FINAL DRAFT REPORT

ROUTE 10 CORRIDOR PLANNING STUDY

A Comprehensive Analysis of Traffic and Land
Use Within the Route 10 Transportation
Corridor Interconnecting Easthampton and Northampton, MA

Prepared for:

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and

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1.0 PREFACE

1.0 PREFACE

Route 10 is the principal highway connecting the center of Northampton and the center of Easthampton. As a result of concerns in the two communities regarding increased activity along the Route 10 Corridor, especially including safety issues, the Pioneer Valley Planning Commission, in consultation with officials of the municipalities involved, has undertaken an extensive corridor planning study to determine existing conditions, project future trends, and establish what problems are likely to emerge. A strategy has been designed for addressing and resolving the conditions of anticipated congestion and safety hazards.

Traffic in this corridor has increased significantly over the past decade, partly due to greater interchange between the communities, but largely the result of trips generated by new developments built along Route 10, particularly in the Town of Easthampton. Inadequate control of this growth has resulted in periods of congestion, increasing delays at driveways and intersections, lengthening travel times, more safety hazards and conflicts.

Growth has some benefits as well, such as increased tax base and employment opportunities. A major point of this study is to show what changes need to be made to accommodate desirable future development without suffering from increasing highway congestion and safety hazards in the process.

2.0 LAND USE

2.0 ROUTE 10 LAND USE ANALYSIS

2.1 INTRODUCTION

2.1.1 Study Objectives

The objectives of the land use component of this study are to:

- Determine current land use patterns and development trends within the Route 10 Corridor;
- Assess the impacts of existing and future land use on Route 10 traffic safety and volumes;
- Recommend appropriate land use policies to minimize adverse future traffic impacts;
- Provide opportunities for public participation in the planning process by municipal officials, residents, landowners, and business leaders;
- Provide a specific action plan which will promote well-planned commercial and residential development within the Route 10 Corridor, in accordance with available public infrastructure capacity, protection of environmentally sensitive areas and community character.

2.1.2 Description of the Route 10 Corridor

Route 10 is a state-maintained highway which connects Northampton to Easthampton (and ultimately to Westfield), and is one of the Pioneer Valley's key north-south transportation arteries. The Route 10 Corridor is defined, for purposes of this study, as extending from the Old South Street intersection in Northampton to the Pleasant Street intersection in Easthampton. *See Route 10 Corridor Study Area Map.*

Northampton is a commercial center and residential community, with a 1990 population of 29,289. Easthampton is a commercial, industrial and residential community of 15,537 residents.

Both Northampton and Easthampton experienced considerable residential, commercial and industrial growth between 1971 and 1985 as illustrated in Table 1, although their populations levels have remained practically unchanged during the past decade.

Northampton experienced a surge of new housing construction in the late 1980's, with 654 new residential building permits issued in the period 1985-1987, as compared to 140 building permits in the previous three-year period 1982-1984. Easthampton's activity peaked in the early 1980's in part due to a building moratorium established in February, 1987. Easthampton issued 257 building permits in the three-year period 1982-1984, and 101 building permits in the two-year period 1986-1987.

Table 1.
Land Use Change in Northampton and Easthampton 1971-1985

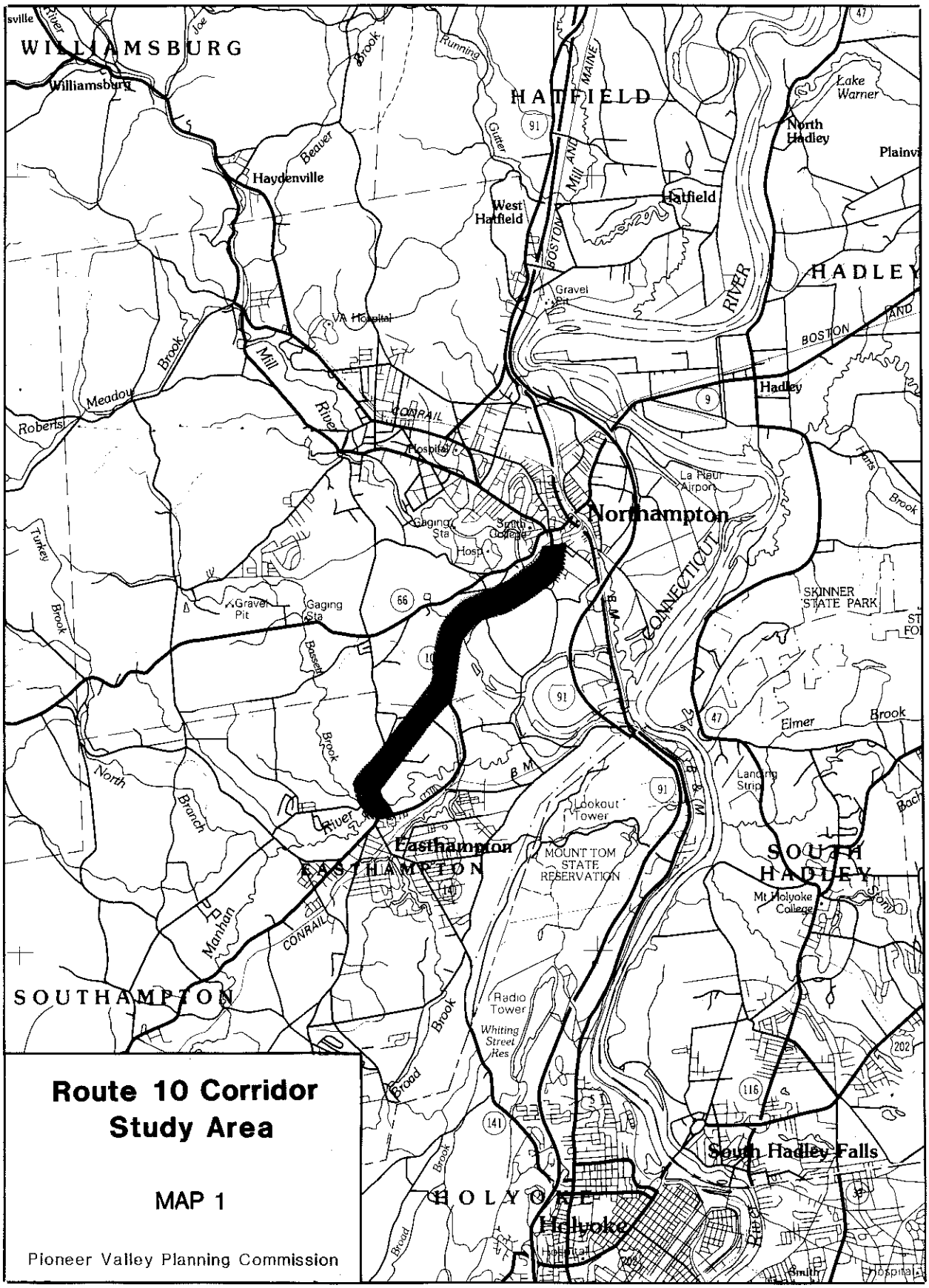
	Residential		Commercial		Industrial	
	Change In Acres	Percent of Change	Change in Acres	Percent of Change	Change in Acres	Percent of Change
Northampton	+433	14.5	+37	0.6	+ 37	32.0
Easthampton	+398	22.6	+26	27.9	+147	40.3

Source: Pioneer Valley Planning Commission and University of Massachusetts Department of Forestry and Wildlife Management

Within the Route 10 Corridor, the level of commercial development differs greatly between Northampton and Easthampton. The Northampton section of the corridor is heavily built-up in residential neighborhoods at the northern end, but contains significant undeveloped acreage in the southern section near the Easthampton town line. Some of the undeveloped land in Northampton has environmental constraints, such as floodplain or wetlands, which affect its development potential. Isolated land tracts in this section contain industrial or commercial uses, such as solid waste recycling, fuel oil storage and self-service storage units.

The Easthampton section of the Route 10 Corridor is much closer to the build-out stage than the Northampton section. The southern section, closest to the Easthampton town center, is heavily built-up in a mix of residential and commercial uses. The northern section is a traditional commercial strip, comprised of a mix of business uses, including gas stations, auto dealers, fast-food restaurants and banks. Although many of the lots fronting Route 10 have been developed, there is significant potential for intensification of existing uses, and development of back land, behind the frontage lots.

The results of unmanaged growth in the Route 10 Corridor have adversely affected traffic safety and congestion. The Easthampton section of the corridor, in particular, has been adversely affected by multiple, uncontrolled curb cuts, by lack of pedestrian safety features and amenities; by the profusion of auto-oriented businesses on small lots; and by the aesthetic impacts on community character of commercial strip development in the absence of design and landscaping controls. This trend of strip development is beginning to evolve on the Northampton section of the corridor as well, despite the environmental constraints and industrial zoning that exist along much of this section.


WILLIAMSBURG
Williamsburg
HATFIELD
Haydenville
West Hatfield
Hatfield
North Hadley
Lake Warner
HADLEY
Hadley
Northampton
Easthampton
EASTHAMPTON
SOUTHAMPTON
SOUTH HADLEY
South Hadley Falls
HOLYOKE
Holyoke
MOUNT TOM STATE RESERVATION
SKINNER STATE PARK
Mt Holyoke College
La Fleur Airport
VA Hospital
Gravel Pit
Gaging Sta
Lookout Tower
Radio Tower
Whiting Street Res
Landing Strip
CONRAIL
CONNECTICUT RIVER
Mill River
Meadow Brook
Broad Brook
Manhan
North Branch
Bassett Brook
Elmer Brook
Roberts
Turkey Brook
Running Gutter Brook
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Route 10 Corridor
Study Area
MAP 1
Pioneer Valley Planning Commission

2.2 LAND AND ENVIRONMENTAL CHARACTERISTICS

Route 10, as it passes from the intersection of Route 10 and Old South Street in Northampton to Easthampton Center, is mostly level with a few sloping sections. There are four distinct land use types, from north to south. For approximately one mile the landscape in Northampton is dominated by an extension of an intensively developed urban residential area with scattered commercial uses. There are well kept older homes with mature trees and modest landscaping. Past the Mill River diversion to the Easthampton town line (approximately 1.5 miles) the landscape becomes more open with scattered industrial sites. To the east is a large wetland and floodplain area. To the west the topography becomes more steeply sloped and wooded. The highway climbs slightly to the town line. In Easthampton, from the town line south, is an approximately one mile segment of straight highway, newly developed as a commercial strip. To the west of the highway is a large expanse of farmland. Until recently, the predominant use of this segment was farmland scattered with a few commercial uses. The final segment of the highway to Easthampton center drops down to cross the Manhan River through an older, modest residential neighborhood.

2.2.1 Soil Characteristics and Prime Farmland

Soils for the study area are primarily defined by two soils associations: The Hadley-Merrimac-Windsor (HMW) Association and the Hadley-Winooski-Limerick (HWL) Association. HMW soils are mostly dry, sandy, loamy soils formed in outwash deposits. HWL soils are deep, loamy moderately to poorly drained soils formed in alluvial plains or flood plains.

About 1/4 mile of the frontage of the study area just west of the large wetland area in Northampton contains prime agricultural soils (Boxford soils). About 3/4 mile of the frontage in the Easthampton study just southwest of the town line area are prime agricultural soils (also Boxford soils). These soils extend 1,000 - 1,500 feet from the frontage.

Many of the soil types in Northampton, which are not currently developed have soil characteristics of either a high water table or slow permeability which could limit the use of on-site septic systems. Some Northampton soils also have a 15% slope or greater which could limit larger commercial or industrial developments.

Some soils in Easthampton also have a high water table and slow permeability. Slope in Easthampton is generally less than 8%. *See Environmental Constraints Map.*

2.2.2 Floodplain Areas

Route 10 in Easthampton crosses the Manhan River near the center of town. Approximately 175 feet of the frontage on both sides of the highway are within the 100 year floodplain.

There is a large floodplain in Northampton in the area of the Mill River Diversion encompassing Pynchon and Manhan Meadows. About 1,700 feet of frontage on the east side of Route 10 and 1000 feet on the west side are in the 100-year floodplain. This large floodplain is part of the Oxbow floodplain of the Connecticut River. A large parcel owned by the Audubon Society is located in this floodplain as is the Arcadia Wildlife Sanctuary. There is also a small floodplain area north of Route 10 near the Northampton/Easthampton town line.

2.2.3 Groundwater

The entire study area overlays an area of high potential for groundwater availability. This includes areas underlain by stream and lake deposits of predominantly coarse and fine stratified drift with moderate to high saturated thickness.

The Northampton section of the study area is not located in either the primary or secondary recharge areas for either the Spring Street or Clark Street wells, the two well supplies located in Northampton.

The Easthampton section of the study area is not located in the Barnes Aquifer; a major water supply source for Easthampton and surrounding towns. Hence, it is not located within the primary or secondary recharge areas for the Nonotuck Park well or Hendrick Street Wellfield.

Currently, there is no aquifer study or recharge area map for the Lovefield St. well. It is believed the aquifer recharge area for the Lovefield Well lies to the north of the well. If this is the case it is likely the recharge area would be located in the Route 10 study area. More studies are needed to accurately determine whether this is the case.

2.2.4 Wetlands

Northampton's Conservation Commission has mapped wetlands throughout the community. Along Route 10, there are the large significant wetlands located within the floodplain in Pynchon Meadows. In addition, there is a large wetland located on the east side of the highway near the Easthampton/Northampton town line.

In Easthampton, a development has been proposed on the east side of O'Neil Street at the intersection of Northampton Street, and the developer has been required to further define wetlands in that area. Easthampton does not have wetlands maps to define wetland boundaries. PVPC compiled wetlands mapping data from the National Wetlands Inventory and Soil Conservation Service. This data illustrates significant areas of wetlands and wet soils east of Route 10 in Easthampton, and smaller areas west of Route 10.

Sources : USGS Topographic Maps; Easthampton FIRM Maps; USDA Soil Survey; National Wetlands Inv
MacConnell Map Down Maps; Northampton Flood Boundary and Floodway Work Map

MAP 2

2.3 EXISTING LAND USE

2.3.1 Data Collection and Mapping

In order to assess land use and development trends along the Route 10 corridor, PVPC staff gathered data from assessors' records, realtors and "windshield surveys" of Route 10 properties. Data collected for all land parcels abutting the Route 10 Study area included:

- Ownership/Renter
- Size of Parcel
- Frontage
- Street Access/Number of Curb Cuts
- Zoning District
- Current Use
- Number and Size of Structure
- Assessed Value of Land and Buildings

This data has been stored on a computerized data base of Route 10 land parcels.

A new Route 10 corridor base map has been prepared to illustrate all parcels abutting the highway. Using this base map, the following working maps have been developed at a scale of 1" = 400':

- Zoning
- Generalized Land Use - 1989
- Development Trends
- Environmental Constraints
- Public Utilities

These maps are shown, at reduced scale, on the following pages.

Sources of information used to produce the series of maps were: Assessors maps and records in Easthampton and Northampton, building inspector records and conversations in Northampton and Easthampton, conversations with local realtors, U.S.G.S. topographic maps, Easthampton F.I.R.M. maps, Northampton Flood Boundary and Floodway work map, Northampton "unofficial" wetland location map, National Wetlands Inventory maps, MacConnell Map Down maps, Easthampton zoning map, Northampton zoning map, U.S.D.A. soil survey, Easthampton sewer map, conversations with the Easthampton Town Engineer, Northampton sewer maps, conversations with the Northampton Department of Public Works and conversations with the Easthampton and Northampton Planners.

2.3.2 Existing Land Use

The existing land use for the study area contains a dominance of residential and commercial uses. The following are the "vital statistics" for the study area:

- 258 parcels in the total study area, including 154 in Northampton and 104 in Easthampton;
- 611.96 parcel acres abutting the study area, 440.78 acres in Northampton and 171.18 acres in Easthampton;
- 7.6 miles of assessed frontage along the study area, 4.9 miles in Northampton and 2.7 miles in Easthampton;
- 182 curb cuts along the study area, 96 in Northampton, 86 in Easthampton;

- curb cuts are an average of 219 feet apart for the 7.6 mile area, an average of 163 feet in Easthampton and 268 feet in Northampton;
- parcels have an average of 154.5 feet of frontage per parcel, 167 feet for parcels in Northampton, 135.5 feet for parcels in Easthampton;
- The parcels and structures have a total assessed value of $55,525,700 for the study area; $33,655,800 for Northampton; $21,869,900 for Easthampton;
- There is an average combined land and structure value if $215,215.89/per lot or $90,734/acre;
- There are an average of .70 curb cuts per parcel.

Tables 2, 3 and 4 show generalized land use in each town and for the study area.

Table 2 .
Generalized Land Use for Easthampton

Land Use	# of Parcel	# of Acres	Frontage (ft)
Vacant	24	73.5	3,136.5
Industrial	2	1.0	75.0
Residential	40	24.7	4,162.5
Institutional	1	.8	80.0
Office/Medical/Lodging	5	7.0	831.9
Commercial	17	20.7	3,921.5
Mixed/Multi Use	14	43.3	1,904.8
Open/Recreational	1	.2	60.0
TOTALS	104	171.2	14,172.2

Source: Easthampton Assessor's Records and PVPC field survey.

Table 3.
Generalized Land Use for Northampton

Land Use	# of Parcels	# of Acres	Frontage (ft)
Vacant	34	108.8	8,132.9
Industrial	8	27.9	2,808.4
Residential	91	30.4	7,984.9
Institutional	2	1.4	201.0
Office/Medical/Lodging	2	2.8	484.5
Commercial	3	42.9	872.5
Mixed/Multi Use	13	50.5	4,262.5
Open/Recreational	1	175.7	999.8
TOTALS	154	440.7	25,746.5

Source: Northampton Assessor's Records and PVPC field survey

Table 4.
Generalized Land Use for the Study Area

Land Use	# of Parcels	# of Acres	Frontage (ft)
Vacant	58	182.3	11,269.4
Industrial	10	28.9	2,883.4
Residential	131	55.1	12,147.4
Institutional	3	2.2	281.0
Office/Medical/Lodging	7	9.8	1,316.4
Commercial	20	63.6	4,794.0
Mixed/Multi Use	27	93.8	6,167.3
Open/Recreational	2	175.7	1,059.8
TOTALS	258	611.9	39,918.2

Source: Easthampton and Northampton Assessor's Records and PVPC field survey

The largest number of parcels, 131, (56% of the total number of parcels in the study area) are developed to residential use. These parcels account for 30% of the frontage but only 9% of the acreage.

The greatest amount of acreage, 182 acres, (30% of the study area total), is undeveloped. This land accounts for 28% of the frontage in the study area.

The sections of the study area in each community are very different. In Easthampton, the greatest number of parcels are in residential use, forty parcels, (39% of the parcels in Easthampton.) These parcels account for only 14% of the acreage and 30% of the frontage. Commercial and mixed/multi use (which is mostly commercial) accounts for thirty-one parcels, (30% of the parcels in Easthampton,) which is 37% of the acreage and over 41% of the frontage. In Easthampton, there are twenty-four undeveloped parcels (23%) containing 42% of the acreage and 22% of the frontage. The Easthampton portion of the study area is a densely populated, heavily built-up residential area adjacent to a classic commercial strip development of large frontage sized lots. The relatively large amount of undeveloped land indicates this commercial pattern could continue and intensify without tighter controls.

In Northampton, the greatest number of parcels, ninety-one (59 of the parcels in Northampton) are developed to residential use. These parcels account for 31% of the frontage but only 7% of the acreage. The largest acreage is a 175 acre parcel owned by Arcadia Wildlife Sanctuary. While this parcel is not going to be developed, the relatively small amount of frontage the parcel has will play only a small role in the future development of that section of the highway. Thirty-four parcels, (22% of the parcels in Northampton), which have 25% of the acreage and 32% of the frontage are undeveloped parcels. Three parcels have commercial uses. The future development of the large amount of undeveloped land will play an important role in determining the future of the Northampton section of the study area. *See Map of Existing Land Use.*

2.3.3 Business Use Characteristics

There are twenty parcels devoted solely to business use, either retail or service, in the study area. These parcels are an average of 3.2 acres in size and have an average of 240 feet of frontage on Route 10. There is approximately 70,000 square feet of floor space. Each business has an average of 1.35 curb cuts/parcel.

In addition to these twenty parcels there are twenty-seven parcels which have either mixed use or multiple uses. Eleven of these parcels combine a residential use with some type of more intense commercial use. Ten of these parcels have more than one business use, i.e. small shopping center. The mixed and multi-use parcels average 3.5/acre in size, average 224 feet of frontage and have an average of 1.00 curb cut/parcel.

For the study area there are a total of sixty-nine different retail uses. The following table lists the retail uses:

Table 5.
Retail Use

	Easthampton	Northampton	Study Area
Specialty/general retail	27	1	28
Lumber/hardware	2	0	2
Restaurant/bar	9	0	9
Fast food restaurant	4	1	5
Car dealership: new/used	7	2	9
Gas stations	1	1	2
Auto repair sales/service	7	4	11
Convenience Store	1	0	1
Video Store	2	0	2
TOTALS	60	9	69

Source: Easthampton and Northampton Assessor's Record and PVPC field survey

The business uses, which because of existing zoning are mostly located in Easthampton, are generally on larger parcels, with more frontage and more curb cuts than residential parcels. They exhibit a consumptive land use pattern. The trend toward mixed and multi-uses indicates there is likely to be an intensification of land use in the future.

2.3.4 Residential Use Characteristics

There are 131 parcels developed to residential use in the study area. The average size per parcel is slightly over 18,000 square feet. The average frontage is 93 feet. There are sixty-nine parcels devoted to single-family use and sixty-two parcels devoted to more than one-family use; either duplexes or multi-unit structures. There are a total of 332 living units on these parcels. The average number of curb cuts/parcel is .68.

There are forty parcels in residential use in Easthampton, twenty-five parcels have single family homes, fifteen parcels have more than one living unit. The average size of this residential parcel is 27,000 square feet. The average frontage is 118

feet. These forty parcels support 118 living units. There is an average of .80 curb cuts per parcel.

There are ninety-one parcels developed to residential use in Northampton. These parcels are developed with forty-four single family homes and forty-seven structures with more than one unit. There are 254 living units on these ninety-one parcels. The average size of the parcel is 14,600 square feet. The average frontage is eighty-seven feet. There is an average of .64 curb cuts per parcel.

Thus residential land uses in both municipalities exhibit a densely settled land use pattern with relatively small lot sizes and small amounts of frontage. Many of the parcels have shared curb cuts or access onto side streets rather than Route 10. Residential use in Northampton is predominantly multi-unit while in Easthampton it is single family. However, in Easthampton many of the multi-unit structures have been constructed relatively recently. Recent building permits indicates some conversion of single-family units to two-family use in Easthampton.

2.3.5 Undeveloped Land

There are fifty-eight parcels (22% of all parcels in the study area) which are undeveloped. These parcels total 182 acres (30% of the study area), have 11,269 feet of frontage (28% of the study area) and twenty-three curb cuts. For the purpose of this study, undeveloped land is defined to be land without any structures.

There are twenty-four undeveloped parcels in Easthampton. These parcels total 73.5 acres with 3,173 feet of frontage and eleven curb cuts. The average size per parcel is 3.1 acres, the average frontage is 130 feet. Two of the twenty-four parcels are used as access roads or a parking lot. Twenty-one parcels, totalling seventy-two acres, 2,918 feet of frontage with ten curb cuts, are located in the General Business (GB) district. The other three parcels are in residential zoning districts. Some of these twenty-four parcels, because of size, location (currently landlocked), and environmental constraints, are not readily developable. According to tax assessments, eight parcels totalling fifty acres, and 1,869 feet of frontage have commercial development potential. Two of these eight parcels already have curb cuts. Seven parcels, totalling fourteen acres and 663 feet of frontage have residential developmental potential. Three of these, seven parcels have curb cuts and one parcel has two curb cuts. Only one small parcel in Easthampton is devoted to permanent open space as a town park.

There are thirty-four undeveloped parcels in Northampton. These parcels total 109 acres, have 8,133 feet of frontage and have twelve curb cuts. These parcels average 3.2 acres with 239 feet of frontage. Ten of the thirty-four parcels are currently in use; nine as parking lots for car dealers. Eighteen parcels, totalling 26.4 acres with 3,865 feet of frontage and four curb cuts, are in the General Industry (G.I.) Zone. Seven parcels totalling 80.5 acres, with 3,272.8 and three curb cuts are in Suburban Residential (S.R.) Zone. Nine undeveloped parcels totalling 1.86 acres and 994 feet frontage are located in the Medium Density Residential (URB) district.

According to tax assessments, seven parcels totalling 79.5 acres and 3,297 feet of frontage have immediate residential development potential. Two of these parcels have curb cuts; one parcel has two curb cuts. In addition, seven parcels totalling 14.5 acres with 1,731 feet of frontage have industrial development potential. One parcel has a curb cut.

This data for Northampton does not include the 175 acre Audubon parcel which is classified as permanently protected open space.

Thus the data reveals that there is potential for development, both residential, commercial and industrial, to increase in the study area. Some parcels already have curb cuts, which effectively removes a development control. Several parcels which are in use now as parking lots could be converted to more intense use. While Northampton has some permanent open space, most of the vacant land in Easthampton has development potential.

Sources : Easthampton Assessor's Records; Northampton Assessor's Records; PVPC field survey

MAP 3

2.4 ZONING REVIEW

2.4.1 Introduction

The land uses and development patterns that have evolved along the Route 10 Corridor are largely attributable to the zoning regulations in effect in Easthampton and Northampton. The purpose of this section is to examine the zoning bylaws in effect along the Route 10 Corridor to determine what, if any, recommendations can be made to improve the regulations that will influence future Route 10 development. By increasing local controls, Easthampton and Northampton can reduce the problems associated with traditional commercial strip development.

2.4.2 Summary of Easthampton Zoning in the Route 10 Corridor

Easthampton has zoned its segment of the Route 10 Corridor for a mix of commercial, residential and industrial uses, as shown on the "Existing Zoning" map herein. About three-quarters of the Route 10 Corridor in Easthampton is zoned General Business. This business district generally extends 300-500 feet in width on either side of Route 10.

Permitted uses within Easthampton's General Business district include the following:

Convenience retail establishments
General retail establishment
Sit-down restaurants
Motels
Personal and consumer service establishments
Funeral establishments
Membership club
Professional and business offices and services
Automotive repair, automotive service station or garage
Business repair services
Outdoor amusement and recreation service
Antique or gift shop
Church or religious use
Public or religious educational use
Public park
Town building
Street, bridge, railroad
Public utility
Agriculture, horticulture, and floriculture on parcels over 5 acres
Wholesale and retail greenhouse

In addition, the following uses are allowed by Special Permit:

Drive-in restaurants
Vending machine businesses
Motor vehicle sales
Lodging house
Planned business development
Radio or television tower or station
Raw materials removal (i.e. sand and gravel)
Transportation service facilities
Open storage of raw materials, finished goods or construction equipment
Research offices

Private day nursery or kindergarten
Nonprofit recreational facility
Town highway equipment and electric utility garage
Agriculture, horticulture or floriculture on parcels of 5 acres or less
Commercial stables, kennels or veterinary hospitals
Commercial forestry

Easthampton allows a "planned business development" by Special Permit on lots over five acres in size. These developments must be contained in one continuous building or grouping of buildings, which must be served by a common parking area and driveway. A maximum floor area ratio of 0.5 is also established.

The dimensional regulations in the Easthampton General Business district require the following minimum lot dimensions:

Lot size: 25,000 square feet
Frontage: 120 feet
Front and rear yards: 30 feet
Side yard: 25 feet
Maximum height: 30 feet
Maximum building coverage of lot: 40%

In October 1988, Easthampton approved a Site Plan Review-Special Permit bylaw. Site Plan Review-Special Permit is required for the projects which involve the new construction of commercial, industrial, utility, office, institutional, municipal, or non-exempted residential structures; expansion of an existing use resulting in a floorspace increase of twenty-five percent or 5,000 square feet whichever is less; and a change in use of a building that will produce new processes related to odor, noise, vibration or public health not already associated with the existing use. The bylaw provides that the Planning Board may required a detailed traffic study for large developments or developments in heavy traffic areas.

Easthampton has zoned a small segment of the Route 10 Corridor near the O'Neil Street intersection for industrial use. However, a significantly larger tract on both sides of O'Neil Street directly abutting the Route 10 Corridor is also zoned industrial. The following uses are allowed by right in the industrial zone:

Processing of raw materials
Transportation service facilities
Research offices
Motor vehicle sales
Business repair services
Church or religious use
Public or religious educational use
Public park
Street, bridge, railroad
Town highway equipment and electric utility garage
Public utility
Agriculture, horticulture or floriculture on parcels over 5 acres
Wholesale greenhouse

In addition, the following uses are allowed by Special Permit in the industrial district:

Removal of raw materials (i.e. sand and gravel)
Open storage of raw materials, finished goods or construction equipment
Planned industrial developments
Manufacturing
Convenience retail establishments
General retail establishments

Sit-down and drive-in restaurants
Vending machine business
Automotive repair, automobile service station or garage
Junkyard
Amusement and recreation services
Planned business developments
Town building
Agriculture, horticulture and floriculture on parcels of 5 acres or under
Retail greenhouse
Raising of fur animals and/or swine
Commercial stables, kennels, or veterinary hospital
Commercial forestry

The dimensional regulations in the Easthampton Industrial District require the following minimum lot dimensions:

Lot size: 40,000 square feet
Frontage: 140 feet
Front yards: 50 feet
Side yard: 25 feet
Rear yard: 30 feet
Maximum height: 30 feet
Maximum building coverage of lot: 50 percent

"Planned industrial developments" are permitted by Special Permit in Easthampton's Industrial district on lots of forty acres or more. Uses within a planned industrial development are limited to manufacturing or service industrial uses and the uses must be totally contained with the building. Individual lot sizes within the development can be reduced to ten percent below what is normally permitted, but the number of establishments cannot exceed that which would normally be permitted in the standard requirements of the district. A minimum of ten percent of the district must be set aside as permanent open space.

Finally, several sections of Easthampton's segment of the Route 10 Corridor is zoned for residential use. Most of the areas are zoned R-15 (15,000 square-foot minimum lot size), but there are also some areas zoned R-5 (5,000 square-foot minimum lot size) and R-35 (35,000 square-foot minimum lot size).

2.4.3 Summary of Northampton Zoning in the Route 10 Corridor

Northampton has zoned its segment of the Route 10 Corridor for industrial, residential and special conservancy use, as shown on the "Existing Zoning" Map. About half of the Route 10 Corridor in Northampton is zoned General Industrial. The following uses are allowed by right in the General Industrial zone:

Construction supply establishments
Manufacturing
Wholesale bakery, wholesale laundry or dry cleaning plant
Railroad yards and railway express service
Motor freight terminal and warehousing
Railroad passenger terminal
Wholesale trade and distribution
Research office
Commercial motor vehicle maintenance, garaging and parking facilities
Tradesman
Business service and supply service establishments
Repair service establishments
Commercial parking lot

Agriculture, horticulture and floriculture
Church, religious use or educational use
Municipality facility and parking lot

In addition, the following uses are allowed by Special Permit in the General Industrial zone:

Removal of raw materials (i.e. sand and gravel)
Processing and treating of raw materials
Heliport
Contractor's yard, open storage of raw materials, finished goods or construction equipment
"Sit-down" restaurants
Motor vehicles sales
Medical Center
Automotive repair or automotive service station
Commercial radio and TV tower
Bridge, tunnel
Private utility, power plant
Small scale hydroelectric generation

The dimensional regulations in Northampton's General Industrial zone require the following minimum lot dimensions:

Lot size: 20,000 square feet
Frontage: 120 feet
Depth: 140 feet
Setback: 20 feet
Side yard: 15 feet
Rear yard: 20 feet
Maximum height: 40 feet
Maximum coverage: 50%

Northampton's Special Conservancy district intersects Route 10 for a distance of about 2000 feet on the side near the Mill River (see Map 4). This district also lies behind much of the General Industrial zoned land which abuts the east side of Route 10. The only land uses permitted by right in the Special Conservancy district are agriculture, horticulture and floriculture. The following uses are allowed by Special Permit:

Single family dwelling
Outdoor commercial recreation use
Municipal facility
Bridge, tunnel
Private utility
Small scale hydroelectric generation
Year-round greenhouse
Commercial radio and TV tower
Removal of raw materials (i.e. sand and gravel)
Processing and treating raw materials
Railroad passenger terminal
Airport
Heliport

Finally, Northampton has zoned several segments of the Route 10 Corridor for residential use of varying intensities, including Suburban Residential (SR), Medium Density Residential (URB), and High Density Residential (URC).

Northampton is currently developing a new Business Park zoning district proposal for some of the land located in the Suburban Residential zone on the west side of Route 10. Uses which would be allowed in the Business Park zone

would include any uses currently permitted in the Suburban Residential zone either by right or by special and a planned business park by special permit. Uses permitted in a planned business park include manufacturing, research offices, business offices and services excluding professional offices and sales offices, tradesmen, restricted retail and commercial uses, residential uses and community facilities. The non-business uses of any planned business park are restricted to a specific percentage of gross floor area within the planned business park. The planned business park will be primarily business/manufacturing in nature while permitting on-site support services as well as housing. Common curb cuts and common driveways would be encouraged to minimize traffic and safety impacts. Performance standards would be established for screening buffers, signs, and off-street parking and loading.

In 1988 Northampton adopted a site plan approval process. The bylaw applies to most commercial and industrial projects over 2,000 square feet in gross floor area. Smaller projects (2,000-4,999 square feet) require a simplified site plan review, while larger projects (5,000 square feet and larger) require more detailed site plan approval with a Special Permit. There are no performance standards to be met in the bylaw.

In addition Northampton made some amendments to its zoning ordinance in July 1990 that have a direct impact on the Route 10 corridor. Several definitions (i.e. driveways, construction supply establishments, motor vehicle) were adopted or amended for easier interpretation. Changes to the off-street parking and loading regulations included amendments to parking and loading space standards, standards for parking and loading areas with five or more spaces, and shared parking lot requirements.

2.4.4 Problems Areas in Easthampton Zoning Bylaws

Recently, Easthampton has made efforts to upgrade its commercial development controls, most notably with the adoption of a site plan approval bylaw. However, Easthampton's existing bylaw still contains only limited regulations designed to reduce the traffic volume and safety impacts of new development. It also lacks controls on the aesthetic impacts of new buildings and signs, environmental performance standards.

The existing zoning bylaw has resulted in a somewhat haphazard, uncontrolled form of commercial strip development occurring along almost the entire length of the Route 10 Corridor in Easthampton. Based upon a thorough review of development which has occurred along Route 10, the following problems can be traced to the zoning bylaw or zoning enforcement:

- Uncontrolled curb cuts: multiple curb cuts for individual businesses; large paved areas linked directly to the highway.
- Signage problems: over-sized, unattractive signage which may distract motorists; a proliferation of temporary signs; placement too close to the road.
- Pedestrian and motorist safety: lack of sidewalks and pedestrian crossing areas; traffic circulation problems within sites; vehicular access and safety problems within sites; vehicular access and safety problems.
- Design/Architecture: building designs not in keeping with town character or a unifying design theme.
- Landscaping/Screening: lack of landscaping in between parking areas and highway; lack of landscaping in parking areas; lack of screening of unsightly uses; parking of autos immediately adjacent to highway.

- Density: proliferation of small business uses on small lots, each with an individual curb cut.

In addition to these issues, the following comments are made regarding specific sections of the Easthampton zoning bylaw:

- Planned Business Developments: This concept can be very beneficial to Route 10, and the existing bylaw allowing PBDs are well-drafted, but landscaping standard and pedestrian access issues should be addressed. This form of development should be encouraged through incentives, or required for future projects locating along Route 10.

- Site Plan Review: The bylaw is well-drafted, but should be expanded to include performance standards for landscaping, architectural design, access/driveways, and traffic reduction/mitigation measures.

- Industrial Zone: This district allows many by-right uses which are not industrial in nature, and which are high volume traffic generators (e.g. retail, restaurants, auto repair).

- Minimum Lot Size: The existing minimum lot size in the General Business district of 25,000 square feet is too small to prevent a proliferation of closely-spaced businesses and curb cuts.

- Special Permit Criteria: The criteria under which Special Permit applications are evaluated are somewhat vague.

- Paper Streets: There are several paper streets which intersect Route 10, and which should be discontinued. Development along these streets would create substantial traffic safety problems on Route 10.

- In addition, the interaction of Easthampton's Site Plan Review and Special Permit processes is not functioning effectively. The intent of the bylaw was to provide for joint application for Site Plan Review and Special Permit. In practice, the Special Permit approval is occurring first, and negating any opportunity for negotiating site plan improvements.

- Sign Bylaw: The maximum height requirement could be reduced from 15 feet to 10 feet, and the minimum setback of the feet could be increased.

2.4.5 Problems Areas in the Northampton Zoning Ordinances

Northampton has also recently made efforts to upgrade its commercial and industrial development controls, including the adoption of a site plan review bylaw. The Planning Department has also drafted a new Business Park bylaw which is proposed for an area adjacent to Route 10.

Northampton has not experienced the degree of commercial development and related traffic impacts found in neighboring Easthampton, primarily because there is no business zone on the Route 10 Corridor in Northampton. However, the existing Industrial district in Northampton allows many commercial uses, and many of the problems noted above in the Easthampton section of the corridor have begun to crop up in the Northampton section.

In addition to those issues already noted, the following comments are made regarding specific sections of the Northampton bylaw:

- Special Permits: The criteria used to evaluate Special Permits in the Industrial district are somewhat vague.

- Site Plan Review/Approval: The existing bylaw is well-drafted, but should be expanded to include performance standards for landscaping, architectural design, traffic access and driveways, and traffic reduction.

- Industrial District: The uses allowed by Special Permit include auto service and repair, motor vehicle sales, restaurants and other uses which are not industrial in nature, and which are high volume traffic generators.

- Minimum Lot Size: The minimum lot size of 20,000 square feet may tend to promote a proliferation of small businesses with individual curb cuts.

- Business Park District : The bylaw language is well-drafted and encourages the development of a comprehensive business node that permits on-site residential units. Although business park is designed to be commercial in nature the development permits a mix of uses, encouraging integrated uses. A minimum of ten percent and a maximum of twenty percent of the gross floor area in a planned business park is permitted for residential uses. To provide services to the business park, some commercial and retail uses are permitted, but are limited to four percent of the gross floor area, while community facilities can encompass no more than ten percent. To discourage a proliferation of small lots with multiple curb cuts, a planned business park must be a minimum of seventy-five acres in size and no more than one curb cut per twenty-five acres is permitted onto any collector street. The bylaw could be expanded to include performance standards noted above under "Site Plan Review/Approval." .

- Sign Bylaw: The sign requirements for the Industrial district allow a maximum sign size of 100 square feet, with a 15 foot setback requirement, and 15 foot maximum height requirement. The maximum sign size requirement is excessive, and could be reduced to approximately 40 square feet. The setback requirement could be increased, and the height limitation reduced to ten feet.

Sources : Easthampton and Northampton Zoning Maps

MAP 4

2.5 DEVELOPMENT CONSTRAINTS

2.5.1 Land Availability and Cost

As previously discussed, there are fifty-eight parcels, totalling 182 acres which are currently undeveloped immediately adjacent to Route 10. There are 158 acres which could immediately be converted to residential, commercial or industrial use. Fifteen of these parcels, totalling 64.5 acres have immediate commercial or industrial development potential. Fourteen parcels, totalling 93.5 acres have immediate residential development potential. Much of this acreage is in the Suburban-Residential zoning district which is proposed to change to a business zone. In addition, there are nine residential parcels in the General Business zone in Easthampton which could be converted to business use.

Table 6 shows the number of parcels for sale in the Route 10 Corridor as of December, 1988. Those parcels which could have the greatest immediate impact on the corridor are the three parcels near the Northampton/Easthampton town line marketed as industrial lots. These lots were recently divided from a larger parcel. Also, there is a large parcel in Northampton west of the highway in the Suburban Residential district, which is marketed as having business potential in anticipation of passage of the proposed zone change.

Asking prices for land for sale reflect several trends along the corridor. Residential homes in Northampton reflect an average asking price in Northampton, which is high when compared to the rest of Hampshire County. The undeveloped land currently for sale in the Suburban Residential District reflects a somewhat speculative price. These asking prices reflect a higher price than could be expected for residential land but lower than what could be expected for land zoned business. This price probably reflects the lack of sewer service and only the proposed, not definite, nature of the zone change. This land has not sold rapidly. The industrial land in Northampton for sale also has not sold rapidly primarily due to the utility limitations in the industrial zone.

Commercially developed land in Easthampton commands a relatively high asking price and, while it has sold, has sold only at a moderate rate. Undeveloped industrial land along O'Neil Street has continued to sell well. Residential land in Easthampton in the General Businesses zone is being marketed with business potential.

Table 6 .
Land for Sale in the Route 10 Corridor (12/88)

Current Use	Number of Parcels
Residential	4
Vacant	5
Industrial	1
Commercial	2
TOTAL	10

Source: Conversations with Local realtors

2.5.2 Public Utilities

An approximately 2,000 foot segment of the study area of Route 10 in Easthampton is not serviced by public water. *See Utilities Map.* Public water runs from the town center along Route 10 to a point about 1,000 feet north of the intersection with Florence Road. The most northernly segment of the study area in Easthampton, adjacent to the Northampton Town line has water available from a line extending along O'Neil Street. This line crosses Route 10 and continues along Lyman and Ballard Streets. The new industrial development being built off of O'Neil Street will extend the water line 1,500 feet along the new cul-de-sac road. A water line is being laid along an easement from this cul-de-sac road north to Route 10 which will immediately service a few existing uses but which will allow for continuation of the line at a later date. Easthampton has had problems with T.C.E. well contamination and is not currently using its Hendrick Street well. Another well is also reporting increasingly high levels of contamination. There is uncertainty over Easthampton's ability to meet current water demand in the very near future not to mention new demand.

An approximately 2,600 feet segment of the study area in Easthampton is not serviced by public sewer. Public sewer along Route 10 extends from the center of town to a point approximately 375 feet north of the intersection with Florence Road. The most northernly segment of the study area in Easthampton, adjacent to the Town line has sewer service available from a line along O'Neil Street. This line also extends across Route 10 to Lyman Street. The multi-unit apartment complex, located along the 2,600 foot segment without sewer has built a private line from its parcel to the pumping station along Ballard Street, This private line extends under Route 10 to the Autumn Office Park. The capacity of the wastewater treatment plant is 3.5 mg. The current use is substantially below that level.

Water lines extend the entire segment of the study area in Northampton. This 8" line has adequate pressure to accommodate additional development. Northampton has adequate water supply to meet additional demand. However, Northampton is studying ways to improve distribution from the main reservoir supply.

Northampton's sewer lines only extend west from the City center to the Mill River Diversion. An approximately 8,400 foot section of the study area does not have sewer. There are no definite plans to extend sewer to this area. The lines existing along Route 10 were installed in the early 1900's and are in need of upgrading. A new trunk line south of the residential development, which also extends almost to the Mill River Diversion, could accommodate increased sewage flow. The 8.5 mgd. treatment plan, constructed in the early 1980's could accommodate increased flow.

2.5.3 Environmental Constraints and Zoning Restrictions

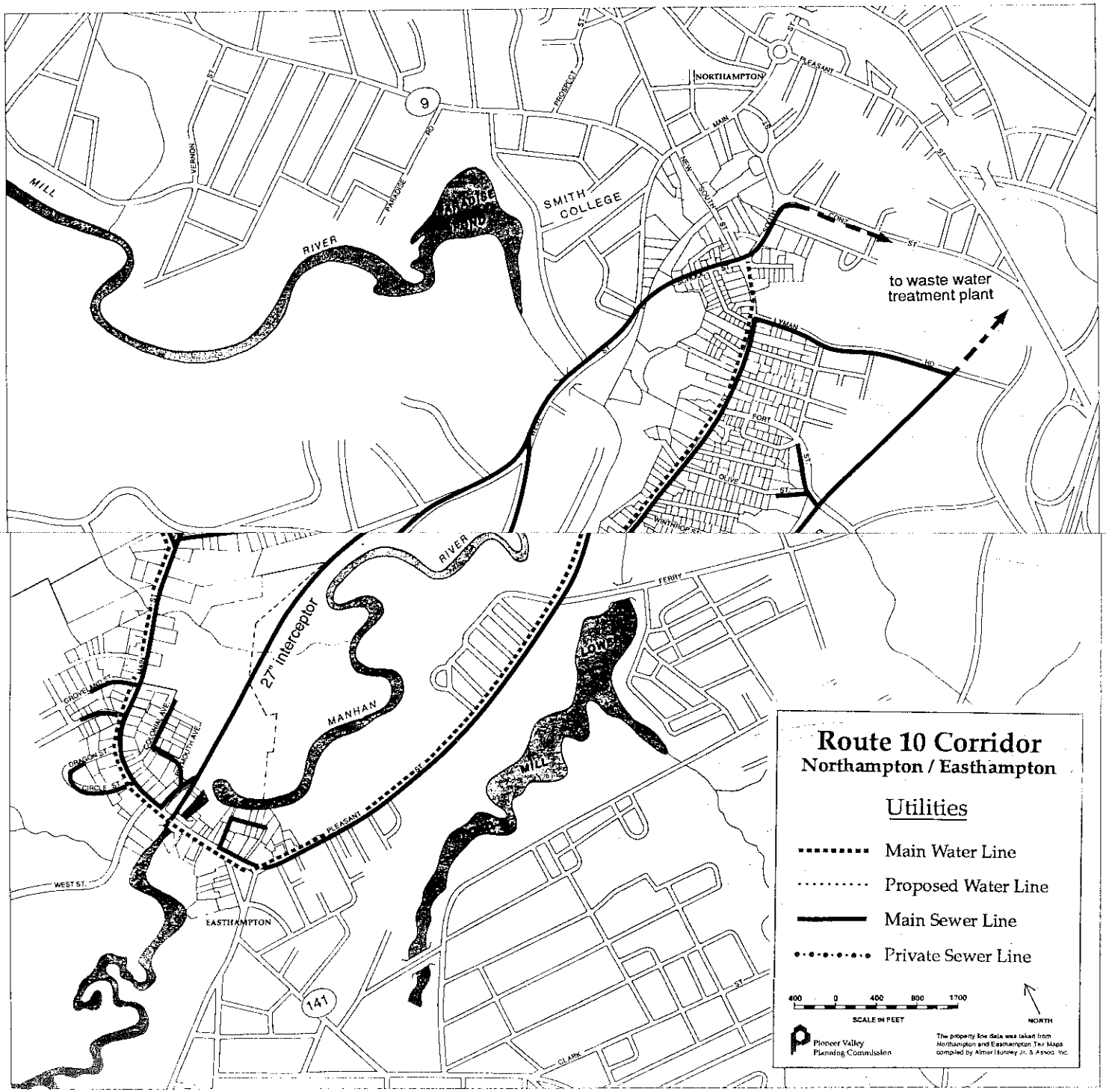
The Route 10 Corridor presents some environmental constraints to development. There are wetlands, 100-year floodplain areas and steep slopes. A 35+ acre parcel along the Easthampton/Northampton town line was recently withdrawn from the market due to wetland restrictions. Steep slopes will serve to make development more costly if it does not prohibit development along the west side of sections of the highway in Northampton.

There is a large area of 100-year floodplain east of the highway in Northampton. Northampton has zoned this area as a Special Conservancy district which prohibits most uses except some agricultural uses and allows single family dwellings, certain outdoor recreational uses, certain municipal uses and limited transportation and industrial uses by special permit.

Only a small portion of the study area in Easthampton is in the Floodplain District where the highway crosses the Manhan River. The study area is not affected by any other overlay districts in Easthampton.

2.5.4 Summary of Development Constraints

The Route 10 Study area has ample vacant land for development. There are some areas limited to development by environmental constraints. The principal current restraint to development is the lack of sewer service and, hence, the cost (estimated at $250/lineal feet) to provide sewer. This is especially noticeable in Northampton. In Easthampton, the lack of sewer has been somewhat circumvented by lines from other access areas and is not a great development constraint.



MAP 5

Sources : Easthampton Sanitary Sewer; Easthampton Town Engineer; Northampton Sewer Maps; Nort

2.6 DEVELOPING BUILD-OUT SCENARIOS FOR ROUTE 10

2.6.1 Introduction

A substantial amount of vacant or under-utilized land still lies along the Route 10 corridor. A "build-out" scenario analysis of the corridor is intended to quantify the potential impact further commercial and industrial growth would have on Route 10. A build-out analysis is a planning tool that allows the communities of Easthampton and Northampton to envision what the Route 10 corridor could look like under a variety of conditions. After carefully considering their options, the residents and officials of both Easthampton and Northampton can adopt policies that will help them plan toward the preferred development option.

2.6.2 Description of Build-Out Scenarios

The four scenarios developed for Route 10 are illustrated in detail in Table 7 and on Maps 6 and 7, and describe the anticipated number of new businesses and resulting traffic impacts for each district on Route 10 in the years 2000 and 2010. The development options are based on four growth scenarios:

Scenario #1: Existing Zoning/High Growth Rate

Growth based on the 2-year average of number of building permits issued per year (3.5) and existing zoning. Assumes that all new businesses will be auto-related in the General Business district while in the Industrial and General Industrial districts seventy percent (70%) of new businesses will be industrial in nature and thirty percent (30%) will be auto-related. The assumption regarding the mix of uses in the industrial districts is based on the existing distribution of uses in the General Industrial district in Northampton. This scenario also assumes that underutilized parcels (i.e. residential use in a business district) will be converted to a higher intensity use.

Scenario #2: Existing Zoning/Moderate Growth Rate

Growth based on the 5-year building permit average (2.2 permits per year) and existing zoning. Assumes a majority of new businesses will be auto-related in the General Business district while in the Industrial and General Industrial districts seventy percent (70%) of new businesses will be industrial in nature and thirty percent (30%) will be auto-related.

Scenario #3: Recommended Zoning Changes/High Growth Rate

Growth rate based on the 2-year building permit average (3.5 permits per year) and recommended zoning changes. The recommended zoning changes include shared curb cuts, reduced number of new curb cuts issued, and other access management techniques. Assumes all new uses in the General Business district will include a majority of low volume traffic generators and in the Industrial and General Industrial districts all new uses will include mostly industrial uses.

Scenario #4: Recommended Zoning Changes/Moderate Growth Rate

Growth based on the 5-year building permit average (2.2 permits per year) and recommended zoning changes implemented. The recommended zoning changes include shared curb cuts, reduced number of new curb cuts issued, and other access management techniques. Assumes all new uses in the General Business district will include a majority of low-volume traffic generators and in the

Industrial and General Industrial districts all new uses will include mostly industrial uses.

In all four scenarios, it was assumed that a Business Park District will be developed in Northampton. The size of the Business Park district will be limited to three large parcels currently zoned as Suburban Residential. The uses permitted in the district are low-traffic generators in nature and include research offices, manufacturing, light manufacturing, miscellaneous professional and business offices and large-scale professional business offices.

2.6.3 Considerations in Developing Build-Out Scenarios

There are eight types of zoning districts along the Route 10 corridor. Four different districts (Suburban Residential, Urban Residential B, Special Conservancy, and General Industrial) are located in Northampton and four districts (General Business, Industrial, Residential R-15, and Residential R-5) are in Easthampton. Because the types of uses permitted in each district play an important role in the generation of traffic along the corridor, a district approach to the build-out analysis was used.

Although there are eight types of zoning districts along the corridor, not all the districts were included in the build-out analysis. The volume of traffic generated along the corridor can be directly attributed to the types of uses permitted within a zoning district. Some zoning districts were dominated by low-density residential uses. Since low-density residential uses were likely to generate limited additional traffic along the corridor, the residential districts (the Urban Residence B district and Suburban Residential in Northampton and the Residence R-5 and R-15 districts in Easthampton) were not included in the build-out analysis. Since the Special Conservancy district in Northampton was also unlikely to generate volumes of traffic, it too was eliminated. In addition, a small General Business district in Easthampton was excluded from the analysis. This 6.2 acre district was eliminated because only a very insignificant amount of land within it was available for future development.

It is typical to follow zoning district boundary lines when determining the amount of acreage to include in the build-out analysis. Whenever district boundary lines follow parcel boundary lines, the amount of acreage to be included in the analysis is readily determined. However, if a district boundary line splits a parcel creating a dual-zoned parcel, it is more complicated to determine the appropriate acreage. In Easthampton, the General Business District boundary line does not follow the parcel line. Instead, the district is delineated by a measurement from the center line of Route 10. This practice has created some dual-zoned parcels with frontage along Route 10 zoned for General Business while backland is zoned as residential. Historically, if someone with a dual-zoned parcel petitioned to have his parcel rezoned into one district due to limited access to the backland, the Planning Board and Town Meeting supported his request. In light of this, if the only access to the backland portion of a dual-zoned parcel was through the General Business district, it was assumed that the entire parcel would eventually be rezoned into the General Business District. However, if access to the backland was readily available from an existing easement or street, it was assumed that the existing zoning boundary line would remain intact.

Districts in the corridor permit a diversity of uses, including high-volume traffic generators. The General Business district in Easthampton allows a variety of commercial uses including high traffic generators such as drive-in restaurants, convenience stores, service stations and mini-malls. Manufacturing, research offices and transportation service facilities are some of the industrial uses permitted in Easthampton's Industrial district as well as drive-in restaurants, convenience markets and service stations, all high-volume traffic generators. In Northampton's General Industrial district, restaurants and service stations (high-

volume traffic generators) and industrial uses (i.e. construction supply establishments, manufacturing, motor freight terminal and warehousing) are permitted.

2.6.4 Procedures

This section will lead you through Table 7 and explain the procedures used to develop the four build-out scenarios. *Please refer to Table 7.*

Column 1: **Building Permit Rates** is simply the average number of building permits for new construction on Route 10 issued over the stated number of years.

Column 2: **Types of Business** were calculated based on the permitted uses allowed in each district and are as follows:

General Business District

Auto-Oriented businesses in the General Business district included fast-food restaurants, shopping mini-malls, convenience markets, service stations, drive-in banks, and high-turnover restaurants.

Majority Auto-Related businesses in the General Business district included those delineated above as well as retail stores, medical office buildings, general office buildings, quality restaurants, and business parks.

Lower Traffic Generators included retail stores, medical office buildings, general office buildings, quality restaurants, and business parks.

Industrial District

Mostly Industrial businesses included fast-food restaurants, shopping mini-malls, convenience markets, service stations, high-turnover restaurants, industrial parks, business parks, manufacturing, warehousing, and research centers.

Lower Traffic Generators included industrial parks, business parks, manufacturing, warehousing, and research centers.

General Industrial District:

Mostly Industrial businesses included fast-food restaurants, service stations, high-turnover restaurants, manufacturing, warehousing, and research centers.

Lower Traffic Generators included manufacturing, warehousing, and research centers.

Column 3: **Number of new businesses by year 2000/2010:**

Column 1 average *X* # of years between 1990 and 2000/2010 for the number of businesses developed in the entire corridor. The total number was then divided among the districts in the corridor based on each district's percentage of land area except for the Business Park district.

