



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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TECHNICAL MEMORANDUM

DATE: October 6, 2016
TO: Boston Region Metropolitan Planning Organization
FROM: Bill Kuttner
RE: Rest Locations for Long-Distance Truck Drivers in Massachusetts

1 INTRODUCTION

1.1 The Goals of this Study

Rest locations for long-distance truck drivers are a critical component of the nation's freight transportation system. While the rest location system is appended to the public road system, most motorists are unfamiliar with the rest-location system's operating parameters and the challenges that confront the motor freight industry in using them effectively.

The ostensibly simple act of parking a truck has always presented a challenge, and industry and regulatory trends have made these challenges more acute. This memorandum will explore this topic in four steps:

- Discuss safety, efficiency, and environmental issues associated with providing appropriate truck parking opportunities.
- Describe existing conditions, including availability, configuration, and physical condition of truck parking locations serving Massachusetts.
- Highlight a specific need for a major rest location that serves trucks traveling on the northwest arc of Interstate 495.
- Present some of the available strategies and opportunities that would expand and improve truck parking locations in Massachusetts, both at commercial truck stops and at public rest areas.

1.2 Regional Context of this Analysis

The issue of availability and adequacy of truck rest locations is a national problem. The 101 municipalities of the Boston Region Metropolitan Planning Organization (MPO) depend almost exclusively on trucks for their freight transportation needs, and so the truck rest location issues are important to the Boston region even if their scope is statewide or New England-wide.

The issues analyzed in this study are generally applicable to trucks whether they are serving the Boston MPO region or merely passing through as part of a longer trip. Moreover, the specific locations discussed may be in the Boston MPO region, near the MPO region, or elsewhere in New England, but all are important to the MPO region.

The need for truck rest locations does not relate simply to the numbers of trucks on a major highway corridor because many trucks are only traveling locally, and so finding a rest location is not a problem for them. Estimating truck trip distances is difficult. The FHWA publishes the Freight Analysis Framework which provides estimates of state-to-state commodity flows by mode; however, a more detailed estimate can be developed using toll-plaza-to-toll-plaza truck flows collected from the ticketed toll system on the Massachusetts portions of Interstate 90.

According to these data, approximately 5,500 trucks enter the Boston MPO region each weekday on I-90 at Hopkinton, just west of I-495. About 1,600 of these trucks entered I-90 from I-84 at the toll plaza in Sturbridge, almost all of which started in Connecticut or beyond. More than 600 eastbound trucks at Hopkinton entered Massachusetts through West Stockbridge at the New York state line. Another important flow is the 1,600 trucks that enter I-90 at Sturbridge but then exit at I-290 in Auburn, many of which connect with I-495 in Marlborough. If the driver of any of these trucks were approaching their hours-of-service (HOS) limit, the driver would need to stop the truck for 10 hours. The numbers of trucks, locations of express highways, and regulatory requirements all make the topic of truck rest locations directly relevant to the Boston Region MPO.

2 SAFETY, EFFICIENCY, AND ENVIRONMENTAL ISSUES

2.1 Three Safety Problems

Inadequate Rest

Ensuring adequate rest for long-distance truck drivers has been a known safety concern since the dawn of the motor carrier industry. The HOS regulations in force today were promulgated by the Federal Motor Carrier Safety Administration (FMCSA) in 2006.¹ FMCSA has modified these regulations since then in accordance with new requirements set by Congress, a recent change being a requirement that all drivers' logs be electronic by the end of 2017.

The HOS rules are not flexible and the few exceptions provided in the regulations are inconsequential to this analysis. There are three key time durations around which a truck driver must organize his or her work schedule:

¹ *Code of Federal Regulations*, Hours of Service of Drivers, title 49, Ch. III, part 395.

- *10-hour Rest Break:* Any work by a driver, either driving or attending to the vehicle or load, must be preceded by a 10-hour rest break, during which time the driver has no work obligations; he or she can sleep or rest in or out of the vehicle, shower, eat, exercise, etc.
- *14-hour Rule:* After a 10-hour rest break, a driver may spend the next 14-hour work period with activities including driving, supervising loading or unloading, or arranging for maintenance. After these 14 hours, the driver must stop driving; however, non-driving work may continue. The driver cannot resume driving until a new 10-hour rest break has been completed.
- *11-hours of Driving:* Within the 14-hour maximum work period, a driver can only be driving a truck for a cumulative total of 11 hours. After 11 hours of driving the driver must stop and park. Non-driving work may continue, but the driver cannot resume driving until a new 10-hour rest break has been completed.

The HOS regulations are discussed here as an issue, but they are not the problem. They are a solution to a problem: the problem of inadequate rest. That said, these regulations have presented the motor carrier industry, including truck drivers and associated businesses, with challenging new circumstances. As the owners of the nation's roadway system, it is appropriate for the states to be partners in ensuring that the highway freight system can operate safely and efficiently in light of these regulations.

Unofficial Truck Parking

When a driver reaches the end of either a 14-hour work period or 11 hours of driving, the truck must be parked and a new 10-hour rest break commenced. If the driver does not find an appropriate off-road parking space in a timely manner, the driver will feel compelled to simply pull out of traffic and park anywhere the vehicle will fit.

This practice is referred to here as "unofficial parking." In many instances, this is legal, such as on city streets or on the side of principal arterials (where not prohibited). In these cases, it might be considered a traffic hazard insofar as large parked vehicles are an unexpected presence at these locations. Traffic in these situations might find accustomed sight lines impeded. The resting truck will be there for a minimum of 10 hours, effectively reducing the size of the road for that period.

Illegal truck parking also poses a safety problem. Modern limited-access highways are designed with wide, durable shoulders both on the main barrels

and on the entry- and exit-ramps, but in most states parking on limited-access facilities is illegal. Ramps, where traffic is slower, and—to a lesser degree—mainline shoulders are regularly used illegally for mandatory rest breaks. Law enforcement personnel trying to maximize system safety face a dilemma. Motorists are expecting wide ramps, which parked trucks partially obstruct. However, waking a sleeping driver and telling them to move the truck initiates the risk of truck operations by a drowsy driver, usually at night. Recent surveys of state officials indicate that this is a problem to varying degrees throughout the country.

Poor planning by drivers or motor carrier dispatchers resulting in unofficial truck parking is not at issue. Drivers would prefer to use some kind of official truck parking space; one just might not be readily available on a particular trip. The financial penalties to the driver and motor carrier for HOS violations can be severe, and many drivers already use electronic logs and so cannot hope to drive out of regulation without being caught and fined. Any temptation by drivers with paper logs to slightly misstate hours will end with mandatory use of electronic logs in 2017.

Personal Safety of Drivers during Rest Breaks

Many trucks used for long-distance shipments have integral rest accommodations for drivers and are referred to as “sleepers.” Figure 1 shows a tractor unit, used to pull the semi-trailer, equipped with an aerodynamic sleeping area. Widespread investment in sleepers by the motor carrier industry, including “owner-operators” (drivers who own their own tractors), has been critical in responding to the stricter HOS regulations. Figure 2 shows a medium-sized sleeper interior.

Taking the mandatory 10-hour rest break in a sleeper parked at an unofficial location, and to a lesser degree at unstaffed official locations, presents the third safety issue: the personal safety of resting drivers. Motorists rarely sleep in light personal vehicles and parking usually entails only the risks of possible car theft or theft of any valuables stored in the car. A parked sleeper, especially at night, signals the likely presence of a resting occupant and potential crime victim, and this concern initiated new interest at the national level.

FIGURE 1
Sleeper Cab Tractor



FIGURE 2
Typical Modern Sleeper Interior



Source: Peterbilt Trucks.

