

7. Traffic & Circulation

Introduction

In a recurring conflict between wants and needs, people hate traffic and love cars. They say alternative modes of transportation would reduce congested roadways, yet few people can imagine their parents traveling as vanpoolers do today: by climbing into a vehicle with a group of strangers after being dropped off at a commuter parking lot. In a world that values speed, our ability to get where we want, when we want, is slowing down.

While the concept of transportation goes far beyond automobiles, the conversation always comes back to roads, cars and traffic. Some roads are referred to as arterials – an apt description given that a roadway network is as important to a community as a circulatory system is to a human being. A blockage in either is crippling. Roadways bring life to a community by supporting commerce, communication and services, allowing both goods and customers to travel in and out of town. The colonial roads that still exist in rural parts of the state were developed so that loggers could transport their lumber to a mill and farmers could deliver produce to a central marketplace. Roadways provide communication on many levels: at the most basic level, they provide ways for townspeople to meet each other and engage in the activities of daily life. Roadways support police, fire and ambulance services in case of an emergency, and they provide the crucial right-of-way that public utilities need to supply water, sewer, natural gas, telephone and cable television service to homes and businesses. We could not survive without a circulatory system and a town cannot survive without a roadway network. Roadways are the basis of an infrastructure system and, as such, they are the foundation of a community.



Afternoon traffic on Route 38, Tewksbury. Photo by Mary Coolidge, October 2002.

Existing Conditions

Located near the intersection of Interstates 93 and 495, Tewksbury is adjacent to one of New England’s major transportation crossroads. In addition to the interstate highways that pass through town, Tewksbury is served by two state highways and approximately 120 miles of local roadways, as shown on Map 1. As a member of the Northern Middlesex Council of Governments (NMCOG), Tewksbury is included in the regional transportation planning efforts of NMCOG. These efforts include a recent region-wide transportation plan and a Route 38 Corridor Study that is currently underway. Table 1 provides summary-level roadway classification data for Tewksbury and is followed by a description of each major class.

Table 1: Streets by Primary Class, Tewksbury

Urban/Rural Designation	Functional Class	Mileage
Urban	Local	90.6
Urban	Limited Access Highways/Principal Arterials	6.9
Urban	Other Numbered Routes/Minor Arterials	10.2
Urban	Major Road Collectors/Major Collectors	18.3
Urban	Minor Collectors	21.8
	TOTAL	147.8

Sources: NMCOG, Regional Transportation Plan (Chapter VI, Table 7) and MassGIS Vector Library, "mrdinv.dbf."

Limited Access Highways/Principal Arterials

Roadways classified in this category include all interstate and limited access highways. These roads connect major economic/geographic regions and constitute the basic transportation network. Tewksbury contains approximately 6.9 miles of interstate roadway. Interstate 495 loops through the northern section of Tewksbury from the Lowell border in the west to the Andover border in the east. There are two I-495 interchanges in Tewksbury: Exit 38, an interchange that connects I-495 and State Route 38 "Main Street" near the Lowell border, and Exit 39, an interchange that connects I-495 and State Route 133 near the Andover border. In addition, Interstate 93 runs in a north-south direction through the easternmost section of Tewksbury. However, the town is not directly served by an I-93 interchange. The closest I-93 interchange to Tewksbury is the Dascomb Road exit located in Andover approximately one-half mile from the Tewksbury town line.

Other Numbered Routes/Minor Arterials

Roadways of this type link economic and population centers within a region. They can provide long-distance travel options to the Major Arterials and often connect two Major Arterials. Typically, non-elevated state routes are classified as Minor Arterials. Tewksbury contains approximately 10.2 miles of roadway in this classification.

Two State highways pass through Tewksbury: Route 133 (Andover Street) and Route 38 (Main Street). From end to end, Route 133 runs from downtown Lowell in the west through portions of Middlesex and Essex counties to Gloucester in the east. Locally, Route 133 runs east to west through North Tewksbury and is connected to I-495 by Interchange 39. From end to end, Route 38 stretches from Somerville in the south to Dracut in the north and across the state line into New Hampshire. In Tewksbury, Route 38 is synonymous with Main Street and it runs southeast to northwest through the entire length of town. Route 38 connects to I-495 at Interchange 38 and serves as a major gateway into the community.

Major Road Collectors/Major Collectors

While Major Collectors do not vary greatly in size or roadway geometry from Minor Arterials, they serve an altogether different purpose. Minor Arterials typically provide a network for travelling through a given region while Major Collectors typically provide a network for travelling within a region or a community. Tewksbury contains approximately 18.3 miles of roadway in this classification. The following local roads fit the classification of Major Collectors: Shawsheen Street, Whipple Road, Pleasant Street, Chandler Street, East Street, North Street and River Road.

Shawsheen Street traverses the entire width of Tewksbury. It runs from the Andover town line in the northeast, where it intersects with Dascomb Road/East Street, south to the Billerica town line, where it intersects Whipple Road. Shawsheen Street also intersects with Route 38 while crossing the southern third of the town. In general, the pavement condition over the length of Shawsheen Street is poor. The pavement markings and signage along the road are in good condition, and the posted speed limit of 30 miles per hour (mph) seems appropriate for current conditions. Except for the ¼ mile length closest to the intersection with East Street, the uses along Shawsheen Street are almost exclusively residential. Even though there is a major intersection at Shawsheen Street and Route 38, very few commercial uses have migrated to this part of the roadway.

Whipple Road is located west of, and essentially runs parallel to, Route 38. It extends from the Lowell city line in a southeasterly direction to the Billerica town line, providing connections with Rogers, Marston, Marshall, Pleasant, Chandler and Shawsheen Streets. The pavement is in generally good condition, and the 35 mph speed limit and double yellow centerline indicate that Whipple Road carries a considerable amount of through traffic, presumably from drivers seeking an alternative to Route 38. The signage is clear, and the use of a four-way stop sign at the Chandler Street intersection acknowledges that traffic on Whipple Road needed some controls. The character of Whipple Road changes significantly as it crosses the town. Along the east side of Whipple Road from Pleasant Street to Lowell, a number of stonewalls and fieldstone foundations create a distinctly rural feel and convey an impression of Tewksbury's earlier history. Development along the west side of the road is clearly more recent: there is less roadside vegetation, the homes are more evenly spaced, and often they attempt to mirror older properties across the street through the use of precast block walls as modern stonewalls. From Pleasant Street to the Billerica line, Whipple Road is quite different. The homes are generally smaller and more closely clustered, and the roadway itself has a more intimate feeling due to old growth trees along both curb lines, a feeling eclipsed by new development along the northern stretch. In general, the land uses along Whipple Road are strictly residential.

