



Existing Transportation Conditions

INTRODUCTION

Overview

This chapter describes the existing transportation system in all modes—automotive travel and the street and highway network supporting it; the available transit and related services; transportation demand management (TDM) programs to reduce vehicular trips among employees in town; and non-vehicular modes—walking and bicycling. In explaining this network and all of its component parts, deficiencies as well as positive opportunities in the system will become apparent.

While some of the movement associated with the different travel modes is internal to Lexington (beginning and ending within town borders), it is also important to note that the transportation system is integrated into a vast regional system in Greater Boston, whereby the origin or destination of automotive, transit, TDM and even pedestrian trips involves a geographic area that is metropolitan in scope. Ultimately, however, from the viewpoint of residents and workers in Lexington, the issue is one of quality of life, largely as it is negatively impacted by traffic congestion. The utter dominance of the automobile as a single occupancy vehicle in the existing transportation system presents a great challenge to the community.

Lexington residents have the option to travel by walking, biking, local or regional bus, paratransit, or taxi. The predominant means of transportation in Lexington, however, is the private automobile. This is increasingly the case throughout the country; the number of vehicles miles traveled by passenger car in the United States rose 12% during the 1990s.¹ Automobile ownership has increased as well: 24% of households now have more vehicles than licensed drivers.²

While the automobile offers flexibility and convenience for individual users, it has negative personal and environmental impacts when used en masse. Exhaust gases, time spent in traffic congestion, noise pollution, and fossil fuel consumption are just a few of these. Recently, the Center for Disease Control, along with other public health organizations, has begun to study the role of the private automobile in the rise of obesity in the United States.

¹ Bureau of Transportation Statistics: “National Transportation Statistics 2002”

² 2001 National Household Transportation Survey

In Lexington, the repercussions of automobile dependency are being felt by residents stuck in traffic, neighborhoods experiencing high traffic volumes on local streets, and by schoolchildren whose parents feel it is too dangerous to allow them to walk to school. Existing road networks are nearing capacity, many intersections fail in level of service for hours each day, and there is no community support for the construction of major new roads. Even if there were, there is relatively little land available in this mature suburb.

To better understand the nature of the problem, we began with a survey of existing conditions in Lexington. This data forms the basis of the strategies and actions proposed in following chapters.

Travel Patterns

Lexington is predominantly a residential community with pockets of retail, office, and light industrial development. The major residential type is multistory single-family homes. There is a growing number of condominium developments, and a stable number of multifamily homes, and apartments as well. There is some small-scale retail in the Town Center, as well along Massachusetts Avenue toward Arlington and at scattered sites throughout the town, including the intersections of Bedford Street and Worthen Road and Lowell Street and Worthen Road. The major centers of employment are the Hayden Avenue /Spring Street area and the Hartwell Avenue / Hanscom area. Both have easy access to major highways. The latter is home to the Hanscom Air Force Base and the Massport-run Hanscom Field Civil Airport, which together generate more than 13,000 vehicle trips each day. The Town Center also contains a significant number of employers, although on a smaller scale. The Town Center is also home to the Battle Green and several buildings of historical interest. Along with the Minuteman National Historical Park and the National Heritage Museum, Lexington Center is a major tourist destination. The major attractions, which include schools and recreation areas, tend naturally to generate the most traffic.

People make many different kinds of trips during the course of a day. These include commuting, shopping, attending events and functions, socializing, running errands and many others. While commuting accounted for only 14.8% of all travel in 2001,³ an analysis of commuting patterns is still a useful way to understand the dimensions of the problem in a given area. Since the home-work trip typically occurs on a regular schedule, it is also the easiest kind of trip to address through transit or transportation demand management. The decennial Census includes questions about commuting under the heading 'journey-to-work'. The following paragraphs summarize Census 2000 journey-to-work data for Lexington and compare it with 1990 data.

From 1990 to 2000, the total number of workers living in Lexington decreased from 15,082 to 14,482, yet the average length of the commute trip increased from 24.87 to 28.75 minutes. This could be due to increased traffic volumes, further separation of the home and workplace, or both.

The mode of transportation data from 1990 to 2000 was relatively unchanged. Approximately 80% of Lexingtonians commute to work by driving alone. The biggest change percentage change

³ National Household Travel Survey, 2001; both shopping and family/personal trips were more frequent

over the period was in the number of people working at home (and thus not commuting), an increase of 2.3%.

Of the 14,482 workers living in Lexington in the year 2000, 23.91% worked in Lexington; 76.09% outside of Lexington. 27.1% of workers living in Lexington worked outside of Middlesex County.⁴ These numbers are fairly similar to those recorded in the 1990 Census. The total number of people who both live and work in Lexington has declined slightly, from 3,700 to 3,463. The total number of those living in Lexington but working outside of Middlesex County increased slightly, from 3,412 to 3,638.

As of this writing (April 2003), detailed (place-to-place) commuting data from the Census 2000 had not yet been released.⁵ Data from the 1990 Census has been examined to give some indication of commuting patterns to and from Lexington. The general similarities noted above give some hope that these patterns are indicative of current conditions. Knowing where people who work in Lexington live, and where people who live in Lexington work, can be helpful in deciding what measures might be effective in addressing peak hour travel demands.