The problem of driver safety was recognized in the 2012 federal transportation authorization, Moving Ahead for Progress in the 21st Century (MAP-21).² One section of MAP-21 mandated a study of the issues and adequacy of long-term truck parking on the National Highway System (NHS).³ This section of MAP-21 is widely referred to as “Jason’s Law” in memory of Jason Rivenburg, who was murdered in 2009 during a mandatory rest break at an unofficial but legal parking location. The recently released Jason’s Law study⁴ appropriately focuses on the adequacy of suitable official long-term truck parking. The expansion and improvement of the nation’s rest area system will address both personal safety and unofficial parking issues while also facilitating adherence to HOS requirements.

Interest in the rest location system continued at the national level with the enactment of the subsequent transportation authorization in 2015, the Fixing America’s Surface Transportation (FAST) Act.⁵ The FAST Act permits states to use their federal highway funding to improve the rest location system.

² Moving Ahead for Progress in the 21st Century, United States Public Law 112-141.

³ Op. cit., Section 1401.

⁴ Jason’s Law Truck Parking Survey Results and Comparative Analysis, Federal Highway Administration Office of Freight Management and Operations, August 2015.

⁵ Fixing America’s Surface Transportation Act, United States Public Law 114-94.

2.2 An Efficient Freight System with Hours-of-Service Regulations

Trip Planning

The Jason's Law study prominently featured the safety issues discussed above. At the intersection of stringent safety standards and efficient operations are various facets of trip planning: the motor freight industry wants to keep its drivers safe, but also must be highly effective in utilizing drivers' allowable 14-hour duty and 11-hour drive intervals, during which motor carriers must be able to cover their costs.

Trip plans may be devised by a driver or a carrier's dispatcher. Dispatchers may be able to track a truck as it travels and may have access to more information than the driver. Even with today's information resources there are inevitable trip uncertainties with respect to weather, traffic, incidents, construction, and rest location availability.

In addition to the inflexible HOS constraints, there is usually a time window during which a customer will allow a delivery or pickup. As drivers approach their final destinations, they will seek a rest location so that deliveries can be completed during the next work period at times acceptable to the customer. This can be a challenge, and drivers often must choose to forgo an official rest location in order to make their delivery windows. Thus unofficial truck parking can be a consequence of poor trip planning, but it also results from unforeseen circumstances during otherwise well-planned trips.

Choosing a Rest Location

While efficiency and customer service are of paramount importance to the motor carrier industry, drivers and dispatchers prefer official rest locations rather than unofficial locations, as typically they use these only as a last resort. Privately operated truck stops and Massachusetts Department of Transportation (MassDOT)-owned highway rest areas vary widely in available truck parking capacity and services and amenities.

With the promulgation of inflexible HOS regulations, truck parking capacity at commercial truck stops and public rest areas has risen in importance. As their allowable duty or driving periods draw to a close, drivers do not feel that they can spare the time to look around for a rest location with available space for their rig. With the larger truck stops, the chance of finding a spot, even in the back corner of the back lot, is greater. But while these large truck stops may have parking spaces and amenities, their locations may not work efficiently with the driver's trip plan. Drivers and dispatchers may choose to pass a large truck stop and risk having to find an unofficial rest location in order to keep the trip as efficient as possible.

2.3 Environmental Issues of Truck Rest Locations

The Problem of Diesel Idling

Truck operations entail some level of unavoidable negative environmental impacts on account of their size and power. Even modern freight vehicles in full compliance with applicable regulations will have significantly more noise and emissions than light vehicles, such as autos that meet the emissions standards of their vehicle class.

The mandatory 10-hour rest break poses particular challenges in dealing with the intrinsic impacts of truck operations. A driver resting in the sleeper needs electric power for heating, cooling, light, and electronic devices. Current is most often generated by the diesel engine idling throughout the rest break. If the semi-trailer has a perishable load, the refrigeration unit also needs to continue running.

The environmental benefits of reduced idling have long been recognized. Also, there are fuel and maintenance expenses associated with prolonged idling, and truck operators willingly reduce idling if cost-effective alternatives are available. Where anti-idling regulations exist, in practice they generally restrict unnecessary idling. However, the comfort of resting drivers and preservation of perishable cargoes are important requirements and the result is often extended noise and emissions from most trucks during mandatory rest breaks.

Strategies to Reduce Diesel Idling

While truck idling has both negative environmental impacts and direct costs to operators, there are few practical alternatives. Any approach to reduce idling requires a tradeoff. For instance, a tractor can be equipped with a smaller-horsepower or battery-based auxiliary power unit (APU). However, APUs add extra weight, limiting the size of the load and putting increased pressure on already narrow profit margins.

Truck stop electrification (TSE) is another approach to excessive idling. In TSE's simplest implementation, 120-volt household current is available at designated parking spaces at a truck stop. Some systems also have individual air conditioners at equipped parking spaces that may be attached to cabs through flexible conduits. Truck operators pay for these services on a per-hour basis.

In addition to the cost of the power distribution system, implementing TSE at existing truck stops can require reconfiguring the parking space layout and vehicle circulation. User fees will not necessarily cover these investments, and so public financial support or TSE as a required condition for receiving approval from planning authorities is sometimes required for TSE implementation.

Transport refrigeration units (TRUs) present similar noise and emissions problems. Most TRUs in current use are powered solely by a diesel engine. TRU manufacturers have introduced diesel-electric hybrid TRUs, which offer operational benefits in terms of fuel and maintenance economies, albeit at a larger initial investment. Unlike diesel TRUs, hybrid TRUs can be plugged into electrical power sources at loading docks or rest stops, providing both operating economies and emissions reductions.

Hybrid TRUs utilize higher-voltage 3-phase industrial current, fundamentally dissimilar to the household current that suffices for drivers' accommodations. While a significant fraction of long-distance trucks have TRUs, only a small portion of these use the hybrid technology. Furthermore, TRU manufacturers have not standardized a voltage level or standard power receptacle for their hybrid offerings. Given the current size of the hybrid TRU submarkets, truck stop operators have little incentive to incorporate TRU support into any TSE capabilities that they currently have and/or may be considering.

Truck Parking Land Requirements

Another difficulty inherent to the 10-hour rest break is the need to park the truck for that interval, which occupies a substantial amount of land for an extended period. Official rest locations, whether private truck stops or public rest areas, require expansive parking lots with lengthy striped parking spaces and wide circulation lanes.

Most truck stops do not charge trucks to park during a mandatory rest break. They generate revenue through the sale of diesel fuel as well as of supplies and services, such as diesel emissions fluid, tire replacement, and vehicle weighing. Food service and convenience stores are also commonplace, and often attract customers in light vehicles as well.

In order for these products to be profitable, they must attract large numbers of trucks to the rest location. Often a truck driver plans to take a 10-hour rest break at a location where they can also purchase various travel services. Only a truck stop with an available truck parking space can attract this customer. Indeed, if this driver does not expect a particular truck stop to have a parking space available, the driver will simply take their business elsewhere.

Many smaller businesses are successful selling fuel, supplies, and travel services to trucks while offering few parking spaces for long-term rest breaks. However, as the preceding discussion suggests, strengthening a network of large truck stops may offer the greatest potential to accommodate future motor carrier growth and reduce the practice of unofficial truck parking.

3 EXISTING CONDITIONS IN MASSACHUSETTS

3.1 Visualizing the Truck Rest Location System

A long-distance truck driver, whether serving a location in Massachusetts or passing through the state, wants to execute an efficient trip plan that complies with both HOS regulations and customer delivery windows. Some drivers have a regular itinerary and schedule, and a trip plan may be optimized for the repeated travel pattern. Other drivers are traveling to unfamiliar destinations in New England or from distant origins, so the time of entry into Massachusetts can only be estimated at the beginning of the trip.

