III.D ASSESSMENT OF IMPACTS

This discussion summarizes findings of analyses of nine alternatives for the South Area of the Central Artery Corridor. It is based upon past studies and analyses of current proposals for South Area improvements, the detailing of transportation impacts of the current proposals, and the social, economic and environmental consequence of alternative improvements. The following sections include a summary of findings resulting from the analysis--presented in the form of two charts, with explanations in the text which follows (see Figures 31 and 32). For purposes of analysis, it has been assumed that the Fort Point Channel tunnel in Alternatives 4-9 will consist of three northbound lanes, with a shoulder used in peak periods to accomodate traffic demand.

III.D.1 Transportation Operational Improvements

Length of A.M. Northbound Queue

Alternative 1 - 1.80 miles
Alternative 2 - 1.70 miles
Alternative 3 - 1.50 miles
Alternative 4 - 1.35 miles
Alternative 5 - 1.20 miles
Alternative 6 - 0.50 miles
Alternative 7 - minimal queues
Alternative 8 - minimal queues
Alternative 9 - minimal queues

Annual Delay Reduction (hours in peak periods)

Alternative 1 - None at opening, delay to increase over time as congestion builds
Alternative 2 - 53,600 hours
Alternative 3 - 114,200 hours
Alternative 4 - 408,300 hours
Alternative 5 - 742,300 hours
Alternative 6 - 1,110,900 hours
Alternative 7 - 1,061,400 hours
Alternative 8 - 1,121,300 hours
Alternative 9 - 1,155,500 hours

Average Vehicles Speed in Peak Period

Alternative 1 - 19 mph
Alternative 2 - 20 mph
Alternative 3 - 25 mph
Alternative 4 - 28 mph
Alternative 5 - 30 mph
Alternative 6 - 36 mph
Alternative 7 - 38 mph
Alternative 8 - 36 mph
Alternative 9 - 36 mph

Annual Value of Time Saved in Peak Periods - Auto Drivers and Passengers

Alternative 1 -	None at opening, with travel time penalties over time as congestion increases
Alternative 2 -	$ 140,900
Alternative 3 -	327,000
Alternative 4 -	1,141,400
Alternative 5 -	1,760,900
Alternative 6 -	3,187,900
Alternative 7 -	3,290,900
Alternative 8 -	3,316,000
Alternative 9 -	3,360,400

Annual Value of Time Saved in Peak Periods - Bus Passengers

Alternative 1 -	None at opening, with travel time penalties over time as congestion increases
Alternative 2 -	$ 89,400
Alternative 3 -	164,000
Alternative 4 -	614,200
Alternative 5 -	1,431,000
Alternative 6 -	1,589,100
Alternative 7 -	1,273,000
Alternative 8 -	1,505,600
Alternative 9 -	1,608,400

Annual Value of Time Saved in Peak Periods - Bus Drivers

Alternative 1 -	None at opening, with travel time penalties over time as congestion increases
Alternative 2 -	$ 5,200
Alternative 3 -	9,500
Alternative 4 -	35,700
Alternative 5 -	83,200
Alternative 6 -	92,400
Alternative 7 -	74,000
Alternative 8 -	87,500
Alternative 9 -	93,400

Annual Value of Time Saved in Peak Periods - Commercial Vehicles

Alternative 1 -	None at opening, with travel time penalties over time as congestion increases
Alternative 2 -	$ 6,500
Alternative 3 -	15,200
Alternative 4 -	66,900
Alternative 5 -	31,700
Alternative 6 -	147,900
Alternative 7 -	152,900
Alternative 8 -	153,900
Alternative 9 -	155,900