In 1990, 24,042 people worked in Lexington and 15,082 workers lived in Lexington. The largest employment destination of people living in Lexington was Lexington (24.9%), followed by Boston (13.6%), Cambridge (11.5%), Waltham (7.3%), and Burlington (6.1%). The largest group of people working in Lexington also lived in Lexington (16.4%), followed by those living in Arlington (4.9%), Waltham (4.2%), Bedford (3.9%), and Boston (3.8%). While the majority of workers living in Lexington worked in the state, their workplaces were scattered among some 100 different Massachusetts cities and towns. People working in Lexington lived in 171 Massachusetts cities and towns, and 88 out-of-state locations.

These numbers indicate there is no very large concentration of employees coming from one particular community. Further analysis of the data indicates that workers commuting to Lexington from any one particular community work in a variety of places throughout the town. A focus on programs for residents of Lexington is likely to make more of an impact than a focus on programs for workers commuting to Lexington from other communities. Not only are there larger numbers of people going to the same area, but Boston and Cambridge, the second and third most common destinations, have strong public transportation systems.

ROADWAYS

Roadway Network

The Town of Lexington is located about 11 miles northwest of Boston at the intersection of two major limited access regional highways: the I-95/Route 128 circumferential highway and Route 2, a major radial highway emanating from Boston (see Map 1). The Town's location allows for

⁴ The Census data that has been released to date is restricted to place, MSA, county, and state level data.

⁵ If the Census Transportation Planning Package is released in time, detailed data from the Census 2000 will be included in this Element.

INSERT ROADWAYS MAP HERE

easy highway access. I-95/Route 128 provides access to all major radial highways from greater Boston, including Route 3 to Cape Cod, I-95 to Rhode Island and points south, Route 24 to New Bedford/Fall River, the Massachusetts Turnpike (I-90) to the west, and I-93 and I-95 to New Hampshire and points north. Route 2 provides access to Boston and points west of Lexington.

Other state-numbered roadways through town include Route 2A and Routes 4/225. Route 2A is a generally east-west route connecting Arlington to Lincoln. It follows Summer Street, Lowell Street, Maple Street, Marrett Road, and Massachusetts Avenue. Route 4/225 runs between Route 2 near the Arlington town line and I-95/Route 128 and the Town of Bedford. It follows Watertown Street, Pleasant Street, Massachusetts Avenue, and Bedford Street.

There are several other significant roadways through and within the town. Massachusetts Avenue, which begins in Boston and continues out towards Central Massachusetts, functions in Lexington as the town's main street. It is the main roadway through the Town Center and is the location of the Town's major retail area and Town government offices. It is generally a two-lane roadway but widens to four lanes through the Town Center.

Waltham Street, Bedford Street, and Woburn Street are all two-lane roadways that connect Lexington Town Center with the centers of Waltham, Bedford and Woburn, respectively. Important roadways providing access to major employment centers include Hartwell Avenue/Maguire Road, which borders Hanscom Field, and Hayden Avenue, which parallels Route 2.

Intersections

The focus of roadway improvements in the Lexington Transportation Element is to provide for more efficient utilization of the existing roadway infrastructure. The first step in developing a roadway improvement action plan was to identify a list of intersections to be considered for improvements. This list was developed through discussions with the Town's Planning and Engineering Departments and an assessment of the safety characteristics of the intersections within the Town. To better understand the magnitude of the traffic issues at the study intersections, the following traffic data were collected and reviewed:

- Accident data for the most recent three-year period
- Physical characteristics
- Geometric conditions
- Adjacent land uses
- Current operating conditions
- Traffic volumes (where available)

In order to identify accident trends, safety concerns, and/or roadway deficiencies, accident data were obtained for the three and a half-year period from January 1999 to mid-2002, the most recent data available. The Planning Department and VHB collected this information from the Police Department records. A summary of the accident data is presented in Table 1. Typically an accident (crash) rate is also calculated for each intersection. The rate represents the ratio of the

number of accidents to the total volume of traffic traveling through the intersection. This is usually an effective tool to measure safety hazards. As part of this study, however, traffic counts were not conducted at the study intersections and therefore a crash rate cannot be calculated. There is, however, a rule of thumb that 5 or more accidents per year establish that an intersection should be reviewed for safety issues. The traffic thresholds for the possible installation of a traffic signal or four-way STOP control use the 5 accidents per year as a factor in determining if installation is warranted.⁶

Other data sources were recent traffic studies for individual development projects and conversations with the Department of Public Works regarding operating conditions, including congestion, delay, queuing and levels of service.

This list identifies those intersections that were evaluated and indicates whether or not they were considered for capital improvements. Specifics of proposed improvements appear in Chapters III and IV.