Pleasant Street provides a connection between Whipple Road and Main Street. It runs from a major three-way intersection with Whipple Road and Marshall Street in the southwest to a four-way intersection with Main, North and East Streets in the northeast. The four-way intersection acts as a major traffic nexus in Tewksbury and it is located near the geographic center of the town. The pavement condition along Pleasant Street is generally fair. The roadway is appropriately striped and has appropriate signage, but the pavement width is narrower than the other major collector streets. Although the multi-road intersections at either end of Pleasant Street provide traffic controls, there are no other controls along the middle portion of the road. Pleasant Street serves a mostly residential area and it has a posted speed limit of 35 mph, except for the section by Tewksbury High School.

Chandler Street lies about one-half mile south of and runs parallel to Pleasant Street, making a similar connection between Whipple Road and Main Street. While Pleasant Street ends at Main Street, Chandler Street crosses Main Street and intersects with East Street near Tewksbury Hospital. The pavement condition along Chandler Street is generally fair to good. The roadway is appropriately striped, has clear signage and is posted for an appropriate speed.

East Street serves as the major feeder road between I-93 and Tewksbury center. Dascomb Road in Andover becomes East Street at the town line, making East Street the access way to the I-93 interchange (Exit 42) closest to Tewksbury. It intersects with Shawsheen Street at the Tewksbury-Andover town line on one end and terminates at the major four-way intersection with Pleasant, Main and North Streets. The pavement condition along East Street is generally poor to fair, most

likely due to the types of traffic that use this heavily traveled roadway. East Street appears to experience a much higher level of use by tractor trailers than the other major collectors in Tewksbury, and these large, heavy vehicles increase wear and tear on pavement. The roadway is appropriately striped and has appropriate signage. Traffic often moves faster than the posted 35 mph speed limit, a condition that can be explained by two factors: first, East Street has fewer curb cuts than comparable roadways due to large parcels along both sides of the road (Tewksbury State Hospital, Little League fields, farms) and second, other than a railroad crossing, traffic controls are not in use. The geometry of the East Street/Main Street intersection is confusing and its current layout should be reviewed.

North Street serves a purpose similar to that of East Street. Located in the northern half of town, North Street runs in a northwest direction from the four-way intersection with Main, Pleasant and East Streets to an intersection with Route 133 (Andover Street). Accordingly, North Street provides the main connection between the two state routes that pass through Tewksbury, Routes 133 and 38. North Street provides an alternate route to I-495 because its intersection with Route 133 is approximately one-half mile from the I-495/Route 133 interchange. The pavement condition along North Street is generally good. The roadway striping and signage are also in good condition and the posted speed limit is appropriate. The land uses along North Street vary considerably. The section of the road from Route 133 to North Gate Road is heavily commercial while the remainder of the road serves residential and civil (fire station and school) uses.

River Road in the northern reaches of Tewksbury runs parallel to the Merrimack River between I-495 and the river. Starting in Tewksbury, where it intersects with Route 133 near the Lowell city line, River Road passes through Tewksbury into Andover, where it intersects with I-93 at Exit 45, and on into Lawrence where it turns into Andover Street and intersects with Routes 28 and 114. The pavement condition along River Road is generally fair. The signage and roadway striping are in good condition. The geometry of the intersections with Fiske Street and Trull Road require someone traveling the speed limit on River Road to slow down significantly in order to negotiate the sharp turns. The area served by River Road is almost exclusively residential. Due to the river north of the road, the cemetery and the golf course, there are fewer curb cuts on River Road than would be found on a comparable roadway.

All of Tewksbury's Major Collectors have one feature in common: a nearly complete lack of sidewalks. Most of them also have very limited shoulder widths, which is understandable given Tewksbury's development history, but the lack of a sidewalk network presents a traffic problem in itself. Even the shortest of trips in Tewksbury must be made by car because it is unsafe to walk great distances along the town's rolling, twisting and unlit rural roadways. About two years ago, the Board of Selectmen appointed a committee to study the need for an improved sidewalk network throughout town. The Tewksbury Sidewalk Committee initiated a plan to evaluate and prioritize streets in need of sidewalk improvements, and ultimately recommended a "Phase 1" approach that includes improvements on Shawsheen Street, North Street, Brown Street, Foster Road and South Street.¹ Although town meeting authorized a bond to finance Phase 1, voters declined to exclude the debt from the Proposition 2 ½ levy limit last fall.

¹ Tewksbury Sidewalk Committee, Five-Year Plan (2002)

Minor Collectors

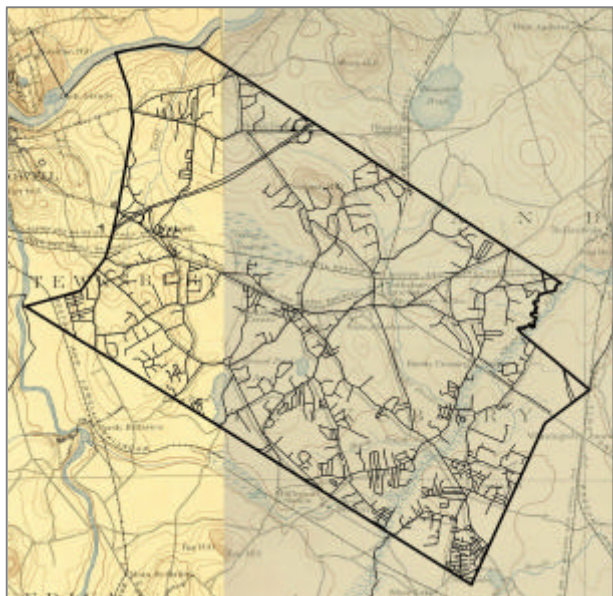
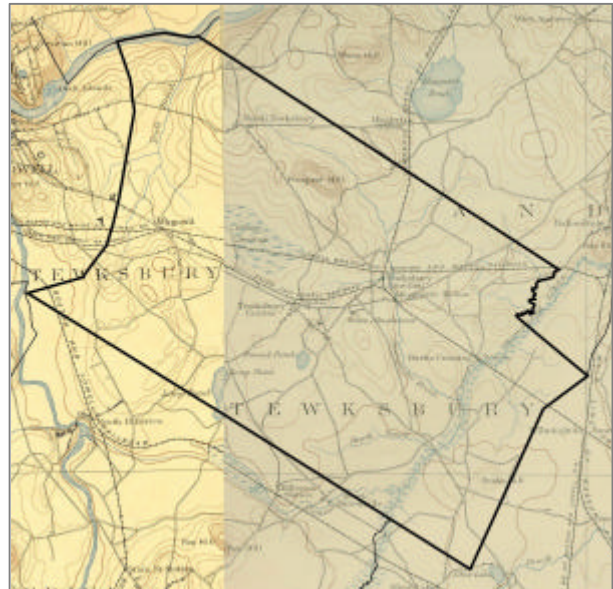
Minor collectors are the network of roadways that allow individuals to move from a local road to a major collector or minor arterial. While these roads may be similar in size and geometry to major collectors, they do not experience the same level of use. In general, minor collectors absorb less use because of their location within a community, away from major destination points. Tewksbury has about 21.8 miles of roadway in this classification. Examples of minor collectors in Tewksbury include South Street, Livingston Street, Rogers Street, Foster Road, Trull Road and Brown Street.

