONE]

- 1  Garage
- 2  Parking lot
- 3  On-Street Parking
- 4  Dropped Off

Could you give the name, address, or nearest intersection?

\_\_\_\_\_

30

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[ALL RESPONDENTS]

12. In this area [SHOW MAP AGAIN] which stores, restaurants or businesses have you visited today? That is, which establishments have you gone into?

Establishments Visited:	Location:	Purchases Made		Value of Purchases	
		YES	NO		
1. _____	_____	<input type="radio"/>	<input type="radio"/>	\$ _____	44 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
2. _____	_____	<input type="radio"/>	<input type="radio"/>	_____	56 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
3. _____	_____	<input type="radio"/>	<input type="radio"/>	_____	63 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
4. _____	_____	<input type="radio"/>	<input type="radio"/>	_____	70 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

13. Did you make a purchase, including food, in any of these establishments today?

14. What was the approximate value of the purchases that you made at each of these establishments?

15. How long have you been in the Washington Street area? \_\_\_\_\_ hours \_\_\_\_\_ minutes <sup>77</sup>   :

16. What other business areas have you visited today? [SHOW MAP OF OTHER SHOPPING AREAS]

Areas Visited	Purchases Made		Value of Purchases	
	YES	NO		
65 <input type="radio"/> Quincy Market	<input type="radio"/>	<input type="radio"/>	\$ _____	
45 <input type="radio"/> Lower Washington Street area	<input type="radio"/>	<input type="radio"/>	_____	81 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
44 <input type="radio"/> North End	<input type="radio"/>	<input type="radio"/>	_____	87 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
40 <input type="radio"/> Newbury Street/Back Bay	<input type="radio"/>	<input type="radio"/>	_____	93 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
46 <input type="radio"/> Prudential Center/Boylston Street	<input type="radio"/>	<input type="radio"/>	_____	
43 <input type="radio"/> Government Center/City Hall	<input type="radio"/>	<input type="radio"/>	_____	
41 <input type="radio"/> Beacon Hill/State House	<input type="radio"/>	<input type="radio"/>	_____	
68 <input type="radio"/> Chinatown	<input type="radio"/>	<input type="radio"/>	_____	
48 <input type="radio"/> Waterfront	<input type="radio"/>	<input type="radio"/>	_____	
67 <input type="radio"/> Boston Common/Public Garden	<input type="radio"/>	<input type="radio"/>	_____	
17 <input type="radio"/> Tremont Street	<input type="radio"/>	<input type="radio"/>	_____	

17. Are there any particular stores or shops that you visited that are not in one of the areas shown on the map? [SHOW MAP OF OTHER SHOPPING AREAS.]

Establishments Visited:	Location:	Purchases Made		Value of Purchases	
		YES	NO		
1. _____	_____	<input type="radio"/>	<input type="radio"/>	\$ _____	99 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
2. _____	_____	<input type="radio"/>	<input type="radio"/>	_____	106 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

18. Have you made any purchases in any of these areas today?

19. What is the approximate value of any purchases that you have already made in each of these other businesses areas?

20. What is the main purpose(s) of your visit to the Washington Street Area?  
[CHECK UP TO 3]

- |  |  |
|--|--|
| 01 <input type="radio"/> Work                  | 06 <input type="radio"/> Sightseeing or strolling    |
| 02 <input type="radio"/> Shopping              | 07 <input type="radio"/> Window Shopping             |
| 03 <input type="radio"/> Work-related business | 08 <input type="radio"/> Recreation                  |
| 04 <input type="radio"/> Personal Business     | 09 <input type="radio"/> Theater/Movie/Entertainment |
| 05 <input type="radio"/> Eating                | 10 <input type="radio"/> Jubilee 350 events          |
|  | 11 <input type="radio"/> Other (specify)             |

21. How many other times per month do you visit this area for shopping only? \_\_\_\_\_  
For all purposes, including shopping? \_\_\_\_\_

22. Where are you going from here? [READ LIST; CHECK ONE]

- |   |   |
|---|---|
| 1 <input type="radio"/> Work                  | 5 <input type="radio"/> Hotel/Temporary Accommodation |
| 2 <input type="radio"/> Home                  | 6 <input type="radio"/> Restaurant                    |
| 3 <input type="radio"/> Another business area | 7 <input type="radio"/> Theater/Movie/Entertainment   |
| 4 <input type="radio"/> Sightseeing           | 8 <input type="radio"/> Other (specify)               |

Where is this place located?