1. Bedford Street (Route 4/225) at Hartwell Avenue is a signalized “T” intersection with a jug-handle provided along Bedford Street northbound for U-turns and left turns onto Hartwell Avenue. There is extensive queuing on Bedford Street during the peak hours, particularly on the southbound approach. Next to the Bedford Street interchange with I-95/Route 128, this intersection is the highest accident intersection. There were 83 accidents recorded in a three and one-half year period and many of the accidents are likely due to the limited sight distance on the Hartwell Avenue approach. Vehicles approaching the intersection from Hartwell Avenue, which has a green signal indication at the same time as the jug handle approach, have difficulty seeing the approaching traffic from the jug handle. Field observations revealed many near collisions of vehicles making a left turn from Hartwell Avenue with vehicles going straight from the jug handle. Bedford Street is a state numbered route but is under Town jurisdiction.
2. Eldred Street at Bedford Street (Route 4/225) is a “T” intersection with Bedford Street as the major roadway. As at the previous intersection, Bedford Street at this location is a state numbered route but is under Town jurisdiction. Eldred Street connects to the residential area east of Bedford Street and north of Route 128. The Eldred Street approach, which is under STOP sign control, consists of one shared left-turn/right-turn lane. Left turns from Eldred Street onto Bedford Street are currently prohibited during peak hours. Bedford Street provides two lanes in each direction. The intersection is also one of the highest accident intersections. Because of heavy volumes and relatively high speeds along Bedford Street it is difficult for traffic to exit Eldred Street. Southbound Bedford Street traffic turning left into Eldred Street must use the left-through lane, another potential cause of accidents.
3. Massachusetts Avenue at Wood Street is a three-legged intersection with Wood Street under STOP Sign control. The intersection falls within the Minuteman National Historic Park. I-95/Route 128 is approximately 150 feet to the east of the intersection with Massachusetts

⁶ Manual on Uniform Traffic Control Device; Millennium Edition; Federal Highway Administration; Washington DC; 2001.

Avenue spanning the interstate highway. The intersection of Old Mass Avenue and Wood Street is approximately 300 feet north of the intersection. Old Mass Avenue is used as a cut-through from Hanscom Airfield. Vehicles travel at fairly high speeds along Massachusetts Avenue making it difficult to exit Wood Street onto Massachusetts Avenue. The Wood Street approach provides one lane and is fairly narrow, making it difficult for right turning vehicles to squeeze by left-turning vehicles.

4. Bedford Street at Worthen Road and Camellia Place is a four-legged signalized intersection. The traffic signal operates with the Bedford Street approaches moving together and Worthen Road and Camellia Place moving at the same time. Bedford Street southbound approach provides an exclusive right turn lane and a through-left lane. The northbound Bedford Street approach and Camellia Place each have only one general lane. Camellia Place is a low volume road that operates more as a driveway. The Worthen Road approach provides two approach lanes (neither of them striped). The traffic signal is equipped with an Opticom emergency preemption system for the fire station located approximately 100-150 feet south of the intersection. There are several retail establishments on the corners of the intersection. There are crosswalks provided on the Bedford Street and Worthen Road approaches and the traffic signal has an exclusive pedestrian phase available with push-button control.
5. The intersection of Massachusetts Avenue at Woburn Street, Winthrop Street and Fletcher Avenue has STOP sign control on Winthrop Street, Fletcher Street and Woburn Street. Massachusetts Avenue is uncontrolled. There is a large triangular traffic island with two-way traffic permitted on all sides. All approaches have a single general lane and there is parking permitted along both sides of Massachusetts Avenue to the west of the intersection. Winthrop Street enters Massachusetts Avenue from the south and provides a cut-through for traffic coming from Waltham Street headed north or east, avoiding the intersection of Massachusetts Avenue at Waltham Street. The movements from Winthrop Street, across Massachusetts Avenue, to Woburn Street are dangerous, with difficult sight distance out of Winthrop Street and higher speed traffic on Massachusetts Avenue. There is an expanse of pavement where Massachusetts Avenue and Woburn Street connect. Two-way operations on all sides of the island create several locations where there are conflicting and potentially confusing traffic movements.
6. Maple Street at Lowell Street is a signalized four-legged intersection with very large channelized right turn lanes on the Maple Street eastbound approach and the Lowell Street southbound approach. These channelized right-turn lanes allow drivers to make turns at relatively high speed, posing a hazard to pedestrians trying to cross the Maple Street eastbound approach.
7. The Spring Street at Marrett Road intersection is an unsignalized intersection. Marrett Road extends east-west with Bridge Street and Spring Street intersecting it adjacent to each other along the south side. Both of the side streets are controlled by STOP signs. Bridge Street operates one-way northbound into Marrett Road. Marrett Road is designated as State Route 2A and is under state jurisdiction. There are generally residential properties along Bridge Street and east of the intersection along Marrett Road, while there are commercial developments west of the intersection. This intersection is open, with a large expanse of

pavement. According to a traffic analysis conducted in 1997, this intersection operates at Level Of Service (LOS) F during both the morning and evening peak hours.⁷ This condition applies to northbound Spring Street traffic, which has difficulty exiting onto Marrett Road.