IMPACTS	ALTERNATIVES	ALTERNATIVE 1: Deck Replacement only	ALTERNATIVE 2: Deck Replacement with Special Purpose Tunnel	ALTERNATIVE 3: Deck Replacement with General Purpose Tunnel	ALTERNATIVE 4: Reconstruction only	ALTERNATIVE 5: Reconstruction with Special Purpose Tunnel	ALTERNATIVE 6: Reconstruction with General Purpose Tunnel	ALTERNATIVE 7: Reconstruction with Central Area reconstruction	ALTERNATIVE 8: Reconstruction with Central Area reconstruction and a Special Purpose Tunnel	ALTERNATIVE 9: Reconstruction with Central Area Reconstruction and a General Purpose Tunnel
Direct tax base impacts		no change	no change	no change	slight positive	slight positive	slight positive	positive	positive	positive
Net new acres for development		none	none	none	1.9 acres	1.9 acres	1.9 acres	5.6 acres	5.6 acres	5.6 acres
Dollar value of land for new development		none	none	none	$2,674,000 to $4,980,000	$2,674,000 to $4,980,000	$2,674,000 to $4,980,000	$7,924,000 to $15,726,000	$7,924,000 to $15,726,000	$7,924,000 to $15,726,000
Impact on community quality and character		no change	no change	no change	slight positive	slight positive	slight positive	slight positive	slight positive	slight positive
Air quality impacts		CO: 4990 HC: 620 NO_x: 760	CO: 4970 HC: 620 NO_x: 780	CO: 5070 HC: 630 NO_x: 770	CO: 3720 HC: 540 NOx: 990	CO: 3010 HC: 490 NOx: 1010	CO: 3020 HC: 490 NOx: 1030	CO: 3140 HC: 530 NOx: 1270	CO: 3000 HC: 510 NOx: 1210	CO: 3000 HC: 500 NOx: 1210
Noise impacts		no change	no significant increase or decrease	no significant increase or decrease	no significant increase or decrease	no significant increase or decrease	no significant increase or decrease	slight improvement north of Dewey Sq Tunnel	slight improvement north of Dewey Sq Tunnel	slight improvement north of Dewey Sq Tunnel
Water quality impacts		no change	no change	no change	improvement in Fort Point Channel	improvement in Fort Point Channel	improvement in Fort Point Channel	improvement in Fort Point Channel	improvement in Fort Point Channel	improvement in Fort Point Channel
Overall impact - Dewey Sq.Tunnel area		negative	negative	negative	positive	positive	positive	major positive	major positive	major positive
Overall impact - South of Dewey Sq. Tunnel		negative	negative	negative	positive	positive	positive	positive	positive	positive
Project life		30 yrs-decks	30 yrs-decks	30 yrs-decks	40 yrs-tunnel 30 yrs-decks	40 yrs-tunnel 30 yrs-decks	40 yrs-tunnel 30 yrs-decks	40 yrs-tunnel 30 yrs-decks	40 yrs-tunnel 30 yrs-decks	40 yrs-tunnel 30 yrs-decks
Construction Costs - South Area Artery project (000)		$10,640	$10,640	$10,640	$190,580	$190,580	$190,580	$190,580	$190,580	$190,580
Construction Costs - Related projects (000)		none	$409,940	$634,420	none	$312,760	$390,720	$875,000	$1,187,761	$1,265,720
Construction duration		one year	1 year plus 4 years for tunnel	1 year plus 5 years for tunnel	three years	3 years plus 4 years for tunnel	3 years plus 5 years for tunnel	three years	3 years plus 4 years for tunnel	3 years plus 5 years for tunnel
Types of construction disruption		Moderate during peak hours	Moderate during peak hours	Moderate during peak hours	Moderate to severe	Moderate to severe	Moderate to severe	Moderate to severe	Moderate to severe	Moderate to severe

Figure 32: Summary of Environmental & Community Impacts

IMPACTS	ALTERNATIVES	ALTERNATIVE 1: Deck Replacement Only	ALTERNATIVE 2: Deck Replacement with Special Purpose Tunnel	ALTERNATIVE 3: Deck Replacement with General Purpose Tunnel	ALTERNATIVE 4: Reconstruction only	ALTERNATIVE 5: Reconstruction with Special Purpose Tunnel	ALTERNATIVE 6: Reconstruction with General Purpose Tunnel	ALTERNATIVE 7: Reconstruction with Central Area reconstrution	ALTERNATIVE 8: Reconstruction with Central Area reconstruction and a Special Purpose Tunnel	ALTERNATIVE 9: Reconstruction with Central Area reconstruction and a General Purpose Tunnel
Length of AM queue northbound (miles)	1.80 miles	1.70 miles	1.50 miles	0.70 miles	0.60 miles	minimal	minimal	minimal	minimal	
Annual delay reduction (hrs in peak periods)	none; delay to increase over time	53,600	114,200	408,300	742,300	1,110,900	1,061,400	1,121,300	1,155,500	
Average vehicle speeds (in peak periods)	19 mph	20 mph	25 mph	28 mph	30 mph	36 mph	38 mph	36 mph	36 mph	
Annual value of time saved - auto driver and passr	none; travel time penalties over time	$140,900	$327,000	$1,141,400	$1,760,900	$3,187,900	$3,290,900	$3,316,000	$3,360,400	
Annual value of time saved - bus passenger	none; travel time penalties over time	$ 89,400	$164,000	$ 614,200	$1,431,000	$1,589,100	$1,273,000	$1,505,600	$1,608,400	
Annual value of vehicle hours saved - buses	none; travel time penalties over time	$ 5,200	$ 9,500	$ 35,700	$ 83,200	$ 92,400	$ 74,000	$ 87,500	$ 93,400	
Annual value of veh. hrs saved - commercial veh.	none; travel time penalties over time	$ 6,500	$ 15,200	$ 66,900	$ 31,700	$ 147,900	$ 152,700	$ 153,900	$ 155,900	
Annual operating savings - all vehicles	none;increased costs over time	$ 8,600	$ 24,000	$ 83,500	$ 92,100	$ 107,500	$ 162,400	$ 146,800	$ 152,300	
Annual number of accidents	449	427	404	114	104	104	114	104	104	
Annual accident reduction - percent	none	-5%	-10%	-75%	-77%	-77%	-75%	-77%	-77%	
Annual accident reduction - dollar savings	none	$ 50,800	$101,600	$1,222,000	$1,270,200	$1,270,200	$1,222,000	$1,270,200	$1,270,200	
Interstate standards	no	no	no	yes	yes	yes	yes	yes	yes	