Local Roads

Local roads almost exclusively serve residential uses. They have driveways cuts to serve abutting properties and are typically the point where local trips begin and end. As is the case with most urban and suburban communities, the approximately 90.6 miles of local roads in Tewksbury make up the majority (61%) of the town’s total roadway miles.

History of Roadway Development

Tewksbury’s location northwest of Boston and its topography both influenced the development of a local roadway network. These factors continue to affect the way development occurs in Tewksbury today. A review of two historical topographical maps provides a great deal of insight into the development of the town’s roadway system. The 1893 U.S.G.S. topographical map of Tewksbury (Fig. 1) shows a rather extensive network of unpaved roadways that bears a striking resemblance to the town’s current layout (Fig. 2). It is clear that the skeleton of today’s road system existed before the first automobile ever rolled through Tewksbury. The 1942 U.S.G.S. topographical map (not shown) identifies only a modest expansion of the basic network of roadways described in the 1893 map. In fact, the roads described on the 1942 map as paved roads – Route 38 “Main Street”, Route 133, Fiske Street, North Street, Kendall Street, East Street, Ballard Street, Shawsheen Street, South Street (portion), Marston Street, Whipple Road and Chapman Street (portion) – are all examples of roadways from the upper portion of the street



Figs. 1-2: 1893 USGS Quadrangle Maps; (1) as of 1893, (2) with overlay of present street network. Map sources: University of New Hampshire Historic Maps Repository, MassGIS.

hierarchy (minor arterials and major collectors). This indicates that in most cases, the role a roadway plays in the transportation network is defined more by geography, topography and history than by the latest round of development. The main roads in Tewksbury today have been the main roads for many generations of residents.

Status of Bridges

According to NMCOG's Regional Transportation Plan (2002), MassHighway has completed an inventory of all bridges in the region. The bridges were inspected and rated on two scales developed by the American Association of State Highway Transportation Officials (AASHTO). One scale considers the structural integrity of a bridge and the other, the operational integrity of a bridge. Although MassHighway did not rate any bridges in Tewksbury as structurally deficient, three bridges have been classified as functionally obsolete: the Bridge Street bridge over the Shawsheen River, the I-93 northbound and southbound bridges over Vale Street.² Responsibility for the I-93 structures lies with MassHighway.

Alternative Modes of Transportation

Regional Bus Service

The Lowell Regional Transit Authority (LRTA) provides fixed-route service in two areas of Tewksbury: the #20 Tewksbury/Route 133/IRS route and the "TK" Main Street/Tewksbury Hospital/Main Street route. The #20 route operates on one-hour headways Monday through Friday from 6:00 a.m. to 6:00 p.m. There are twelve runs both inbound and outbound, and all runs either terminate or originate in Lowell. LRTA added this route in response to the NMCOG region's "Access to Jobs" initiative. The intent of the #20 route is to connect downtown Lowell with suburban employment centers such as the IRS and Raytheon facilities in Andover, and Avid Systems, Wang Technology and other high-tech firms in Tewksbury. The "TK" route operates weekdays only, on approximately one-hour headways from 7:00 a.m. to 5:15 p.m. There are eight runs both inbound and outbound, and all runs either terminate or originate in Lowell. This route provides access to the Main Street business district at several key locations.

LRTA also provides a "Road Runner" one-day advanced notice transportation service for senior citizens and persons with disabilities. Road Runner operates weekdays from 8:00 a.m. to 5:00 p.m. and can be scheduled for other special trips.

Commuter Rail

The Massachusetts Bay Transportation Authority's (MBTA) commuter rail line between Gallagher Terminal in Lowell and North Station in Boston provides indirect service to Tewksbury. By number of parking spaces, the stations along the Lowell commuter rail line include Lowell (695), North Billerica (541), Wilmington (191), Anderson/Woburn (2000), Mishawum (0), Winchester (237), Wedgemere (103), Medford (30) and North Station. Tewksbury does not have a commuter rail station. The closest stations to Tewksbury are North Billerica, Wilmington and Ballardvale in Andover. The North Billerica station is located near the Billerica/Tewksbury/Lowell line, off

² NMCOG, Regional Transportation Plan (2001), Chapter VI, Table 12.

Billerica Avenue near Mt. Pleasant Street. Most Tewksbury commuters have to drive west through town, mainly on local roads, to reach the North Billerica station and its parking lot, while generous (541 spaces), is filled by 8:30 a.m. on most weekday mornings. The Wilmington station on Route 38 is about 1.5 miles south of the Tewksbury/Wilmington border. It is conveniently located for many Tewksbury residents and is served by a 191-space parking lot owned by the town of Wilmington. The Ballardvale station in Andover, off Andover Street about 1.5 miles east of the Tewksbury/Andover border, is convenient for Tewksbury residents who live east of Route 38. However, the Ballardvale station has a relatively small (120 space) parking lot.

Two major airports provide travel outside the region. Manchester Airport in Manchester, NH is approximately 35 miles (or about 40 minutes) from Tewksbury. Manchester Airport is served by eight airlines that provide daily service to major hubs from the Midwest U.S. and southern Canada to the northeast corridor and Florida. Due to a recent terminal expansion and expanded daily flights, passenger activity at Manchester Airport exceeded 2.75 million in 2000. Logan Airport in Boston is approximately 25 miles (30 minutes) from Tewksbury. One of the 25 busiest airports in the world when measured in terms of plane movements (takeoffs and landings), Logan is the gateway to the world for New Englanders. Not long ago, Tewksbury was home to a very small airport near Shawsheen Street and Route 38. The Tew-Mac Airport operated from the early 1950s until it was sold for development in 1997.



The former Tew-Mac Airport in Tewksbury (1996), one year before it closed. Photo by John Ford, Les Vants Aerial Photos (INTERNET, "Abandoned and Little-Known Airfields.")

There are presently no designated bicycle facilities along functionally classified roadways in Tewksbury.³ However, cyclists use many of Tewksbury's major roadways as transportation links despite the absence of bicycle lanes. Potential off-road cycling alternatives include the proposed Strong Meadow Trail from Andover to Billerica and the rehabilitation of a recently acquired rail right-of-way that runs parallel to Main Street near the town center.