8. Marrett Road (Route 2A) at Waltham Street is a four-legged signalized intersection. Marrett Road is state numbered Route 2A and is under state jurisdiction. Marrett Square, a small retail center, is located on the northwest corner of the intersection, a Dunkin Donuts is on the northeast corner, a Gulf gas station and Mobil gas station are on the southwest and southeast corners, respectively. Each of the approaches to the intersection is striped as one lane with the exception of Waltham Street southbound, which has a through/left-turn lane and a small channelized right-turn lane. Because of the roadway width, vehicles are able to operate in two lanes (a left-turn lane and a through/right-turn lane) on both Waltham Street approaches. The curb cuts along the Gulf gas station property are wide open with confusing right-of-way/direction of vehicular travel. The pedestrian crossing signal equipment is outdated and consists of pedestrian buttons that trigger the traffic signal to turn yellow and red simultaneously. There are no pedestrian signal heads. There are fairly long queues on Waltham Street and Marrett Road eastbound during peak hours.
9. Maple Street at Massachusetts Avenue is a “T” intersection with the Maple Street approach under STOP sign control. Maple Street is designated as State Route 2A and is under state jurisdiction. Massachusetts Avenue is designated as State Route 4/225 and is under local jurisdiction. There is a large circular island in the center of the Maple Street approach. All vehicles approaching Massachusetts Avenue from Maple Street travel on the west side of the island while all vehicles turning from Massachusetts Avenue to Maple Street travel on the east side of the island. The correct direction of travel at this intersection is unclear and the high accident rate may reflect driver confusion. There is peak hour queuing on the Maple Street approach because of the high volume of traffic on Massachusetts Avenue and the high number of vehicles turning left from Massachusetts Avenue eastbound onto Maple Street. Vehicles slowing to make this move block vehicles trying to exit Maple Street.
10. Pleasant Street at Massachusetts Avenue and Follen Road essentially operates as a rotary with STOP sign control on the Pleasant Street and Follen Road approaches. Each of the approaches provides one general purpose lane with the exception of Massachusetts Avenue westbound which provides as an exclusive left turn lane and a through lane. During the peak hours, it is difficult for vehicles to exit Pleasant Street and Follen Road onto Massachusetts Avenue. Pleasant Street generates long queues during the peak hours. Pedestrian crossings within the vicinity of this intersection are difficult. There is a large expanse of pavement within the limits of this intersection adding to driver confusion and the difficult pedestrian crossings.
11. Concord Avenue at Waltham Street is a four-legged signalized intersection located approximately 1,000 feet south of the Route 2 Waltham Street ramps. Each approach to the intersection provides a single general through lane although both Waltham Street approaches, which are approximately 43 feet wide, are used as two lanes. The southbound approach is used as a left-turn lane and a shared through/right-turn lane. The northbound approach is

⁷ Office Expansion, 55 Hayden Avenue Lexington, Massachusetts, Abend Associates, January 10, 1997.

used as a shared through/left-turn lane and a shared through/right-turn lane. The traffic signal operates as a semi-actuated, two-phase operation. Land uses that abut the intersection include a day care center, a gas station, medical offices and residential. Crosswalks are provided on all approaches.

12. Pleasant Street at Watertown Street is a “Y” intersection with the Pleasant Street southbound approach forming the base of the Y. The northbound Pleasant Street approach is STOP sign controlled at a traffic island. The island essentially directs traffic to and from the southern Pleasant Street leg to and from Watertown Street and creates driver confusion for vehicles traveling through the intersection. The southern Pleasant Street leg enters Watertown Street/Pleasant Street at a sharp angle that creates sight distance issues for vehicles exiting Pleasant Street northbound. Field observations revealed that vehicles queue up along Pleasant Street northbound and can block vehicles attempting to enter Pleasant Street southbound from Watertown Street.
13. Bedford Street at Route 128: Bedford Street at Route 128 was rated as the highest accident location in Lexington with 134 accidents over the three and one-half year period analyzed (see below). This location is a full cloverleaf interchange providing only right turns onto and off of the Route 128 ramps to and from Bedford Street. There are no traffic signals at any of the ramp junctions. Because the interchange is under MassHighway jurisdiction, it was not reviewed for improvements as part of the Town’s Transportation Element. The intersection of Bedford Street at Hartwell Avenue was reviewed for possible improvements that could also have positive impacts on the 128 interchange.
14. Bedford Street at Harrington Road/Hancock Street: This is a four-way intersection adjacent to the Battle Green. Bedford Street is the main street with Harrington Road and Hancock Street controlled by STOP signs. Exiting the side streets can be difficult during periods of heavy traffic flow on Bedford Street. Because the intersection is on the National Register of Historic Places and is within the Historic District, it was not deemed a desirable location to make improvements.
15. Waltham Street at Hayden Avenue: This intersection is a T-type intersection adjacent to the Route 2 interchange with Waltham Street. Hayden Avenue provides access to and through a major business area along Route 2 between Waltham Street and Spring Street. Hayden Avenue is STOP-controlled at Waltham Street. Because the intersection is very close to the Route 2 westbound off-ramp to Waltham Street northbound, it creates a difficult maneuver for traffic exiting Route 2 and turning left onto Hayden Avenue. Channelization improvements were implemented in 1999-2000 and the intersection was not reanalyzed as part of this study.
16. Lowell Street at Woburn Street: This is a four-way intersection with commercial land uses on each corner. It is signal controlled and was recently reconstructed. As a result it was not analyzed for improvements as part of the Transportation Element.
17. Hartwell Avenue at Maguire Road: This is a T-type intersection in the middle of the Hartwell Avenue/Maguire Road business area. Maguire Road is STOP-controlled at Hartwell

Avenue and exiting Maguire Road can be difficult during busy times. The intersection is a short distance from the Minuteman Bikeway crossing of Hartwell Avenue. Design and permitting for intersection improvements were complete prior to this study; however, no funding is currently available for construction.