Table 7

Route 10 Build-Out Scenario for Years 2000 - 2010

Build-Out Scenario	Annual New Building Permits 1	Type of Business 2	Number of New Businesses by Year 2000/2010 3	Estimated Current Trips/Day 4	Net Number of New Trips Generated 2000/2010 5	Total Trips per Day 2000/2010 6	Percent Increase 2000/2010 7	Year of Build-Out For Entire Corridor 8
Scenario #1: Existing Zoning/High Growth Rate	3.5 permits 2 - year rate (1988-1989)	GB district - All auto-related I district - Mostly industrial GI district - Mostly industrial BP district - Lower Traffic generators	GB district - 11/26 I district - 4/9 GI district - 5/11 BP district - 15/24	15,654 13,692 15,061 15,061	5,357/12,663 1,232/3,272 1,858/5,648 2,628/4,206	21,011/28,317 14,924/16,964 16,919/20,709 17,689/19,267	34%/81% 9%/24% 24%/37% 17%/30%	2030
			Total 35/70	Total Average: 18,619	Total: 886/2,063	Total Corridor: 19,501/19,682	Total: 5%/11%	
Scenario #2: Existing Zoning/Moderate Growth Rate	2.2 permits 5 - year rate (1985-1989)	GB district - Mostly auto-related I district - Mostly industrial GI district - Mostly industrial BP district - Lower traffic generators	GB district - 7/12 I district - 3/6 GI district - 3/7 BP district - 9/19	15,654 13,692 15,061 15,061	4,057/6,600 1,091/2,182 986/2,082 1,577/3,329	19,711/22,254 14,783/15,874 16,047/17,143 16,638/18,390	26%/42% 8%/16% 7%/14% 10%/22%	2054
			Total 22/44	Total Average: 18,169	Total: 616/1,140	Total Corridor: 19,235/19,759	Total: 3%/6%	
Scenario #3: Recommended Zoning Changes/ High Growth Rate	3.5 permits 2 - year rate (1988-1989)	GB district - Mostly lower traffic generators I district - Mostly industrial GI district - mostly industrial BP district - Lower traffic generators	GB district - 11/26 I district - 4/9 GI district - 5/11 BP district - 15/24	15,654 13,692 15,061 15,061	3,352/8,487 1,233/3,273 986/2,087 2,628/4,206	19,006/24,141 14,925/16,965 16,047/17,148 17,689/19,267	21%/54% 9%/24% 7%/14% 17%/28%	2030
			Total 35/70	Total Average: 18,619	Total: 656/1,444	Total Corridor: 19,275/20,063	Total: 3%/8%	
Scenario #4: Recommended Zoning Changes/ Moderate Growth Rate	2.2 permits 5 - year rate (1985-1989)	GB district - Mostly lower traffic generators I district - Mostly industrial GI district - Mostly industrial BP district - Lower traffic generators	GB district - 7/12 I district - 3/6 GI district - 3/7 BP district - 9/19	15,654 13,692 15,061 15,061	2,190/4,109 1,091/2,182 986/2,087 1,577/3,329	17,844/19,763 14,783/15,874 16,047/17,148 16,638/18,390	14%/26% 8%/16% 7%/14% 10%/22%	2054
			Total 22/44	Total Average: 18,169	Total: 467/937	Total Corridor: 19,086/19,556	Total: 2%/5%	

Nodes: GI and BP districts are in Northampton. The GB and I districts are in Easthampton

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Example: The total number of permits along the corridor is calculated as follows: 3.5 permits X 10/20 = 35/70.

The General Industrial district comprises approximately fifteen percent (15%) of the corridor. Fifteen percent (15%) of 35/70 is equal to 5/11 new businesses in the General Industrial district along the corridor.

In the case of the Business Park district there is not enough available land to accommodate the number of permits that could be issued. The Business Park district comprises forty-three percent (43%) of the corridor. Forty-three percent (43%) of 35/70 is equal to 15/30 new businesses in the Business Park district. There are only 24 building lots available in this district. To accommodate this, an adjustment has been made in Scenario #1 and Scenario #3 in the Business Park and General Business district. Any spill-over building permits were transferred to the General Business district, the next district most likely to receive new businesses. For Scenarios #1 and #3, the number of new businesses in the Business Park district is 15/24 while in the General Business district it is 11/26.

Column 4: **Estimated current trips/day**

Average daily traffic counts were taken at various locations along the corridor. Estimates of average daily traffic were calculated for each district.

There were two ADTs in Northampton, one at the beginning of the corridor (19,282 ADT) and one at the Northampton/ Easthampton town line (13,692 ADT). It was assumed that most of the traffic at the beginning of the corridor was diverted into the Urban Residential district. As a result an additional ten percent (10%) of the town line ADT was calculated as the ADT for the General Industrial District and the Business Park District.

The ADT at the Northampton/Easthampton town line (13,692) was used as the ADT for the Industrial district in Easthampton.

For the General Business district in Easthampton, the ADT was calculated as the average of the ADT's taken at the Northampton/Easthampton town line (13,692) and at Florence Road (17,616).

Column 5: **New Number of New Trips Generated was derived as follows:**

Step 1: Trip generation rates for business types along Route 10 were calculated.

The information in Table 8 was taken from the TRIP GENERATION MANUAL by the Institute of Transportation Engineers. Studies conducted show the average number of trips that each type of business generates per day. A sampling of high, medium and low traffic generators was used and the number of trips per day calculated.

Table 8
Trip Generation Rates for Business Types

Type of Business	Average Weekday Vehicle Trips	Likely Average Size of Business	Trip Generation Rate/Day
1. Fast-Food Restaurant	632.1 per 1,000 sq. ft.	3,000 sq. ft.	1896.3
2. Shopping Mini-Mall	166.5 per 1,000 sq. ft.	10,000 sq. ft.	1665.0
3. Convenience Market	427.0 per 1,000 sq. ft.	2,000 sq. ft.	854.0
4. Service Station	748.0 per station	1 station	748.0
5. Drive-In Bank	291.1 per 1,000 sq. ft.	2,500 sq. ft.	727.7
6. High-Turnover (Sit-Down) Restaurant	200.9 per 1,000 sq. ft.	3,000 sq. ft.	602.7
7. Retail Store	48.0 per 1,000 sq. ft.	3,500 sq. ft.	168.0
8. Medical Office Building	34.2 per 1,000 sq. ft.	3,500 sq. ft.	119.7
9. General Office Building	12.4 per 1,000 sq. ft.	7,000 sq. ft.	87.0
10. Quality Restaurant	97.3 per 1,000 sq. ft.	3,500 sq. ft.	340.5
11. Industrial Park	6.9 per 1,000 sq. ft.	40,000 sq. ft.	276.0
12. Business Park	12.4 per 1,000 sq. ft.	20,000 sq. ft.	248.0
13. Manufacturing	3.8 per 1,000 sq. ft.	35,000 sq. ft.	171.5
14. Warehousing	4.9 per 1,000 sq. ft.	20,000 sq. ft.	196.0
15. Research Center	6.1 per 1,000 sq. ft.	20,000 sq. ft.	122.0
16. Corporate Headquarters Building	7.0 per 1,000 sq. ft	20,000 sq. ft.	420.0

Source: Institute for Transportation Engineers, Trip Generation.

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Table 9
Gross Number of Trips Generated

Build-Out Scenario	Business Types Anticipated (Nos. from Table 8)			Average Trips/Day x Per Business			Projected No. of New Business 2000/2010			Gross No. of Trips Generated			
	Auto-Related	Industrial	Other	Auto-Related	Industrial	Other	Auto-Related	Industrial	Other	Auto-Related	Industrial	Other	Total
Scenario #1: Existing Zoning/High Growth Rate													
GB District	1-6	-	-	1,082.3	-	-	11/26	-	-	11,905/28,140	-	-	11,405/28,140
I District	1-4; 6	11-15	-	1,153.2	202.7	-	1/3	3/6	-	1,153/3,459	608/1,216	-	1,761/4,675
GI District	1; 4; 6	13-5	-	1,082.3	163.2	-	2/3	3/8	-	2,165/3,247	490/1,306	-	2,655/4,553
BP District	-	-	8; 9; 12; 13; 15; 16	-	-	194.7	-	-	15/24	-	-	2,920/4,763	2,920/4,673
Scenario #2: Existing Zoning/Moderate Growth Rate													
GB District	1-6	-	7-10; 12	1,082.3	-	192.6	5/8	-	2/4	5,411/8,658	-	385/770	5,796/9,428
I District	1-4; 6	11-15	-	1,153.2	202.7	-	1/2	2/4	-	1,153/2,306	405/811	-	1,558/3,117
GI District	1; 4; 6	13-15	-	1,082.3	163.2	-	1/2	2/5	-	1,082/2,165	326/816	-	1,408/2,981
BP District	-	-	8; 9; 12; 13; 15; 16	-	-	194.7	-	-	9/19	-	-	1,752/3,699	1,752/3,699
Scenario #3: Recommended Zoning Changes/ High Growth Rate													
GB District	1-6	-	7-10;12	1,082.3	-	192.6	3/8	-	8/18	3,247/8,658	-	1,541/3,467	4,788/12,125
I Diostrict	1-4; 6	11-15	-	1,153.2	202.7	-	1/3	3/6	-	1,153/3,460	608/1,216	-	1,761/4,676
GI District	1; 4; 6	13-15	-	1,082.3	163.2	-	1/2	2/5	-	1,082/2,165	326/816	-	1,408/2,981
BP District	-	-	8; 9; 12; 13,;15; 16	-	-	194.7	-	-	15/24	-	-	2,920/4,673	2,920/4,673

Scenario #4: Recommended Zoning Changes/ Moderate Growth Rate

GB District	1-6	-	7-10; 12	1,082.3	-	192.6	2/4	-	5/8	2,165/4,329	-	963/1,541	3,128/5,870
I District	1-4; 6	11-15	-	1,153.2	202.7	-	1/2	2/4	-	1,153/2,306	405/811	-	1,558/3,117
GI District	1; 4; 6	- 13-15	-	1,082.3	163.2	-	1/2	2/5	-	1,082/2,165	326/816	-	1,408/2,981
BP District	-	-	8; 9; 12; 13; 15; 16	-	-	194.7	-	-	9/19	-	-	1,752/3,699	1,752/3,699

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Table 10
Net Number of New Trips Generated

Build-Out Scenario	Gross No. of Trips Generated 2000/2010	Percent of Gross Trips Which Are New Trips	Net No. of New Trips Generated
Scenario #1: Existing Zoning/High Growth Rate			
GB District	11,905/28,140	45%	5,357/12,663
I District	1,761/4,675	70%	1,232/3,272
GI District	2,655/4,553	70%	1,858/5,648
BP District	2,920/4,673	90%	2,628/4,206
Scenario #2: Existing Zoning/Moderate Growth Rate			
GB District	5,796/9,428	70%	4,057/6,600
I District	1,558/3,117	70%	1,091/2,182
GI District	1,408/2,981	70%	986/2,087
BP District	1,752/3,699	90%	1,577/3,329
Scenario #3: Recommended Zoning Changes/Moderate Growth Rate			
GB District	4,188/12,125	70%	3,352/8,487
I District	1,761/4,676	70%	1,233/3,273
GI District	1,408/2,981	70%	986/2,087
BP District	2,920/4,673	90%	2,628/4,206
Scenario #4: Recommended Zoning Changes/High Growth Rate			
GB District	3,128/5,870	70%	2,190/4,109
I District	1,558/3,117	70%	1,091/2,182
GI District	1,408/2,981	70%	986/2,087
BP District	1,752/3,699	90%	1,577/3,329

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A trip is defined as one vehicular movement to or from a destination. For example, a vehicle driving to a business and leaving the business is two trips.

Step 2: The gross number of trips expected to be generated under each build-out scenario was calculated. This gross number was derived by multiplying the average trip generation rate per business by the project number of new businesses anticipated in years 2000 and 2010 for each district. *See Table 9*. An example is given below:

Scenario #1: Worst Case for the General Business district: Businesses #1-6 from Table 6 are high traffic generators. In the General Business district all of these uses are allowed. It was assumed that any new businesses would fall only into one of these types for this district. The trips/day of these six were averaged (1,082.3 trips/day/business). This number times the number of new businesses (11/20) gave the number of trips generated by these additional businesses by the years 2000 and 2010 in the General Business District.

Step 3: Accounting for diverted trips versus new trips generated is important to accurately project the traffic impact of new business development. The gross number of trips generated, as shown in Table 8, is somewhat deceptive, however. Not all of these trips generated by new businesses are <u>new</u> trips. Some of the people going to these new businesses would have been driving on Route 10 anyway. Studies have shown there are three types of trips generated and that each type of business produces a different percentage of new trips.

1. Passerby trips: cars not going to business in question.

2. Diverted: cars going somewhere else, but go to business in question as well.

3. New trips: trips solely going to the new business.

Studies have shown that new trips comprise about forty-five percent (40%) of trips to auto-oriented businesses, seventy percent (70%) of those to a mixture, and ninety percent (90%) of those to low traffic generators. Therefore, the number of trips generated multiplied by the appropriate percentage equals the new number of trips that are <u>new</u> (i.e. new traffic generated that would not otherwise have been there), as shown in Table 10 below.

Column 6: **Total trips** is the sum of the current trips/day and the additional trips generated by 2000/2010 for each district.

Column 7: **Percent increase 2000/2010:** This column shows the percent increase in traffic from 1990 to the years 2000 and 2010 for each district.

Column 8: **The year of build-out** takes the number of vacant or under-utilized parcels adjacent to Route 10, the projected number of buildings on each, and given the respective building permit rates, calculates how long it would take to fill all the parcels. The year at which this "build-out" for the entire corridor would occur is given.

2.6.5 Conclusions

The permitted uses along the Route 10 corridor play an important role in determining the amount of traffic generated, as can be seen by comparing Scenario #1 and Scenario #4. *See Map 6 and Map 7.* This is particularly true for the General Business district in Easthampton, where the majority of high-traffic generating uses already exist. In Scenario #1 (with a high growth rate) if all new businesses in the General Business district are high volume traffic generators and existing zoning continues, the Easthampton segment of the corridor can expect an estimated 2,063 new trips by the year 2010 or an eleven percent (11%) increase. However, if a moderate growth is complimented with a comprehensive package of new land uses, the anticipated new trips in the corridor could reach an estimated 1,444 or only eight percent (8%) increase over the present. Because there is a significant amount of vacant or underdeveloped land along the corridor (129 acres) the Route 10 corridor will not reach build-out even under the most intense building conditions (Scenario #1 - Existing Zoning/High Growth Rate) until the year 2030.

The moderate increase in development along the corridor is outlined in Map 6 (Existing Zoning Build-Out Scenarios) and Map 7 (the Recommended Zoning Changes Build-Out Scenarios) proposes changes in the type of development permitted along the corridor and establishes development standards that effect its physical form. Since the recommended zoning changes effect the types of uses permitted the amount of traffic generated is effected. In addition the recommended zoning changes establish development standards for uses along the corridor that greatly affect its appearance. These changes cannot be reflected on the build-out scenario maps.

What the Build-Out Scenarios maps do reveal is the rate of growth along the corridor under high growth rate and moderate growth rate conditions. Because the growth rate (3.5 permits per year) is the same for Scenario 1 (Existing Zoning - 2000) and Scenario 3 (Recommended Zoning Changes - 2000) the same number of parcels are developed for each scenario. In the case of Scenario 2 (Existing Zoning - 2010) and Scenario 4 (Recommended Zoning Changes - 2010) a moderate growth rate was used. The maps reflect the building permit rate but do not show how the new developments will appear.

Since build-out is not an immediate danger it may be misleading to think that the impacts of this build-out are long in coming. In fact, this calculation does not consider the physical capability of Route 10 to accommodate traffic demands with an acceptable quality of service, also known as the measure of level of service (LOS). Five segments of the corridor are currently at a LOS rating of D. LOS D means that traffic begins to flow unevenly with considerable and sudden variation in traffic speed. Gridlock is classified as LOS F. It is very likely that segments along Route 10 will reach traffic gridlock long before they reach parcel build-out.

2.6.6 Change in Build-Out Assumptions and Its Impact on Traffic Volumes

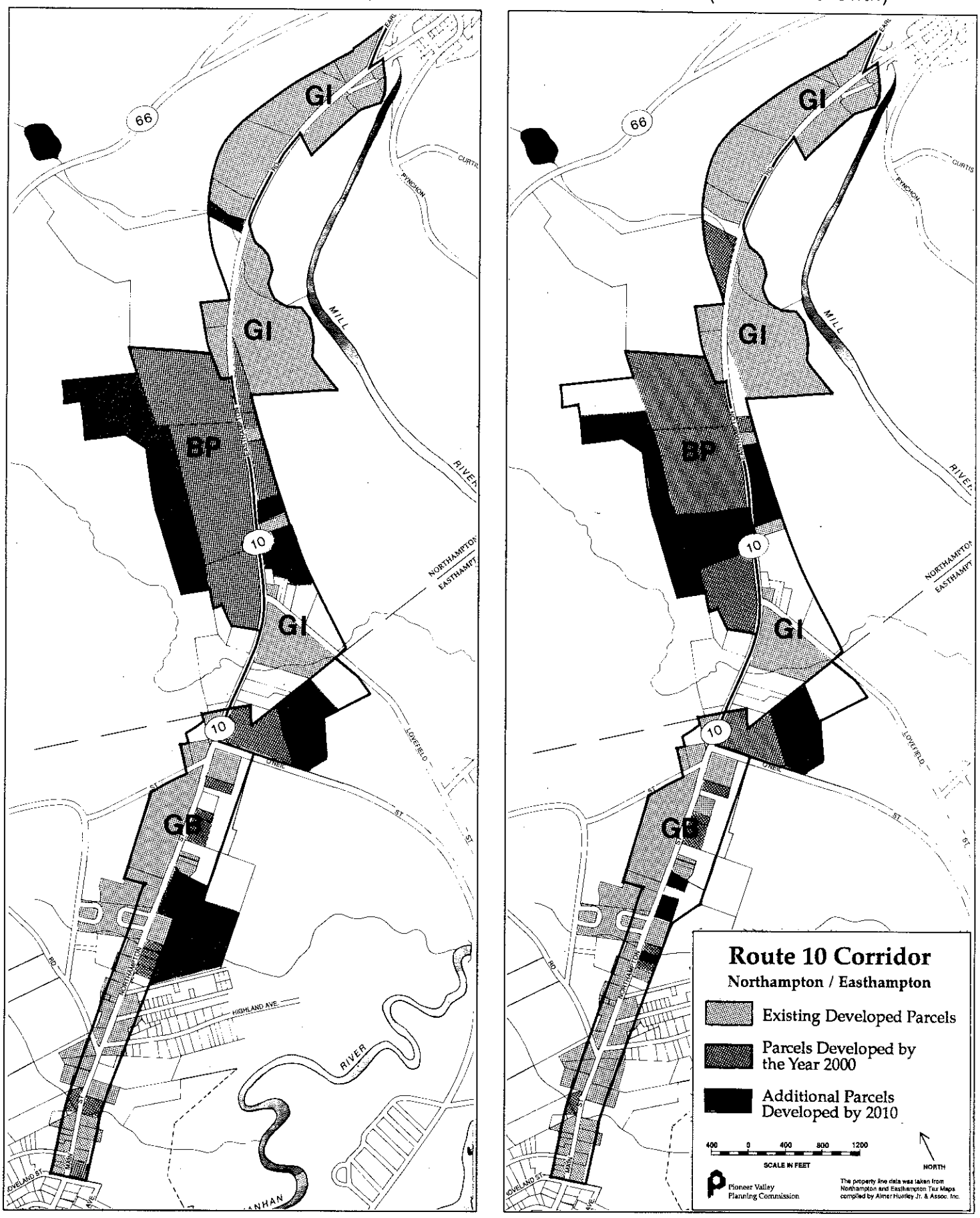
The build-out scenarios presented are based on the development trends that are most likely to occur along the Route 10 corridor. Some general assumptions have been made (i.e. a Business Park district will be developed in Northampton). Altering any of the general assumptions will have a direct impact on the volume of traffic generated. The high-volume traffic generators have a significant impact on the traffic volume figures along the corridor. The elimination of high-volume traffic generators in Scenarios #3 and #4 would substantially reduced traffic in the General Business, Industrial, and General Industrial districts. Since the uses currently permitted in the Business Park district are lower traffic generators, the elimination of high-volume traffic generators would have no direct impact on this district.

If the Business Park district provided on-site housing in addition to its current permitted uses, traffic in all four scenarios would slightly increase in the Business Park district only. This would occur in order to accommodate the new housing in an area that presently has some industry and very few residential uses.
In all four scenarios it was assumed that a Business Park district in Northampton existed. However, this district has not been adopted yet. If the Business Park district is not adopted, traffic volumes in the remaining districts (the General Business, Industrial, and General Industrial districts) would increase. There would also be a redistribution of new businesses generated in the remaining districts. For example fifty percent (50%) of all new businesses would be developed in the General Business district, as opposed to its current level of twenty-nine percent (29%).

EXISTING ZONING BUILD-OUT SCENARIOS

Scenario 1* (High Growth)

Scenario 2 (Moderate Growth)



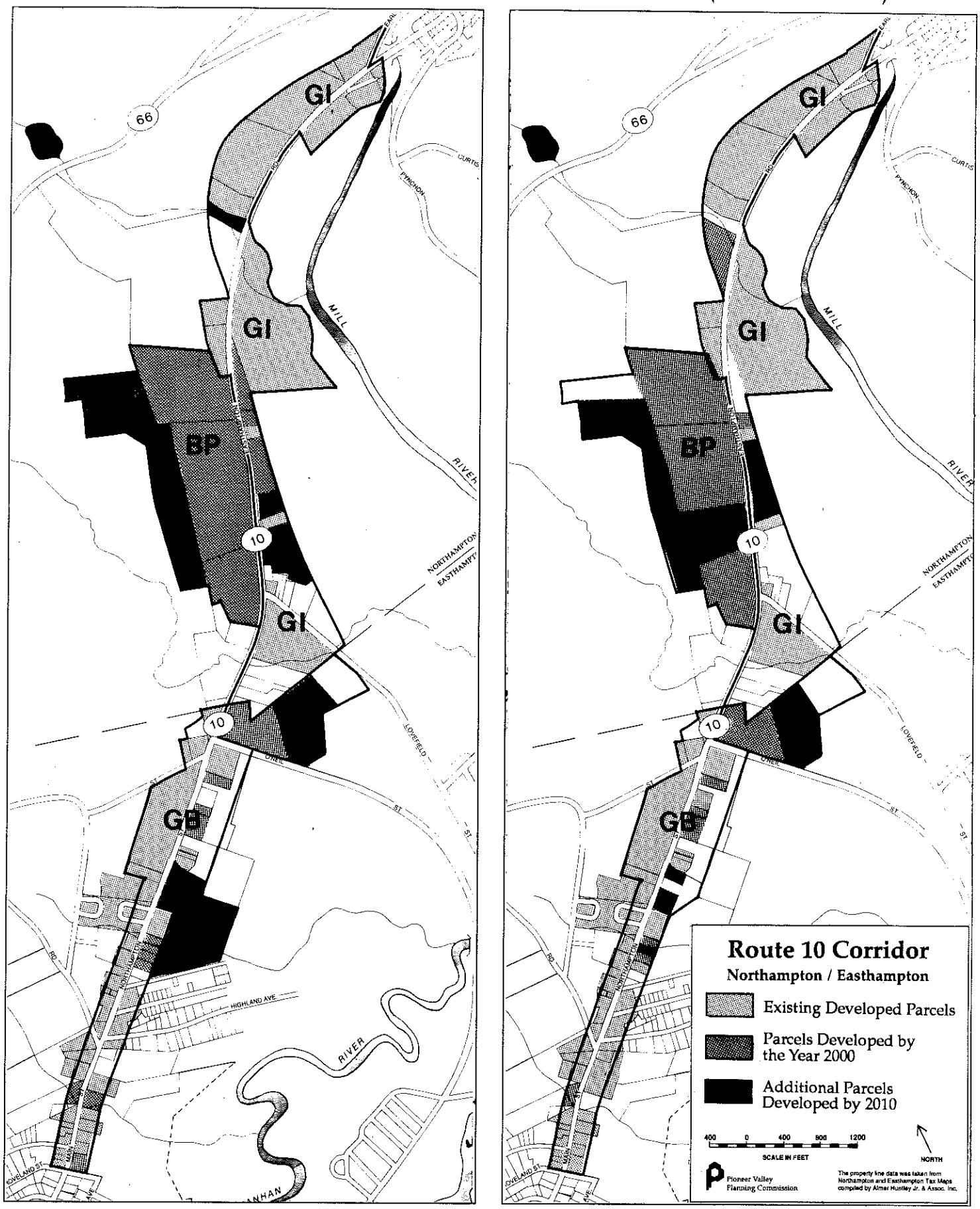
*Doesn't include underdeveloped lots.

MAP 6

RECOMMENDED ZONING CHANGES BUILD-OUT SCENARIOS

Scenario 3* (High Growth)

Scenario 4 (Moderate Growth)



*Includes underdeveloped lots in build-out.

MAP 7

2.7 DEVELOPMENT TRENDS

2.7.1 Recent or Current Development

New development has proceeded at a slow but steady pace in recent years along the Route 10 study area. The segment of the study area zoned as a General Business district in Easthampton has had the greatest amount of development. Building permits for remodeling or expansion have outnumbered new construction as shown in Table #11.

In Easthampton, much of the new development has occurred along O'Neil Street where there have been four industrial expansions. Development along Route 10 in Easthampton has been concentrated near intersection of O'Neil and Lyman Streets with the Goldmine Restaurant office addition, the ATM machine and the car dealership expansion. *See Table #12.*

Recent development in Northampton has been limited to scattered industrial uses. *See Table #13.* The mini-storage buildings at the intersection of Easthampton Road and Lovefield Street have had the most visual impact along an otherwise relatively undeveloped landscape.

Table 11.
Building Permits Issued in the Route 10 Corridor - 1985-1989

	Northampton			Easthampton		
Year	New Construction	Remodel/ Expansion	Total	New Construction	Remodel/ Expansion	Total
1985	1	0	1	0	1	1
1986	0	1	1	1	4	5
1987	2	1	3	0	7	7
1988	2	0	2	4	3	7
1989	0	1	1	1	5	6
TOTAL	5	3	8	6	20	26

Source: Northampton and Easthampton Building Inspector's records and conversation

Table 12.
Proposed or Completed Industrial or Commercial Projects
1985-1990: Easthampton

Name	Development Type	Status as of 9/90
Olds Pontiac	Car Showroom Expansion	Completed
D. Strong	Industrial Building Addition	Completed
Farm Petroleum	Industrial Building Addition	Completed
Tubed Products	Industrial Building Addition (24,000 sq. ft.)	Completed
Rock Valley Tool	Industrial Building Addition (5,000 sq. ft.)	Completed
Town Building	Office/Lumber Warehouse (20,000 sq. ft.)	Completed

Name	Development Type	Status as of 9/90
Early Times	Bar Expansion	Completed
Gruber	New Office Construction	Completed
Autumn Office Park	Three New Office Building (3,774 sq. ft.)	Two Units Completed
Seraphim Pizza	Renovation	Completed
Goldmine Restaurant		Completed
Easthampton Savings Bank	New ATM	Completed
Cernak Tank Co.	Office Renovation	Completed
ACE Hardware	Retail Renovation	Completed
O'Neil St. Industrial Park	Ten-Lot Industrial subdivision	Plan Approved
Lot 1-Liebman Optical, Inc.	Manufacturing	Under Construction
Lot 2-(Towne)	Truck Terminal	Under Construction

Source: Easthampton Building Inspector Records and Conversation

Table 13.
Proposed or Completed Industrial or Commercial Projects 1985-1990: Northampton

Name	Development Type	Status as of 9/90
A to Z Rental	Five Storage Buildings/Two Light Buildings (19,200 sq. ft.)	Partially Constructed One Storage Bldg. Completed
Auto Body Shop	Auto Repair Business	Special Permit *Granted - 1987 Special Permit *Extended - 1989 No Building Permit Issued to Date
Philips Enterprises	Storage/Manufacturing	Completed
P. Allen & Sons	Recycling Process	Completed
Wayside Auto Body	Auto Repair & Sales	Completed

Source: Northampton Building Inspectors Records and Conversation

2.7.2 Proposed Development

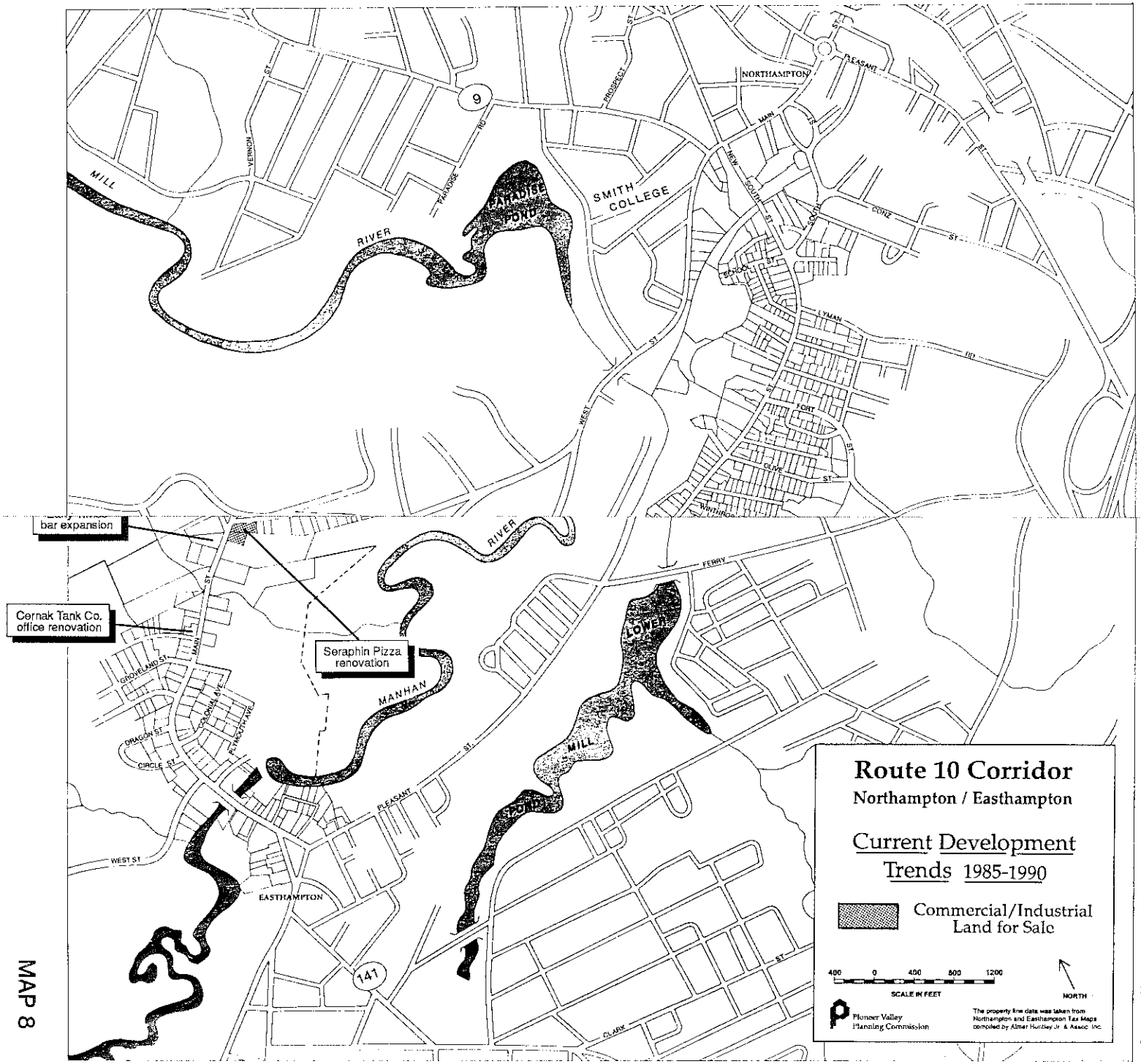
The most recent industrial development activity in Easthampton is near the intersection of Northampton Street and O'Neil Street. *See Map 8.* The plans for a ten-lot industrial subdivsion off of O'Neil Street were approved and construction of a 1,500 foot subdivision road was completed this summer. Shortly after the completion of the road, construction of a trucking terminal has commenced on one of the approved lots. The trucking terminal should be completed this fall. Due to some wetland concerns, Liebman Optical Inc., is unable to start construction of its manufacturing facility in this subdivision until late fall. A mini-mall is proposed on the parcel abutting Route 10 just east of O'Neil Street. The developer is negotiating the resolution of a wetland issue.

Once an agreement with the Conservation Commissioner is reached the proposed development will occur. A new ATM is also located on a two-acre parcel at the corner of O'Neil Street and Route 10. There is a strong probability that once the two industrial developments along O'Neil Street are completed, the use of the parcel may intensify, possibly to a drive-in bank with ATM facilities.

In Northampton the only new development proposed is an auto body repair shop near the Northampton/Easthampton town line. Although a special permit for the site was granted an extension in 1989, to date no building permit has been issued for the site. There is a preliminary proposal for a zone change for a segment of the corridor from a residential district and a general industrial district to a business park district but until traffic improvements along the intersection of Route 10 and Old South Road occur the likelihood of its adoption is limited.

Easthampton has a number of "paper streets", Mountainview Street, Lycurgus Street, and Floriana Street. These are streets for which a subdivision plan was filed several years ago but no development begun. The development of these streets in the future as either residential development or as access roads would increase traffic and turning movements along Route 10.

Also, there are large blocks of undeveloped land in Easthampton behind the existing Route 10 commercial frontage development which are owned by a small number of landowners. This common ownership increases the potential for future large-scale developments.



MAP 8

Sources : Northampton Building Inspector's Records; Easthampton Building Inspector's Records

2.8 ALTERNATE LAND USE STRATEGIES

All across the United States, communities are struggling with a common problem: controlling the traffic and aesthetic impacts of commercial strip development. Clearly, there is no simple solution, but communities have been successful in combining various elements of traffic, access and development management into multi-faceted commercial corridor programs.

In developing a series of alternate land use strategies, PVPC investigated a wide range of alternatives. Many of these alternatives are based upon the strategies and experiences of communities across the United States in controlling traffic volumes and commercial strip development along highway corridors. Other alternatives are more conceptual, and are linked to the unique problems and opportunities presented by the Route 10 corridor. The complete package of options is contained in the following section, in Table 14, "Alternative Land Use Strategies".

Table 14.
ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES/OPTIONS	EXAMPLES (Bylaw or Policy Implemented)
• Controlling Traffic Impacts	• Reduce traffic generation by controlling form and type of development	• COMMERCIAL CORRIDOR SITE PLAN APPROVAL - Establish a commercial corridor overlay zone requiring Site plan approval for all non-residential uses. Approval criteria can be designed to promote planned unit or clustered business development	Canton, Massachusetts Citrus County, Florida
	• Encourage clustering of business to minimize curb cuts	- Require developer to demonstrate that proposed project will minimize traffic impacts by using single driveways or cul-de-sacs roads for multiple businesses	Loudon County, Virginia
		- Require traffic impact statement for large developments describing measures necessary to preserve traffic-bearing capacity of roads	Savannah, Georgia Westport, Connecticut El Segundo, California
		- Require that open space preservation be maximized	Austin, Texas
		- Encourage the concentration of complimentary uses	
	• Reduce traffic impacts of new development	• TRIP REDUCTION ZONING - Require development of strategies designed to reduce traffic impact of a proposed project	Cambridge, Massachusetts Chapel Hill, North Carolina Agoura Hills, California
	• Reduce traffic volumes • Link commercial development to on-site housing	• PLANNED UNIT DEVELOPMENT - Establish use intensity regulations (floor area ratios)	Reading, Massachusetts
		- Create incentives for or require on-site housing	Santa Monica, California
		- Require on-site and off-site transportation improvements	Sacramento County, California
• Controlling Types of Uses	• Limit business uses to those which generate lower traffic volumes	• PROHIBIT OR RESTRICT HIGH TRAFFIC GENERATING USES - Prohibit or restrict uses which generate highest volumes traffic, including fast-food restaurants, supermarkets large shopping centers, large office buildings, gas stations, and convenience stores	Faifrax County, Virginia
		• DOWNZONING OR RE-ZONING Re-zone highway properties to a less intensive use or increase lot sizes	
• Controlling Location of Uses	• Focus high intensity uses at appropriate locations	• DIVIDE COMMERCIAL CORRIDOR INTO MULTIPLE DISTRICTS - Establish separate districts for high intensity and lower intensity commercial uses	Carlsbad, California York, Maine
		- Provide option for transfer of development nights	
		- Restrict high intensity uses to nodes or clusters, such as major intersections	

Table 14.
ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES/OPTIONS	EXAMPLES (Bylaw or Policy Implemented)
		• RESTRICT LOCATION TO MAJOR INTERSECTION - Restrict commercial and office uses to major intersections along the corridor, extending no further than 2,000 feet from major intersections	Carlsbad, California
• Conversion of Residences to Business Use	• Control conversion of existing residences to business	• RESIDENTIAL CONVERSION BYLAW - Establish increased minimum lot sizes for business uses, and provisions for change of use from residential to commercial	Taunton, Massachusetts
		- Restrict construction to one principal building per lot	
		- Recommend low intensity commercial use for developable parcels in transitional areas (transition from residential to commercial use)	Charleston County and Dorchester County, South Carolina
		• RE-ZONING - Zone existing residential areas for residential rather than commercial use	
• Access Control	• Limit curb cuts to improve highway safety	• COMPREHENSIVE ACCESS CONTROL POLICY - Establish new MDPW curb cut permit policy for new businesses or change of use in existing residential or business uses, requiring:	
		Correction of existing access problems Require minimum distance between curb cuts	Savannah, Georgia
		Require minimum curb cut distance from intersections Require new uses to integrate access, circulation and parking with adjoining properties	
		Limit curb cuts to one per business, except in special circumstances	
		Require access on side roads, or frontage roads, if available	Granby, Massachusetts
		Circulation to be designed so that internal access will minimize need for frequent use of arterial highway. Frontage or loop roads, common driveways to encouraged.	Savannah, Georgia Forest Grove, Oregon
		Require parallel service drives as on alternative to the individual curb cuts for each parcel. A service drive can serve multiple lots	Rensselaer County, New York
		For already developed parcel subject to random redevelopment, develop a redevelopment strategy requiring the correction of existing access problems before a business license or building permit is issued	Forest Grove, Oregon

Table 14.
ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES/OPTIONS	EXAMPLES (Bylaw or Policy Implemented)
• Sign Control	• Control signs to protect community character, enhance traffic safety	• SIGN ORDNANCE - Limit number of signs per business - Limit sign size, based upon size of building - Establish standards for sign materials, light placement - Limit sign information to business name, address - Establish maximum height - Ban temporary, free-standing signs - Ban billboards - Require removal of non-conforming signs within 3 years - Provide for enforcement with system of tickets for offenders - The maximum size of wall signs is regulated on the basis of street-side building width and/or width of building area occupied by the individual tenant - Require an integrated sign system design for all new commercial subdivisions, office complexes and shopping centers	New Orleans, Louisiana Boulder, Colorado Montgomery County, Maryland New Orleans, Louisiana Champaign, Illinois Jefferson Parish, Louisiana Hilton Head, South Carolina
• Design/ Appearance	• Control business appearance to protect community character, improve attractiveness of business	• DESIGN REVIEW/APPEARANCE CONTROLS - Require design review as part of site plan approval process for all non-residential uses Establish Design Review Board, and design standards for: • Architectural design • Building materials and finish • Landscaping and screening - Establish appropriate setback requirements with no parking permitted in required front yards - Review streetscape improvements and external changes as part of design review	Boca Raton, Florida Amherst, Massachusetts Savannah, Georgia Granby, Massachusetts Hilton Head, South Carolina
• Landscaping	• Improve overall appearance of highway corridors. Screen objectionable uses. • Provide uniform standards for development and maintenance of landscaping	• ZONING STANDARDS FOR LANDSCAPING - Establish performance standards for landscaping element - Require landscaping of a minimum front yard area - Require a buffer between commercial and residential area - Require screening of loading areas, equipment, areas etc. - Require landscaping for existing uses planning to expand by more than 25% of gross floor area - Require maintenance of landscaping	Pima County, AZ Colorado Springs, Colorado Thornton and Westminster, Colorado, Granby, MA Pima County, Arizona New Hanover, North Carolina

Table 14.
ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES/OPTIONS	EXAMPLES (Bylaw or Policy Implemented)
		- Control height and placement of exterior lights	
		- Prevent the disturbance of existing natural landscaping within 25 feet of the property line that adopts the street right-of-way	Santa Fe, New Mexico
		- Require applicants for new construction, additions or remodeling (value of over $10,000) along the corridor shall meet the standards for landscaping before a building permit is issued	Santa Fe, New Mexico
		- Provide a tree-lined parkway on both sides of the right-of-way	Charleston County and Dorchest County, South Carolina
		- Trees interspersed with low-growing vegetation or grass should visually predominate over impervious surface	Portland, Oregon
		• HIGHWAY BEAUTIFICATION - Apply for state grant to undertake landscaping highway right-of-ways. Establish local "beautification committee".	
• Parking	• Improve safety and aesthetics of parking areas	• PARKING STANDARDS - Establish standards for parking including:	
		- Required number of spaces and dimensions	Granby, Massachusetts
		- Required landscaping to screen parking from street or residential uses	Colorado Springs, Colorado Pima County, Arizona
		- Parking to be located at side or rear of building	
		- Promote shared parking areas between adjacent business	
		- Restrict parking from front yard requirements	Colorado Springs, Colorado
		- Require interior traffic and pedestrian circulation plan for large developments	
		- Driveway standards designed to minimize traffic impacts	Rensselaer County, New York
		- Require data on drainage flow in site plan	
		- Establish off-street loading requirements	Pima County, Arizona
		• DEVELOP DRIVEWAY SPACING REGULATIONS - Set minimum spacing standards based on arterial highway operating speeds	Lansing, Michigan
	• Eliminate uncontrolled access	• INSTALL VERTICAL CURBS - install vertical curbs on entire length of right-of-way	New Orleans, Louisiana

Table 14.
ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES/OPTIONS	EXAMPLES (Bylaw or Policy Implemented)
• Intergovernmental Coordination	• Coordinate efforts of involved municipalities, state agencies institutions to control traffic volumes	• INTERGOVERNMENTAL MEMORANDUM OF AGREEMENT - Promote coordinated zoning controls, establish an intermunicipal development review process for large-scale commercial project, and pursue other cooperative traffic reduction measures, such as variable work hours, carpool/vanpool options, ridesharing	Five communities in Grand Rapids, Michigan metro area
		- Establish a plan for development of land and provision of public services in the corridor	Thorton and Westminister, CO
		- Establish revenue sharing between communities to avoid competitiveness	Thorton and Westminister, CO
• Growth Rate	• Phase in traffic impacts of commercial growth over time	• PHASED GROWTH BYLAW - Establish annual limit on commercial building permits, linked to highway capacity	Hadley, Amherst, Massachusetts
	• Temporary relief from commercial growth until highway improvements are made	• TEMPORARY GROWTH MORATORIA - Can be imposed via: local bylaw; sewer connection limit: or by MDPW curb cut moratoria	Easthampton, Amherst, MA
• Density Control	• Reduce traffic generation • Encourage consolidation of land parcels • Encourage clustering of businesses	- Increase minimum lot size for businesses uses (i.e. 60,000 s.f.) - Increase frontage requirements - Allow reduced lot sizes and frontage requirements through planned unit development, via Special Permit	Rehoboth, Westminster, MA
• Open Space Preservation	• Preserve "green spaces" between business districts to promote highway safety and clustering of business uses	• LAND ACQUISITION - Apply for MDPW grant funds to purchase selected land parcels	Gloucester, Beverly, MA
		• LOCAL LAND BANK - Establish local fund to enable exercising of Chapter 61a right of first refusal	
		• TRANSFER OF DEVELOPMENT RIGHTS - Allow for transfer of development rights to increase density, preserve open lands	Sunderland, Massachusetts

Table 14.
ALTERNATIVE LAND USE STRATEGIES

ISSUE	GOAL	STRATEGIES/OPTIONS	EXAMPLES (Bylaw or Policy Implemented)
• Pedestrian/ Bicycle Access	• Promote pedestrian and bicycle access to business to reduce a need for driving to individual businesses	• ZONING FOR PEDESTRIAN BICYCLE ACCESS - Promote clustering of businesses via site plan - Require paved access routes to bikeway, if adjacent to right-of-way - Require sidewalks - Provide sidewalks and pathways through larger developments with landscaping - Orient structures and parking areas to facilitate access for pedestrians between adjacent uses	 Portland, Oregon Portland, Oregon
• Costs/Financing	• Provide method of financing necessary infrastructure improvements in highway corridors	• IMPACT FEES FOR TRIP GENERATION - Establish system of road impact fees, based upon amount of traffic generated by businesses, to pay for costs of public infrastructure improvements and town inspection services	Seattle, Washington DuPage, Lake Counties, Illinois
		• LANDSCAPING FEES - Develop a landscape fee to finance installation of right-of-way and medians plantings	Thornton and Westminister, CO
		• REVENUE SHARING - As part as an intergovernment memorandum of agreement divide all tax revenues collected between member communities	Thornton and Westminister, CO
• Public Information	• Promote effective use of Zoning Regulations	• COMMERCIAL DESIGN MANUAL - Develop a design manual to explain regulation and standards, and provide examples of appropriate signs, landscaping, architectural design	Pima County, Arizona Colorado Springs, Colorado
• Billboard Removal	• Improve safety and aesthetics	• BILLBOARD AMORTIZATION AND REMOVAL - The Massachusetts Outdoor Advertising Board has authority to delicense billboards	

2.9 RECOMMENDED LAND USE STRATEGIES

2.9.1 Summary of Recommendations

The following is a brief summary of the land use recommendations which are described in detail in Section 2.9.2 through 2.9.4.

Recommendations for both Easthampton and Northampton

#1 Revise Site Plan Approval/Review Standards with Traffic Impact Statenents

#2 Improve Zoning Controls for Signs, Parking and Landscaping

#3 Promote Communication between Easthampton, Northampton, and the Massachusetts Department of Public Works Regarding Development Along State Highways

#4 Improve Access Driveway Spacing by Increasing Minimum Frontage

Recommendations Specific to Easthampton

#5 Revise the Planned Business Development Bylaw

#6 Restrict High-Volume Traffic Generating Uses in the General Business District

#7 Amend the Planned Industrial Development Bylaw

#8 Discontinue Paper Roads

#9 Require Sidewalks Along the Route 10 Corridor to Enhance Pedestrian Safety

Recommendations Specific to Northampton

#10 Planned Unit Development: Linking Housing to Commercial Development

2.9.2 Recommendations for Both Easthampton and Northampton

Route 10 Action #1 - Revise Site Plan Approval/Review Standards with Traffic Impact Statements

Easthampton and Northampton have adopted a site plan review bylaw or ordinance. Although the bylaw and ordinance do have some standards regarding traffic and safety issues they should be modified to incorporate some additional commercial development standards. In addition some conceptual changes are recommended to meet each municipality's individual needs.

In Easthampton, the site plan review process should be streamlined in places to eliminate the need for certain uses to go through two separate permitting processes - one for site plan review and the other for special permit. Instead, this process should be consolidated to produce a joint site plan review/special permit process by one reviewing board.

In Northampton, the site plan approval/review process should be consolidated into a site plan approval process. In this manner the process moves from sometimes being only an advisory process (site plan review) to always being a special permit process (site plan approval) and gives the reviewing board more authority when making recommendations.

Traffic impact statements should be required for all projects in Northampton on Route 9, Route 10, King Street, and Damon Road. In Easthampton, traffic impact statements would be required for large developments, high-volume traffic generating uses (uses with a trip generation rate of 700 vehicles/day) and new uses with 10,000 square feet or more of gross floor area.

In both communities, new businesses should be clustered or required to share access where feasible. Performance standards should be established for:

access and traffic impacts;
parking and loading;
lighting and landscaping;
appearance/architectural design; and
environmental impact.

In Figure 1, two commercial site plans for one parcel have been illustrated. One site plan demonstrates what conditions are to be permitted under existing zoning while the other site plan highlights improvements included in the recommended zoning changes. If new performance standards were developed the parcel would have less paved surface, more landscaping and would encourage more thoughtful development.

The revised site plan review bylaw for Easthampton and site plan approval bylaw in Northampton are included in Appendix A along with new table of use schedule, amended to the proposed site plan approval text.

Route 10 Action #2 - Improve Zoning Controls for Signs, Parking and Landscaping

Both Easthampton and Northampton could improve the impact of signs on the Route 10 corridor by strengthening zoning control for signs and providing additional regulations for sign size, height, illumination and placement. In addition, parking standards addressing parking area design, landscaping, and driveway location should be adopted in Easthampton. *See Appendix B for model bylaws.*

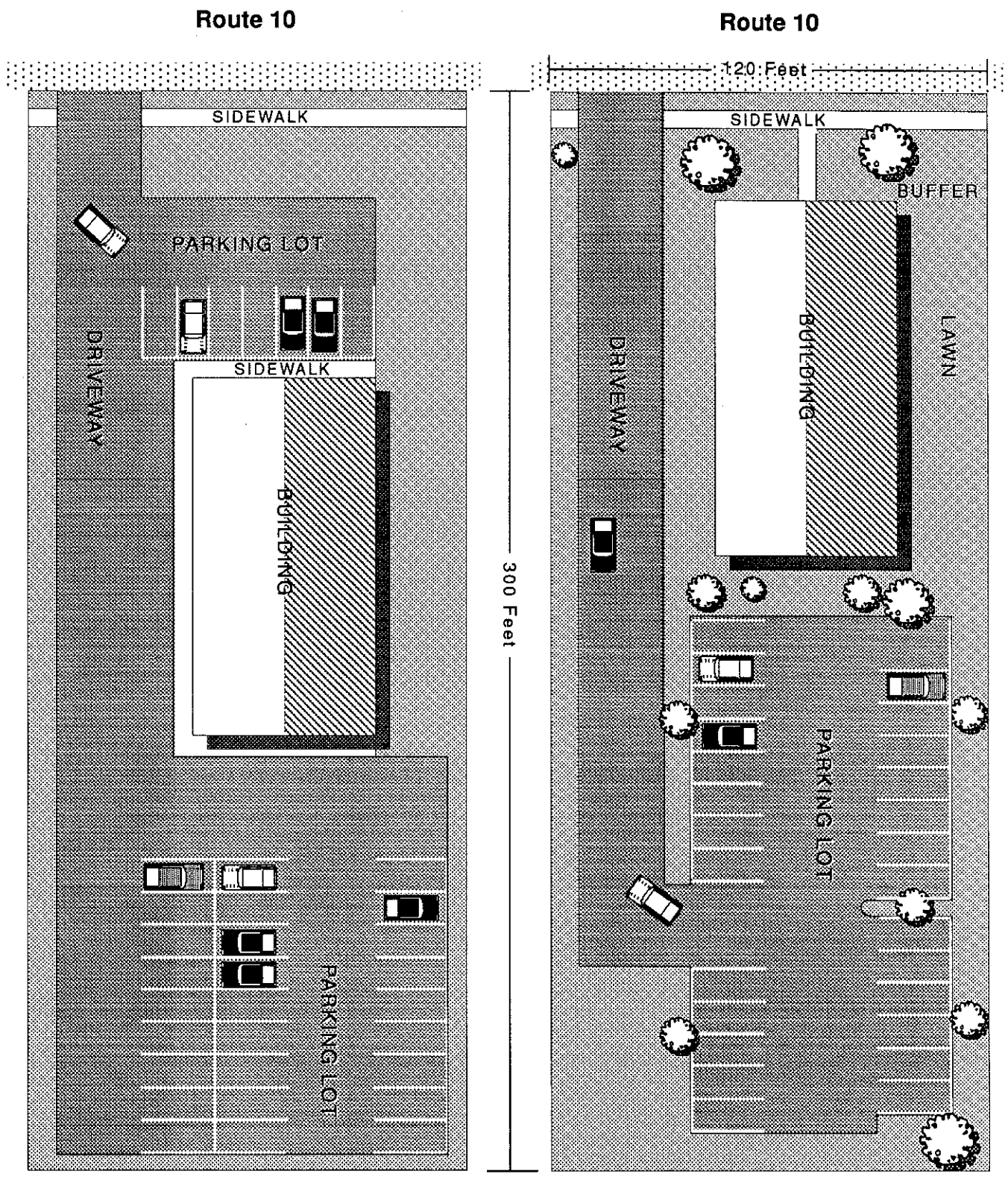
Route 10 Action #3 - Promote Communication Between Easthampton, Northampton, and the Massachusetts Department of Public Works Regarding Development Along the State Highway

Although the Massachusetts Department of Public Works (MDPW) welcomes comments from communities regarding curb cuts along a state highway, it has not established a formal notification system between itself and the communities it serves. Easthampton and Northampton should establish a MDPW notification system. This could be achieved through the site plan approval/review process.

In instances where the reviewing board is concerned about a traffic, safety or other related impact of a proposed development, the board should send a copy of the site plan approval/review application to the MDPW District II office in Northampton for their review. The application must be accompanied by a letter stating the municipality's concerns. MDPW will be made aware that the municipality is interested in the participating in the state curb cut permitting process. In some cases MDPW may attend the municipal public hearing from the proposed development. If MDPW cannot attend the public hearing, the agency will request minutes of the public hearing and/or (if no public hearing is

Figure 1

Lot Available for Development



Potential Site Plan
Under Existing Zoning Requirements

Potential Site Plan
Under Recommended Zoning Changes

necessary) any pertinent municipal board meeting minutes where the project was discussed. When the applicant applies for a state curb cut permit, MDPW will be aware of the municipality's concerns and address them in their review process.

Route 10 Action #4 - Improve Access Driveway Spacing By Increasing Minimum Frontage Requirements

Numerous driveways with close spacing usually result in delays and can cause traffic conflicts, increasing the potential for accidents. A driver has to be on the alert for traffic entering and exiting the roadway at numerous locations. There is also increased delay to vehicles entering the roadway from adjacent parcels and the ability of the traffic stream on the roadway to accept these vehicles is strained. Longer spacing between driveways reduces the amount of information a driver must process and improves the ability of traffic stream to absorb the vehicles turning onto the roadway.

