CAMBRIDGE SYSTEMATICS

New Haven Truck Route Study

study

report

prepared for

South Central Regional Council of Governments

prepared by

Cambridge Systematics, Inc.

with

Clough Harbour & Associates LLP

June 30, 2007

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Executive Summary

The South Central Regional Council of Governments (SCRCOG) in cooperation with the City of New Haven has undertaken the New Haven Truck Route Study in an effort to develop a strategy for directing truck traffic to use appropriate routes while traveling through or within the city. The study's purpose was to define existing truck route conditions within the City of New Haven and develop a truck routing program to manage and limit the impact of general commercial and non-local truck traffic through the city's residential streets. Primary goals and objectives are to:

- Evaluate existing truck routing network utilized in the City of New Haven;
- Limit the impact of road construction and general commercial traffic in residential sections of the city;
- Facilitate more direct access to the interstate highway system;
- Reduce harmful emissions; and
- Reduce the overall volume of non-local truck traffic on city streets.

This study has progressed with the completion of a data gathering effort, a geospatial analysis of "hot spot" areas, and a sensitivity receptor analysis to determine existing truck travel patterns and potential impacts. Additionally, the experiences of other cities throughout the United States were examined to find innovative initiatives that could be applied in New Haven. A recommended truck route network that makes use of state, Federal, and city roadways has been developed and compliments recommended implementation strategies.

DATA GATHERING AND EXISTING CONDITIONS

Existing conditions were assessed through the collection of traffic data, including analyzing activity in trucking "hot spot" areas, and examining land use and zoning data throughout the city. These analyses indicated where trucks presently travel within the city and where sensitive areas such as residential communities, schools, parks, and places of worship are impacted by truck activity.

Additionally, a set of case studies was presented to discover problems encountered in other cities throughout the United States. Each of the selected case studies have similar community attributes to New Haven and similar issues that were addressed. The approach that was used in each location was noted and considered when developing the recommended policy for the City of New Haven.

TRUCK ROUTE NETWORK DEVELOPMENT

The existing conditions assessment led to the development of a network of truck routes that serve the needs of the city's industrial and commercial interests while minimizing the negative effects of truck traffic such as noise and diesel emissions, on residential areas, schools, and parks. The recommended network relies heavily on the state and Federal highways that traverse the city and uses select city roadways to make important connections where necessary. The roadways included in the recommended truck route network are illustrated on the backside.

TRUCK ROUTE NETWORK IMPLEMENTATION PROGRAM

A set of guidelines and strategies were established to facilitate the implementation of the recommended truck route network. The goals of the Implementation Program are to engage and educate the public, and adoption of the truck route network program. The Implementation Program includes the following steps:

- **Adoption of Truck Route Network and Ordinances –** Guidelines are provided for developing and adopting truck route city ordinances that clearly defines regulations and the truck route network.
- **Signage Program –** Signs that indicate where truck routes exist and where trucks should be prohibited were recommended. A sign layout and locations where signs should be posted within the city was produced.
- **Outreach and Education –** The city should reach out to stakeholders, including the trucking industry, law enforcement agencies, city and state transportation officials, and residents to secure cooperation in implementing the truck route network and supporting policies. Education initiatives are crucial to ensure that all stakeholders share an understanding of the truck regulations, and act as contributors to the development and implementation of truck management techniques.

1.0 Introduction

The New Haven Truck Route Study was commissioned by the South Central Regional Council of Governments in association with the City of New Haven. The consultant team commissioned to perform analysis in this study consists of Cambridge Systematics, Inc. and Clough Harbour & Associates LLP. The study was undertaken in an effort to define the existing movements of trucks within the city and to develop policies to manage truck movements on city roadways. The primary goals and objectives of this study are to:

- Evaluate existing truck routing network utilized in the City of New Haven;
- Limit the impact of road construction and general commercial traffic in residential sections of the city;
- Facilitate more direct access to the interstate highway system;
- Reduce harmful emissions; and
- Reduce the overall volume of non-local truck traffic on city streets.

New Haven's economy and quality of life depend on the ability to move freight and goods into, out of, and through the city. Trucks perform the functions of moving and delivering freight, providing residents with goods and services, providing utility and public safety services, and waste disposal. These functions are necessary to keep the city's economy strong and the quality of life for residents high.

As much as New Haven's economy is dependent upon truck activity, there are negative effects associated with that activity in many areas of the city. Trucks are large vehicles that produce much more noise than standard automobiles, and when they travel in large numbers through areas that are otherwise quiet residential communities, the quality of life in those communities suffers. Because many streets New Haven traverse are busy commercial and university districts, there is a pedestrian safety issue on roads that are heavily used by trucks.

Furthermore, heavy trucks inflict much more physical wear and tear on road surfaces than standard automobiles. According to the American Association of State Highway and Transportation Officials (AASHTO), one 40-ton truck inflicts as much damage on roadways as 9,600 automobiles. Many city roadways are not well-equipped to accommodate heavy truck traffic.

For these reasons there is a need to control truck movements in order to reduce their effects on sensitive communities, while providing a seamless, easy-to-understand network of roadways that meets the needs of commerce and the services that rely on truck movements. Such a network should be designed to protect the safety of vehicles and pedestrians and improve air quality by limiting congestion and circuitous routing.

By identifying truck travel patterns in New Haven and developing a network of preferable alternatives to be designated as truck routes, truck traffic will be encouraged to use highways that are most appropriate in terms of roadway weight and traffic capacity, and with minimal impacts on residents' safety and quality of life. With the designation of a network of truck routes, roadways that are ill-suited for trucking activity can be indicated as such via restrictive signage and police enforcement. Restrictions such as Through Truck Prohibitions posted by the State Traffic Commission, cannot be implemented unless reasonable alternate routes exist for trucks to use.

2.0 Existing Conditions

The purpose of this technical memorandum is to define the current state of truck movements within the City of New Haven. This was accomplished by identifying existing truck movements and routes on local roadways, assessing the current condition of truck-specific roadway infrastructure (i.e., truck route signage), and analyzing the findings within the city's current physical environment.

This section is organized as follows:

- Section 2.1 contains a summary of the data gathering and outreach effort that supported this study and identifies existing truck corridors and five "hot spot" corridors for which more detailed data were obtained and analyzed;
- Section 2.2 contains an in-depth analysis of the "hot spot" corridors and recommendations regarding which should and should not be included in a citywide truck route network; and
- Section 2.3 summarizes the findings of existing conditions assessment, including existing physical, operational, and institutional issues that need to be addressed in order to successfully implement a truck route network.

2.1 DATA GATHERING

The project team engaged in a data gathering effort to establish the patterns and trends of truck movements within the City of New Haven. A variety of data sources were reviewed when developing the citywide profile, including field research, various state and local traffic counting programs, accident data, geographic information systems (GIS), and interviews with local officials.

It should be noted that datasets focused on local roadways under the authority of the City of New Haven since regulations restricting the operation of trucks cannot be legally enacted nor enforced by the city on state and Federal roadways. Moreover, state and Federal roadways should be included within a well-designed truck route network and management program, as paths of first choice.

Existing Roadway Network

The City of New Haven is located on the northern coast of Long Island Sound, around Interstate 91 (I-91) and Interstate 95 (I-95). The city's original roadway network was based on a four-street by four-street grid design that created what is now commonly known as the "Nine Squares." Today the "Nine Square" grid network continues to preserve its historic character and primarily can be identified as the downtown city center.

Beyond the immediate downtown, New Haven's local roadways maintain a grid pattern based on one-way street pairings. Major local roadways provide bidirectional traffic operations and function as radial spokes that flow directionally away from the city center towards state and Federal highways. As shown in Table 2.1, 2 Interstate highways, 2 Federal highways, and 10 state highways are located within the city's boundaries.

Table 2.1 Interstate, Federal, and State Highways in New Haven

Interstate Highways	• I-91 • I-95
Federal Highways	• U.S.-1 • U.S.-5
State Highways	• State Route 10 • State Route 15 • State Route 17 • State Route 34 • State Route 63 • State Route 80 • State Route 103 • State Route 122 • State Route 243 • State Route 337

Truck Route Network

The movement of freight within New Haven can be classified into four categories: 1) internal-to-internal trips; 2) internal-to-external trips; 3) external-to-internal trips; and 4) external-to-external trips. Each category characterizes the purpose and manner in which trucks navigate through New Haven.

For example, internal-to-internal trips are those whose origins and destinations are both located within New Haven. Internal-to-external trips are those whose origins begin within the city and travel to a destination outside city

boundaries. Conversely, external-to-internal trips are those whose origins begin outside of New Haven and travel to destination contained within the city boundaries. Collectively, the above-mentioned movements will use a mixture of Federal, state, and local roadways. External-to-external trips are those whose origins and destinations lie outside of New Haven, and should be maintained on the Federal or state highway system within New Haven.

Currently, a truck route network and signage program does exist. According to officials from the New Haven Police Department and city staff, its current form is out-of-date, incomplete, fragmented, and for all intent cannot be enforced by local authorities. For example, field research discovered that directional or trailblazing truck signage was limited to Ella T. Grasso Boulevard (State Route 34/State Route 10) within New Haven, as depicted in the accompanying photographs. A single truck route sign along a major street does not adequately meet the needs of drivers. Additionally, existing signage does not follow recommendations provided within the latest Federal Manual for Uniform Traffic Control Devices (MUTCD), which could create confusion to drivers accustomed to nationally recognized standards.

Figure 2.1 Historical New Haven Truck Routes Map

According to the City Plan Department and the Department of Traffic and Parking, the current Truck Routes Map was created in the 1950s and has not been modernized. As can be observed in Figure 2.1, the truck routing network has not been revised to include changes in roadway configurations, such as those made to State Route 34, roadway designations, bridge maintenance and improvements, current land uses, as well as the most recent city policies. Although the current mapping program does not reflect existing conditions within New Haven, many of the routing alternatives and truck management concepts will be considered within an updated program. As a result, the *Historical Truck Routes Map* will be utilized as base material for the creation of a current truck route network map.