Problem Areas and Critical Traffic Locations

Route 38 "Main Street"

Empirical evidence exists everywhere that traffic is a major problem in Tewksbury. It was a major problem when the town's previous master plans were written (1958, 1973), and although attention has been paid to some of the improvements recommended in 1973, most of the issues, constraints and needs described at the time remain true today. For Tewksbury residents, traffic is one of the leading points of contention every time a commercial property owner proposes to expand or a

³ NMCOG, Regional Transportation Plan, Chapter XI.

housing developer files a new subdivision plan. Nowhere are Tewksbury’s traffic problems more obvious than along its spine road, Route 38 “Main Street.” It makes sense to refer to this roadway as Route 38 “Main Street” because doing so highlights the dual (if not competing) functions that it serves. As Route 38 “Main Street,” the road traverses the entire length of Tewksbury, from Wilmington in the south to Lowell in the north, essentially bisecting the town. Its designation as a state numbered route suggests a roadway that functions as a major arterial for those seeking to travel through Tewksbury, yet “Main Street” functions as a major collector for those traveling within Tewksbury. “Main Street” is Tewksbury’s historical mecca, where important civic structures and prominent homes were built and commerce flourished. Over time, its development resulted in unregulated curb cuts that pre-date current review policies and regulations.

Owing to its unique nature, Route 38 “Main Street” allows one to take the pulse of Tewksbury traffic by examining traffic changes along this roadway. As demonstrated by Average Daily Traffic (ADT) statistics from MassHighway, traffic on Route 38 has steadily increased over the past ten years. The increasing ADT at four points along Route 38 “Main Street,” as shown in Table 2, conveys the incredible pressure experienced by this major element of Tewksbury’s infrastructure (see Map 2).

Table 2: Average Daily Traffic (ADT) on Route 38/Main Street in Tewksbury, 1993-2001

Location	Map #	1993	1994	1996	1997	1998	1999	2000	2001
@ Wilmington town line	1							14,700	18,670
South of Villa Roma Drive	2					19,196		25,800	27,436
East of Pleasant Street	3	18,000		17,400			23,600		
South of I-495	4		22,000		28,100			29,200	

Sources: NMCOG (www.nmcog.org/tewksburytrafficcounts1998.htm) and MassHighway (www.state.ma.us/mhd/traffic/bytown/tewksbury.htm)

East Street

The other roadway with significant traffic issues is East Street, one of Tewksbury’s major collectors. It is important because it connects the closest I-93 interchange, Dascomb Road in Andover, with the geographic center of Tewksbury, or the intersection of Main and Pleasant streets. Over its 2¼-mile length, East Street has major intersections with Shawsheen Street (at the Andover-Tewksbury town line), Maple Street and Livingston Street, as well as a railroad crossing. The most recent ADT statistics available for East Street were recorded in 2000. At the time, the ADT on East Street (measured just east of Livingston Street) was 12,000 vehicles. In 1998, NMCOG predicted that by 2002, all of East Street would be operating at Level of Service (LOS) “E” during the morning and evening peak hours.⁴ At the time of NMCOG’s study, the East Street intersections with Chandler Street and Whittemore Street were operating at acceptable levels but the intersections with North Street, Livingston Street, Maple Street and Shawsheen Street all were failing or operating at

⁴ NMCOG, East Street Traffic Study (March 1998).

unacceptable levels during peak hours. While operating at LOS "E" is less than ideal, it means that the roadway can still function because it has some reserve capacity. However, without physical improvements to East Street, the LOS at all intersections will continue to deteriorate.

Tewksbury has taken some steps to address East Street's traffic problems. For example, there are short- and longer-term plans to install traffic control signals at three major intersections along East Street. The design for signalization improvements at East and Chandler Streets has been completed, and the project was scheduled to be put out for bid in Spring 2003. Similar improvements will be made at the East Street/Livingston Street intersection, but the design plans have not been initiated yet. The Transportation Bond Fund will be tapped to finance both signalization projects.

Traffic Incidents

In the Northern Middlesex Regional Transportation Plan (2001), NMCOG identifies and ranks the most dangerous intersections in the nine-town area on a scale that considers number of accidents, property damage, injuries and fatalities. According to NMCOG, three of the region's 41 highest-ranked accident locations are in Tewksbury. Not surprisingly, two are the town's interchanges with I-495: the Main Street/I-495 intersection ranks 16 out of 41 and the Andover Street/I-495 intersection, 29. However, the Main Street/Shawsheen Street intersection ranks as the 14th most dangerous in NMCOG's region. It is little wonder that MassHighway plans on spending \$250,000 to reconstruct the traffic signals at this intersection. According to the most recent State Transportation Improvements Plan (STIP), MassHighway will solicit bids this fall, with construction to occur in Spring 2004.⁵

The Tewksbury Police Department recently compiled a list of all reported traffic accidents in town between January 1-November 11, 2002. During this period, 692 accidents were reported in Tewksbury. An astounding 46% (319 of the 692) occurred at locations on Main Street. Given its length and the amount of traffic it carries each day, Route 38 "Main Street" is more likely to generate accidents than any other road in town. Regardless, when 46% of all accidents occur on one roadway, it is crucial to identify and address the causes.

Congestion

NMCOG completed a Congestion Management Plan in 1997 and continues to monitor the high-congestion areas identified in that report. In some cases, including Route 38 in Tewksbury, NMCOG conducted further studies. The Regional Transportation Plan contains a list of the 25 most congested roadway segments in the region, and two are in Tewksbury: nearly the entire length of Route 38 "Main Street," between I-495 to the Wilmington town line, and a 1.2-mile long segment of Route 133, from I-495 to the Andover town line. The inclusion of these areas probably comes as no surprise to residents of Tewksbury. However, some may wonder why other roadways, such as East Street near the Andover town line, were not included.

⁵ MassHighway, http://db.state.ma.us/mhd/planning/Pro_Select.asp [updated 5 June 2003].

Master Plan Goals

The Master Plan provides an opportunity to explore several challenges and address current and potential future shortcomings in the town's transportation network. When residents participated in the Master Plan Committee's visioning meetings (Fall 2002), they expressed four goals that relate directly to traffic and circulation, all of which touch on issues described in the preceding pages:

- Reduce congestion on Route 38 "Main Street."
- Increase vehicular and pedestrian safety throughout town.
- Address residential/industrial traffic conflicts in the East Street corridor.
- Develop a capital budgeting plan to finance improved roadway maintenance.

In so many words, the transportation goals that residents identified during the visioning forums call for a comprehensive transportation management plan: strategies to improve traffic operations, reduce the number of vehicles on the road, and reduce traffic impacts on a community. To achieve these ends, Tewksbury needs complementary land use regulations, design and capacity, improvements, transportation demand management, and where appropriate, traffic calming.