\_\_\_\_\_  
Street address or nearest intersection

23. How will you travel to your next destination from here? [CHECK ONE]

- |                                     |   |
|-------------------------------------|---|
| 1 <input type="radio"/> Walk        | 4 <input type="radio"/> Taxi            |
| 2 <input type="radio"/> MBTA Subway | 5 <input type="radio"/> Auto            |
| 3 <input type="radio"/> MTBA Bus    | 6 <input type="radio"/> Other (specify) |

24. In which city or town do you live? (IF BOSTON, specify neighborhood.)

\_\_\_\_\_  
City or Town

\_\_\_\_\_  
ZIP CODE

25. Which letter most closely represents your age group? [SHOW CARD A]

- |                                    |  |
|------------------------------------|--|
| 1 <input type="radio"/> A under 16 | 5 <input type="radio"/> E 45 - 64          |
| 2 <input type="radio"/> B 16 - 24  | 6 <input type="radio"/> F 65 and over      |
| 3 <input type="radio"/> C 25 - 34  | 7 <input type="radio"/> Refused to Respond |
| 4 <input type="radio"/> D 35 - 44  |  |

26. Which letter most closely represents your combined household income?  
[SHOW CARD B]

- |   |   |
|---|---|
| 1 <input type="radio"/> A under \$6,000     | 4 <input type="radio"/> D \$18,000 - 29,999 |
| 2 <input type="radio"/> B \$6,000 - 11,999  | 5 <input type="radio"/> E \$30,000 and over |
| 3 <input type="radio"/> C \$12,000 - 17,999 | 6 <input type="radio"/> Refused             |

113

115

117

119

121

123

124

127

128

131

132

27. What has been your reaction to the following components of the Downtown Crossing project?

	Positive 1	Neutral 2	Negative 3	No Opinion 4	
Closing of Streets to Traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	133 <input type="checkbox"/>
Bricking of Streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Benches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plantings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance & Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entertainment Activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bus Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Police Presence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	141 <input type="checkbox"/>

THANK YOU FOR YOUR COOPERATION.

28. [INDICATE SEX OF RESPONDENT]

1  Male

2  Female

142

29. [NOTE WHETHER RESPONDENT HAS AN OBVIOUS PHYSICAL HANDICAP]

1  YES

2  NO

143





Hello! This survey is being conducted by the Boston Redevelopment Authority to assist in planning and development for the downtown Boston area. Would you please help by COMPLETING this questionnaire and returning it as you leave the parking location or by dropping it in any mailbox. No postage is necessary. THANK YOU!

1. What was your main reason(s) for coming to downtown Boston today? (You may check one or more.)
1. Work
2. Shopping
3. Entertainment
4. Personal Business
5. Eating
6. Work Related Business
7. Sightseeing
8. Other (specify)
2. Where were you coming from when you drove to this parking location?
1. Work
2. Home
3. Sightseeing
4. Shopping elsewhere
5. Other (specify)
3. Where is the place that you came from located? (Please give the street address or nearest intersection.)
Address
City or Town ZIP Code
4. At what time did you park at this location?
Time of Arrival AM PM
5. Did you have any trouble finding a parking place?
1. YES 2. NO
6. How long did you park at this location?
Hours Minutes
7. How much did you pay (or will you pay) for parking at this location today?
\$
8. How many people will be riding in the car when you leave this location (including yourself)?
1. 1 2. 2 3. 3 4. 4 or more
9. Where will you go after leaving this parking location?
1. Work
2. Home
3. Sightseeing
4. Shopping elsewhere
5. Other (specify)
Street address/Intersection
City or Town ZIP Code
10. Are you presently employed?
1. YES 2. NO
IF YES, in which city or town (if Boston, please specify neighborhood)?
City or Town ZIP Code
11. In which city or town do you live? (If Boston, please specify which neighborhood.)
City or Town ZIP Code
12. Are you:
1. MALE 2. FEMALE
13. What is your age?
1. Under 16
2. 16 - 24
3. 25 - 35
4. 35 - 44
5. 45 - 64
6. 65 or older
14. What is the approximate combined income of your household?
1. Less than \$6,000
2. \$6,000-11,999
3. \$12,000-17,999
4. \$18,000-29,999
5. \$30,000 or more
19. What has been your reaction to the following changes in the Downtown Crossing?
Positive Neutral Negative No Opinion
Closing of Streets
Bricking of Streets
Lighting/Benches/Plantings
Street Maintenance
Bus Service
Police Presence