Whether a particular trip is routine or is the driver's first time, the efficiency and safety of the trip may be enhanced by well-situated rest locations and associated amenities. Drivers with a regular itinerary will be familiar with the available rest locations and amenities and this knowledge will inform a standard trip plan. Drivers executing a new trip plan, as well as those who may be modifying it over the course of a long journey, need to understand their rest location options as they enter an unfamiliar region.

An exhaustive list of commercial truck stops on or near interstate and other major highways is published in the *National Truck Stop Directory: The Trucker's Friend*.⁶ Any service station that can accommodate a Class 8 truck—the largest class allowed on US highways without a special permit—can be listed in the *Trucker's Friend* free of charge. The *Trucker's Friend* is considered authoritative for most purposes, and the Jason's Law final report used it as the primary source for commercial truck stop information.

Figure 3 shows how the state of Massachusetts appears in the *Trucker's Friend*, citing the Commonwealth's 32 towns with truck stops. In some cases, there is more than one truck stop in a town; for example, a total of 42 Massachusetts truck stops are listed in the *Trucker's Friend* tables. These tables include 67 data fields for each truck stop, including data such as the availability of showers and tire replacement service.

Figure 4 shows only those truck stops in Figure 3 that have overnight parking for at least five trucks, indicated here with brown dots. Also indicated with brown dots are commercial truck stops in neighboring states with overnight parking for at least 85 trucks. The small truck stops in Beverly and Barnstable are not on major long-distance corridors and do not appear in the *Trucker's Friend*. They are shown in Figure 4 because they are mentioned on the MassDOT website.

⁶ 2016 *National Truck Stop Directory: The Trucker's Friend*. Clearwater, FL: TR Information Publishers, 2015 (published annually since 1986).

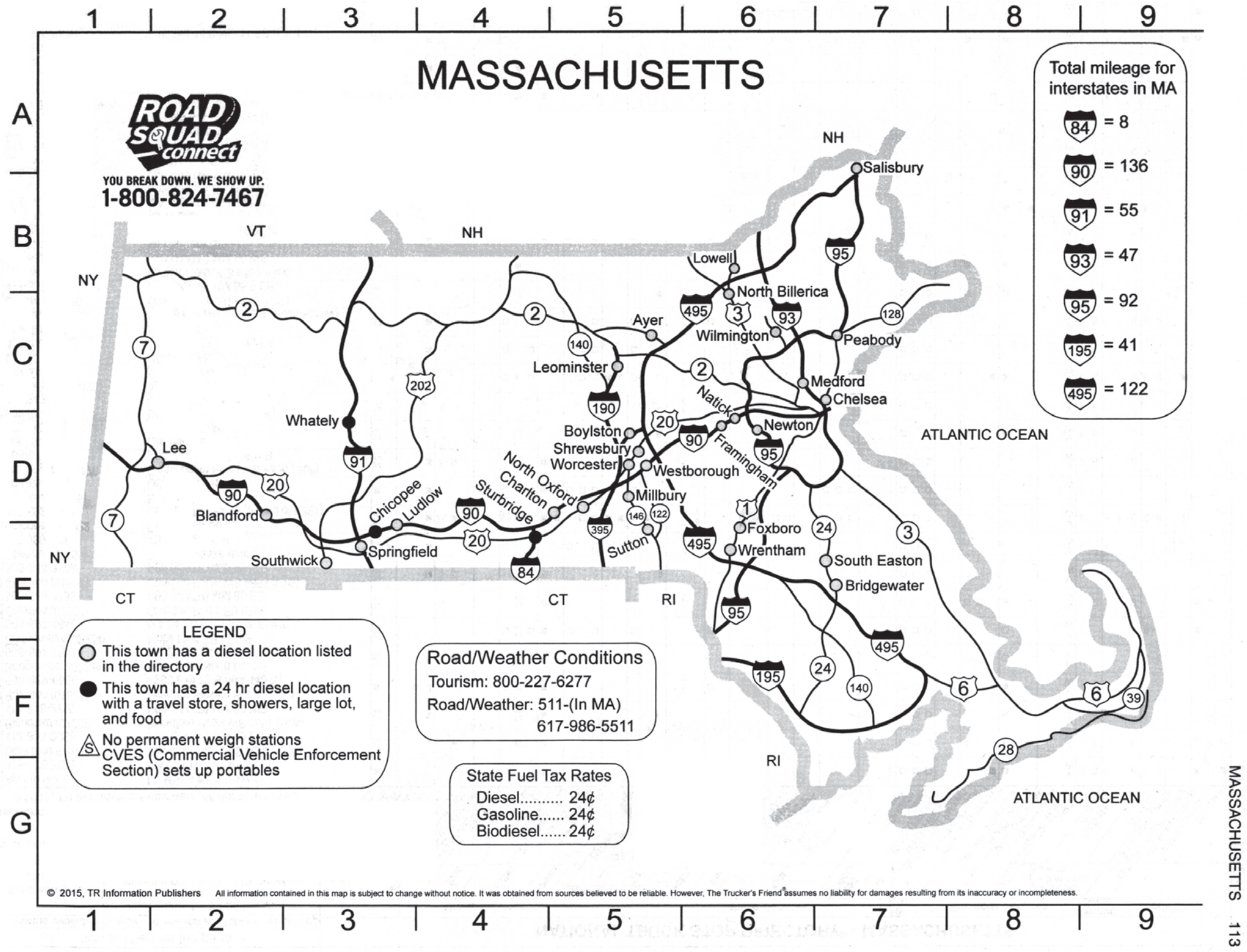


FIGURE 3
Massachusetts Locations Listed in the National Truck Stop Directory:
The Trucker's Friend