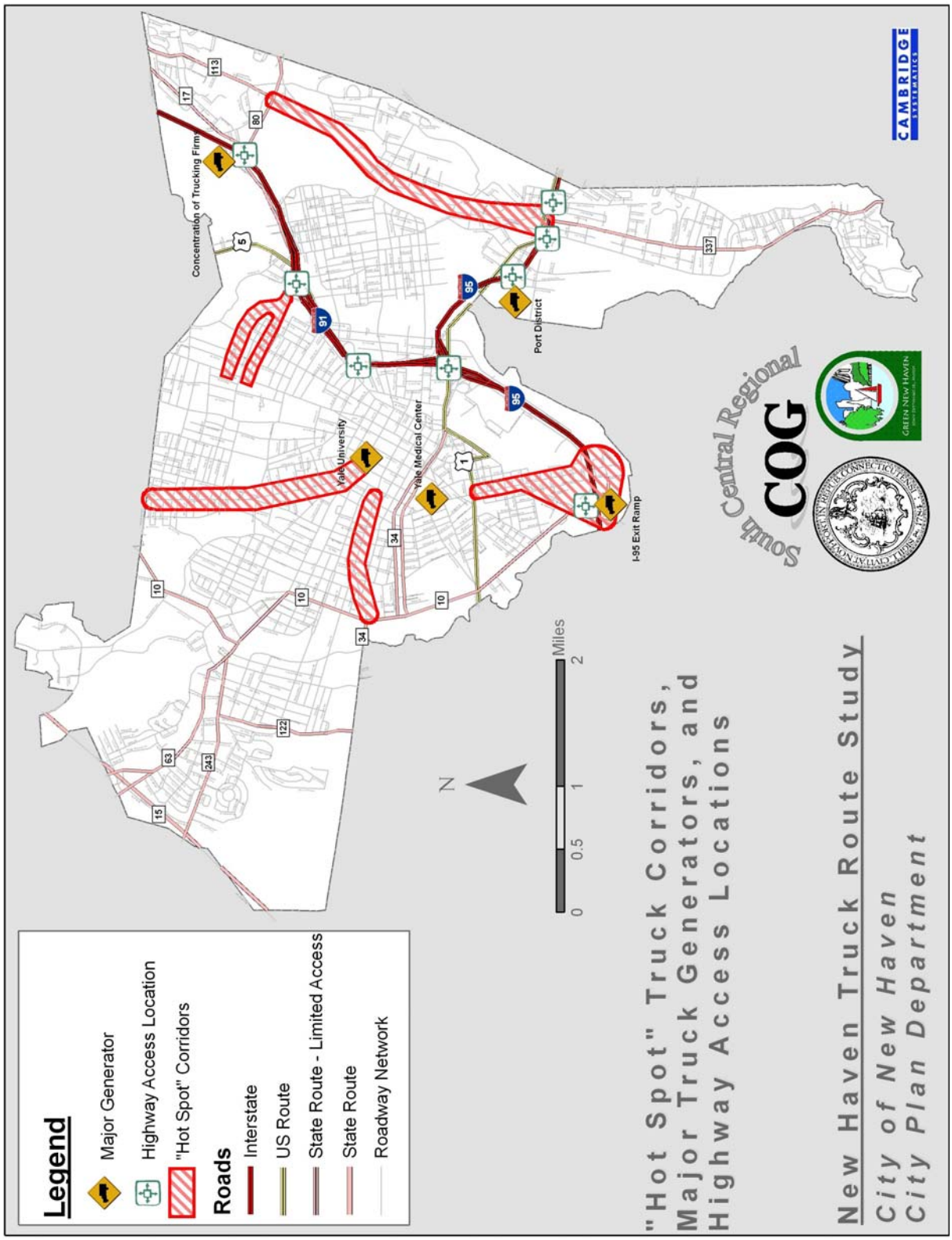
Identification of Local Truck Corridors

From reviewing various datasets and speaking with local officials, the sections of roadway shown in Table 2.2 have been identified as local corridors that are currently utilized by truck traffic within the City of New Haven. A local truck route corridor is defined as a section of local roadway that maintains significant truck traffic activity. Additionally, corridors were reviewed for their ability to provide linkages through New Haven's street network, since roadways providing a clear linear path of travel through the city are more prone for use by trucks. As discussed previously, this list only pertains to local streets, since the City of New Haven does not maintain authority over State and Federal roadways.

Table 2.2 Identified Local Truck Corridors

Local Roadway	Cross Streets (Between)
Congress Avenue	U.S.-1 and State Route 34
Derby Avenue/Chapel Street	Ella T. Grasso Boulevard: State Route 34/State Route 10 and Howe Street
Dixwell Avenue	Goffe Street and Northern City Boundary Line
Elm Street	State Street and Ella T Grasso Boulevard (State Route 34/State Route 10)
George Street/Chapel Street/Edgewood Avenue	State Route 10 and State Street
Grand Avenue	State Street and Russell Street
Howard Avenue	Legion Avenue (State Route 34) and Sea Street
Long Wharf Drive	Sargent Drive and U.S.-1
Quinnipiac Avenue	Foxon Boulevard (State Route 80) and Forbes Avenue (U.S.-1)
Sargent Drive	Howard Drive and U.S.-1
Whalley Avenue	State Route 10 and Broadway
Willow Street and Cold Spring Street/Mitchell Drive	I-91 and Whitney Avenue

Figure 2.2 Potential "Hot Spot" Corridors



Identification of Potential "Hot Spot" Corridors

Of the previously identified local truck route corridors, five were recognized for formal examination during the existing conditions analysis to determine each corridor's acceptability for inclusion or exclusion from the recommended truck route network. The five routes may or may not have been ever formally identified for through truck usage, but are being reviewed as a result of problematic perceptions attributed to each corridor, various community complaints, and an acknowledgment by local law enforcement and local officials regarding known issues for each corridor. The identified corridors are listed below and are illustrated in Figure 2.2 as perceived problematic truck corridors of concern:

- Derby Avenue/Chapel Street (between Ella T. Grasso Boulevard (State Route 34/State Route 10) and Howe Street);
- Dixwell Avenue (between Goffe Street and Northern City Boundary Line);
- Howard Avenue (between Legion Avenue (State Route 34) and Sea Street);
- Quinnipiac Avenue (between Foxon Boulevard (State Route 80) and Forbes Avenue (U.S.-1); and
- Willow Street and Cold Spring Street/Mitchell Drive (between I-91 and Whitney Avenue).

Traffic Count Data

The project team received traffic count data from various state and local sources for this effort. The data was collected between 2003 and 2007, and is summarized in Table 2.3.

Table 2.3 Utilized Traffic Count Data

Data Type	Source	Date Collected
Average daily traffic (ADT) volumes along specified roadways	ConnDOT	November/December 2003
Statewide average percentage of heavy vehicles by functional roadway class	ConnDOT	2006
24-hour ADT counts (requested roadways)	ConnDOT	2006
Manual intersection turning movement counts (Legion Ave/Howard Ave and State Route 34/State Route 10)	SCRCOG	June 2006
Manual intersection turning movement counts (I-95 Exit 46 – Sargent Drive and Long Wharf Drive)	SCRCOG	February 2007

The obtained datasets were reduced to focus on data pertinent to the five "hot spot" corridors for use in the existing conditions analysis. Additionally, the datasets collected provide a planning level understanding of truck impacts, and will assist in determining the extent and nature to which truck activity is affecting identified roadways. Additionally, the traffic data will be utilized to help determine optimal alternative routing options and recommended management policies. Table 2.4 summarizes the findings associated with truck traffic along the five "hot spot" corridors. Existing data was not available for several locations as shown in the table.

Table 2.4 "Hot Spot" Corridor Traffic Count Data Summary

"Hot Spot" Truck Corridor	ADT
Derby Avenue Corridor *EB Traffic Only Collected From ADT Counts Conducted Prior on Rt10 NB/SB and Rt34 EB)*	7,600
Dixwell Avenue Corridor *(ADT Collected North of Bristol Street)*	6,600
Dixwell Avenue Corridor *(ADT Collected North of Basset Street)*	13,700
Howard Avenue Corridor *(ADT Collected North of 3rd Street)*	3,800
Quinnipiac Avenue Corridor *(ADT Collected North of 3rd Street)*	5,900
Quinnipiac Avenue Corridor *(ADT Collected North of 3rd Street)*	5,500
Willow Street *EB*	8,858
Willow Street *WB*	7,583

Note: Statewide Average Heavy Vehicle Percentage on Local Roadways – 2005: 2.3 percent.

Sensitivity Receptor/Land Use Data

Many land uses surrounding the city's local roadways are especially sensitive to high volumes of truck traffic. Residents typically do not enjoy the noise trucks produce in their neighborhoods, especially at night. Parks are sensitive areas because of the concern over noise pollution and the safety of bicyclists and pedestrians. Many children walk to and play near schools within New Haven, therefore school locations should be considered when developing a truck routing network. Collectively, these issues are known as sensitive receptors and are utilized when analyzing the effects of potential routing alternatives. Sensitivity

receptor datasets were obtained from the City Plan Department's GIS program, and included schools, libraries, museums, parks, and residential land uses. Figures 2.3 and 2.4 illustrate the sensitivity receptors in relation to "hot spot" corridors, and the current citywide land use patterns located within the "hot spot" corridors.

Figure 2.3 **"Hot Spot" Corridors In Relation to Sensitivity Receptors**

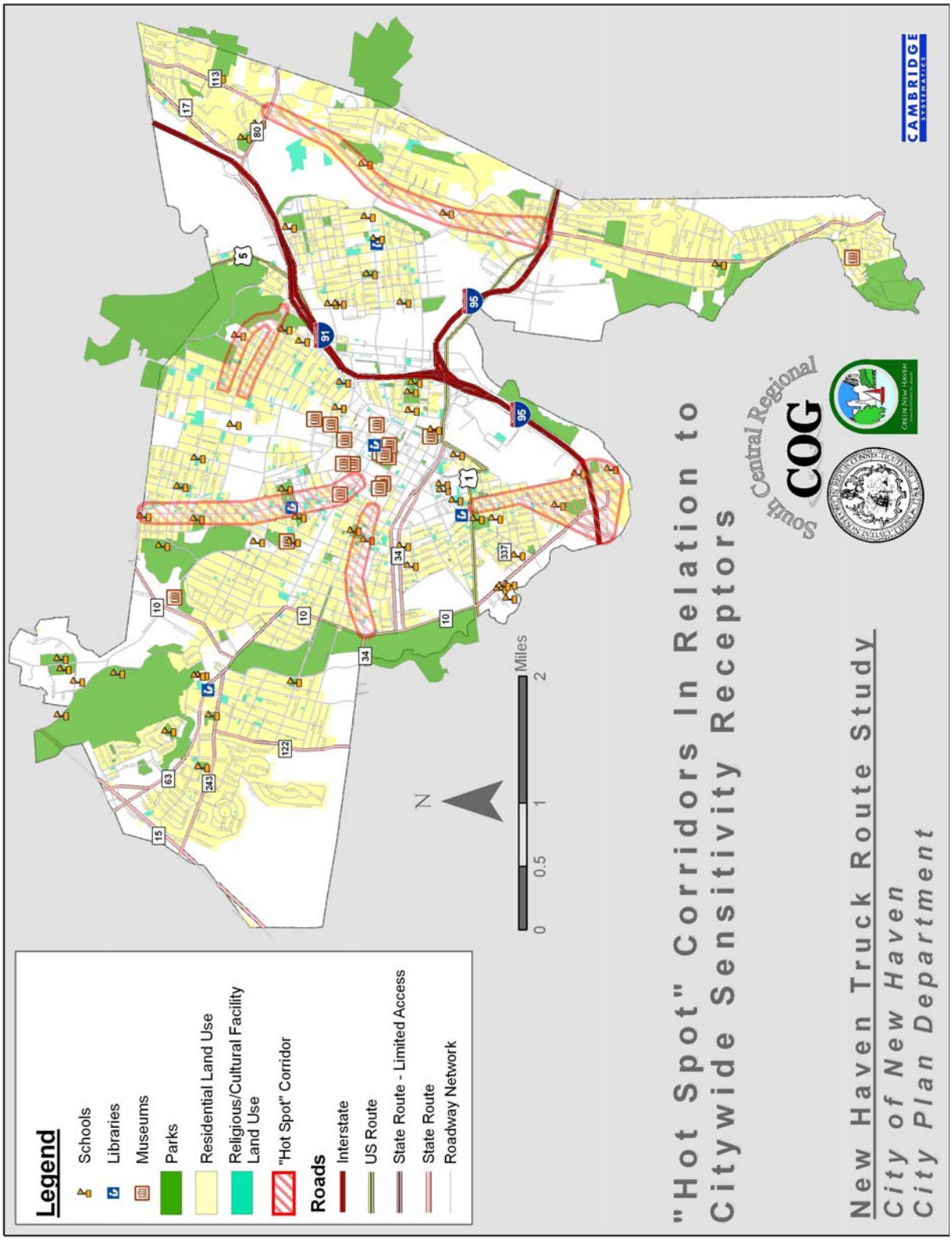
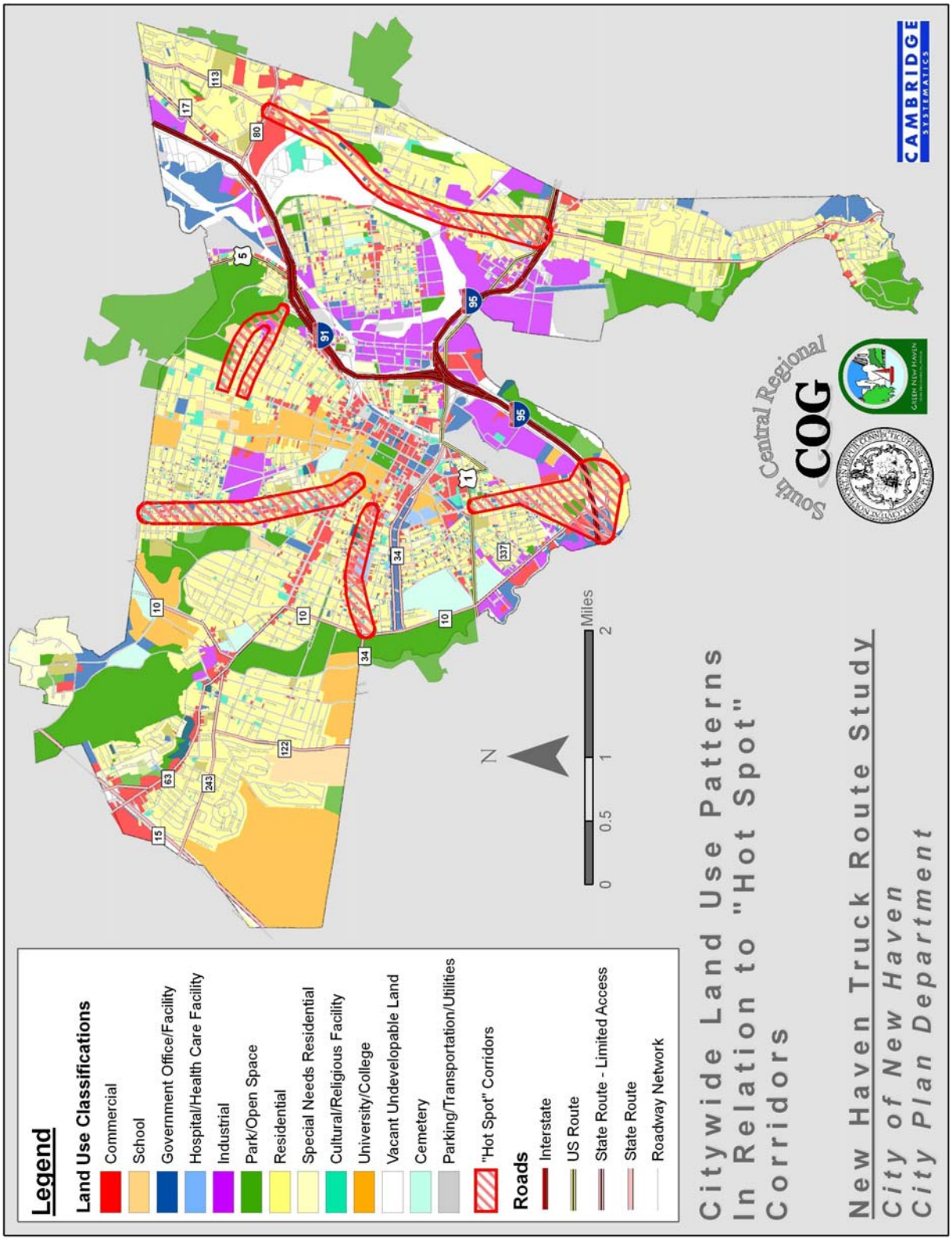