The recommended minimum distances between driveways is based on minimum driveway spacing to reduce collisions:

Speed (mph)	Minimum Spacing (feet)
30	100
35	160
40	210
45	300

(Source: Stover and Koepke, Transportation and Land Development, 1988)

2.9.3 Recommendations Specific to Easthampton

Route 10 Action #5- Revise Planned Business Development Bylaw

Planned business developments allow a variety of business uses to be consolidated on a single parcel, thereby reducing the number of curb cuts that would be necessary for each business. The current Easthampton zoning bylaw permits planned business developments in the General Business and Industrial districts. As an incentive for development, Easthampton allows a reduction in the parking requirements for planned business developments. To avoid a commercial strip appearance additional standards are necessary. Easthampton should adopt additional parking and landscaping standards for planned business developments, establishing regulations for:

interior parking lot landscaping requirements
parking location
landscaping along street frontages
loading and unloading location standards

High-volume traffic generating uses (uses with a trip generation rate of 700 vehicles per day or more) shall be restricted to a total of twenty (20) percent of the gross floor area of any structure. By limiting the amount of the high-volume traffic generators within a planned business development, Easthampton reduces the chances for major traffic congestion attributed to the site.

Route 10 Action #6 - Restrict High-Volume Traffic Generating Uses in the General Business and Industrial Districts

To preclude high-traffic generating uses (uses with a trip generation rate of 700 vehicles per day or more) from dominating the General Business district, consuming valuable industrial land for non-industrial uses in the Industrial district

and increasing traffic and safety concerns in both the General Business and Industrial districts, Easthampton should prohibit all high-volume traffic generators from the General Business and Industrial districts unless the use is incorporated in a Planned Business Development.

Route 10 Action #7 - Amend the Planned Industrial Development Bylaw

In Easthampton, Planned Industrial Developments are permitted in the General Business and Industrial districts. As an incentive for development, the Easthampton zoning bylaw permit a reduction in the minimum area regulations for each district. Additional standards are necessary to ensure that the development reflects the character of the town. Easthampton should adopt additional parking and landscaping standards for planned industrial developments, establishing regulations for:

Interior parking lot landscaping requirements
Parking location
Landscaping along street frontages
Loading and unloading location standards

Route 10 Action #8 - Discontinuing Paper Roads

There are several streets along the Route 10 corridor in Easthampton that exist on the town map but have not actually been constructed. If a developer wished to use a "paper" street as frontage for development, the town could be responsible for constructing the road. On some of these paper streets (i.e. Lycyrgus and Floriana) small lots were recorded many decades ago. By discontinuing these paper streets before any development is sought the town will eliminate the debate over responsibility for the construction of the paper way.

Route 10 Action #9 - Require Sidewalks Along the Route 10 Corridor to Enhance Pedestrian Safety

Due to increased ratio of pedestrian/vehicular conflicts, particularly in Easthampton, sidewalks should be provided along both sides of the state governed portion of Route 10 corridor. This could be achieved either by a) the municipality assuming the cost of the sidewalk and constructing the sidewalk itself or b) the establishment of a betterment district for those properties that lacked appropriate sidewalks. A betterment assessment would apply only to those properties along the corridor where it would be necessary to construct a new sidewalk or upgrade an existing sidewalk in disrepair. In this way the municipality would reduce or eliminate the cost of construction for the municipality and instead pass part or all of the costs on to the landowners. Developers of new projects along the corridor would have the option of either paying the betterment assessment or constructing the sidewalk as part of their development.

To eliminate confusion between pedestrian areas and curb cuts, the construction of new sidewalks should include a landscaped pedestrian system of sidewalks, fences, plantings, and buffers to control and direct pedestrian traffic. A strongly landscaped corridor edge could strongly define the boundaries between the pedestrian way and the corridor.

In addition to providing sidewalks, Easthampton should improve the safety of existing pedestrian crosswalks to further ensure pedestrian safety. A pedestrian crosswalk coupled with a traffic signal offers maximum security for pedestrians crossing a busy street. Section 3.0 of this report examines each intersection along the corridor to determine whether the installation of a traffic signal is warranted. Two of the intersections analyzed, the intersection of West Street and Route 10 and the intersection of Florence Road and Route 10, warranted the installation of a traffic signals with the existing pedestrian crosswalks.

A crosswalk already exists at the intersection of West Street and Route 10, but its location, to the north of the intersection, is problematic. It is difficult for motorists on West Street to look around the corner to check if a pedestrian is in the crosswalk before they turn onto Route 10. It is also difficult for pedestrians to easily cross Route 10 without facing ongoing traffic. Section 3.0 recommends the installation of a traffic light without a pedestrian crossing cycle at this intersection by the year 1995. When the traffic light is installed, the location of the crosswalk should be shifted from the north side of the intersection to the south side to minimize pedestrian conflicts with vehicles. It will allow pedestrians sufficient time to cross.

Currently there is a crosswalk located to the north of the Florence Road/Route 10 intersection. Due to the volume of traffic at this intersection pedestrians find it difficult to cross the roadway. Section 3.0 recommends that a traffic signal without a pedestrian crossing cycle be installed. This will reduce the obstacles pedestrians face when trying to cross the road. Unfortunately the number of pedestrian traffic crossing near this intersection does not meet the state's guidelines for adding a pedestrian phasing cycle to the traffic signal. The state threshold for justification of a pedestrian phasing cycle is 100 pedestrians crossing the intersection per noon hour. Currently there are sixty pedestrians crossing at the Florence Road/Route 10 intersection per noon hour. If Easthampton felt that the addition of a pedestrian crossing cycle would further minimize pedestrian conflicts with vehicles, the Town could request the addition of a pedestrian cycle to the traffic signal.

2.9.4 Recommendation Specific to Northampton

Route 10 Action #10 - Planned Unit Development: Linking Housing to Commercial Development

Under consideration by the Northampton Planning Board is the addition of a Business Park District along the Route 10 corridor. Included in this draft bylaw is a provision for housing units, allowing a mix of jobs and housing on the site. The proposed ordinance establishes regulations for:

floor area ratios to regulate development intensity
provision of common open space
permitting residential units on site with business uses with a density bonus for affordable units
performance standards for environmental protection
limited curb cut access

Northampton should adopt this draft ordinance with additional parking and landscaping standards including:

interior parking lot landscaping requirements
parking location
landscaping along street frontages
loading and unloading location standards

2.9.5 Implementation of Strategies

Since the "Route 10 Corridor Study Technical Memo: Land Use, Development Trends and Zoning Review" was first published in 1989, the Town of Easthampton and the City of Northampton have been working independently to implement some of the document's preliminary recommendations. In 1990, Easthampton revised its site plan review-special permit bylaw to streamline the

application process. Northampton modified a proposed Business Park district ordinance, including a linkage between housing and commercial development. In addition, Northampton made changes to its off-street parking and loading regulations which will have an impact along Route 10.

To date municipalities are continuing to revise their zoning regulations. Easthampton is considering rezoning some land along the Route 10 corridor from General Business to Industrial. Northampton has continued to revise its site plan review ordinance while also adding landscaping and screening requirements for all business and industrial districts.

Table 15 summaries the status of recommendations as of February, 1991

Table 15.
Status of Recommendations as of 2/91

Recommendations		Easthampton	Northampton
# 1.	Revise Site Plan Approval/ Review	#	*
# 2.	Improve Zoning Controls for Signs, Parking and Landscaping	#	*,#
# 3.	Promote Communication in State Curb Cut Permit Process	#	#
# 4.	Improve Access Driveway Spacing	#	#
# 5.	Planned Business Development	#	N/A
# 6.	Restrict High-Volume Traffic Generating Uses	#	N/A
# 7.	Planned Industrial Development	#	N/A
# 8.	Discontinue Paper Road	#	N/A
# 9.	Require Sidewalks	#	N/A
#10.	Planned Business Park	N/A	*

Legend: N/A - Not Applicable
* Work in Progress
# Wok Needed to Adopt Recommendation

3.0 TRAFFIC

3.0 ROUTE 10 TRAFFIC OPERATION ANALYSIS

3.1 Introduction

This Section of the Route 10 corridor study concentrates on the transportation issues associated with the anticipated growth along the Route 10 corridor. Transportation issues of concern for growing corridors include: the level of travel demands, motorist and pedestrian safety, changing travel patterns, and capacity constraints at key locations. The major contributor to the increasing concern of these transportation issues is the size and type of new land uses developed along the corridor. With an appropriate growth management strategy, future undesirable growth impacts may possibly be avoided through proper planning and land use controls.

Section 2.0 of this report identifies future planning strategies based on the historical and existing characteristics of the Easthampton/Northampton area. Several growth rates and zoning conditions were grouped together to conduct a "Build-out" analysis and to forecast probable growth impacts for four scenarios. In order to analyze the growth impacts of these various development rates and land use conditions, a forecast of the anticipated travel conditions was measured for each of the four Build-out scenarios described in Section 2 of this report. The four development scenarios described in Section 2 are as follows:

Scenario 1 - Existing Zoning/High Growth Rate;
Scenario 2 - Existing Zoning/Moderate Growth Rate;
Scenario 3 - Recommended Zoning/High Growth Rate; and
Scenario 4 - Recommended Zoning/Moderate Growth Rate.

The horizon years studied for the Build-out scenarios are the years 2000 and 2010. The travel conditions for roadway segments and various key intersections have been analyzed for each Build-out scenario during these years. Based on these analyses, proposed long term improvements to the roadway network were developed. Analyses have also been conducted for the interim year 1995 to identify the possible need for short term improvements on the Route 10 corridor. The analyses conducted examine roadway segment conditions, intersection levels of service, and intersection accident experience.

3.2 STUDY AREA

The Route 10 corridor which is the focus of this report is located between the Easthampton and Northampton centers. Figure 1 highlights the section of the Route 10 corridor which will be addressed as the study area. The study area encompasses the Route 10 corridor between and including the intersection with Route 9 (Main Street) in Northampton and the intersection with Route 141 (Union Street) in Easthampton. The total length of the study area is approximately 4.2 miles.

The study area encompasses 40 intersections with Route 10. These intersections include 16 in Easthampton and 24 in Northampton. The majority of the

intersecting roads are local residential streets. The PVPC has identified seven of the 40 intersections as key locations for evaluation. These intersections are noted on Figure 2 and are listed below:

Easthampton
1. Route 10 (Main Street) at Route 141 (Union Street);
2. Route 10 (Main Street) at West street;
3. Route 10 (Northampton Street) at Florence Road;
4. Route 10 (Northampton Street) at O'Neil street;

Northampton
5. Route 10 (Easthampton Road) at Earle Street;
6. Route 10 (South Street) at Old South Street; and
7. Route 10 (South Street) at Route 9 (Main Street).

Figure 2 also shows the Route 10 corridor divided into five segments. These segments were selected based on their conformance with the highway segment descriptions outlined in the Highway Capacity Manual. The boundaries of the Route 10 segments appropriate for study are as follows:

1. Route 9 (Main Street) to Old South Street;
2. Old South Street to Earle Street;
3. Earle Street to Easthampton/Northampton line;
4. Town Line to Florence Road; and
5. Florence Road to Pleasant Street.

These segments represent portions of the corridor that are consistent in geometric design, travel speed, and traffic flow.

3.3 METHODOLOGY

3.3.1 Study Area Volumes

Data collection for the Route 10 Corridor study first began in 1988. Since then additional data have been collected in support of determining the corridor's historical growth rate, travel patterns and demands, accident rates, and developmental characteristics. These data are the primary basis by which the corridor's performance is measured. A series of comparative evaluations have been conducted to determine the present and future conditions of the corridor.

Automatic Traffic Recorders (ATRs) were stationed at various locations within the study area to measure the Average Daily Traffic (ADT) along the corridor. The data were compared to other annual data collected throughout the region to determine an appropriate annual background growth rate for the Route 10 study area. Based on these historical and recent ADT counts, the annual background growth rate for the corridor was estimated at approximately 1.0 percent. This growth rate accounts for the general increase in vehicle traffic generated throughout the local area. This growth rate does not account for specific developments anticipated within the study area.

This annual background growth rate was applied to the existing volumes described in the Route 10 Technical Memorandum of Existing Transportation Conditions published by the PVPC in December 1989. This application developed the baseline ADT and peak hour volumes for the years 1995, 2000, 2010. The vehicle trips generated from the four scenarios were then added to

these baseline volumes to present the four Build-out traffic volume scenarios for each study year.

3.3.2 Operations Analysis

Traffic operations were analyzed according to standard procedures and practices outlined in the 1985 Highway Capacity Manual. The efficiency of traffic operations at a location is measured in terms of "Level of Service" (LOS). The LOS refers to the quality of traffic flow along roadways and at intersections. It is described in terms of Levels A through F, where A represents the best possible conditions and F represents forced-flow or failing conditions.

At signalized intersections, LOS is defined in terms of average delays. For unsignalized intersections, reserve capacity is used to determine LOS. These measures are discussed briefly below, and Table 16 summarizes their relationships.

Average delay is a measurement of the mean stopped delay experienced by vehicles entering a signalized intersection during the peak hour period. Average delay is measured for each individual approach and the intersection as a whole. The LOS provided deteriorates with increasing average delays. Generally LOS D or better is considered acceptable.

Reserve capacity at an unsignalized intersection is the unused capacity of an approach. This measure, defined in passenger cars per hour, indicates how many more vehicles using an individual approach would be required to bring the intersection leg to capacity. The LOS of an unsignalized intersection is measured by the worst LOS along any of the intersection's approaches. Generally LOS D or better is considered acceptable. However, minor street approaches may be very sensitive to even minimal amounts of traffic and yield lower levels of service. Intersections with LOS E may also be considered acceptable when volumes along the minor street approach volumes are not large.

Roadway segments are analyzed based on mobility and accessibility. The primary measure of service quality is percent time delay, speed, and capacity utilization. The criteria for analyzing highway segments are based on standards set for roadways with ideal capacities of 2,800 passenger cars per hour (both directions). These ideal roadways are typically designed for speeds greater than or equal to 60 mph, adequate lane and shoulder widths, no absence of passing zones, limited truck traffic, and an equal directional split of traffic. Using these parameters for a given roadway segment, the 1985 Highway Capacity Manual has determined adjustment factors for segments below the ideal conditions. In doing this, segments with varying conditions and volumes can be measured in terms of LOS. Generally, LOS D or better is considered acceptable. However, segments that are designed to operate below the ideal highway conditions may operate acceptably at LOS E as measured under the ideal highway standards.

The above types of analysis were conducted for the appropriate locations along the Route 10 corridor. Anticipated No-Build volumes, as well as the four Build-out scenario volumes, were analyzed under similar conditions to provide comparable results. These analyses were conducted for the weekday PM peak hour of three future-year periods: 1995, 2000, and 2010. Mitigation measures to improve the unacceptable study area travel conditions and safety have been examined for the existing conditions as well as for future study year conditions. Analyses of the recommended improvements have been conducted for the short term and long term time frames, in order to identify these improvements on an as-needed basis.

Table 16
Level of Service (LOS) Designations*

Category	Description	Delay Range (Seconds per vehicle)**	Reserve Capacity (Passenger Cars Per Hour)***
LOS A:	Describes a condition of free flow, with low volumes and relatively high speeds. There is little or no reduction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds. Little or no delays result for side street motorists.	0.00-5.0	400
LOS B:	Describes a condition of stable flow, with desired operating speeds relatively unaffected, but with a slight deterioration of maneuverability within the traffic stream. Side street motorists experience short delays.	5.1-15.0	300-399
LOS C:	Describes a condition still representing stable flow, but speeds and maneuverability begin to be restricted. Motorists entering form side streets experience average delays.	15.1-25.0	200-299
LOS D:	Describes a high-density traffic condition approaching unstable flow. Speeds and maneuverability become more restricted. Side street motorists may experience longer delays.	25.1-40.0	100-199
LOS E:	Represents conditions at or near the capacity of the facility. Flow is usually unstable, and freedom to maneuver within the traffic stream becomes extremely difficult. Very long delays may result for side street motorists.	40.1-60.0	0-99
LOS F:	Describes forced flow or breakdown conditions with significant queuing along critical approaches. Operating conditions are highly unstable as characterized by erratic vehicle movements along each approach.	60.1 or greater	N/A

* Source: Transportation Research Board, Highway Capacity Manual, Special Report 209; 1985.

** Delay ranges relate to the mean stopped delay incurred by all vehicles entering the intersection and do not consider the effects of traffic signal coordination. This criteria is intended for use in the evaluation of signalized intersections.

*** Reserve capacity refers to the unused capacity of an intersection approach, on a per lane basis. This criteria is limited to use in the evaluation of unsignalized intersections.

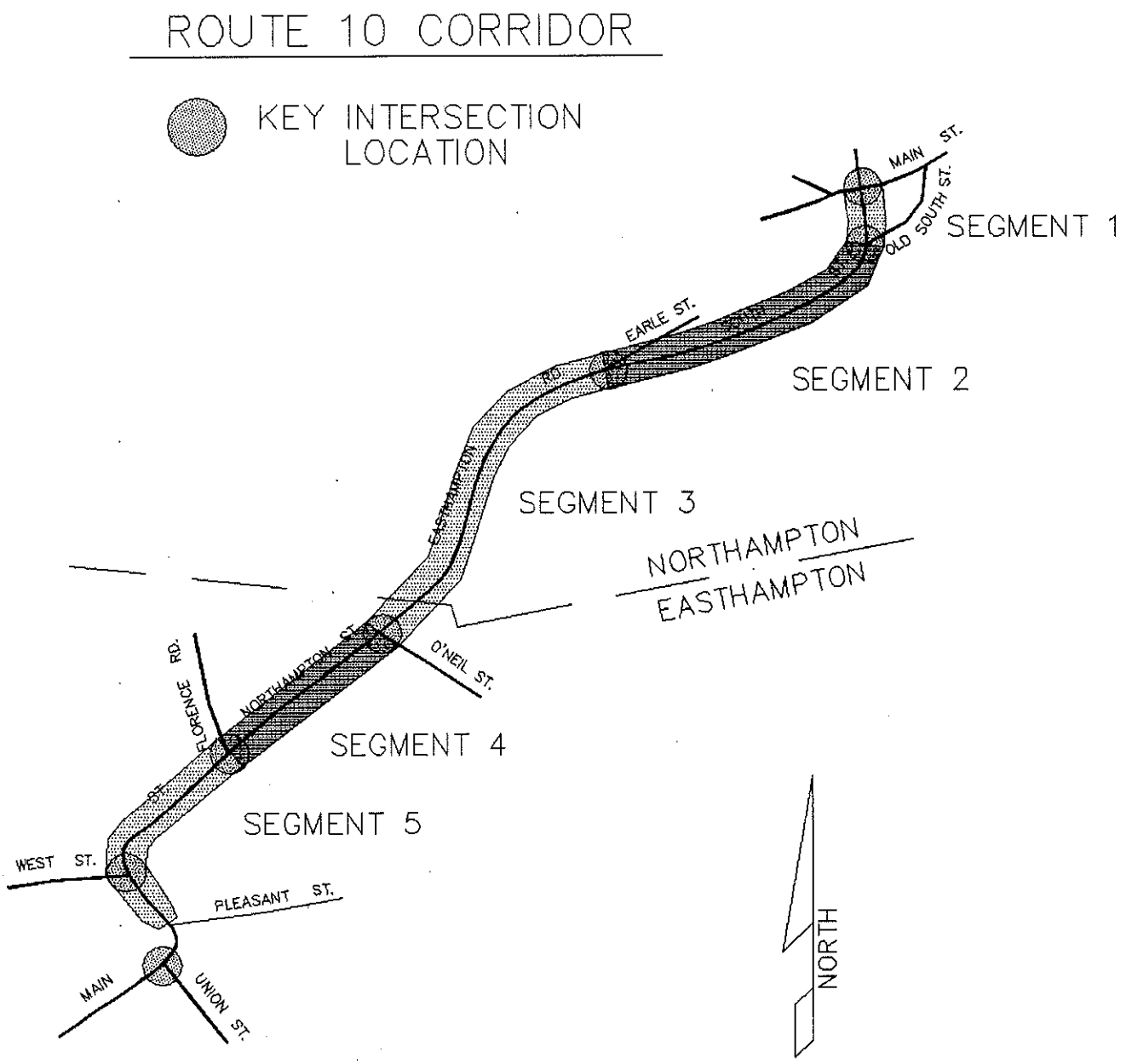


FIGURE 2
ROUTE 10 STUDY AREA FOCUS

3.4 EXISTING CONDITIONS

The technical memorandum of existing conditions along the Route 10 corridor published by the PVPC in December 1989 provides detailed information of the study area roadway and intersection characteristics, as well as travel demands and patterns, and safety conditions. The following paragraphs summarize the contents of that previous report.

3.4.1 Existing Intersection Analysis

The key locations examined for this report have been selected based upon their perceived significance to the corridor. Of the 40 roadways that intersect with Route 10 within the study area, seven are identified as having higher functional classification than typical local roadways. These intersections are described briefly below:

EASTHAMPTON

Route 10 (Main Street) at Union Street (Route 141)

This three-way intersection is the southern boundary of the Route 10 corridor study. The intersection of Route 10 with Union Street from the east is presently controlled by a three phase signal system.

Route 10 (Main Street) at West Street

West Street intersects Route 10 to form a three-way intersection just south of a significant curve in the Route 10 corridor. This curve restricts the sight distance along the eastbound West Street approach to the unsignalized intersection.

Route 10 (Northampton Street) at Florence Road

Florence Road intersects Route 10 from the west to form a three-way intersection. The present control at this location is a stop sign reinforced by flashing beacon.

Route 10 (Northampton Street) at O'Neil street

This intersection is located just south of the Easthampton/Northampton line. O'Neil Street approaches from the east to form a three-way stop sign controlled intersection with Route 10.

NORTHAMPTON

Route 10 (Easthampton Road) at Earle Street

Earle Street intersects Route 10 at an acute angle to form a three-way unsignalized intersection. The atypical approach angle supports the selection for evaluation at this location. Earle Street is located on the west side of Route 10 and has restricted sight distance of the Route 10 southbound approach.

Route 10 (South Street) at Old South Street

Route 10 is intersected by Old South Street to form a three-way unsignalized intersection The westbound Old South Street approach is divided at the intersection into two lanes separated by an island. This intersection is presently under evaluation by the City of Northampton. Reconfiguration and improved traffic control of this intersection are planned.

Route 10 (South Street) at Route 9 (Main Street)

Route 10 intersects Route 9 to form a major four-way signalized intersection. This northern study area boundary is equipped with a sophisticated five phase signal system to serve the high traffic demand at this location.

Traffic volumes presented in the December 1989 technical memorandum were used to represent the existing PM peak hour demands at each location. These PM peak hour volumes signify typical weekday peak commuter traffic, in which travel demands are greatest. Existing traffic volumes for the study area intersections are presented in Figure 3.

Each key intersection within the study area was analyzed to comparatively measure its quality of service based on the existing volumes and geometry. The Level of Service (LOS) calculations were conducted based on the procedures and practices outlined in the 1985 Highway Capacity Manual. Table 17 presents the results of the intersection analysis conducted at each of the study area locations.

Table 17 shows the estimated conditions experienced at the key study area intersections during the peak hour of any given weekday. As seen, three intersections operate at LOS D while the remaining four operate at LOS E or F. A brief description of each intersection's deficiencies is presented below.

Route 10 at Union Street in Easthampton operates at an acceptable service level under existing conditions. The present signal system offers three phase operation including a lead southbound phase to accommodate the heavy left turn movement from Route 10 onto Union Street. Although this lead phase exists, the volumes along this movement require more green time to fully satisfy demands. The Union Street right turn movement is also extremely heavy and approaches unacceptable delays.

The West Street approach to Route 10 in Easthampton is operating with excessive delays related to the high volume level experienced on Route 10. The restricted sight distance and shared lane approach add to the intersection operating over its capacity.

Based on the results presented in Table 17, the intersection of Route 10 and Florence Road in Easthampton operates over capacity under the existing conditions. The negative reserve capacity refers to the minor street approach operations of Florence Road. The present geometry accommodates a single approach lane which the left and right turning vehicles must share. This, coupled with the heavy volumes on Route 10, induces an insufficient number of acceptable gap times between the through moving vehicles, thereby creating excessive delays. The volumes along the northbound left turn movement are also significantly high and create delays for the entire northbound approach.

The O'Neil Street approach experiences a reserve capacity of 63 vehicles under existing conditions. Although the volumes along this approach are relatively low, the high volumes along Route 10 and the increased speed limit of 45 mph create substandard conditions.

The acute angle in which Earle Street intersects with Route 10 in Northampton hinders the sight distance of the vehicles maneuvering onto Route 10 southbound. This hindrance is realized through the capacity analysis resulting in a LOS D. The volumes along Earle Street are extremely low. However, as with the O'Neil Street intersection, the mainline volumes restrict maneuverability from this approach.

Table 17
Existing Intersection LOS Summary

Signalized Locations	Delay*	LOS
Route 10 at Union St.	26.4	D
Route 10 at Main St.	35.9	D

Unsignalized Locations	Reserve Capacity**	LOS
Route 10 at West St.	-113	F
Route 10 at Florence Rd.	-37	F
Route 10 at O'Neil St.	63	E
Route 10 at Earle St.	160	D
Route 10 at Old South St.	-401	F

* Delay measured in seconds per passenger cars per hour.
** Reserve capacity measured in passenger cars per hour.

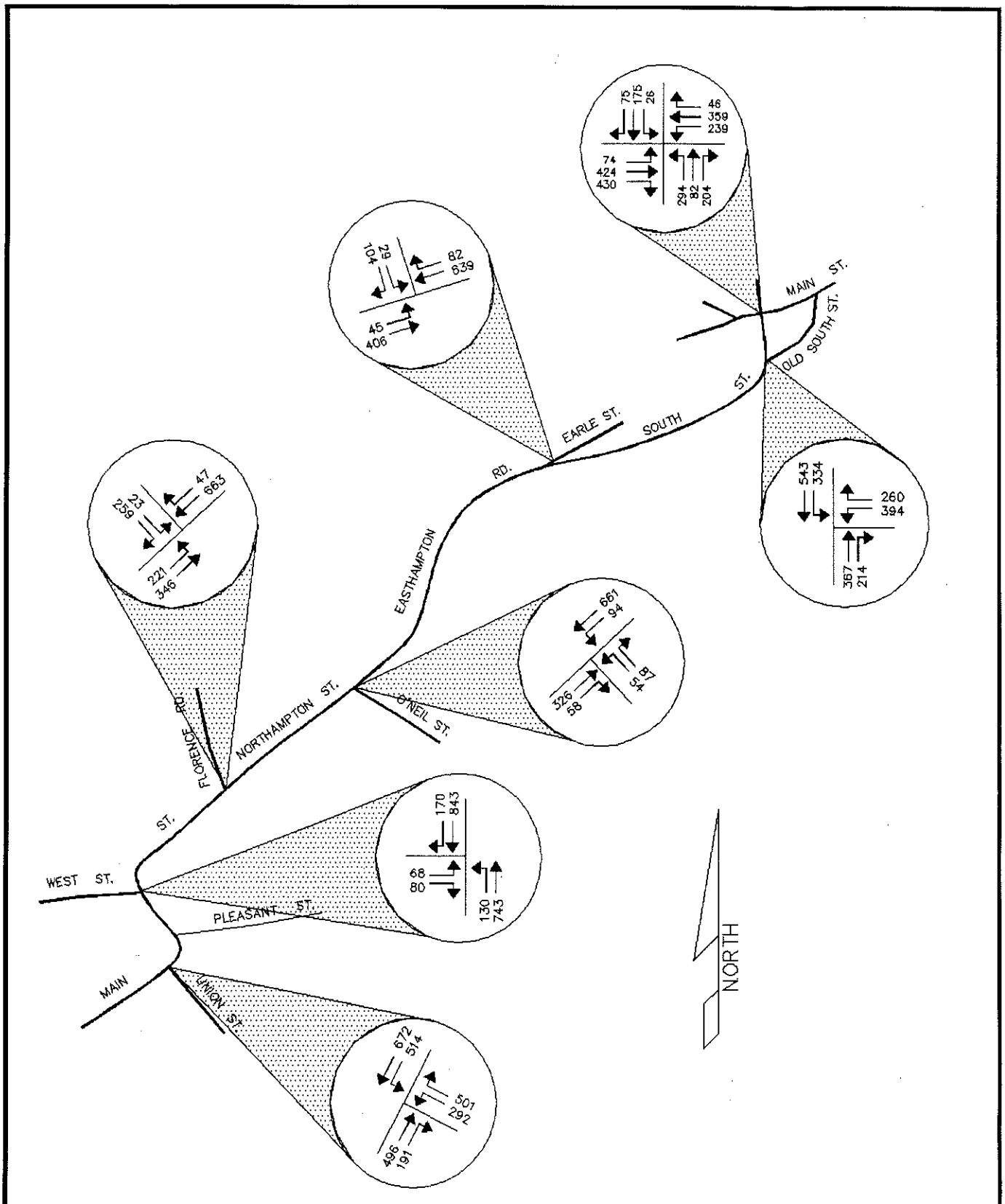


FIGURE 3
EXISTING STUDY AREA PEAK HOUR VOLUMES

The largest intersection delays within the study area are experienced at the Route 10 at Old South Street location. Volumes along each approach leg are extremely high causing excessive congestion. The atypical geometric configuration, although not accounted for in the analysis, increases user confusion reducing the effective utilization of the intersection. As seen in Table 17, the intersection presently is estimated to be operating well below capacity.

The delays experienced at the Route 10 at Main Street intersection in Northampton remains modestly under the LOS E threshold of 40 seconds of average delay per passenger car per hour (pcph). The southbound approach experiences significant delays due to the limited green time designated to this phase. However, the southbound approach is the lowest volume approach, and increasing green time for this phase will increase delays along the other three approaches which carry twice the volumes. Therefore, the present phasing sequence is appropriate in satisfying the demands along the high volume approaches and, in turn, keeping the average intersection delays to a minimum.

3.4.2 Existing Segment Analysis

The Route 10 corridor has been broken into five segments to examine the operations of traffic flow within the study area. The segments were determined based on the continuous geometric conditions as well as travel patterns. A brief description of each segment is presented below.

NORTHAMPTON
Segment 1: Main Street to Old South Street
- Length = 0.1 miles;
- Speed limit = 25 mph;
- Shoulders = street side parking;
- Directional split = 60/40;
- Percent heavy vehicles = 2.

Segment 2: Old South Street to Earle Street
- Length = 1.1 miles;
- Speed limit = 25-35 mph;
- Shoulders = wide;
- Directional split = 60/40;
- Percent heavy vehicles = 2.

Segment 3: Earle Street to Town line
- Length = 1.5 miles;
- Speed limit = 50 mph;
- Shoulders = wide;
- Directional split = 60/40;
- Percent heavy vehicles = 2.

EASTHAMPTON
Segment 4: Town line to Florence Road
- Length = 0.7 miles;
- Speed limit = 40-45 mph;
- Shoulders = none;
- Directional split = 60/40;
- Percent heavy vehicles = 2.

Segment 5: Florence Road to Pleasant Street
- Length = 0.7 miles;
- Speed limit = 35 mph;
- Shoulders = narrow;
- Directional split = 60/40;

Percent heavy vehicles = 2.

The segments were analyzed based on the parameters set forth by the Highway Capacity Manual. Segment LOS was determined by comparing the actual segment travel demands to the theoretical capacities and calculated LOS criteria established by each segment's characteristics. Peak hour travel demands were estimated from the ADT information gathered at mid-block locations along the corridor. Table 18 presents a summary of the existing segment analysis findings.

Table 18
Existing Segment Analysis Summary

Location	Mid-block Volume	LOS
Segment 1	1600	E
Segment 2	1535	D
Segment 3	1165	D
Segment 4	1130	E
Segment 5	1663	E

The criteria for measuring LOS presented in the 1985 Highway Capacity Manual for two lane highway segments principally address roadways with travel speeds of over 50 mph. The speed limits along the Route 10 corridor segments studied are posted for speeds below 50 mph, with the exception of segment 3. Therefore, the LOS values summarized in Table 3 can be interpreted as extremely conservative. Field observations will also suggest that operating conditions along the Route 10 segments are not as critical as the analysis results appear. Knowing this, the report will acknowledge LOS E as being an acceptable service level for the analysis of segments along Route 10. It is also important to understand that the LOS designation identified for each segment condition measures user's freedom to maneuver and operating comfort as well as roadway capacity. A poor LOS may be typical of a segment with some travel restrictions and not necessarily a gridlock condition.

3.4.3 Existing Study Area Safety

Safety conditions throughout the study area were estimated based on the accident history along Route 10. Unfortunately, detailed accident information regarding incidents at mid-block locations are not consistently available. Therefore, accident occurrence was based on information gathered at the key locations within the study area. The Massachusetts Department of Public Works (MDPW) was contacted to identify all accidents occurring at these intersections. Local police records were also reviewed to check this information. The accident information obtained focuses on the three year period of 1986 (when available), 1987 and 1988.

The information collected identified a total of 58 accidents occurring at the seven study area intersections. Of these 58 accidents, approximately 52 percent reported property damage only, while 48 percent reported personal injury, including one fatality. Annually, 1986 experienced 8 accidents (some data not available), 1987 experienced seven accidents, and 1988 experienced 33 accidents. This information is presented in Table 18 by year, type and severity for each of the six study area intersections. Table 18 also presents the accident rate per million vehicles for each intersection. This measure is presented to compare accident experience throughout the study area, as well as with the state average.

The high accident locations within the study area are the intersections of Route 10 at Old South Street, Route 10 at Florence Road and Route 10 at West Street. All three intersections experienced moderate accident rates before 1988 and then more than doubled during the 1988 year. Notably, these three intersections each accommodate over 7 million vehicles per year and operate under stop sign control.

The greatest number of accidents within the study area occurred at the intersection of Route 10 at Old South Street in Northampton. This intersection experienced a total of 19 reported accidents in a two year period. The primary types of accidents vary between angle and rear-end accidents. It is conceivable that the atypical configuration of the intersection induces such significant confusion to motorists that a high number of accidents occur.

The Route 10 at Florence Road intersection in Easthampton experienced a total of 13 reported accidents during the three year study period. Of these 13 accidents, the majority, eight, have been of the angle type. This may be the result of insufficient gap time available for the minor street approach or for northbound Route 10 left turning vehicles.

The one fatal accident within the study area occurred south of the Route 10 at Florence Road intersection which involved a pedestrian. At the time of the accident this segment had not been equipped with pedestrian cross walks, sidewalks or shoulders. Since the 1988 fatal accident, cross walks have been installed along with a flashing beacon at the intersection. Additional research on pedestrian safety at this location has been conducted by an Easthampton Safety Committee on Route 10 called ESCORT. ESCORT has reported that approximately 60 accidents have occurred in 1988 along roadway segments south of Florence Road. The segment just south of Florence Road is also an area of high pedestrian volume in which ESCORT observed a midday peak of approximately 60 pedestrians per hour. The high pedestrian traffic along with travel speeds in excess of 35 mph have raised concerns. Efforts to forewarn motorists of the posted 35 mph speed limit in the area are underway.

The abundance of accidents occurring at the Route 10 at West Street intersection are assumed to be associated with the excessive delays experienced on West Street coupled with the poor sight distance along Route 10. The frustrated West Street motorists make unsafe maneuvers when entering the flow of traffic along Route 10. The same is true for vehicles entering West Street from Route 10 northbound. This is apparent by the high number of accidents including southbound vehicles conflicting with the vehicles entering and exiting West Street.

3.4.4 Transit

The Route 10 corridor is served by the Pioneer Valley Transit Authority (PVTA). The PVTA Route 701 presently is operating well under capacity for all times of the day. It is anticipated that under the existing zoning regulations Route 701 will adequately provide service for the Route 10 corridor.

Future transit demand conditions under the four Build-out scenarios are also anticipated to be within the capacity of Route 701. It is expected that an increase in residential and retail development will induce a direct increase in transit demand. It is recommended that as transit ridership increases, the service be reviewed to identify the efficiency of the Route 701 scheduling and capacity.

Table 19
Accident History Summary

Location	Year	Number of Accidents	Type		Severity		Rate Per Mil. Veh.
Route 10 at Union St.	1986	4	AN	1	PD	5	.34
	1987	1	RE	4	PI	3	.08
	1988	3	HO	1	F	0	.25
			PED	1			
			FO	1			
Route 10 at West St.	1986	4	AN	14	PD	10	.44
	1987	6	RE	6	PI	10	.66
	1988	10	HO	0	F	0	1.09
			PED	0			
			FO	0			
Route 10 at Florence Rd.	1986	4	AN	8	PD	5	.59
	1987	3	RE	5	PI	9	.44
	1988	8	HO	0	F	1	1.25
			PED	1			
			FO	1			
Route 10 at O'Neil St.	1986	0	AN	1	PD	1	.00
	1987	1	RE	1	PI	1	.17
	1988	1	HO	0	F	0	.17
			PED	0			
			FO	0			
Route 10 at Earle St.	1986	NA	AN	0	PD	4	NA
	1987	2	RE	1	PI	1	.34
	1988	2	HO	0	F	0	.34
			PED	0			
			FO	3			
Route 10 at Old South St.	1986	NA	AN	6	PD	10	NA
	1987	5	RE	11	PI	9	.53
	1988	14	HO	0	F	0	1.47
			PED	0			
			FO	2			
Route 10 at Main St.	1986	NA	AN	4	PD	5	NA
	1987	5	RE	3	PI	4	.46
	1988	5	HO	0	F	0	.46
			PED	0			
			FO	2			

NA = Not Available
AN = Angle
RE = Rear End
HO = Head On
PED = Pedestrian
FO = Fixed Object

Mil Veh = Million Vehicles
PD = Property Damage
PI = Personal Injury
F = Fatality

3.4.5 Signal Warrant Analysis

The findings of the existing conditions analyses prompt further investigation. A signal warrant analysis was conducted for several key study area locations under the criteria presented in the Manual on Uniform Traffic Control Devices (MUTCD) set forth by the U.S. Department of Transportation, Federal Highway Administration. These criteria are the accepted standard throughout the United States.

The signal warrants described in the MUTCD are presented below:

Warrant 1 - Minimum vehicular volume.
Warrant 2 - Interruption of continuous traffic.
Warrant 3 - Minimum pedestrian volume.
Warrant 4 - School crossings.
Warrant 5 - Progressive movement.
Warrant 6 - Accident experience.
Warrant 7 - Systems.
Warrant 8 - Combination of warrants
Warrant 9 - Four hour volumes.
Warrant 10 - Peak hour delay.
Warrant 11 - Peak hour volume.

The available field data is tested under these warrants to determine if a traffic signal installation is justified. Signal installation is warranted if at least one of the above warrants is satisfied. However, good planning and engineering judgement is also required when determining if a location is suitable for traffic control.

Four intersections along the Route 10 corridor were examined using the MUTCD guidelines. The intersecting roadways include West Street, Florence Road, O'Neil Street, and Old South Street. The data used in the analysis was obtained in 1988. The traffic signal warrant worksheets for each of these intersections is presented in Appendix I.

With limited data collected at the Route 10 at West Street intersection, five of the 11 signal warrants were satisfied. These warrants include Warrant 6 (Accident experience), Warrant 7 (Systems warrant), Warrant 9 (Four hour warrant), Warrant 10 (Peak hour delay), and Warrant 11 (Peak hour volume).

The intersection of Route 10 at Florence Road satisfied 8 of the 11 signal warrants listed above. Among the warrants not satisfied were Warrant 3 (Minimum Pedestrian Volumes) and Warrant 5 (Progressive Movement). The minimum pedestrian volume required to satisfy Warrant 3 is 100 pedestrians for any four hours or 190 pedestrians for any single hour. Warrant 5 was designed to accommodate systems which involve additional signalized locations. Warrant 4 (School crossing) is the only warrant that did not apply.

Two signal warrants were satisfied at the Route 10 at O'Neil Street intersection. These warrants include Warrant 9 (Four hour volumes) and Warrant 11 (Peak hour volume). Two of the signal warrants did not apply, Warrant 3, due to lack of information, and Warrant 4.

The Route 10 at Old South Street intersection satisfied eight of the 11 warrants, did not satisfy one, and two did not apply. The one warrant not satisfied was Warrant 5 which requires the need to assist a signal system in the proper platooning of vehicles. This did not seem necessary. The two warrants which did not apply include Warrant 3, due to lack of information, and Warrant 4.

3.4.6 Short-Term Improvements

The results presented in Table 2 and Table 4 identify four intersections which experience unsatisfactory conditions under existing conditions and may warrant immediate attention. Based on this information, it is recommended that mitigation in the form of traffic signals be installed at three of the four locations. These locations include Route 10 at West Street, Route 10 at Florence Road, and Route 10 at Old South Street. It does not seem apparent that signal installation is required at this time at the Route 10 at O'Neil Street intersection.

The Route 10 at West Street intersection experiences traffic volumes which satisfy the installation of a traffic signal. It would appear that this improved control would reduce the number of angle accidents at the intersection. However, the installation of a traffic signal may also induce a significant increase in rear-end accidents along the Route 10 southbound approach due to the curvature of the corridor. Possibly the installation of forewarning signs would minimize this problem. Along with the installation of signal control, other control improvement alternatives may also be appropriate. Specifically, the implementation of a restricted right-turn-only system from West Street should also be considered.

Installation of traffic signals at the Route 10 at Florence Road intersection will significantly reduce traffic delays at this location. Traffic signal control should also reduce the number of significant accidents at and adjacent to the intersection. Pedestrian crossings at the intersection will also be more controlled and the increased platooning of Route 10 traffic will simplify these maneuvers. Actuated push buttons may also be installed to serve the pedestrian traffic.

Operations at the Route 10 at O'Neil Street intersection have been calculated to be below the generally accepted standards under existing conditions. However, the volumes along O'Neil Street are relatively low and intersection delays are not significant. Therefore, it is not anticipated that improvement measures are presently required at this location.

As with the Route 10 at Florence Road intersection, the intersection of Route 10 at Old South Street will be better served by traffic signal control. It would also be appropriate at this time to reconfigure the intersection geometry to reduce confusion. Again, significant accidents at this location should decline with the installation of improved control.

Table 20
Signal Warrant Analysis Summary

	West St.	Florence Rd.	O'Neil St.	Old South St.
Warrant 1	DNC	YES	NO	YES
Warrant 2	DNC	YES	NO	YES
Warrant 3	DNC	NO	DNC	DNC
Warrant 4	NA	NA	NA	NA
Warrant 5	DNC	NO	NO	NO
Warrant 6	YES	YES	NO	YES
Warrant 7	YES	YES	NO	YES
Warrant 8	DNC	YES	NO	YES
Warrant 9	YES	YES	YES	YES
Warrant 10	YES	YES	NO	YES
Warrant 11	YES	YES	YES	YES
TOTAL	5 YES 0 NO 6 NA/DNC	8 YES 2 NO 1 NA	2 YES 7 NO 2 NA/DNC	8 YES 1 NO 2 NA/DNC

NA = Not Applicable.
DNC = Data Not Collected.

3.5 YEAR 1995 CONDITIONS

Existing study area traffic volumes were forecast to 1995 levels based on an estimated annual growth rate of 1.0 percent. These baseline volumes or "No-Build" volumes were established to measure the future conditions of the Route 10 corridor. A Build-out analysis was then conducted to compare the impacts of different development growth rates. Projected vehicle trip generation volumes were combined with the baseline volumes to depict the travel demands for the various rates of development of the four Build-out scenarios described earlier in the report. The quality of travel along Route 10 was again measured through intersection and segment analyses for each scenario, as well as for a No-Build condition.

Figure 4 represents the 1995 No-Build peak hour volumes for the key study area intersections. These volumes depict conditions of limited additional development within the study area. Figure 5 represents the number of estimated new trips generated by the various rates of development proposed by each of the four scenarios. These development-generated volumes were assigned throughout the Route 10 corridor based on the procedures described in Section 2.0 of this report.

3.5.1 Year 1995 Intersection Analysis

Analysis of the intersection operations was conducted for the 1995 No-Build condition and scenarios 1 through 4. The existing geometric configurations and traffic controls were maintained to identify future problem locations and capacity deficiencies. Table 21 presents a summary of the 1995 intersection operating conditions with and without intersection mitigation. Table 5 also presents a summary of the existing operating conditions for comparison.

As seen in Table 21, all of the intersections experienced a significant decline in operating performance. Mitigation at four study area locations was required to return the intersections to acceptable levels of service. Operating conditions after mitigation are also presented in Table 21. The mitigation requirements for each location are described below.

Route 10 at Union Street: Acceptable operating conditions are achieved at this location by simply adjusting the signal phasing and timing. By extending the left turn lead phase, the critical southbound movement will receive adequate green time for an acceptable LOS. Also, by permitting the Union Street right turns to share this phase, average intersection delays are reduced significantly. Upgrading the signal head along the Union Street approach to provide a protected green right-turn arrow would improve intersection operation but is not absolutely necessary. This is also true along the Route 10 northbound approach.

Route 10 at West Street: Two mitigation alternatives were examined at this location. Alternative 1 involves the installation of traffic signal control. Signalization will administer the added control to allow critical movements to pass through the intersection safely. The signal control is anticipated to require second approach lanes along the Route 10 northbound and southbound legs in order to operate optimally. These second approach lanes will separate the turning vehicles and allow the through movements to pass with minimal interference.

Mitigation Alternate 2 examines restricting left turns from West street. The vehicles desiring to head northbound on Route 10 would be required to turn right out of West street, travel into downtown Easthampton and follow the rotary in order to complete a u-turn and change direction

towards Route 10 northbound. By restricting the left turn movement out of West street, the intersection is relieved of a critical and hazardous movement due to poor sight distance. The control at the intersection will be assisted by reconstructing the West Street leg to include a raised channelization island and proper signage to discourage left turn movements.

Route 10 at Florence Road: Existing conditions at this intersection warrant the installation of traffic signal control. However, the volumes at the intersection also require additional approach lanes to increase the capacity of the intersection and satisfy travel demands. The significant volumes along Route 10 northbound justify a second approach lane, as do the approach volumes along Florence Road. By installing traffic signals and the northbound and eastbound exclusive approach lanes, the intersection will be capable of maintaining adequate operational control and improving safety. Also, appropriate pedestrian crossing facilities may be installed to reduce pedestrian/vehicle conflicts.

Route 10 at O'Neil Street: By the year 1995 the Route 10 at O'Neil Street intersection will require the installation of traffic signals. The anticipated development within the study area will cause the intersection to operate over capacity during the daily peak hours. The present conditions at the intersection satisfy two of the 11 warrants described in the MUTCD, and by the year 1995 it is anticipated that the increase in volume will satisfy more of these warrants. Under signal control, the existing geometry will continue to handle the traffic demands. Therefore, additional widening will not be needed at this time.

Route 10 at Earle Street: Based on the analysis conducted for the year 1995, it is not anticipated that mitigation improvements will be required at this location. Although the intersection is expected to operate below the generally accepted conditions, the intersection will still operate under the calculated capacity limit. It is recommended that this intersection be monitored to identify any increase in accidents caused by the poor sight distance due to the design of the Earle Street approach.

Route 10 at Old South Street: This intersection is presently under the examination of the City of Northampton to install traffic signals and possibly reconfigure the intersection design. Table 5 analyzed the intersection under signal control and additional intersection capacity. The northbound right turn volume was assigned to an exclusive lane as was the southbound left turning vehicles. The signal phasing at the intersection consisted of a three phase sequence including a lead southbound left turn phase.

Route 10 at Main Street: The limited intersection right-of-way restricts any possible widening at this location. Therefore improvements to the intersection operations must come in the form of improving upon the signal control system. Examination of this intersection control reveals a very complex signal timing sequence and phasing. In order to improve the operating conditions of this intersection careful adjustments would have to be made to this sophisticated timing according to the variance in traffic levels and travel patterns through the intersection. This type of timing sophistication is beyond the scope of this report.

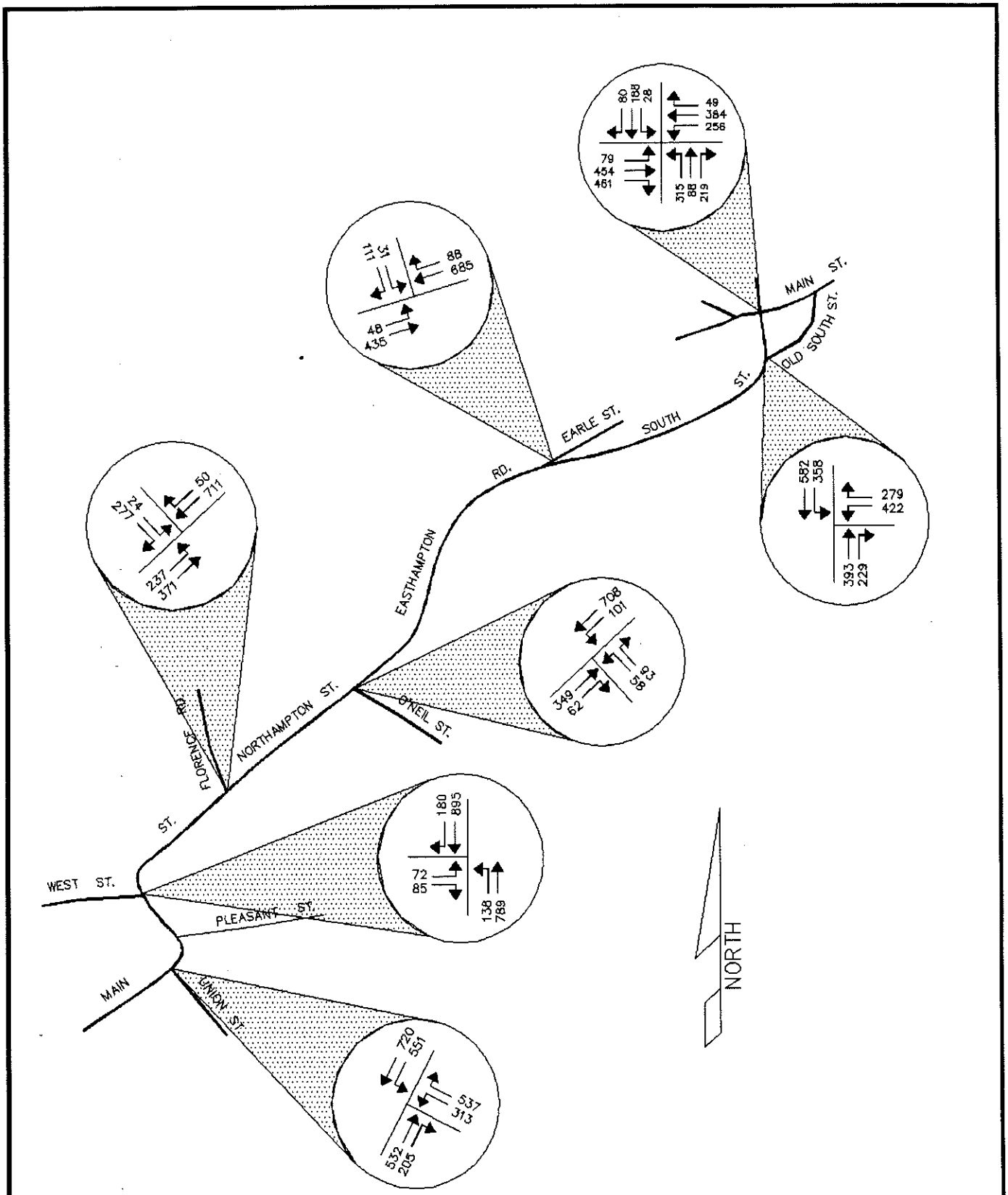


FIGURE 4
YEAR 1995 STUDY AREA PEAK HOUR VOLUMES

YEAR 1995 BUILD-OUT TRIP GENERATION

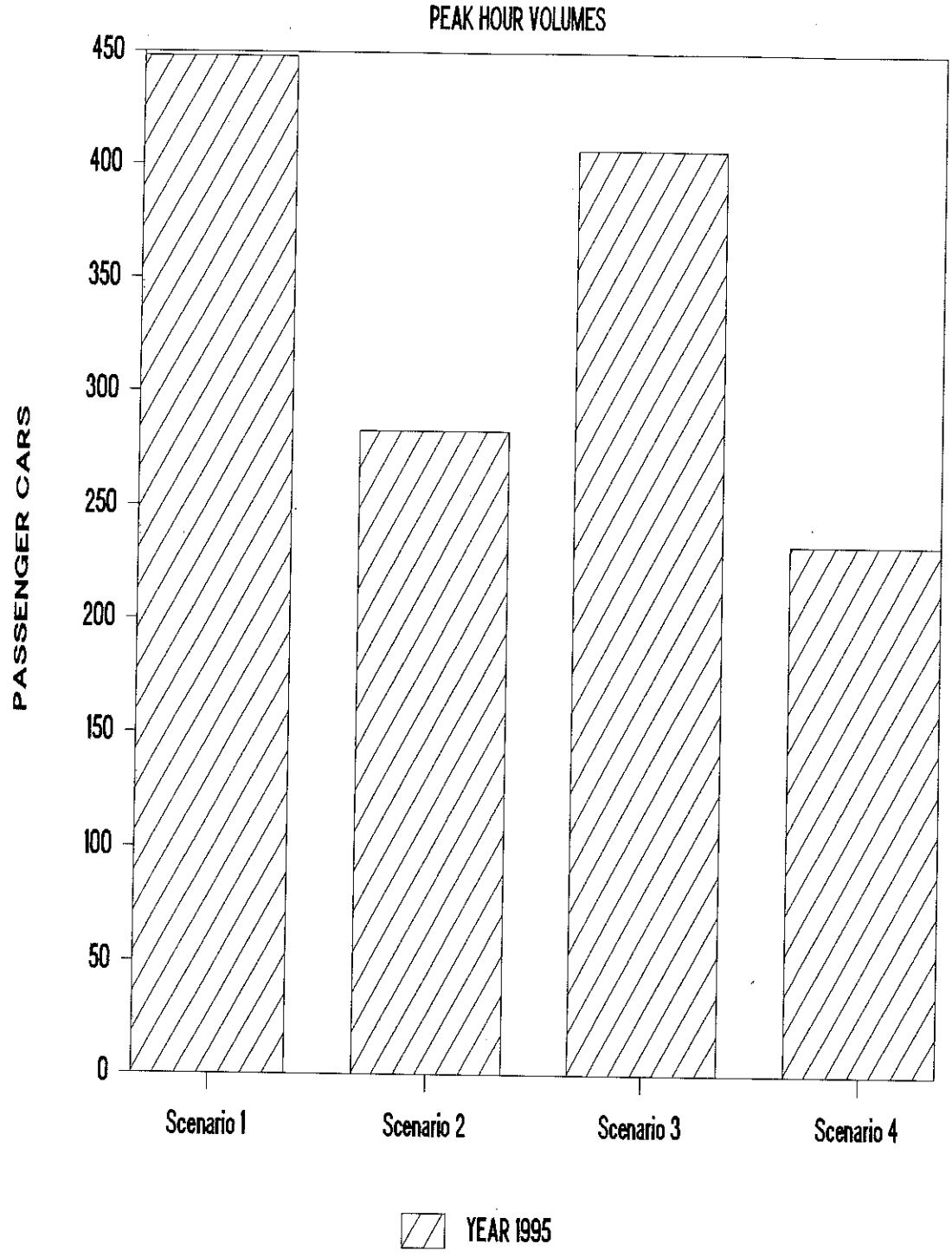


FIGURE 5
YEAR 1995 BUILD-OUT
PEAK HOUR TRIP GENERATION VOLUMES

Table 21
Year 1995 Intersection LOS Summary

Study Area Location	Condition	Existing Year	Year 1995		Recommended Mitigation
Route 10 at Union Street	No Build	D	E	C	1995: adjust signal timing.
	Scenario 1		F	D	
	Scenario 2		F	C	
	Scenario 3		F	D	
	Scenario 4		F	C	
Route 10 at West Street	No Build	F	F	B/E*	1995: ALT 1 signalize, add NB LT lane, add SB RT lane. ALT 2 - restrict EB left turns.
	Scenario 1		F	C/E	
	Scenario 2		F	B/E	
	Scenario 3		F	C/E	
	Scenario 4		F	B/E	
Route 10 at Florence Road	No Build	F	F	B	1995: signalize, add NB LT lane, add EB LT lane.
	Scenario 1		F	C	
	Scenario 2		F	C	
	Scenario 3		F	C	
	Scenario 4		F	C	
Route 10 at O'Neil Street	No Build	E	E	B	1995: signalize.
	Scenario 1		F	B	
	Scenario 2		F	B	
	Scenario 3		F	B	
	Scenario 4		F	B	
Route 10 at Earle Street	No Build	D	D		1995: none.
	Scenario 1		E		
	Scenario 2		E		
	Scenario 3		E		
	Scenario 4		E		
Route 10 at Old South Street	No Build	F	F	B	1995: signalize, add SB LT lane, add NB RT lane.
	Scenario 1		F	B	
	Scenario 2		F	B	
	Scenario 3		F	B	
	Scenario 4		F	B	
Route 10 at Main Street	No Build	E	E		1995: detailed study required
	Scenario 1		E		
	Scenario 2		E		
	Scenario 3		E		
	Scenario 4		E		

*Represents LOS for mitigation plans Alternative 1/Alternative 2

3.5.2 Year 1995 Segment Analysis

The existing ADT volumes were forecast to 1995 levels based on the 1.0 percent annual growth rate discussed earlier. The estimated peak hour volumes were compared to the calculated LOS criteria established by each segment's characteristics. The results of the analysis are presented in Table 6. Table 6 also includes the results of the existing conditions analysis for comparison.