Analysis of Needs and Planning Considerations

Transportation and land use issues usually go hand-in-hand, and in this regard Tewksbury is no exception. Many of the traffic problems that residents, local officials and regional planners have identified in Tewksbury stem from land use conditions, some with deep historical roots. An obvious example is Route 38, where the challenge of moving high-volume traffic is exacerbated by uncontrolled and poorly defined curb cuts on commercial property. In addition, the traffic situation on East Street reflects not only a large number of cars moving between I-93 and the center of town, but also the tangle of land uses that pit tractor-trailer operators against resident drivers.

Ultimately, origin and destination points – land uses – in and outside of town generate the traffic that puts demands on Tewksbury's roadways. While changing local development regulations will address some of these problems, Tewksbury does not control the land use policies of other communities. Many of its circulation issues are more complicated and entrenched than regulations alone can cure. Moreover, Tewksbury does not have jurisdiction over all of the roads that cross through town. The structure of transportation policy, planning and finance involves a complex weave of federal, state and regional authorities, effectively forcing cities and towns to compete for limited dollars in a process that elevates the worst hazards to the top of funding priority lists.

Traffic and circulation issues in Tewksbury have garnered attention from state, regional and local officials and obviously, from the town's residents. At the state level, MassHighway's STIP provides for traffic control improvements at several of Tewksbury's problem intersections. At the regional level, NMCOG oversees the long-range Regional Transportation Plan and the region-wide Transportation Improvements Plan (TIP), and as a result the agency plays a vital role in bringing transportation resources to Tewksbury. NMCOG is currently working on a Route 38 corridor study that will examine issues in much greater detail than can be accomplished during the master plan process. Locally, the Board of Selectmen formed a committee to prepare a sidewalk improvement plan and citizens at large have consistently sought improvements to conditions along East Street. While the projects undertaken and the issues addressed by these groups differ somewhat, they share the common theme of addressing transportation safety needs in Tewksbury.

1. Reducing congestion on Route 38 “Main Street” is Tewksbury’s most critical transportation need and a key objective of the Master Plan. If any single road is the face of Tewksbury, it is Main Street.

“Route 38, which is also the main street of Tewksbury, creates the worst traffic problem in town. A large amount of the traffic utilizing this road is local and, therefore, slow. In addition, cars and trucks are continually turning off the road into the many roadside businesses, making it extremely hazardous and slow for through traffic.”

When these words appeared in Tewksbury’s first master plan (1958), the ADT on Route 38 was about 8,000 vehicles. Today, the ADT is 21,000 vehicles. In 1958, Tewksbury’s major transportation challenge was to address congestion on Route 38 “Main Street,” and the same holds true today. Main Street’s transportation needs are inextricably linked to many goals of the master plan. For example, creating a pleasant, pedestrian-oriented town center and attracting the types of development that Tewksbury deserves depend on making the process of getting to Main Street more humane. Since NMCOG expects to publish a report on existing conditions and projected future traffic loads, the planning concepts outlined below must be taken in conjunction with the findings of the Route 38 corridor study. Still, there are actions that Tewksbury can take even without the corridor study – actions that will be compatible with NMCOG’s work because they are obvious, well known, and consistent with recommendations of past master plans.

A comprehensive approach to improving conditions on Route 38 will most likely include widening in a few key locations to allow for left-hand turn lanes, consolidating curb cuts and improving traffic controls. Of course, Tewksbury does not have the power to widen Route 38 “Main Street” in any

manner, or to improve signalization and other controls, because the road is under MassHighway’s jurisdiction. Physical improvements to Route 38 “Main Street” must await the completion of NMCOG’s corridor study. However, Tewksbury has the power to adopt regulations that will consolidate the number of curb cuts along Route 38 “Main Street.” The curb cut problems along Route 38 “Main Street” take one of two forms: commercial properties without defined curb cuts (or a “lot wide curb cut”) and contiguous commercial properties with a succession of individual curb cuts. Each curb cut represents another potential traffic movement and increases the risk of vehicular conflicts.



An example of a “lot wide” curb cut on Route 38 in Tewksbury. Photo by Wayne Darragh, March 2003.

Curb cuts also destroy the continuity of the curblines, thereby blurring the existence of the sidewalk and increasing the potential for automobile-pedestrian conflicts.

There are many examples of commercial properties without defined curb cuts in Tewksbury’s Commercial District. They warrant concern for a number of reasons: lack of control over automobile movements, elimination of the sidewalk for long stretches at a time, and lack of any buffer area between the parking lot and the roadway. The lack of defined access and egress points means that drivers entering or exiting a parking area must be prepared for the approach of other automobiles

from every possible direction. This condition also jeopardizes the safety of pedestrians attempting to cross the width a commercial lot, first because vehicles can enter and exist the parking area from any point and second, there are no defined sidewalks and curbs to separate the travel way and walkway. The same condition represents a lost opportunity for beautification and enhancement of the roadside, for landscaped buffers between parking lots and the street would make Route 38 a more attractive corridor through town.

The consolidation of curb cuts can take two forms: multiple curb cuts on a single parcel can be consolidated into one curb cut, and curb cuts for adjacent parcels can be consolidated so that all of the parcels are served by common points of access and egress. Limiting a commercial parcel to one curb cut that doubles as an entrance and an exit will significantly reduce the total number of curb cuts along Route 38 “Main Street.” Multiple curb cuts on a single parcel increase the potential number of traffic movements and cause congestion, a condition made worse by multiple curb cuts that can be used for both entering and exiting a parcel. Single entrances and exits also provide opportunities to consolidate signage along the roadway and reduce visual clutter. This approach is particularly valuable for managing access to corner lots. Limited entrance and exit points can be used to route traffic through the commercial site onto a less busy side street instead of forcing another traffic movement onto the already congested Route 38 “Main Street” corridor.

Although consolidating curb cuts on adjacent parcels is a more complicated endeavor, it has the potential to provide greater benefits to the town. For example, when two adjacent commercial parcels have individual entrance and exit curb cuts, the result is four curb cuts along one section of the road. If travel were allowed over the “borders” between the parcels, two or three of the existing curb cuts could be removed, as suggested by Fig. 3. By closing a curb cut on each parcel, one of the remaining curb cuts could become the designated entrance for both parcels and the other, a designated exit, thereby eliminating two curb cuts. If both parcels close both their existing curb cuts and redevelop a single curb cut along the property line to accommodate both entrance and exit movements, three of the original curb cuts would be eliminated. A consolidated entrance provides an opportunity to consolidate the streetside signage for these businesses, possibly by locating it on an island in the middle of the single two-way (entrance/exit) curb cut.