Figure 2.4 Land Use Patterns In Relation to "Hot Spot" Corridors



Accident Data

Along with traffic count data, it is important to understand any safety issues associated with a particular roadway when developing a truck management program. Understanding the current accident rates and accident specifics, such as fatalities and the time of occurrence, may establish cause for precluding through truck traffic on certain roadways. Accident data was provided by the New Haven Department of Traffic and Safety and prepared by the City Plan Department. Information includes annual statistics for the city as a whole and the five "hot spot" corridors for 2006. Table 2.5 summarizes the accident datasets on local roadways provided by the city.

Table 2.5 Citywide and "Hot Spot" Corridor Accident Summary

	Derby Avenue Corridor	Dixwell Avenue Corridor	Howard Avenue Corridor	Quinnipiac Avenue Corridor	Willow Street Corridor	Citywide
Number of Accidents or Incidents	116	270	284	370	96	12,194
Percent of Citywide Accidents	0.95%	2.21%	2.33%	3.03%	0.79%	100%
Number with Injury	10	55	35	53	15	1,734
Percent with Injury	9%	20%	12%	14%	16%	14%
Number on Weekends	26	60	55	80	14	2,697
Percent on Weekdays	78%	78%	81%	78%	85%	78%
Number with Fatalities	2	0	0	4	0	16
Number from 8:00 a.m. to 8:00 p.m.	75	173	208	245	61	8,391
Percent During Working Hours	65%	64%	73%	66%	64%	69%

Physical Constraint Data

Additionally, physical constraints such as steep grades, height restrictions, awkward intersection geometry, and narrow or curving roadways along each of the five corridors where reviewed to establish each roadway's ability to physically accommodate commercial and industrial vehicles. Physical constraint data was assembled and verified through field checks, reviewing city maps, and

working with City Plan staff members. The information collected from this effort will be applied to the overall safety concerns of the five "hot spot" corridors, and will be considered when making truck routing decisions.

Major Trucking Generators Identification

Truck generators are defined as any facility that generate significant levels of truck traffic on a regular basis. To establish major truck generators within the City of New Haven, the project team analyzed citywide employment and economic datasets contained within the City of New Haven's *Comprehensive Plan of Development – Data Book* and conducted interviews with officials of the City Plan Department. From this analysis a list of major generators was developed and presented to members of Technical Advisory Committee for review. Confirmed generators were then incorporated within the project's geodatabase and mapping program. The following outlines the major truck generators identified for inclusion within this analysis:

- Middletown Avenue area;
- I 95 Exit 44 and Exit 45;
- Port District;
- Yale Medical Center; and
- Yale University.

The purpose of identifying specific truck generators was to establish their physical location and identify how trucks access each location along city roadways. By understanding these movements, the project team will obtain a better understanding of truck movements within the city, which ultimately translate into developing a comprehensive truck routing management plan.

Current Law Enforcement Practices

Enforcement of truck routes and policies are a critical component of successful truck routing and freight movement programs. Often, enforcement can be the most challenging to implement, since it requires time, money, training, and organizational support. After meeting with representatives from the New Haven Police Department (NHPD) and the Traffic and Parking Department, it was determined that the current state of the truck routes and truck management policies does not provide law enforcement with an enforceable program. In fact, law enforcement officials stated that the Historical Truck Routes Map (Figure 2.1) was unfamiliar and that any known routes within the city where unworkable in their current state. Additionally, officers believed that lack of signage, and the disconnected nature of the current signage system, created a truck management program that is impossible to enforce. Lastly, officers were concerned that current reductions in the traffic enforcement unit have stretched their ability to monitor traffic in its current state, and a lack of manpower prohibits them from focusing on truck and freight-related traffic issues. In summary, existing truck

traffic regulations are not being effectively enforced within New Haven. Second, officers do not have the manpower, training, and policies to perform their jobs effectively. As a result the enforcement of truck-specific traffic violations is non-existent.

2.2 "HOT SPOT" ANALYSIS

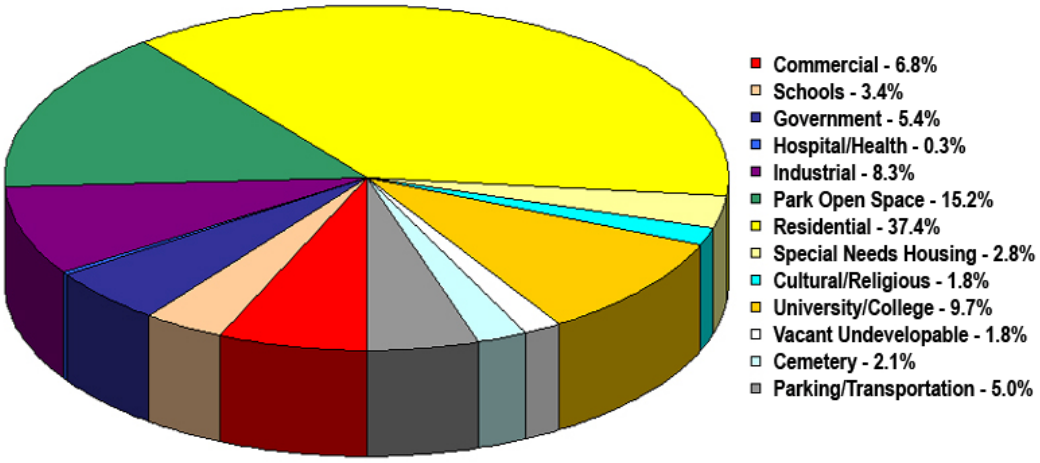
The data gathering effort led to the identification of five trucking "hot spot" corridors for review. These are corridors in which real or perceived problems exist, either as a result of truck traffic impacts on the environment or community, or physical and safety issues that limit route options for trucks. A geospatial analysis was undertaken to determine the significance of the problem, and to determine whether corridors should be included or excluded from the recommended truck routing network.

A geospatial analysis examines specific roadways and their relationship with neighboring land uses and sensitivity receptors. Determining this relationship assisted the study team in making a comprehensive and informed decision regarding truck routing within New Haven. This analysis incorporated residential and religious facility land uses, parks, schools, museums, and libraries, in relation to the five "hot spot" corridors.

Land Use Review

According to GIS datasets provided by the New Haven City Plan Department, residential land use maintains the largest percentage of citywide land in terms of area at 37.4 percent. Park open space, which accounts for 15.2 percent of the city's area, and is the second largest land use. Figure 2.5, demonstrates the distribution of citywide land use by percentage of acreage.

Figure 2.5 Citywide Land Use Patterns by Acreage Percentage



Using ArcGIS, the land use data layer underwent a geoprocessing technique that produced land use patterns for the five identified "hot spot" corridors. Table 2.6 reports the results of this analysis.

Table 2.6 Comparison of Land Use Patterns by Acreage for "Hot Spot" Corridors in Relation to Citywide Totals

Land Use	Derby Avenue Corridor	Dixwell Avenue Corridor	Howard Avenue Corridor	Quinnipiac Avenue Corridor	Willow Street Corridor	Citywide
Commercial	25.0%	15.4%	8.2%	12.8%	2.7%	6.8%
Schools	5.4%	6.5%	5.4%	3.0%	7.6%	3.4%
Government	5.0%	5.2%	20.6%	4.2%	0.3%	5.4%
Hospital/Health	10.4%	0.0%	0.0%	0.0%	0.0%	0.3%
Industrial	0.0%	1.4%	0.9%	4.5%	8.1%	8.3%
Park Open Space	2.3%	0.0%	11.3%	5.2%	25.8%	15.2%
Residential	36.5%	42.7%	50.8%	61.6%	53.0%	37.4%
Special Needs Housing	5.6%	9.9%	0.1%	1.7%	0.0%	2.8%
Cultural/Religious	5.9%	9.5%	1.4%	1.2%	2.5%	3.9%
University/College	1.3%	7.1%	0.0%	0.0%	0.0%	9.7%
Vacant Undevelopable	0.0%	0.1%	1.2%	0.6%	0.0%	1.8%
Parking/Transportation	2.6%	2.4%	0.0%	5.1%	0.0%	5.0%

Sensitivity Receptor Analysis

Sensitivity receptors are defined as land uses or community facilities particularly vulnerable or sensitive to high truck volumes and the conditions associated with their presence (i.e., emissions, air quality, vibrations, noise pollution, and pedestrian safety). Sensitivity receptor analysis is critical to preventing the mix of conflicting uses when developing truck management programs. Table 2.7 reports on the sensitivity receptor analysis and its findings.

Table 2.7 Sensitivity Receptor Analysis by "Hot Spot" Corridor

Sensitivity Receptor	Derby Avenue Corridor	Dixwell Avenue Corridor	Howard Avenue Corridor	Quinnipiac Avenue Corridor	Willow Street Corridor	Citywide
Schools	1	2	3	2	1	61
Libraries	0	1	0	0	0	5
Museums	0	1	0	0	0	19
Parks (Acres)	1.7	0.0	19.2	9.5	19.3	1,506.0
Residential (Acres)	26.8	62.7	86.2	111.6	39.7	3,712.1
Religious/Cultural (Acres)	4.3	13.9	2.3	2.2	1.9	388.6

"Hot Spots" Analysis Findings

The following sections outline the findings from the geospatial analysis for each "hot spot" corridor, and discuss the reasoning for inclusion or exclusion from the proposed truck route network. It should be noted that exclusion of a corridor from the truck route network does not restrict all truck traffic along the corridor, it only imposes restrictions on through truck movements. This is due to the fact that trucks with origins and/or destinations within any given roadway are legally entitled to travel on that roadway. In order to ensure and promote health and safety, a driver must utilize the shortest and safest feasible route to and from an origin/destination that is not located on a designated truck route network.