Figure 31: Summary of Anticipated Transportation Impacts

Annual Operating Savings in Peak Periods - All Vehicles

Alternative 1 -	None at opening, with travel time penalties over time as congestion increases
Alternative 2 -	$ 8,600
Alternative 3 -	24,000
Alternative 4 -	83,500
Alternative 5 -	92,100
Alternative 6 -	107,500
Alternative 7 -	162,400
Alternative 8 -	146,800
Alternative 9 -	152,300

III.D.2 Safety

Annual Number of Accidents, Percent Reduction, and Dollar Savings

Alternative 1 -	449:	0% reduction
Alternative 2 -	427:	5% reduction, at a value of $50,800.
Alternative 3 -	404:	10% reduction, at a value of $101,600.
Alternative 4 -	114:	75% reduction, at a value of $1,222,000.
Alternative 5 -	104:	77% reduction, at a value of $1,270,200.
Alternative 6 -	104:	77% reduction, at a value of $1,270,200
Alternative 7 -	114:	75% reduction, at a value of $1,222,000.
Alternative 8 -	104:	77% reduction, at a value of $1,270,200.
Alternative 9 -	104:	77% reduction, at a value of $1,270,200.

Interstate Standards

Alternatives 1, 2 and 3 do not meet interstate standards; improvements will not bring the roadway up to standards. Alternatives 4 through 9 will meet interstate standards. Modifications to the substandard curves within the existing Dewey Square Tunnel will be made to increase design speeds to Interstate standards.

III.D.3 Community Impacts

Tax Base and Development Impacts

Alternatives 1, 2 and 3 would have no impacts on the tax base nor would they provide new acreage for development. Alternatives 4, 5 and 6 may have tax base impacts as a result of the potential taking of the Sheraton Building. Tax losses as a result of this potential taking could be off-set, with the possible positive tax base impacts resulting from the development of new buildings on an enlarged parcel adjacent to and

over the right-of-way of the Artery. Alternatives 7, 8 and 9, which connect the tunnel in the Fort Point Channel to the existing elevated Artery in the Central area of the Corridor may have negative tax base impacts in the event that it is necessary to take the Sheraton Building. Improvements to the environment of the Artery may produce second order positive impacts as a result of making the area more attractive for investments in redevelopment and reuse of existing structures.

Impact on Community Quality and Character

This is an overall impact evaluation of factors which are difficult to quantify but which reflect community and environmental concerns. These include visual and aesthetic qualities, pedestrian amenities and the local street pattern and its relation to arterials and the expressway network.

Alternatives 1, 2 and 3	No change in community quality and character over the present situations. The present negative influence of the transportation facilities in the area will continue.
Alternatives 4, 5 and 6	Would have a slight positive effect on community quality, differing from Alternatives 7, 8 and 9 in that South Area construction will have to link back to the existing Central Artery viaduct on an aerial structure. In the vicinity of the new structure, community quality will be negatively impacted.
Alternatives 7, 8 and 9	Would have a positive effect on community quality and character, largely because of removing the impacts of spillover traffic on local streets. These improvements would also enhance the pedestrian environment, especially in the Fort Point Channel, where a pedestrian way can be created along the edge of the water. Local streets will be better able to serve local collection and distribution needs, when the expressway spillover traffic is removed.

Overall Impacts - Dewey Square Tunnel Area

Alternatives 1, 2 and 3 - will have continued major negative traffic and environmental impacts in the South Area. These include continued and growing congestion, associated air and noise impacts from expressway and local street operations, spillover of traffic onto local streets, and continued blighting influence of expressway constraints and operations. Opportunities for community improvements would be constrained as a result of the continued negative impacts of the Dewey Square Tunnel on the area.

Alternatives 4, 5 and 6 - will produce major positive transportation improvements in the South Area. Environmental impacts, in the area of the link between the South Area and the existing Central Artery, will be somewhat greater because of the link to the aerial structure.

Alternatives 7, 8 and 9 - will produce major positive transportation environmental improvements in the South Area. These include reduced congestion and delays for all types of traffic, decreased accidents on expressways and local streets and reduction of environmental impacts associated with transportation operations. Major new opportunities for development, pedestrian-ways, public open space, and other amenities would result from these improvements in the vicinity of Fort Point Channel and Northern Avenue.