As seen in Table 22 the increase in peak hour traffic volumes did not significantly alter the operating conditions along the study area corridor segments. Segment 2 experienced the only drop in level of service due to the expected demand induced by the four Build-out scenarios. As stated earlier, LOS E for a given segment within the study area is not considered unacceptable as it may be for the operation of an intersection. Therefore, segment operations within the study area for the year 1995 are acceptable based on the methodology.

3.5.3 Year 1995 Study Area Safety

Safety conditions at the study area intersections should improve with the installation of mitigation measures at each intersection. Specifically, the three intersections of West Street (under mitigation alternative 1), Florence Road, and Old South Street with Route 10 are anticipated to experience fewer significant accidents with the installation of traffic signals. This improved control will reduce the conflicts between the mainline traffic flow and the side street traffic flow. The traffic signals will also platoon the vehicles and allow for easier pedestrian crossings at both the intersections and mid-block locations. Mitigation Alternative 2 at West Street suggests eliminating a hazardous movement from the intersection. The restriction of left turns at this intersection will reduce conflicts for the Route 10 southbound vehicles. However, the intersection is located south of a significant curve in the roadway and the installation of a sign warning motorists of entering vehicles is recommended.

Table 22
Year 1995 Segment Analysis Summary

Location	Condition	Existing Year		Year 1995	
		LOS	VOL.	LOS	VOL.
Segment 1	No Build	E	1600	E	1709
	Scenario 1			E	1788
	Scenario 2			E	1752
	Scenario 3			E	1782
	Scenario 4			E	1750
Segment 2	No Build	D	1432	D	1535
	Scenario 1			E	1663
	Scenario 2			E	1614
	Scenario 3			E	1654
	Scenario 4			E	1604
Segment 3	No Build	D	1165	D	1236
	Scenario 1			D	1457
	Scenario 2			D	1359
	Scenario 3			D	1445
	Scenario 4			D	1358
Segment 4	No Build	E	1130	E	1198
	Scenario 1			E	1448
	Scenario 2			E	1340
	Scenario 3			E	1425
	Scenario 4			E	1328
Segment 5	No Build	E	1663	E	1783
	Scenario 1			E	2033
	Scenario 2			E	1942
	Scenario 3			E	2007
	Scenario 4			E	1910

VOL.= mid-block volume for peak hour.

3.6 YEAR 2000 CONDITIONS

The traffic volume information for the study area was forecast to depict the year 2000 No-Build levels using the same method described earlier. The 2000 No-Build peak hour volumes are presented in Figure 6. The anticipated trip generation values for each scenario's development growth rate was individually combined with these No-Build volumes to develop the four build-out scenarios. Figure 7 shows the anticipated levels of the four build-out scenarios trip generation values for the year 2000.

3.6.1 Year 2000 Intersection Analysis

Analysis of the intersection operations was conducted for the 2000 No-Build condition and for the Scenarios 1 through 4. The existing geometric configurations were maintained to depict the operating conditions of each key study area location without improvement. Analysis of the operating conditions were also conducted with mitigation improvements where needed. These mitigation improvements include the improvements described previously for the 1995 analysis and any additional improvements if required. Table 7 presents a summary of the year 2000 intersection operations and a summary of the previous analysis for comparison.

The increase in background traffic and in study area development growth are seen to significantly affect the intersection quality of service. Without mitigation measures it is anticipated that six of the seven key study area intersections will operate at LOS F under any of the four build-out scenarios. If the mitigation recommendations for the study area intersections were incorporated in 1995, then only minor additional improvements will be required for the year 2000. These improvements are described below.

Route 10 at Union Street: In order to satisfy the demands for the year 2000 volumes, minor lane reconfiguration is required. The northbound approach presently has one exclusive through lane and one exclusive right turn lane. Under this configuration, the through volumes are not receiving enough green time to satisfy the demand. Therefore, the right turn lane will be designated as a shared through/right turn lane. This lane will allow the passage of enough through vehicles to reduce delays to acceptable levels without taking green time away from other critical movements. This method of improvement may, however, reduce the available parking along Route 10 north of the intersection in order to accommodate two receiving lanes of acceptable length.

Route 10 at West Street: Under 1995 conditions, two mitigation alternatives were presented. The year 2000 volumes were again analyzed for both levels of mitigation. Mitigation Alternative 2, the restriction of West street left turn movements, resulted in LOS F conditions under the year 2000 volumes. The Route 10 southbound volumes are anticipated to be too high for the critical northbound left turn movement. Therefore, this mitigation measure is considered temporary and inappropriate for a long term planning strategy. Mitigation Alternative 1, however, recommends the installation of traffic signals and additional northbound and southbound approach lanes by the year 1995. This level of mitigation is anticipated to operate at acceptable service levels for the year 2000 volumes.

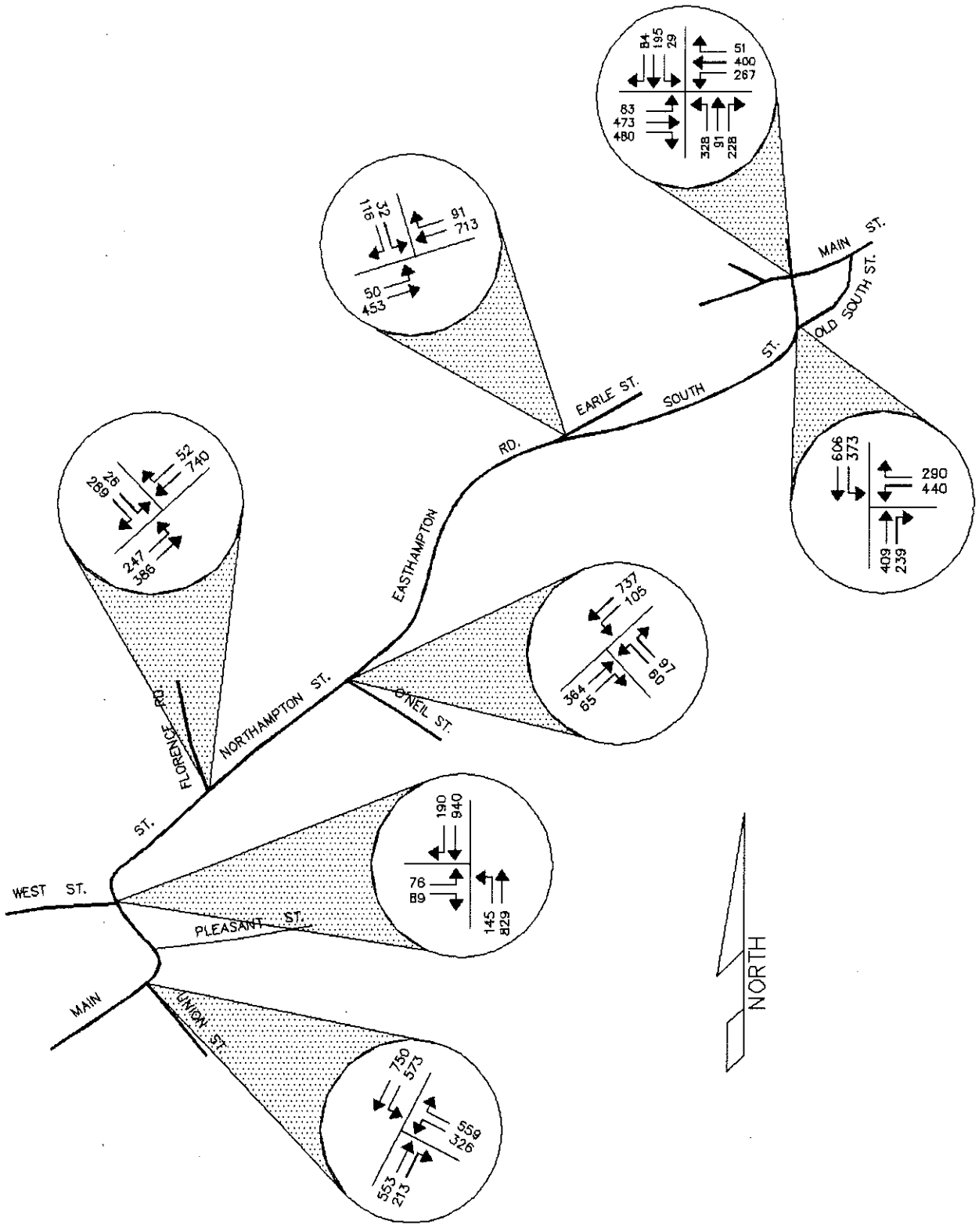


FIGURE 6
YEAR 2000 STUDY AREA PEAK HOUR VOLUMES

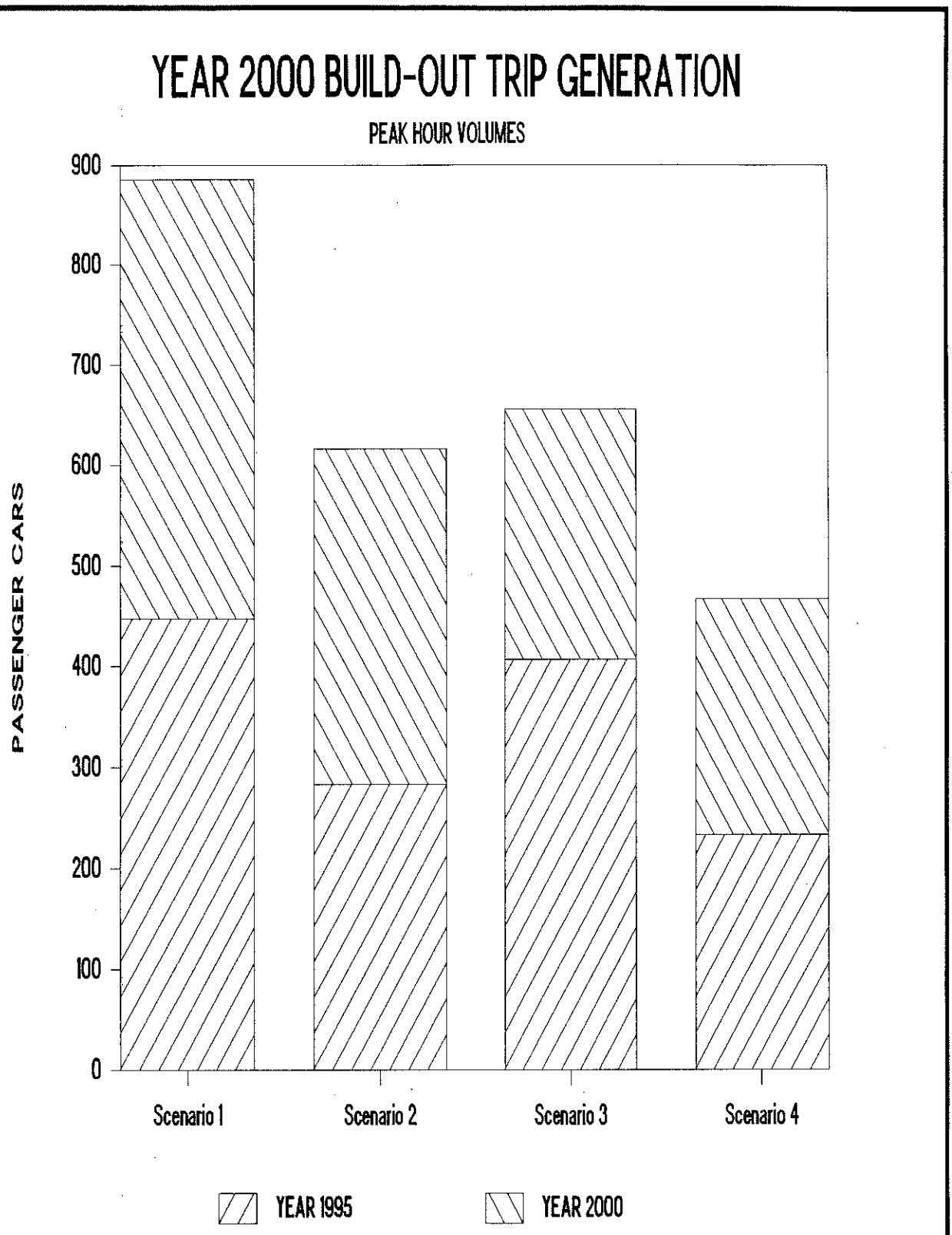


FIGURE 7
YEAR 2000 BUILD-OUT
PEAK HOUR TRIP GENERATION VOLUMES

The remaining five intersections are expected to continue to operate acceptably with the mitigation improvements recommended under the 1995 conditions. These improvements were applied to the year 2000 analysis and the results are summarized in Table 23.

3.6.2 Year 2000 Segment Analysis

The existing ADT volumes were forecast to 2000 levels based on the 1.0 percent annual growth rate discussed earlier. The estimated peak hour volumes were compared to the calculated LOS criteria established by each segment's characteristics. The results of the analysis are presented in Table 8, which also includes the results of the previous analyses for comparison.

As seen in Table 24, the increase in peak hour traffic volumes did not significantly alter the operating conditions along the study area corridor segments. None of the study area segments experiences an operating condition below LOS E.

3.6.3 Year 2000 Study Area Safety

As stated earlier, safety conditions at the study area intersections should improve with each mitigation measure adopted. However, the volumes within the study area are expected to increase each year and unexpected problems may arise. It is recommended that the two municipalities systematically gather and review accident occurrence data along the Route 10 corridor.

Table 23

Year 2000 Intersection LOS Summary

Study Area Location	Condition	Existing Year	Year 1995		Year 2000		Recommended Mitigation
			as is	w/mit	as is	w/mit	
Route 10 at	No Build	D	E	C	F	C	1995 mit: adjust
Union Street	Scenario 1		F	D	F	D	signal timing.
	Scenario 2		F	C	F	C	2000 mit: reconfigurate
	Scenario 3		F	D	F	D	land assignment.
	Scenario 4		F	C	F	C	
Route 10 at	No Build	F	F	B/E*	F	B/E	1995 mit: ALT 1 -
West Street	Scenario 1		F	C/E	F	E/F	signalize,
	Scenario 2		F	B/E	F	D/F	add NB LT lane,
	Scenario 3		F	C/E	F	D/F	add SB RT lane.
	Scenario 4		F	B/E	F	C/F	ALT 2 - restrict
							left turns.
							2000 mit: ALT 1 none.
							ALT 2 - not
							applicable.
Route 10 at	No Build	F	F	B	F	C	1995 mit: signalize,
Florence Road	Scenario 1		F	C	F	E	add NB LT lane,
	Scenario 2		F	C	F	D	add EB LT lane.
	Scenario 3		F	C	F	D	2000 mit: none.
	Scenario 4		F	C	F	D	
Route 10 at	No Build	E	E	B	E	B	1995 mit: signalize.
O'Neil Street	Scenario 1		F	B	F	D	2000 mit: none.
	Scenario 2		F	B	F	C	
	Scenario 3		F	B	F	C	
	Scenario 4		F	B	F	C	
Route 10 at	No Build	D	D		E		1995 mit: none.
Earle Street	Scenario 1		E		E		2000 mit: none.
	Scenario 2		E		E		
	Scenario 3		E		E		
	Scenario 4		E		E		
Route 10 at	No Build	F	F	B	F	B	1995 mit: signalize,
Old South Street	Scenario 1		F	B	F	C	add SB LT lane,
	Scenario 2		F	B	F	C	add NB RT lane.
	Scenario 3		F	B	F	C	2000 mit: none.
	Scenario 4		F	B	F	C	
Route 10 at	No Build	E	E		E		1995 mit detailed study
Main Street	Scenario 1		E		F		required, mit:
	Scenario 2		E		F		2000 mit: detailed study
	Scenario 3		E		F		required
	Scenario 4		E		F		

*Represents LOS for mitigation plans Alternative 1/Alternative 2

Table 24

Year 2000 Segment Analysis Summary

Location	Condition	Existing Year		Year 1995		Year 2000	
		LOS	VOL.	LOS	VOL.	LOS	VOL.
Segment 1	No Build	E	1600	E	1709	E	1803
	Scenario 1			E	1788	E	1978
	Scenario 2			E	1752	E	1912
	Scenario 3			E	1782	E	1920
	Scenario 4			E	1750	E	1887
Segment 2	No Build	D	1432	D	1535	E	1614
	Scenario 1			E	1663	E	1886
	Scenario 2			E	1614	E	1796
	Scenario 3			E	1654	E	1804
	Scenario 4			E	1604	E	1750
Segment 3	No Build	D	1165	D	1236	D	1313
	Scenario 1			D	1457	E	1757
	Scenario 2			D	1359	E	1622
	Scenario 3			D	1445	E	1663
	Scenario 4			D	1358	E	1568
Segment 4	No Build	E	1130	E	1198	E	1273
	Scenario 1			E	1448	E	1779
	Scenario 2			E	1340	E	1623
	Scenario 3			E	1425	E	1648
	Scenario 4			E	1328	E	1544
Segment 5	No Build	E	1663	E	1783	E	1874
	Scenario 1			E	2033	E	1378
	Scenario 2			E	1942	E	2243
	Scenario 3			E	2007	E	2243
	Scenario 4			E	1910	E	2134

VOL. + mid-block volume for peak hour.

3.7 YEAR 2010 CONDITIONS

The traffic volume information for the study area was forecast to depict the year 2010 No-Build volumes using the same method described earlier. The 2010 No-Build peak hour volumes are presented in Figure 8. The anticipated trip generation values for each scenario's development growth rate were individually combined with these No-Build volumes to develop the four build-out scenarios. Figure 9 shows the anticipated levels of the four build-out scenarios trip generation values for the year 2010.

3.7.1 Year 2010 Intersection Analysis

Analysis of the intersection operations was conducted for the 2010 No-Build condition and for the scenarios 1 through 4. The existing geometric configurations were maintained to depict the operating conditions of each key study area location without improvement. Analysis of the operating conditions were also conducted with mitigation improvements where needed. These mitigation improvements include the improvements described previously for the 1995 and/or the 2000 analysis and any additional improvements if required. Table 25 presents a summary of the year 2010 intersection operations and a summary of the previous analyses for comparison.

Under the existing geometry and with no mitigation, all of the key study area intersections are expected to operate at LOS F in the year 2010. The mitigation recommendations described for the study years 1995 and 2000 have enabled the intersections to keep pace with the growing travel demands. The mitigation improvements recommended for the year 2010 may be incorporated at any time previous to this year if the municipality has the available funding. Earlier implementation of these improvements may also be considered if other reconstruction activity is planned at any of the same locations.

The additional anticipated mitigation needs for the year 2010 at key study area intersections are listed below.

Route 10 at Union Street: By the year 2010, the present geometric restrictions will not accommodate the volumes anticipated at this location, and extreme mitigation measures may be warranted. However, it may be premature at this time to recommend these mitigation improvements. It is recommended that by the year 2010 a detailed study be conducted to identify effective mitigation measures.

Route 10 at West Street: The results from the year 2000 analysis basically identified Mitigation Alternative 2 as a short term improvement since operations are not expected to be acceptable for much more than a five year period or up to the year 2000. Therefore, this Alternative was disregarded from further consideration. Mitigation Alternative 1 will need additional mitigation in the year 2010. The Route 10 southbound volumes become excessive and require two travel lanes through the intersection. One of these two lanes will also be shared by the Route 10's southbound right turning vehicles. In order to accommodate the two southbound through lanes, additional widening will be required along the southern section of the intersection to receive and gradually merge the two travel lanes.

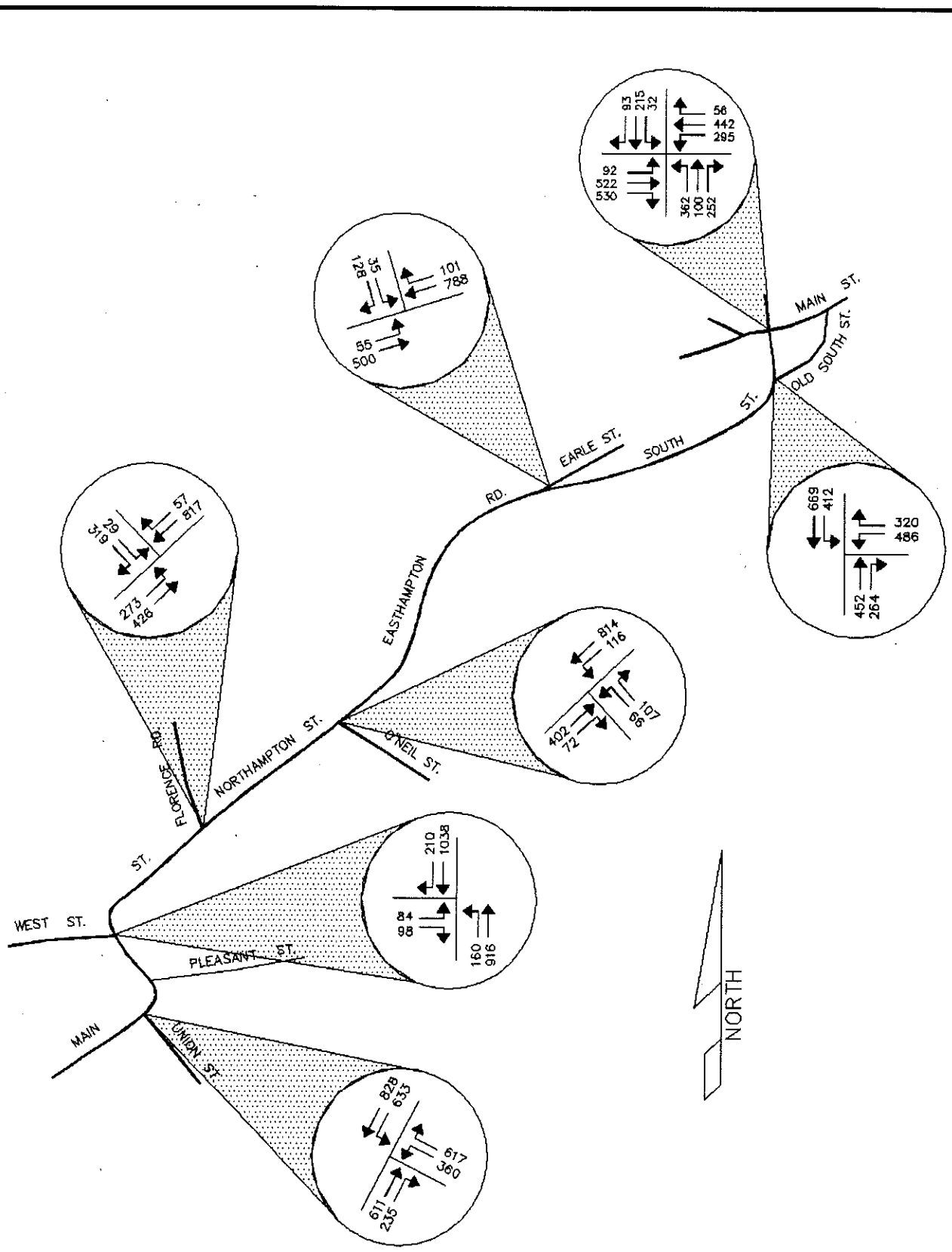


FIGURE 8
YEAR 2010 STUDY AREA PEAK HOUR VOLUMES

YEAR 2010 BUILD-OUT TRIP GENERATION

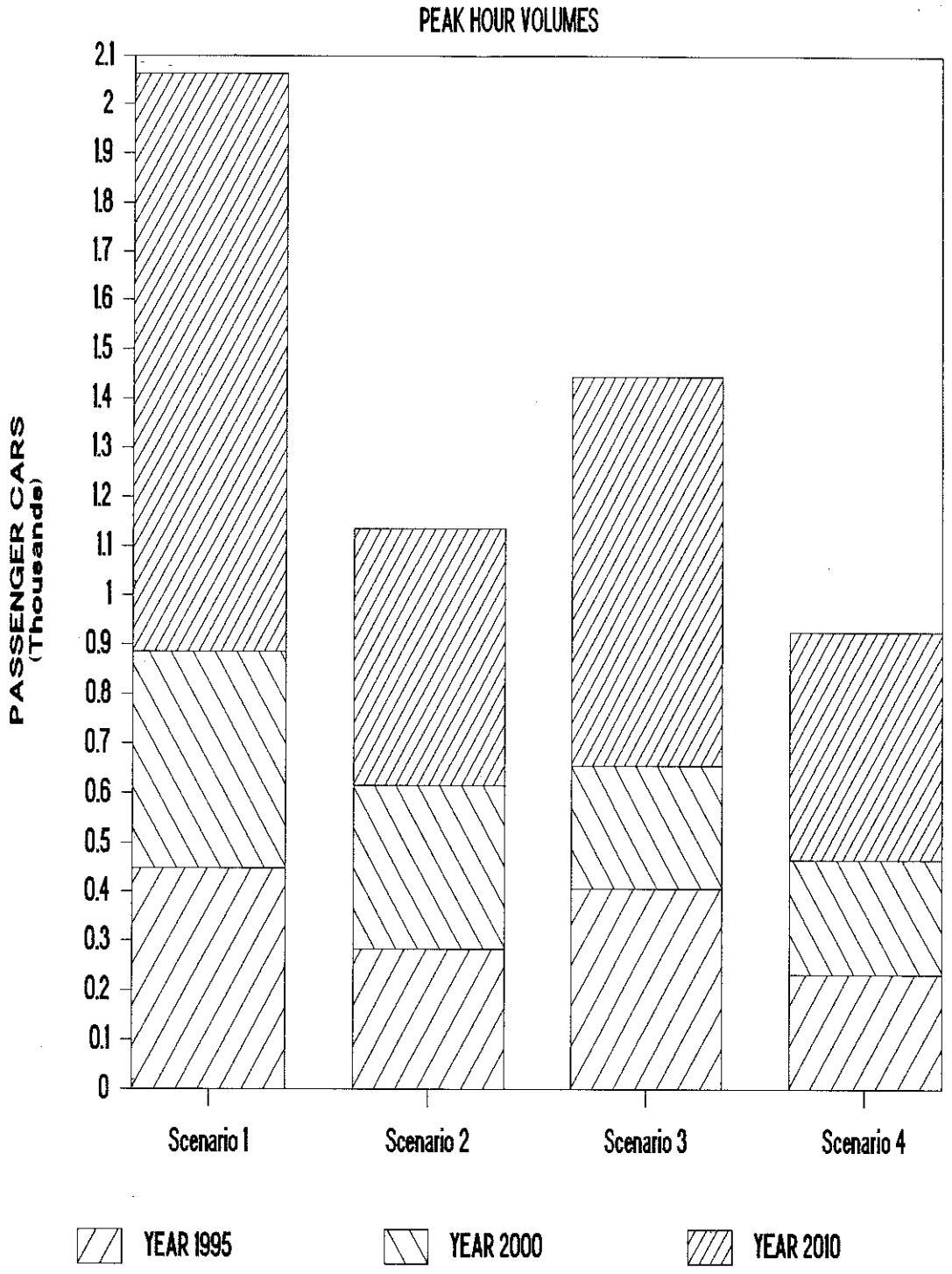


FIGURE 9
YEAR 2010 BUILD-OUT
PEAK HOUR TRIP GENERATION VOLUMES

Table 25

Year 2010 Intersection LOS Summary

Study Area Location	Condition	Existing Year	Year 1995		Year 2000		Year 2010		Recommended Mitigation
			as is	w/mit	as is	w/mit	as is	w/mit	
Route 10 at Street	No Build	D	E	C	F	C	F		1995: adjust Union signal timing. 2000: recon-figurate lane assignment. 2010: detailed study required
	Scenario 1		F	D	F	D	F		
	Scenario 2		F	C	F	C	F		
	Scenario 3		F	D	F	D	F		
	Scenario 4		F	C	F	C	F		
Route 10 at Street	No Build	F	F	B/E*	F	B/E*	F	B/F	1995: ALT 1 - West signalize., add NB LT lane, add SB RT lane turns. ALT 2 - restrict EB left turns. 2000: ALT - 1 none. ALT 2 - not applicable. 2010: ALT 1 - accommodate SB through and through/RT lane. ALT 2 - not applicable.
	Scenario 1		F	C/E	F	E/F	F	E/F	
	Scenario 2		F	B/E	F	D/F	F	C/F	
	Scenario 3		F	C/E	F	D/F	F	C/F	
	Scenario 4		F	B/E	F	C/F	F	C/F	
Route 10 at Florence Road	No Build	F	F	B	F	C	F	B	1995: signalize, add NB LT lane, add EB LT lane. 2000: none. 2010: none.
	Scenario 1		F	C	F	E	F	C	
	Scenario 2		F	C	F	D	F	B	
	Scenario 3		F	C	F	D	F	B	
	Scenario 4		F	C	F	D	F	B	
Route 10 at O'Neil Street	No Build	E	E	B	E	B	F	B	1995: signalize, 2000: none. 2010: add SB LT lane. add WB LT lane.
	Scenario 1		F	B	F	D	F	D	
	Scenario 2		F	B	F	C	F	C	
	Scenario 3		F	B	F	C	F	C	
	Scenario 4		F	B	F	C	F	B	
Route 10 at Earle Street	No Build	D	D		E		E	E	1995: none. 2000: none. 2010: add EB LT lane.
	Scenario 1		E		E		F	E	
	Scenario 2		E		E		F	E	
	Scenario 3		E		E		F	E	
	Scenario 4		E		E		F	E	

Study Area Location	Condition	Existing Year	Year 1995		Year 2000		Year 2010		Recommended Mitigation
			as is	w/mit	as is	w/mit	as is	w/mit	
Route 10 at Old South Street	No Build	F	F	B	F	B	F	C	1995: signalize, add SB LT lane, add NB RT lane.
	Scenario 1		F	B	F	C	F	E	
	Scenario 2		F	B	F	C	F	D	
	Scenario 3		F	B	F	C	F	D	2000: none.
	Scenario 4		F	B	F	C	F	D	2010: none.
Route 10 at Street	No Build	E	E		E		F		1995: detailed Main study required.
	Scenario 1		E		F		F		
	Scenario 2		E		F		F		2000: detailed study required.
	Scenario 3		E		F		F		
	Scenario 4		E		F		F		2010: detailed study required.

*Represents LOS for mitigation plans Alternative 1/Alternative 2

Route 10 at O'Neil Street: By the year 2010 it is anticipated that this intersection will require the installation of additional approach lanes. The Route 10 southbound approach will require an exclusive left turn lane, as will the O'Neil Street approach. The addition of these approach lanes to the signalized intersection is expected to eliminate the increased delays associated with the shared lane approaches.

Route 10 at Earle Street: The level of service at this intersection is anticipated to reach LOS F by the year 2010. Although the volumes along Earle Street are relatively low, the intersection yields poor operating conditions due to the high volumes along Route 10. The addition of a second approach lane along Earle Street may serve two purposes. First, the delay time at the intersection will be reduced by eliminating the shared lane approach and increase the operating conditions to LOS E. Second, the reconstruction may offer the opportunity reduce the acuteness of the Earle Street approach and reconfigure it to form a standard 3-way intersection.

The remaining intersections are expected to continue to operate acceptably with the mitigation improvements recommended under the 1995 and/or 2000 conditions. These improvements were applied to the year 2010 analysis and the results are summarized in Table 25.

3.7.2 Year 2010 Segment Analysis

Table 26 presents the summary of the segment analysis for the year 2010. As seen, the analysis yields one segment that operated at LOS F consistently under the four build-out scenarios, while all other segments are expected to operate within acceptable standards. The segment of the Route 10 corridor between Florence Road and Pleasant Street is expected to operate at unacceptable levels of service by the year 2010. The segment's characteristics coupled with the significantly high volumes present conditions which may produce restricted speeds and heavy congestion throughout the course of the daily peak hours. Improvement of this segment's condition may be achieved by widening the available shoulder widths in each direction. Vehicle capacity along this segment of Route 10 may not increase, however, user comfort and safety will be improved. It should be noted that restricted travel conditions along this section of Route 10 may result in motorists using alternates routes of travel instead of Route 10. One available route to and from the north is via Pleasant Street and O'Neil

Street. This route by-passes the operationally restricted segment of Route 10. It is difficult to estimate the number of diverted travelers from this segment of Route 10 without conducting further in-depth study of diversion travel times and Route 10 user knowledge of the local network.

3.7.3 Year 2010 Study Area Safety

The long term recommendations described above are planned to reduce the vehicle delay as well as motorists' confusion and frustration of the conditions of the future. The efficient management of accident data collection will allow the municipalities to review regularly the accident rates at various intersections and mid-block locations. By conducting a continuing record of this information, the municipalities may be able to effectively develop improvement measures before severe concentrations of problem arise.

Table 26

Year 2010 Segment Analysis Summary

Location	Condition	Existing Year		Year 1995		Year 2000		Year 2010	
		LOS	VOL.	LOS	VOL.	LOS	VOL.	LOS	VOL.
Segment 1	No Build	E	1600	E	1709	E	1803	E	1991
	Scenario 1			E	1788	E	1978	E	2367
	Scenario 2			E	1752	E	1912	E	2191
	Scenario 3			E	1782	E	1920	E	2243
	Scenario 4			E	1750	E	1887	E	2159
Segment 2	No Build	D	1432	D	1535	E	1614	E	1782
	Scenario 1			E	1663	E	1886	E	2398
	Scenario 2			E	1614	E	1796	E	2108
	Scenario 3			E	1654	E	1804	E	2193
	Scenario 4			E	1604	E	1750	E	2057
Segment 3	No Build	D	1165	D	1236	D	1313	D	1450
	Scenario 1			D	1457	E	1757	E	2520
	Scenario 2			D	1359	E	1622	E	2030
	Scenario 3			D	1445	E	1663	E	2181
	Scenario 4			D	1358	E	1568	E	1973
Segment 4	No Build	E	1130	E	1198	E	1273	E	1407
	Scenario 1			E	1448	E	1779	F	2587
	Scenario 2			E	1340	E	1623	E	2065
	Scenario 3			E	1425	E	1648	E	2233
	Scenario 4			E	1328	E	1544	E	1945
Segment 5	No Build	E	1663	E	1783	E	1874	E	2070
	Scenario 1			E	2033	E	2378	F	3249
	Scenario 2			E	1942	E	2243	F	2718
	Scenario 3			E	2007	E	2243	F	2892
	Scenario 4			E	1910	E	2134	F	2689

VOL.= mid-block volume for peak hour.

3.8 CONCLUSIONS

In order to examine the transportation needs of the Route 10 corridor, an analytical forecast of the travel conditions between Easthampton and Northampton has been conducted for four conditions of various growth rates and zoning conditions. These four build-out scenarios generate various levels of traffic volume along the Route 10 corridor. By forecasting these growth patterns into the long term, transportation deficiencies can be identified. The analysis conducted in this report identifies these deficiencies and recommends levels of mitigation on an as-needed basis.

The corridor of Route 10 examined is approximately 4.7 miles in length. This stretch of road has been divided into five roadway segments which contain seven locations that have been identified as key intersections. These segments and intersections have been examined for deficiencies under the four various Build-out scenarios for the existing conditions as well as years 1995, 2000, and 2010. The mitigation improvement measures developed have been identified to reduce travel delay and increase corridor safety. It is anticipated that the recommendations presented below will contribute to the reduction of severe accidents, more efficient control of intersection operations, and improvement of travel times.

3.8.1 Intersection Recommendations

Recommendations have been identified for all seven of the key study area intersections. In some cases the short-term recommendations (year 1990) have been calculated to satisfy the demands of the long-term conditions (years 2000 and 2010). Other mitigation strategies identify measures to satisfy the problems at hand and continue progressive improvement measures in later years on an as-needed basis. The location-specific mitigation recommendations are listed below for each study year.

Route 10 at Union Street Mitigation:
- 1995 - Adjust signal timing;
- 2000 - Reconfigure lane assignments;
- 2010 - Detailed study recommended. (See Figure 10.)

Route 10 at West Street Mitigation
- 1995 - Signalize, add northbound left turn lane and southbound right turn lane, install signal-ahead sign;
- 2000 - No additional mitigation required;
- 2010 - Change second southbound lane assignment to a shared right/through lane and widen receiving leg. (See Figure 11.)

Route 10 at Florence Road Mitigation:
- 1995 - Signalize, add northbound left turn lane, add eastbound approach lane;
- 2000 - No additional mitigation required;
- 2010 - No additional mitigation required. (See Figure 12.)

Route 10 at O'Neil Street Mitigation:
1995 - Signalize;
2000 - No additional mitigation required;
2010 - Add southbound left turn lane and westbound left turn lane. (See Figure 13.)

Route 10 at Earle Street Mitigation:
1995 - No mitigation required;
2000 - No mitigation required;
2010 - Add eastbound left turn lane. (See Figure 14.)

Route 10 at Old South Street Mitigation:
1995 - Signalize, add northbound right turn lane and southbound left turn lane;
2000 - No additional mitigation required;
2010 - No additional mitigation required. (See Figure 15.)

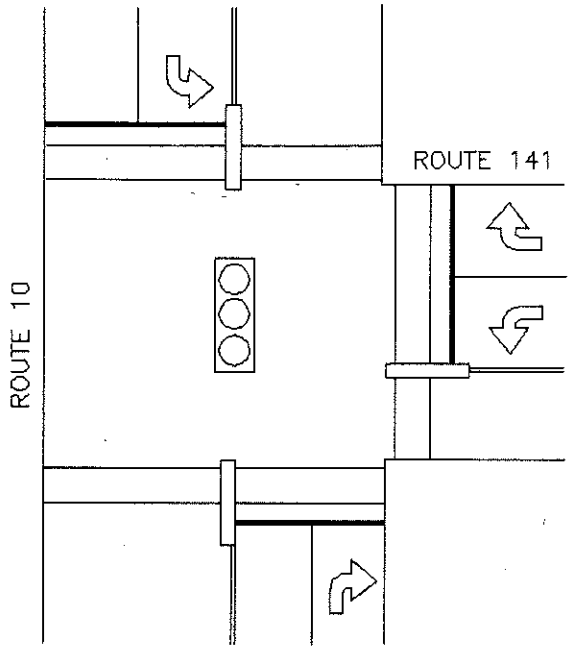
Route 10 at Main Street Mitigation:
1995 - Detailed study recommended;
2000 - Detailed study recommended;
2010 - Detailed study recommended.

3.8.2 Segment Recommendation

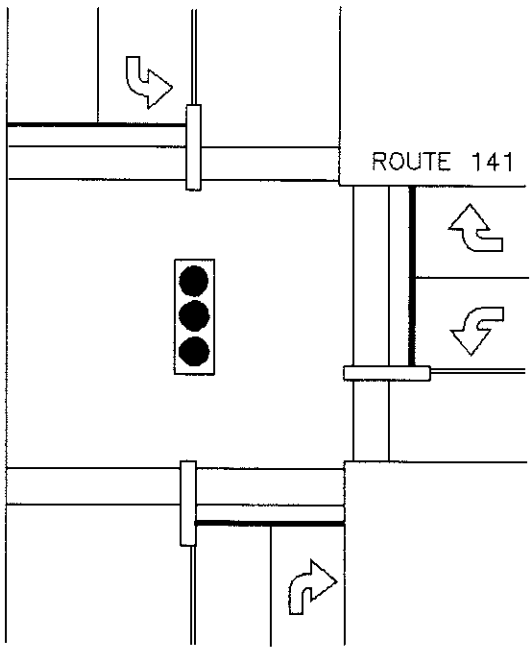
The Route 10 study also included analysis of the five corridor segments. Based on the criteria set forth in the 1985 Highway Capacity Manual, the segment travel conditions were evaluated for each study year. The results of this evaluation determined that one segment will operate below satisfactory conditions by the year 2010. The segment of Route 10 between Florence Road and Pleasant Street in Easthampton is anticipated to reduce user freedom in maintaining preferable travel speeds and comfort. This restriction may possibly divert users to alternate routes. It is recommended that continued observation be conducted at this location by the year 2000.

3.8.3 Study Area Safety

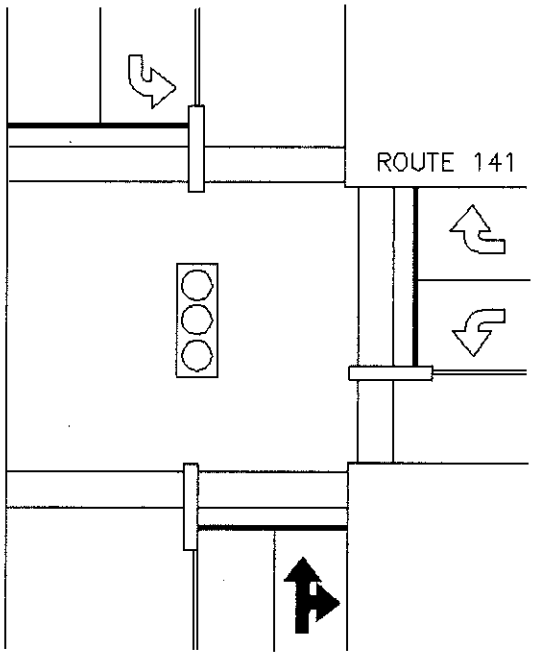
The safety conditions along the Route 10 corridor have been measured primarily at the key study area intersections. It is anticipated that the number of severe accidents occurring within the study area will be reduced with the implementation of the recommended improvements discussed above. However, additional attention should be given to pedestrian travel and safety. As developments continue along the Route 10 corridor, pedestrian travel will also become heavier. This increase in pedestrian travel will prompt the need for the regular installation of pedestrian facilities such as sidewalks, crosswalks, pedestrian actuated detectors and signage throughout the developed portions of the corridor.



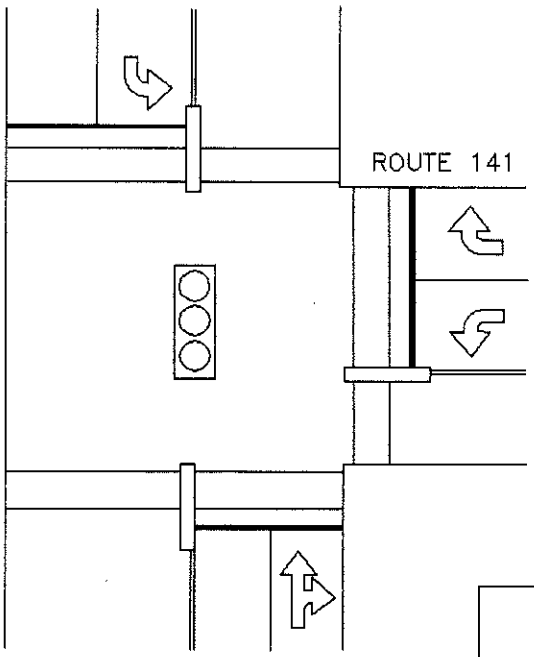
EXISTING CONDITIONS



YEAR 1995 MITIGATION:
ADJUST SIGNAL TIMING



YEAR 2000 MITIGATION:
LANE RECONFIGURATION



YEAR 2010 MITIGATION:
FURTHER STUDY REQUIRED

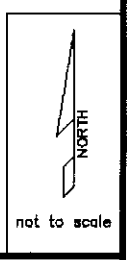
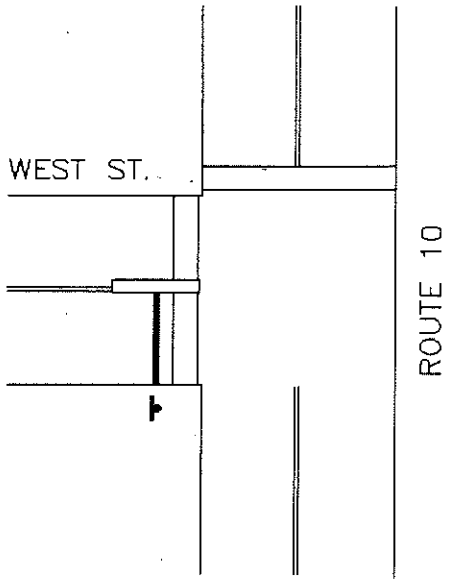
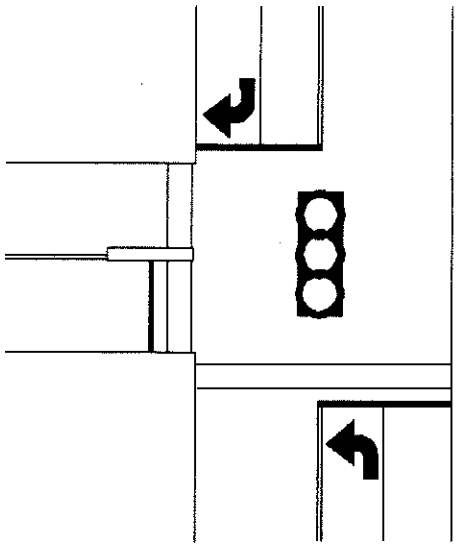


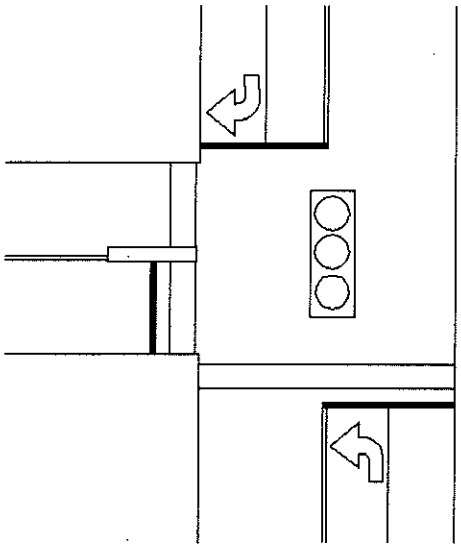
FIGURE 10
ROUTE 10 AT UNION ST. MITIGATION DIAGRAM



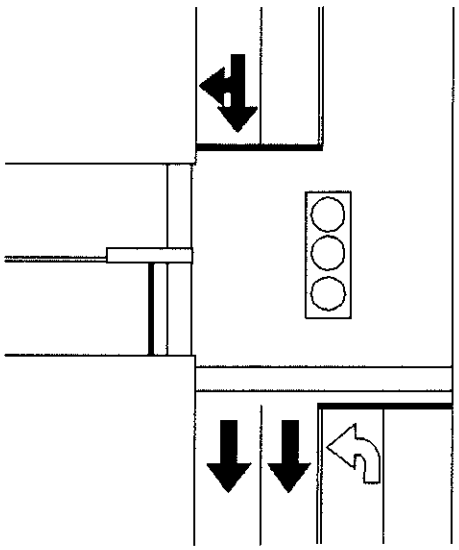
EXISTING CONDITIONS



YEAR 1995 MITIGATION:
INSTALL SIGNALS,
NB LANE, SB LANE



YEAR 2000 MITIGATION:
NO ADDITIONAL
MITIGATION REQUIRED



YEAR 2010 MITIGATION:
RECONFIGURE SB
LANE ASSIGNMENT,
LANE ALIGNMENT

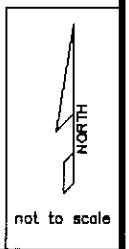
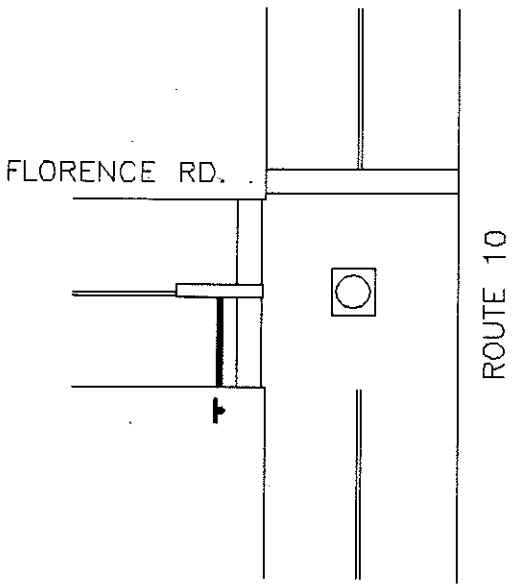
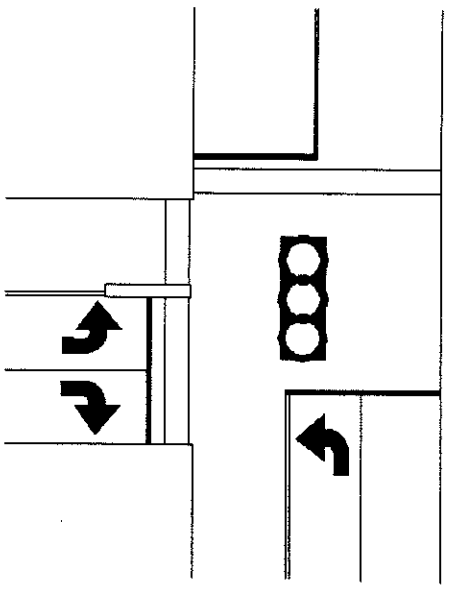


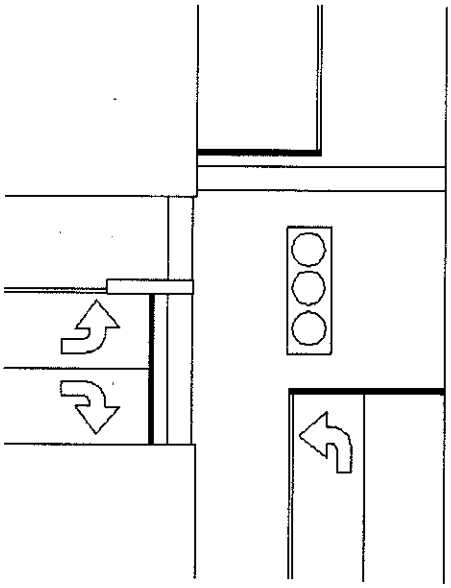
FIGURE 11
ROUTE 10 AT WEST ST. MITIGATION DIAGRAM



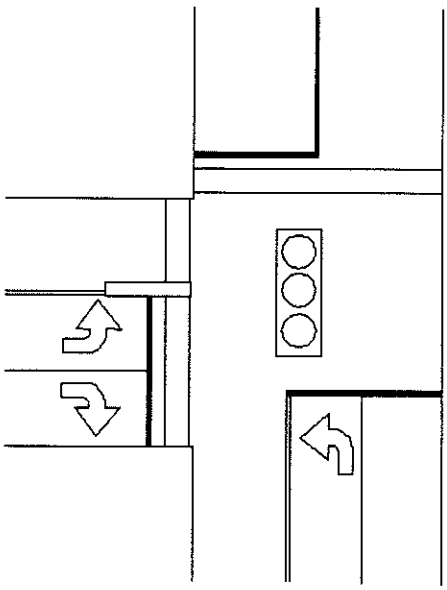
EXISTING CONDITIONS



YEAR 1995 MITIGATION:
INSTALL SIGNALS,
EB LANE, NB LANE



YEAR 2000 MITIGATION:
NO ADDITIONAL
MITIGATION REQUIRED

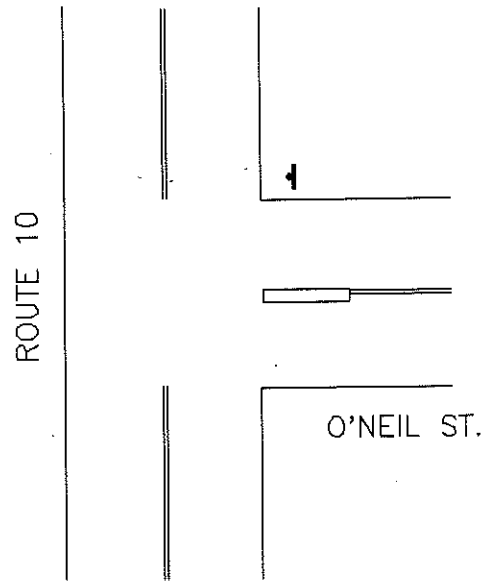


YEAR 2010 MITIGATION:
NO ADDITIONAL
MITIGATION REQUIRED

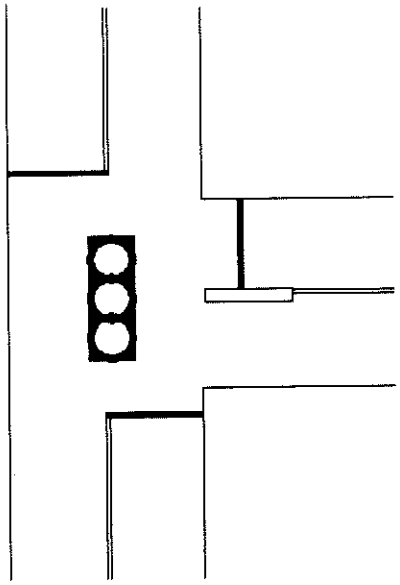
NORTH

not to scale

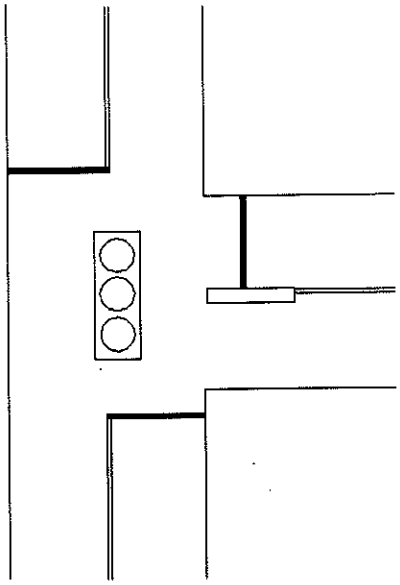
FIGURE 12
ROUTE 10 AT FLORENCE RD. MITIGATION DIAGRAM