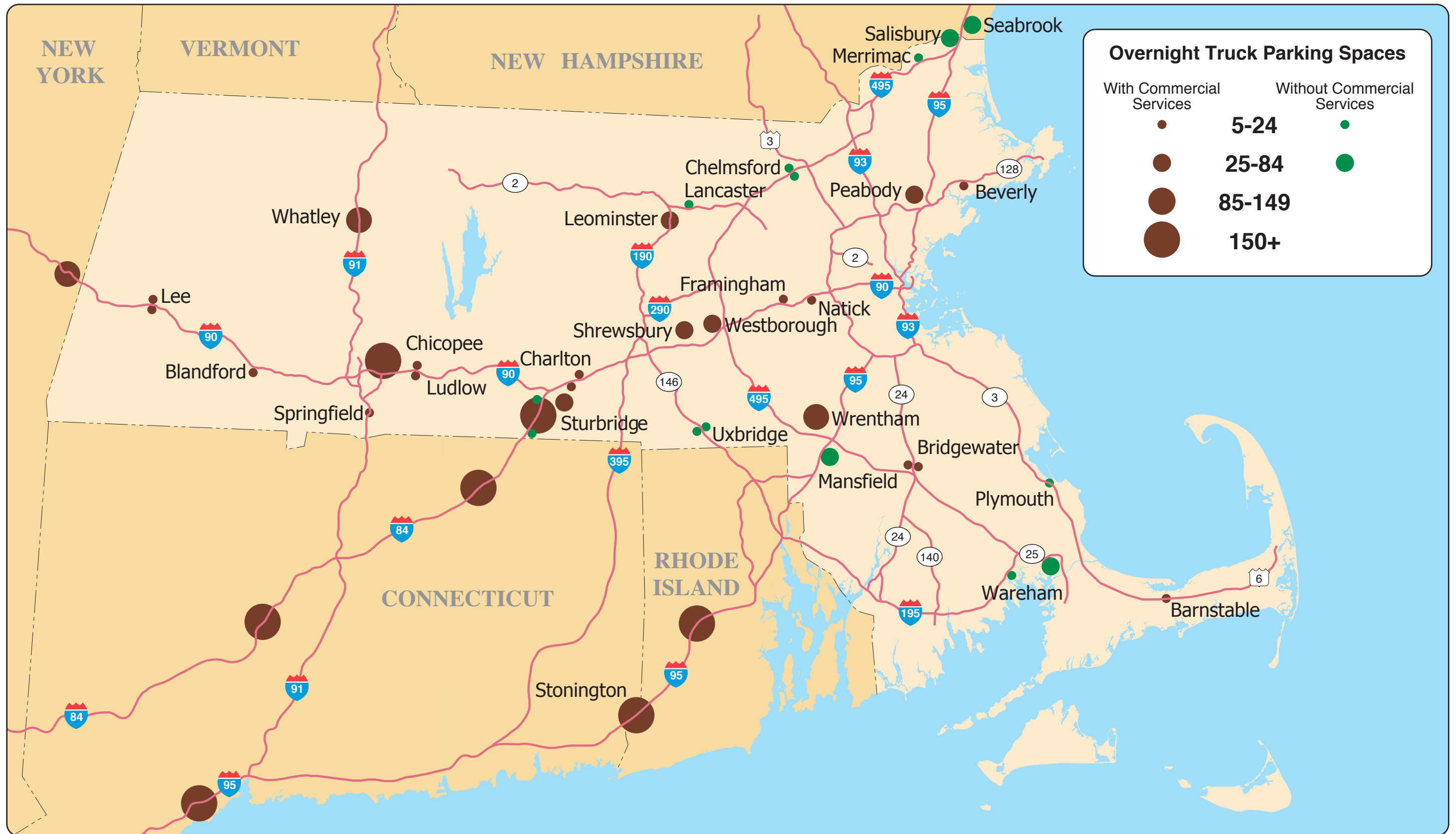


FIGURE 4
Important Truck Parking Locations in Massachusetts
and Large Truck Stops in Neighboring States

Aerial photos of the rest locations mentioned in the text are included in the appendix.

The green dots in Figure 4 indicate Massachusetts-owned rest areas that have at least five parking spaces striped to accommodate large trucks. The roles of commercial truck stops and public rest areas in the rest location system differ considerably; each subsystem will be discussed individually below.

3.2 Truck Stops with Commercial Services

Truck Parking Capacity

The number ranges of overnight parking spots used in Figure 4 are the same ranges used to characterize parking capacity in the *Trucker's Friend* truck stop listings. Of the 42 Massachusetts truck stops listed in the *Trucker's Friend*, only 20 have five or more overnight spaces. The other 22 commercial truck stops may offer a variety of useful services and as many as four long-term spaces, but availability of overnight parking is not implied.

The importance of the number of parking spaces is further emphasized in Figure 3. Of the 32 towns with truck stops, only three truck stops are shown as having a "large" lot, represented by black dots at Whatley, Chicopee, and Sturbridge. In the *Trucker's Friend* size system, a "large" lot has at least 85 spaces and an "extra-large" lot can hold 150 trucks. The truck stops in neighboring states marked in Figure 4 are those locations that the *Trucker's Friend* indicates with a black dot on its individual state maps. The nearest large commercial truck stop north of the area illustrated in Figure 4 is in Kittery, Maine. The *Trucker's Friend* lists no large truck stops in Vermont or New Hampshire.

Connecting Truck Stops to the Road System

The most convenient location for a commercial truck stop serving long-distance motor freight is on an interstate highway, with access provided by direct off- and on-ramps connecting with the main travel lanes. In the 1950s, as designs for the soon-to-be-built interstate highways took shape, Congress recognized that commercial service plazas were a competitive threat to local town businesses, and so new commercial plazas were not allowed on any interstate highway completed in 1960 or later.

A number of major toll highways in the Northeast, including the Massachusetts Turnpike, already existed by 1960 and had been built with integral service plazas. Many of these pre-existing highways were given new route designations and incorporated into the Interstate Highway System, including the Massachusetts Turnpike, which became the eastern end of I-90. Commercial service plazas on these toll highways have been allowed to continue.

Traffic growth since their construction has placed increased demands on the service plazas. In Massachusetts, large food courts were built at service plazas, and truck-parking capacity was lost. Except for the medium-sized truck parking area in Westborough, the Turnpike service plazas can accommodate only a handful of trucks for an extended rest break. Other states have taken different approaches. For instance, the Ohio Turnpike has been able to acquire farmland adjacent to a pair of I-90 service plazas near Sandusky, which now have 76 truck parking spaces in each plaza, with a plaza located on each side of the highway.

The most common type of truck parking space in Massachusetts is the truck stop near interstate highway exit ramps. The three truck stops highlighted in *Trucker's Friend* for their large parking lots have this kind of convenient access: the Watley location at Exit 23 off I-91, Chicopee at Exit 6 off I-90, Sturbridge at Exit 1 off I-84, and the medium-sized truck stop in Leominster at Exit 7 off I-190.

Unlike service plazas on the express highways, which usually can only serve traffic traveling in one direction, truck stops near highway exits can serve traffic in both directions. This distinction is shown graphically in Figure 4, where service plazas are shown with dots touching one side of the highway and off-highway truck stops indicated by dots placed on top of the highway.

Some truck stops are located a short drive away from the express highway, including a second truck stop in Sturbridge and stops in Shrewsbury, Wrentham, and Peabody. Graphically, these stops appear in Figure 4 as dots placed a short distance from the express highways they serve.

3.3 Truck Rest Areas without Commercial Services

Identifying Rest Areas of Interest

There are a large number of rest areas without commercial services within the rights-of-way of state-owned roads in Massachusetts. There is no uniform standard for improvements at these locations, and the overall condition and management of public rest areas as a whole is beyond the scope of this study. All locations with at least five striped truck parking spaces allowing overnight parking are shown in Figure 4.

The 14 public rest areas shown in Figure 4 are all in Massachusetts except for one in Seabrook, New Hampshire, which complements its southbound counterpart in Salisbury, Massachusetts. Another exception not apparent from the graphic is in Plymouth, Massachusetts, on Route 3, with 15 truck parking spaces: since Route 3 is not part of the Interstate Highway System, it can have a

commercial service plaza. Fuel cannot be purchased there, so this location is grouped with the rest areas rather than with the truck stops.

Some of the rest areas have visitors' information centers staffed through local visitors' bureaus. Staffing hours vary by location and sometimes by season. State support for highway visitors' centers was eliminated several years ago; only where a local visitors' bureau can absorb the entire cost do information centers continue to operate. In Plymouth, the cost of the center is shared with the restaurant operator at the site.

The management and maintenance of unstaffed rest areas have become a problem for MassDOT. Where visitors' centers were closed, portable toilets have been set up which are serviced only once daily. Nighttime loitering and illegal activity have been exacerbated by closing the visitors' centers. Even a daytime staff presence can reduce nighttime problems at rest areas.

Use of Public Rest Areas by Truck Drivers

Despite non-existent or minimal amenities, an official parking spot at an on-highway rest area is generally preferable to looking for an unofficial parking spot on or near an exit ramp. Drivers who are approaching an HOS limit often pull onto the grass if all the spaces in a small rest area taken, in effect resorting to unofficial parking.