Overall Impacts - South of Dewey Square Tunnel

Alternatives 1, 2 and 3, which provide only for rebuilt decks in the area south of Dewey Square will have continued negative traffic and environmental impacts on the area. Alternatives 2 and 3 will add traffic impacts in this area, because of access which is provided to the harbor tunnel alternatives. Without reconstruction or realignment of the facility in this area, community impacts will include spillover of traffic onto local streets which are inadequate to handle the demand, especially in the South End area.

Alternatives 4 through 9 will provide a reconstructed facility which will reduce congestion and delays in this area, and decrease accidents on expressways and local

streets. Environmental impacts in the vicinity will be reduced because of improved transportation operations. Opportunities for new development are minimal, but adjacent communities will have fewer traffic impacts and should become more attractive for existing development.

III.D.4 Environmental Impacts

Air Quality Impacts

The proposed changes to the South Area which potentially affect air quality in the area include:

A. Changes in traffic volumes and speeds using the existing expressway corridor will affect gross emissions areawide under all alternatives.

B. Changes in pollutant dispersion would occur in the northern end of the South Area, near the present Purchase Street ramps, if the Central Section of the Artery is depressed (Alternatives 4, 5 and 6). This would mean the enclosure within a tunnel of the presently open section of the South section, and the channeling of emissions from this section into additional ventilation stacks. These new stacks would become point sources, replacing the existing line source of the open roadway.

C. The creation of a new partial right-of-way in the Fort Point Channel to carry northbound volumes to the Northern Avenue Bridge results in the shifting of the emissions associated with these volumes from the old right-of-way area to the new. Most of this length of roadway would be located in tunnel, so that additional ventilation stacks would be required closer to the Channel.

As a first-cut estimate of air quality impacts of the South Area project, calculations of gross pollutant emissions were carried out for each of the nine project alternatives. All calculations were performed using 1975 A.M. peak traffic volumes. Emissions factors used were 1975 average emissions factors from the EPA Compilation document, Supplement 5; as in the No-Build case (defined above as the

"Existing" air quality situation), these emissions factors were speed-corrected to correspond to predicted speeds on individual links. The resulting emission totals of CO, HC and NO_x associated with all alternatives are presented in Figure 33.

Figure 33

Gross Pollutant Emissions
Central Artery (South) Alternatives

	Pollutant Emissions tons/year		
Alternative	CO	HC	NO_x
1 - No Build	4990	620	760
2 - No Build & SP	4970	620	780
3 - No Build & GP	5070	630	770
4 - South only	3720	540	990
5 - South & SP	3010	490	1010
6 - South & GP	3020	490	1030
7 - Central & South	3140	530	1270
8 - Central & South & SP	3000	510	1210
9 - Central & South & GP	3000	500	1210

SP = special-purpose third harbor crossing
GP = general-purpose third harbor crossing

Variations among the alternatives may occur because of:

- differences in demand associated with capacity differences among the alternatives;
- changes in speeds from link to link according to capacity and demand (emissions of all three pollutants are speed dependent);
- minor differences among alternatives in length of roadway, resulting in changes in overall vehicle-miles of travel even when volumes are constant.

Generally speaking, either of the "Artery Build" alternatives produces smaller quantities of CO and HC emissions than does the "No Build" alternative for the corresponding tunnel option; e.g., Alternatives 4 and 7, which include no additional harbor tunnel, are preferable to Alternative 1 in terms of CO and HC pollutant burden. However, the "No Build" alternatives emerge as more desirable in terms of NO_x emissions when compared

with the corresponding "Artery Build" alternatives (4 - 9).

Finally, any new surface ventilation stacks which are required to accompany roadway construction in tunnels will become "point sources" of automotive pollutants. The design and location of such stacks for the area north of Dewey Square (assuming the Central section is depressed--Alts. 7, 8 and 9) and the Fort Point Channel alignment, as well as the detailed analysis of air quality impacts of additional stacks, are steps to be accomplished at a later stage of planning for this project.

Noise Impacts

Several of the changes associated with the various South Area alternatives have the potential to affect noise levels in adjacent areas. These changes, and their likely effects, are discussed below.

A. The creation of a new alignment for the northbound section in the Fort Point Channel - This relocated section of roadway would be located in tunnel for most of its length, and would not therefore represent a major new noise source in the Fort Point Channel. The only potential areas of concern are the tunnel connections to both the Central section and the southbound roadway of the South section. If the Central section is not depressed, the northbound tunnel will emerge above grade to connect with the elevated Central section traversing an area which is not included in the present right-of-way, and creating increased noise levels for abutters of the upgrade. Likewise in the South, the split of northbound and southbound roadways occurs south of the Dewey Square Tunnel; noise levels generated by at-grade visible sections would be shifted eastward of the existing right-of-way.