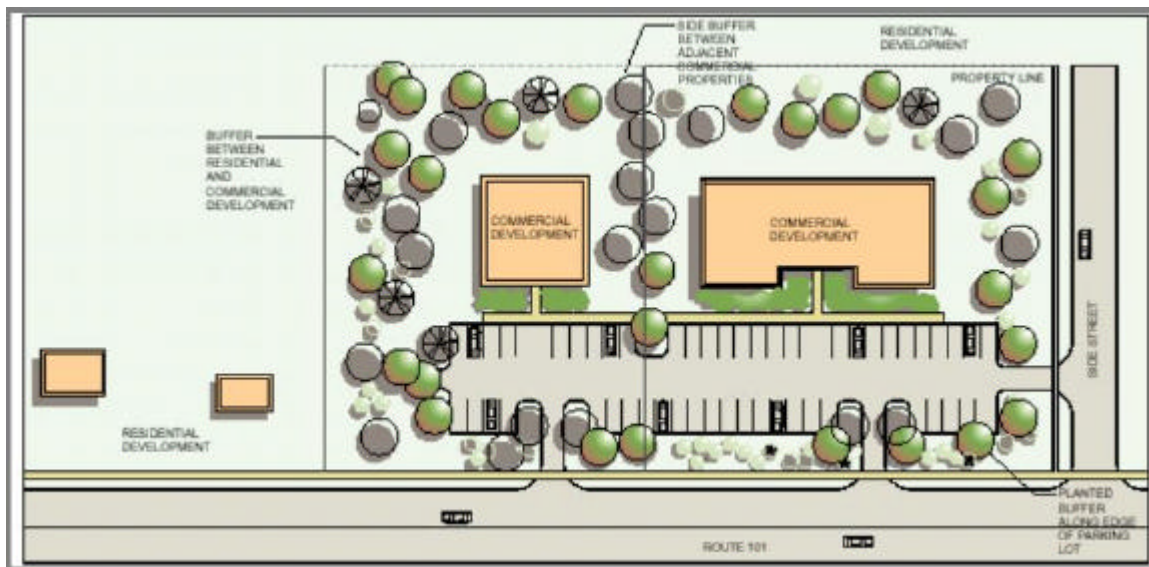


Fig. 3: Shared points of ingress and egress. Image supplied by Terry S. Szold, MIT (2002).

Curb cut consolidation will remove many of the breaks in sidewalks along Route 38 “Main Street” and create a safer environment for pedestrians because they would not have to cross so many active entrances/exits. Moreover, curb cut consolidation would complement the use of designated left-turn lanes along Route 38 “Main Street ” if local and state officials decide to create them. It is impossible to establish a left-hand turn lane at every curb cut, but consolidating multiple curb cuts into single entrance/exit points would allow a single designated left-hand turn movement to access multiple commercial parcels.

2. The condition and appearance of major entry points into a city or town cast an impression of the entire community. These “gateway” locations need careful consideration, not only in terms of land use but also roadway treatments: signage, landscaping, and friendly “ground rules” for the use of a community’s roads.

One of Tewksbury’s important qualities is its visual diversity. The town has scenic rural byways and major highway interchanges, historic homes, cottages and modern suburban housing stock, two-family homes and large multi-family developments, beautiful civic buildings and churches, and a wide mix of business activity, yet the major points of entry into Tewksbury belie all that the town has to offer. Instead, Tewksbury’s “gateways” – roads that carry a majority of the town’s incoming traffic – are visually and operationally confusing, a condition often attended by incompatible land uses. This is particularly true at the Tewksbury/Andover boundary on East Street and along Andover Street (Route 133) north and west of the I-495 interchange. In addition, the entries into Tewksbury on both ends of Route 38 convey an unattractive image of the town, and regrettably, the character of development along most of Route 38 reinforces that image. An unintended consequence of failing to pay attention to gateway areas is that traffic entering the community perceives a place that does not care about quality, yet Tewksbury does care about the quality of life for residents, the quality of services delivered by town departments and the public schools, the quality of jobs supplied by commercial and industrial establishments, and the quality of its economic base.

Tewksbury needs to strengthen both the appearance and operational elements of major gateways into the town. Enhancing gateways requires a combination of wise land use regulations and transportation-related improvements. Attractive, visually consistent “welcome” signs that double as a warning against excess traffic speeds, landscaped islands, median strips and berms, clear directional signage, and well-marked walkways that show the town puts pedestrians and bicyclists ahead of cars, all would contribute to a more favorable image of the town and help to improve traffic safety in Tewksbury.

3. Walkable communities need safe, accessible facilities for pedestrians. Tewksbury needs to improve its sidewalk network – for the sake of local residents, businesses and those who drive through town.

Since Tewksbury is not an urban community, sidewalks along every mile of public roadway are neither required nor appropriate. However, Tewksbury’s need for safe, pedestrian-friendly facilities has been touched on several times before and during the master plan process. For example, the Board of Selectmen created a Sidewalks Committee to examine the need for sidewalk improvements throughout town. The committee developed a five-year plan, representing Phase 1 of a long-term process to improve the sidewalk network in Tewksbury. The plan is based on a rational analysis of current gaps in existing sidewalk networks and contains a method for prioritizing projects based on

neighborhood characteristics. Demand for pedestrian access as indicated by neighborhood population density and age characteristics, land uses along a particular roadway (e.g., the location of a school) and roadway right-of-way widths are all issues that Tewksbury must consider as it evaluates the costs and benefits of proposed sidewalk improvements.

Tewksbury's sidewalk deficiencies affect public safety and livability in many ways. Sidewalks protect pedestrians and facilitate neighborhood interaction. The safety benefits of sidewalks are clear and indisputable: they separate pedestrians from vehicles and provide a safe transportation alternative to automobiles. Accordingly, they help to reduce vehicular traffic on local roadways because without sidewalks, even the shortest of trips requires the use of an automobile. Finally, sidewalks encourage socialization because they provide an arena for neighborhood residents to interact. Sidewalks are a play area for children and a meeting place for adults. These benefits are very important in Tewksbury's more densely populated neighborhoods, especially those located near commercial areas. To some extent, sidewalk improvements can be accomplished by working with developers and consistently enforcing sidewalk design regulations. However, areas with the most urgent needs for sidewalk access are substantially built-out. While redevelopment could bring relief over time, public safety problems exist in these areas today and they cannot be resolved on an incremental or parcel-by-parcel basis. Tewksbury voters must be willing to invest in safe public walkways, just as they invest in police and fire protection.

4. Tewksbury needs to address the seriousness of residential-industrial traffic and land use conflicts on East Street.

The end of East Street near I-93 has been a source of long-simmering conflicts between residential and non-residential uses, mainly industrial development. The close proximity of residential and industrial zones creates numerous problems: noise, pollution, public safety and traffic. Some residents believe their fears and concerns outweigh the tax dollars that Tewksbury receives from industrial development along East Street. They find it unacceptable that tractor trailers idle around the corner for hours on end, that traffic must stop while a tractor trailer rig performs a multi-point turn in order to negotiate a poorly designed intersection or driveway entrance, or that tractor trailers rumble by their homes throughout the day and night. When used as zoned, industrial areas usually generate tractor-trailer trips, noise and noxious fumes, and produce qualities that are unattractive from a residential point of view, e.g., storage containers, piles of materials and parked heavy-duty equipment or machinery. In Tewksbury, these characteristics of industrial development are magnified by the lack of adequate buffers between zoning districts and until recently, the inclusion of residential uses in industrial zones.