15. We are very interested in any establishments that you visited on any of the following streets: Washington, Winter, Summer, Franklin, Bromfield, Temple Place, Hawley, School or Milk. Would you please give the establishment name, nearest street or intersection and the value of any purchases that you made?
Name and Location of Establishments Value of Purchases None Purchased
Trip 1
Trip 2
Trip 3
Trip 4

Did you visit establishments in any other locations? Please check the location(s).
Value of Purchases None Purchased
Tremont Street
Quincy Market
North End
Newbury Street/Back Bay
Prudential/Boylston Street
Government Center
Beacon Hill/State House
Chinatown
Waterfront
Common/Public Garden
Other (specify)

THANK YOU FOR YOUR COOPERATION. We welcome your suggestions for ways in which the downtown area can be improved as an area for shopping, dining, working or sightseeing.









1980

DOWNTOWN CROSSING BUSINESS SURVEY

As you may know, the Downtown Crossing Project has been carefully monitored over the past two years by the Boston Redevelopment Authority and the Boston Traffic and Parking Department to determine the impact of the project on downtown businesses as well as the physical environment in downtown Boston. As part of that continuing monitoring process, we are asking you to complete this questionnaire which asks you to compare your current business patterns with the patterns of 1977, the year prior to the implementation of the Downtown Crossing. Your full participation in this effort will help us to better respond to the needs of the Downtown Crossing business community in the future. The results of this and other surveys we have done as part of the evaluation will be sent at no charge to all who respond to this survey.

If your business was not in the Downtown Crossing in 1977, please answer only those questions applicable to the present time.

The survey should be completed by the establishment proprietor or manager. Please complete and return the questionnaire by mail as soon as possible.

No postage is required. All responses will be kept strictly confidential and your cooperation in this effort will be greatly appreciated. **THANK YOU!**

If you have any questions, please call Sue Clippinger at the Boston Traffic and Parking Department, 725-4684, or Jane Algin at the Boston Redevelopment Authority, 722-4300.

All information requested pertains only to the establishment located at the address specified below:

FIRST, WE WOULD LIKE TO KNOW A LITTLE BIT ABOUT YOUR BUSINESS.

1. How would you categorize your business? (Check one or more)

- |  |  |
|--|--|
| <input type="checkbox"/> Apparel store                 | <input type="checkbox"/> Bank            |
| <input type="checkbox"/> Furniture or home furnishings | <input type="checkbox"/> Shoe            |
| <input type="checkbox"/> General merchandise           | <input type="checkbox"/> Jewelry         |
| <input type="checkbox"/> (department) store            | <input type="checkbox"/> Book/records    |
| <input type="checkbox"/> Eating and drinking place     | <input type="checkbox"/> Other (specify) |
| <input type="checkbox"/> Wholesale or manufacturing    | _____                                    |

2a. On what floor(s) is your business located? (Check as many as apply.)

Basement  
 First  
 Second  
 Third or above

2b. On how many floors is your business located?

Floors

3. Does your business have outlets at other locations?

no  
 yes → If yes, how many other locations are there in the Greater Boston area? (within Route 495)  
 locations

4. How would you describe the ownership of your business?

Independently owned and operated  
 Part of a company-owned regional or national chain  
 Franchise operation  
 Other (specify)

5a. What is the approximate gross floor area of your business?

square feet

5b. Has your floor area changed since 1978?

no  
 yes → If yes, by how much?  
Increased  square feet  
Decreased  square feet

6. Approximately what percentage of your gross floor area is in each of the following categories?

% sales and display or customer service  
 % storage and inventory  
 % other (specify: e.g., administration)

7. How long has your business been at its present location?

\_\_\_\_\_ years

\_\_\_\_\_ months

8. Do you own or rent the space which your business now occupies?

\_\_\_\_\_ Rent

\_\_\_\_\_ Own

IF YOU OWN THE SPACE, SKIP TO QUESTION 11a.

9. In how many years will the lease at your current location expire?

\_\_\_\_\_ years

10a. What is your current rent?

\$ \_\_\_\_\_ per month

\$ \_\_\_\_\_ per square foot per month

10b. Has your rent changed since 1977?

\_\_\_\_\_ no

\_\_\_\_\_ yes → If yes, by how much?

Increased \$ \_\_\_\_\_ per square foot per month

Decreased \$ \_\_\_\_\_ per square foot per month

11a. How many persons are employed at your business full-time (30 or more hours per week?)

\_\_\_\_\_ persons

11b. Has this number changed since 1977?