18. Marrett Road (Route 2A) at Route 128: This location is a full cloverleaf interchange providing only right turns onto and off of the Route 128 ramps to and from Marrett Road. There are no traffic signals at any of the ramp junctions. Because the interchange is under MassHighway jurisdiction, it was not reviewed for improvements as part of the Town's Transportation Element.
19. Massachusetts Avenue at Marrett Road: This is a four-way intersection with the fourth leg providing access to the Minuteman Vocational Technical School. It is a signalized intersection operating at generally good levels of service. The intersection had a lower number of accidents. Because of these two factors it was not analyzed for improvements.
20. Lowell Street at East Street: This fully signalized intersection in a single family residential area has pedestrian on-demand crossings, sidewalks with granite curbing on Lowell and one side of East, and a channel island facilitating the right hand turn movement from southeast-running Lowell onto East. Lowell becomes a major commercial arterial, the Middlesex Turnpike, just over the nearby Burlington town line, while East is a significant feeder from central and northwest parts of Lexington to the Turnpike retail and employment areas. Accident data reveals that the intersection functions with a fairly high degree of safety due to the controls.
21. Massachusetts Avenue at Grant Street: This is a T-type of intersection in the Town Center. It is unsignalized, with STOP control on the Grant Street approach. Massachusetts Avenue has four travel lanes in this section. Exiting Grant Street can be difficult during times of heavy traffic flow on Massachusetts Avenue. The traffic signal at Waltham Street and Massachusetts Avenue sometimes provides breaks in traffic flow that can make it easier for vehicles to exit Grant Street. This intersection had a lower number of accidents and was not analyzed for this study.

Table 1 Intersection Accident Summary — 1999-2002

Scenario	Bedford Street at Route 128	Bedford Street at Hartwell Avenue	Bedford Street at Eldred Street	Bedford Street at Harrington Road & Hancock Street	Marrett Road at Waltham Street	Maple Street at Mass Avenue	Lowell Street at Maple Street	Waltham Street at Hayden Avenue	Lowell Street at Woburn Street	Bedford Street at Worthen Road
Rating	1	2	3	4	5	6	7	8	9	10
Year										
1999	49	31	21	3	15	20	17	11	15	8
2000	42	20	16	19	12	12	12	12	9	9
2001	38	28	13	18	18	10	7	5	5	10
<u>2002¹</u>	<u>5</u>	<u>4</u>	<u>5</u>	<u>11</u>	<u>2</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>3</u>
Total	134	83	55	51	47	44	40	31	31	30
Type										
Motor vehicle in traffic	129	79	53	50	38	42	37	27	28	27
Unknown—Other	5	4	2	1	9	2	3	4	3	3
Severity										
Property Damage Only	86	57	23	38	38	34	26	17	24	26
Personal Injury	48	26	32	13	9	10	14	14	7	4
Fatality	0	0	0	0	0	0	0	0	0	0
Pavement/Weather										
Dry	110	60	45	44	42	42	33	25	23	25
Wet	17	20	10	6	5	2	5	5	6	4
Snow/Ice	2	0	0	0	0	0	0	0	0	0
Other	5	3	0	1	0	0	2	1	2	1
Time of Day										
7:00 to 10:00 AM	39	12	11	15	13	15	11	12	4	5
3:00 to 6:00 PM	33	22	12	16	9	9	13	9	9	8
Other	62	49	32	20	25	20	16	10	18	17

Source: Compiled by The Town of Lexington Planning Department and Vanasse Hangen Brustlin, (VHB) Inc. from Town of Lexington Police Department records

1 Data for 2002 are for the first half of the year.

Table 1 (cont.) Intersection Accident Summary — 1999-2002

Scenario	Concord Avenue at Waltham Street	Hartwell Avenue at Maguire Road	Marrett Road at Route 128	Woburn Street/Mass Avenue at Fletcher Avenue	Mass Avenue at Grant Street	Pleasant Street at Mass Avenue	Mass Avenue/ Old Mass Avenue /Marrett Road	Pleasant Street at Watertown Street	Lowell Street at East Street	Old Mass Avenue/ Mass Avenue/ Wood Street	Marrett Road at Spring Street
Rating	11	12	13	14	15	16	17	18	19	20	21
Year											
1999	11	10	11	6	5	5	5	4	4	4	2
2000	8	9	7	10	4	6	2	4	5	2	3
2001	7	7	6	4	13	5	5	5	2	4	1
<u>2002¹</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>6</u>	<u>1</u>	<u>2</u>	<u>5</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>1</u>
Total	28	28	27	26	23	18	17	13	12	11	7
Type											
Motor vehicle in traffic	27	27	23	22	21	15	15	10	11	7	4
Unknown-Other	1	1	4	4	2	3	2	3	1	4	3
Severity											
Property Damage Only (Over \$1,000)	19	12	21	20	19	17	8	12	7	7	4
Personal Injury	9	16	6	6	4	1	9	1	5	4	3
Fatality	0	0	0	0	0	0	0	0	0	0	0
Pavement/Weather											
Dry	20	25	21	21	20	14	14	12	8	8	7
Wet	6	2	5	3	2	3	2	1	2	2	0
Snow/Ice	0	0	0	1	0	0	0	0	0	0	0
Other	2	1	1	1	1	1	1	0	2	1	0
Time of Day											
7:00 to 10:00 AM	8	12	11	7	5	5	4	2	4	3	2
3:00 to 6:00 PM	9	7	6	7	7	5	3	4	2	3	0
Other	11	9	10	12	11	8	10	7	6	5	5

Source: Compiled by The Town of Lexington Planning Department and Vanasse Hangen Brustlin, (VHB) Inc. from Town of Lexington Police Department records

1 Data for 2002 are for the first half of the year.

TRANSIT

Lexington's transit service consists of MBTA intercity bus service, the LEXPRESS in-town bus service, some demand-responsive van services for the elderly and disabled, and a commuter shuttle operated by the 128 Business Council, a transportation management association. Of these, MBTA Route 62/76 carries by far the highest number of passengers.