   In the case of both connections, the land area affected by noise levels from the relocation is industrial or undeveloped land--the South Bay rail yards, the loading areas of the South Postal Annex, the vacant areas around the Sheraton Building --not noise sensitive land uses.

B. The diversion of the northbound traffic discussed in (A) from the existing alignment - The reduction in total traffic volume traversing the existing corridor is about one-half, resulting in a noise level reduction from this single source of only a few dBA (2 or 3 at most). This reduction applies only to portions of the alignment which are not enclosed in tunnel; sections which are in tunnel do not represent the predominant noise source to abutters in their area, and no reduction in noise levels would be perceived by nearby observers.

C. Changes in traffic volumes generated by different alternatives - The relatively minor increases or decreases in volumes traversing individual links will have little or no effect on areawide noise levels.

D. In addition to the above, many of the existing ramps and frontage roads in the South Area would be redesigned to accomodate the proposed Artery changes. Such design changes would possibly cause some increases or decreases in noise levels for a specific street corner, row of buildings, etc. Such changes would be both minor and extremely localized; they can more properly be addressed at a later stage of the planning process, when specific designs for such connections become available.

One particular area to which attention must be devoted is the Chinatown neighborhood located immediately west of the ramps which connect the Artery with the Mass. Turnpike. Hudson Street in this area is lined with 3- and 4-story buildings located within 50 feet of expressway on-ramps.

The South Area project itself probably will not cause any noticeable increase or decrease in noise levels at this location. However, noise levels here are already so high that the area will be evaluated in terms of possible noise abatement measures, such as shielding or noise barriers, to be implemented as part of the South Area project.

Water Quality Impacts

Alternatives 1, 2 and 3 will provide no change in water quality in the South Area of the Corridor. Alternatives 4 through 9 all require construction of a northbound roadway on the edge of the Fort Point Channel. During construction, depending on the method of construction, differential impacts may result in the waters of the channel. Following construction, all alternatives will likely result in a positive impact on water quality as a consequence of roadway runoff control. The Fort Point Channel improvement not only fits with overall plans to improve the quality of the channel water, but may provide an incentive to advance the plans for water outfall treatment and control through integrated construction of the highway and water pollution control facilities.

III.D.5 Costs, Construction Duration and Disruption

Project Life

All deck replacement work anticipated in the alternatives will have a service life of 30 years. All tunnel construction will have a service life of 40 years.

Construction Costs - South Area

Construction costs for the No-Build alternatives (1, 2 and 3) are $10,640,000 in the South Area. This includes only the costs of concrete deck replacements on the existing Artery facility in the South Area.

Construction costs for alternatives 4 through 9 - Reconstruction of the South Area - are $190,580,000 in the South Area. This includes the construction of a new northbound roadway in the Fort Point Channel, connections into the existing facilities on the extremities of the new tunnel, and improvements to the approaches to the Dewey Square Tunnel from the south.

These costs are only for improvements to the Artery itself in the South Area, and exclude related projects, such as the Third Harbor Tunnel and the Central portion of the Artery.

Construction Costs - Related Projects

Alternative 1 - No related projects
Alternative 2 - Special Purpose Harbor Tunnel from Broadway to E. Boston: $407,940,000
Alternative 3 - General Purpose Harbor Tunnel from Broadway to E. Boston: $634,420,000
Alternative 4 - No related projects
Alternative 5 - Special Purpose Harbor Tunnel: $312,760,000
Alternative 6 - General Purpose Harbor Tunnel: $390,720,000
Alternative 7 - Reconstruction of the Central Area of the Artery: $875,000,000
Alternative 8 - Reconstruction of the Central Area of the Artery: $875,000,000 plus Special Purpose Harbor Tunnel: $312,760,000
Alternative 9 - Reconstruction of the Central Area of the Artery: $875,000,000 plus General Purpose Harbor Tunnel: $390,720,000

Types of Construction Disruption

Alternatives 1, 2 and 3	In order to maintain traffic on the expressways, the decks would be replaced one lane at a time. This will result in moderate traffic disruption for the duration of the construction period.
Alternatives 4, 5 and 6	While the northbound roadway is constructed along the Fort Point Channel, traffic on the Artery will not be affected. However, disruption to local traffic could be severe with streets being closed or detoured during construction. There will be moderate disruption resulting from tying the northern end of the tunnel in the Fort Point Channel into the existing elevated Artery.
Alternatives 7, 8 and 9	Similar construction disruption to alternatives 4, 5 and 6. There will be less disruption in the vicinity of Northern Ave. because the roadway is not tied to the existing elevated Artery.

Alternatives 4 through 9	Minimal construction disruption will result from deck replacements on the approaches to the Dewey Square Tunnel. In this area, where the roadway will be modified to link into the new Fort Point Channel tunnel, construction can be phased to allow for shifting of traffic between lanes to minimize the impacts of taking one lane out of service for deck repairs.