Once a driver at the HOS limit has fit their vehicle into a rest area and stopped, they will be there for 10 hours. A modern sleeper will have a refrigerator and toilet, and can be kept comfortable using power from an idling engine or APU. The presence of several trucks resting at one rest area can provide a level of personal security, both real and perceived, that is preferred over unofficial parking but still less secure than a commercial truck stop.

If a truck does not require service, and the driver does not mind spending 10 hours where amenities are minimal, taking a mandatory break at a public rest area can work as part of an efficient trip plan. Utilizing a public rest area versus a commercial truck stop ultimately hinges on the same circumstance: finding truck parking spaces that are available near the end of drivers' allowed driving or working intervals.

4 STRATEGIES TO IMPROVE SAFETY AND ANTICIPATE GROWTH

4.1 Reasons to Expand the Rest Location System in Massachusetts

The Jason's Law study surveyed state transportation planners, public safety officials, truck stop operators, and long-distance truck drivers. Many issues elicited extensive commentary and represent the starting point for understanding the overall rest location problem. Massachusetts is geographically small, and the study evaluated multi-state regions by both analyzing aggregate capacity and surveying regional drivers and dispatchers. New England was consistently viewed as having a tight supply of official truck parking spaces.

The environmental, operational, and practical issues presented in the Jason's Law study were echoed broadly by Massachusetts officials and stakeholders. This study builds on the nationwide Jason's Law study by analyzing the geographical organization and practical utility of the rest location system in Massachusetts, recommending specific possible improvements and discussing strategies to achieve these improvements.

Ultimately, however, the core improvement recommendation is to expand capacity. Part of the motor carrier industry's success may be attributed to its quick adoption of new technologies that solve practical problems, such as using Citizen's Band radios to alert other drivers to the availability of low-cost diesel fuel during energy crises in the 1970s. However, GPS, vehicle tracking, and mobile communications allow only for better use of existing facilities: they do not make those facilities better. The execution of efficient trip plans without resorting to unofficial parking will benefit greatly from increased availability of well-designed and -situated official truck parking.

Expanding the truck rest location system in Massachusetts could provide four concrete benefits:

- **Improved safety:** Official truck stops and rest areas are safer than unofficial parking.
- **Improved efficiency:** Drivers will be better able to take full advantage of their HOS intervals and take rest breaks at locations convenient to upcoming delivery windows.
- **Innovative technologies:** Available new technologies that reduce engine idling and allow for parking space reservations should be integral features of new truck stops. Light vehicle charging stations could also be included.
- **Accommodate growth:** Larger trends of economic growth will be accompanied by growth in long-distance motor freight, and Massachusetts will benefit in the future if it can support efficient motor freight service.

4.2 Geographical Analysis of the Rest Location System

Long-distance Motor Freight and the Express Highway System

The basic tool for this analysis is the Figure 4 graphic. The express highway system in eastern Massachusetts has a set of radial highways, both interstate and non-interstate, converging in Boston. Some of these radial highways reach downtown Boston and others end at the I-95/Route 128 beltway. This beltway and the outer I-495 beltway allow traffic not destined to Boston's inner core to bypass the city.

This system is designed to serve the needs of commuters. But it also serves well the majority of regional truck movements, whose distribution patterns geographically resemble commuting patterns to some extent. Freight enters the region by truckload and is delivered in many instances to a distribution center near an express highway. The greatest portion of trucks observed on the local street system are those making deliveries from these regional distribution centers.

The long-distance truck drivers who must organize their trips around HOS regulations may be organized into two groups: drivers with an eastern Massachusetts destination and drivers passing through Massachusetts. The rest location needs of the drivers serving eastern Massachusetts are diffuse because of the numerous industrial parks spread throughout the region. There are, however, well-defined long-distance corridors, and a working assumption of this study is that rest location improvement in a long-distance corridor will also offer practical value to truck drivers destined for eastern Massachusetts locations.

Massachusetts Truck Corridors

The Northwest Arc of I-495

The section of I-495 between I-290 and US Route 3 has the greatest number of trucks of any express highway in Massachusetts. In addition to those trucks engaged in regional distribution, it is also the direct corridor connecting the middle-Atlantic states and lower New England with upper New England and the Canadian Maritime provinces. From the west and south, this corridor collects out-of-state traffic from Interstates 90, 84, and 395, and delivers this traffic to New Hampshire via US Route 3 and Interstates 93 and 95. Both government and industry stakeholders have cited this corridor as lacking adequate official truck parking, and examining Figure 4 bears out this concern.

Western Massachusetts

Trucks using the north-south I-91 corridor through Springfield and the east-west I-90 corridor west of Sturbridge are well-served by commercial truck stops both in Massachusetts and in neighboring states. The private sector has responded to

the expanding long-distance motor freight market: recently, 56 new truck parking spaces were constructed just over the border in New York on I-90 (as shown in Figure 4).

Southeastern Massachusetts

Locations for mandatory rest breaks are critical in long-distance corridors. In contrast, most trucks traveling in southeastern Massachusetts are relatively close to the customer and often can make arrangements to park for a mandatory break at or near the customer's site. Although the total number of truck parking spaces is adequate in southeastern Massachusetts, the well-lighted and -maintained locations fill up quickly, as some public rest areas suffer from a lack of staffing and amenities, as discussed above.⁷

The Northwest Arc of I-495 from a Driver's Perspective

The value of a new rest location in the I-495 corridor may be illustrated by considering an example of how a driver might plan a trip segment when entering this corridor. If a driver enters Massachusetts on I-84, there is probably an available parking space at one of the truck stops in Sturbridge. But if the driver has driven only nine of the allowed eleven-hour driving period, the driver reasonably would want to continue and not take the mandatory break until closer to the 11-hour limit.

If the driver's destination is in Greater Boston, the driver may be able to reach the customer, but not necessarily during an agreed-upon delivery window. If the driver is going to upper New England or Canada, the next concentration of parking spaces would be in Seabrook, New Hampshire, just across the state line from Salisbury. This is about 90 miles away and with normal traffic the driver might assume that they could reach it in less than two hours. Extra time would be necessary in case the rest area is full and another location, official or unofficial, must be found as the 11-hour limit approaches. If traffic is unusually heavy or the driver needs to buy diesel fuel, the driver might not make it in time.

If there were a new truck stop in the I-495 corridor, this driver might reach the stop at the tenth hour and decide that the convenience of resting and perhaps buying fuel all at one stop would make it a reasonable place for a mandatory break. If all the truck parking spaces at the new truck stop were taken, though, the driver more likely would find spaces at the Chelmsford or Seabrook rest areas because the added spaces at the new truck stop would relieve pressure on some of the other regional rest locations.

⁷ Regional Truck Route Study, Southeastern Regional Planning and Economic Development District, 2009.

Of course, there are an infinite number of possible trip scenarios, tens of thousands of which are incorporated into trip plans by truck drivers across New England every day. All of them would be made simpler and safer, though, if the rest location system in the corridor were substantially expanded: the challenges to these drivers of building a safe and efficient trip plan in this corridor are greater than they are in western Massachusetts and Connecticut, where large truck stops are more closely spaced.

4.3 Building a New Truck Stop

Finding a Location

As discussed above, large truck stops offer important advantages to both the motor carrier industry and the truck stop operator. Drivers have a greater probability of finding room for a ten-hour rest break at the larger truck stops. The truck stop operators must generate enough revenue from trucks, both resting and passing through, to support their commercial offerings, and a large lot translates directly into more revenue.

The need to assemble a substantial amount of land often leads commercial truck stop developers to acquire inexpensive land at some distance from areas where existing or prospective development have already caused real estate prices to rise. Furthermore, residents and businesses in existing developed areas may not be amenable to a new truck stop as a neighbor, even if land is available that the truck stop developer is able to purchase.