\_\_\_\_\_ no

\_\_\_\_\_ yes → If yes, by how many?

Increased \_\_\_\_\_ employees

Decreased \_\_\_\_\_ employees

12a. How many persons are employed part-time (less than 30 hours per week?)

\_\_\_\_\_ persons

12b. Has this number changed since 1977?

\_\_\_\_\_ no

\_\_\_\_\_ yes → If yes, by how many?

Increased \_\_\_\_\_ employees

Decreased \_\_\_\_\_ employees



NEXT, WE WOULD LIKE TO KNOW ABOUT HOW YOU RECEIVE DELIVERIES AND WHETHER THE DOWNTOWN CROSSING HAS AFFECTED YOU IN THIS AREA.

13a. Do you own or operate your own delivery vehicles to or from this location?

\_\_\_\_\_ no

\_\_\_\_\_ yes

13b. Do you have off-street loading facilities?

\_\_\_\_\_ no

\_\_\_\_\_ yes

14a. What is the average number of consignments delivered to this location per week?

\_\_\_\_\_ consignments per week

Please indicate the approximate percent of consignments delivered in each of the following time periods:

\_\_\_\_\_ 6 AM to 11 AM

\_\_\_\_\_ 11 AM to 2 PM

\_\_\_\_\_ 2 PM to 6 PM

\_\_\_\_\_ 6 PM to 1 AM

\_\_\_\_\_ 1 AM to 6 AM

14b. Have your delivery or servicing patterns changed since the Downtown Crossing was implemented?

\_\_\_\_\_ no

\_\_\_\_\_ yes → If yes, please describe any changes in delivery times, methods of handling, locations where deliveries are made, cost of deliveries, size and frequency of deliveries or other changes that have resulted from the Downtown Crossing project.

IN THIS SECTION, WE WOULD LIKE TO FIND OUT WHAT OTHER TYPES OF CHANGES YOU HAVE MADE IN YOUR BUSINESS IN THE LAST TWO YEARS AND ALSO WHAT TYPES OF CHANGES YOU ARE PLANNING TO MAKE.

15a. In which of the following ways have you made changes to your business in the past two years? (Please use the space to the right to explain any changes made.)

- Location  Please indicate former location \_\_\_\_\_
- Product mix or services offered
- Hours of operation
- Days of operations
- Quality of goods or services offered:
- Quantity of stock
- Percentage of floor space devoted to "walk in" customers

Please indicated whether the Downtown Crossing project influenced your decision on any of the changes indicated above.

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15b. Do you intend to make any changes in the next year in any of the following ways? (Please use the space to the right to explain any intended changes.)

- Changing location
- Opening new locations
- Product mix or services offered
- Hours of operation
- Days of operation
- Quality of goods or services offered
- Quantity of stock
- Percentage of floor space devoted to "walk in" customers
- Total square feet of floor space
- Number of employees
- Window displays
- Renovations

Please indicated whether the Downtown Crossing project influenced your decision on any of the intended changes indicated above.

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THE EVALUATION OF THE DOWNTOWN CROSSING WILL BE MEANINGLESS IF WE CANNOT DETERMINE HOW SALES VOLUMES AND BUSINESS PROFITS HAVE BEEN AFFECTED. PLEASE ANSWER THE FOLLOWING ABOUT YOUR BUSINESS COSTS AND RESULTS AS ACCURATELY AS POSSIBLE.

16. By approximately what percentage have your business costs (stock, salaries, transportation, taxes, etc.) changed in the two years from 1977 to 1979?

\_\_\_\_\_ %    \_\_\_ Increase    \_\_\_ Decrease

17a. What was your approximate advertising outlay in:

\$ \_\_\_\_\_ 1977

\$ \_\_\_\_\_ 1979

\$ \_\_\_\_\_ In the first quarter of 1980 (January-March)

17b. Do you (or someone else locally) make the advertising decisions for your business?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

18a. What was the approximate sales volume of your business in:

\$ \_\_\_\_\_ 1977

\$ \_\_\_\_\_ 1979

\$ \_\_\_\_\_ In the first quarter of 1980 (January-March)

18b. By what percent did your sales volume change from 1977 to 1979?

\_\_\_\_\_ %    \_\_\_ Increase    \_\_\_ Decrease

19. Approximately what percentage of your gross sales is:

in retail \_\_\_\_\_ %

in wholesale \_\_\_\_\_ %

20. What percentage of your total sales would you estimate are purchased by persons employed in the downtown area?

\_\_\_\_\_ %

21. Has this changed since 1977?

\_\_\_\_\_ no

\_\_\_\_\_ yes → If yes, what would you estimate that percentage was in 1977?