Improvements to portions of the South Area of the Central Artery will have to be undertaken within the near future. These improvements are principally deck replacements on the expressway in the area of the corridor south of the Dewey Square Tunnel. These decks are deteriorating and will need replacement if no other work is undertaken in the corridor. However, there are substantial problems in the operations of the present facility which should be examined to determine the appropriate course of action.

Operational problems of the present facility in the South Area must be solved within the present corridor. There are no feasible alternatives to the present corridor in which a new or bypass facility can be located. Alternatives to the present corridor have been examined for all alignments which have been discussed in past or present contexts; none of the alternative corridors provides a feasible location for a new facility.

Within the present corridor, there are few alternatives which improve operations of the South Area of the Artery without extensive negative environmental impacts. Widening the present Dewey Square tunnel, for example, is not an acceptable solution from a community or land damage viewpoint. Double-decking the Tunnel is likewise infeasible. Existing land uses and proposed new developments constrain alternative locations for improvements. Two basic alternatives have emerged: the no build which provides for upgrading the present facility; and a reconstruction which includes a new facility in the Fort Point Channel to provide for northbound movement, with a modified Dewey Square Tunnel providing for south-bound movement. These two basic alternatives have been examined in detail particularly with respect to their relationship to projects external to the South Area; i.e., the proposed improvements to the Central Area of the Artery Corridor, and a proposed Third Harbor Tunnel, for

either general or special purpose use. This analysis led to the examination of nine possible alternatives.

Feasible Alternatives for South Area

The chart below shows the alternative permutations which are possible in the South Area of the Artery Corridor. Alternative 1 is the basic no-build Alternative with Alternatives 2 and 3 as permutations. Alternative 4 is the basic reconstruction alternative with alternatives 5,6,7,8 and 9 as permutations.

Figure 34: South Area Alternatives

	Without 3rd H.C.	With 3rd Harbor Crossing	
		Special Purpose	General Purpose
NO BUILD	Alt. 1	Alt. 2	Alt. 3
RECONSTRUCTION WITHOUT AREA	Alt. 4	Alt. 5	Alt. 6
RECONSTRUCTION WITH CENTRAL CENTRAL AREA	Alt. 7	Alt. 8	Alt. 9

The No-Build Alternatives

Alternative 1, with deck replacement as its major feature, has two variations- Alternatives 2 and 3 - which include deck replacement in combination with previously developed alignments for a third harbor tunnel project. Alternatives 2 and 3 were examined because: 1. previous alternatives for a third harbor tunnel required study in relation to more current thinking about improvements in the South Area; 2. these alternatives are useful analytically for comparing no-build with build alternatives, each of which has been analyzed in relation to the possibility of a separate third harbor crossing project. Previous studies of a third harbor tunnel identified the Fort Point Channel as the most feasible location

for such a facility. However, use of the Channel for a third harbor tunnel, as in Alternatives 2 and 3, would foreclose South Area Artery improvements in that alignment. Current analysis shows that the Fort Point Channel can be used for Artery improvements while at the same time preserving the option for a separate third harbor tunnel at a later date, if that should become desirable. Because Alternatives 2 and 3 foreclose options for South Area Artery improvements, and because they are otherwise identical to Alternative 1, they should be dropped from further consideration as potential solutions for the South Area of the Artery. Alternative 1 should be retained for further study. If at a later date, Alternative 1 is selected, the question of a third harbor tunnel, as raised in Alternatives 2 and 3, can be examined on its own merits as a separate project.

Reconstruction Alternatives

Alternatives 4 through 9 represent the various possibilities of a full reconstruction of the South Area for Artery improvements. Alternative 4 is the basic alternative for reconstruction; Alternatives 5 through 9 are permutations of Alternative 4 which take into account related improvements to the Central Area of the Artery and/or the Third Harbor Tunnel.

Each of the permutations has been included to afford a basis for analysis of the reconstruction as it might relate to subsequent separate projects. Analysis of Alternative 4 has shown that it is possible to construct a new facility which would improve the transportation operations of the South Area without precluding or requiring any subsequent or separate projects in other areas. At the same time, Alternative 4 is compatible with concurrent or subsequent development of the related projects. Because of the potential interactions between South Area Artery improvements and other projects, it is recommended that Alternatives 4 through 9 be carried into further environmental and engineering analysis to determine the effects which might result if other projects are connected to the South Area.

It should be noted that the improvements to the Central Area of the Artery Corridor and the construction of a third harbor tunnel are separate projects, serving purposes and having benefits which are different from the reconstruction of the South Area of the Artery Corridor. The alternatives which have been developed for the South Area, and which should be carried forward (Alternatives 1,4,5,6,7, 8, and 9) have inherent flexibility to accommodate those future projects and the South Area needs, while accommodating those potential projects.