While Lexington has a number of options for a town of its size and population density, the existing transit network is limited in its usefulness. LEXPRESS ends operations by 7:00 P.M. at the latest on weekdays, which is a handicap in attracting commuters who keep irregular hours. The relative infrequency of transit service during the hours in which it operates further reduces its attractiveness. Another limitation is the lack of Sunday service by any public transportation provider in the area. Most residents cannot depend wholly on existing public transit and maintain their current quality of life. For those who cannot or do not wish to drive, however, the existing public transit system is immensely valuable.

MBTA Transit Service

The MBTA operates the Route 62/76 service through Lexington on weekdays and Saturdays. Both routes operate between the Town Center and Alewife Station. Route 62 operates between the Center and the Bedford V.A. Hospital while Route 76 operates between the Center and Hanscom Field and the Air Force Base (AFB).

The routes provide weekday service between the Center and Alewife Station from 6:00 AM to 10:00 PM. Both routes operate on 30-minute headways during peak hours, providing 15 to 20-minute frequency between the Center and Alewife Station. Off-peak service is hourly on each route, with 25 to 35-minute frequency between the Center and Alewife Station. Scheduled travel time between the Center and Alewife Station is typically 22 minutes. Saturday service is provided hourly, from 6:00 AM to 10:00 PM. There is no service on Sundays.

In addition to the connection to the Red Line at Alewife Station, the MBTA bus service provides limited connections to other bus routes. The Route 62 bus travels through Arlington Heights and connects to the terminus of Route 77 and Route 79, which serve the Massachusetts Avenue corridor through Arlington and into Cambridge.

A 1998 ridership survey performed by the MBTA found that out of 2,050 trips/day on the Route 62/76 bus, 1368 had their origin or destination in Lexington. The 76 branch carried somewhat more of these trips—778—than the 62, which carried 590. Inbound and outbound trips were fairly well balanced.

INSERT BUS ROUTES MAP HERE

LEXPRESS Transit Service

LEXPRESS is a Town supported in-town service created in 1979 amidst growing concerns over the fuel crisis and energy consumption. Since its inception, LEXPRESS has been an especially important resource for children and the elderly, who may otherwise have significant difficulty in getting around town. Scheduling incorporates the provision of transportation for students who participate in after-school activities.

The LEXPRESS service uses three minibuses operating on three pairs of routes. The routes are circular through various neighborhoods and to the Burlington Mall. Each routes takes 30 minutes to complete and the use of one bus to serve two routes results in hourly headways on each route. Buses operate out of a hub at Depot Square in the Town Center. The MBTA bus routes described above have stops at Depot Square. LEXPRESS weekday routes start at 6:45/7:15 AM and end at 6:00/6:30 PM. Saturday routes start at 10:00/10:30 AM and end at 5:00/5:30 PM. There is no Sunday service and no Saturday service during July and August.

LEXPRESS provides limited connections to bus services in neighboring communities. There are connections at the Burlington Mall (Route 6) to the Lowell Regional Transit Service and to Burlington's B-Line. The connecting times are 20 to 30 minutes. The Route 2 bus provides connecting service to the Waltham Citibus at Avalon at Lexington on Waltham Street. Connecting times to Waltham are 15 minutes and connecting times from Waltham are 10 minutes. Travel time, including connections, is 45 minutes to Waltham Center and 35 minutes from Waltham Center.

LEXPRESS carries over 300 passengers each weekday and approximately 80,000 passengers annually. Ridership rebounded in fiscal year 2002 after a steady decline the previous three years (see Table 2). The majority of passengers (61 percent) are students. Eighteen percent are seniors and 21 percent are adult riders. There are typically 10 to 15 transfers each day between LEXPRESS buses and one or two transfers each day between LEXPRESS buses and the Waltham Citibus or the Burlington B-Line service.

Table 2
LEXPRESS Ridership by Rider Type

Rider Type	FY99	FY00	FY01	FY02
Adults	19,423	21,971	17,161	16,537
Students	51,075	40,042	43,929	47,323
Seniors	15,822	15,246	13,841	13,787
Children	1,265	1,257	511	424
Total Ridership	87,585	78,516	75,442	78,071

As of this writing, LEXPRESS funding for the fiscal year 2004 is in jeopardy. If the budget override is not approved by residents, LEXPRESS will lose its funding. Securing adequate funding is a perennial concern in public transportation. Budget uncertainties complicate the process of maintaining and strengthening service. Currently, 25 percent of LEXPRESS's budget

is dependent upon the tax levy. Grant money from the MBTA and fare collection account for 25 percent each of the total budget, while another quarter comes from municipal parking revenues. The loss of nearly a quarter of the budget would likely necessitate the suspension or, possibly, termination of service. If service were interrupted, reinstating it would be a politically complex and expensive prospect. The Town of Lexington was an area leader in recognizing the importance of local transit service and it is to be hoped that residents will continue to support this valuable service.