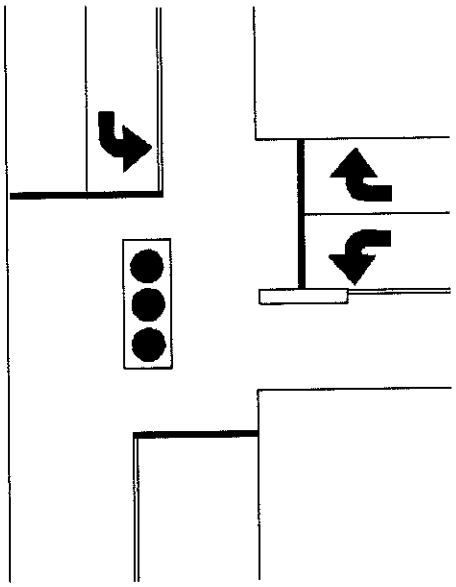
EXISTING CONDITIONS



YEAR 1995 MITIGATION:
INSTALL SIGNALS



YEAR 2000 MITIGATION:
NO ADDITIONAL
MITIGATION REQUIRED



YEAR 2010 MITIGATION:
INSTALL EB AND WB
TURN LANES,
ADJUST SIGNAL TIMING

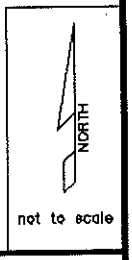


FIGURE 13
ROUTE 10 AT O'NEIL ST. MITIGATION DIAGRAM

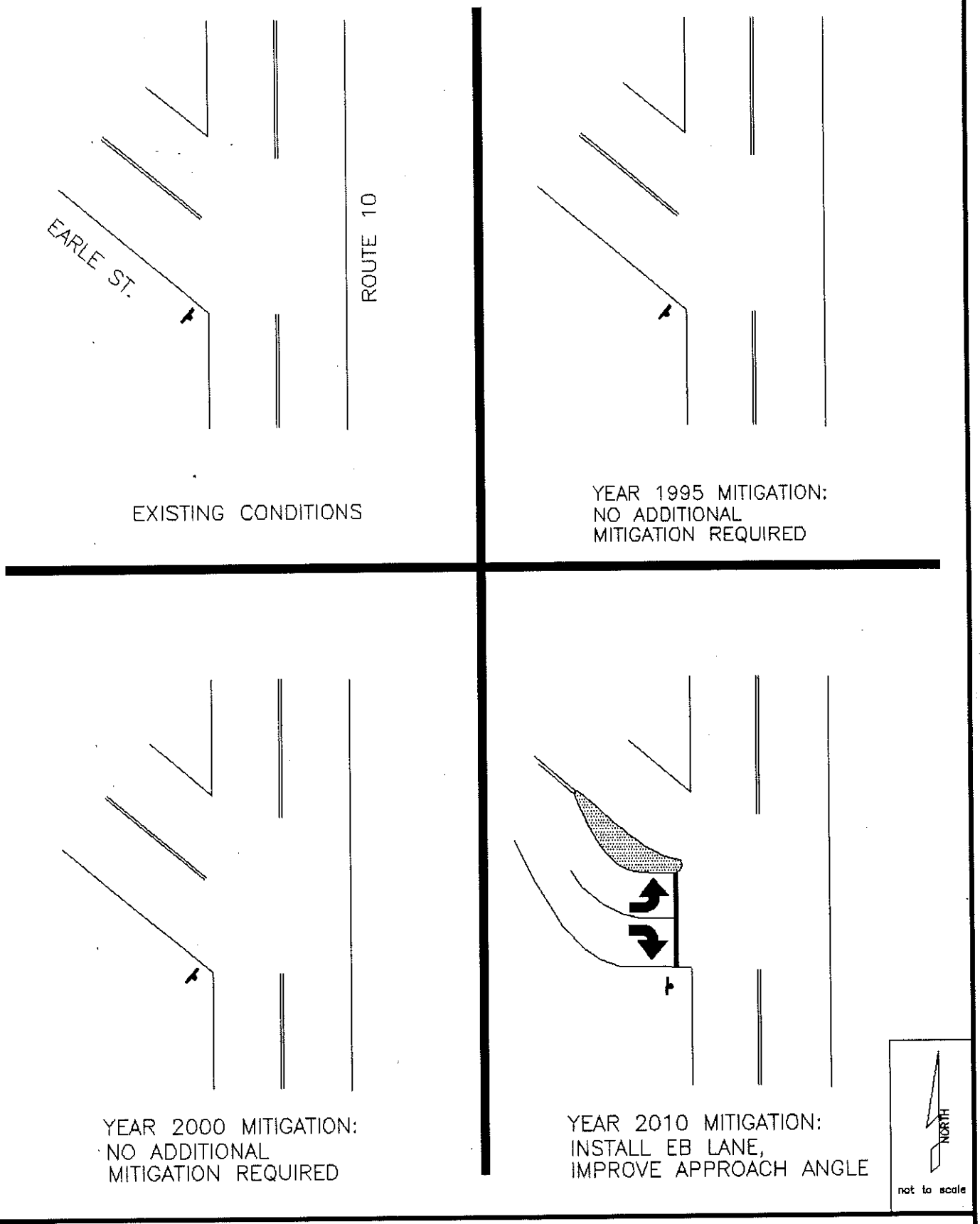
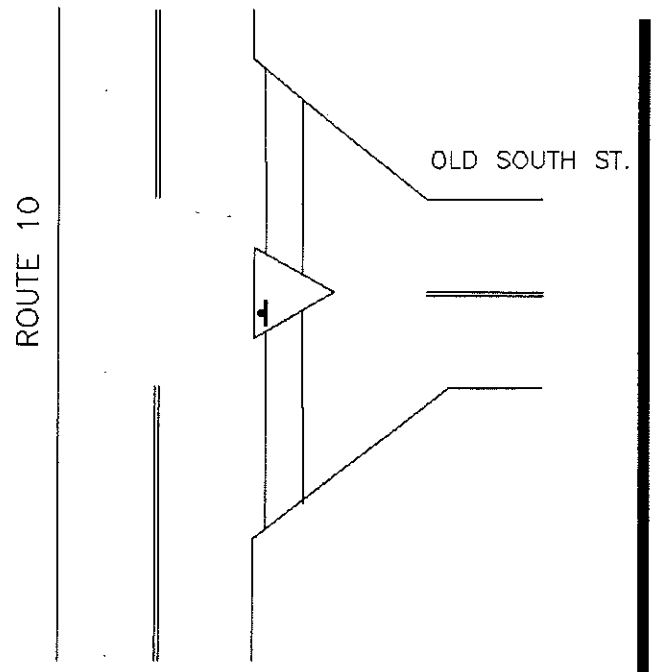
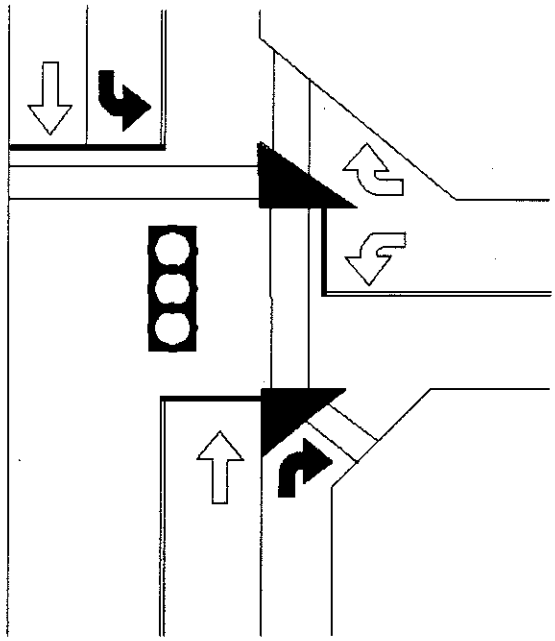


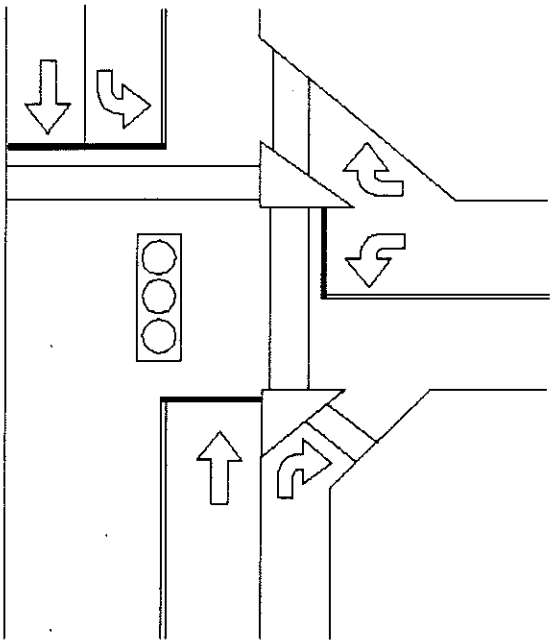
FIGURE 14
ROUTE 10 AT EARLE ST. MITIGATION DIAGRAM



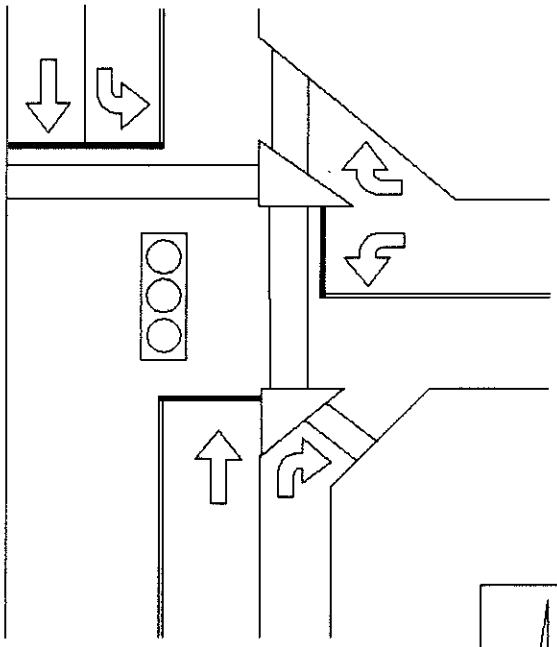
EXISTING CONDITIONS



YEAR 1995 MITIGATION:
INSTALL SIGNALS,
RECONFIGURE APPROACH,
INSTALL SB, NB LANES



YEAR 2000 MITIGATION:
NO ADDITIONAL
MITIGATION REQUIRED



YEAR 2010 MITIGATION:
NO ADDITIONAL
MITIGATION REQUIRED

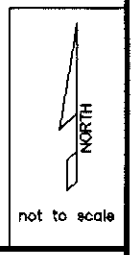


FIGURE 15
ROUTE 10 AT OLD SOUTH ST. MITIGATION DIAGRAM

APPENDICES

APPENDIX A

PROPOSED SITE PLAN APPROVAL/REVIEW BYLAW/ORDINANCE

Section XVII SITE PLAN REVIEW

(a) Purpose

This section of the town by-law is enacted under the authority of Chapter 40A of the Massachusetts General Laws to protect the health, safety, convenience and general welfare of the inhabitants of the town. The site plan review by-law regulates the development of structures and sites in a manner which considers the following concerns and, where necessary, requires modification of development proposals to eliminate or minimize potential problems and nuisances. In considering a site plan the reviewing authority shall assure:

(1) Protection of adjacent areas against detrimental or offensive uses on the site by provision of adequate surface water drainage, buffers against light, sight, sound, dust and vibration, and preservation of light and air;

(2) Adequacy of methods of disposal for wastes;

(3) Protection of environment features, especially ground water resources on the site and in adjacent areas;

(4) Promote the safety of vehicular and pedestrian movement within the site and in relation to the adjacent areas, enhance highway traffic safety and protect the capability of state and local roads to conduct traffic smoothly; and

(5) Discourage unlimited commercial "strip development" and curb cuts along highways and encourage commercial growth in nodes and clusters.

(b) Projects Requiring Site Plan Review

No special permit or building permit shall be issued and no application for such permits shall be accepted for any of the following uses unless a site plan has been approved and endorsed in accordance with this section:

(1) new construction of commercial, industrial, utility, office, institutional, municipal, or non-exempted residential structures:

(2) expansion of any existing commercial, industrial, utility, office, institutional, municipal, or non-exempted residential uses resulting in a floorspace increase of twenty-five percent (25%) or five thousand (5,000) square feet, whichever is less;

(3) any change in commercial, industrial, utility, office, institutional, municipal, or non-exempted residential use in any structure;

(4) resumption of any use described above discontinued for more than two (2) years;

*NOTE: Revisions are indicated by underlining.

All of the above uses require site plan review. However, some uses require a special permit in addition to site plan review. Section V. (Use Regulations) delineates which uses require only site plan review and which uses require both site plan review and a special permit. When only site plan review is required the site plan review authority is the Planning Board. When both site plan review and a special permit are required the site plan review authority is the Board of Appeals.

(c) Exemption from Site Plan Review

Site plan review is not required for:

(1) The construction or enlargement of any one to four-family dwelling or building accessory to such dwelling;

(2) Any building used exclusively for agriculture, horticulture or floriculture.

(3) Customary home occupations as defined in the zoning bylaw.

(4) Projects for which, after a pre-application conference, the planning board may waive all site plan review requirements.

(d) Applications for Site Plan Review

(1) An applicant for site plan review under this section shall file with the Town Clerk ten (10) copies each of an application and a site plan, including the mylar originals. Receipt of the documents shall be acknowledged by the Town Clerk dating them. A copy of the site plan so endorsed shall be kept on file by the town clerk.

(2) In those instances where the reviewing authority is concerned about a traffic or safety issue of a proposed development, along a state highway the reviewing board will submit a copy of the site plan review application and map to the Massachusetts Department of Public Works, District II, North King Street, Northampton, Ma. The application to MDPW must be accompanied by a letter stating the municipality's concern.

(3) The reviewing authority shall obtain with each submission, a deposit sufficient to cover any expenses connected with a public hearing and review of plans, including the costs of any engineering or planning consultant services necessary for review purposes.

(e) Required Site Plan Contents

Site plans shall be prepared by a registered professional engineer, surveyor, architect, or landscape architect at a scale of one inch equals twenty (20) feet, one inch equals forty (40) feet, or one inch equals eighty (80) feet, whichever is appropriate to the size of the proposal, on standard twenty-four-inch by thirty-six-inch sheets. All of the following requirements shall be met unless specifically waived at a preapplication conference.

(1) Name of project, boundaries, and locus maps showing the site's location, date, north arrow, and scale of the plan. All revisions occurring after original submission shall be noted and dated.

(2) Name and address of the owner of record and the developer, and the seal of the engineer, surveyor, architect or landscape architect, as applicable.

(3) Names and addresses of all owners of record abutting parcels and those within three hundred (300) feet of the property line.

(4) All existing lot lines, easements, and rights-of-way. Included area in acres of square feet; abutting land uses, and the location and use of structures within three hundred (300) feet of the site.

(5) The location and use of all existing and proposed buildings and structures within the development. Include all dimensions of height and floor area, and show all exterior entrances, and all anticipated future additions and alterations. Structures to be removed shall be indicated by dashed lines.

(6) The locations of all present and proposed public and private ways, parking areas, driveways, sidewalks, ramps, curbs, fences, paths, landscaping walls, and fences. Location, type, and screening details for all waste disposal containers shall also be shown.

(7) The location, height, intensity and bulb type of all external lighting fixtures. The direction of illumination and methods to eliminate glare onto adjoining properties must also be shown.

(8) The location, height, size, materials, and design of all proposed signage.

(9) The location of all present and proposed utility systems including sewage or septic system; water supply system; telephone, cable television, and electrical systems; and storm drainage system including existing and proposed drain lines, culverts, catch basins, headwalls, endwalls, manholes, and drainage swales.

The reviewing authority may also require soil logs, percolation tests, and storm run-off calculations for large or environmentally sensitive developments.

(10) Plans to prevent pollution of surface or groundwater; erosion of soil both during and after construction; excessive run-off; excessive raising or lowering of the water table; and flooding of other properties, as applicable. Existing topography, indicated by dashed lines of two-foot contour intervals where slopes are greater than three (3) percent but less than fifteen (15) percent, and at five-foot contour intervals where slopes are fifteen (15) percent or more. All elevations shall be referred to the nearest U.S. Coastal and Geodetic datum. Where any changes in topography are proposed, finished contours shall be shown as solid lines.

If any portion of the site is within the one hundred-year flood elevation of any water body, the area will be shown and base flood elevations given.

Indicate all areas within the site and within fifty (50) feet of the site, where ground removal or filling is proposed, and give its approximate volume in cubic yards.

(11) A landscape plan showing all existing natural land features, major trees, forest cover, and water sources, and all proposed changes to these features including size and type of plant material. Water sources will include ponds, lakes, brooks, streams, wetlands, floodplains, and drainage retention areas. General soil types shall be indicated as part of the landscape plan.

(12) Zoning district boundaries within five hundred (500) feet of the site's perimeter shall be drawn and identified on the plan. Such features may be shown as a key map on the detail plan itself.

(13) Traffic flow patterns within the site, entrances and exits, loading and unloading areas, size and location of curb cuts on the site and within one hundred (100) feet of the site. Include the possible organization of traffic channels, acceleration and deceleration lanes, additional width or other means necessary to prevent difficult traffic situations.

(14) For new construction or alterations to any existing building, a table containing the following information must be included:

a. area of building to be used for a particular use such as retail operation, office, storage, etc.
b. Maximum number of employees
c. Maximum seating capacity, where applicable
d. Number of parking spaces existing and required for the intended use.

(15) Elevation plans of a scale of one-quarter (1/4) inch equals one foot for all exterior facades indicating pertinent design features and type of materials to be used.

(f) Procedures for Site Plan Review

(1) The reviewing authority, within five (5) days of receipt of the site plan review application, shall transmit to the building inspector, the conservation commission, the planning board or board of appeals, and any other appropriate town boards, commissions or departments, copies of the application and site plan. The boards, commissions or departments shall review the application and submit their recommendations and comments to the reviewing authority concerning:

a. the adequacy of the data and methodology used by the applicant to determine the impacts of the proposed development;

b. the effects of the projected impacts of the proposed development; and

c. recommended conditions or remedial measures to accommodate or mitigate the expected impacts of the proposed development.

Failure of the boards, commissions or departments to make recommendations within 35 days of referral of the application shall be deemed to be lack of opposition.

(2) The reviewing authority shall hold a public hearing within sixty-five (65) days of receipt of an application and after due consideration of the recommendations received, the reviewing authority shall take final action within ninety-day (90) from the time of hearing, as provided in M.G.L. Chapter 40A Section 9. The reviewing authority's final action in writing shall consist either of:

a. approval of the site plan based on the determination that the proposed project will constitute a suitable development and is in compliance with the standards set forth in this bylaw;

b. denial of the site plan based on the determination that either 1) insufficient information was submitted with the application in order for the reviewing authority to adequately review the proposal, or; 2) a determination that the project does not meet the requirements of this Section; or

c. approval of the site plan subject to conditions, modifications and restrictions necessary to ensure compliance with the standards for review.

(3) Projects requiring both site plan review and a special permit

The period of review for site plan review and a special permit shall be the same as any other special permit and shall conform to the requirements of Chapter 40A Sec. 9. Specifically a joint public hearing to address the Special Permit application and the Site Plan Review application shall be held within sixty-five (65) days of the filing a special permit application with the Board of Appeals. The Board of Appeals shall then have 90 days following the public hearing in which to act.

(g) Preapplication Conference

(1) An applicant for a special permit for site plan review may request a preapplication conference from the reviewing authority.

(2) The preapplication request form shall contain such information so as to describe the nature, scope and site of the intended project, and such waiver of the site plan content requirements (Section e. Required Site Plan Contents) to be requested by the applicant.

(3) The reviewing authority shall forward the request for preapplication conference to the planning board or board of appeals and the conservation commission for comment which shall be returned to the reviewing authority within thirty-five (35) days, and the reviewing authority shall schedule a conference within thirty-five (35) days of the receipt of the request to hold such meeting. Such meeting shall be an open meeting, but the notice and publication requirements of Section 11 of Chapter 40A will not apply.

(4) The preapplication conference shall be conducted by the reviewing authority to determine which if any filing requirements of the site plan submittal may be waived, to schedule with the applicant public hearings before the board so as to coordinate and/or reduce the number of separate public hearings on the same or similiar subjects, and to suggest to the applicant specific areas of concern relative to the project that should be addressed in the site plan submittal, such as presenting optional methods for handling stormwater run-off, traffic patterns, or other matters covered by the site plan.

(5) Waivers of the site plan submittal requirements shall only be granted on to an applicant if the appliant requests a preapplication conference.

If, after a prepapplication conference, the reviewing authority is satisfied that the proposed project does not require the filing of a site plan or any part thereof, and if within thirty-five days of receipt of the preapplication conference request the conservation commission and the planning board or board of appeals objection, the reviewing authority may waive all requirements of site plan review.

(6) If it is determined that one or more additional special permit and/or variance are required in addition to the site plan review and special permit, then one or more public hearings could be held.

(h) Site Plan Review Criteria

The reviewing authority shall review the site plan and supporting data taking into consideration the reasonable fulfullment of the following critera:

(1) Conformance with the provisions of the bylaws of the Town of Easthampton, the General Laws of Massachusetts and all applicable rules and regulations of state and federal agencies;

(2) Protection of town amenities and abutting properties through the minimizing of any detrimental or offensive uses or destruction of unique or important natural, scenic, or historic features on the site;

(3) Convenience and safety of vehicular and pedestrian movement within the site and in relationship to adjoining ways and properties;

(4) Adequacy of the methods of disposal of sewage and refuse and the drainage of surface and subsurface water;

(5) Adequate means of protecting wetlands, watershed, aquifers and well areas.

(6) Mitigation of adverse impacts on the town's resources including the effect on the town's water supply and distribution system, sewage collection and treatment systems, fire protection and streets;

(7) Provisions for the off-street loading and unloading of vehicles incidental to the normal operation of the establishment, parking, lighting and internal traffic control;

(8) Applicant's efforts to integrate the development into the existing landscape through design features such as vegetative buffers, and retention of open space or agricultural land;

(9) Minimization of the area over which existing vegetation is to be removed. Where tree removal is required, special attention is to be given to the planting of replacement trees;

(10) The consistency of the development with respect to setback, area, placement of parking, architectural style and landscaping of the surrounding buildings and development.

(11) The site plan complies with the Commercial Development and Performance Standards contained in Section (i).

(i) Commercial Development and Performance Standards

In order to receive a site plan approval, all projects or uses must demonstrate compliance with the commercial development standards herein.

(1) Access Standards

Applicants must demonstrate that the project will minimize traffic and safety impacts on highways.

a. The number of curb cuts on state and local roads shall be minimized. To the extent feasible, access to business shall be provided via one of the following:

1. Access via a common driveway serving adjacent lots or premises

2. Access via an existing side street

3. Access via cul-de-sac or loop road shared by adjacent lots or premises.

b. One driveway per parcel shall be permitted as a matter of right. Where deemed necessary by the reviewing authority, two driveways may be permitted as part of the Site Plan Review process which shall be clearly marketed "entrance" and "exit".

c. Curb cuts shall be limited to the minimum width for safe entering and exiting, and shall in no case exceed 24 feet in width.

d. All driveways shall be designed to afford motorists exiting to highways with safe sight distance.

e. The proposed development shall assure safe interior circulation within its site by separating pedestrian, bicycle and vehicular traffic.

f. Driveway design and placement must be in harmony with internal circulation and parking design such that the entrance can absorb the maximum rate of in-bound traffic during a normal weekday peak traffic period.

g. Driveway entrance must be able to accommodate all vehicle types having occasion to enter the site, including delivery vehicles.

h. Driveway placement should be such that loading and unloading activities will in no way hinder vehicle ingress or egress.

i. Driveway design must be such that an entering vehicle will not encroach upon the exit lane of a two-way driveway. Also, a right turning exiting vehicle will be able to utilize only the first through traffic lane available without encroachment into the adjacent through lane.

(2) Parking Standards

Proposed projects or uses must comply with Parking and Off-Street Loading requirements in Section VII and the following standards:

a. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of structure.

b. To the extent feasible, parking areas shall be shared with adjacent businesses.

(3) Landscaping

a. A landscaped buffer strip at least fifteen (15) feet wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and deciduous shade trees (minimum 2-inch caliper) planted at least every 50 feet along the road frontage. At all street or driveway intersections, trees or shrubs shall be set back a sufficient distance from such intersections so that they do not present a traffic visibility hazard. The sidewalk required above shall be incorporated into the buffer strip.

b. Large parking areas shall be subdivided with landscaped islands so that no paved parking surface shall extend more than 80 feet in width. At least one tree (minimum 2" caliper) per 35 parking spaces shall be provided.

c. Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen plantings, or earthen beams, or wall or tight fence complemented by evergreen plantings.

d. All landscaped areas shall be properly maintained. Shrubs or trees which die shall be replaced within one growing season.

(4) Appearance/Architectural Design

a. Architectural design shall be compatible with the character and scale of buildings in the neighborhood and the Town through the use of appropriate building materials, screening, breaks in roof and wall lines and other architectural techniques. Variation in detail, form and siting shall be used to provide visual interest and avoid monotony. Proposed buildings shall relate harmoniously to each other with adequate light, air, circulations, and separation between buildings.

b. The reviewing authority may adopt such regulations as may be necessary to further specify design standards.

(5) Storm Water Runoff

a. The rate of surface water run-off from a site shall not be increased after construction. If needed to meet this requirement and to maximize groundwater recharge, increased runoff from impervious surfaces shall be recharged on site by being diverted to vegetated surfaces for infiltration or through the use of detention ponds. Dry wells shall be used only where other methods are infeasible and shall require oil, grease, and sediment traps to facilitate removal of contaminants.

b. Neighboring properties shall not be adversely affected by flooding from excessive run-off.

(6) Erosion Control

Erosion of soil and sedimentation of streams and waterbodies shall be minimized by using the following erosion control practices:

a. Exposed or disturbed areas due to stripping of vegetation, soil removal, and regrading shall be permanently stabilized within six months of occupancy of a structure.

b. During construction, temporary vegetation and/or mulching shall be used to protect exposed areas from erosion. Until a disturbed area is permanently stabilized, sediment in runoff water shall be trapped by using staked haybales or sedimentation traps.

c. Permanent erosion control and vegetative measures shall be in accordance with the eroision/sedimentation/vegetative practices recommended by the Soil Conservation Service.

d. All slopes exceeding 15% resulting from site grading shall be either covered with 4 inches of topsoil and planted with a vegetative cover sufficient to prevent erosion or be stabilized by a retaining wall or other structure.

e. Dust control shall be used during grading operations if the grading is to occur within 200 feet of an occupied residence or place of business. Dust control methods may consist of grading fine soils on calm days only or dampening the ground with water.

(7) Water Quality

All outdoor storage facilities for fuel, hazardous materials or wastes, and potentially harmful raw materials shall be located within an impervious, diked containment are adequate to hold the total volume of liquid kept within the storage area.

(8) Explosive Materials.

a. No highly flammable or explosive liquids, solids or gases shall be stored in bulk above ground, unless they are located in anchored tanks at least seventy-five (75) feet from any lot line, town way, or interior roadway plus all relevant federal and state regulations shall also be met. Underground storage tanks are prohibited. Underground storage tanks for storing gas and diesal fuels of gas stations are exempt.

b. Propane gas tanks in 100-lb cylinders (or smaller) shall be exempt from these safety regulations.

(9) Lighting

a. Any outdoor lighting fixture newly installed or replaced shall be shielded so that it does not produce a strong, direct light beyond the property boundaries;

b. No light standard shall be taller than fifteen (15) feet.

(10) Vibration

a. No vibration shall be transmitted outside the property where it originates.

(11) Pedestrian Safety Improvement

Sidewalks along Route 10 are required for new developments or existing uses undergoing a major improvements. A major improvement shall include the alteration, change, addition or reconstruction of a structure where the costs of the actions exceeds seventy-five percent (75%) of the assessed value of structure at the time of the change.

(12) Traffic Impact Statement

The reviewing authority may require a detailed traffic study for large developments, high-volume traffic generating uses with a trip generation rate over 700 vehicles/day (based on Institute of Transportation Engineers rates found in Trip Generation) and new uses with 10,000 square feet or more of gross floor area. The traffic impact statement shall contain:

a. The projected number of motor vehicle trips to enter or leave the site, estimated for daily and peak hour traffic levels.

b. The projected traffic flow pattern including vehicular movements at all major intersections likely to be affected by the proposed use of the site;

c. Traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred feet of the site.

d. A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities, and impacts on intersections. Existing daily and peak hour traffic levels and road capacities shall also be given.

e. A plan to minimize traffic and safety impacts through such means as physical design and layout concepts, staggered employee work schedules, promoting use of public transit or carpooling, or other appropriate means;

f. An internal traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

g. Adequate pedestrian and bicycle access shall be provided by providing access to adjacent properties and between individual business within a development.

h. Specific mitigating measures which will alleviate impacts to the adjacent roadway network.

j. Enforcement

(1) To ensure compliance with the plan and conditions, including landscaping and off-site improvements, the reviewing authority may require any of the following: a performance bond, deposit of money, bank passbook, or letter of credit in an amount determined by the reviewing authority to be sufficient to cover the cost of all or any parts of improvements required. The reviewing board may suspend any permit or license when work is not performed as required.

(2) Any special permit issued under this section shall lapse in one year if a substanital use thereof has not commenced sooner except for good cause.

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

MICHAEL S. DUKAKIS
GOVERNOR

Executive Office of Transportation & Construction
10 Park Plaza, Room 3510
Boston, MA 02116-3969

October 7, 1988

To Whom It May Concern:

In a joint effort, the Massachusetts Environmental Policy Act (MEPA) office and the state's transportation agencies have formulated the attached "EIR/EIS Guidelines for Traffic Impact Assessment." The primary purpose of defining these guidelines is to clarify the procedures to be followed in documenting the information of the traffic section of environmental impact statements and reports. By streamlining and standardizing these reporting procedures we have greatly improved the process of preparing and reviewing environmental impact reports.

We are today endorsing these guidelines for use in all traffic impact reports where there will be state agency review and action. Six months from this date we will review their utility and effectiveness.

Frederick P. Salvucci, Secretary
Executive Office of Transportation & Construction

James S. Hoyte, Secretary
Executive Office of Environmental Affairs

RECEIVED
MAR 7 1989
PIONEER VALLEY
PLANNING COMMISSION

EIR/EIS
GUIDELINES FOR SUBMISSION
TRAFFIC IMPACT ASSESSMENT

CAVEAT

The following guidelines were compiled as a representation of basic information to be included in traffic analysis sections of Environmental Impact Reports/Environmental Impact Statements submitted to all state agencies. Specific projects may warrant that additional information also be included. The primary intention of these guidelines is to ensure consistency among reports produced for review. Outlined below are the specific guidelines. The Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form (ENF) containing the scope, may contain more specific directives for the required EIR. These guidelines are designed to be general and may be amended in the future as new research becomes available.

A. Project Introduction

1. Proposal Description - A brief description of the proposed development and study area. The boundaries of this study area should be well defined and documented in the Secretary's Certificate. The total build-out of the development anticipated by the proponent must also be clearly stated.

2. Locus Map - to set context regionally

   a. Site plotted centrally on USGS map.

   b. Site plotted on State Highway Map with radius defined.

   c. Map showing proposed site in relation to existing passenger and freight rail facilities as well as all sensitive receptors identified in the ENF.

3. Site Plan - indicating proposed "footprint" of the project relative to other buildings on the site and showing all land owned by the proponent and all access to/from the site. A standard engineering scale should be used.

4. Zoning Map - indicating current zoning of the site and adjacent parcels. Proposed changes in zoning should be discussed relative to the potential "full" development of the site. A brief summary of the applicable zoning regulations and requirements should be included.

B. Existing Conditions

1. Roadway Network - indicating jurisdictional responsibilities of each roadway link within the study area.

2. Traffic Volumes - a traffic flow map should be developed covering the entire study area. Average Annual Weekday volumes should be shown for 24 hours and the AM and PM peak hours in all cases. Saturday peak conditions should also be included for retail developments. Volumes that are factored to base year levels should be no greater than two (2) years old (from the date of the Draft EIR submittal). Any adjustment factors or growth rates used should be cited and sourced.

3. Pedestrian counts may be required for specific developments. Transit usage should also be quantified on a site-specific basis.

4. Air quality analysis may be required for specific developments.

5. Accident History - a minimum of three (3) most recent years available to identify problem locations. A written request should be made initially to the local MDPW District Highway Engineer for accident reports. Accident diagrams summarizing local police reports may be required for problem locations.

6. Capacity and LOS Analysis - an existing conditions capacity and level of service analysis should be computed for the roadway network. The performance indicators, delay, v/c ratio and queue length, should be documented in this section. A weave, merge, diverge and ramp road segment analysis should be included where applicable. Also, departure lane merge capacity should be addressed as required and saturation flow rates adjusted accordingly. These analyses should be performed using the 1985 Highway Capacity Manual, Special Report 209, published by the Transportation Research Board. If microcomputer software is used for intersection analysis, the Capacity of Intersections: CTPS' HCM Program (CINCH)* should be used for baseline analysis. Substitute software may also be used and will be considered for comparative analysis where applicable.

C. Trip Generation

1. ITE Rates - the ENF and, where applicable in the EIR/S, as an initial analysis, the unadjusted Institute of Traffic Engineers (ITE) rates must be used for the particular land use code and presented in this section of

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*Available from McTrans, University of Florida Transportation Research Center, 512 Weil Mall, Gainesville, Florida 32611.

the report. Trip Generation, 4th Edition, published by ITE in 1987 should be used for all land use codes. Rates should be developed from the "fitted curve" equations and used according to the methods outlined. If employment levels are known, trip rates per employee should also be cited. If ITE rates are not available or the sample size is prohibitively small, other transferable empirical research shall be cited, sourced and fully justified.

2. Alternative Trip Generation - can be used and will be considered for comparative purposes where appropriate. Alternate capacity analyses of baseline and future conditions will also be required for those alternatives presented.

D. Trip Distribution

1. Distribution - all generated vehicle trips to/from the site through all access points are to be documented. Several categories of trips should be considered for applicable land uses as outlined in the ITE Trip Generation, 4th Edition manual. Analytic bases for reducing the main street volumes due to pass-by trips, impulse trips, etc., are to be documented in detail. The following trips should be considered for all retail developments:

   a. Primary/Site - "one which the purpose of the trip is shopping and the trip pattern is generally home-to-shopping-to-home."

   b. Pass-By/Site - "directly from the traffic stream passing the facility on the adjacent street system and does not require a diversion from another roadway."

   Retail developments of significant size or at certain locations should consider:

   c. Diverted Link/Site - "involves a route diversion from one roadway to another..."

   All developments should also consider the following:

   d. External-External - trips made between zones outside of the study area.

   e. Other Study Area Sites - trips generated from nearby approved projects including state and/or local approvals.

E. Future Conditions

1. Traffic Volumes - for the "no-build" and "build" scenarios should be graphically shown. Future conditions should cover a five-year time horizon as a minimum.

a. Trip tables for all developments within the study area should be generated from approved EIR's. These tables should be combined with future year background volumes to develop the "no-build" traffic volumes.

b. The trip table for the proposed development should then be added to generate "build" volumes.

c. Transit tables for specific developments should also be included in this section.

2. Current Projects - table of local and/or MEPA projects within the study radius covering as a minimum a five year time horizon from the Draft EIR. Proponents should contact state agencies and local cities and towns regarding the impact of other known projects in the affected study area to determine how to incorporate those impacts.

3. Capacity Analysis - future conditions capacity and LOS should be computed for no build and build, without and with mitigation measures in place. The performance indicators as documented above in the Existing Conditions section of the report should again be computed and depicted in tabular form.

4. Signal Warrant Analysis - using the Manual on Uniform Traffic Control Devices Handbook, FHWA, 1986 Edition.

5. Summary - tabular summary comparing base-case to five year "no-build" and "build" scenarios.

F. **Mitigative Measures**

All assessments should include but not be limited to the following:

1. Mitigative Actions - future year performance degradation must be fully mitigated to equivalent "no build" delay and v/c ratios. The effects of mitigative measures such as actively marketing MBTA passes should be quantified in this section.

2. Additional Analysis - capacity analyses of all mitigative measures should be computed as outlined above. Impacts on wetlands, archeology, etc., should also be examined for all mitigation proposed to determine the feasibility of implementation. Where use of existing transit systems is proposed as mitigation, analysis of the impacts on capacity and performance of those services should be quantified and documented in this section.

3. Commitment - the report should clearly identify the individual costs of the proposed improvements. The responsible party for the implementation of the proposed improvements should also be clearly identified. A mechanism by which these commitments will be executed and their intended duration should be indicated where appli-

cable. Also, a schedule of where, in relation to any project phasing, particular improvements need to be implemented should be outlined.

4. Site Analysis/Geometric Design - the proposed site layout in relation to the existing right-of-way should be clearly shown. Also, the following should be included:

   a. Scaled plan showing existing and proposed layout lines, building and parking lot areas, driveways and land usage.

   b. Proposed geometric changes and widenings. (Driveways, storage lanes, acel/decel lanes)

   c. Construction Schedule - with proposed mitigative measures for noise and dust pollution from construction equipment and any capacity restraints on the existing network during construction.

5. Development Options - alternative densities and land uses along with smaller size developments can and in some instances should be analyzed as a means of traffic mitigation.

G. **Appendix**

The following list identifies data which should be included in each report. This list is to be consistently followed when displaying data and analyses:

1. Recorded traffic counts - tabular summaries

   a. Turning movement counts
   b. Directional volume counts
   c. Existing AM/PM peak period and 24 hour traffic volumes including Peak Hour Factors by approach
   d. Future year peak hour traffic volumes
   e. Adjustment factors and sources

2. Permit sketches and layout plans

3. Capacity and LOS analysis data

   a. Lane geometry
   b. Assumed signal phasing
   c. Critical volumes
   d. Assumed saturation flow rates
   d. All work sheets or computer outputs

4. ITE land use code sheets

5. Plotted stopping sight distance analyses

6. Signal warrant analysis sheets

H. Design Standards

The following publications are required:

1. 1985 Highway Capacity Manual

2. ITE Trip Generation, 4th Edition

3. Manual on Uniform Traffic Control Devices Handbook and Massachusetts Amendments

4. Massachusetts Department of Public Works Highway Design Manual

5. American Association of State Highway and Transportation Officials (AASHTO) Handbook.

Listed are some additional recommended publications:

6. Access Management for Streets and Highways, FHWA Implementation Package FHWA-IP-82-3, June 1982.

7. Report FHWA-RD-76-87 Technical Guidelines for the Control of Direct Access to Arterial Highways, August 1975, FHWA.

8. Site Impact Traffic Evaluation Handbook, FHWA, January 1985.

SITE PLAN REVIEW AMENDMENTS TO THE EASTHAMPTON TABLE OF USES

SECTION V. USE REGULATIONS

(a) Applicability of Use Regulations

Except as provided in the Zoning Act or in this bylaw, no building, structure, or land shall be used except for the purposes permitted in the district as described in this section. Any use not listed shall be construed to be prohibited.

(b) Permitted Uses

The following notations apply to the Table of Use Regulations:

"P" - Use permitted by right

"SP" - Use permitted by Special Permit from the Zoning Board of Appeals

"SPR" - Use permitted with Site Plan Review from the Planning Board

"SPR/SP"- Use permitted by Special Permit with Site Plan Review from the Zoning Board of Appeals

"-" - Use prohibited

(c) Uses Subject to Other Regulations

Use permitted by right, site plan review, or special permit shall be subject, in addition to use regulations, to all other provisions of this bylaw.

(d) Table of Use Regulations

See Table 3 on accompanying pages which is declared to be part of this bylaw.

APPENDIX E - ZONING BYLAW AND MAP

Table 3. Use Regulations

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
1. One-family detached dwelling	P	P	P	P	-	-	-
2. Multifamily dwelling (two to four family units per structure)	P	SP	-	-	-	-	-
3. Multifamily dwelling (more than four-dwelling units per structure)	P	SPR/SP	-	-	-	-	-
4. Conversion of existing one-family dwellings to two-three, and four-family	S	S	S	-	-	-	-
COMMUNITY FACILITIES							
1. Church or other religious purpose	SPR	SPR	SPR	SPR	SPR	SPR	SPR
2. Educational purpose which is on land owned or leased by the commonwealth or any of its agencies, subdivisions, or bodies political; or by a religious sect or denomination; or by a nonprofit educational corporation	SPR	SPR	SPR	SPR	SPR	SPR	SPR
3. Public park, conservation area and preserved open spaces including areas for passive recreation, but not including active recreational facilities	P	P	P	P	P	P	P
4. Nonprofit recreational facility, not including a membership club	SPR	SPR	SPR	SPR	SPR/SP	SPR	-
5. Nonprofit country, hunting, fishing, tennis, or golf club	SPR/SP	SPR/SP	SPR/SP	SPR	-	-	-
6. Day camp or other similar camping area	SPR/SP	SPR/SP	SPR/SP	SPR	-	-	-

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
7. Town building except highway equipment garage and electric utility garage	SPR	SPR	SPR	SPR	SPR	SPR	SPR/SP
8. Town cemetery, including any crematory therein	SPR/SP	SPR	SPR	SPR	-	-	-
9. Historical association or society	SPR	SPR	SPR	SPR	SPR	SPR	-
10. Public libraries and museums	SPR	SPR	SPR	SPR	SPR	SPR	-
11. Nursing, rest, or convalescent home	SPR/SP	SPR/SP	SPR/SP	SPR/SP	-	SPR/SP	-
12. Hospital, sanitarium, or philanthropic institutions	SPR/SP	SPR/SP	SPR/SP	SPR/SP	-	SPR/SP	-
13. Street, bridge, railroad	SPR	SPR	SPR	SPR	SPR	SPR	SPR
14. Town highway equipment and electric utility garage	-	-	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR
15. Public utility except power plant, water filter plant, sewage treatment plant, and refuse facility	SPR	SPR	SPR	SPR	SPR	SPR	SPR
16. Essential services	SPR	SPR	SPR	SPR	SPR	SPR	SPR
AGRICULTURAL							
1. Agriculture, horticulture and floriculture except a greenhouse or stand for retail sale	-	S	P	P	S	S	S
a. On parcels of 5 acres or under	-	S	P	P	S	S	S
b. On parcels over 5 acres	-	P	P	P	P	P	P
2. Year-round greenhouse or stand for wholesale and retail sale of agricultural or farm products	-	S	S	S	P	P	S
a. Retail products	-	S	S	S	P	P	S
b. Wholesale products	P	P	P	P	P	P	P

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
3. Temporary (not to exceed erection or use for a period exceeding 3 months in any one year) greenhouse or stand for retail sale of agricultural or farm products raised primarily on the same premises	-	S	S	P	S	P	P
4. Raising and keeping of livestock, horses, and poultry, not including the raising of swine or fur animals for commercial use	-	-	S	P	-	-	-
5. Raising of fur animals and/or swine	-	-	-	S	-	-	S
6. Commercial stables, kennels, or veterinary hospital in which all animals, fowl or other form of life are completely enclosed in pens or other structures	-	S	S	S	S	S	S
7. Noncommercial forestry and growing of all vegetation	P	P	P	P	P	P	P
8. Commercial forestry	-	-	S	P	-	S	S

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
RETAIL AND SERVICE							
1. Retail establishment selling principally convenience goods including but not limited to food, drugs, and proprietary goods	-	-	-	-	SPR	SPR	SPR/SP
2. Retail establishment selling general merchandise, including but not limited to dry goods, apparel and accessories, furniture and home equipment, small wares, and hardware, and including discount and limited price variety stores	-	-	-	-	SPR	SPR/SP	SPR/SP

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
3. Eating and drinking places not including drive-in establishments	-	-	-	-	SPR	SPR/SP	SPR/SP
4. Drive-in eating establishments	-	-	-	-	SPR/SP	SPR/SP	SPR/SP
5. Sales by vending machines as a principal use	-	-	-	-	SPR/SP	-	SPR/SP
6. Establishment selling new and/or used automobiles and trucks, new automobile tires and other accessories, aircraft, boats, motorcycles and household trailers	-	-	-	-	SPR/SP	-	SPR
7. Motel	-	-	-	SPR/SP	SPR	SPR/SP	-
8. Lodginghouse	SPR/SP	-	-	-	SPR/SP	-	-
9. Personal and consumer service establishment	-	-	-	-	SPR	SPR	-
10. Funeral establishment	SPR/SP	SPR/SP	-	-	SPR	SPR	-
11. Membership club	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR	SPR	-
12. Professional and business offices and services	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR	SPR	-
13. Automotive repair, automobile service station or garage (not including a junkyard or open storage of abandoned automobiles or other vehicles)	-	-	SPR/SP	SPR/SP	SPR	SPR/SP	SPR/SP
14. Motor vehicle, machinery or other junkyard, provided it shall be screened from outside view by an enclosed solid fence or wall and gate at least 10 feet in height or by natural or topographic features	-	-	-	-	-	-	SPR/SP
15. Miscellaneous business repair services	-	-	-	-	SPR	SPR/SP	SPR
16. Amusement and recreation service, outdoor	-	-	-	SPR/SP	SPR	SPR/SP	SPR/SP
17. Amusement and recreation service, indoor	-	-	-	SPR/SP	SPR/SP	SPR/SP	SPR/SP

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
18. Communications, radio and television tower or station	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP
19. Antique or gift shop	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR	SPR	-
20. Reserved							
21. Planned business development (see Section IX(C))	-	-	-	-	SPR/SP	-	SPR/SP
22. Construction of drainage facilities other than essential services or damming up or relocating any watercourse, water body or wetlands	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP
WHOLESALE, TRANSPORTATION AND INDUSTRIAL							
1. Removal of sand, gravel quarry or other raw material	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP
2. Processing and treating of raw materials including operations appurtenant to the taking, such as grading, drying, sorting, crushing, grinding and milling operations	-	-	SPR/SP	SPR/SP	-	-	SPR
3. Construction trailers (temporary) while construction is in progress	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP	SPR/SP
4. Transportation service facilities	-	-	-	SPR/SP	SPR/SP	SPR/SP	SPR
5. Open storage of raw materials, finished goods, or construction equipment and structures for storing such equipment provided it shall be screened from outside view by an enclosed solid fence and gate at least 10 feet in height, or a solid wall of evergreens when planted not more than 18 inches apart and at least 3 feet in height, and a solid gate at least 10 feet in height and not more than 20 feet in width	-	-	-	-	SPR/SP	-	SPR/SP

Principal Uses	R-5	R-10	R-15	R-35GB	NB	I
6. Research offices or establishments devoted to research and development activities	-	-	-	- SPR/SP	-	SPR
7. Planned industrial development (see Section XI(d))	-	-	-	SPR/SP	-	-
SPR/SP						
8. Manufacturing	-	-	-	- -	-	SPR/SP
9. Radioactive waste disposal. No land or structures within any use district in the Town of Easthampton may be used for the collection, treatment, storage, burial, incineration, or disposal of radioactive waste, including, but not limited to wastes classified as low-level radioactive waste, or for the garaging or temporary storage of vehicules used in the transportation of radioactive waste.						

Accessory Uses	R-5	R-10	R-15	R-35GB	NB	I
1. Home Occupation (see Section XI(e))	S	S	S	S -	-	-
2. Private day nursery or kindergarten, provided it shall not occupy more than 40 percent of the gross floor area of the structure; and there shall be a minimum of 100 square feet of outside play area for each enrolled child	-	-	S	S S	S	-
3. Accessory building such as a private garage, playhouse, greenhouse, tool shed, private swimming pool, or similar accessory structures, subject to provisions of Section VI	P	P	P	P P	P	P

	Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
4.	Accessory private garage for not more than 3 non-commercial motor vehicles, and, except on a farm, not more than one-half ton-rated or less in size commercial motor vehicle. Subject to provisions of Section VI	P	P	P	P	P	P	P
5.	Accessory storage of a trailer, unregistered automobile or boat provided: it shall either be stored within a principal or accessory building or not less than 25 feet from any front line and not within the side yards; and it shall not be used for dwelling or sleeping purposes. Maximum number-two trailers, autos, or boats	P	P	P	P	P	P	P
6.	Accessory repair and storage facilities in any retail sales or consummer establishment provided: it shall not occupy more than 25 percent of the gross floor area	-	-	-	-	SPR	SPR/SP	SPR
7.	Keeping of a small flock (25 maximum) of poultry and saddle or riding horses and other farm animals, for use of occupants only	-	-	S	P	-	-	-
8.	Accessory industrial and commercial uses to serve principal industrial and commercial uses respectively	-	-	-	-	P	P	P
9.	Accessory signs subject to the provisions of Section VII	P	P	P	P	P	P	P
10.	Accessory off-street parking and loading spaces as required in Section VIII	P	P	P	P	P	P	P

Principal Uses	R-5	R-10	R-15	R-35	GB	NB	I
11. Accessory uses which are necessary in connection with scientific research or scientific development or related production provided that the board of appeals finds that the proposed accessory use does not substantially derogate from the public good	SPR	SPR	SPR	SPR	SPR	SPR	SPR

TEMPORARY

1. Temporary mobile homes to be placed on the same lot as a residence which has been destroyed by fire or other natural holocaust. Such temporary living quarters may remain on the lot for 12 months while the residence is being rebuilt. Any such mobile home shall be subject to the provisions of the state sanitary code. (Bylaw of 5-31-79; Bylaw of 5/19/82)	P	P	P	P	P	P	P

SECTION VI. AREA, HEIGHT AND BULK REGULATIONS

(a) Applicability of Area, Height, and Bulk Regulations.

The regulations for each district pertaining to minimum lot area, minimum lot frontage, minimum lot depth, minimum front yard depth, minimum side yard depth, minimum rear yard depth, maximum height of buildings, maximum number of stories, maximum building area, and minimum open space shall be specified in this section and set forth in the tables of area, height, and bulk regulations, and subject to the further provisions of this section.

(b) Table of Area Regulations.

See Table 4 on accompanying pages plus attached notes, which is declared to be a part of this bylaw.

(c) Table of Height and Bulk Regulations.

(See Table 5 on accompanying pages plus attached notes, which is declared to be a part of this bylaw.

(d) Reduction of Lot Areas.

The lot, yard areas or open space required for any new building or use may not include any part of a lot that is required by any other building or use to comply with any provisions of this bylaw, nor may these areas include any property of which the ownership has been transferred subjsequent to the effective date of this bylaw, if such property was a part of the area required for compliance with the dimensional regulations appliable to the lot from which such transfer was made.

(e) Separation of Lots.

Lots shall not be so separated or transferred in ownership so as not to comply with the provisions of this bylaw.

10.11 COMMERCIAL SITE PLAN APPROVAL

1. **Purposes**

   a. To promote the safety of vehicular and pedestrian movement with the site and in relation to the adjacent areas, highway traffic safety and protect the capability of state and local roads to conduct traffic smoothly.

   b. To promote an attractive and viable commercial district and expand the commercial tax base of the City;

   c. To discourage unlimited commercial "strip development" and curb cuts along highways, and encourage commercial growth in nodes and clusters.

   d. To assure proper drainage, safe access, adequate parking and loading spaces, public convenience and safety and adequate consideration of abutting land owners.

2. **Projects Requiring Site Plan Approval**

   Within the Central Business, General Business, Highway Business, Neighborhood Business, General Industry and Special Industry districts, no special permit nor building permit shall be issued and no application for such permits shall be accepted for any of the following uses:

   a. the construction, exterior alteration, or remodeling (value over $10,000) of a business structure;

   b. the construction, exterior alteration or remodeling (value over $10,000) of an industrial structure; or

   c. any expansion or change in use of a business or industrial structure,

   unless a site plan has been endorsed by the Special Permit Granting Authority (SPGA) after consultation with other boards, including but not limited to the following: Building Inspector, Board of Health, Planning Board, Zoning Board of Appeals, Office of the Mayor, City Council, Historical Commission, Conservation Commission, Department of Public Works, Fire Department and Police department. The SPGA may waive any or all requirements of site plan review for external enlargements of less than 10% of the existing floor area. See the Table of Use Regulations for a complete list of uses that require site plan approval.

3. **Applications for Site Plan Approval**

   a. Each application for Site Plan Approval shall be submitted to the Special Permit Granting Authority by the current owner of record, accompanied by eleven (11) copies of the site plan.

   b. The Special Permit Granting Authority shall obtain with each submission, a deposit sufficient to cover any expenses connected with a public hearing and review of plans, including the costs of any engineering or planning consultant services necessary for review purposes.

4. **Required Site Plan Contents**

a. All site plans shall be prepared by a registered architect, landscape architect, or professional engineer unless this requirement is waived by the Special Permit Granting Authority because of unusually simple circumstances. All site plans shall be on standard 24" x 36" sheets at a scale of 1 inch equals 20 feet, with additional narrative as necessary.

(1) name of the project, locus, date and scale plan;

(2) name and address of the owner of record, developer, and seal of the engineer, landscape architect or architect;

(3) the location and boundaries of the lot, adjacent streets or ways, and the location and owner's names of all adjacent properties and those within 300 feet of the property line, and all zoning district boundaries;

(4) existing and proposed topography at the two foot contour interval the location of wetlands, streams, waterbodies, drainage swales, areas subject to flooding and base flood elevations and unique natural land features;

(5) existing and proposed structures, including dimensions and elevations; and all exterior entrances and exits;

(6) the location of parking and loading areas, parking layout, public and private ways, driveways, walkways, access and egress points;

(7) the location and description of all proposed septic systems, percolation test when necessary, water supply, storm drainage systems including existing and proposed drainlines, culverts, drainage swales, catchbasins, drainage calculations, and subdrainage along with soil logs, utilities, hydrants, manholes, lighting fixtures, and refuse and other waste disposal methods;

(8) proposed landscape features including the location and a description of buffers, screening, fencing, and plantings, including the size and type of plant material;

(9) the location, dimensions, height, color, illumination and characteristics of existing and proposed signs;

(10) the location and a description of proposed open space or recreation areas;

(11) the location and design of access points;

(12) the location and design of any intersections in close proximity to the site,

(13) the width of circulation roadways and radius of horizontal curves;

(14) the plan shall describe estimated daily and peak-hour vehicle trips to be generated by the site and traffic flow patterns for vehicles and pedestrians showing adequate access to and from the site and adequate circulation within the site. A detailed traffic impact statement is required for uses as specified in Section 10.1-8.