About five years ago, NMCOG conducted a traffic study of East Street in an attempt to quantify traffic-related issues and propose workable solutions. The study led to several in-progress and future improvements, notably plans to install traffic control signals at three major intersections. The design for Transportation Bond Fund improvements at the East Street/Chandler Street intersection has been completed and according to the project schedule, the town will seek bids for the work this spring. A similar project is in the pipeline for the East Street/Livingston Street intersection. Beyond traffic control improvements, however, Tewksbury needs to consider better land use regulations, permitting standards and code enforcement. East Street's ready access to an interstate highway and its large expanse of industrially zoned land all but guarantee that businesses will continue to operate in this area for many years. As long as the area remains industrial, it will most likely create conflicts with adjoining neighborhoods.

TRAFFIC & CIRCULATION ELEMENT

Since the early 1980s, transportation planning has expanded its focus far beyond building new roads. Today, transportation planning places increasing emphasis on the management and reduction of traffic volumes and alternative (non-automobile) forms of transportation. Communities have come to recognize that major new roadway projects often cause unintended consequences with economic, environmental, and social costs. Typically, a master plan addresses transportation by integrating traffic and circulation issues into a community's overall physical planning process. It usually suggests town-wide policies that a community may adopt to promote transportation-related goals. In general, a master plan does not focus on roadway projects or improvements that pertain to specific sections of town. These tasks call for corridor studies such as the one NMCOC is presently conducting for Route 38, and more detailed traffic studies and field investigations than a master plan is designed to accommodate. Nonetheless, a master plan for Tewksbury that ignores Route 38 "Main Street" is a plan destined to fail, which means that the transportation element must recommend Route 38 strategies that Tewksbury has the power to implement.

Four principles guide the Master Plan's transportation element and they appear as recurring themes in each of the plan's major recommendations. The principles include:

- Integration of land use and transportation planning. By locating residential neighborhoods, schools, shopping areas and workplaces in close proximity to one another, and by allowing appropriate mixed-use development, Tewksbury can reduce the need for vehicular travel to conduct one's daily activities. Areas appropriate for more compact, mixed-use development would include the town center and designated nodes along and adjacent to Route 38.
- Corridor access management. Tewksbury needs a comprehensive approach to corridor access management, notably along Route 38. Land use, transportation and public safety strategies must be integrated in order to provide safe, efficient access to property, improve traffic flow and safety, and enhance the town's visual image. At the very least, Tewksbury should require all new developments to minimize curb cuts and provide internal circulation and adequate access points, thereby minimizing traffic impacts on adjacent roads.
- Transportation demand management. Tewksbury's commercial and industrial establishments employ more than 17,000 people, of which about 16% are residents of the town. Large companies bring tax revenue to the community, but they also bring traffic. Tewksbury needs to explore transportation demand management (TDM) strategies that encourage or require alternatives to travel by single-occupancy vehicles. The feasibility of better public transportation service, ride-sharing, walking and biking should be investigated with local employers, perhaps through the aegis of a local economic development council or development corporation.
- Traffic calming. The concept of "traffic calming" includes a range of strategies to slow down traffic, reduce the use of local roads for through traffic, and improve pedestrian safety.

Transportation Policies

Throughout the Master Plan process, several transportation-related issues frequently surfaced in Tewksbury: the volume of traffic and congestion along Route 38, traffic (and land use) conflicts on East Street, inadequate sidewalks, and the role of gateways in conveying Tewksbury's image and shaping driver behavior within the community. It is important to reiterate that land uses generate traffic. People drive because they must travel from their home to work, school, shopping, or other

places. As a result, the number and length of vehicle trips required for routine activities can be reduced by fostering development that encourages appropriate land uses to locate near each other and to take advantage of this proximity. Tewksbury's Land Use Policy Plan incorporates this concept in several ways. For example, it promotes a compact, mixed-use town center and a selectively broadened mix of uses in new districts proposed elsewhere on Route 38. It also recommends replacing the existing industrial district with mixed-use and transitional zoning for the area on East Street near the Andover/Tewksbury town line. The following transportation-related policies complement the Land Use Policy Plan and they are illustrated on Map 3.

Route 38 "Main Street." The completion of NMCOG's Route 38 corridor study will most likely mean that Tewksbury has to choose one or more preferred methods to improve traffic operations on Main Street. Toward that end, the town should apply several criteria to the options available for review, working to achieve consistency with the Master Plan:

- Adopt a comprehensive approach to corridor access management. Give preference to solutions that limit points of vehicular access and vehicular conflict and encourage alternative modes of travel.
- Where appropriate, give preference to traffic calming techniques that have been used effectively on arterial roadways, e.g., medians and localized roadway narrowing at key intersections and pedestrian crossing points.
- Avoid transportation improvements that come at the expense of community or neighborhood quality of life.
- Encourage a walkable, attractive town center in the general vicinity of Main, Pleasant and East Streets, emphasizing traditional village development, pedestrian accessibility, and aesthetics.
- Promote safe and efficient traffic movement by controlling the amount, location and spacing of curb cuts, and coordinate the same with designated left-turn lanes.

At the level of local regulations and policies, Tewksbury should implement the following recommendations:

- Amend the zoning bylaw to include site design standards that promote coordinated access to development along Route 38, and tailor these standards to the unique needs of each proposed commercial/mixed-use district in the Land Use Policy Plan.
- Amend the zoning bylaw to include site design standards that encourage travel patterns across property lines between adjacent commercial parcels.
- Adopt a general bylaw that governs all curb cut review, including upon changes in tenancy.
- Review existing parking requirements and consider reducing them, including the introduction of maximum parking standards for uses such as "big box" or "power center" developments. Excess parking creates an incentive to drive, and there is ample visual evidence that many commercial areas along Route 38 have far more parking than they need.
- Adopt incentives to subordinate parking to commercial buildings. Although many commercial establishments prefer to place parking lots in front of buildings for visibility to customers, even "big box" and large national chains can be persuaded to locate parking in more aesthetically pleasing ways. For example, the Old Navy store shown in Fig. 4 is separated from the street by a sidewalk system along an arterial roadway, with parking located in the rear. Tewksbury needs

to consider the ways in which land use regulations, transportation and access policies come together to create a safe, livable community.