Derby Avenue Corridor

At approximately 73 acres, the Derby Avenue Corridor is the smallest of the five "hot spot" corridors. As shown in Table 2.6, one-fourth of all land uses contained within the Derby Avenue Corridor are commercial in nature. Additionally, over 10 percent of the corridor's land use is utilized by hospital or medical operations, which collectively have been identified as a generator of truck movements citywide. Lastly, on average, the Derby Avenue Corridor maintains a lower percentage of residential land use by acre when compared to citywide averages.

In relation to sensitivity receptors, Derby Avenue contains very few. As illustrated in Table 2.7, the only major sensitivity receptor located within its borders is the Barnard Environmental Studies Magnet School located at 170 Derby Avenue. However, with an adequate setback from Derby Avenue and with trucks currently using the adjacent Ella T. Grasso Boulevard, the Barnard School should experience limited impacts with truck usage along Derby Avenue.

With direct connections to Ella T. Grasso Boulevard, no physical constraints, a limited number of sensitivity receptors, and high percentage of commercial and hospital land uses, the Derby Avenue Corridor provides merit for consideration within the citywide truck route network, even though some of the perceived issues exist.

Dixwell Avenue Corridor

The Dixwell Avenue Corridor is approximately 147 acres in area and is comprised of mixed land uses, with no single land use dominating the corridor's landscape. Interestingly, when compared to the other "hot spot" corridors, the Dixwell Avenue Corridor maintains a disproportionate percentage of religious/cultural facilities and university/college land uses. With 9.5 percent of the corridor's land area utilized for religious/cultural facilities and 7.1 percent utilized for university/college land uses, the corridor contains a conflicting condition between sensitivity receptors (i.e., religious/cultural facilities) and identified citywide truck generators (i.e., university/college land uses).

In terms of sensitivity receptors, Dixwell Avenue contains a moderate amount, besides the relatively higher concentration of religious/cultural facilities. As shown in Figures 3.3 and 3.4, the Dixwell Avenue Corridor encompasses two municipal schools, is located near four others, and is adjacent to Bowen Field and Beaver Ponds Park. Of the sensitivity receptors in the area, the Primary Learning Academy and the Stetson Library are the only ones located directly along Dixwell Avenue.

Dixwell Avenue's wide roadway and the lack of physical constraints provides a safe and adequate route for trucks. Additionally, its position as a connector between the center of New Haven and communities to the north with limited highway access makes Dixwell Avenue a logical route for trucks traveling to the north to utilize.

Although Dixwell Avenue maintains a larger share of religious and cultural facilities in terms of land usage, 9.5 percent as compared to 3.9 percent observed citywide, and contains a modest number of sensitivity receptors, the roadway's overall land use, roadway geometry, and direct route to northern communities provides adequate reasoning for its inclusion within the city's truck route network.

That being said, when developing the truck route network and management program, special consideration should be given to the time periods when truck utilize the corridor, as to limit the effect on schools and religious facilities. This could be achieved by identifying Dixwell Avenue as a "target zone" that maintains specific regulation tied to its use. For example, restricting truck traffic

during identified times of worship or during time periods when school is beginning and ending.

Howard Avenue Corridor

The Howard Avenue Corridor was identified as a "hot spot" due its close proximity to I-95, its use as a cut through for trucks along Kimberly Avenue, Sea Street, and Howard Avenue, and due to the fact that portions of Howard Avenue have been assigned historical status.

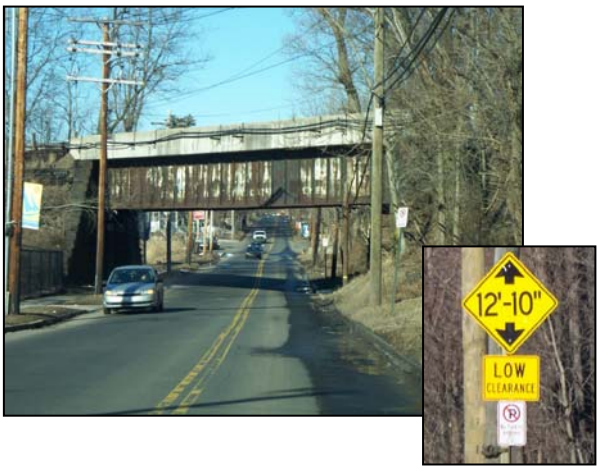
The corridor encompasses almost 170 acres, maintains over 50 percent in residential land use, and presents a strong residential character, especially towards the southern end of the corridor. As a result, it is not surprising that field observations noted a large number of "No Thru Truck" signs within the Howard Avenue Corridor from previous and isolated truck management programs.

Sensitivity receptor analysis reported that besides a high residential land use, over 11 percent of the corridor's land mass is for park/open space. As shown in Figures 3.3 and 3.4, the Howard Avenue Corridor maintains a higher number of schools, with three within its boundary and two lying just outside in the northern portion of the corridor.

Howard Avenue maintains a strong residential character, is recognized for historical significance, and an adequate routing alternative is provided along Ella T. Grasso Boulevard (Exit 44 and 45) and Sargent Drive/Long Wharf Drive (Exit 46) for trucks entering and existing I-95, Howard Avenue should be excluded from consideration within the citywide truck route network.

Quinnipiac Avenue Corridor

At approximately 181 acres, the Quinnipiac Avenue Corridor is the largest of the five "hot spot" corridors. Community complaints for this Corridor center around the belief that trucks use Quinnipiac Avenue as a through route between the Port District, located to the south, and Foxon Boulevard (State Route 80). Additionally, city officials and community members alike believe that the existing "No Thru Truck" signage is not adhered too because signage is not present along State Route 80 that would inform truck drivers before proceeding onto Quinnipiac Avenue.



When examining the current land use characteristics, the Quinnipiac Avenue Corridor is significantly residential in character, with almost 62 percent of the land area reported for residential use. Even though the corridor maintains a notable commercial land use (12.8 percent) and a moderate industrial use (4.5 percent), the overall character of the Quinnipiac Avenue Corridor is predominately residential. When examined in relation to sensitivity receptors, the Quinnipiac Avenue Corridor contains two schools and a small percentage of park/open space when compared to citywide averages, 5.2 percent to 15.2 percent, respectively.

Besides a large residential population, the Quinnipiac Avenue Corridor contains narrow and twisting roadways that are often dangerous to navigate. In fact, of all accidents that occurred citywide, over three percent occurred along Quinnipiac Avenue. More importantly, four were fatal accidents, which accounts for 25 percent of the citywide automobile fatalities on local roadways. In addition to its dangerous topography and roadway, Quinnipiac Avenue also contains a number of physical constraints, including height restrictions, that limit the ability of trucks to navigate the corridor safely.

Due to its prominent residential features, narrow roadway, difficult topography, and physical constraints, the Quinnipiac Avenue Corridor should be excluded from consideration within the citywide truck route network.

Willow Street and Cold Spring Street/Mitchell Drive Corridor

The Willow Street and Cold Spring Street/Mitchell Drive Corridor was identified as problematic due to its close proximity and easy access points on and off of I-91. Community complaints center around the belief that trucks use either Willow Street or Cold Spring Street/Mitchell Drive as a cut through between the Interstate and Whitney Avenue in order to bypass the New Haven city center accessed via Exit 3. Currently, prohibitive signage is located along Willow Street before and after the intersection of Willow Street and Mitchell Drive. The current

signage effectively directs truck traffic from Willow Street onto Cold Spring Street/Mitchell Drive.

When compared to the other "hot spot" corridors, the Willow Street and Cold Spring Street/Mitchell Drive Corridor maintains the second highest residential land use percentage (53.0 percent) and by far the highest percentage of park/open space land usage (25.8 percent). Sensitivity receptor analysis revealed that one school, the Wilbur Cross High School, is located within the corridor.

Due to the high percentage of residential land usage along Willow Street and Cold Spring Street, the prominence of parkland and Wilbur Cross High School bordering Mitchell Drive, and a satisfactory alternative for trucks to access Whitney Avenue via downtown New Haven, it is recommended that the Willow Street and Cold Spring Street/Mitchell Drive Corridor should be excluded from consideration within the truck route network.

2.3 EXISTING CONDITIONS ASSESSMENT

The data gathering outreach efforts established a comprehensive understanding of the problems and issues that hinder the movement of freight within the City of New Haven and the impacts that freight movements have on various segments of the city's residents and business owners. Four primary issues have been identified that affect goods movement and the management of truck traffic on local roadways. These issues include the lack of a current and cohesive freight movement network, the lack of an identifiable and understandable signage program, lack of sufficient southeast to northwest roadway connections, and an insufficient enforcement and public education program.

Deficient Truck Route Network and Signage Program

Perhaps the greatest problem identified in the data gathering and outreach processes is the lack of an identifiable truck route network and signage program in the City of New Haven. With only one roadway in the city designated as a preferred truck route, and various neighborhood roadways labeled with "No Thru Truck" signs, New Haven currently has an inconsistent, incomprehensive, and ineffective truck route network and management program.

For the most part, the current signage and routing program has developed as a result of noise or other complaints from neighborhood residents, and historical records. Over time, the truck management program has evolved into a patchwork system based on targeting specific neighborhood problems, with little consideration for the effects on other roadways and the movement of goods throughout New Haven as a whole. Additionally, a lack of positive directional signage that is clearly identifiable and communicates a safe route to drivers, promotes confusion, doubt, and potentially dangerous maneuvering throughout city roadways.

In order to resolve this issue, a visible, comprehensive network of acceptable trucking routes must be established. Such a network should provide a set of routes that drivers can be assured are safe for use while traveling within and through the City of New Haven. The existence of a truck route network would also establish guidelines for law enforcement to help them determine whether or not a truck is using an appropriate route, and therefore whether or not a citation or warning is necessary.

Deficient Mobility North of City Center

In New Haven, general mobility and roadway linkages are fairly easy to come across with direct access to I-91, I-95, U.S.-1, State Route 10, and State Route 34. North of the city center, however, mobility for automobiles and trucks are increasingly difficult. North-south movements to and from the city center are difficult to navigate, especially for trucks traveling with no clear route guiding them. The north-south roadway network north of the city center is complicated, with unconventional intersections, roadway splits, hilly topography, and an irregular street network. Dixwell Avenue and Whitney Avenue are the clearest options, but with no directional aids present, errors occur that result in truck traffic using north-south routes that would ordinarily be considered undesirable. This is an area for concern due to increased trucking origins and destinations identified north of New Haven.

Insufficient Enforcement and Education Program

As discussed previously, the current state of truck routes and truck management policies does not provide law enforcement officials with an enforceable system. As a result, the current state of truck enforcement in New Haven is minimal at best. Compounding the situation, law enforcement officials have acknowledged an insufficient number of officers and a lack of additional truck management training hinders their ability to enforce truck movements within New Haven. Besides a lack of officer training, the public in general has not been educated in the importance of trucking within New Haven. For the most part, citizens only observe and relate to the negative impacts of trucking. Instead, citizens need to be educated in the role trucks play in the economy of New Haven, the positive effects trucks have on their lives, as well as the facts on trucks, truckers, and the trucking industry.

3.0 Best Practices

This technical memorandum is the second of three that are part of the New Haven Truck Route Study. The purpose of Technical Memorandum 2 is to examine the experiences of truck studies in select case study locations, identify city streets within New Haven that are recommended to serve as truck routes, and to present alternatives for supporting city ordinances that will ease the flow of freight through the city and minimize the effects of freight transportation on sensitive communities and the environment.

This section introduces the case study cities and presents the issues, challenges, outcomes, and lessons learned from each. Truck route studies of various types that were undertaken in Rockland County, New York; Tampa-Hillsborough County, Florida; Cambridge, Massachusetts; Baltimore, Maryland; and New York, New York all lend lessons that are applicable to the situation in New Haven, Connecticut.

3.1 CASE STUDIES

The experiences of other localities can provide valuable information when undertaking the development of a goods movement policy. Cities and counties throughout the United States have engaged in efforts to control and direct freight movements within their jurisdictions; each with unique approaches and methods, and each with varying degrees of success. Each of the selected case studies have similar community attributes to New Haven and similar issues that were resolved. The selected case study locations and the lessons learned from the primary issues experienced in each are provided below in Table 3.1.