(15) a plan for the control of erosion, dust, and silt, both during and after construction sequencing, temporary and permanent erosion control, and protection of water bodies.

(16) for alterations to any existing or new business/commercial/industrial uses a table containing the following information:

aa. Maximum area of building to be used for selling, offices, business, industrial or other uses.

bb. Maximum number of employees where applicable.

cc. Maximum seating capacity where applicable.

dd. Number of parking spaces existing or required for the intended use.

(17) elevation plans at a scale of 1/4"=1'0" for all exterior facades of the proposed structure(s) and/or existing facades plus additioin(s) showing design features and indicating the type and color of materials to be used.

The Special Permit Granting Authority may waive any information requirements it judges to be unnecessary to the review of a particular plan.

5. **Procedures for Site Plan Review**

a. The Special Permit Granting Authority shall transmit one copy each to the Building Inspector, Board of Health, Planning Board, Zoning Board of Appeals, Office of the Mayor, City Council, Historical Commission, Conservation Commission, Department of Public Works, Fire Department and Police Department, who shall review the application and submit their recommendations and comments to the Special Permit Granting Authority concerning:

(1) the adequacy of the date and methodology used by the applicant to determine the impacts of the proposed development:

(2) the effects of the projected impacts of the proposed development; and

(3) recommended conditions or remedial measures to accommodate or mitigate the expected impacts of the proposed development.

Failure of Board to make recommendations within 35 days of the referral of the application shall be deemed to be lack of opposition.

b. In those instances where the reviewing board is concerned about a traffic or safety issue of a proposed development along a state highway, the reviewing board may submit a copy of the site plan approval application

with map to the Massachusetts Department of Public Works (MDPW), District II located on North King Street in Northampton for their review. The application sent to MDPW must be accompanied by a letter stating the concerns of the municipality. MDPW will investigate these concerns when the applicant applies for a state curb cut permit.

c. The Special Permit Granting Authority shall hold a public hearing within sixty-five (65) days of the receipt of an application and after due consideration of the recommendations received, the SPGA shall take final action within 90 days from the time of hearing. The Special Permit Granting Authority's final action in writing shall consist of either:

(1) Approval of the site plan based on a determination that the proposed project will constitute a suitable development and is in compliance with the standards set forth in this bylaw;

(2) Disapproval of the site plan based on a determination that the proposed project does not meet the standards for review set forth in this bylaw; or

(3) Approval of the project subject to any conditions, modifications and restrictions which will ensure that the project meets the Standards for Review.

d. The period of review for a special permit requiring site plan approval shall be the same as any other special permit and shall conform to the requirements of Chapter 40A, Sec. 9 "Special Permits". Specifically, a joint public hearing to address the Special Permit application and Site Plan Approval application shall be held within sixty-five (65) days of the filing of a special permit application with the Planning Board or Board of Appeals. The Board shall then have 90 days following the public hearing in which to act.

6. **Site Plan Review Criteria**

a. In reviewing and evaluating the site plan, and in making a final determination regarding site plan approval, the Special Permit Granting Authority shall consider the following criteria:

(1) The site plan complies with the Commercial Development and Performance Standards contained in Section 10.1-7.

(2) The site plan minimizes traffic and safety impacts of the proposed development on adjacent highways or roads, and maximizes the convenience and safety of vehicular and pedestrian movement within the site.

(3) The proposed development, to the extent feasible: a) is integrated into the existing landscape and protects abutting properties; b) minimizes adverse environmental impacts on such features as wetlands, floodplains, and aquifer recharge areas; c) minimizes obstruction of scenic views from possibly accessible locations; d) preserves unique natural or historical features; e) minimizes tree, vegetation, and soil removal and grade changes, f) maximizes open space retention; and g) screens objectionable features from neighboring properties and roadways.

(4) The architectural design, layout and landscaping of the proposed development is in harmony with the character of the neighborhood and the City of Northampton.

(5) The proposed development is served with adequate water supply and waste disposal systems and will not place excessive demands on City services and infrastructure.

(6) The site plan shows adequate measures to prevent pollution of surface or groundwater, to minimize erosion and sedimentation, and to prevent changes in groundwater levels, increased run-off and potential for flooding.

7. **Commercial Development and Performance Standards**

In order to receive site plan approval, all projects or uses must demonstrate compliance with the commercial development standards herein.

a. Access Standards

(1) The number of curb cuts on state and local roads shall be minimized. To the extent feasible, access to businesses shall be provided via one of the following:

aa. Access via a common driveway serving adjacent lots or premises.

bb. Access via an existing side street.

cc. Access via cul-de-sac or loop road shared by adjacent lots or premises.

(2) One driveway per business shall be permitted as a matter of right. Where deemed necessary by the Special Permit Granting Authority, two driveways may be permitted as part of the Site Plan Approval process which shall be clearly marked "entrance" and "exit."

(3) Curb cuts shall be limited to the minimum width for safe entering and exiting, and shall in no case exceed 24 feet in width.

(4) All driveways shall be designed to afford motorists exiting to highways with safe sight distance.

(5) The proposed development shall assure safe interior circulation within its site by separating pedestrian, bicycle and vehicular traffic.

(6) Driveway design and placement must be in harmony with internal circulation and parking design such that the entrance can absorb the maximum rate of inbound traffic during a normal weekday peek traffic period.

(7) Driveway entrance must be able to accommodate all vehicle types having occasion to enter the site, including delivery vehicles.

(8) Driveway placement should be such that loading and unloading activities will in no way hinder vehicle ingress or egress.

(9) Driveway design must be such that an entering vehicle will not encroach upon the exit lane of a two way driveway. Also, a right turning exiting vehicle will be able to utilize only the first through traffic lane available without encroachment into the adjacent through lane.

b. Parking Standards

Proposed projects or uses must comply with Parking and Off-street Loading requirements in Section VIII and the following standards:

(1) Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of a structure.

(2) To the extent feasible, parking areas shall be shared with adjacent businesses.

c. Pedestrian Safety Improvement

Internal pedestrian systems are required for large business/commercial/industrial developments and applicants are encouraged to link pedestrian systems between proposed new large developments and existing developments.

d. Landscaping

(1) A landscaped buffer strip at least fifteen (15) feet wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and shade trees (minimum 2-inch caliper, planted at least every 50 feet along the road frontage). At all street or driveway intersections, trees or shrubs shall be set back a sufficient distance from such intersections so that they do not present a traffic visibility hazard. The sidewalk required above shall be incorporated into the buffer strip.

(2) Large parking areas shall be subdivided with landscaped islands so that no paved parking surface shall extend more than 80 feet in width. At least one tree (minimum 2" caliper) per 35 parking spaces shall be provided.

(3) Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen plantings, or earthen beams, or wall or right fence complemented by evergreen plantings.

e. Appearance/Architectural Design

(1) Architectural design shall be compatible with the character and scale of buildings in the neighborhood and the City through the use of appropriate building materials, screening, breaks in roof and wall lines and other architectural techniques. Variation in detail, from and siting shall be used to provide visual interest and avoid

monotony. Proposed buildings shall relate harmoniously to each other with adequate light, air, circulations, and separation between buildings. The Special Permit Granting Authority may take into consideration whether exterior building facades and materials are consistent with neighborhood's character. Large work area doors or open bays shall not open toward or face roadways.

(2) The Special Permit Granting Authority may adopt such regulations as may be necessary to further specify design standards.

f. Storm Water Run-off

(1) The rate of surface water run-off from a site shall not be increased after construction. If needed to meet this requirement and to maximize groundwater recharge, increased runoff from impervious surfaces shall be recharged on site by being diverted to vegetated surfaces for infiltration or through the use of detention ponds. Dry wells shall be used only where other methods are infeasible and shall require oil, grease, and sediment traps to facilitate removal of contaminants.

(2) Neighboring properties shall not be adversely affected by flooding from excessive run-off.

g. Erosion Control

Erosion of soil and sedimentation of streams and waterbodies shall be minimized by using the following erosion control practices:

(1) Exposed or disturbed areas due to stripping of vegetation, soil removal, and regrading shall be permanently stabilized within six months of occupancy of a structure.

(2) During construction, temporary vegetation and/or mulching shall be used to protect exposed areas from erosion. Until a disturbed area is permanently stabilized, sediment in run-off water shall be trapped by using staked haybales or sedimentation traps.

(3) Permanent erosion control and vegetative measures shall be inaccordance with the erosion/sedimentation/vegetative practices recommended by the Soil Conservation Service.

(4) All slopes exceeded 15% resulting from site grading shall be either covered with 4 inches of topsoil and planted with a vegetative cover sufficient to prevent erosion or be stabilized by a retaining wall.

(5) Dust control shall be used during grading operations if the grading is to occur within 200 feet on an occupied residence or place of business. Dust control methods may consist of grading fine soils on calm days only or dampening the ground with water.

h. Water Quality

All outdoor storage facilities for fuel, hazardous materials or wastes, and potentially harmful raw materials shall be located within an impervious,

diked containment area adequate to hold the total volume of liquid kept within the storage area.

i. Explosive Materials

(1) No highly flammable or explosive liquids, solids, or gases shall be stored in bulk above gorund, unless they are located in anchored tanks at least seventy-five (75) feet from any lot line, town way, or interior roadway plus all relevant federal and state regulations shall also be met. Underground storage tanks are prohibited.

(2) Propane gas tanks in 100-lb. cylinders (or smaller) shall be exempt from these safety regulations.

j. Lighting

(1) Any outdoor lighting fixture newly installed or replaced shall be shielded so that it does not produce a strong, direct light beyond the property boundaries;

(2) No light standard shall be taller than fifteen (15) feet.

k. Vibration

No vibration shall be transmitted outside the property where it originates.

8. <u>Additional Commercial Development and Performance Standards for Route 9, Route 10, King Street and Damon Road in Northampton</u>

a. Traffic Impact Statement

A traffic impact statement shall be prepared, which shall contain:

(1) Traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred feet of the site.

(2) An estimate of the motor vehicle trips generated by the proposed development entering and exiting the site for daily and peak hour periods.

(3) A detailed assessment of project-related traffic impacts on the safety and capacity of any adjacent highway and/or road via a comparison of no-build conditions to build conditions.

(4) Specific mitigating measures which will alleviate impacts to the adjacent roadway network.

(5) A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities, and impacts on intersections.

(6) A place to minimize traffic and safety impacts through such means as physical design and layout concepts, staggered employee work schedules, promoting use of public transit or carpooling, or other appropriate means.

(7) An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

(8) Adequate pedestrian and bicycle access shall be provided as follows:

aa. Sidewalk shall be provided to provide access to adjacent porperties and between individual businesses with a development.

b. Trip Reduction Plan

1. In each case where a new building(s) or new use of more than 10,000 square feet is developed the applicant shall prepare and submit a "Trip Reduction Plan" which clearly identifies a combination of transportation systems management strategies which are designed to reduce anticipated vehicle trips by 35%. These strategies should include, but are not limited to:

(1) Creating vanpool/carpool incentive programs, such as employer subsidies for vanpools/carpools, preferred vanpool/carpool parking, ride matching services, and providing parking at the vanpool/carpool pick-up site.

(2) Allowing and encouraging flexible work hours and flexible work weeks.

(3) Encouraging pedestrian and bicycle commute modes by providing on-site bicycle parking storage, locker room facilities, bike and walking paths, and similar features.

(4) Developing site designs which are conducive to transit or vanpool use, such as convenient, weather protected transit shelters.

(5) Encouraging employee and customer use of transit services, including providing transit subsidies for improved transit service and accessibility.

(6) Providing of on-site services, retail opportunities, and housing if allowed in the zone.

(7) Naming a full-time or part-time transportation systems management coordinator to oversee implementing all strategies identified in the "Trip Reduction Plan."

2. For developments which make a long-term commitment to actively promote employee and public use of transit, ridesharing, and other means to reduce single occupant vehicle (SOV) trips, minimum parking standards may be reduced by a percentage to be determined by the Special Permit Granting Authority based on the adequancy of trip reduction plans submitted.

c. Pedestrian Safety Improvement

Sidewalks along Route 9, Route 10, King Street and Damon Road are required for new developments or existing uses undergoing major remodeling.

9. Enforcement

a. The Special Permit Granting Authority may require the posting of a bond or other adequate security to assure compliance with the plan and conditions and may suspend any permit or license when work is not performed as required.

b. Any special permit issued under this section shall lapse within one (1) year if a substantial use thereof has not commenced sooner except for good cause. The time required to pursue and await determination of a judicial appeal pursuant to Chapter 40a of the General Laws shall be included within the one (1) year time limit.

c. The Planning Board or Board of Appeals may periodically amend or add rules and regulations relating to the procedures and administration of this section.

SITE PLAN APPROVAL

AMENDMENTS TO THE NORTHAMPTON TABLE OF USE REGULATIONS

ARTICLE V

USE REGULATIONS

Section 5.1 - Applicability of Use Regulations. Except as provided in this Ordinance, no building, structure, or land shall be used except for the purposes permitted in the district as described in this article. Any use not listed shall be construed to be prohibited. Uses permitted by right, by special permit, or by a variance granted under the provisions of Section 10.9, shall be subject, in addition to the use regulations contained in the Article, to all of the other provisions of the Ordinance.

Section 5.2 - Table of Use Regulations. The Table of Use Regulations on the following pages is hereby declared to be a part of this Ordinance. In the Table, the following designations shall apply:

"A" shall designate uses allowed by right in the district indicated.

"SP" shall designate uses allowed in the district indicated, but only with a specal permit granted by the Zoning Board of Appeals subject to the provisions of Articles X and XI.

"PC" shall designate uses allowed in the district indicated, but only with a special permit granted by the City Council subject to the provisions of Articles X and XI.

"PB" shall designate uses allowed in the district indicated, but only with a special permit from the Planning Board subject to the provisions of Articles X and XI.

"SPA" shall designate uses allowed in the district indicated, but only with site plan approval from the Zoning Board of Appeals subject to the provisions of Articles X and XI.

"--" shall designate uses not allowed in the district indicated.

Any use which is accessory to a principal use allowed under the Table of Use Regulations shall be allowed only in connection with the bona fide operation of a principal use allowed under the Table of Use Regulations, and subject to the provisions of Section 5.3 where applicable.

Note: See also

Article VI for dimension and density regulations
Article VII for sign requirements
Article VIII for parking and loading regulations
Article X.II for Site Plan Review/Approval requirements

9/28/90

TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
RESIDENTIAL												
One-family dwellings	A	A	A	A	A	-	-	-	SP	-	-	SP
Accessory Apartments	SP	SP	SP	SP	SP	-	-	-	-	-	-	-
Two-family dwellings	-	-	-	SP	A	-	-	-	SP	-	-	-
Three-family dwellings	-	-	-	SP	A	-	-	-	A	-	-	-
Multi-family dwellings not to exceed three stories	-	-	-	-	A	-	-	-	A	-	-	-
Multi-family dwellings exceeding three stories	-	-	-	-	SP	-	-	-	SP	-	-	-
Town houses	-	-	-	PB	PB	-	-	-	PB	-	-	-
Lodging houses	-	-	-	SP	SP	-	-	-	SP	-	-	-
Halfway houses	-	-	SP	SP	SP	-	-	-	SP	-	-	-
Fraternities and sororities	-	-	-	SP	SP	-	-	-	-	-	-	-
Dormitories	-	-	-	SP	SP	-	-	-	SP	-	-	-
Planned unit development	PB	PB	PB	PB	PB		PB	-	PB	PB	-	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
Planned unit development (see Section 11.5) (Amended July 19, 1990)	PB	PB	PB	PB	PB	PB	PB	PB	PB	-	PB	-
Cluster residential development (see Section 11.4)	PB	PB	PB	PB	PB	-	-	-	-	-	-	-
Mixed Residential/Retail, Service, Commercial uses	-	-	-	-	SP	A	A	SP	A	-	-	-

a. In UR-C Districts -- are permitted by ZBA Special Permit. Retail, Service, Commercial uses limited to only Miscellaneous Professional and Business Offices, and shall not include banking, insurance and real estate offices.

b. In CB, GB, and NB Districts -- are permitted as a matter-of-right. All Residential units must be located above the first floor. All retail Service, Commercial uses normally permitted in these Districts are permitted (a Special Permit is required ifa Special Permit is normally required for the Retail, Service, Commercial, use), except the following uses are prohibited:

- Establishments selling, leasing or renting new and/or used automobiles, trucks, boats, motorcycles, household and camping trailers, and new automobile tires and other accessories
- Medical Center including accessory medical research and associated facilities
- Automotive repair or automobile service station
- Pool or billiards hall, bowling alley, amusement arcade, teen center

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC

d. in HB Districts -- are Permitted by ZBA Special Permit. All Residential units must be located above the first floor. All Retail, Service, Commercial uses normally permitted in the HB District are permitted by Special Permit except the following uses are prohibited:

- Drive-in eating and drinking establishments
- Establishments selling, leasing or renting new and/or used automobiles, trucks, boats, motorcycles, household and camping trailers, and new automobile tires and other accessories
- Medical Center including accessory medical research and associated facilities
- Automotibe repair or automobile service station
- Pool or billiards hall, bowling alley, amusement arcade, teen center
  (Amended August 17, 1989)

Home Occupations	SP	SP	SP	SP	SP	A	A	SP	A	-	SP	-
Tourist Home/Bed and Breakfast	SP	SP	SP	SP	SP	-	-	-	SP	-	-	-

***In the URC District only: residential uses on the first floor; business uses limited to only miscellaneous professional offices, and shall not include banks, real estate and insurance offices and retail, personal and consumer service establishments. (Amended August 21, 1986)

COMMUNITY FACILITIES

Church or other religious use of any educational use which is religious, sectarian, denominational or public	A	A	A	A	A	A	A	A	A	A	A	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
Any other private school, college or university	SP	SP	SP	SP	SP	SP	-	-	-	-	-	-
Private day nursery care or kindergarten (licensed or unlicensed (Amended July 19, 1990)	SP	SP	SP	SP	SP	SP	-	-	SP	-	-	-
Family Day Care (in the home) (Adopted July 19, 1990)	SP	SP	SP	SP	SP	-	-	-	-	-	-	-
Membership club	SP	SP	SP	SP	A	A	A	A	A	-	-	-
Outdoor commercial recreation use	SP	SP	-	-	-	-	-	-	-	-	-	SP
Municipal facility	A	A	A	A	A	A	A	A	A	A	A	PC
Heavy public use (See Section 11.6)	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
City or nonprofit cemetery, including any crematory therein	A	A	A	A	A	-	-	-	-	-	-	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
Historical association or society (may include the residence of a caretaker (Amended July 19, 1990)	A	A	A	A	A	A	A	A	A	A	A	SP
Hospital	SP	SP	SP	SP	SP	-	SP	SP	SP	-	-	-
Facilities for essential services	A	A	A	A	A	A	A	A	A	A	A	SP
Power plant	-	-	-	-	-	-	-	-	-	PC	-	-
Municipal parking lot or structure	-	-	-	-	SP	A	A	A	A	A	A	-
Bridge, tunnel	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
Private utility, substation, or similar facility or building	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
Small scaly Hydroelectric Generation (Adopted July 19, 1990)	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
AGRICULTURAL USES												
Agriculture, horticulture and floriculture except a greenhouse stand for retail sale	A	A	A	A	A	A	A	A	A	A	A	Aor
Year-round greenhouse or stand for wholesale and retail sale of agricultural or farm products	SP	SP	SP	SP	SP	A	A	A	-	-	-	SP
Temporary (not to exceed erection or use for a period of four (4) months in any one year) greenhouse or stand for retail sale or agricultural or farm products raised primarily on the same premises	A	A	A	A	A	A	A	A	A	A	A	A
Commercial stable or kennel in which all animals, fowl, or other forms of life are completely enclosed in pens or other structures (See Section 11.7)	SP	SP	SP	-	-	-	-	-	-	-	-	-
Veterinary hospital in which all animals are kept inside permanent buildings	-	-	-	-	-	-	A	A	A	-	-	-
Noncommercial forestry and growing of all vegetables	A	A	A	A	A	A	A	A	A	A	A	A

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TABLE OF USE REGULATIONS

Principal Use	District: Residential RR	SR	UR-A	UR-B	UR-C	Business CB	GB	HB	NB	Industrial GI	SI	Conservancy SC
Agricultural fair and/or exhibition grounds for events not exceeding eleven (11) days duration (Amended July 19, 1990)	-	-	SP	-	-	-	-	-	-	-	-	-
Agricultural fair and/or exhibition grounds for events exceeding eleven (11) days duration (Amended July 19, 1990)	-	-	PC	-	-	-	-	-	-	-	-	-
RETAIL SERVICE COMMERCIAL USES												
Retail establishment selling principally convenience goods including, but not limited to: food, drugs, and proprietary goods												
a. with maximum floor area limitation of 10,000 per floor sq. ft. for any single establishment	-	-	-	-	-	SPA	SPA	SPA	SPA	-	-	-
b. in excess of 10,000 sq. ft./floor are (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	-	-	-
Retail establishment selling general merchandise, including, but not limited to, dry goods, apparel and accessories, furniture and home furnishings, home equipment, small wares and hardware, and including discount and limited price variety stores												
a. with maximum floor area limitation of 10,000 sq. feet per floor for any single establishment	-	-	-	-	-	SPA	SPA	SPA	SPA	-	-	-
b. retail establishments in excess of 10,000 sq. ft./floor area (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	-	-	-

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District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
Eating and drinking places where consumption is primarily intended to be within the building	-	-	-	-	-	SPA	SPA	SPA	SPA	SPA	SPA	-
Drive-in eating and drinking establishment	-	-	-	-	-	-	-	SPA	-	-	-	-
Tradesman (Adopted July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	SPA	SPA	SPA	-
Night Club/Dance Hall (Adopted July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	-	-	-
Establishment selling, leading, renting automobiles and/or used automobiles and trucks, new automobile tires and other accessories, boats, motorcycles and household and camping trailers	-	-	-	-	-	-	SPA	SPA	-	SPA	SPA	-
Hotels/motels (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	-	-	-	-	-
Personal and consumer service establishment	-	-	-	-	-	SPA	SPA	SPA	SPA	-	-	-
Funeral establishment	-	-	-	-	SPA	SPA	SPA	SPA	SPA	-	-	-
Medical center including accessory medical research and associated facilities (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	SPA	-	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential RR	SR	UR-A	UR-B	UR-C	Business CB	GB	HB	NB	Industrial GI	SI	Conservancy SC
Nursing home (any facility licensed/ sanctioned by the state as a nursing home) (Amended July 19, 1990_	SPA	SPA	SPA	SPA	SPA	-	-	-	-	-	-	-
Membership club operated for profit	-	-	-	-	-	SPA	SPA	SPA	-	-	SPA	-
Miscellaneous professional and business offices and services including, but not limited to, medical, legal, and other offices (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	SPA	-	-	-
Automotive repair or automobile service station (not including a junkyard or open storage of abandoned automobiles or other vehicles) subject to obtaining gas storage permit from City Council where necessary	-	-	-	-	-	-	SPA	SPA	SPA	SPA	-	-
Business service and supply service establishments	-	-	-	-	-	SPA	SPA	SPA	-	SPA	SPA	-
Repair service establishments (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	SPA	SPA	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
Motion picture establishment, indoor (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	-	-	-
Miniature golf course, temporary carnival	-	-	-	-	-	-	-	SPA	-	-	-	-
Pool or billiards hall, amusement arcade, bowling alley, teen center (Amended July 19, 1990)	-	-	-	-	-	SPA	SPA	SPA	-	-	-	-
Commercial radio and TV tower	SPA	SPA	-	-	-	-	-	-	-	SPA	SPA	SPA
Commercial parking lot or structure including a public garage	-	-	-	-	-	SPA	SPA	SPA	SPA	SPA	SPA	-
Filling of water or wet area (See Section 11.2)	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
Filling of any land area (See Section 11.3)	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	-
Establishments selling foods prepared on premises where consumption is primarily off the premises	-	-	-	-	-	SPA	SPA	SPA	SPA	-	-	-

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"-" - Not allowed
"SP" - Allowed by Special Permit from the Zoning Board of Appeals
"PB" - Allowed by special Permit from the Planning Board
"SPA" - Allowed by Site Plan Approval from the Zoning Board of Appeals

0925K:12/27/90

TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
WHOLESALE, TRANSPORTATION AND INDUSTRIAL USES												
Removal of sand, gravel, quarry, or other raw material (See Section 11.2)	SPA	SPA	SPA	-	-	-	-	-	-	SPA	SPA	SPA
Processing and treating of raw materials including operations appurtenant to the taking, such as grading, drying, sorting, crushing, grinding and milling operations	SPA	SPA	-	-	-	-	-	-	-	SPA	SPA	SPA
Construction supply establishments	-	-	-	-	-	-	-	SPA	-	SPA	SPA	-
Manufacturing	-	-	-	-	-	-	-	-	-	SPA	SPA	-
Wholesale bakery, wholesale laundry, or dry cleaning plant	-	-	-	-	-	-	SPA	SPA	-	SPA	SPA	-
Railroad yards and railway express service	-	-	-	-	-	-	SPA	SPA	-	SPA	SPA	-
Motor freight terminal and warhousing	-	-	-	-	-	-	-	SPA	-	SPA	SPA	-
Bus passenger terminal and taxi facilities	-	-	-	-	-	SPA	SPA	SPA	-	-	SPA	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
Railroad passenger terminal	-	-	-	-	-	SPA	SPA	SPA	-	SPA	SPA	SPA
Airport, including aircraft sales	-	-	-	-	-	-	-	-	-	-	-	SPA
Helliport, subject to the design criteria and standards of the Federal Aviation Administration as published in "Heliport Design Guide", November, 1969, or any later revision thereto	-	-	-	-	-	SPA	SPA	SPA	-	SPA	SPA	SPA
Wholesale trade and distribution	-	-	-	-	-	-	SPA	SPA	-	SPA	SPA	-
Contractor's Yard, open storage of raw materials, finished goods, or construction equipment and structures for storing such equipment, provided outside storage areas shall be screened from outside view (Amended July 19, 1990)	-	-	-	-	-	-	-	SPA	-	SPA	SPA	-
Storage of a fluid other than water as a principal use	-	-	-	-	-	SPA	SPA	SPA	SPA	SPA	SPA	-
Research offices or establishments for research and development activities	-	-	-	-	-	-	SPA	SPA	-	SPA	SPA	-
Burial, incineration, disposal or storage of high-level and intermediate level radioactive wastes	-	-	-	-	-	-	-	-	-	-	-	-

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TABLE OF USE REGULATIONS

District

Principal Use	Residential					Business				Industrial		Conservancy
	RR	SR	UR-A	UR-B	UR-C	CB	GB	HB	NB	GI	SI	SC
a. Burial, incineration, disposal or storage of low-level radioactive wastes greater than the levels permitted by the mission to holders of licenses of broad scope for byproduct material*	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
b. Burial, incineration or disposal of low-level radioactive wastes less than the levels permitted by the Nuclear Regulatory Commission to holders of for byproduct materials*	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC

*Storage quantities of byproduct materials permitted by the Nuclear Regulatory Commission to such licensees are specified in U.S. Nuclear regulatory Commission Rules and Regulations Title 10-Energy Part 33 "Specific Licenses of Broad Scope for Byproduct Material."

Commercial motor vehicle maintenance, garaging and parking facilities (out-side parking shall be screened from the public view	-	-	-	-	-	-	-	-	-	SPA	SPA	-

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0925K:12/27/90

APPENDIX B

MODEL SIGN BYLAW

MODEL OFF-STREET PARKING AND LOADING BYLAW

Source: Massachusetts Executive Office of Communities and Development and Pioneer Valley Planning Commission, "The Growth Management Workbook," 1988.

MODEL SIGN BYLAW

(Based on a zoning bylaw developed for the Town of Hadley, Massachusetts. Includes excerpts from a comprehensive sign bylaw developed by the Center for Rural Massachusetts.)

E-2 SIGN BYLAW

2.00 Purpose

The purpose of the sign regulations set forth in this section shall be the following:

a. to protect public and private investments in buildings and open spaces;

b. to encourage signs which, by their location and design, are harmonious to the buildings and sites which they occupy, and which eliminate excessive and confusing sign display;

c. to eliminate potential hazards to motorists and pedestrians; and

d. to promote the public health, safety, and general welfare.

2.01 Applicability

The provisions of this section shall apply to the construction, erection, alteration, use, location, and maintenance of all signs located out-of-doors, to those signs affixed on any part of a building for the express purpose of being visible from the exterior of the building.

2.02 Definitions

a. Sign: Any permanent or temporary structure, devise, letter, word, model, banner, pennant, insignia, trade flag, or representation use as, or which is in the nature of an advertisement, announcement, or direction, or is designed to attract the eye by means including intermittent or repeated motion of illumination.

b. Sign, Accessory: Any sign that advertises, or indicates the person occupying the premises on which the sign is erected or maintained, or the businesses transacted thereon, or advertises the property itself or any part thereof as for sale or rent, and which contains no other matter.

c. Sign, Area of:

1. The area of a sign shall be considered to include all lettering, wording, and accompanying designs and symbols, together with the background on which they are displayed, any frame around the sign and any "cutouts" or extensions, but shall not include any supporting structure or bracing.

2. The area of a sign consisting of individual letters or symbols attached to or painted on a surface, building, wall or window, shall be considered to be that of the smallest quadrangle or a triangle which encompasses all of the letters and symbols.

3. The area of a sign consisting of a three-dimensional object shall be considered to be the area of the largest vertical cross-section of that object.

4. In computing the area of signs one side of back-to-back signs shall be included.

d. Sign, Awning: A sign painted on or attached to the cover of a movable metallic frame, of the hinged, roll, or folding type of awning.

e. Sign, Free-Standing: A self-supporting sign not attached to any building, wall, or fence, but in a fixed location. This does not include portable or trailer type signs.

f. Sign, Movable: A sign capable of being readily moved or relocated, including portable signs mounted on a chassis and wheels, or supported by legs.

g. Sign, Non-Accessory: Any sign not an accessory sign.

h. Sign, Projecting: A sign which is affixed to building, tree, or other structure and which extends more than six (6) inches beyond the surface to which it is affixed.

i. Sign, Roof: A sign which is located above, or projected above, the lowest point of the eaves or the top of the parapet wall of any building, or which is painted on or fastened to a roof.

j. Sign, Temporary: Any sign, including its support structure, intended to be maintained for a continuous period of not more than thirty (30) days in any calendar year.

k. Sign, Wall: Any sign which is painted on, incorporated into, or affixed parallel to the wall of a building, and which extends not more than six (6) inches from the surface of that building.

2.03 General Regulations

2.031 Permitted Signs

Only signs which refer to a permitted use or an approved conditional use as set forth in Section (Schedule of Use Regulations) of the __(town)__ bylaw area permitted, provided such signs conform to the provisions of this section.

2.032 Prohibited Signs

a. Billboards or non-accessory signs are not permitted.

b. Flashing signs, roof signs, signs containing moving parts, and signs containing reflective elements which sparkle in the sunlight are not permitted. Signs indicating the current time and/or temperature are permitted providing they meet all other provisions of this bylaw.

c. Any sign advertising or identifying a business or organization which is either defunct or no longer located on the premises is not permitted.

d. In no case shall nay sign exceed sixty-four (64) square feet, and all signs shall conform to size standards in Section 2.08.

e. No new sign shall be permitted in the Floodplain District.

2.04 General Standards

2.041 Any exterior sign or advertising device hereafter erected or maintained, must, unless expressly provided, conform to the following restrictions in all districts:

a. Any traffic, informational or directional sign owned and installed by a governmental agency shall be permitted.

b. No private sign shall be placed on a public property.

c. Signs necessary to warn of a hazard or to post land shall be permitted as required to accomplish these purposes.

d. Lettering signs: Letters shall be carefully formed and properly spaced, to be neat and uncluttered. Generally, no more than 60% of the total sign area shall be occupied by lettering.

e. Sign materials: Sign materials should be durable and easy to maintain. Signs may be constructed of wood, metal, slate, or marble, gold leaf, glass, canvas, stained glass, or encased in a wooden frame.

2.05 Placement Standards/Sign Height

2.051 Signs shall not be mounted on roofs or extend above the roof line.

2.052 No sign together with any supporting framework shall extend to a height above the maximum building height allowed in the district. Free-standing or movable signs cannot extend more than ten (10) feet above ground level.

2.053 If any sign is supported by or suspended from a pedestal, post, or tree, it cannot project more than 24 inches over or into any pedestrian or vehicular way customarily used by the public.

2.054 Signs must not dominate building facades or obscure any architectural details, (including but not limited to arches, sills, moldings, and cornices).

2.055 No sign may be placed in a side yard or a rear yard as required for the particular district in which it is located.

2.056 Signs shall be placed at least ____ feet from any lot line and shall be placed so as not to obstruct the view of traffic.

2.06 Illumination Standards

2.061 No sign shall incorporate, or be lighted by, flashing or blinking lights, or be designed to attract attention by a change in intensity or by repeated motion.

2.062 Any illumination provided for signs shall be white only.

2.063 The light source shall be shaded from view off the premises.

2.064 no signs shall be illuminated between the hours of 11 p.m. and 6 a.m. unless the premises on which it is located is open for business.

2.07 Additional Standards for Specific Types of Signs

2.071 Awning Signs

a. Awning signs must be painted on or attached flat against the surface of the awning, but not extend beyond the valance or be attached to the underside.

b. A minimum of eight (8) feet above sidewalk level must be allowed for pedestrian clearance.

2.072 Construction Signs

One temporary sign of an architect, engineer, or contractor erected during the period such person is performing work on the premises on which such sign is erected and shall be permitted, provided: it shall not exceed four (4) square feet in surface area; and, it shall be set back at least ten (10) feet from the street lot line.

2.073 For Sale, Rent, or Lease Signs

Any temporary sign advertising property for sale or lease shall be permitted provided:

a. Only one sign shall be erected and it shall not exceed four (4) square feet.

b. Such signs shall advertise only the property on which the sign is located.

c. The sign shall be removed by the owner or agent within thirty (30) days of rent, sale, or lease.

2.074 Moveable Signs

Moveable signs are not permitted in any district, except the Town Center district(s) or Central Business district(s). In these areas, moveable signs made only of wood, and standing on legs not over four (4) feet in total height may be allowed by special permit by the Special Permit Granting Authority.

2.075 Multiple Signs

Multiple signs shall be defined as a group of signs clustered together in a single structure or compositional unit. Multiple signs are used to advertise several occupants of the same building or building complex or development.

a. The display board shall be of an integrated and uniform design.

b. The allowable sign area shall be computed at 10% of the building front face square footage (FFSF), as computed by the length of times the width of the building facade, to achieve the base square footage, or sixty-four (64) square feet, whichever is smaller.

2.076 Political Signs

a. A maximum of two (2) temporary signs per lot are allowed.

b. Such signs may not exceed four (4) square feet in area.

c. Such signs shall be displayed no earlier than twenty (20) days prior to a voting day, and shall be removed within ten (10) days after a voting day.

2.077 Special Event Signs

A special event sign is a temporary sign that is used in connection with a circumstance, situation, or event (i.e., church bazaar, grand opening, fair, circus, festival) that is expected to be completed within a reasonably short or definite period.

a. A maximum on one (1) temporary sign per lot is allowed.

b. Such signs may not exceed ten (10) square feet in area.

c. Such signs may be erected no sooner than fourteen (14) days before the event and must be removed not later than seven (7) days after the event.

2.08 Districts and Special Regulations

2.081 Signs in Residence Districts

a. A maximum of two (2) signs per lot is permitted.

b. Such signs may not exceed eight (8) square feet in area.

c. One sign per lot indicating the names of the occupants thereof shall be permitted which sign shall not exceed two (2) square feet in area.

d. One sign per lot relating to an allowed accessory use shall be permitted provided said sign shall not exceed two 92) square feet in area.

e. One identification sign for each membership club, funeral establishment, community facility or public facility if permitted provided that the sign shall not exceed eight (8) square feet in surface area.

f. Signs designated historical places or points of interest, erected by governmental authority or by a duly chartered historical association or the like is permitted, not to exceed four (4) square feet in area.

g. Signs relating to trespassing and hunting shall not exceed two (2) square feet in area. One sign per 50 feet of frontage is allowed.

h. Signs in residence districts must be located at least ten (10) feet from the front lot line.

2.082 Signs in Agricultural - Residential Districts

a. A maximum of three (3) signs per lot is permitted.

b. Such signs may not exceed ten (10) square feet in area.

c. Any sign allowed under Section 2081 in an Residence district shall be permitted.

d. No sign shall be permitted on which the principal product or service advertised is not regularly produced or available on the premises.

2.083 Signs in Town Center or Central Business District(s)

Within these districts the intent of the sign regulation is to ensure visual compatibility with the scale and character of the surrounding architecture. The signage shall be designed to be readable by pedestrians and slow moving cars.

a. There shall be no more than three (3) types of signs (i.e., free-standing, window, wall; or awning, free-standing, and window) employed per building, regardless of the number of occupancies.

1. Each ground floor occupant of a building may display two (2) signs.

2. Each occupant in an upper level of a building may display one sign.

b. Such signs may not exceed sixteen (16) square feet in area.

c. Any signs allowed under Section 2.081 in a Residence District, Section 2.082 in an Agricultural district shall be permitted.

d. Free-standing pole signs shall have a maximum height of 10 feet, a maximum area of 10 square feet and a minimum ground clearance of 7 feet.

e. Other free-standing signs shall have a maximum height of 4 feet and shall have a maximum area of 16 square feet.

f. Window signs shall not exceed more than thirty percent (30%) of the window area in which they are displayed.

2.084 Signs in the General Business Districts and Industrial Districts

a. Each business may not display more than two (2) signs.

b. Each development may not display more than two (2) signs, one of which may be free-standing. For the purposes of this Section, development shall refer to a site which includes a lot or lots considered as a unit for the development purposes where the lot or lots is occupied by more than one business whether in the same structure or not.

c. Such signs shall not exceed sixty-four (64) square feet in area.

d. Any signs allowed under Section 2.08 in a Residence District, Section 2.082 in an Agricultural District, and Section 2.083 in a Town Center or Central Business District shall be permitted.

e. The allowable sign area for a free-standing sign or wall sign shall be computed at 10% of the building front face square footage (FFSF), as computed by the length times the width of the building facade, to achieve the base square footage of width along the wall on which the business has its main entrance. In no case shall the area for any sign be greater than 64 square feet.

f. Any detached sign shall be set back from all adjacent public rights-of-way a distance of at least two (2) feet. Signs, in all cases, shall avoid conflicts with public utilities and services.

g. Signs on adjacent storefronts should be coordinated in height and proportion. The use of a continuous sign-bank extending over adjacent shops within the same building is encouraged, as a unifying element.

2.09 Administration and Enforcement

2.091 Permits

a. No sign larger than two square feet shall be erected, altered, displayed, relocated, enlarged or created without first obtaining a permit from the Building Inspector or Sign Officer. At minimum, all applications shall include a scale drawing specifying dimensions, illumination, materials, and location on land or buildings.

b. The Building Inspector or Sign Officer shall issue a permit for a sign when an application therefor has been made and the sign complies with all applicable regulations of the Town and the State Building Code, Article 14. Such application may be filed by the owner of the land or building, or any persons who has the authority to erect a sign on the premises.

c. The Building Inspector or Sign Officer shall act within 30 days of receipt of said application together with the fee. The Building Inspector's or Sign Officer's action or failure to act may be appealed to the board of Selectmen.

2.091 Fees

A schedule of fees for such permits may be established and amended from time to time by the Planning Board.

2.10 Enforcement

2.101 Designation of the Sign Officer

The Building Inspector (or any other qualified person) shall be appointed by the Selectmen as the Sign Officer. The Sign Officer is authorized to order the repair or removal of any sign and supporting structure which is erected or maintained contrary to this bylaw. Whenever a Sign Officer is designated, the Selectmen should notify the State Outdoor Advertising Board.

2.102 Maintenance and Removal

Every sign shall be maintained in good structural condition at all times. All signs shall be kept neatly painted, including all metal parts and supports thereof that are not galvanized or of rust resistant material. The Building Inspector or the Sign Officer shall inspect and shall have the authority to order the painting, repair, alteration or removal of a sign which shall constitute a hazard to safety, health, or public welfare by reason of inadequate maintenance, dilapidation, or obsolescence.

2.103 Abandoned Signs

Except as otherwise provided in the Section, any sign that is located on property which becomes vacant and is unoccupied for a period of three months or more, or any sign which pertains to a time, event or purpose which no longer applies, shall be deemed to have been abandoned. permanent signs applicable to a business temporarily suspended because of a change of ownership or management of such business shall not be deemed abandoned, unless the property remains vacant for a period of six months or more. An abandoned sign is prohibited and shall be removed by the owner of the sign or owner of the premises.

2.104 Dangerous or Defective Signs

No person shall maintain or permit to be maintained on any premises owned or controlled by him any sign which is in a dangerous or defective condition. Any such sign shall be removed or repaired by the owner of the sign or the owner of the premises.

2.105 Removal of Signs by the Building Inspector or Sign Officer

a. The Building Inspector or Sign Officer shall cause to be removed any sign that endangers the public safety, such as an abandoned, dangerous, or materially, electrically, or structurally defective sign, or a sign for which no permit has been issued.

b. The Building Inspector or Sign Officer shall prepare a notice which shall describe the sign and specify the violation involved and which shall state that, if the sign is not removed or the

violation is not corrected within 20 days, the sign shall be removed in accordance with the provisions of this section.

c. All notices mailed to sign owners or property owners by the Building Inspector or Sign Officer shall be sent by certified mail. Any time periods provided in this section shall be deemed to commence on the date of the receipt of the certified mail.

d. Any person having an interest in the sign or the property may appeal the determination of the Building Inspector or Sign Officer ordering removal or compliance by filing a written notice of appeal with the __town__ Board of Selectmen within 45 days after the date of mailing the notice, or 45 days after receipt of the notice if the notice was not mailed.

2.11 Penalties

Violation of any provision of this bylaw or any lawful order of the Sign Officer shall be subject to a fine of not more than $____ per offense. Each day that such violation continues shall constitute a separate offense.

2.12 Non-Conforming Signs

2.121 Continuance

A non-conforming sign lawfully existing at the time of adoption or subsequent amendment of this bylaw may continue, although such sign does not conform to the provisions of this bylaw.

2.122 Replacement

Any sign replacing a non-conforming sign shall conform with the provisions of this Section, and the non-conforming sign shall no longer be displayed.

2.123 Abandonment

If a non-conforming sign associated with a permitted use or structure has been abandoned for no less than six months (i.e., the structure has not been occupied for six months) than the non-conforming sign shall be removed and its non-conformity shall not continue.

MODEL OFF-STREET PARKING AND LOADING STANDARDS

(Based upon excerpts from Westfield Zoning Ordinance, Northampton Zoning Ordinance, and A Unified Development Ordinance, by Michael B. Brough)

E-3 GENERAL PARKING REGULATIONS

3.00 General Parking Regulations

3.001 Off-street parking shall be provided in conjunction with and during the construction, conversion and/or expansion of any structure, as well as upon the expansion of use. In the case of expansion or conversion, these standards shall apply only to the expanded or converted areas.

3.002 In granting special permit for any use, the Special Permit Granting Authority may require off-street parking spaces, standards, or conditions in addition to those set forth in this Bylaw, if it deems necessary for the use.

3.003 Any specific, more stringent provision in any other section of the Town Bylaw relating to parking shall prevail over provisions in this section.

3.01 Parking Areas Design and Location

All new structures and additions or extensions on existing structures shall be provided with off-street parking spaces in accordance with the following specifications:

3.011 Definitions:

a. Driveway -- A space, located on a lot, which is not more than fifteen (15) feet in width for residential uses nor more than twenty-four (24) feet in width for commercial or industrial uses at the lot line, built for access to a garage or off-street parking or loading space.

b. Parking Space -- An off-street space at least nine (9) feet in width and twenty (20) feet in length, excluding the portion of the driveway to such space.

3.012 Location

a. Required parking shall be provided on the same lot with the main use it is to serve or, in Commercial and Industrial Districts, on a lot that is in the same ownership as, and located within, three-hundred (300) feet of the main use. Parking required for two or more buildings or uses may be provided in combined facilities where it is evident that such facilities will continue to be available for the several buildings or uses.

b. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of the structure.

3.013 Drainage

a. Drainage facilities for each parking area should be designed and constructed to contain stormwater run-off on the premises.

3.014 Screening

a. For five (5) or more vehicles, parking spaces shall be effectively screened with planting or fencing which adjoins or faces the side or rear lot line of a lot situated in any district.

b. Screening may consist of decorative elements such as building wall extensions, plantings, berms or other innovative means, must be maintained in good condition, and no advertising shall be placed thereon. The screening shall be designed so that vehicle sight distance shall not be affected at entrances, exits, or at street intersections.

3.015 Lighting

a. Drives and parking areas shall be illuminated in such a way that there shall be no glare for motorists, pedestrians, or adjoining premises.

3.016 Driveway Access Permits

a. A driveway access permit must be obtained from the (Building Inspector or Public Works Department) for all new or relocated driveways or parking lots.

3.02 Additional Parking Area Standards for Areas with Ten (10) or More Parking Spaces

3.021 Size

In a parking lot or parking building up to sixty percent (60%) of the parking space must be 9 feet by 20 feet in size. The remaining forty percent (40%) may have a reduced parking space size of 9 feet by 16 feet to accommodate smaller cars. The parking space sizes are exclusive of adequate driveways and aisles.

3.022 Surfacing

The area and access driveways shall be surfaced with bituminous or cement concrete material. The location of spaces shall be suitably marked by painted lines or other appropriate markings.

3.023 To the extent feasible, parking areas shall be shared with adjacent uses. This may be accomplished via one of the following methods:

a. Access via a common driveway serving adjacent lots or premises.
b. Access via an existing side street.
c. Access via a cul-de-sac or loop road shared by adjacent lots or premises.

3.024 Parking areas shall be designed so that vehicles cannot extend beyond the perimeter of such area onto adjacent properties or public rights-of way. Such areas shall also be designed so that vehicles do not extend over sidewalks or tend to bump against or damage any wall, vegetation, or other obstruction.

3.025 Landscaping

All open air surface parking area shall be landscaped in the following manner:

a. A landscaped buffer strip at least fifteen (15) feet wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and shade trees (minimum 2" caliper, planted at least every 50 feet along the road frontage). At all street or driveway intersections, trees or shrubs shall be set back a sufficient distance from such intersections so that they do not present a traffic visibility hazard.

b. Large parking area, areas providing more than seventy-five (75) parking spaces, shall be subdivided with landscaped islands, so that no paved parking surface shall extend more than 80 feet in width. At least one tree (minimum 2" caliper) per 35 parking spaces shall be provided.

c. Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen plantings, or earthen berms, or wall or tight fence complemented by evergreen plantings.

d. All landscaped areas shall be properly maintained. Shrubs or trees which die shall be replaced within one growing season.

3.026 Driveway Location

a. Any portion of any entrance or exit driveway shall not be closer than fifty (50) feet to the curb line of an intersecting street nor shall it be closer than fifty (50) feet to any portion of an existing driveway located in a Business or Industrial District.

b. Any two driveways leading to or from the same street and from the same lot shall note be within thirty (30) feet of each other at their intersections with the front lot line for an interior lot and forty (40) feet for a corner lot.

3.03 Required Minimum Parking Spaces

3.031 For all zoning districts, off-street parking spaces shall be provided for every new structure, the enlargement of an existing structure, or the development of a new land use.

3.032 For all zoning districts, except the Central Business District, in cases of a change in use where the existing use (or in cases of vacancy, the next previous use) did not provide for the number of off-street parking spaces required under this Bylaw, then the proposed use does not have to provide for the number of off-street parking spaces, provided said proposed use does not require any more off-street parking spaces under this Bylaw than the existing use (or in cases of vacancy, the next previous use) would. In situations where the proposed use would require a larger number of off-street parking spaces, the proposed use shall only have to provide an additional number of off-street parking spaces equal to the difference between the number required under this Bylaw for the proposed use.

3.033 All uses shall provide parking spaces adequate to accommodate under all normal conditions the vehicles of occupants, employees, members, customers, clients, residents, and visitors to the premises, as determined by the Planning Board.

3.04 Mixed Uses

In the case of mixed uses, the parking spaces required shall be the sum of the requirements for the various individual uses computed separately. Parking spaces for one use shall not be considered as providing the required parking for any other use.

3.05 Parking Guidelines

The following guidelines may be used by the Planning Board when determining adequate parking:

USES	REQUIRED MINIMUM SPACES
Residential	
Single-Family Dwelling	2 spaces per dwelling unit
Accessory Apartment	2 spaces per dwelling unit, except the one-bedroom units require only one space
Dwelling Conversion	2 spaces per dwelling unit
Home Occupation	1 additional space
Rooming House, Boarding House	1 space for each room rented in addition to dwelling unit requirements
Tourist Home/Bed & Breakfast	2 spaces, plus 1 additional space for each rooming unit
Two- and Three-Family Dwelling	2 spaces per dwelling unit
Multi-family Dwelling limited to persons of low or moderate income or the elderly	1 space per dwelling unit
Multi-family Dwelling	1 space for each bedroom in each unit plus 1 additional space for every 4 units in the development
Congregate Housing for Elderly and Handicapped	1.5 spaces for each sleeping room

USES	REQUIRED MINIMUM SPACES
Business, Commercial, and Industrial Uses	
Automobile retail and service establishment, and other retail and service establishments involving usually extensive display areas, either indoor or outdoor, in relation to customer traffic.	1 space per 800 square feet of gross floor space. In the case of outdoor display areas one for each 1,000 square feet of lot area in such use.
Commercial, retail, and personal service establishments	1 space per each 300 square feet of gross floor area
Miscellaneous professional and business offices, including banks, insurance, and real estate establishments.	1 space per each 300 square feet of gross floor area
Medical/Dentist Office/Clinics	5 spaces per professional space
Kennels, Veterinary Establishments	Parking spaces adequate to accommodate, under normal conditions, the vehicles of occupants, employees, members, customers, clients, and visitors to the premises shall be provided as determined by the Special Permit Granting Authority
Gas/Service Station	3 spaces/service bay, but not less than 1 space/100 square feet of gross floor area
Hotel or Motor Inn	1 space for each sleeping room, plus 1 space for each 500 square feet of public meeting area or restaurant
Funeral Parlors	10 spaces for each reposing room
Drive-in Eating Establishment	1 space per 30 square feet of gross floor area
Restaurants, Taverns	1 space for each 4 seats, 1 space addition for each 2 employees on largest shift
Warehouse or Storage Facility	1 space for 3,000 square feet of gross floor area and/or of lot area in such use
Manufacturing or Industrial Establishment	1 space for each person employed on the largest shift
For all other permitted commercial or industrial uses, including, but not limited to, farm stands, open lot sales, place of the building trades, storage, or distribution plants	Parking spaces adequate to accommodate, under normal conditions, the vehicles of occupants, employees, members, customers, clients, and visitors to the premises shall be provided as determined by the Board of Appeals

USES	REQUIRED MINIMUM SPACES
Government, Institutional, and Public Services Uses	
Indoor place of assembly with fixed seating capacity including theaters, auditoriums, assembly hall, churches, arenas, and convention centers	1 space for every 4 seats
Indoor place of assembly without fixed seats, including libraries, museums, art galleries, government buildings, recreation and community centers membership clubs, skating rinks, or other places of amusement	1 space per each 300 square feet of gross floor area
Bowling Alleys	1 space per 3 lanes
Day Care, Nursery School	1 space per 2 employees
Elementary and Junior High School	1 space for each teacher and employee, including space for the gymnasium or the auditorium, whichever has the larger capacity
High School	1 space for each teacher and employee, plus 1 space per 4 students, including space for the gymnasium or the auditorium, whichever has the larger capacity
Hospital	1.5 spaces per bed at design capacity
Rest, convalescent, and nursing homes and homes for the aged	1 space for each 4 beds
Any use permitted by this Bylaw not interpreted to be covered by this schedule	Closest similar use as shall be determined by the Planning Board

Note 1: Gross floor area shall mean the total area of a building measured by taking the outside dimensions of the building at each floor level intended for occupancy or storage.

Note 2: When the computation of required parking or loading spaces results in the requirement of a fractional space, any fraction of one-half or more shall require one space.

3.06 Off-Street Loading and Unloading Requirements

3.061 Adequate off-street loading and unloading space with proper access from a street, highway, common service driveway, or alley shall be provided whenever the normal operation of any development requires that goods, merchandise, or equipment be routinely delivered to or shipped from that development.

3.062 The loading and unloading area must be of sufficient size to accommodate the numbers and types of vehicles that are likely to use this area, given the nature of the development proposed. The following table indicates the number and size of spaces that generally satisfy the standard set forth in this subsection. However, the Planning Board may require more or less loading and unloading area if it deems such increases or decreases reasonably necessary to satisfy the foregoing standard.

Gross Leasable Area of Building	Number of Spaces*
1,000 - 19,999	1
20,000 - 79,999	2
80,000 - 127,999	3
128,000 - 191,999	4
192,000 - 255,999	5
256,000 - 319,999	6
320,000 - 391,999	7

Plus one (1) space for each additional 72,000 square feet or fraction thereof.

* Minimum dimensions of 12 x 55 feet and overhead clearance of 14 feet from street grade required.

3.063 Loading and unloading areas shall be so located and designed that the vehicles intended to use them can maneuver safely and conveniently to and from a public right-of-way, and complete the loading and unloading operations without obstructing or interfering with any public right-of-way or any parking space or parking lot aisle.

3.064 No area allocated to loading and unloading facilities may be used to satisfy the area requirements for off-street parking, nor shall any portion of any off-street parking area be used to satisfy the area requirements for loading and unloading facilities.

3.065 Whenever there exists a lot with one or more structures on it constructed before the effective date of this chapter, and a change in use that does not involve any enlargement of a structure is proposed for such lot and, the loading area requirements of ths section cannot be satisfied because there is not sufficient area available on the lot that can practically be used for loading and unloading, then the developer need only comply with this section to the extent reasonably possible.

APPENDIX C

PROPOSED EASTHAMPTON PLANNED BUSINESS DEVELOPMENT BYLAW

PROPOSED PLANNED BUSINESS DEVELOPMENT - EASTHAMPTON

SECTION XIX. PLANNED BUSINESS DEVELOPMENT

(a) Planned Business Developments shall be permitted in the General Business and Industrial districts only upon issuance of a Special Permit with Site Plan Review from the Zoning Board of Appeals.

(b) *General Description.* A Planned Business Development shall mean a development constructed on a lot or lots under single or consolidated ownership at the time of application, planned, developed, operated and maintained as a single entity containing one or more structures to accommodate retail and service uses. Planned Business Developments are permitted a reduction in the parking requirements contained in the Table of Off-Street Parking Regulations provided that the Special Permit and Site Plan Review requirements (Sections XI and XVIII) of the bylaw are met as well as additional requirements herein specified.