Finally, Tewksbury boards and committees may find it helpful to review efforts in other towns that are working to address commercial strip redevelopment. Framingham, Natick, and Salem and Bedford, NH, all have instituted comprehensive approaches to reinventing commercial strips. They have had varying degrees of success, some emphasizing zoning and others pairing zoning with traffic improvements. Changing the land use pattern on a mature commercial strip is difficult and it requires tremendous staying power on the part of local officials. In addition to exercising its police powers to regulate development, Tewksbury would benefit from involving a local economic development council or development corporation in addressing issues on Route 38 "Main Street." A combination of tax incentives, low-interest financing and business improvement districts may be instrumental for stimulating participation by established property owners in a corridor-wide strategy.



Fig. 4. Large commercial establishments can be required to subordinate parking and give preference to pedestrian access at the street. Source: PBIC Image Library (2003).

Sidewalk Improvements. Tewksbury officials and residents are already aware of the town's need for safe, accessible sidewalks, particularly in areas with higher population densities and concentrated business activity. The existing "Phase 1" sidewalks plan should be funded and implemented, and the town should take the following additional steps:

- Incorporate the existing five-year plan by reference into the Master Plan.
- Authorize the Sidewalks Committee to undertake Phase 2 of the sidewalk plan.
- Incorporate proposed sidewalk improvements into the town's five-year capital improvement plan.
- Require consistency with official sidewalk improvements plans by incorporating them by reference in the zoning bylaw.
- Require installation of sidewalks or multi-user paths and trails in other locations, in conformance with the Planning Board's subdivision rules and regulations.

East Street. The land use and traffic conflicts that exist on East Street are complicated and entrenched by investments that have been made over a long period of time. The proposed installation of traffic signals at key intersections will help to improve general traffic operations, but ultimately the problems on East Street will require additional transportation-related and land use policies. The town should pursue the following recommendations:

- Change the zoning on East Street by replacing portions of the existing industrial district with a planned mixed-use development district and a transitional district to provide better separation between industrial and residential areas.
- Supplement traditional density and dimensional controls with performance standards for non-residential development, focusing on environmental, noise and traffic standards to reduce conflicts between industrial and residential land uses.
- Work with larger industrial, commercial and other establishments to institute transportation demand management (TDM) for employees commuting to facilities on East Street.
- Acquire land for development of a buffer zone between residential and industrial areas.
- Acquire additional East Street right-of-way when available for pedestrian and bicycle access.
- Develop an enforcement plan for ensuring compliance with local health, safety and land use codes as they apply to industrial uses in the area.
- Work closely with NMCOG to secure East Street improvements through the TIP process.

Transportation Demand Management (TDM). Tewksbury should work closely with developers and owners of large commercial and industrial developments to encourage (or require) alternatives to single-occupancy vehicles as a means of employee transport. Though fairly new in Massachusetts transportation planning policy, TDM is widely used in other parts of the country. Its purpose is to achieve more efficient traffic operations on established roadways by reducing vehicle trips instead of making significant, costly capital improvements. TDM also encourages “live near work” situations in which residents may walk, bike, or have a very short commute to their workplace. In this regard, it is consistent with other Master Plan recommendations that promote mixed-use development.

Tewksbury needs to evaluate the appropriateness of requiring TDM as a condition of approving new non-residential development. Since TDM involves many techniques, the town should offer a menu of compliance possibilities to developers and new business establishments, such as transit, carpool and ride-sharing incentives, and appropriately maintained bicycle facilities.

Traffic calming. The term “traffic calming” has somewhat different meanings in the transportation planning community, but the Institute of Transportation Engineers (ITE) has adopted a fairly useful definition: "Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." A practice that originated in Europe, traffic calming has gained credence in American transportation circles and is widely used throughout the western states, the Midwest and in Maryland, New Jersey and New York. Traffic calming includes simple, low-cost ways to address a variety of traffic problems – speed, volume, pedestrian-vehicular conflicts – but even the more expensive traffic calming techniques rarely cost as much as conventional roadway improvements such as widening to increase capacity. Most of the national and international applications of traffic calming have occurred on local and collector roadways in central business districts, urban areas and suburban neighborhoods, but they have also been used on arterial roads that carry traffic volumes comparable to Route 38.

There are areas in Tewksbury that may benefit from traffic calming measures and the town should investigate them, possibly with technical assistance from NMCOG. For example, Whipple Road appears to absorb a considerable amount of cut-through traffic, no doubt by drivers seeking to avoid congestion on Route 38. Whipple Road is also a long residential street that serves a number of subdivisions with dead-end or cul-de-sac roads, mainly west of Pleasant Street. As a result, it

doubles as a traffic collector and a neighborhood roadway, a condition ripe for use conflicts. Traffic calming measures to improve pedestrian safety should be considered at critical locations such as the Whipple road intersections with Marston, Rogers and French Streets, and from the Whipple Road-Pond Street intersection southward along Pond Street.

In addition, while installing traffic signals at key intersections on East Street may result in safety improvements, East Street has some unique characteristics that go beyond the oft-cited residential-industrial conflicts. Specifically, it has extended stretches of unvaried land use due to the presence of some larger parcels and notably, the land associated with Tewksbury Hospital. As East Street progresses toward the center of town, it serves or provides indirect access to a number of civic or public uses: the Livingston Street recreation area, the town’s senior center and a cemetery. Traffic-calming strategies to reduce traffic speed and increase driver awareness of pedestrians between Maple Street and the four-way intersection on Main Street would be very appropriate in this area, and they would also enhance East Street’s function as a gateway to the town center.

Gateways. Tewksbury residents and local officials have expressed a desire to improve the appearance, function and operation of gateway areas into the community. In planning terms, gateways include specific points of entry, such as a town line or a major highway interchange, and sections of roadways that lead to a recognized destination or landmark, such as a town center. By these standards, Tewksbury has several primary and secondary gateway areas that would benefit from transportation management policies:

Primary Gateways	Secondary Gateways
I-495/Rte. 133 (Andover Street) interchange	Whipple Road (Lowell line)
I-495/Rte. 38 (Main Street) interchange	Shawsheen Street (Billerica line)
Route 38, Wilmington line	Trull Road/Andover Street area
Route 38, Lowell line	
East St., Andover line	
Approaches to town center: East Street (from Maple Street), North Street (from railroad right-of-way) and Main Street (from Pike to Marshall Streets to the west, and from Chandler Street to the east).	

Gateways serve two critical functions: they convey a community’s image and influence the behavior of drivers entering and passing through town. They often support major economic nodes, as is the case in Tewksbury. Effective gateway planning should include business leaders, public safety and public works officials, gateway neighborhood residents, local professionals with specific skills and experience, e.g., marketing, advertising, education, historic preservation, landscape architecture or urban design, and representatives of community organizations that could contribute to a gateway plan’s implementation. Tewksbury needs to establish a gateway planning committee to examine each of the above-listed locations, focusing on the primary gateways first. The committee’s charge should center on traffic management, directional and other public signage, landscaping and design standards. In addition, the planning process should include not only consultation with local residents, but also residents and officials of neighboring communities.