Table 3.1 Case Study Selections

Case Study Area	Years of Study	Primary Lessons Learned/Applicable Programs
Rockland County, New York	2005 to 2007	• Imposition of a designated truck route network where none existed previously
Tampa-Hillsborough County, Florida	1994 to 2006	• Long-term freight planning • Major capital projects
Cambridge, Massachusetts	2001 to 2003	• Time-of-day truck route policies • Target enforcement areas
Baltimore, Maryland		• Signage Program • Infrastructure replacement
New York, New York	2003 to 2006	• Outreach and Education Program

Rockland County, New York

Rockland County, located on the western shore of the Hudson River approximately 20-miles north of New York City, has encountered difficulty managing truck activity on county highways and other roadways within the jurisdiction. Rockland County's economy is focused on industries that are highly dependent upon truck shipment, with trucks transporting 92 percent of all freight moving into and out of the County.

Like New Haven, Rockland County does not have an existing network of designated, enforceable truck routes. Prior to the undertaking of the county's Truck Movement Study, truck management consisted primarily of posting restrictive signage where complaints from residents occurred. There was no comprehensive effort to plan for and designate routes that truck traffic would be allowed to use.

The large share of freight transported by trucks indicates the type of growth and land development that has occurred in Rockland County in recent decades. Suburban sprawl has brought shopping malls, including the two million square-foot Palisades Center shopping and entertainment complex, residential subdivisions, office parks, and industrial parks to the area, often within close proximity to one another, and especially near municipal boundaries where local land use planning has not always taken the plans of neighboring municipalities into account. One area in particular, the area of Western Highway near the border of Orangetown and Clarkstown, proved to be particularly problematic as truck traffic traveling to and from industrial facilities in Orangetown passed through sensitive residential communities in Clarkstown.

Furthermore, there was no designated network of truck routes through Rockland County. Instead, many towns posted truck prohibitions on roadways within their boundaries, including county and state highways over which municipalities have no jurisdiction. The patchwork of restrictions, which were meant to satisfy residents' complaints in various neighborhoods, did not introduce or promote a logical set of alternative routes for truck drivers to use.

These problems led Rockland County to conduct a study of truck movements and community impacts which was completed in 2007. The goals of the study were to identify existing truck movements, evaluate their impacts, evaluate alternative truck routes, recommend a network of truck routes, and develop an implementation plan and supporting strategies. The Truck Movement Study engaged in a geographic analysis of truck travel patterns, land use data, and the physical characteristics of roadways throughout the county. A truck driver origin-destination survey was conducted on various highways within the county to determine where the trucks observed traveling through Rockland County were coming from, going to, and which routes they use on their trips. The nearly 1,300 survey responses were complemented with a series of interviews with representatives from many of the large businesses in Rockland County that generate truck traffic.

The data gathering effort led to the identification of three key findings: 1) an identifiable freight network is lacking in Rockland County; 2) there are few available options for east-west travel across the County for all traffic, including trucks; and 3) economic and population growth have resulted in conflicting land uses being developed in close proximity.

The data gathering effort also led to the identification of five trucking "Hot Spots." These are locations in which significant problems exist, either as a result of truck traffic impacts on the environment or community, or physical and safety issues that limit route options for trucks. A comparative analysis was undertaken to determine whether alternate routes could be identified that would alleviate the problems in the Hot Spot areas.

Based upon all collected data and the Hot Spot Analysis, a network of recommended truck routes was developed for state and county highways. The truck route network was intended to keep truck traffic on appropriate roads and to provide a reasonable set of routes truckers can use to conduct business in Rockland County while avoiding physical constraints and other sensitive areas.

A set of strategies were assembled that allow the Rockland County Highway Department and the Rockland County Department of Planning to implement a truck route network and supporting policies that are clearly communicated and easily understood by truck drivers, area businesses, and community residents. The strategies were arranged to accomplish the following four goals:

1. **Effective Truck Signage Program.** It was recommended that the County adopt a signage program that clearly identifies truck routes and communicates restrictions on commercial traffic where necessary. Signs posted on state and county highways in Rockland County should meet Federal and state guidelines.
2. **Interagency Cooperation.** Cooperation with state, municipal, and neighboring jurisdictions was strongly encouraged to facilitate implementation of the recommended network, to ensure that recommended truck routes were sensitive to conditions beyond Rockland County, and to account for freight movement in municipal land use planning.
3. **Outreach and Education.** Several initiatives were recommended in order to foster the involvement and education of community groups, the trucking industry, and law enforcement.
4. **Capital Improvements.** A set of capital projects was recommended to improve vehicular and pedestrian safety.

Tampa-Hillsborough County, Florida

The City of Tampa, Florida and surrounding Hillsborough County each engaged in truck route studies in the 1980s and 1990s that, like the Rockland County study, acted as a planned approach to moving freight through the area efficiently while restricting freight movements in sensitive areas. These early studies

implemented networks of truck routes, identified roadways that were to be restricted, laid out an education program for residents, law enforcement, and the trucking industry, and established advisory committees to monitor the performance of the networks and accompanying policies as well as to solicit input from the trucking industry, community groups, and other stakeholders.

In the years since, Tampa officials recognized that the network was not resolving all of the problems associated with freight movement. Changes to the truck route network ensued, with some routes being added to the designated network, and others being removed. Truck traffic traveling to and from the Port of Tampa, specifically, was the source of complaints in the historic Ybor City neighborhood. Although most traffic used a designated truck route, residents suffered due to the high volume of truck traffic passing by the area's historic homes and sidewalk cafes.

The Hillsborough County Metropolitan Planning Organization (HCMPO) was used as a vehicle for studying the problems in the Ybor City area and elsewhere, and for developing a plan to move freight efficiently, safely, and in a manner that is sensitive to the needs and plans of the entire metropolitan region. The *Tampa Bay Regional Goods Movement Study*, completed in 2005, identified major freight activity centers, established strategic "Freight Mobility Corridors" that connected the activity centers with major transportation facilities, promoted a capital improvements program to enhance the freight corridors, and established a Regional Freight Advisory Committee

The regional cooperation that these studies have fostered has been extremely beneficial to the region as a whole. The Florida Department of Transportation is engaged in a project to alleviate truck traffic in Ybor City by constructing a connector expressway between the Port of Tampa and Interstate 4. When completed in 2010, the connector will consist of general-purpose lanes and exclusive trucks-only lanes, making it one of the first trucks-only facilities in the United States.

Through each step of the planning process, keeping stakeholders involved and reaching out to regional and state agencies has resulted in the realization that many local issues and problems can affect the health of an entire region.

Cambridge, Massachusetts

In Cambridge, Massachusetts the primary issue of concern was the impacts that trucking activity inflicted upon residential communities in the city. Many of the major streets that lead into commercial districts such as Central Square, Harvard Square, and the East Cambridge districts pass through dense, sensitive residential neighborhoods. The city received many complaints from residents in these areas concerning noise and vibrations experienced when trucks traveled through. Furthermore, the city was receiving complaints from residents frustrated with trucks shortcutting through their neighborhoods to get from industrial areas in East Cambridge to the Massachusetts Turnpike across the

river from the south and western ends of the city. Prior to the undertaking of a citywide truck route study, the countermeasure imposed by the city was a patchwork of truck bans and other restrictions, with little in the way of a provision for preferred routes for truck drivers to use.

After the city engaged in a truck route study in 2001, a network of truck routes was established citywide. The route network offered one particularly interesting feature – overnight trucking restrictions on select routes. Between the hours of 11:00 p.m. and 6:00 a.m. each day, through trucks are prohibited on several truck routes that pass through particularly sensitive residential areas. During the overnight hours, through trucks must only use 24-hour truck routes.

An additional feature in the Cambridge plan is the establishment of "Target Zones" for enforcement of truck regulations. The Cambridge Police Department spends the majority of its resources for truck regulations enforcement within especially sensitive areas and areas where the regulations are believed to be frequently ignored. This effort leads to better compliance by dissuading many drivers who are aware of the practice from entering the target zones if they are not making local deliveries.

Baltimore, Maryland

In the City of Baltimore, many resident complaints about through truck traffic are a result of activities at the city's seaport facilities. Significant volumes of truck traffic traveling to and from the Port of Baltimore use the city street network. This activity places a strain on the city's aging infrastructure and negatively affects the quality of life in residential neighborhoods.

A truck study conducted in the City of Baltimore resulted in the recommendation to create Truck Zones that restrict through truck traffic in sensitive areas. Traditional truck route signage would be accompanied by the Maryland Department of Transportation's use of Variable Message Signs (VMS) to notify truck drivers of the newly recommended truck route to the Port of Baltimore. The study also resulted in the establishment of relationships between city and private agencies for the purpose of managing truck traffic patterns during construction periods. A regional Freight Movement Task Force was created to develop measures to improve the movement of freight throughout the Baltimore region.

New York, New York

In 2006, New York City's latest truck route management study was completed. The study reexamined the city's network of through and local truck routes, its signage program, and explored ways to minimize the effect of increasing truck traffic on sensitive communities. One of the most valuable elements of the New York City study is the Outreach and Education Program. The program is innovative and makes use of a variety of city, state, and national resources to

educate the public, the trucking industry, and law enforcement about truck regulations and travel information within the city.

The Outreach and Education Program consists of 20 programs that allow the New York City Department of Transportation (NYCDOT) to create, share, and update truck route and travel information with all necessary agencies, departments, and groups. The programs give special attention to distributing information that educates the public, the trucking industry, law enforcement, and other city departments. The programs would be developed and managed by a new division within NYCDOT, the Office of Freight Mobility (OFM). The OFM is responsible for managing the city's truck route network, disseminating information to necessary city agencies, the New York City Police Department (NYPD), and all other relevant stakeholders.

Public Education

The Public Education program calls for truck route information and truck regulations to be made easily available on the NYCDOT web site and organized in a manner that web site visitors can easily navigate the site and find relevant information. Up-to-date, detailed truck route maps are available on the web site. OFM acts as a conduit to provide a one-stop shopping destination for residents seeking truck route information. Additionally, enhancements to the city's 3-1-1 resident information hotline (reachable outside New York City at 212-NEW-YORK) are planned so that residents' complaints and requests for information can be fulfilled quickly and easily. The OFM will provide materials that 3-1-1 representatives can easily refer to in order to streamline the process for seeking information or making complaints via 3-1-1. New information and updates are made available to the public via the NYCDOT web site, 3-1-1, mailing lists to community organizations, general public education workshops, public safety education programs, and community newspapers and newsletters. Finally, the study recommends the establishment of a Truck Study Comment Log through which residents may provide any relevant information concerning truck activity in their neighborhoods, and gauge the effectiveness of the city's trucking regulations.