(c) Uses permitted by special permit with site plan review in a Planned Business Development shall be limited to the following:

(1) Retail establishment selling principally convenience goods including but not limited to food, drugs and proprietary goods;

(2) Retail establishment selling general merchandise, including but not limited to dry goods, apparel and accessories, furniture and home equipment, small wares and hardware, and including discount and limited price variety stores;

(3) Eating and drinking places not including drive-in establishments;

(4) Drive-in eating establishments;

(5) Sales by vending machines as a principal use;

(6) Establishment selling new and/or used automobiles and trucks, new automobile tires and other accessories, aircraft, boats, motorcycles and household trailers;

(7) Motel;

(8) Personal and consumer service establishment;

(9) Membership club;

(10) Professional and business offices and services;

(11) Automotive repair, automobile service station or garage (not including a junkyard or open storage of abandoned automobiles or other vehicles);

(12) Miscellaneous business repair services;

(13) Amusement and recreation service, outdoor;

(14) Amusement and recreation service, indoor;

(d) *Dimensional and density regulations*

(1) All uses in a Planned Business Development shall be in conformity with the dimensional and density regulations set forth in the Planned Business Development Table of Dimensional Regulations:

Planned Business Development Table of Dimensional Regulations

District	General Business	Industrial
Minimum Lot Area Per Planned Business Development:	5 acres	5 acres
Minimum Lot Width:	120 feet	140 feet
Minimum Frontage:	120 feet	140 feet
Minimum Front Yard:	30 feet	50 feet
Minimum Side Yard:	25 feet	25 feet
Minimum Rear Yard:	30 feet	30 feet
Maximum Permitted Height:	30 feet	30 feet
Maximum Permitted Stories:	2 stories	2 stories
Maximum Building Coverage of Lot Based on Gross Floor Area:	50%	50%

(2) Uses shall be contained in one continuous building except that groupings of buildings may be allowed by special permit of the board where such groupings are consistent with the safety of the users of the development and are further consistent with the overall intent of this section; the development shall be served by one common parking area, exit and entrance.

(3) High-volume traffic generating uses, uses that have a trip generation rate of 700 vehicles per day or more, are restricted to a total of only twenty (20) percent of the gross floor area of a building. These uses include, but are not limited to, fast-food restaurants, service stations, convenience markets and automatic teller bank machines. Unless the applicant provides data from existing uses, the Institute for Transportation Engineers' publication, Trip Generation shall be used to calculate the number of vehicle trips per day for proposed uses. Building permits for additional high-volume traffic generators will not be issued once the twenty (20) percent threshold has been reached.

(4) The screening and buffer requirements for industrial or business districts apply to Planned Business Developments.

(e) *Additional Planned Business Development Requirements*

In addition to the Special Permit and Site Plan Review requirements (in Sections XI and XVII) of this bylaw, the development must conform to the following:

(1) The development shall be served by a public water and sewer system.

(2) The development shall be served by one common parking area and by common exit and entrance areas.

(3) The proposed development must comply with the Commercial Development and Performed Standards of Section XVIII.

(4) A reduction in parking space requirements is permitted for a Planned Business Development.

Reduction in parking space requirements shall not exceed more than ten (10) percent of those required under normal application of requirements for the particular uses proposed.

(5) Except for the permitted parking space reduction, the Planned Business Development shall comply with the Off-Street Parking and Loading regulations in Section VIII. In addition, the development must comply with the following:

a. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of a structure.

b. Notwithstanding other screening and landscape requirements set forth elsewhere in the bylaw, all front and side yards shall be landscaped. Such landscaping shall include, but not necessarily be limited to, the planting of grass, ground cover, flowerbeds, shrubs, hedge or trees. All landscaping shall be maintained in a healthy growing condition, neat and orderly in appearance, and free of refuse and debris. All plantings shall be arranged and maintained so as not to obscure the vision of traffic.

c. Street frontages shall include shade trees and there shall be trees planted for every 30 feet of street frontage, using trees no less than 2.5 inch caliper at the time of installation. In the case of an uncleared site, existing vegetation can be preserved to achieve said objective.

d. When a parking lot is located adjacent to a public right-of-way, at least a 10-foot wide landscaped area between the right-of-way and the parking lot shall be provided. This area shall be landscaped with one shade or ornamental tree planted every forty (40) feet along the right-of-way.

e. For interior parking lot areas at least two (2) percent of the gross area of the vehicular use area shall be landscaped. Developed areas shall be a minimum of nine (9) feet in width. One shade tree for every fifteen (15) parking spaces is required in parking lots of over 20 parking spaces.

f. Failure to maintain landscaping shall be grounds to revoke parking lot approval and the approval for the principal use which the parking lot serves.

g. Loading and unloading facilities shall be located in a manner so as not to be visible from the street frontage. In addition, such facilities shall be screened from public view from any side streets abutting the lot on which the building is located.

(6) A traffic impact statement is required for all Planned Business Development.

(f) *Application for a Planned Business Development*

(1) The applicant must comply with the application requirements of M.G.L. Chapter 40A, Section 9 and the requirements contained in Sections XI and XVII of this bylaw. Where the site plan constitutes a subdivision, the development shall be subject to Planning Board approval under the subdivision control law.

(2) The applicant shall provide the Town with a performance guarantee if the development requires subdivision. The performance guarantee is subject to approval from the Planning Board and shall be in the form of (a) a Covenant covenanting that before any lot is built upon or conveyed, all roads and utilities shall be built and approved by the Planning Board, or (b) performance bond or surety. In the case of (b), the applicant shall complete all the required improvements at least nine (9) months prior to the expiration date of the financial performance guarantee so that the Town will have time to draw upon said funds and complete the unfinished work.

APPENDIX D

PROPOSED BYLAW TO RESTRICT HIGH-VOLUME TRAFFIC GENERATING USES IN EASTHAMPTON

PROPOSED AMENDMENT TO SECTION V. USE REGULATIONS OF EASTHAMPTON'S ZONING B

Add the following amendment:

SECTION V. USE REGULATIONS

(e) Prohibit all high-volume traffic generating uses in the General Business and Industrial districts unless the uses are included in a Planned Business Development. A high-volume traffic generating use shall be defined as any use that has a trip generation rate of 700 vehicles per day or more based on the statistics provided in the most recent edition of the Institute of Transportation Engineer's publication, Trip Generation. Traffic data from existing uses may be used to supplement the ITE's information for a particular use.

0932K
3/7/91

APPENDIX E

PROPOSED EASTHAMPTON PLANNED INDUSTRIAL DEVELOPMENT BYLAW

PROPOSED PLANNED INDUSTRIAL DEVELOPMENT - EASTHAMPTON

SECTION XVIII. PLANNED INDUSTRIAL DEVELOPMENT

a. Planned Industrial Developments shall be permitted in the General Business and Industrial districts only upon issuance of a Special Permit with Site Plan Review from the Zoning Board of Appeals.

b. *General description.* A Planned Industrial Development shall mean a development constructed on a lot or lots under single ownership at the time of the application, planned and developed as an integral unit, and consisting primarily of manufacturing or service industrial uses. Planned Industrial Developments are permitted a reduction in the minimum area regulations as specified in Table of Area Regulations provided that Special Permit and Site Plan Review requirements (Sections XI and XVII) of this bylaw are met as well as the additional requirements herein specified.

c. *Uses Permitted By Special Permit With Site Plan Review*

The permitted uses shall be limited to manufacturing or service industrial uses with the total use completely within building.

d. *Dimensional Requirements*

1. The tract in single or consolidated ownership at the time of application shall be at least forty (40) acres in size.

2. Individual lot sizes shall not be reduced more than ten (10) percent below the largest that is normally is required in the district.

3. The total number of establishments in the development shall not exceed the number of establishments which could be developed under normal application requirements of the district.

e. *Additional Requirements*

In addition to the Special Permit and Site Plan Review requirements (in Sections XI and XVII of this bylaw), the development must conform to the following requirements:

1. The development must be adequately serviced by a municipal water system and a municipal sewer system.

2. Proposed developments must comply with the Commercial Development and Performance Standards of Section XVII.

3. In addition to the Off-Street Parking and Loading regulations in Section VIII, the development must comply with the following standards:

   (a) Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of a structure.

(b) No more than one (1) curb cut per twenty (20) acres is permitted onto any collector streets already existing when the Planned Industrial Development is proposed.

A collector street is a street which receives and distributes traffic to and from various sub-areas within a neighborhood and receives traffic from a given neighborhood and carries it to an arterial highway. These roads can be part of the state roadway system.

(c) Not withstanding other screening and landscape requirements set forth elsewhere in this bylaw, all front and side yards shall be landscaped. Such landscaping shall include, but not necessarily be limited to, the planting of grass, ground cover, flowerbeds, shrubs, hedges, or trees. All landscaping shall be maintained in a healthy growing condition, neat and orderly in appearance, and free of refuse and debris. All plantings shall be arranged and maintained so as to not obsure the vision of traffic.

(d) Street frontages shall include shade trees and there shall be trees planted for every 30 feet of street frontage, using trees no less than 2.5 inch caliper at the time of installation. In the case of an uncleared site, existing vegetation can be preserved to achieve said objective.

(e) When a parking lot is located adjacent to a public right-of-way at least a 10-foot wide landscaped area between the right-of-way and the parking lot shall provided. This area shall be landscaped with one shade or ornamental tree planted provide per every forty (40) feet of along the right-of-way.

(f) For interior parking lot areas at least two (2) percent of the gross area of the vehicular use area shall be landscaped areas shall be a minimum of nine (9) feet in width. One shade tree for every fifteen (15) parking spaces is required in parking lots of over twenty (20) parking spaces.

(g) Failure to maintain landscaping shall be grounds to revoke parking lot approval and the approval for the principal use which the aprking lot serves.

(h) Loading and unloading facilities shall be located in a manner so as to be visible from the street frontage. In addition, such facilities shall be screened from public view from any side streets abutting the lot on which the building is located.

4. Roads and utilities adequate to serve each stage of development must be installed prior to the occupancy of any structure within that stage of development.

5. A traffic impact statement is required for all Planned Industrial Developments.

f. *Common Land Requirements*

1. At least ten (10) percent of the total tract area (of which at least fifty (50) percent shall not be wetlands or over five (5) pecent slope land) shall be set aside as common land and shall be either deeded to the town or covenanted to be maintained as permanent "open space" in private or cooperative non-profit ownership.

2. Such common land shall be deeded to the town or permanently covenanted simultaneously with the planning board's approval of the definitive subdivision plan, if any.

3. Such common land shall be restricted to open space, playfield, golf course, or conservation area.

4. Such common land shall have suitable access to a street.

g. *Application for a Planned Industrial Development*

1. The applicant must comply with the application requirements of M.G.L. Chapter 40A, Section 9 and the requirements contained in Sections XI and XVII of this bylaw. It shall be referred to the planning board for advice and recommendation. Where the site plan constitutes a subdivision, it shall be subject to planning board approval under the subdivision control law.

2. A Planned Industrial Development may be developed in stages, in accordance with a sequencing plan approved by the Board of Appeals.

3. The applicant shall provide the Town with a performance guarantee if the development requires subdivision. The performance guarantee is subject to approval from the Planning Board and shall be in the form of a) a Covenant covenanting that before any lot is built upon or conveyed all roads and utilities shall be built and approved by the Planning Board, or b) the applicant shall complete all the required improvements at least nine (9) months prior to the expiration date of the financial performance guaranteed so that the Town will have time to draw upon said funds and complete the unfinished work.

APPENDIX F

DISCONTINUING ROADS

Source: Franklin County Planning Department,
"Discontinuing Town and County Roads." 1990

DISCONTINUING TOWN AND COUNTY ROADS

by the Franklin County Planning Department
Lynn Rubinstein, Land Use Planner
funding provided by the
Massachusetts Department of Public Works

INTRODUCTION

Discontinuing roads has become a popular pastime in many towns, and with good reason. Once a road is duly laid out, by either a town or county, and thus a public way,[1] it continues to be public until legally discontinued. Mahan v. Town of Rockport, 287 Mass. 34 (1934), Carmel v. Baillargen, 21 Mass. App. 426 (1986). This is true even if the road was never constructed, or has not been used or maintained for decades.

Among the advantages of discontinuing a town or county road are: 1) the town is no longer responsible for the maintenance of the road, 2) the town is relieved of liability for harm to people using the road, and 3) depending on local zoning and specific circumstances, it may not be possible to build on a lot with frontage on a discontinued road. Thus, discontinuing a road can be an important tool in controlling town road costs and for managing residential growth.

Of course, there can also be disadvantages associated with discontinuing roads: 1) because the way ceases to be public or maintained, people who rely upon it for their travel may be severely inconvenienced, 2) abutters to roads that are discontinued may be "locked out" by other abutters if there are no legal agreements for rights of passage, 3) what was a building lot may no longer be one,

4) a town may experience a decrease in state and federal highway funds because of the decrease in road mileage, and 5) in certain unusual cases,

1. A public way can also be created through prescriptive use by the public, or by dedication prior to 1846. In general, however, public ways are created by being laid out by Selectmen and accepted at Town Meeting.

the town may be liable for damages for discontinuing the road.

The discontinuing of roads is a complex and controversial subject. Please be sure to discuss the discontinuation process and its implications with counsel before proceeding. It is also important to verify whether the road is a town or county road, or a public way at all.

In addition, it is important to determine whether the town has a fee or easement interest in the public way. In most cases, the town simply has an easement to travel across the land while the land is owned by the abutters. If the town owns the road in fee, then it owns both the right of travel as well as the land beneath the road. Once it is determined whether the interest is a fee or easement it must be determined HOW the town acquired this interest. If it was by eminent domain — which is likely —there are specific requirements for discontinuance.

DISCONTINUING TOWN ROADS

How to Discontinue a Town Road

The phrase "discontinue a town road" is often used interchangeably in two different ways. The most commonly understood meaning is to make the road no longer public: thereby ceasing maintenance and eliminating the public right of passage. The other meaning is simply to cease responsibility for maintenance. The second use of the word is not correct. Discontinuing a road means that it is no longer a public road. Maintenance is a separate issue. Because the word is commonly understood in both ways, however, we will discuss both usages in this document.

Whether you want to discontinue the road or simply to cease

maintenance will determine the legal route for action. The first case, both ceasing maintenance and eliminating the public right of passage, requires town meeting action. M.G.L. Ch. 82, Sect. 21. Ceasing responsibility for maintenance, but continuing the public right of passage can be accomplished by Board of Selectman action pursuant to M.G.L. Ch. 82, Sect. 32A.

Discontinuing At Town Meeting

M.G.L. Chapter 82, Section 21 states that "a town, at a meeting, . . . may discontinue a town way . . .." There are no requirements that abutters be notified, that a public hearing be held (except if the road to be discontinued lies within 500 yards of an abutting town)[2] nor that there be any particular reason for the discontinuance. All that is required is a vote of town meeting to discontinue a certain town road.

If the town way was created by easement and was NOT taken by eminent domain, then a simple majority vote is required at town meeting to accomplish the discontinuance. In addition, if the town has a fee or easement interest in land over which the road passes and that land was acquired without the deed stating that the purpose of the land is for a public way, then a simple majority vote is adequate for discontinuance. However, if the town took its fee or easement interest by eminent domain (likely), then a two-thirds majority vote is required to succeed. M.G.L. Ch. 40, Section 15. Procedural steps for discontinuing a road at town meeting are:

- placing a warrant article on the town meeting warrant (sample in appendix).

- following regular warrant article posting requirements (M.G.L. Ch. 39, Section 6).

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2. A public hearing must be held if the road to be discontinued lies within 500 yards of an abutting town. M.G.L. Chapter 82, Section 1.

- if your town does NOT have an Official Town Map, then the Planning Board must have 45 days before town meeting in which to comment and report to the Selectmen concerning the advisability of discontinuing the road in question, M.G.L. Chapter 41, Sects. 81-G, I.

- vote at town meeting.

As can be seen, from a procedural perspective, discontinuing a town road at town meeting is quite simple. From a "political perspective" it may not be quite so straightforward. While the law does not require notice to abutters or a public hearing, we strongly urge that these be provided well in advance of town meeting. This type of outreach is important because the rights of abutters will be seriously affected by the discontinuance action.

Effects of Discontinuance

There are two particularly important possible results of discontinuing a town road: 1) loss of the ability to build on undeveloped land, and 2) being "locked out" by other abutters.

Loss of the Ability to Build on Undeveloped Land

A likely result of the discontinuance of a public road is the loss of the ability to build on undeveloped land which abuts the discontinued road: it will not be possible to get a building permit and it may not be likely to further divide the land.

State and local law often require that a lot have frontage on a public way in order to be a building lot, and thus eligible for a building permit. In particular, it is common for local zoning by-laws to define frontage as frontage on a public way, access as access on a public way, and a road as a public road. In addition, the Subdivision Control Act provides exceptions for the division of land on public ways, and requires adequate access for subdivision development

Local Zoning

Once a road is discontinued at town meeting it is no longer a public way. Thus, if local zoning by-laws require frontage or access on a public way, what was once a legal building lot will lose that status when the road is discontinued. There is **no grandfathering** protection from this change of status.

If local zoning is silent about the definition of a road, access, and frontage, then discontinuance of a road will not affect the ability of the road to be developed. However, most towns require that frontage for approval not required endorsement be on a public way.

Obviously, the consequences to individuals of the loss of building lot status can be quite dramatic and this should be carefully considered by the town and town counsel.

Subdivision Regulations

If a lot loses its status as a building lot because of local zoning by-law requirements, it is possible that with enough land, subdivision may be a possible route for development. Caution is dictated, however. If local subdivision regulations require that the subdivision road have access or frontage on a public way then it is possible that subdivision will not be an available route. In addition, subdivision regulations may define adequate access in such a way that the discontinued road does not provide that access. In particular, a "paper road" is likely to fail the standards provided by local subdivision regulations. Thus, local subdivision regulations may restrict the ability of the land to be developed or divided as well.

In addition, lots may not be created or divided through the approval not required process once a road is discontinued.

Subdivision Control Act

A subdivision of land is defined as "the division of a tract of land into two or more lots" which do not have frontage on (1) a public way or a way certified by the town clerk as used or maintained by the town, 2) an approved subdivision road, or 3) a road which existed prior to subdivision control which in the opinion of the planning board is adequate for vehicular access. M.G.L. Ch. 41, Section 81L. The Subdivision Control Act requires that subdivisions have "adequate access," Section 81M, but this need not be on a public way. On the other hand, it is possible to divide a tract of land into two or more lots without going through the subdivision approval process.

The Subdivision Control Act states that land which is to be divided which has sufficient frontage with adequate access on a public way or the other types of roads mentioned above, may be divided with "approval not required," Section 81L, emphasis added; so called "ANR lots."[3]

By discontinuing a town road, the frontage for land abutting that road, ceases to be on a public way. If land abutting a road which is discontinued is undeveloped and undivided, the ANR process for dividing the land is not available. Subdivision approval is the only possible route for dividing or even building upon the land. This may be a source of frustration for some abutters and should be addressed before town meeting.

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3. ANR is a commonly used development technique and something that many small landowners rely upon for lower development costs of land. The full subdivision approval process can be quite lengthy and expensive. The ANR route is much quicker, simpler, and thus, cheaper.

Summary

Because road discontinuance is likely to result in the loss of the ability of abutting land to be developed, it can play an important role in growth management. Strip or frontage development will not be possible once a road is discontinued. New development, if available under local zoning by-laws and subdivision regulations, will be forced into subdivision; over which towns have much more control. It is also this consequence of road discontinuance which is likely to most affect abutters, and most anger them. This issue needs to be carefully considered and addressed before towns proceed with discontinuing town roads.

Being Locked Out

Case law has demonstrated that when a road is discontinued and no right of passage is reserved in deeds or by prescriptive use for abutters, that a landowner has the right to bar abutters further down the road from passage over their land. Schuffels v. Bell, 21 Mass. App. 76 (1985), Cowls v. Woicekoski, 7 Mass. App. 18 (1979). This is not a desired result of discontinuance and the town should work with abutters to be sure that such an easement for the right to travel is in place for landowners abutting the road before discontinuance. As an alternative, the town may want to consider the creation of a statutory private way to provide this access. For more information about how this is done, see the discussion below.

Other Consequences of Discontinuing a Road at Town Meeting

In addition to restricting the ability of land to be developed, towns are also released from responsibility to maintain the road once

it is discontinued, M.G.L. Ch. 84, Section 1. The town is also relieved from the legal liability for use of the road, M.G.L. Ch. 84, Section 15. These results can have significant financial benefits to a community. It should be noted, however, that there may be a slight adverse financial impact as well: there will be fewer road miles in town and thus less state and federal monies for road reconstruction and repairs.

Damages for Discontinuing a Town Road[4]

M.G.L. Chapter 82, Section 24, provides that "any person sustaining damage . . . by the discontinuance of a town way . . . shall be entitled to recover . . . under said chapter seventy-nine." However, in the late 19th century, case law established that there are no damages[5] to abutters of town roads which are discontinued unless they suffer damage unique to themself, and not to the rest of the public. For example, a landowner who owned undeveloped land on a road which was discontinued and converted to a railroad did not suffer compensatory damage. In this case, the landowner had access to the lots from another route and was suffering the same type of inconvenience as everyone else. Smith v. City of Boston, 61 Mass. 254 (1851). Similarly, in Willard v. City of Cambridge, 85 Mass. 574 (1862), the owner of a business which suffered because the city removed a drawbridge was not entitled to damages because "the damage . . . are not special or peculiar to him."

The first instance of damages awarded to an individual for the discontinuance of a town road occurred in October, 1990, in the town of Warwick. In this case, the landowners were awarded dam-

4. This discussion is applicable to the discontinuance of county highways and roads as well.
5. The same is true for county roads and highways.

ages by a jury because they had lost the ability to develop their land when the road was discontinued. This case is presently being appealed.

While no cases of payment of damages have been reported in the case law, the Warwick example demonstrates that there is the possibility of recovery if unique damages are established. This is an area in which legal counsel should work closely with the town and abutters.

Official Map

If your town has adopted an Official Map pursuant to M.G.L. Chapter 41, Section 81E - I, then planning board review of the proposed discontinuance is not required. In addition, if you have an Official Town Map, once discontinued, that action must be reflected on the official map. M.G.L. Chapter 41, Section 81H.

Misconceptions About Discontinuing Roads

A common misconception of road discontinuance is that the act of discontinuing a road conclusively establishes that it was a public road. This is not true. Witteveld v. City of Haverhill, 12 Mass. App. 877 (1981). "The discontinuance may have signified no more than an abundance of caution against the possibility that a public way did exist." Id.

Discontinuing Maintenance by Action of Board of Selectmen

M.G.L. Chapter 82, Section 32A, gives the Board of Selectmen the authority to discontinue maintenance of a town road. This is a relatively new law and has not yet been interpreted by the courts. Present belief and interpretation holds that discontinuing mainte-

nance pursuant to Section 32A results in a cessation of responsibility for maintenance and liability for damage for use of the road (if the road is adequately posted as not maintained), but the road remains a public way with a public right of passage, and with the potential for approval not required development.

Unlike town meeting action under Section 21, town roads can only be discontinued under Section 32A if the Board of Selectmen finds that the road in question has become "abandoned and unused for ordinary travel and that the common convenience and necessity no longer requires said town way . . . to be maintained in a condition reasonably safe and convenient for travel . . .." In other words, the Selectmen act as judges in determining that the road is not generally used and that there is no reason to continue to maintain it. This is a hard standard to meet.

"Abandon" as used here can cause confusion since the law does not define it. In addition, "abandon" is often confused with "discontinue." In this section, abandon does not mean that the town has taken a legal position on the status of the road, nor that the town has evinced any particular policy concerning the road. It just means that it is not generally used (if at all) for travel.

In order for the Board of Selectmen to discontinue a town road under Section 32A, there are several important procedural requirements.

Procedural Requirements

- The Board of Selectmen call a public hearing to discuss the proposed discontinuance.

- Individual notice by registered mail, return receipt requested, is sent to all property owners abutting the affected road.

- Notice of the public hearing is published in a newspaper of general circulation in the town once in each of two successive weeks, the first publication not less than fourteen days before the hearing.

- The Planning Board is given notification of the proposed discontinuance and is given 45 days in which to comment on the proposal.

- After the public hearing and comment from the Planning Board (or 45 days after the Planning Board has been given the opportunity to comment), the Board of Selectmen determine that the road has become "abandoned and unused for ordinary travel and that the common convenience and necessity no longer requires said town way . . . to be maintained in a condition reasonably safe and convenient for travel . . .." A reminder, that this determination is made in an adjudicatory manner. It is not a subjective decision, but one made on the basis of the limited standard provided by the statute.

If the Selectmen make such a finding and vote to discontinue, the road must be clearly posted that it is no longer maintained and that travel is at the individual's risk. The road remains open to the public for travel, however.

Other Ways to Discontinue Town Roads

In addition to town meeting and action by the Board of Selectmen, town roads may be discontinued by: a) action of the County Commissioners upon petition of an aggrieved party, or b) relocation or alteration of the lay out of the road.

County Commissioners

County Commissioners have the authority to discontinue town roads. This is an avenue rarely pursued, and even more rarely successful. M.G.L. Chapter 82, Section 30, gives the Commissioners the authority to discontinue a town road upon the written petition of an individual "aggrieved by the refusal of a town to discontinue a town way . . .."

Section 31 provides that in such a case the county may assess the costs of the discontinuance procedure to the applicant, and that the same notice requirements apply as for a viewing or public hearing on the matter.[6]

Alteration or Relocation

When the lay out of a road is altered or relocated by town meeting action, the portion of the road which is no longer part of the official lay out automatically becomes discontinued; without separate action. M.G.L. Chapter 82, Section 21, Bowley v. Walker, 90 Mass (8 Allen) 21 (1864).

Statutory Private Ways

Unique to Massachusetts is the statutory private way, M.G.L. Ch. 82, Section 21. This odd creature is actually a public road, with a public right of passage, but no responsibility by the town for maintenance. Maintenance is provided by the abutters.

There are two mechanisms, however, for town maintenance of a statutory private way. M.G.L. Chapter 40, Sections 6D and 6N provide for a town ballot vote to allow the town to maintain the road, and also provide for a town meeting by-law setting up standards and requirements for maintaining statutory private ways town wide.

Statutory town ways are not considered to be public ways under the Subdivision Control Act. In Casagrande v. Town of Harvard, 387 N.E. 2d 571 (1979), the Massachusetts Supreme Judicial Court determined that statutory private ways are not public ways within the meaning of the Subdivision Control Act, and therefore cannot be used as frontage for Approval Not Required lots. Thus, it

6. For detail, see the discussion below about discontinuance of county highways or roads. The same standards and procedures for a county highway discontinuance apply to a petition to the county to discontinue a town road.

is unclear whether frontage on a statutory private way is adequate for frontage on public way requirements prescribed in local zoning and subdivision regulations. This would be a matter of local interpretation.

A statutory private way is laid out by the Board of Selectmen and then accepted at town meeting, as is any public road. It can be an important tool in those cases where Selectmen would like to cease maintenance on a town road, but cannot reach the decision under M.G.L. Chapter 82, Section 32A, that the road has been "abandoned and unused for ordinary travel and that the common convenience and necessity no longer requires said town way . . . to be maintained in a condition reasonably safe and convenient for travel . . .." In such an instance, town meeting could discontinue the road and then lay it out as a statutory private way; thereby relieving the town of the obligation of maintenance, but retaining public access.

This tool could also be used when it is not possible to ensure a right of passage for abutters when discontinuance by town meeting is being considered. By discontinuing the road at town meeting and the Board of Selectmen laying it out as a statutory private way and accepted at the same town meeting, it is possible to achieve the desired ends of release from responsibility for maintenance, for liability for use, and from the possibility of approval not required, or strip development of undeveloped land.

Town Roads Which May Not Be Discontinued

In two instances town roads may not be discontinued:

Roads Within 500 Yards of Another Town

A town may not discontinue a town road within 500 yards of an adjoining town without meeting certain requirements. M.G.L.

Chapter 82, Section 1. This rule only applies to discontinuance through the town meeting process, and does not apply to Section 32A votes to cease to maintain.

In order to discontinue a town road within 500 yards of an abutting town, the abutting town must give written approval of the discontinuance. This would come from the Selectmen. In addition, a public hearing must be held on the proposed action, with written notice given to the abutting town's Selectmen and published in a newspaper of general circulation in the abutting town.

If within 90 days of the public hearing the abutting town does not concur with the proposed discontinuance the initiating town may make a written request to the Commissioner of the state Department of Public Works requesting approval of the proposed discontinuance. If the Commissioner approves of the proposal, the discontinuance may proceed without the approval of the abutting town.

Town Cemeteries

While the law is not clear on this point, it seems likely that towns may not discontinue town roads on which town cemeteries lie.

M.G.L. Chapter 114, Section 17 states that "a town shall not alienate or appropriate to any other use than that of a burial ground, any tract of land which has been for more than one hundred years used as a burial place . . .."[7] Discontinuing public access to a public cemetery could be construed as "alienating" the use of the burial ground.

In addition, the doctrine of implied public dedication suggests that ancient burial grounds have been dedicated to the perpetual use by

7. This includes known or suspected burial grounds of one or more American Indians. M.G.L. Chapter 114, Section 17.

the general public. In this case, it would be a violation of public dedication to cut off public access to the site.

While neither of these legal points clearly establish that towns may not discontinue a town road which has a town owned cemetery, a cautious approach would require careful consideration before taking such an action. Proceeding under Section 32A would certainly be preferable to a town meeting discontinuance in this instance.

DISCONTINUING COUNTY ROADS

Only the County Commissioners can discontinue county roads. This means that towns MAY NOT discontinue county roads, nor may they vote to cease to maintain such roads. M.G.L. Chapter 84, Sections 1 and 7. In addition, because towns are responsible for the maintenance of county ways, they are also liable for harm to travelers from failure to maintain.

How to Discontinue a County Highway or Road

Authority

A county highway can only be discontinued by the county. Towns **may not** discontinue county roads. M.G.L. Chapter 82, Section 17, and Coombs v. Board of Selectmen, 26 Mass. App. 379 (1988), nor do they have the authority to cease to maintain them. In practice, however, towns often cease maintaining county roads and over time the roads stop being used.

Although the County Commissioners are the only entity having the authority to discontinue county roads, M.G.L. Chapter 82, Section 1, they cannot do so on their own motion. A written petition to the

MODEL TOWN MEETING WARRANT ARTICLE FOR ROAD DISCONTINUANCE

(Method Established Under M.G.L. Ch. 40, Sec. 15 and Ch. 82, Sec. 21)

C-11. Town Meeting Warrant Article

"To see if the Town will vote by two-thirds majority to discontinue the maintenance of and abandon the public's right of access to the town ways enumerated below and depicted in the accompanying map:

_____Road Name_____, (include descriptions);

_____Road Name_____, and

_____Road Name_____.

These roads have fallen into disrepair and no longer serve the public interest. (Since these roads were established as an easement on the land, the land under the ways reverts to the abutting landowners.)"

NOTE: The provision in the parenthesis ( ) applies only if it has been determined that the town road was only an easement. If the Town had acquired all the property rights with the road, a strip of public land would still remain between abutting landowners after the road was discontinued.

2. Public Hearing Notice

_____Town_____, Board of Selectmen
Notice of Public Hearing;

In accordance with the M.G.L. Ch. 82, Sec. 32A as amended by Ch. 136 of the Acts of 1983, the ____Town____, Board of Selectmen/City Council will hold a Public Hearing on DATE at TIME at PLACE to hear testimony to discontinue the maintenance of and abandon the public's right to access to town roads enumerated below and depicted in an accompanying map:

_____Road Name_____, (include descriptions);

_____Road Name_____, and

_____Road Name_____.

These roads have fallen into disrepair and no longer serve the public interest.

APPENDIX G

STREETSCAPE DESIGN

Source: Design Consortium, Ltd., "Williams Boulevard Corridor," 1985;
City of Boulder, Co., "Urban Design Plan," 1986

STREETSCAPE MASTER PLAN 4

Intent of the Plan

A Better Community Image

If we are all in agreement that Williams Boulevard is the "main street" of Kenner, then it is deserving of a special design treatment, which reflects the quality of life of the community itself. Many other communities have undertaken similar approaches and have realized positive socio-economic response. This response has resulted in more sales, higher usage, and an increased perception of the shopping opportunities on Kenner's greatest open air pedestrian mall.

New plantings will herald the seasons. Banners will announce special events and new business on Williams Boulevard. With pedestrian amenities, shoppers will be able to walk between businesses and not have to move and repark their automobiles for each purchase. Annual events in Rivertown, the City Hall Complex and Park, major shopping centers, and Lake Pontchartrain waterfront festivals will create year-round activities, which will bring new life to Williams Boulevard.

The streetscape Master Plan is composed of the following improvements:

Signs

To allow all business to compete equally on Williams Boulevard, while maintaining a positive community image, the overall height of signs is proposed at a maximum of ten (10) feet. The new location, next to the public right-of-way, allows the signs to maintain a positive community scale, enframed under the canopy of the proposed street tree plantings. These image signs, located adjacent to the roadway, would name the development and address only. A second identification sign would be located on the building itself, providing a logical hierarchy of information without damaging community image. The sign size would be in proportion to the building size and scale.

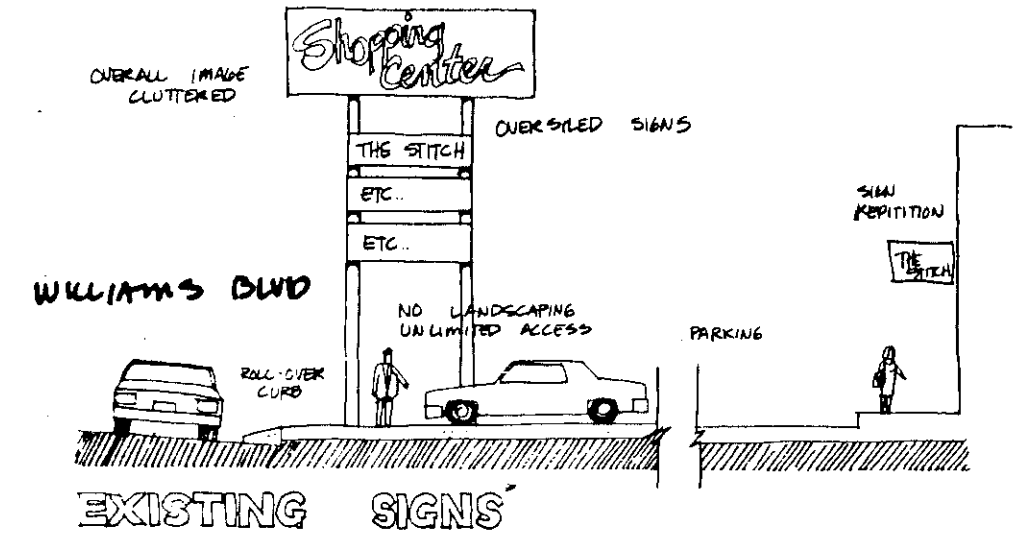
Limited Access

Vertical curbs are proposed along the property edge on Williams Boulevard. The removal of rollover curb, in preference to the vertical curb, would limit access to the business to one entrance and one exit driveway. The problem of cars pulling in and out of these establishments would be severely modified by limiting the access to one entrance and one exit.

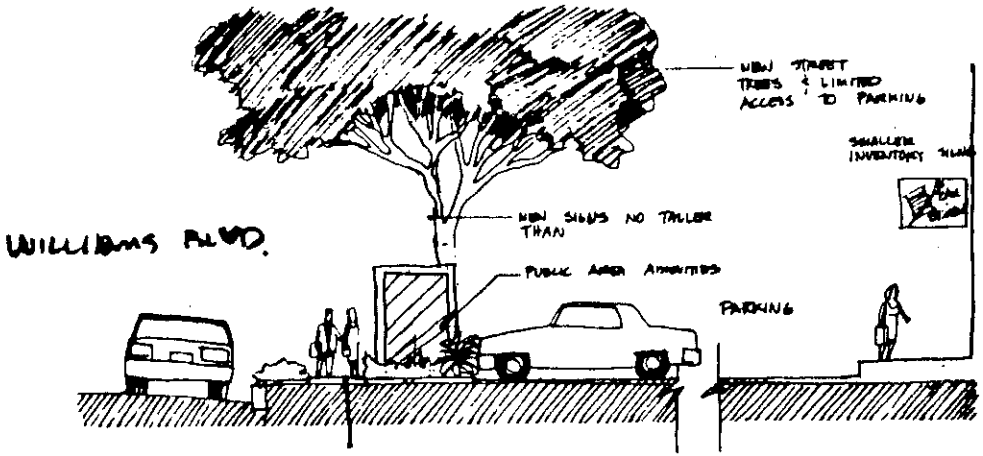
It is estimated that less than one percent of the properties along Williams Boulevard would have difficulty with the construction of vertical curbs, because of the effect on parking and circulation. We have identified those sites which are too small to accommodate vertical curbs and limited access. It is recommended that, by policy, these kinds of developments not occur on Williams Boulevard in the future. The size of the lot is too small to accommodate the tree-planting easement, the limited access and the vertical curbs. However, if these properties were excluded from the edge treatment, they would not seriously affect the visual success of the plan. As the acreage they occupy moves to the highest and best use in the future, demolition of existing structures would be logical, in order to assemble adequate acreage and properly realize new development. These new developments would fall under the Urban Corridor Design restrictions.

Landscaping

To create a "grande promenade" comparable to the Champs-Elysees, St. Charles Avenue and others, Williams Boulevard will be lined with Cherrybark Oak Trees. The tree will give a lush image to the corridor, and it will also provide fall color. Since this is a medium-rate growth tree, visual impact will probably take five to eight years. Although this might seem like a long time, the tree was chosen for its seasonal performance, indigenous nature, low subsidence, and rate of growth.



EXISTING SIGNS



PROPOSED TREATMENT

The median will be planted with Cabbage Palms. Aside from the trees' aesthetic value, they are hardy and evergreen.

Flowering shrubs will be required in order to screen parking areas and give emphasis and beauty to the businesses, making them more attractive and appealing to shoppers and visitors. None of the plant materials will interfere with driving sight lines nor critical vistas.

Utilities

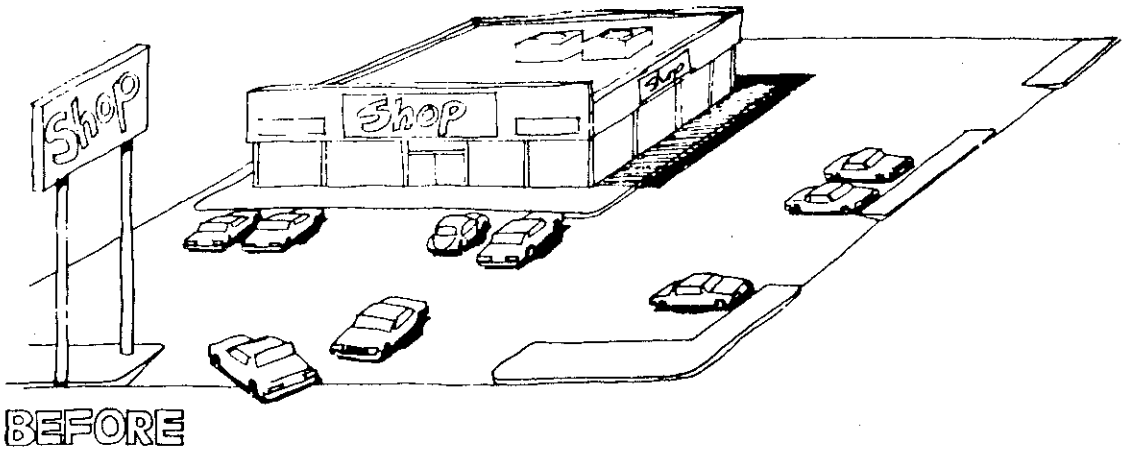
Due to costs, utilities will remain above ground. This makes the landscaping even more important. One is not readily aware of the fact that St. Charles Street in New Orleans has overhead utilities, as they are screened by the landmark size Oak Trees. Another asset is that the utility poles might be used for hanging banners, creating a special events atmosphere. This is delineated in the proposed street section.

Lighting

High pressure sodium lighting will prevail as street lighting. A major oportunity will exist to light up trees and signs in front of the developments, using metal halide or mercury vapor as emphasis. This, coupled with effective use of neon, will create eye-catching scenarios, while promoting a higher quality of development.

Street Furniture

This feature concerns all elements from traffic signals to bus shelters, including trash cans and hose bibbs used for watering the trees and plants, and painting them all in such a manner as to coordinate the colors with the landscape, in order to maintain the quality of the overall image of the Corridor. It is conceivable that a whole new "family" of directional signs and modular information systems will evolve from the traffic signalization study. This study recommends a unification of all materials, colors, and design of these components to provide a comprehensive and integrated city fabric, when the project is complete.



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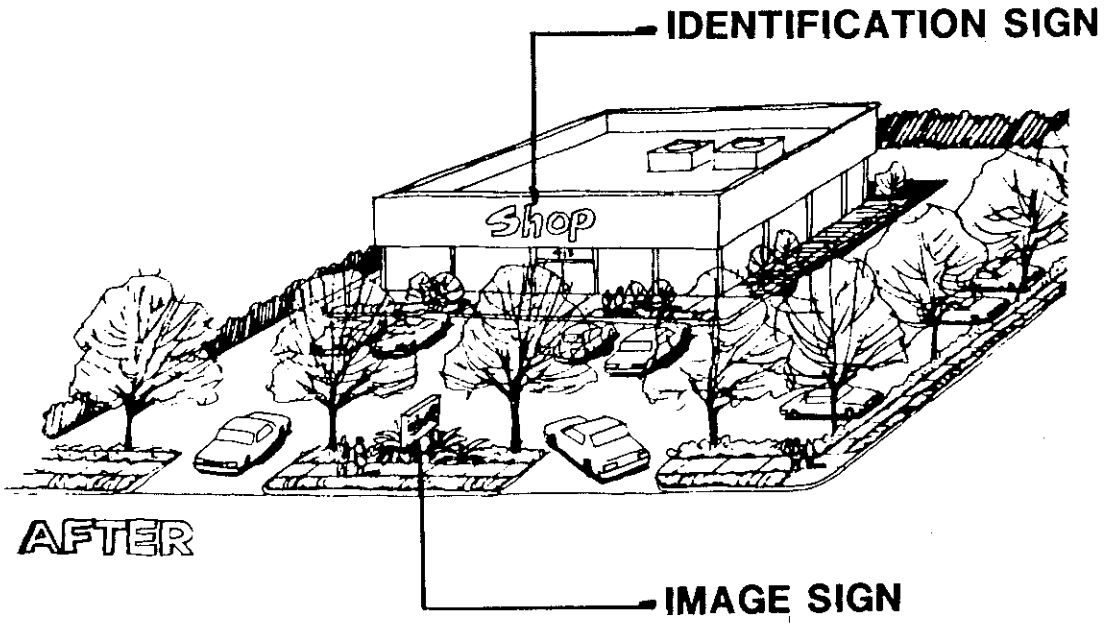

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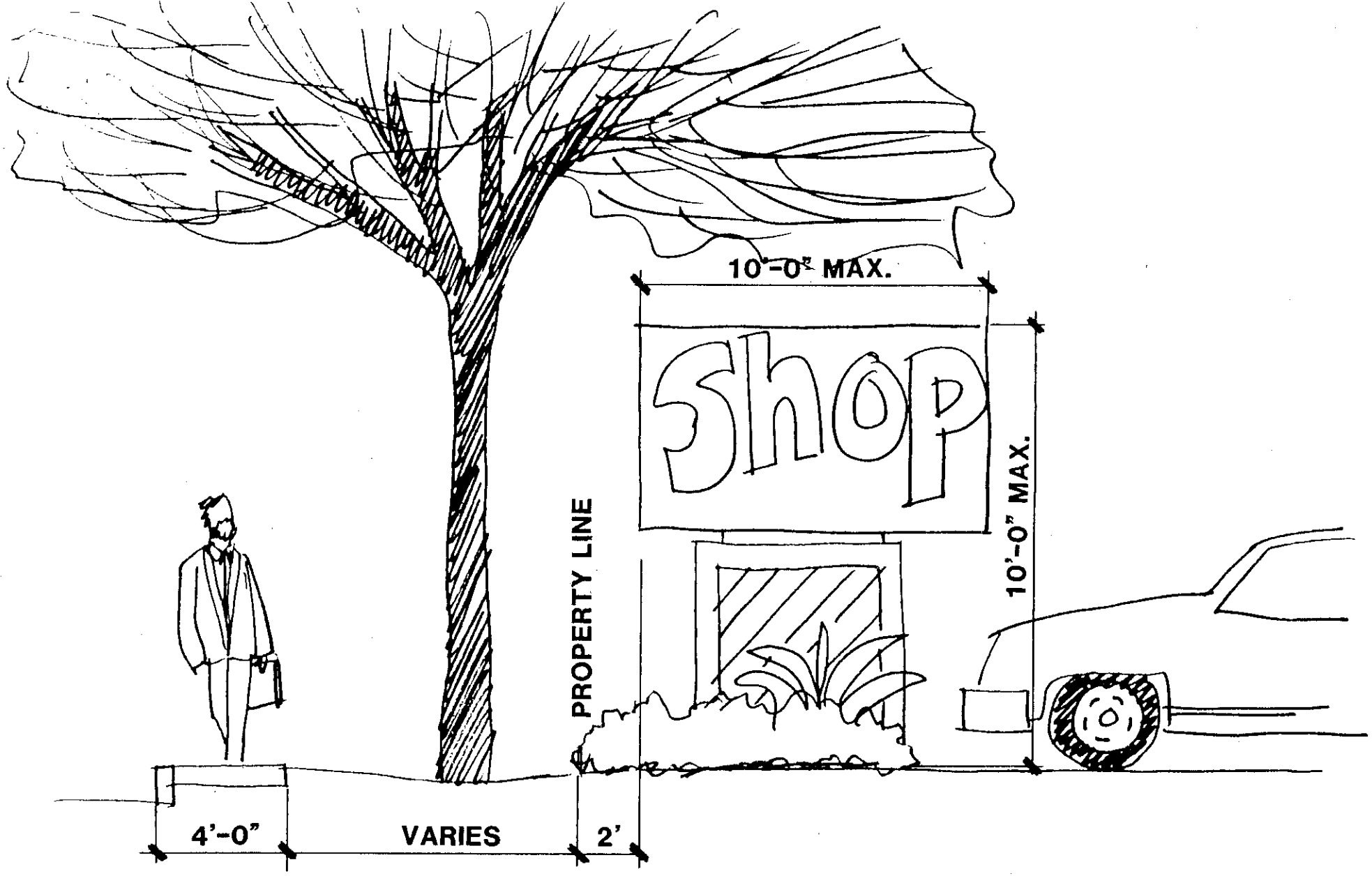


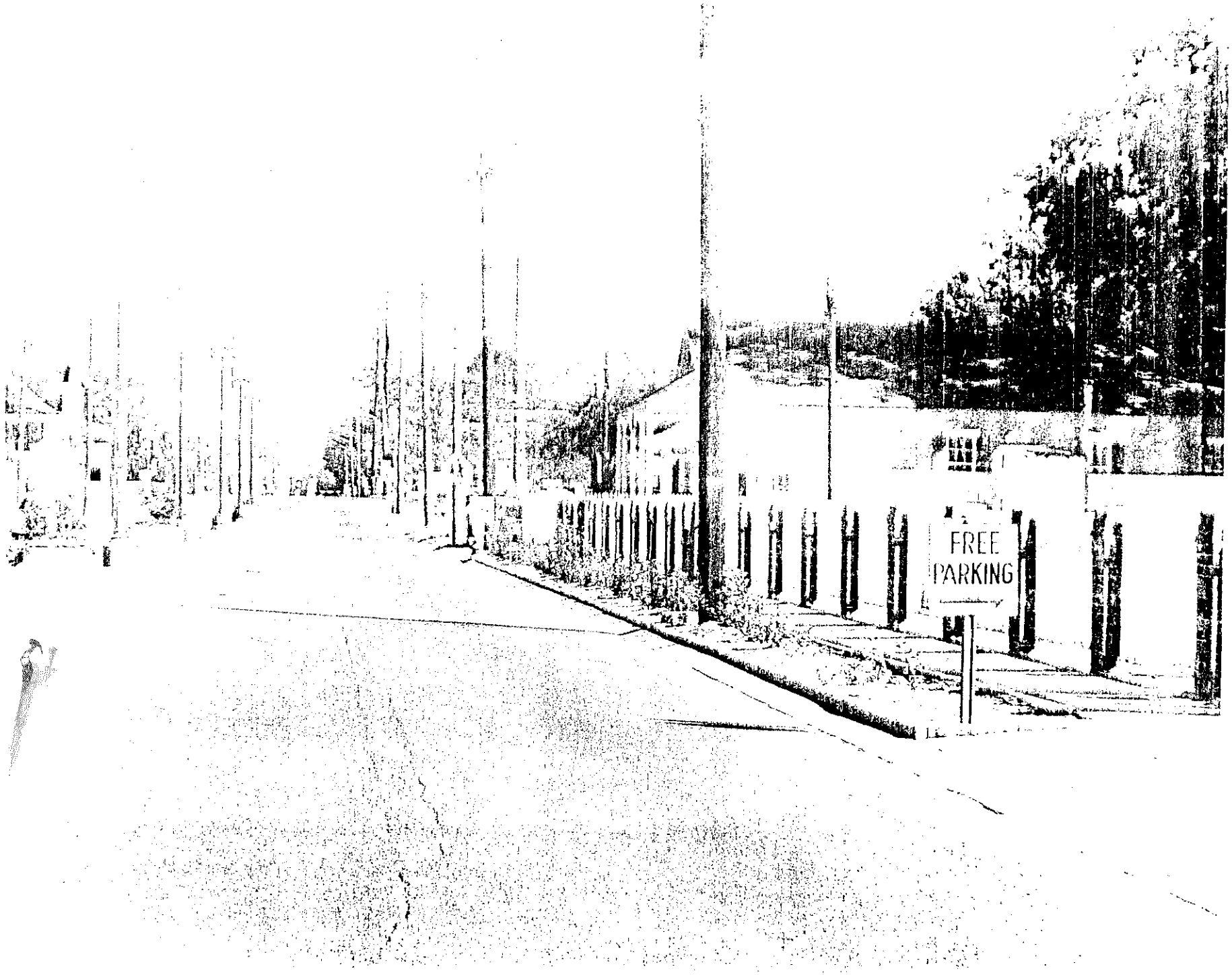
VILLIAMS BLVD.

Typical Right-of-Way Section

Typical Street Section

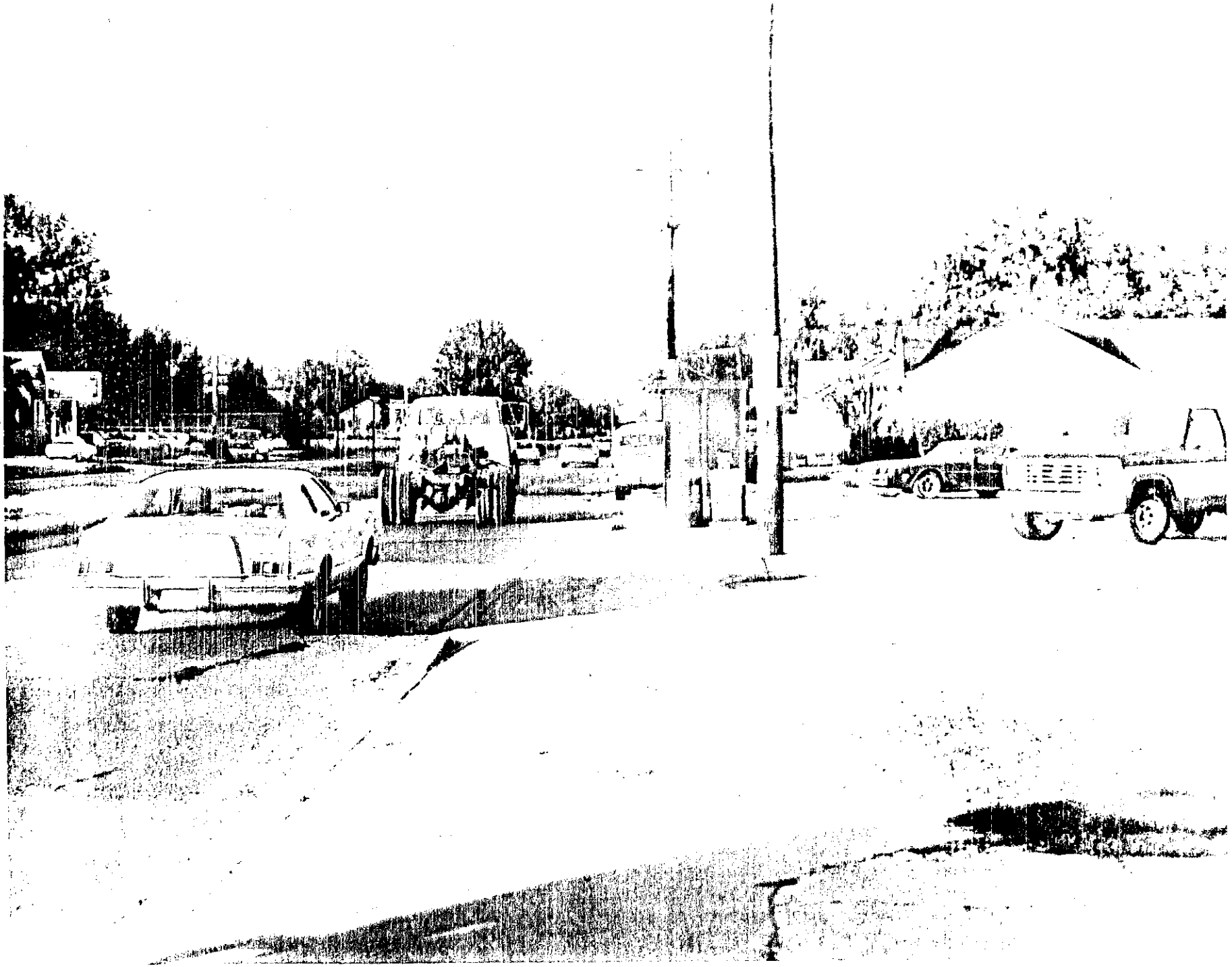
Application of the Principles

The following are "before and after" scenarios of three prototypical projects on Williams Boulevard. They attempt to show, in composite form, the end result achieved by application of the proposed streetscape master plan. Tree and planting signs, shown realistically, represent year ten of the development. The sketches show the exciting future image of Williams Boulevard with its shade-lined sidewalks, proportionately-scaled signs, and lush planting screening parking lots, giving special emphasis to each development.