Paratransit Service

In addition to the MBTA-run "Ride", two other paratransit services are available to Lexington residents. The Chair Car complements the LEXPRESS service for those physically unable to access the fixed route service. The other service is a volunteer-run program known as "FISH" (Friendly Instant Sympathetic Help).

The Chair Car program operates Tuesdays and Thursdays from 9:30AM to 2:30PM. Ridership was 834 in FY2001 and 382 in FY2002. The majority of ridership occurs on the weekly shopping trip to Stop & Shop.

The FISH program provides occasional rides to doctor's offices and grocery stores.

Commuter TMA Service

The 128 Business Council is a regional transportation management association (TMA) of firms, residential complexes and office parks. The Council operates six commuter shuttle routes for its member companies which subsidize the service. Employees can ride free or purchase tickets, depending on the amount subsidized by the company.

Several Lexington locations are served by the 128 Council's Alewife Shuttle. The route provides service between the Alewife MBTA Red Line station in Cambridge and Waltham/Lexington companies along the Spring Street and Hayden Street corridor. The service operates nine runs between 6:40 and 10:05 AM, and has four trips in the evening between 4:15 and 7:15 PM. Travel time between Hayden Avenue and Alewife station is approximately 15 minutes.

Table 3. Alewife Shuttle Ridership, 2002, Lexington Stops

Address	Stop	Total Ridership, 2002	Daily Average
33 Hayden Ave	Mercer	1287	5.148
45 Hayden Ave	Spyglass	891	3.564
	Hayden		
55 Hayden Ave	Woods	159	0.636
65 Hayden Ave	Cubist	4245	16.98
92 Hayden Ave	HCP	743	2.972
92 Hayden Ave	Other	177	0.708
	Fresenius		
	Medical		
95 Hayden Ave	Care	2464	9.856
95 Hayden Ave	Other	20	0.08
95 Hayden Ave	Verbind	180	0.72
191 Spring St	StrideRide	3175	12.7
128 Spring St	Phylos	1097	4.388
All Lex. Stops		14438	57.752

An examination of Alewife Shuttle ridership data for the year 2002 clearly shows that existing programs are having relatively little impact on the total volume of personal automobile trips. While the Shuttle is not totally ineffective, current usage is not of a scale to significantly improve traffic conditions.

Liberty Ride

While tourism has many benefits for Lexington, the issues of parking availability in Lexington Center, and a lack of appropriate parking for tour buses in particular, can be problematic. To address these issues, as well as to support tourism, the Liberty Ride, a shuttle bus offering on-board narration and stops at multiple tourist destinations, was instituted in the summer of 2002.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) focuses on providing alternative means of travel to driving alone in a car. The purpose of TDM is to enhance mobility by providing an expanded array of travel options and to reduce the demand for roadway improvements by reducing automobile travel. The latter is accomplished by inducing drivers to shift to non-driving modes or by encouraging people who drive alone to share a ride. TDM programs support and encourage ridesharing, transit use, walking, and bicycling. TDM programs are often implemented by groups of employers with a large number of employees in an identifiable area. Employers often pool their resources by establishing a Transportation Management Association (TMA), which can be the vehicle for delivering TDM services.

TDM Bylaw and TDM Policy

Unlike many other communities in Eastern Massachusetts, Lexington many years ago recognized the need to consider the transportation impacts of new development and to encourage and support the implementation of TDM measures.

Article XII of Chapter 135 of the Code of the Town of Lexington, Traffic, sets out minimum criteria for requiring traffic studies and mitigation of traffic impacts caused by a proposed development. For applicable developments, building permits shall not be granted until the SPGA⁸ has determined that there is adequate traffic capacity for the new development. Applicable developments include commercial establishments over 100,000 square feet, new housing developments with 25 units or more, and other activity that generates 50 or more new vehicle trips per day. Where negative impacts occur, a variety of mitigations, from signalization of intersections to membership in a Transportation Management Association, can be required.

In addition, in March 1997, the Planning Board adopted a TDM Policy, which is much more detailed than Article XII. The thresholds for TDM are the same as those triggering traffic impact studies. Developers must provide a written TDM plan, which includes measures selected from a variety of transportation services outlined in nine categories in the policy. These include site design, transportation information, and connections to transit. A reporting component is detailed in the policy.

Monitoring and enforcement of special permit conditions under Article XII have been complicated by the lack of a clear and funded enforcement responsibility in the municipal organization. While Article XII and the TDM Policy are fairly clear on the reporting procedure, special permit conditions as actually written have varied significantly from case to case. As some developers are instructed to submit annual transportation reports to multiple departments, no one department has taken responsibility for ensuring that reports are submitted promptly and in sufficient detail. Similar confusion surrounds other special permit conditions. The result of this is that many existing developments are not fully complying with special permit conditions.

Transportation Management Association

⁸ Special Permit Granting Authority – The SPGA is usually the Planning Board or Zoning Board of Appeals.

The 128 Business Council operates employer shuttles in the 128/West area and assists employers with their employee commuting needs. In Lexington, the 128 Business Council has worked with employers on Spring Street and Hayden Avenue to establish transportation options, including shuttles, Guaranteed Ride Home programs, establishment of carpools and vanpools, hold transportation awareness fairs, and assist the designated employer transportation coordinators for individual firms.