Unfortunately, the northwest arc of I-495, a vital long-distance freight corridor, threads its way through gradually developing suburbs in the Boston metropolitan region. This means higher land prices: the scattered presence of high-tech companies better reflects the type of land use that the communities are encouraging.

The state's transportation infrastructure investment program may be able to help ameliorate these issues by identifying and procuring suitable land. The recently enacted 2015 federal transportation authorization, FAST Act, permits federal funds to be used to improve and expand the truck rest location system. If MassDOT, possibly with federal participation, purchases an appropriate site, it would be able to structure a long-term lease with a commercial truck stop operator who would build a truck stop subject to requirements that would ensure benefits to both Massachusetts and the motor freight industry, while mitigating both real and perceived negative impacts.

Envisioning a Future Truck Stop

Any new truck stop developed in cooperation with MassDOT should accomplish three things:

- Provide significant benefits to motor carriers
- Contain a viable commercial business mix
- Incorporate impact-mitigating designs and technologies

Benefits

The benefits to the motor freight industry relate primarily to the number of truck parking spaces provided. Any new truck stop should have parking for at least 85 trucks so that it will be labeled on the *Trucker's Friend* map as having a "large" lot. This will signal to drivers entering Massachusetts that there is a good probability of finding a parking space at the new location.

Business Mix

A viable commercial mix can be developed with sales and services to both trucks and motorists in light vehicles. Modern truck stops fuel both diesel trucks and light vehicles but in separate parts of the facility. Most of these truck stops are off an express highway, and the light vehicles purchasing fuel may be exiting the express highway or accessing the truck stop from the local road system.

Similarly, restaurants and convenience stores can serve all three markets: the long-distance trucker, the long-distance motorist, and the local motorist. A newly designed truck stop would serve these three markets by separating the trucks and light vehicles and by including attractive family dining or food court offerings.

This business mix could be accommodated in as little as 12 acres. A modern truck stop in North Stonington, Connecticut, serving these three markets, is listed in *Trucker's Friend* as having an "Extra Large" truck parking lot, and fits into 12 acres, or about 7 football fields, of land area. Additional commercial services focused on the needs of truck drivers might be offered depending on market demand and land availability.

Impact-Mitigating Designs and Implementing New Technologies

The most important mitigation requirement at a new truck stop would be minimizing the amount of truck engine idling. Figure 5 shows a tractor drawing current at a TSE-equipped truck stop. The driver pays by the hour, activating an outlet online or using a cash card. Similar systems can power hybrid refrigerated trailers.

Any new truck stop should be designed to accommodate some type of TSE system throughout the truck parking areas. While there would be power distribution throughout the lot, plug-in pedestals for trucks that can use household current would need to be installed only as demand warranted. Not all tractors can utilize household current for climate control and cab amenities, but this capability is becoming more widespread as older long-distance tractors are replaced by newer models. A portion of the parking spaces should also offer the appropriate current for hybrid refrigerated trailers.

FIGURE 5
Truck Stop Electrification (TSE) Providing an Idle-Free Rest Break



Source: Shorepower Technologies.

The implementation of TSE in North America has been gradual. It is possible that a driver on a cross-country trip might use one TSE system at one truck stop, a different TSE system at a second stop, and at a third stop, might have no choice but to idle overnight. Where TSE has been installed, it is usually available only at a portion of the spaces. Unfortunately, trucks not using TSE sometimes park in a TSE-equipped space because the space is convenient, it is one of the only available spaces, or the driver simply did not notice or care whether or not someone else might need it. Ensuring that TSE-equipped spaces are available for drivers desiring the service and not already taken by idling trucks requires some amount of parking lot management, which is not a typical truck stop operating practice.

One simple approach to the problem cited above is to have a clearly marked idle-free zone in the parking lot. Drivers using TSE would not just be saving fuel and

maintenance expense, but also would be renting themselves rest space in a quiet and low-emissions part of the lot. In the future, more trucks and truck fleets will want to use TSE and will seek out TSE-equipped truck stops. Adding TSE pedestals would be facilitated if power distribution were incorporated into the initial design.

However, it is still preferable that trucks idling during mandatory rest breaks are doing so in some official truck parking space rather than at an unofficial location. The anti-idling strategy of a new truck stop should be to make TSE attractive and implementable. Idling might be prohibited if some kind of TSE option is available that can be used by any truck.

Industry observers have long believed that online reservation systems that have so revolutionized personal travel might have practical analogs in the motor carrier industry. In practice, however, truck-trip planning differs greatly from personal-travel planning. Drivers want to see how far they can get before reaching an HOS limit, and then take a mandatory rest break. Therefore, their time window is not fixed, and the rest location cannot always be predicted.

A federal pilot program predating MAP-21 funded the application of intelligent transportation systems (ITS) techniques to inform truck drivers of truck parking availability, but funding for this particular program is no longer available. A renewed effort in this area might focus on a New England-wide reservation system. Any truck-parking information system will need to be broad-based and involve a significant number of locations in order to be seen by drivers as offering practical benefits. The rollout of a reservation system could complement the opening of a major new truck stop.

Finally, the ideal truck stop would also feature more prosaic amenities that would make features like TSE as easy to use as possible. For instance, the truck shown in Figure 5 has long power cables, which allow the driver to use a parking space some distance from a power pedestal and still be able draw current from the pedestal and turn off the engine. The convenience stores could stock extension cords, adaptors, and related accessories and appliances to offer drivers easy access to this as well as other conveniences.

4.4 Revitalizing Public Rest Areas

Context

This study does not envision that public rest areas could accommodate the increasing demands on the truck rest location system made by the growth in motor freight. However, it is clear that today the public rest area system serves neither the motor carrier industry nor the general public particularly well.

Discussions with officials and motor freight stakeholders have resulted in ideas about how the public rest areas might be utilized more effectively.

Arguably the most successful highway rest area is in Plymouth, where a commercial food service presence allows for extended hours and cleaning and maintenance of facilities. This arrangement is permitted on Route 3, but generally not on the Interstate Highway System. Congress has repeatedly declined to loosen the prohibition against commercial activities on interstate highways.

Partnering with Existing Truck Stop Operators

As mentioned above, the federal government does not want to assist on-interstate businesses that compete with off-interstate businesses. However, the federal government has occasionally resolved similar competitive issues in the past. For example, the Urban Mass Transit Act of 1964 greatly increased federal support of publicly owned transit systems at a time when many private motor coach companies were still providing commuter service in a number of urban markets.

Congress recognized this as an issue of fairness and provided formula-based assistance administered by the states—commonly referred to as the 5311 (f) program⁸—to assist affected motor coach companies. In effect, this made existing motor coach carriers partners in furthering the federal policy of strengthening urban transportation. The states are empowered to ensure that the 5311 (f) funds are sustaining, improving, or expanding regional transportation services.

A similar public-private partnership might work with rest areas on the interstate system. In the case of truck driver rest locations, Congress and the Federal Highway Administration (FHWA) might be persuaded that the safety benefits are sufficiently great that a new program should be considered. Existing nearby truck stop operators might be invited to bid on the opportunity to offer a subset of their services at an existing unstaffed rest area. The government contribution would be to allow some commercial use of the existing rest area. The private partner would provide on-interstate commercial services, though the extent of those services would be limited to avoid harming existing off-interstate private businesses.

⁸ Title 49 United States Code section 5311 (f).

Utilizing other Highway-Related Facilities

If a partnership program were successful in revitalizing public rest areas, it possibly could be expanded to other underutilized highway facilities, such as unused weigh stations. Most truck weighing is now performed with mobile equipment or, in some locations, with new, remote-sensing weigh-in-motion (WIM) equipment. Weigh stations in Massachusetts are now obsolete and largely unused. Recently, however, their use has been allowed during extreme weather situations as a practical way of getting large numbers of trucks out of the way of snow-clearance operations.