Detailed analysis of each of the alternatives is necessary. In particular the following tasks should receive special attention.

a. All alternatives require detailed analysis of:

- construction techniques and phasing
- traffic maintenance during construction
- transportation service
- demand/capacity analyses
- surface street impacts
- relation to harbor crossing demand and airport service
- safety during and after construction
- social impacts (regional and local) during and after construction
- social impacts to adjacent neighborhoods and the region, during and after construction
- land use and urban design considerations
- detailed cost estimates
- employment generation

b. Reconstruction alternatives require, in addition, detailed analyses of:

- ventilation requirements
- joint development opportunities
- decking requirements
- tunnelling requirements
- dangerous cargo handling
- joint rail line construction
- rail line service, space requirements

Anticipated Federal Funding Participation

I-93 is the principal North-South route connecting, in the north, the Boston Metropolitan Area to the Merrimac Valley (Lowell and Lawrence), New Hampshire, Vermont and Canada. To the south, it connects the Metropolitan Area to the southeast area of the Commonwealth, Cape Cod , Rhode Island, and the eastern seaboard. I-90, the Massachusetts Turnpike, a toll facility, connects the Metropolitan Area with the western Massachusetts metropolitan area of Worcester and Springfield, New York State, and states west of New York. Traffic problems associated with the interchange of these two roadways are documented in this report. Volumes of traffic on I-93 approximate 135,000 ADT; on I-90, 60,000 ADT.

Certain alternatives described in this document would require the addition, removal and/or realignment of certain ramp connections between these two major interstate routes. Replacement "in-kind" is anticipated.

Any federal-aided highway is subject to the requirement in Section 301 of Title 23, United States Code, Highways, that it be free from tolls (except for certain toll bridges and tunnels as provided in Section 129). This requirement is met. There is no intention of imposing tolls on I-93, nor are motorists using I-93 required to exit through the I-90 tolls. A large portion of I-93 traffic is not interchanging with the Massachusetts Turnpike. While the I-93/I-90 connection provides a major transfer of traffic between the two interstate facilities, I-93 as part of the interstate system is an essential through route and the major highway in the City of Boston. As long as the present interchange is not improved, motorists on I-93 will continue to experience severe traffic problems from operational and safety viewpoints.

If certain alternatives described were solely improvements for an approach to or from a toll facility, then that particular alternative would not be eligible for federal participation. This is not the case here.

The improvements described in all alternatives are mainly to improve traffic operational conditions on I-93, not I-90. In view of this, it is the opinion of the Department of Public Works that the formula for funding the chosen alternative be on an Interstate 90:10 basis.

APPENDIX I

Previous Studies Related to the South Area of the Artery Corridor

Over the past 15 years there have been many studies of the transportation problems of the South Area of the Artery Corridor. These have resulted in improvements for some situations and a backlog of attempts to correct certain of the Artery problems. The following is a compendium of the studies and subsequent action which has resulted from the studies.

1. Relocated Dorchester Avenue. In 1967, studies were conducted for the MDPW to determine the feasibility of widening the existing Dorchester Avenue. The proposed improvement was for a six-lane roadway in the Fort Point Channel, adjacent to existing Dorchester Avenue. The proposal included filling Fort Point Channel and several alternative construction techniques were examined in order to minimize impacts on the existing Red Line rapid transit tunnels in the middle of the Channel. The proposal required use of the Fort Point Channel alignment, even though special measures would have to be taken to protect the Red Line tunnels. Dorchester Avenue if improved would extend to Northern Avenue from its existing terminus at the bridge over the Channel in South Boston. The present right-of-way of Dorchester Avenue would not be used for new improvements, owing to its sale to the U.S. Post Office Department. After consideration of the proposal and its potential conflicts with proposed land uses along the channel, it was dropped from further consideration.

2. Third Harbor Crossing (Howard Needles, Tammen Bergendorff,1968) This study, directed to be undertaken by the Massachusetts Legislature, recommended a six-lane general-purpose tunnel to

be operated as a toll facility. The alignment chosen was the Fort Point Channel on the Downtown side of the harbor, to East Boston on the railroad alignment through the middle of the community, with connections to C-1 at the entrance to the Airport. The proposal elicited much adverse comment from the community, and led to the need for further examination of the potential alignment and demand for the facility. This work was done in the Boston Transportation Planning Review.

3. Harbor Crossing. The Boston Transportation Planning Review examined proposals for a third Harbor Crossing between E. Boston/Logan Airport and Downtown Boston. General - and special - purpose tunnels were examined on various alignments. Some alternatives included provision for related operations and service improvements, such as satellite parking, rapid transit improvements, bus-limo service, street improvements and high-speed rail in the NE corridor. The basic alternatives were: (1) a six-lane general-purpose tunnel from Downtown to the Airport and north to connect to a new expressway serving the north and north shore; (2) a 2-lane special-purpose tunnel between Downtown and the Airport and no new harbor crossing, but improved rail, bus/limo service and satellite parking; and (3) a no-build alternative, with Central Artery improvements including bus rights-of-way to the Sumner and Callahan tunnels along with major transit and service improvements.