Trucking Industry Education

The study recommends educating members of the trucking industry by making up-to-date truck regulations and route information available on the NYCDOT web site and 3-1-1. Additionally, truck route geographic data should be shared with other city departments so that official city maps may include truck route data. The city has approached map vendors such as Hagstrom in an effort to have truck routes displayed on their maps. On-line mapping and navigation sources such as Co-Pilot, Google, Mapquest, and Yahoo also may become sources of truck route information. Truck travel information has become available at traveler information kiosks at New York State Thruway rest areas and at the Port Authority Bus Terminal in Manhattan, pictured below in Figure 3.1. Truck

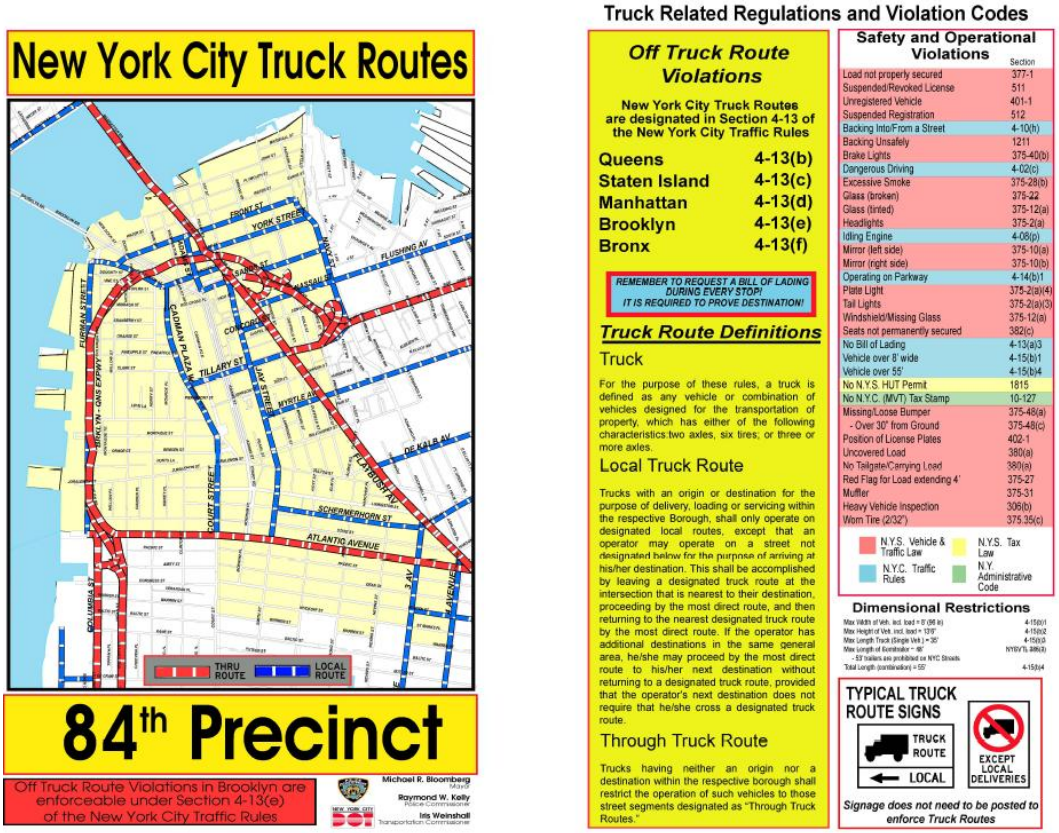
Drivers may find truck route maps, travel advisories, and other pertinent information at these kiosks so that they may plan alternate routes if necessary on their approach to the city. Information also may be shared via newsletters to industry organizations and at industry conferences.

Figure 3.1 TRANSCOM Information Kiosk at the Port Authority Bus Terminal in New York City

Enforcement Education

Educating the NYPD and administrative law judges on what the truck regulations mean, how they are enforceable, and where truck routes exist within each precinct is an important part of the Outreach and Education Program. The study produced an outline for training modules that will help these individuals enforce the law. In addition, it is recommended that police officers carry a wallet-sized card, such as the one shown in Figure 3.2, that displays a map of truck routes within their precincts, cites the city codes that apply to trucking violations, and other information that will allow law enforcement officials to adequately enforce the truck regulations.

Figure 3.2 An Example of a Truck Route Information Card Proposed for NYPD Use



3.2 BEST PRACTICES

The five case study locations have encountered problems and reached solutions, many of which are directly related to the issues that have surfaced in New Haven and could be of significant benefit to the City of New Haven. The experience of Rockland County's establishment of a countywide truck route network allowed the county to clearly communicate to the trucking industry where through truck traffic may travel on state and county highways. It also allowed municipalities in the county to plan truck restrictions on local streets and land use decisions around the existence of a county truck route network. Cambridge encountered issues with late night truck traffic and accompanying noise complaints by instituting time constraints on the use of several truck routes which passed through sensitive neighborhoods. Baltimore provides a good example for managing port area truck activity. New York City's elaborate effort to educate stakeholders, law enforcement, and the public, has fostered an

awareness and understanding that contributes to compliance and better enforcement of truck route regulations.

The collective experiences of the case study locations have indicated a set of best practices – measures that, through experience, have proven to contribute positively to the development and maintenance of truck route programs. These best practices serve as lessons that the City of New Haven can borrow to solidify the program it develops. The best practice lessons are listed below:

- Assume a regional, cooperative approach to freight transportation planning;
- Develop a comprehensive network of truck routes that provides truck drivers adequate route options and that is easy to recognize and use;
- Get stakeholders involved and educated prior to the institution of truck route regulations;
- Make ordinance as clear, and hence, as self-enforcing as possible;
- Adopt policies to support truck routes and improve public health and safety;
- Signage should be easily recognizable and understood; and
- Use targeted enforcement techniques to concentrate resources and maximize effectiveness.

4.0 Truck Route Network Development and Analysis

The experience of the case study locations and an examination of existing conditions, problems, and issues in the City of New Haven, lead to the conclusion that it would be to the benefit of the city to establish a network of designated truck routes. Such a network would focus the truck traffic that travels through the city onto roadways that are determined physically capable of carrying their loads and where the impact of trucks on sensitive land uses and public safety will be minimal. The network would serve two very important functions – limiting through truck use of undesirable or sensitive roadways, and providing the necessary set of "alternative routes" for trucks that must be identified before the State Traffic Commission may post through truck prohibitions on sensitive roadways.

The proposed Truck Route Network for the city will rely heavily upon the interstate and state highway system to enable through trucks to navigate safely and efficiently through New Haven. In addition, sections of 16 local roadways have been incorporated into the proposed truck route network, and function as important connectors between the interstate and state highway systems.

Section 4.1 presents the recommended truck routes that are on city roadways and assesses the land use surrounding each, with special attention to sensitivity receptors such as residential areas, parks, schools, museums, libraries, and religious facilities. Section 4.2 lists all roadway segments that are included in the proposed truck route network and includes a map illustrating the network these roadways create.

4.1 SENSITIVITY RECEPTOR ANALYSIS: PROPOSED TRUCK ROUTES ON CITY ROADWAYS

The 16 city roadways that are included in the proposed truck route network have been scrutinized using a sensitivity receptor analysis to determine the impacts truck traffic on these routes may have on sensitive land uses such as schools, libraries, museums, parks, religious and cultural facilities, and residential areas. This analysis included land parcels located within 500 feet of the centerline of each route. Sensitive locations within this close proximity would be most affected by truck activity on these roadways. Additional sensitivities include bicycle and pedestrian facilities. SCRCOG's Regional Bicycle and Pedestrian Plan was a resource used to identify where potential conflicts between bicyclists, pedestrians, and trucks may occur and where careful planning to safely accommodate multiple transportation modes should be made.

Roadways along which few receptors exist should be considered especially appropriate for truck traffic. The existence of receptors should not immediately disqualify a roadway from consideration as a potential truck route, however. Some roadways provide connections or access to highways that are critical. Where receptors exist on those roadways, special efforts in planning, outreach, and enforcement will have to be undertaken in order to maintain driver compliance, public safety, and quality of life.

Brewery Street

The section of Brewery Street proposed for inclusion within the citywide truck route network is located between Water Street and Sargent Drive, and is approximately 800 feet in length. The character for the area surrounding this portion of Brewery Street is for the most part industrial in nature. The 500-foot buffer study area along Brewery Street totals approximately 88 acres, consisting predominantly of industrial and government facility land use patterns, at 46 percent and 42 percent of the total area, respectively. This section of roadway provides connections between U.S. Route 1, Interstate 95, Route 34, and the industrial and commercial complexes along Sargent Drive. Table 4.1 outlines the sensitivity receptors located in the study area. Because of the important connections to major roadways this street provides, and absence of many sensitive land uses, Brewery Street is recommended for inclusion in the city's truck route network.

Table 4.1 Brewery Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Brewery Street 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	0	19
Parks (Acres)	0	1,506
Residential (Acres)	5.8	3,712
Religious/Cultural Facilities (Acres)	1.1	387

Broadway

The section of Broadway proposed for inclusion within the citywide truck route network is located between Elm Street and Tower Parkway, and is approximately 950 feet in length. The character of the area surrounding this portion of Broadway is for the most part commercial in nature. The 500-foot buffer study area along Broadway totals approximately 102 acres, consisting predominantly of university/college and commercial land uses, at 68 percent and 42 percent of the total area, respectively. This section of roadway provides

connections to Elm Street, Tower Parkway, Dixwell Avenue, and Whalley Avenue. Table 4.2 outlines the sensitivity receptors located in the study area.

Table 4.2 Broadway Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Broadway 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	1	19
Parks (Acres)	0	1,506
Residential (Acres)	3.9	3,712
Religious/Cultural Facilities (Acres)	69.2	387

Church Street

The section of Church Street proposed for inclusion within the citywide truck route network is located between Elm Street and Trumbull Street, and is approximately 1,900 feet in length. The character for the area surrounding this portion of Church Street is for the most part commercial in nature. The 500-foot buffer study area along Church Street totals approximately 83 acres, consisting predominantly of commercial and open space land uses, at 29 percent and 25 percent of the total area, respectively. This section of roadway provides connections to Interstate 95 via Trumbull Street, Elm Street, Downtown New Haven, and Yale University via Grove Street/Tower Parkway. Table 4.3 outlines the sensitivity receptors located in the study area.

Table 4.3 Church Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Church Street 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	1	5
Museums	2	19
Parks (Acres)	20.8	1,506
Residential (Acres)	3.7	3,712
Religious/Cultural Facilities (Acres)	4.4	387

Church Street Extension

The section of the Church Street Extension proposed for inclusion within the citywide truck route network is located between Union Avenue and Sargent

Drive, and is approximately 2,500-feet in length. The character for the area surrounding this portion of Church Street is for the most part industrial in nature. The 500-foot buffer study area along Church Street totals approximately 212 acres, consisting predominantly of transportation infrastructure and industrial land uses, at 37 percent and 33 percent of the total area, respectively. This section of roadway provides connections to Interstate 95 via Sargent Drive, Route 1, and Route 5. Table 4.4 outlines the sensitivity receptors located in the study area.

Table 4.4 Church Street Extension Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Church Street 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	0	19
Parks (Acres)	0	1,506
Residential (Acres)	5.7	3,712
Religious/Cultural Facilities (Acres)	0.4	387

Dixwell Avenue

The section of Dixwell Avenue proposed for inclusion within the citywide truck route network is located between the Broadway/Goffe Street/Whalley Avenue intersection and the city's northern boundary near Cherry Ann Street, and is approximately 8,300 feet in length. The character for the area surrounding this portion of Dixwell Avenue is for the most part residential in nature. The 500-foot buffer study area along Dixwell Avenue totals approximately 306 acres, consisting predominantly of residential and park/open space land uses, at 26.8 percent and 18.5 percent of the total area, `respectively. This section of roadway provides connections to the Broadway/Whalley Avenue commercial area and Route 10 in Hamden. Despite the presence of a large amount of residential properties on Dixwell Avenue, the connection it makes between Downtown New Haven and commercial areas in Hamden is important, and with few viable alternatives for such truck movements, it is recommended that Dixwell Avenue be included in the truck route network. Table 4.5 outlines the sensitivity receptors located in the study area.

Table 4.5 Dixwell Avenue Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Dixwell Avenue 500-foot Buffer Study Area	Citywide
Schools	2	61
Libraries	1	5
Museums	1	19
Parks (Acres)	56.6	1,506
Residential (Acres)	81.9	3,712
Religious/Cultural Facilities (Acres)	15.9	387

East Street

The section of East Street proposed for inclusion within the citywide truck route network is located between State Street and Long Wharf Drive, and is approximately 6,500 feet in length. The character for the area surrounding this portion of East Street is for the most part industrial in nature. The 500-foot buffer study area along East Street totals approximately 197 acres, consisting predominantly of industrial and commercial land uses, at 61.8 percent and 18.1 percent of the total area, respectively. This section of roadway provides connections to Interstates 91 and 95 via State Street, the Port of New Haven via U.S. Route 1, and the waterfront commercial and industrial complexes along Sargent Drive. Table 4.6 outlines the sensitivity receptors located in the study area.