Another opportunity would be to encourage use of MassDOT-owned park-and-ride lots located at numerous locations throughout the state. Current regulations allow use of many of these lots for a mandatory 10-hour rest break. However, very few locations have spaces striped for truck parking, which has eliminated these lots from being considered in this study.

Because of the preference of long-distance truck drivers to try their luck at large truck stops or rest areas, they still might not seek out re-striped park-and-ride lots for their mandatory rest breaks. However, the common ownership of these lots by MassDOT could provide an opportunity to implement video surveillance and perhaps implement a system that could alert truck drivers to the availability of an appropriate parking space in one of these MassDOT-owned lots.

5 SUMMARY AND CONCLUSIONS

The truck driver rest location system is a critical component of the nation's motor freight system. Its importance has been recognized in federal legislation, and its usefulness was evaluated on a nationwide basis in the federally mandated Jason's Law study. State and local jurisdictions are authorized to use federal funding allocations for its maintenance and improvement.

The Boston Region MPO recognized the importance of this system and noted that a critical corridor, the northwest arc of I-495, passes through or near several MPO member communities. To understand the role of this and other regional express highway corridors in the national rest location system, the study that this memorandum documents has considered all the rest locations in Massachusetts and a number of important rest locations in neighboring states.

Key findings of this study include:

- The large commercial truck stop is the most important building block of the national rest location system.
- Western Massachusetts is well served by large rest locations in both Massachusetts and neighboring states.
- The northwest arc of I-495 is a clear gap in the New England rest location system.
- Public rest areas on express highways contribute little to the truck driver rest location system because of factors such as small size, poor condition, or not being located on a key long-distance corridor.
- Adding or expanding commercial truck stops is an effective method of reducing truck parking at unofficial locations, along with their attendant safety problems.
- Good design and new technologies can materially lessen the real and perceived negative impacts of a commercial truck stop.
- Long-term economic growth will continue to place increased demands on the motor freight system and associated rest location system.
- Identifying viable locations for new truck stops could be an important government function for strengthening the rest location system.
- Public on-highway rest areas supplement the commercial truck stop system. New institutional arrangements may be required to improve the condition and usefulness of these locations for all users.

Follow-up work on this topic might include observation and analysis of rest location utilization at key points in the highway network. Fieldwork could also include interviews with drivers and truck stop operators. A list of potential future truck stop locations could also be assembled in collaboration with regional stakeholders.

WSK/wsk

APPENDIX

Rest Locations Mentioned in Memorandum Text

Municipality	Highway
Barnstable	US Route 6, Exit 6
Beverly	MA Route 128 northbound
Chelmsford	I-495
Chicopee	I-90, Exit 6
Kittery, ME	I-95, Exit 2
Leominster	I-190, Exit 7
North Stonington, CT	I-95, Exit 93
Peabody	US Route 1
Plymouth	MA Route 3, Exit 5
Salisbury	I-95 southbound
Sandusky, OH	I-90
Seabrook, NH	I-95 northbound
Shrewsbury	US Route 20
Sturbridge	I-84, Exit 1
Sturbridge	US Route 20
Westborough	I-90 westbound
Whatley	I-91, Exit 24
Wrentham	US Route 1

Note: All of the locations are in Massachusetts unless otherwise noted.