At the conclusion of the study, the then governor recommended the construction of a two-way special-purpose tunnel in an alignment in the Fort Point Channel crossing the harbor and surfacing on airport property to terminate at the airport service road. This tunnel was intended to serve only buses, limos, trucks, emergency vehicles and taxis. It was also intended to be supplemented by major transit improvements and by satellite terminals for park-and-ride between suburbs and airport. After

presentation and deliberation by the state legislature, no approval was granted to proceed with the tunnel.

4. Deck Reconstruction--Southeast Expressway Reconstruction of deteriorating highway decks on the Southeast Expressway was first suggested in 1973. The original proposals called for replacement of all decks on the Southeast Expressway bridges. Two areas of concern were located within the South Area of the Artery Corridor: approaches to both the Dewey Square Tunnel and the Massachusetts Avenue Interchange, which are on elevated structures. Because of the extent of deterioration, the Massachusetts Avenue Interchange work is now under construction. However, deck replacement at other locations within the South Area has been postponed because of its potential relationship to the Central Artery project in the South Area. Along with the deck reconstruction, other operational efforts are underway to improve capacity and flow on the Southeast Expressway, both during and after construction. These include preferential bus and carpool lanes during rush hours and in peak direction, and the state program to encourage use of transit and carpools.

5. Massachusetts Turnpike Frontage Roads. The BRA recommended in a 1974 statement of South End transportation issues "a state-sponsored environmental assessment and basic design of alternatives for completing a Turnpike frontage road system from Dorchester Avenue and the Southeast Expressway to Dartmouth Street." This would involve a connection of Broadway with Marginal Road and an extension of Herald Street from Arlington Street to Dartmouth Street, along with related street modifications. The road would serve to remove truck traffic from congested South End residential streets.

6. South Boston Seaport Access Road. In September 1976, the BRA and MassPort selected a consultant to prepare a draft environmental assessment for a seaport access road in South Boston.

Currently, industrial truck traffic randomly utilizes the South Boston local street system in seeking access to the Castle Island container terminal and other industrial or commercial areas located north of West First Street. The Seaport Access road has been proposed to end intrusion of industrial traffic onto residential streets and improve the potential for development of South Boston's 600 acres of underused and vacant land. It would supplement joint private and public efforts to revitalize existing commercial and industrial properties in the area north of First Street and west of Summer Street.

7. New Northern Avenue Bridge Over Fort Point Channel and its Approaches. Plans have been advanced for a new fixed-span Northern Avenue bridge approximately 200 feet southwest of the antiquated existing bridge. An EIS has been completed by the MDPW and final engineering studies await the outcome of final determination of the historic worth of the existing bridge and the issues of navigation of the Fort Point Channel. Northern Avenue and its bridge is the most important and heavily used traffic link betweek South Boston and Boston Proper. The bridge is vital for smooth flow of present and future traffic and for improvement of commercial and residential life in the adjacent and deteriorating areas.

8. Lafayette Place. As part of continuing efforts to strengthen the retail shopping core of Downtown, Lafayette Place has been designed to house new shops, expansion room for a major department store, and parking for shoppers. The major transportation impacts result from the proposed alterations to the Downtown street pattern. Essex Street is proposed to become a major connector into the new development, tying to the Artery Corridor at Atlantic Avenue. The new street would be two-way, and would link to the South Station area near Dewey Square. New parking would be approached from the street, and major connections to the Artery corridor would be essential for ready service to the proposed parking facilities.

9. South Station Transportation Center. The most important new traffic generator in the South Area is the proposed 82-acre South Station Transportation Center, presently owned by the BRA and scheduled to be rebuilt by 1980 as an "intermodal transportation center" serving Amtrak inter-city trains and MBTA commuter and rapid transit trains. Public improvements, totaling over $100 million, will include renovation of the existing "head house," and construction of a passenger facilities center and a rail, bus and auto transportation terminal. An EIS has been completed and reconstruction of the old "head house" has begun. The upper levels of the new Transportation Center will provide up to 2,500 parking spaces and may connect directly to the Southeast Expressway and adjacent streets.

10. Crosstown Street, South End. The BRA is currently designing the portion of the Southwest Corridor Arterial Street that runs from Massachusetts Avenue to Tremont and Columbus Avenues. At Massachusetts Avenue, the street ties directly to ramps of the Central Artery. Construction of the Arterial Street has been declared a non-major action. Actual construction of the arterial will be undertaken by the Massachusetts Department of Public Works.