Table 4.6 East Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	East Street 500-foot Buffer Study Area	Citywide
Schools	1	61
Libraries	0	5
Museums	0	19
Parks (Acres)	2.1	1,506
Residential (Acres)	9.4	3,712
Religious/Cultural Facilities (Acres)	1.9	387

East Street is included in the bicycle and pedestrian facilities network identified in SCRCOG's Regional Bicycle and Pedestrian Plan, with a recommendation that these facilities be improved on this roadway. Such improvements should be made with attention to the industrial character of the area. Bicycle, pedestrian,

and truck accommodations should each undertake in a manner by which users of each mode may travel safely on this roadway.

Elm Street

The section of Elm Street proposed for inclusion within the citywide truck route network is located between State Street and Whalley Avenue, and is approximately 3,200 feet in length. The character for the area surrounding this portion of Elm Street is for the most part institutional in nature. The 500-foot buffer study area along Elm Street totals approximately 178 acres, consisting predominantly of university/college, park/open space, and commercial land uses, at 39.6 percent, 28.0 percent, and 16.2 percent of the total area, respectively. This section of roadway provides connections to Whalley Avenue, Broadway and Dixwell Avenue, State Street, Downtown New Haven, and Yale University via Church Street and Temple Street. Table 4.7 outlines the sensitivity receptors located in the study area.

Table 4.7 Elm Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Elm Street 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	1	5
Museums	4	19
Parks (Acres)	49.8	1,506
Residential (Acres)	2.5	3,712
Religious/Cultural Facilities (Acres)	7.6	387

The portion of Elm Street between Orange Street and College Street is included in the bicycle and pedestrian route network identified in SCRCOG's Regional Bicycle and Pedestrian Plan. Due to the importance of Elm Street to the movement of all modes of transportation through central New Haven, improvements that are made to the roadway and adjacent facilities should be undertaken in a manner that ensures safe travel for all roadway users.

Grove Street

The section of Grove Street proposed for inclusion within the citywide truck route network is located between State Street and Tower Parkway, and is approximately 2,800 feet in length. The character for the area surrounding this portion of Grove Street is for the most part institutional in nature. The 500-foot buffer study area along Grove Street totals approximately 184 acres, consisting predominantly of university/college and cemetery land uses, at 43.7 percent and 19.6 percent of the total area, respectively. This section of roadway provides connections to State Street and Yale University via Tower Parkway, Church

Street, and Temple Street. Table 4.8 outlines the sensitivity receptors located in the study area.

Table 4.8 Grove Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Grove Street 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	4	19
Parks (Acres)	0	1,506
Residential (Acres)	7.2	3,712
Religious/Cultural Facilities (Acres)	5.2	387

Long Wharf Drive

The section of Long Wharf Drive proposed for inclusion within the citywide truck route network is located between East Street and Sargent Drive, and is approximately 6,200 feet in length. The character for the area surrounding this portion of Long Wharf Drive is for the most part industrial and open space in nature. The 500-foot buffer study area along Long Wharf Drive totals approximately 324 acres, consisting predominantly of park/open space and industrial land uses, at 39.0 percent and 38.4 percent of the total area, respectively. This section of roadway provides connections to the East Street industrial area, Sargent Drive, and Interstate 95. Table 4.9 outlines the sensitivity receptors located in the study area.

Table 4.9 Long Wharf Drive Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Long Wharf Drive 500 ft Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	0	19
Parks (Acres)	126.4	1,506
Residential (Acres)	0	3,712
Religious/Cultural Facilities (Acres)	0.0	387

Main Street Annex

The section of Main Street Annex proposed for inclusion within the citywide truck route network is located between Interstate 95 and the New Haven/East

Haven boundary, and is approximately 2,600 feet in length. The character for the area surrounding this portion of Main Street Annex is for the most part industrial in nature. The 500-foot buffer study area along Main Street Annex totals approximately 61 acres, consisting predominantly of industrial and residential land uses, with at 61.5 percent and 21.5 percent of the total area, respectively. This section of roadway provides connections to Interstate 95, U.S. Route 1 via Townsend Avenue, and East Haven. Table 4.10 outlines the sensitivity receptors located in the study area.

Table 4.10 Main Street Annex Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Main Street Annex 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	0	19
Parks (Acres)	1.0	1,506
Residential (Acres)	13.2	3,712
Religious/Cultural Facilities (Acres)	0.4	387

Sargent Drive

The section of Sargent Drive proposed for inclusion within the citywide truck route network is located between Brewery Street and Long Wharf Drive, and is approximately 5,100 feet in length. The neighborhood character for this portion of Sargent Drive is for the most part industrial in nature. The 500-foot buffer study area along Sargent Drive totals approximately 296 acres, consisting predominantly of industrial and parks/open space land uses, at 61.3 percent and 21.4 percent of the total area, respectively. This section of roadway provides connections to Long Wharf Drive, U.S. Route 1 and Route 34 via Brewery Street, and Interstate 95. Table 4.11 outlines the sensitivity receptors located in the study area.

Table 4.11 Sargent Drive Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Sargent Drive 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	0	19
Parks (Acres)	63.2	1,506
Residential (Acres)	0	3,712
Religious/Cultural Facilities (Acres)	0.0	387

State Street

The section of State Street proposed for inclusion within the citywide truck route network is located between James Street and Water Street/U.S. Route 1, and is approximately 8,500 feet in length. The character for the area surrounding this portion of State Street is for the most part commercial in nature. The 500-foot buffer study area along State Street totals approximately 268 acres, consisting predominantly of parking/transportation and commercial land uses, at 38.1 percent and 19.8 percent of the total area, respectively. This section of roadway provides connections to Downtown New Haven, Interstates 91 and 95, U.S. Route 1, U.S. Route 5, and Route 34. Table 4.12 outlines the sensitivity receptors located in the study area.

Table 4.12 State Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	State Street 500-foot Buffer Study Area	Citywide
Schools	3	61
Libraries	0	5
Museums	2	19
Parks (Acres)	10.3	1,506
Residential (Acres)	39.8	3,712
Religious/Cultural Facilities (Acres)	7.4	387

Temple Street

The section of Temple Street proposed for inclusion within the citywide truck route network is located between Trumbull Street and Elm Street, and is approximately 1,800 feet in length. The character for the area surrounding this portion of Temple Street is for the most part institutional in nature. The 500-foot buffer study area along Temple Street totals approximately 130 acres, and consisting predominantly of university/college and park/open space land uses, at 36.2 percent and 33.6 percent, respectively. This section of roadway provides connections to Downtown New Haven, Interstate 95 via Trumbull Street, and Yale University via Grove Street/Tower Parkway and Elm Street. Table 4.13 outlines the sensitivity receptors located in the study area.

Table 4.13 Temple Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Temple Street 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	1	5
Museums	4	19
Parks (Acres)	43.5	1,506
Residential (Acres)	6.3	3,712
Religious/Cultural Facilities (Acres)	6.9	387

Tower Parkway

The section of Tower Parkway proposed for inclusion within the citywide truck route network is located between Grove Street and Dixwell Avenue/Goffe Street/Whalley Avenue, and is approximately 1,300 feet in length. The character for the area surrounding this portion of Tower Parkway is for the most part institutional in nature. The 500-foot buffer study area along Tower Parkway totals approximately 151 acres, consisting predominantly of university/college and cemetery land uses, with 62.5 percent and 23.8 percent, respectively. This section of roadway provides connections to Grove Street, Yale University, and the Broadway/Whalley Avenue commercial district. Table 4.14 outlines the sensitivity receptors located in the study area.

Table 4.14 Tower Parkway Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Tower Parkway 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	2	19
Parks (Acres)	0	1,506
Residential (Acres)	3.3	3,712
Religious/Cultural Facilities (Acres)	3.1	387

Trumbull Street

The section of Trumbull Street proposed for inclusion within the citywide truck route network is located between State Street/Interstate 95 and Temple Street, and is approximately 1,700 feet in length. The character for the area surrounding this portion of Trumbull Street is for the most part commercial in nature. The 500-foot buffer study area along Trumbull Street totals approximately 79 acres,

consisting predominantly of commercial, university/college, and residential land uses, with 25.3 percent, 20.3 percent, and 19.1 percent, respectively. This section of roadway provides connections to Interstate 95 and Downtown New Haven and Yale University via Temple Street. Table 4.15 outlines the sensitivity receptors located in the study area.

Table 4.15 Trumbull Street Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Trumbull Street 500-foot Buffer Study Area	Citywide
Schools	1	61
Libraries	0	5
Museums	1	19
Parks (Acres)	0.1	1,506
Residential (Acres)	19.1	3,712
Religious/Cultural Facilities (Acres)	3.0	387

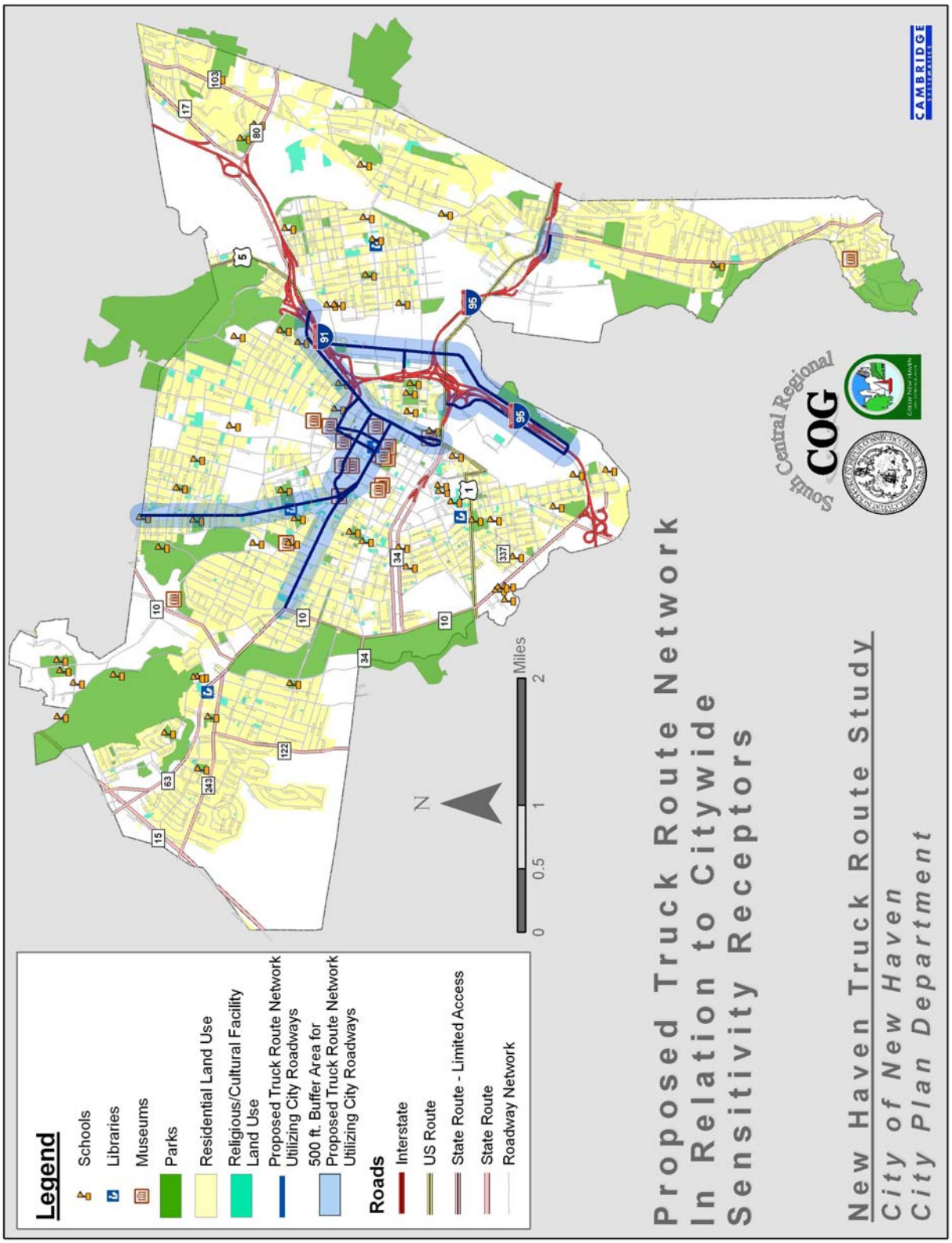
Whalley Avenue

The section of Whalley Avenue proposed for inclusion within the citywide truck route network is located between Elm Street and Route 10, and is approximately 6,000 feet in length. The character for the area surrounding this portion of Whalley Avenue is for the most part commercial in nature. The 500-foot buffer study area along Whalley Avenue totals approximately 140 acres, consisting predominantly of commercial and residential land uses, with 36.2 percent and 35.8 percent, respectively. This section of roadway provides connections to Downtown New Haven via Elm Street, Yale University via Elm Street and Tower Parkway, and areas to the north and west of New Haven via Routes 10, 63, and 243. Table 4.16 outlines the sensitivity receptors located in the study area.