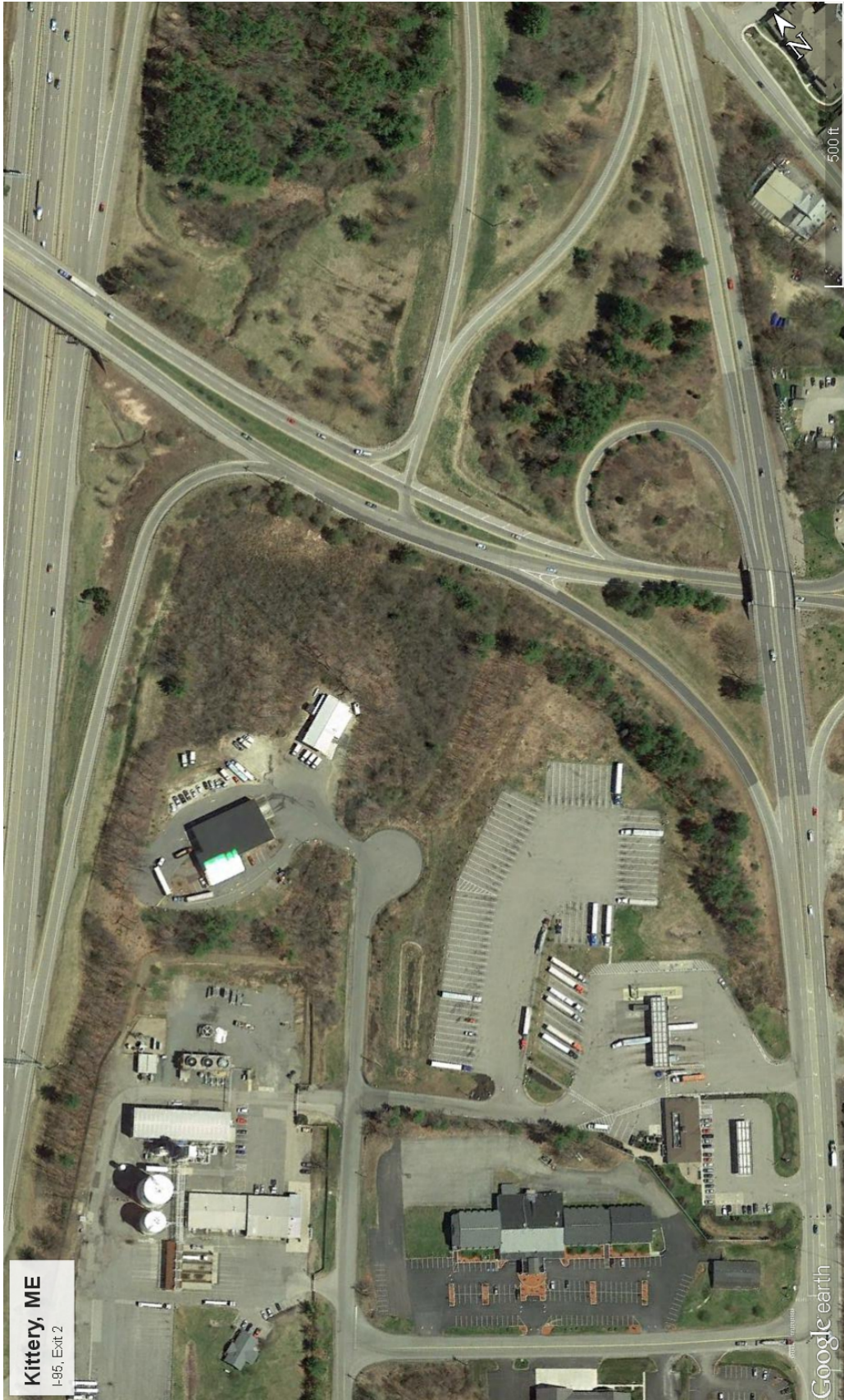


Barnstable
US Route 6, Exit 6







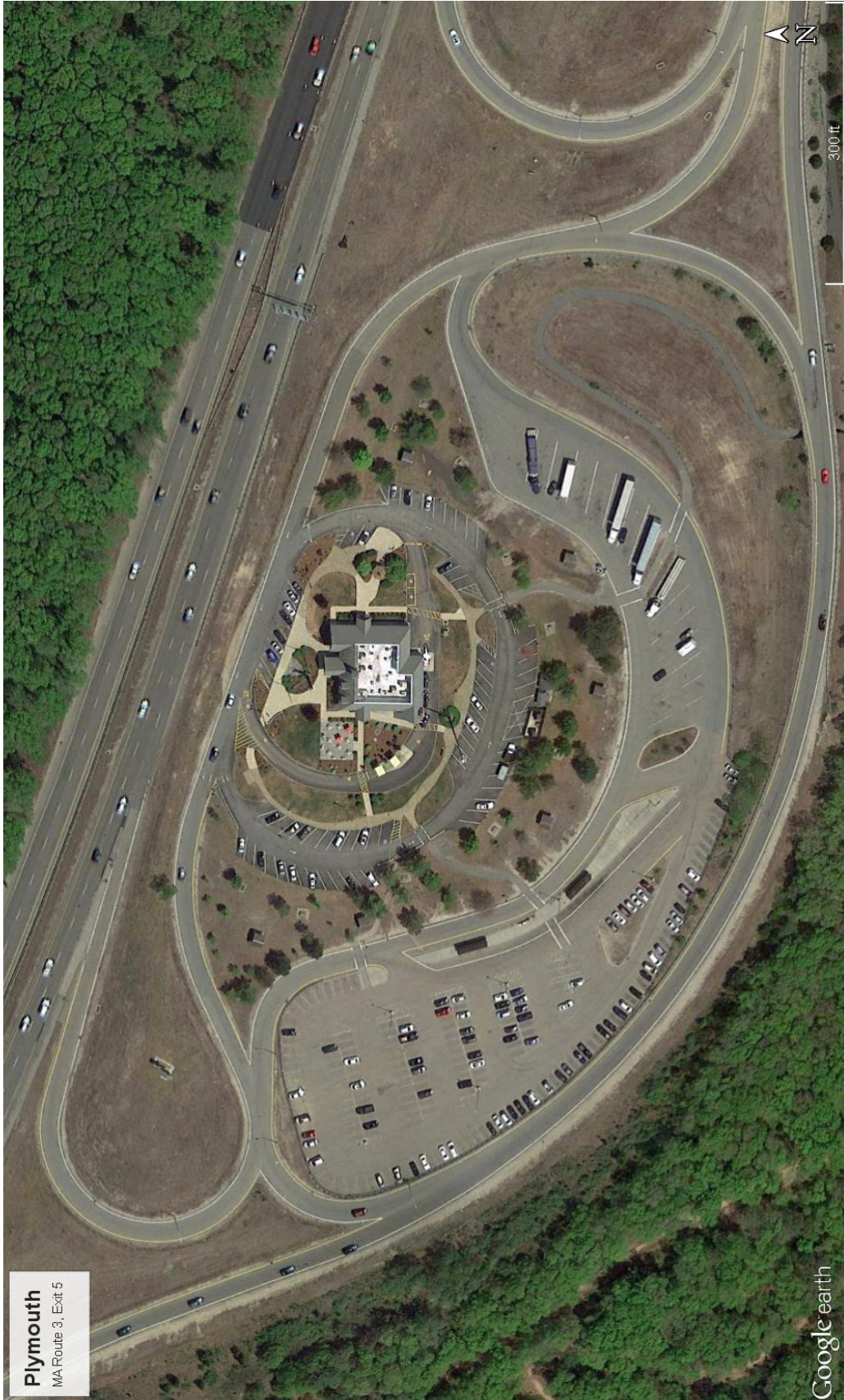








Peabody
US Route 1



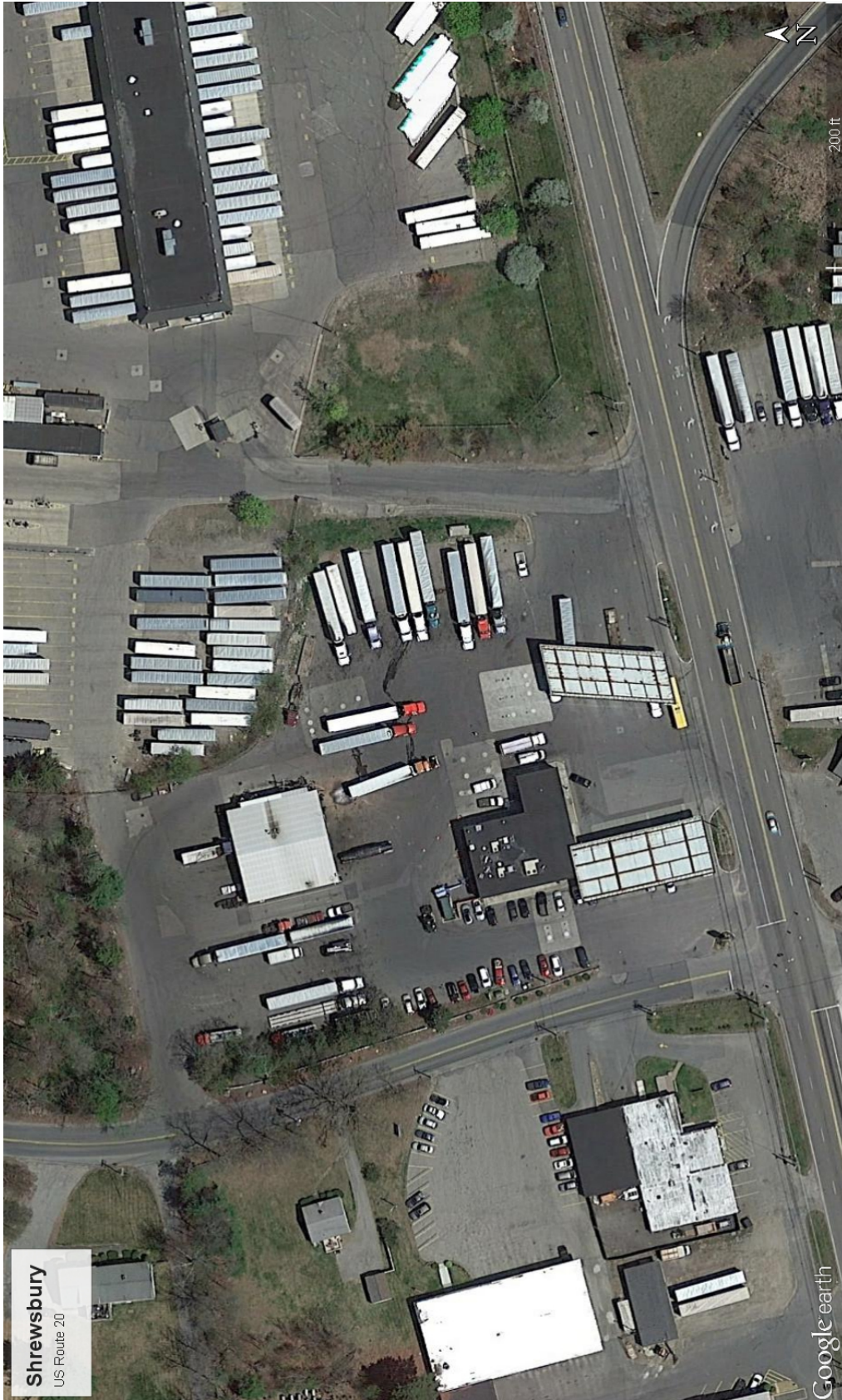
Plymouth
MA Route 3, Exit 5

Google earth











Sturbridge
I-84, Exit 1

Google earth



Sturbridge
US Route 20