\_\_\_\_\_ % by persons employed in the downtown area



NEXT, WE WOULD LIKE TO KNOW WHETHER YOU WERE INVOLVED IN THE PLANNING OF THE DOWNTOWN CROSSING IN ANY WAY.

22. Were you invited to participate in the planning of the Downtown Crossing?

\_\_\_\_\_ no  
 \_\_\_\_\_ yes

23. Did you participate in any of the planning of the Downtown Crossing?

\_\_\_\_\_ no → If no, why not? \_\_\_\_\_  
 \_\_\_\_\_ yes → If yes, in what way? \_\_\_\_\_

24. Did you participate in any of the joint promotional activities of the Downtown Crossing by making a financial contribution?

\_\_\_\_\_ no  
 \_\_\_\_\_ yes → If yes, how much did you contribute? \$ \_\_\_\_\_

FINALLY, WE WOULD LIKE YOUR OPINIONS ABOUT THE DOWNTOWN CROSSING. THE PROJECT CAN BE CONSIDERED A TRUE SUCCESS ONLY IF THE BUSINESS OWNERS AND MANAGERS ARE PLEASED WITH IT.

25. What effect do you think the following project components have had on your business?

	Very Positive	Positive	Neutral	Negative	Very Negative
Closing of streets to traffic	_____	_____	_____	_____	_____
Bricking of streets	_____	_____	_____	_____	_____
Lighting	_____	_____	_____	_____	_____
Benches	_____	_____	_____	_____	_____
Plantings	_____	_____	_____	_____	_____
Maintenance	_____	_____	_____	_____	_____
Promotions	_____	_____	_____	_____	_____
Entertainment Activities	_____	_____	_____	_____	_____
Merchant Organization	_____	_____	_____	_____	_____
Police presence	_____	_____	_____	_____	_____
MBTA Bus service	_____	_____	_____	_____	_____
Delivery regulations	_____	_____	_____	_____	_____

26. What effects would you say the Downtown Crossing has had on the following conditions downtown?

	Very Worsened	Worsened	No Effect	Improved	Very Improved
Maintenance	_____	_____	_____	_____	_____
Traffic/parking enforcement	_____	_____	_____	_____	_____
Appearance, amenities	_____	_____	_____	_____	_____
Safety, security	_____	_____	_____	_____	_____
Promotions, events	_____	_____	_____	_____	_____
Foot traffic	_____	_____	_____	_____	_____

27. Do you feel that the project has:

- \_\_\_\_\_ Helped your businesses substantially
- \_\_\_\_\_ Helped your business a little
- \_\_\_\_\_ Had no effect on your business
- \_\_\_\_\_ Hurt your business a little
- \_\_\_\_\_ Hurt your business substantially

28. Which of the following best describes your overall attitude toward the Downtown Crossing project?

- \_\_\_\_\_ favorable
- \_\_\_\_\_ unfavorable
- \_\_\_\_\_ neutral
- \_\_\_\_\_ no opinion

THANK YOU FOR YOUR COOPERATION! We welcome any additional comments you might have on ways in which downtown Boston can be improved as an area for shopping, dining, working, or conducting business. Please feel free to use the space provided below or the back of any of the sheets to give additional comments or explanation of answers you gave in the questionnaire.

PLEASE ENCLOSE THE COMPLETED SURVEY IN THE SELF-ADDRESSED POSTAGE-PAID ENVELOPE PROVIDED AND MAIL AS SOON AS POSSIBLE.

## APPENDIX B: REPORT OF NEW TECHNOLOGY

A thorough review of the work performed under this contract has revealed no significant innovations, discoveries or inventions at this time. In addition, all methodologies employed are available in the open literature. However, the findings in this document do represent new information and should prove useful throughout the United States in designing and evaluating future transportation-related demonstration projects in general, and auto restricted zone projects in particular. Major elements of the report which bear on performing a comprehensive evaluation include the development of project impact measures pertaining to traffic flow, parking demand, transit ridership, air quality, pedestrian movement, and retail business.

334 Pages





HE 18.5 • A3 / no. DC  
UMTA- 82-21

Downtown crossing

Form DOT F 1720.2 (8-70)  
FORMERLY FORM DOT F 1700.11.1



00010200

Department  
of Transportation  
Research and  
Programs  
Administration  
Boston, Massachusetts 02142

Official Business  
Penalty for Private Use \$300

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