Since 1996, Transportation Coordinators have made three attempts to establish a TMA on Hartwell Avenue area. The most recent effort began in the autumn of 2001 and continues. Current Hartwell TMA planning is a joint effort of the Transportation Coordinator, Economic Development Officer, and the 128 Business Council.

The need for such an organization is clear. The Hartwell area is comprised of more than 140 businesses. Approximately 10,000 commuters travel to and from the area daily. By and large, these commuters drive single-occupancy vehicles. Traffic is problematic during peak commute hours, particularly at the intersection of Hartwell Avenue and Bedford Street. A TMA presence would be a great boon to the area.

Other TDM Related Measures and Information

The success of TDM measures depends heavily on the existence of complementary services and infrastructure. These include a well-planned and maintained sidewalk and street network, provision of local and regional transit, and complementary land uses that provide increased opportunity to walk and bicycle, sidewalks, and bicycle facilities. If these services and facilities are limited or non-existing, TDM support measures will be limited or ineffective. For employees to be able to use private shuttle buses, they will first have to get to the shuttle – perhaps by train or bicycle. If there are shops and services within walking distance of their workplace, employees will be more willing to commute by alternative means of transportation.

BICYCLING AND WALKING

Lexington has a network of bicycle trails and paths and sidewalks that facilitate bicycling and walking not only as a form of recreation but also as a mode of travel. The Town is fortunate to have the Lexington Bicycle Advisory Committee (LBAC), which has done much to expand the bicycle network and inventory the sidewalk network. More generally it provides active support and encouragement of bicycle use and walking.

The existing bicycle network is divided into off-road bicycle trails and on-road recommended routes. Recommended routes are judged to be both relatively convenient to major destinations and fairly safe, although caution is urged at all times. Bicycle trails are generally on town-owned land or easements through private land and offer access to recreational facilities and open space.

The most well known bicycle facility in the community is the Minuteman Commuter Bikeway which runs generally north of, and parallel to, Massachusetts Avenue through much of the town. The Bikeway is a production of the Rails to Trails program and follows the former B & M rail corridor. The Bikeway runs from the MBTA Alewife Red Line station in Cambridge to Bedford. It traverses Lexington from Arlington just north of Massachusetts Avenue to Bedford just north of Maquire Road. It runs through Lexington Center just behind Depot Square. It is a heavily used facility that draws large summertime crowds to Lexington Center. In the wintertime, it is not plowed so that it can be used by cross-country skiers. While ridership figures are unavailable for the Minuteman Bikeway, it is generally reputed to be among the most successful rail trail conversions in the country.

The town has developed additional off-road paths and on-street routes to link Lexington neighborhoods with the Town Center and the Minuteman Bikeway. Map 4 shows a plan of existing bike routes and bikeways in town.

The LBAC is continually involved in efforts to identify and secure additional routes with an emphasis on serving major in town attractions such as public schools. This is made difficult both by Lexington's physical form and political tradition. Lexington is a mature suburb, and as such, has relatively little space for infrastructure expansion. Streets are typically narrow, houses are fairly close to the street, and much remaining undeveloped land is reserved for conservation. The question of whether bike trails are appropriate uses in conservation areas has not been fully settled. In addition, certain neighborhoods have opposed the construction of sidewalks or bike lanes in the past. Future efforts will need to clearly state the need for such improvements and work to gain community support.

A recent major effort of the committee focused on a sign inventory. The purpose was to identify where signage needed to be replaced or added to make sure there was clear identification of the existing bike route system.

The town has also been using Geographic Information System to develop a sidewalk inventory which is shown on Map 5. Sidewalks are concentrated in the town center and nearby neighborhoods and adjacent to public schools. The presence of sidewalks in other areas is less uniform with some lower density residential areas having few if any sidewalks. The Town has no

INSERT BIKE MAP HERE

INSERT SIDEWALK MAP HERE

capital program or plan for expanding the sidewalk network. Subdivision regulations establish requirements for sidewalks in new development but with much of the Town already developed, a plan and program will be needed to insure the expansion of sidewalks into areas which need them or should have them.

The opportunities for bicycle and pedestrian improvements are many. Bicycling and walking are low-cost, healthy, environmentally friendly means of transportation and recreation. They also play an important role when other modes of transportation are used, whether one bikes to the bus stop or walks from a municipal parking lot.

CONCLUSION

In general, Lexington is fairly well-provided with transportation options. It is nevertheless experiencing growing traffic congestion and associated problems. This is due in some part to larger social and regional trends, and in some part to the choices that the town has made. Nationally, people have been making more trips, traveling longer distances, and spending more time behind the wheel. Regionally, the high cost of housing has pushed residential development further and further out, creating longer commutes. Locally, Lexington has failed to advance a proactive agenda to make alternative transportation a more attractive prospect. Major sidewalk improvements, for example, have been repeatedly postponed over the last 20 years. An investment made in 1983 could have resulted in a more walkable community by 2003.

While limited funding and political realities will make hard choices necessary, the threat to quality of life in Lexington needs to be addressed. Improvements must be made in order to allow greater access to existing transportation options, to improve the quality of those options, and to mitigate safety and operational problems with the roadway system. These improvements cannot be made by the municipal government acting alone. The transportation system is of such complexity that collaboration with private businesses, community groups, and regional, state, and possibly federal authorities is necessary. In the following chapters, we analyze possible strategies and develop recommended courses of action.