Before Photograph

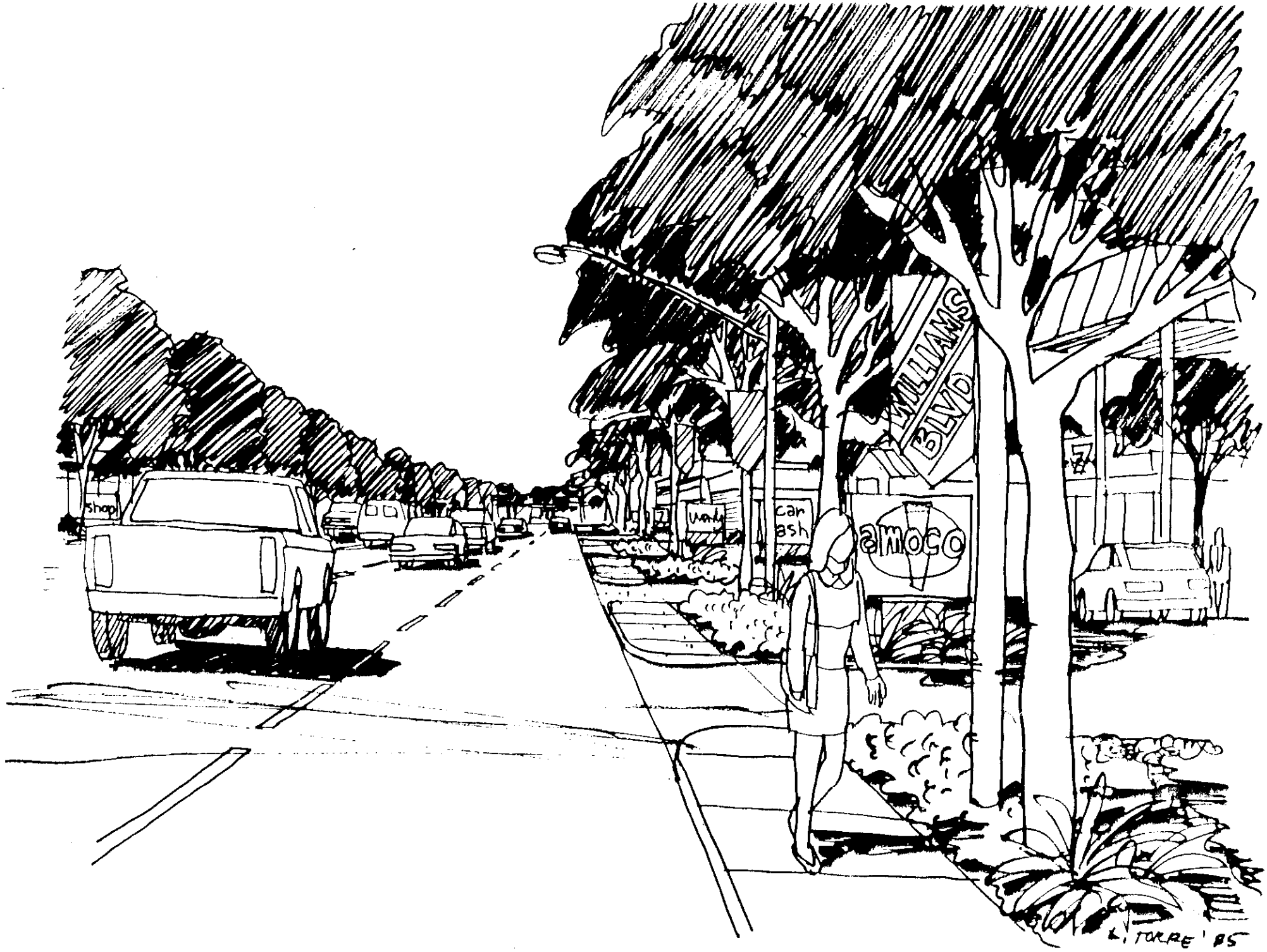
After Sketch



Before Photograph

After Sketch

Before Photograph


WILLIAMS BLVD
amoco
car wash
L. TORRE '85

Streetscape Plan: Streetscape Improvements

The objectives of the streetscape plan are to support the identity of downtown; to encourage visual continuity for the area; to encourage expanded pedestrian use; and to improve pedestrian safety. These are similar to the overall objectives of the design guidelines but focus on improvements to the public right-of-way.

The street network acts as the primary circulation path for a variety of users: motorists, bicyclists, pedestrians. Our view of the city and countryside is most often from vantage points along these corridors. Our image of the world and the sequence with which we move through space is determined by the pattern and character of the street system.

The Urban Design Plan proposes improvements to the downtown streetscape which will help the traveler arrive more easily at a particular destination, providing a continuous and distinctive image for downtown and its sub-areas. The emphasis is on pedestrian movement in the downtown.

STREET HIERARCHY

The concept of the street hierarchy system is based on an understanding of the different functions that each street has with regard to its image or purpose in the downtown. Canyon Boulevard and Broadway, as examples, are major vehicular routes through the downtown. As this is their primary function, any planned public improvements along either street should have, as the main objective, the smooth passage of large volumes of traffic. Pedestrian improvements along either street would then seek to buffer the pedestrian from the negative impacts of the traffic volume and to reduce pedestrian vehicular conflicts with a slight bias towards the automobile.

For planning and design purposes, varying degrees of priority should be given to pedestrian use depending on street functions. Four types of streets have been defined.

'A' Streets (exclusive pedestrian streets): The Pearl Street pedestrian mall is designated as an 'A' street in recognition of its role as exclusively for pedestrian use. It is to remain the most intensely used pedestrian zone. Its characteristics are:

— Vehicles prohibited (service or emergency vehicles excepted).

— Permanent change of use to public rights-of-way.

Streetscape Plan: Streetscape Improvements

— Pedestrian paving design throughout.

— Intense landscape treatment, including seasonally-varied plantings.

— Coordinated street furniture.

— Food concessions, street vendors permitted.

'B' Streets (pedestrian-oriented vehicular streets): 'B' streets are identified as major pedestrian corridors. The objective along these streets is to incorporate paving materials, landscaping, street furniture, and roadway improvements which enhance pedestrian movement and emphasize pedestrian scale. Land use regulations and architectural guidelines regarding first floor uses, bulk, scale and architectural details which affect pedestrian interest and movement will be enforced along these streets. Its characteristics are:

— Removal of pedestrian obstructions by consolidating elements such as newspaper vending boxes.

— Widening of sidewalks at intersections.

— Consolidation of signs.

— Special treatment of sidewalks and pedestrian crosswalks (e.g. brick sidewalks and crosswalks).

— Tree planting.

— Coordinated street furniture.

— Pedestrian scale street lighting.

— Adjacent land uses, such as restaurants, may be permitted to expand into the public right-of-way.

'C' Streets (pedestrian/vehicular streets): Secondary pedestrian corridors are those streets where there is expected to be less pedestrian traffic and which serve an important role as inter-area vehicular circulation routes (e.g. mall traffic loop). The objective along these streets is to improve mobility and render existing pedestrian space more pleasant and efficient with minimal capital cost. Its characteristics are:

— Special treatment of pedestrian crossings such as brick crosswalks.

— Special treatment at building entries such as bricked entry alcoves.

— Tree planting.

— Street lighting.

'D' Streets (Vehicular priority streets): The primary objective along these streets is safe efficient movement of large volumes of vehicular traffic. Design features along these streets will seek to buffer the pedestrian from the negative impacts of the traffic volume. This includes greater building setbacks, detached sidewalks with planting strips between the sidewalk and curb, and extensive landscaping. Its characteristics are:

Streetscape Plan: Streetscape Improvements

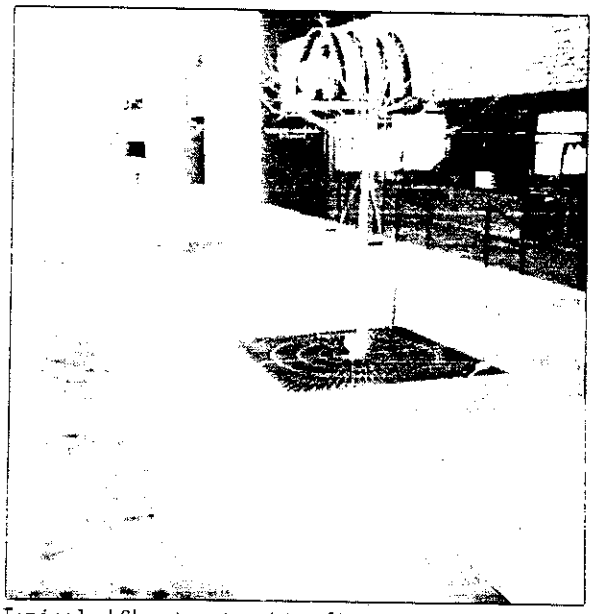
— Consolidation of traffic signs.

— Landscaping/tree planting where significant setbacks are required.

— Removal of vehicular obstructions.

Pedestrian improvements along either 'D' street, Canyon Boulevard or Broadway, would then seek to buffer the pedestrian from the negative impacts of the traffic volume and to reduce pedestrian-vehicular conflicts with a slight bias towards the automobile.

Many improvements to the public right-of-way have already been carried out by private property owners. These improvements consist primarily of using brick or other sidewalk paving materials and street trees. In these instances, the existing improvements should be retained and missing elements such as lighting and street furniture should be added.

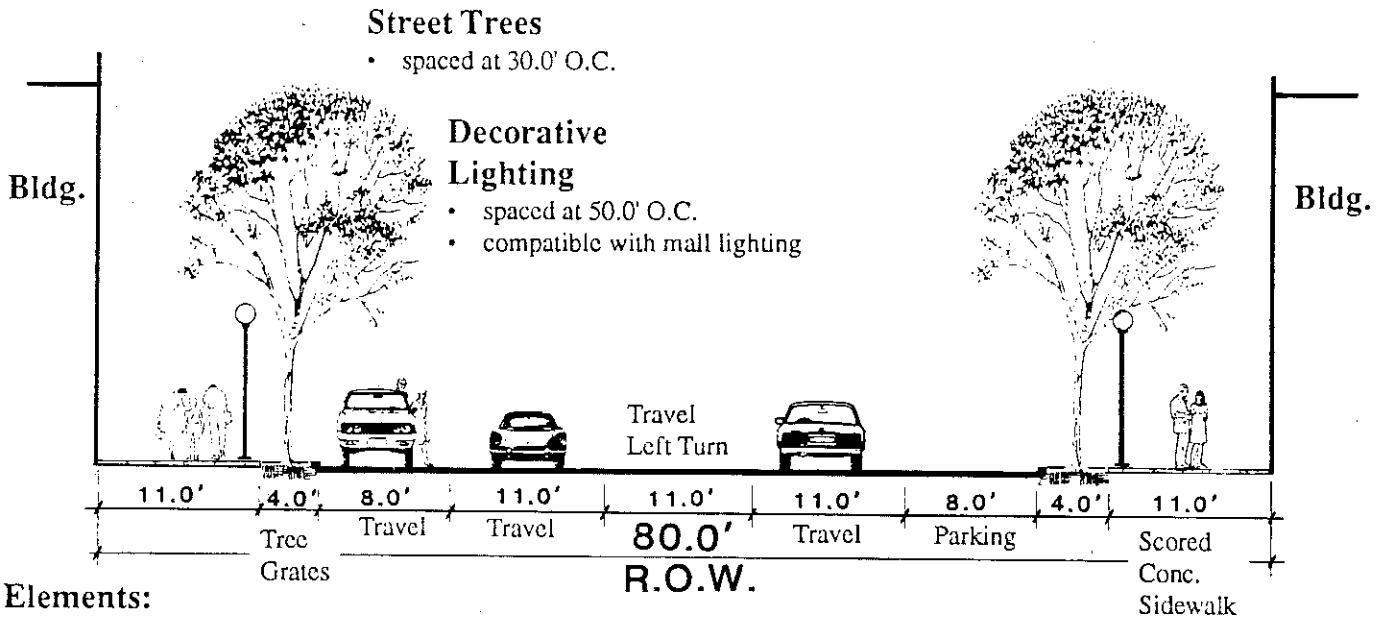


Typical 'C' street sidewalk paving and street planting.

Alternate paving pattern appropriate for 'C' street.

Streetscape Plan: Street Hierarchy

"C" Street, Walnut
Typical Section
Typical Plan

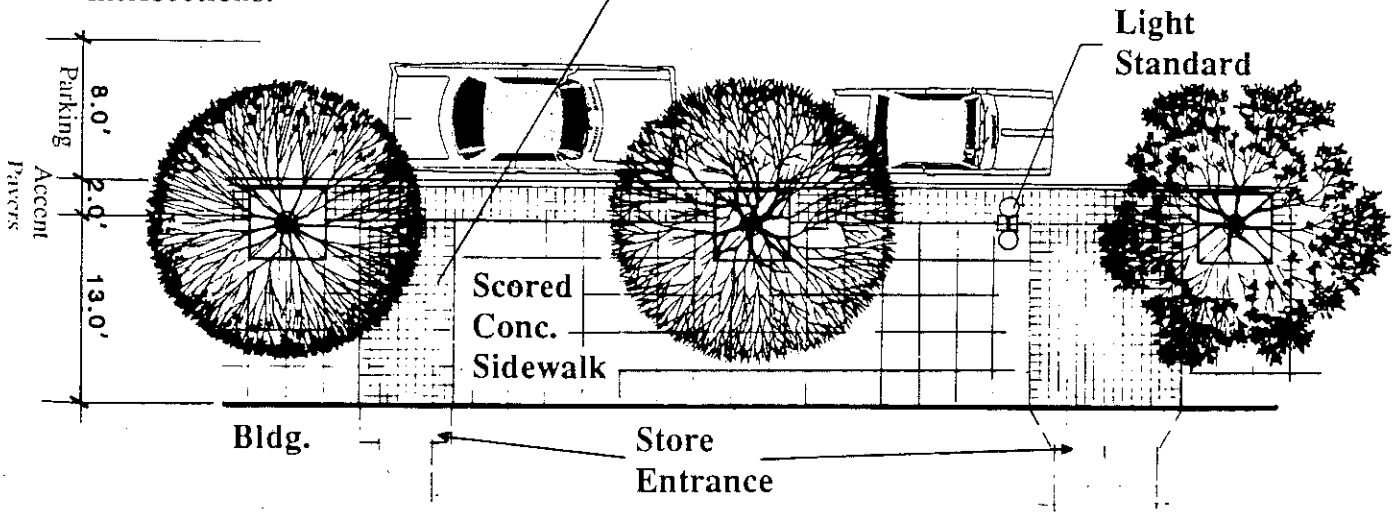


Elements:

Scored concrete sidewalk with 2.0' wide brick band along curb edge, tree grates with street trees 30.0'0.c., decorative street lighting 70.0' o.c., metal halide light source, high scale/ high pressure sodium lights at intersections.

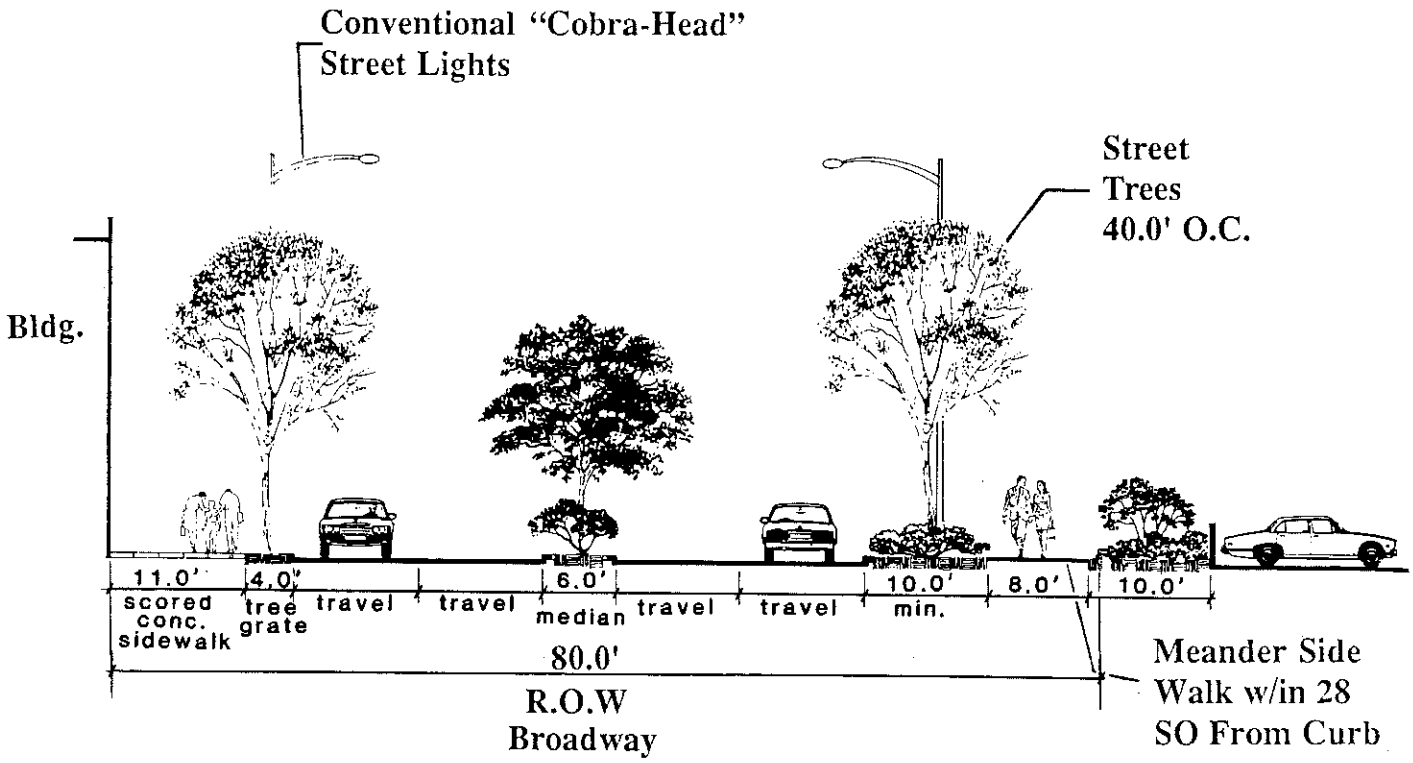
Note:

Encourage variation in conc. sidewalk to enhance bldg. entrances.



Streetscape Plan: Street Hierarchy

"D" Street, Broadway
Typical Section



Conditions Where Bldg.
Close To Street (Broadway)

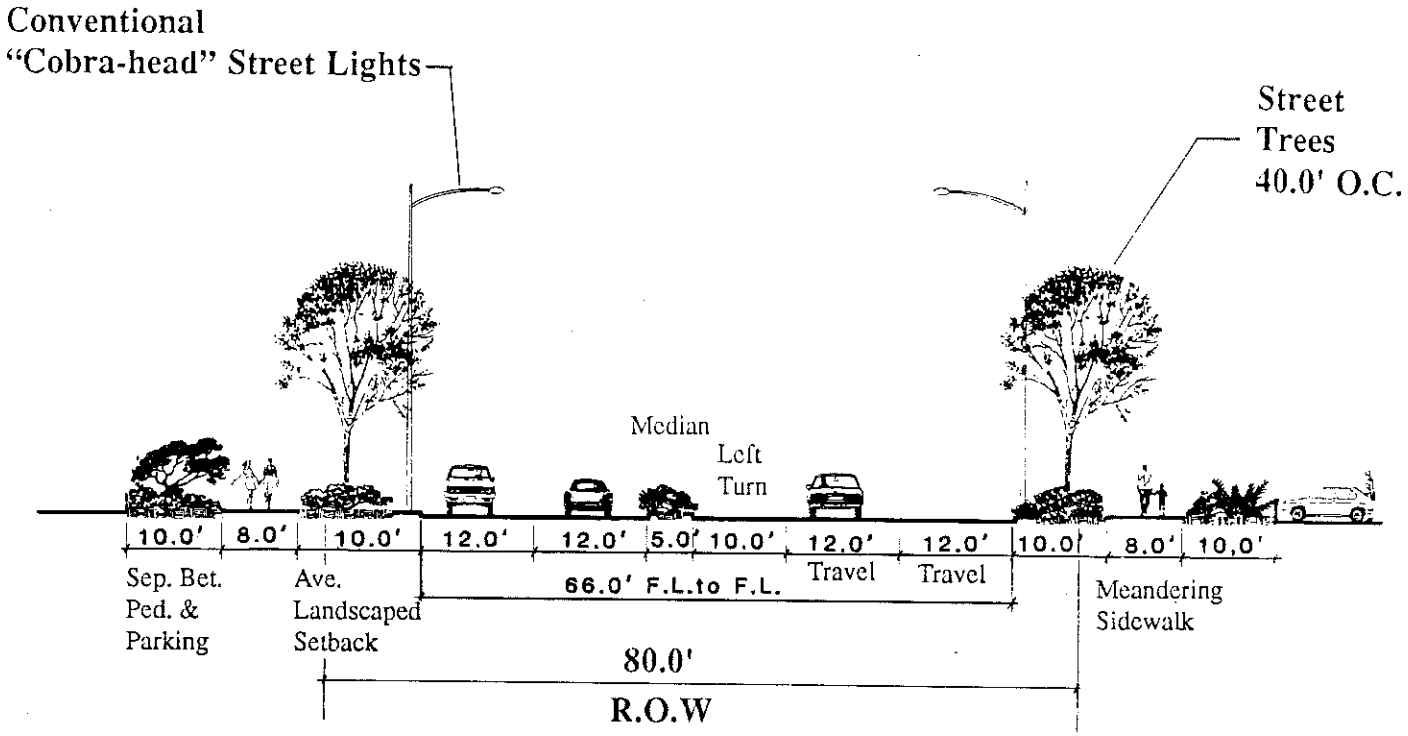
• Decorative light standards appropriate mid block between Walnut and Spruce on Broadway

Condition Where Bldgs.
Set Back From Street

Landscaped median potential on Broadway at Walnut, Spruce and Pearl where left-turns are not possible ornamental trees & shrubs

Streetscape Plan: Street Hierarchy

"D" Street, Canyon
Typical Section



Elements:

Street trees at 40.0' O.C., "cobra head" type street lights, intensively landscaped separations between pedestrian and vehicle.

Note: Landscaped medians can only occur where no left turns are allowed (ie: Canyon blvd. between 13th and 14th streets

APPENDIX H

PROPOSED BUSINESS PARK DISTRICT IN NORTHAMPTON

PROPOSED NORTHAMPTON BUSINESS PARK ZONING

Based on proposed business park district prepared by the Office of Planning and Development

BUSINESS PARK

PROPOSED ZONING

Section 3.1 - Division into Districts.
[revise by adding a new district]

Business Park	BP	Industrial "I" District

Section 3.4 - Zoning Map

That the following described land located generally off the westerly side of Easthampton Road (Route 10), and more particularly described below, be rezoned from the Suburban Residence (SR) District to the Business Park (BP) District:

- all of Parcels 49 and 50, Assessors/Zoning Map 37.
- all of Parcels 29, 30, and 31, Assessors/Zoning Map 44.

Section 5.2 Table of Use Regulations.
[revise to add a new column of industrial uses:]

BP

[the same designations of uses shall apply to BP as currently apply to SR (A, PC, SP, PB,--)]

[revise to add a new row under WHOLESALE, TRANSPORTATION AND INDUSTRIAL USES:]

Planned Business Park

[in all columns except for BP, this use is not allowed "--", in the BP column, Business Park shall be allowed by a special permit from the Planning Board, PB]

Section 6.2 Table of Dimensional and Density Regulations.

[add a new row below SI:]

BP

For Planned Business Park uses:

see Article XVII, Business Park District

For all other uses:

Minimum Lot Area:	30,000
Minimum Lot Frontage/Width:	125
Minimum Lot Depth:	160
Minimum Setbacks:	
Frontyard:	30
Sideyard:	20
Rearyard:	40
Maximum Height	35
Maximum Building Coverage	20
Maximum FAR:	none
Minimum Open Space	70

Section 6.5 - Screening and Buffers - Industrial or Business Districts.

Screening and buffers shall be required on any lot in any industrial or business district where it adjoins a lot in a residential district and shall be required for any lot in the BP district to screen the use from abutting collector streets as follows:

Section 7.5 - Signs Permitted in any "I" District.

[revise 7.5 (1)(a) In all GI... to read in all GI and BP]

[add new section:]

(c) For GI and BP Districts where a number of individually owned parcels are developed as a single collective entity (I.E. an Industrial or Business Park) the Planning Board may grant a Special Permit permitting one additional ground sign identifying the collective entity and/or the individual business located therein. Said sign must conform to all of the requirements for ground signs contained in section (b) above.

Section 8.1 - Off Street Parking Requirements.

[revise the last paragraph before the Table of Off-Street Parking Regulations to read:]

Parking shall be provided to serve the parking needs which are generated by a particular use or structure. When there is more than one primary use of a structure, the parking requirements for each use must be met unless one use is incidental to the principal use of structure.

Section 8.2 - Off Street Loading and Unloading Requirements.

Add the following to Table of Off-Street Loading Regulations:

Business services and offices

Section 10.11 - Site Plan Review/Approval Process.

[add the following to the end of Paragraph 2 (major projects):]

- Planned Business Park projects

ARTICLE XVII

BUSINESS PARK DISTRICT

Section 17.1 - Purpose: To encourage economic development, provide an area for light industrial uses, research facilities, and large scale business offices, and encourage planned and integrated land uses which minimize impacts on public services and natural resources and which links housing needs to housing production.

Section 17.2 - Planned Business Park: In addition to the uses allowed in S5.2, the Table of Use Regulations, the Planning Board may grant a Special Permit for a Planned Business Park (PBP) for the following uses, within the allowed percent of each use listed below:

1. All residential uses listed in the Table of Use Regulations except one-family dwellings and cemeteries. A minimum of ten (10) percent and no more than twenty (20) percent of gross floor space shall be residential uses.

2. All community facilities listed in the Table of Use Regulations except power plants, and municipal parking lots or structures. No more than ten (10) percent of gross floor area shall be community facilities.

3. The following retail and commercial uses, but no more than four (4) percent of gross floor space shall be retail or commercial uses:

    a. Retail establishment selling principally convenience goods including, but not limited to: food, drugs, and proprietary goods with a maximum of 10,000 sq. foot/floor area for any single establishment.

    b. Eating and drinking places where consumption is primarily intended to be within the building.

    c. Establishments selling foods prepared on premises where consumption is primarly off the premises and where consumption of food in motor vehicles on the premises is not permitted nor encouraged.

4. The following service and office uses:

    a. Tradesman, not involved with retail sales on the premises.

    b. Business offices and services, including large scale offices but excluding professional offices, such as medical or legal offices, and any offices where the primary function is to provide services to retail customers or individuals.

5. The following wholesale and industrial uses:

    a. Manufacturing and light manufacturing.

    b. Research offices or establishments for research and development activities.

Section 17.3 - Planned Business Park Requirements: The following conditions must be met for any Planned Business Park Special Permit, in addition to S10.10 criteria for Special Permit approval:

1. All uses must use municipal water and municipal sanitary sewage systems, built in accordance with the standard specifications of the Department of Public Works.

2. Planned Business Parks must be a minimum of 75 contiguous acres in size. All Special Permit Applications, plans, Special Permits, and sequencing plans must be for the Business Parkin its entirely.

3. At least fity (50) percent of the total tract area (of which at least fifty (50) percent shall not be wetlands), excluding screening and buffers required under S6.5 and detention ponds and and structures which require on-going maintenance and shall be set aside as open-space common land. Common land must be easily accessible from the developed areas of the park and must have suitable access to a street.

   Said open-space common land can include land adjacent to the area zoned Business Park if the Planning Board finds that the additional land is valuable for open space and conservation purposes and is accessible to the public and the business park tenants. If land outside of the BP zone is included, the total tract area for the purposes of calculating required open space shall include the Planned Business Park and the additional open space land.

   Common land shall be restricted to open space, conservation, and recreational uses such as tot-lots, playground, playfield, golf course, park land or conservation. The deed for the common land must contain such conservation restrictions or be transferred to a conservation agency/organization to insure that it will be maintained as common land in perpetuity.

4. Common land shall either be deeded to the City as park or conservation land at no cost (but only with the consent of the Conservation Commission or Recreation Commission and the City Council) or shall be conveyed to a tax-exempt conservation organization or to a legal entity established for the purpose of owning and maintaining such common land, such organization shall be created by covenants running with the land. The plan for disposition and protection of the open space land shall be subject to approval by the Planning Board as part of their approval of the planned Business Park.

5. A Business Park may be developed in stages, in accordance with a sequencing plan approved by the Planning Board. Each stage of development must comply with all the Business Park requirement, except as provided for below.

6. Roads and utilities adequate to serve each stage of development, including the perrcent of residential development required, must be installed prior to the occupancy of any structure within that stage of development.

7. The applicant shall provide the City with a performance guarantee, subject to approval by the Planning Board, in the form of a.) Restrictive Covenant covenanting that before any lot is built on or conveyed all roads and utilities shall be built and approved by the Planning Board, or b.) performance bond, letter or credit, or cash escrow. In case of b.), the applicant shall complete all the required improvements at least nine (9) months prior to the expiration date of the financial performance guarantee so that the City will have time to draw upon said funds and complete the unfinished work.

8. Residential development may occur after other aspects of the Business Park are developed, but the approved plans must show where residential space can be developed economically and this land can not be used for any use other than residential development.

9. No more than one (1) curb cut per 25 acres is permitted onto any collector streets already exisiting when the Planned Business Park is proposed.

10. Site plans must be provided in accordance with S10.11, Site Plan Approval Process. None of the requirements for information on the site plan may be waived.

11. The applicant must demonstrate that the project will not overburden municipal/public facilities, including water, sewer, or traffic circulation, and must make such improvements as are needed to mitigate any impacts.

12. The applicant must demonstrate that the project will not create objectionable noise, odor, or emissions of any kind at the property boundary and all public ways.

13. The applicant must demonstrate that the project will not in the opinion of the Planning Board excessively degrade natural systems, including wetlands and wildife habitat and corridors.

14. The applicant must demonstrate that the project will not increase storm water peak flows during a one (1) or two (2), ten (10), and hundred (100) year Soil Conservation Service design storm and will not degrade water quality.

15. Parking Standards

    a. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of a structure.

16. Additional Landscaping Standards

    a. Not withstanding other screening and landscape requirements set forth elsewhere in this bylaw, all front and side yards shall be landscaped. Such landscaping shall include, but not necessarily be limited to, the planting of grass, ground cover, flowerbeds, shrubs, hedges, or trees. All landscaping shall be maintained in a healthy growing condition, neat and orderly in appearance, and free of refuse and debris. All plantings shall be arranged and maintained so as to not obscure the vision of traffic.

    b. Street frontages shall include shade trees and there shall be trees planted for every 30 feet of street frontage, using trees no less than 2.5 inch caliper at the time of installation. In the case of an uncleared site, existing vegetation can be preserved to achieve said objective.

    c. When a parking lot is located adjacent to a public right-of-way at least a 15-foot wide landscaped area between the right-of-way and the parking lot shall be provided. This areas shall be landscaped with one shade or ornamental tree planted provided per every forth (40) feet along the right-of-way.

d. For interior parking lot areas, at least two (2) percent of the gross area of the vehicular use area shall be landscaped areas shall be a minimum of nine (9) feet in width. One shade tree for every fifteen (15) parking spaces is required in parking lots of over 20 parking spaces.

e. Failure to maintain landscaping shall be grounds to revoke parking lot approval and the approval for the principal use which the parking lot serves.

17. Additional Loading and Unloading Requirements

Loading and unloading facilities shall not be be visible from the street frontage. In addition, such facilities shall be screened from public view from any side streets abutting the lot on whcih the building is located.

18. All Planned Business Park uses shall follow the Dimensional and Density Regulations below.

Section 17.4 - Business Park Dimensional and Density Regulations

USE	MIN LOT AREA	MIN LOT FTG/WD	MIN LOT DEPTH	SETBACK MIN FRONT*	SETBACK MIN SIDE	SETBACK MIN REAR*	MAX BLDG HEIGHT	% BLDG COVG.	FAR	% OPEN SPACE
Residential	10,000 + 1,000/unit**	75	80	20	15	20	40	60	.5	30
Community Facilities, Retail and Commercial Uses	10,000	100	100	20	15	20	40	60	1	15
Service, Office, Research, and Industrial Uses	50,000	100	100	20	15	20	50	60	1	15

* All buildings must be setback at least eighty (80) feet from collector streets which exist when a planned business park is proposed. This strip shall contain screening in accordance with §6.5, Screening and Buffers. Parking is not permitted in this eighty (80) foot setback nor in the minimum required frontyard setback in BP.

** Minimum lots areas of 7,500 square feet plus 750 square feet per unit are permitted for housing when a minimum of thirty-three (33) percent of the total units in the section of the development for which this bonus is requested are sold or rented and maintained at affordable prices for low and moderate income families, in accordance with the definitions in §11.10, Residential Incentive Development District.

1/3/90:0931K

APPENDIX I
TRAFFIC SIGNAL WARRANT WORKSHEETS

TRAFFIC SIGNAL WARRANTS

CALC. JSP DATE 11/30/90
CHK _____ DATE _____

DIST _____ CO _____ RTE _____ PM _____

Major St: Route 10 (EASTHAMPTON) Critical Approach Speed 45 mph

☒ 1 Lane ☐ 2 or More

Minor St: Florence Rd Critical Approach Speed 30 mph

☒ 1 Lane ☐ 2 or More EXISTING CONTROL: ☐ STOP ☐ YIELD

Critical speed of major street traffic ≥ 40 mph ..... ☒
In built up area of isolated community of <10,000 pop. ..... ☐ or

☒ RURAL (R)
☐ URBAN (U)

WARRANT 1 - Minimum Vehicular Volume

100% SATISFIED: ☒ Yes ☐ No
80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		7 AM	8 AM	12 NOON	2 PM	3 PM	4 PM	5 PM	6 PM BEGIN Hour
	U	U								
APPROACH LANES	1	2 or more								
Both Apprchs. Major Street	500 (400)	600 (480)	1024	1068	1119	1071	1313	1393	1414	1077
Highest Apprch. Minor Street*	150 (120)	200 (160)	252	217	215	229	292	285	289	216

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 2 - Interruption of Continuous Traffic

100% SATISFIED: ☒ Yes ☐ No
80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)									Hour
	U	U								
APPROACH LANES	1	2 or more								
Both Apprchs. Major Street	750 (600)	900 (720)	1024	1068	1119	1071	1313	1393	1414	1077
Highest Apprch. Minor Street*	75 (60)	100 (80)	252	217	215	229	292	285	289	216

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 3 - Minimum Pedestrian Volume

SATISFIED: ☐ Yes ☒ No

MINIMUM REQUIREMENTS								Hour
100 pedestrians or more (any four hours)								
190 pedestrians (any one hour)								

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED X WALK	FULFILLED
150 ≤ X ≥ 300	N/E _____ ft S/W _____ ft	☐ Yes ☐ No

WARRANT 4 - School Crossings

☐ Applicable ☒ Not Applicable

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 5 - Progressive Movement

SATISFIED ☐ Yes ☒ No

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	FULFILLED
> 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	☐ Yes ☒ No
On isolated one way street or street with one way traffic significance adjacent signals are so far apart that necessary platooning & speed control would be lost.		
On 2-way street where adjacent signals do not provide necessary platooning & speed control, proposed signals could constitute a progressive signal system.		☐ ☒

WARRANT 6 - Accident Experience

SATISFIED ☒ Yes ☐ No

REQUIREMENT	WARRANT	√	FULFILLED
ONE WARRANT SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume or	✓	
	WARRANT 2 - Interruption of Continuous Traffic or	✓	
	WARRANT 3 - Minimum Pedestrian Volume or		☒ Yes ☐ No
Accident within a 12 month period susceptible of corr. & involving injury or > $200 damage.			
MINIMUM REQUIREMENT	NUMBER OF ACCIDENTS		
5 or more*	1988 - 7 accidents		☒ Yes ☐ No

NOTE: Left turn accidents can be included when LT - phasing is proposed.

WARRANT 7 - Systems Warrant

SATISFIED ☒ Yes ☐ No

MIN. VOLUME REQ.	ENTERING VOLUMES - ALL APPROACHES	√	FULFILLED
1000 VEH/HR	During typical weekday peak hour _____ VEH/Hr	✓	
	During each of any 5 hours of a Saturday and/or Sunday _____ VEH/Hr		☒ Yes ☐ No

CHARACTERISTICS OF MAJOR ROUTES	MAJOR ST.	MINOR ST.	
Part of highway system serving as principle network for through traffic.	✓		
Connects areas of principle traffic generation.	✓	✓	
Rural or suburban highway outside of entering or traversing a city.	✓		
Appears as major route on an official plan.	✓		
Any major route characteristics met. Both streets.			☒ Yes ☐ No

WARRANT 7 - Combination of Warrants

(Used if no one warrant satisfied 100%)

SATISFIED ☒ Yes ☐ No

REQUIREMENT	WARRANT	√	FULFILLED
TWO WARRANTS SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume	✓	
	WARRANT 2 - Interruption of Continuous Traffic	✓	
	WARRANT 3 - Minimum Pedestrian Volume		☒ Yes ☐ No

The satisfaction of a warrant is not necessarily justification for signals. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 9 - Four Hour Volumes

SATISFIED: ☒ Yes ☐ No

Time Periods	2 PM	3 PM	4 PM	5 PM	Hours Total
Minor Street Volume (highest volume approach)	229	292	285	289	
Major Street Volume (total of both approaches)	1071	1313	1393	1414	

NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-7 or 4-8 of the M.U.T.C.D.

WARRANT 10 - Peak Hour Delay

100% SATISFIED: ☒ Yes ☐ No

80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		7 AM	5 PM	12 NOON OTHER	BEGIN Hour
	U	U				
APPROACH LANES	1	2 or more				
Minor Street (one direction only)	100 (80)	150 (120)	252	289	215	
TYPE OF INTERSECTION	4 OR MORE APPROACHES	3 APPROACHES				
Total Entering Volume	800 (640)	650 (520)	1276	1703	1334	

WARRANT 11 - Peak Hour Volume

SATISFIED: ☒ Yes ☐ No

Time Periods	7 AM	5 PM	12 NOON OTHER	HOUR
Minor Street Volume (highest volume approach)	252	289	215	
Major Street Volume (total of both approaches)	1024	1414	1119	

NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-5 or 4-6 of the M.U.T.C.D.

CONCLUSION

Number of Satisfied	8
Number of Not Satisfied	2
Number of Not Applicable	1
TOTAL	11

TRAFFIC SIGNAL WARRANTS

CALC. JSP DATE 11/20/10
CHK _____ DATE _____

DIST _____ CO _____ RTE _____ PM _____

Major St: Route 10 (Easthampton) Critical Approach Speed 45 mph

☒ 1 Lane ☐ 2 or More

Minor St: O Neil St Critical Approach Speed 30 mph

☒ 1 Lane ☐ 2 or More EXISTING CONTROL: ☒ STOP ☐ YIELD

Critical speed of major street traffic ≥ 40 mph ..... ☒
In built up area of isolated community of <10,000 pop. ..... ☐ or RURAL (R)

☐ URBAN (U)

WARRANT 1 - Minimum Vehicular Volume

100% SATISFIED: ☐ Yes ☒ No
80% SATISFIED: ☐ Yes ☒ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		7	/8	/1	/2	/3	/4	/5	/6 Begin Hour
	U	U								
APPROACH LANES	1	2 or more		✓	✓		✓	✓	✓	✓
Both Apprchs. Major Street	500 (400)	600 (480)	779	769	697	822	914	936	833	617
Highest Apprch. Minor Street*	150 (120)	200 (160)	102	125	139	97	122	141	162	133

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 2 - Interruption of Continuous Traffic

100% SATISFIED: ☐ Yes ☒ No
80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		7	/8	/1	/2	/3	/4	/5	/6 Hour
	U	U								
APPROACH LANES	1	2 or more	✓	✓		✓	✓	✓	✓	
Both Apprchs. Major Street	750 (600)	900 (720)	779	769	697	822	914	936	833	617
Highest Apprch. Minor Street*	75 (60)	100 (80)	102	125	139	97	122	141	162	133

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 3 - Minimum Pedestrian Volume

SATISFIED: ☐ Yes ☐ No

MINIMUM REQUIREMENTS	/	/	/	/	/	/	/	/ Hour
100 pedestrians or more (any four hours)								
190 pedestrians (any one hour)								

NA

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED X WALK	FULFILLED
150 ≤ X ≥ 300	N/E _____ ft S/W _____ ft	☐ Yes ☐ No

WARRANT 4 - School Crossings

☐ Applicable ☒ Not Applicable

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 5 - Progressive Movement

SATISFIED ☐ Yes ☒ No

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	FULFILLED
> 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	☐ Yes ☐ No
On isolated one way street or street with one way traffic significance adjacent signals are so far apart that necessary platooning & speed control would be lost.		
On 2-way street where adjacent signals do not provide necessary platooning & speed control, proposed signals could constitute a progressive signal system.		☐ ☐

WARRANT 6 - Accident Experience

SATISFIED ☐ Yes ☒ No

REQUIREMENT	WARRANT	√	FULFILLED
ONE WARRANT SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume or		
	WARRANT 2 - Interruption of Continuous Traffic or		
	WARRANT 3 - Minimum Pedestrian Volume or		☐ Yes ☐ No
Accident within a 12 month period susceptible of corr. & involving injury or > $200 damage.			
MINIMUM REQUIREMENT	NUMBER OF ACCIDENTS		
5 or more*			☐ Yes ☐ No

**NOTE: Left turn accidents can be included when LT - phasing is proposed.*

WARRANT 7 - Systems Warrant

SATISFIED ☐ Yes ☒ No

MIN. VOLUME REQ.	ENTERING VOLUMES - ALL APPROACHES	√	FULFILLED
1000 VEH/HR	During typical weekday peak hour _____ VEH/Hr	✓	
	During each of any 5 hours of a Saturday and/or Sunday _____ VEH/Hr		☒ Yes ☐ No

CHARACTERISTICS OF MAJOR ROUTES	MAJOR ST.	MINOR ST.
Part of highway system serving as principle network for through traffic.	✓	
Connects areas of principle traffic generation.	✓	
Rural or suburban highway outside of entering or traversing a city.	✓	
Appears as major route on an official plan.	✓	
Any major route characteristics met. Both streets.		☐ Yes ☒ No

WARRANT 7 - Combination of Warrants

SATISFIED ☐ Yes ☒ No

(Used if no one warrant satisfied 100%)

REQUIREMENT	WARRANT	√	FULFILLED
TWO WARRANTS SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume		
	WARRANT 2 - Interruption of Continuous Traffic	✓	
	WARRANT 3 - Minimum Pedestrian Volume		☐ Yes ☒ No

The satisfaction of a warrant is not necessarily justification for signals. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 9 - Four Hour Volumes

SATISFIED: ☒ Yes ☐ No

Time Periods	3-4 PM	4-5 PM	5-6 PM	1-2	Hours Total
Minor Street Volume (highest volume approach)	122	141	162	139	
Major Street Volume (total of both approaches)	914	936	833	697	

*NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-7 or 4-8 of the M.U.T.C.D.

WARRANT 10 - Peak Hour Delay

100% SATISFIED: ☐ Yes ☒ No

80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		8 AM	5 PM	1 PM OTHER	Hour
	U	U				
APPROACH LANES	1	2 or more				
Minor Street (one direction only)	100 (80)	150 (120)	125	162	139	
TYPE OF INTERSECTION	4 OR MORE APPROACHES	3 APPROACHES				
Total Entering Volume	800 (640)	650 (520)	894	995	836	

WARRANT 11 - Peak Hour Volume

SATISFIED: ☒ Yes ☐ No

Time Periods	8 AM	5 PM	1 PM OTHER	HOUR
Minor Street Volume (highest volume approach)	125	162	139	
Major Street Volume (total of both approaches)	769	533	697	

*NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-5 or 4-6 of the M.U.T.C.D.

CONCLUSION

Number of Satisfied	2
Number of Not Satisfied	7
Number of Not Applicable	2
TOTAL	11

TRAFFIC SIGNAL WARRANTS

CALC. JSP DATE 11/30/00
CHK _____ DATE _____

DIST _____ CO _____ RTE _____ PM _____

Major St: RTE 10 (NORTHAMPTON) Critical Approach Speed 45 mph

☒ 1 Lane ☐ 2 or More

Minor St: OLD SOUTH ST. Critical Approach Speed 30 mph

☐ 1 Lane ☒ 2 or More EXISTING CONTROL: ☒ STOP ☐ YIELD

Critical speed of major street traffic ≥ 40 mph ..... ☒
In built up area of isolated community of <10,000 pop. ..... ☐ or RURAL (R)

☐ URBAN (U)

WARRANT 1 - Minimum Vehicular Volume

100% SATISFIED: ☒ Yes ☐ No
80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		7 AM	8 AM	12 N	1 PM	2 PM	3 PM	4 PM	5 PM
	U	U								Hour BEGIN
APPROACH LANES	1	2 or more								
Both Apprchs. Major Street	500 (400)	600 (480)	1534	1455	1168	1066	1296	1368	1482	1464
Highest Apprch. Minor Street*	150 (120)	200 (160)	262	367	411	449	497	496	579	633

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 2 - Interruption of Continuous Traffic

100% SATISFIED: ☒ Yes ☐ No
80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)									
	U	U								Hour
APPROACH LANES	1	2 or more								
Both Apprchs. Major Street	750 (600)	900 (720)	1534	1455	1168	1066	1296	1368	1482	1464
Highest Apprch. Minor Street*	75 (60)	100 (80)	262	367	411	449	497	496	579	633

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 3 - Minimum Pedestrian Volume

SATISFIED: ☐ Yes ☐ No

MINIMUM REQUIREMENTS									
									Hour
100 pedestrians or more (any four hours)									
190 pedestrians (any one hour)									

NA

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED X WALK	FULFILLED
150 ≤ X ≥ 300	N/E _____ ft S/W _____ ft	☐ Yes ☐ No

WARRANT 4 - School Crossings

☐ Applicable ☒ Not Applicable

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 5 - Progressive Movement

SATISFIED ☐ Yes ☒ No

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	FULFILLED
> 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	☐ Yes ☐ No
On isolated one way street or street with one way traffic significance adjacent signals are so far apart that necessary platooning & speed control would be lost.		
On 2-way street where adjacent signals do not provide necessary platooning & speed control, proposed signals could constitute a progressive signal system.		☐ ☐

WARRANT 6 - Accident Experience

SATISFIED ☒ Yes ☐ No

REQUIREMENT	WARRANT	√	FULFILLED
ONE WARRANT SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume or	✓	
	WARRANT 2 - Interruption of Continuous Traffic or	✓	
	WARRANT 3 - Minimum Pedestrian Volume or		☒ Yes ☐ No
Accident within a 12 month period susceptible of corr. & involving injury or > $200 damage.			
MINIMUM REQUIREMENT	NUMBER OF ACCIDENTS		
5 or more*	1987 - 5 1988 - 12		☒ Yes ☐ No

NOTE: Left turn accidents can be included when LT - phasing is proposed.

WARRANT 7 - Systems Warrant

SATISFIED ☒ Yes ☐ No

MIN. VOLUME REQ.	ENTERING VOLUMES - ALL APPROACHES	√	FULFILLED
1000 VEH/HR	During typical weekday peak hour _____ VEH/Hr	✓	
	During each of any 5 hours of a Saturday and/or Sunday _____ VEH/Hr		☒ Yes ☐ No

CHARACTERISTICS OF MAJOR ROUTES	MAJOR ST.	MINOR ST.
Part of highway system serving as principle network for through traffic.	✓	✓
Connects areas of principle traffic generation.	✓	
Rural or suburban highway outside of entering or traversing a city.	✓	✓
Appears as major route on an official plan.	✓	✓
Any major route characteristics met. Both streets.		☒ Yes ☐ No

WARRANT 7 - Combination of Warrants

(Used if no one warrant satisfied 100%)

SATISFIED ☒ Yes ☐ No

REQUIREMENT	WARRANT	√	FULFILLED
TWO WARRANTS SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume	✓	
	WARRANT 2 - Interruption of Continuous Traffic	✓	
	WARRANT 3 - Minimum Pedestrian Volume		☒ Yes ☐ No

The satisfaction of a warrant is not necessarily justification for signals. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 9 - Four Hour Volumes

SATISFIED: ☒ Yes ☐ No

Time Periods	2-3	3-4	4-5	5-6	Hours Total
Minor Street Volume (highest volume approach)	497	496	579	633	
Major Street Volume (total of both approaches)	1296	1368	1482	1464	

'NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-7 or 4-8 of the M.U.T.C.D.

WARRANT 10 - Peak Hour Delay

100% SATISFIED: ☒ Yes ☐ No

80% SATISFIED: ☒ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		8 AM	5 PM	12 N OTHER	Hour
	U	U				
APPROACH LANES	1	2 or more				
Minor Street (one direction only)	100 (80)	150 (120)	367	633	411	
TYPE OF INTERSECTION	4 OR MORE APPROACHES	3 APPROACHES				
Total Entering Volume	800 (640)	650 (520)	1822	2097	1579	

WARRANT 11 - Peak Hour Volume

SATISFIED: ☒ Yes ☐ No

Time Periods	8 AM	5 PM	12 N OTHER	HOUR
Minor Street Volume (highest volume approach)	367	633	411	
Major Street Volume (total of both approaches)	1455	1464	1168	

'NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-5 or 4-6 of the M.U.T.C.D.

CONCLUSION

Number of Satisfied	8
Number of Not Satisfied	1
Number of Not Applicable	2
TOTAL	11

TRAFFIC SIGNAL WARRANTS

CALC. JSP DATE 1/3/[illegible]
CHK _____ DATE _____

DIST _____ CO _____ RTE _____ PM _____

Major St: Route 10 (EASTHAMPTON) Critical Approach Speed 35 mph

☒ 1 Lane ☐ 2 or More

Minor St: WEST ST. Critical Approach Speed 30 mph

☒ 1 Lane ☐ 2 or More EXISTING CONTROL: ☒ STOP ☐ YIELD

Critical speed of major street traffic ≥ 40 mph ..... ☐
In built up area of isolated community of <10,000 pop. ..... ☐ or RURAL (R)

☐ URBAN (U)

WARRANT 1 - Minimum Vehicular Volume

100% SATISFIED: ☐ Yes ☐ No
80% SATISFIED: ☐ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		Hour							
	U	U								
APPROACH LANES	1	2 or more								
Both Apprchs. Major Street	500 (400)	600 (480)								
Highest Apprch. Minor Street*	150 (120)	200 (160)								

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 2 - Interruption of Continuous Traffic

100% SATISFIED: ☐ Yes ☐ No
80% SATISFIED: ☐ Yes ☐ No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		Hour							
	U	U								
APPROACH LANES	1	2 or more								
Both Apprchs. Major Street	750 (600)	900 (720)								
Highest Apprch. Minor Street*	75 (60)	100 (80)								

*NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed. ☐

WARRANT 3 - Minimum Pedestrian Volume

SATISFIED: ☐ Yes ☐ No

MINIMUM REQUIREMENTS	Hour							
100 pedestrians or more (any four hours)								
190 pedestrians (any one hour)								

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED X WALK	FULFILLED
150 ≤ X ≥ 300	N/E _____ ft S/W _____ ft	☐ Yes ☐ No

WARRANT 4 - School Crossings

☐ Applicable ☒ Not Applicable

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 5 - Progressive Movement

SATISFIED ☐ Yes ☐ No

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	FULFILLED
> 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	☐ Yes ☐ No
On isolated one way street or street with one way traffic significance adjacent signals are so far apart that necessary platooning & speed control would be lost.		
On 2-way street where adjacent signals do not provide necessary platooning & speed control, proposed signals could constitute a progressive signal system.		☐ ☐

WARRANT 6 - Accident Experience

SATISFIED ☒ Yes ☐ No

REQUIREMENT	WARRANT	√	FULFILLED
ONE WARRANT SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume or		
	WARRANT 2 - Interruption of Continuous Traffic or		
	WARRANT 3 - Minimum Pedestrian Volume or		☐ Yes ☐ No
Accident within a 12 month period susceptible of corr. & involving injury or > $200 damage.			
MINIMUM REQUIREMENT	NUMBER OF ACCIDENTS		
5 or more*			☒ Yes ☐ No

NOTE: Left turn accidents can be included when LT - phasing is proposed.

WARRANT 7 - Systems Warrant

SATISFIED ☒ Yes ☐ No

MIN. VOLUME REQ.	ENTERING VOLUMES - ALL APPROACHES	√	FULFILLED
1000 VEH/HR	During typical weekday peak hour 1234 VEH/Hr		
	During each of any 5 hours of a Saturday and/or Sunday _____ VEH/Hr		☒ Yes ☐ No

CHARACTERISTICS OF MAJOR ROUTES	MAJOR ST.	MINOR ST.	
Part of highway system serving as principle network for through traffic.	✓		
Connects areas of principle traffic generation.	✓	✓	
Rural or suburban highway outside of entering or traversing a city.	✓		
Appears as major route on an official plan.	✓		
Any major route characteristics met. Both streets.			☒ Yes ☐ No

WARRANT 7 - Combination of Warrants

(Used if no one warrant satisfied 100%)

SATISFIED ☐ Yes ☐ No

REQUIREMENT	WARRANT	√	FULFILLED
TWO WARRANTS SATISFIED 80%	WARRANT 1 - Minimum Vehicular Volume		
	WARRANT 2 - Interruption of Continuous Traffic		
	WARRANT 3 - Minimum Pedestrian Volume		☐ Yes ☐ No

The satisfaction of a warrant is not necessarily justification for signals. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS (continued)

WARRANT 9 - Four Hour Volumes

SATISFIED: [X] Yes [ ] No

Time Periods	7-8 am	8-9 am	4-5 PM	5-6 PM	Hours Total
Minor Street Volume (highest volume approach)	243	233	130	139	
Major Street Volume (total of both approaches)	1266	1200	1673	1777	

NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-7 or 4-8 of the M.U.T.C.D.

WARRANT 10 - Peak Hour Delay

100% SATISFIED: [X] Yes [ ] No

80% SATISFIED: [X] Yes [ ] No

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)		7 AM	5 PM	OTHER	Hour
	U	U				
APPROACH LANES	1	2 or more				
Minor Street (one direction only)	100 (80)	150 (120)	243	139		
TYPE OF INTERSECTION	4 OR MORE APPROACHES	3 APPROACHES				
Total Entering Volume	800 (640)	650 (520)	1509	1916		

WARRANT 11 - Peak Hour Volume

SATISFIED: [X] Yes [ ] No

Time Periods	7 AM	5 PM	OTHER	HOUR
Minor Street Volume (highest volume approach)	243	139		
Major Street Volume (total of both approaches)	1266	1777		

NOTE: Apply volume totals, geometric conditions and population characteristics to either Figure 4-5 or 4-6 of the M.U.T.C.D.

CONCLUSION

Number of Satisfied: 5

Number of Not Satisfied: _____

Number of Not Applicable: 6 (DATA NOT COLLECTED)

TOTAL: 11