Table 4.16 Whalley Avenue Study Area Sensitivity Receptor Analysis

Sensitivity Receptor	Whalley Avenue 500-foot Buffer Study Area	Citywide
Schools	0	61
Libraries	0	5
Museums	1	19
Parks (Acres)	0	1,506
Residential (Acres)	50.3	3,712
Religious/Cultural Facilities (Acres)	11.7	387

Figure 4.1 Proposed Truck Route Network in Relation to Citywide Sensitivity Receptors



4.2 RECOMMENDED CITYWIDE TRUCK ROUTE NETWORK

The 16 city roadways examined in the previous section, when combined with state highways that pass through the City of New Haven, create a network of truck routes that adequately serve the needs of freight movement through the city while shielding sensitive areas from disturbances created by truck activity. In sum, the citywide truck route network should consist of the following roadways. These roads are mapped in Figure 4.2.

City Roadways

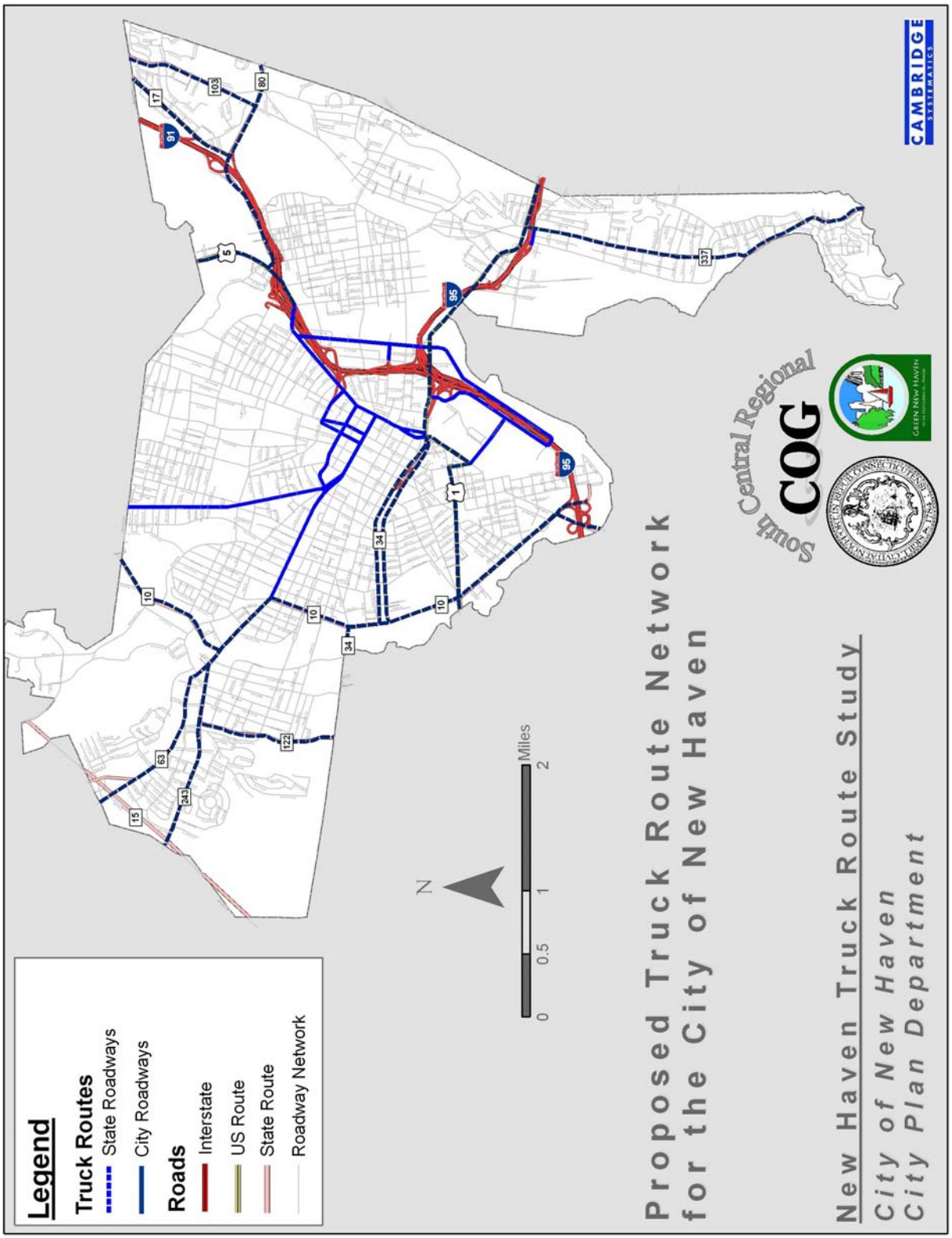
- Brewery Street between U.S. Route 1 and Sargent Drive;
- Broadway between Elm Street and Tower Parkway/Goffe Street/Whalley Avenue;
- Church Street between Trumbull Street and Elm Street;
- Dixwell Avenue between Broadway/Goffe Street/Whalley Avenue and the New Haven-Hamden municipal boundary;
- East Street between State Street and Long Wharf Drive;
- Elm Street between Church Street and Whalley Avenue;
- Grove Street between Church Street and Tower Parkway;
- Long Wharf Drive between East Street and Sargent Drive;
- Main Street Annex between Interstate 95 and the New Haven-East Haven municipal boundary;
- Sargent Drive between Brewery Street and Long Wharf Drive;
- State Street between James Street and Water Street/U.S. Route 1;
- Temple Street between Trumbull Street and Elm Street;
- Tower Parkway between Grove Street and Broadway/Goffe Street/Whalley Avenue;
- Trumbull Street between Interstate 95 and Temple Street; and
- Whalley Avenue between Elm Street and Route 10.

State Highways

- U.S. Route 1;
- U.S. Route 5;
- Route 10;
- Route 17;
- Route 34;
- Route 63;

- Route 80;
- Route 103;
- Route 122;
- Route 243; and
- Route 33.

Figure 4.2 Proposed Truck Route Network



5.0 Municipal Ordinance and Policy Program

The roadways listed in the previous section are deemed most appropriate for truck use when traveling through and within the City of New Haven. They provide important connections between industrial and commercial centers that generate truck traffic and the state and Federal highway networks which deliver trucks from New Haven to locations throughout the region and nation. In order to recognize these roadways as the city's official truck route network, a city ordinance should be enacted. Within this section of the document, the recommended elements of such an ordinance are provided. In addition, further regulations that have the potential to limit the effects of truck traffic on sensitive communities and the environment are provided. Such regulations include time-of-day truck route restrictions in select areas, restrictions on vehicle idling, and the establishment of designated loading zones in certain commercial districts.

5.1 TRUCK ROUTE ORDINANCE

Any truck regulations that are to be enforced in New Haven must be supported by a city ordinance and state law. With respect to the designation of truck routes, a city ordinance will have to be enacted. This ordinance must clearly, concisely, and fully describe the truck route regulations, where, when, and to whom they apply. Elements of the ordinance should include:

- Definition of the types of vehicles to which the ordinance applies, for example, vehicles over X tons in gross vehicle weight, or all commercial vehicles;
- The type of trips that are affected by the ordinance, such as through trucks;
- Definition of "truck route," the purpose they serve, and how applicable vehicles should make use of them; and
- The city streets that are included in the truck route network. This list must be clear in its description of street names and segment boundaries.

5.2 TIME-OF-DAY TRUCK RESTRICTIONS

Along certain routes, especially those with significant amounts of adjacent residences, imposing time-of-day truck route restrictions may be a desirable course of action. The restrictions could be based on time-of-day, such as the overnight restrictions effective in Cambridge, Massachusetts, or on certain days of the week, such as Sundays, when large numbers of pedestrians move toward

the many religious facilities along Whalley Avenue, for example. Such restrictions would be applicable only to through truck traffic, as the ability to make local deliveries must be upheld. Time-of-day restrictions would rely on the existence of an underlying all-hours or all-days route network. If through trucks were restricted on Dixwell Avenue after 11 p.m., for example, a reasonable alternative unrestricted route would have to be in place.

Any ordinance drafted to enact such a regulation would have to clearly specify the type of vehicle that the prohibition affects, the hours in which the prohibition is in effect, and the roadways that affected trucks are permitted to use during the prohibition period.

5.3 RESTRICTIONS ON IDLING

The State of Connecticut has developed regulations that prohibit the idling of vehicles for more than three minutes while not in motion. The regulations are intended to reduce the emission of particulate matter (PM), ground-level ozone, carbon, and to reduce the health risks attributable to diesel emissions. The regulations apply to all motor vehicles within the State, although exemptions are made for the several types of activities, such as:

- When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control;
- When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers;
- When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source;
- To bring the mobile source to the manufacturer's recommended operating temperature;
- When the outdoor temperature is below 20 degrees Fahrenheit (20°F);
- When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes; or
- When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.

The active enforcement of this restriction against private and commercial vehicles could contribute to the reduction of the impacts motor vehicle operations have on the natural environment. The New Haven Police Department should be encouraged to enforce the State's idling regulations within the city.

5.4 DESIGNATED LOADING ZONES

Most municipalities establish loading zones on streets where there are many businesses that receive frequent shipments by truck. These zones allow truck drivers to park at the side of a street for a brief period of time, usually anywhere from 15 minutes to two hours, to unload and load materials. These loading zones keep parked trucks out of travel lanes and discourage double parking. Some cities, such as Saint Paul, Minnesota and Houston, Texas allow trucks that possess appropriate loading permits to park in metered parking spaces to load and unload without payment. This allowance, in the case of Saint Paul, is available only between the hours of 8:00 a.m. and 11:00 a.m. The time limit encourages trucks to make deliveries early in the day, so that valuable parking space is not kept unavailable to shoppers during busy afternoon hours. The City of New Haven should consider such a measure in busy commercial districts where parking availability is limited or where the time and location of truck deliveries are known to cause problems.

6.0 Truck Signage Program

The purpose of this technical memorandum is to identify the truck route signage currently utilized within the City of New Haven, and to develop a recommended alternative signage program for implementation. This will be accomplished by reviewing current signage practices observed through field reconnaissance and through meeting with local officials, and comparing against Federal, state, and city guidelines.

This technical memorandum is organized as follows:

- Section 6.1 describes standard truck route signage practices that are outlined in the Federal Manual on Uniform Traffic Control Devices. The manner in which these standards are applied to the regulations of the State of Connecticut and the City of New Haven are then explored and acceptable sign types are identified.
- Section 6.2 provides a set of recommended sign types for use in the City of New Haven. Recommended sign schemes for "positive" enforcement trailblazer and route marker signs and "negative" prohibitive signage are presented.
- Section 6.3 presents a recommended plan of action for implementing a truck signage program in the City of New Haven. Locations where signs are recommended are identified and a preliminary capital cost estimate is provided. The prospect of soliciting ConnDOT to communicate truck route compliant advisories using Variable Message Signs (VMS) also is addressed. Finally, a map illustrating the recommended sign locations is furnished.

6.1 TRUCK ROUTE SIGNAGE PRACTICES

Regulations and guidelines regarding sign types, sizes, text, colors, and placement are formed by authorities at all levels of government. Federal standards are established by the Federal Highway Administration (FHWA) and are communicated in the Manual on Uniform Traffic Control Devices (MUTCD). The most recent MUTCD guidelines were published in 2003. State and local government agencies establish standards and uniform approaches for compliance with the MUTCD.

Federal – Manual on Uniform Traffic Control Devices (MUTCD)

The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) provides transportation and highway agencies throughout the country with a standardized set of guidelines concerning traffic control devices such as signs, traffic signals, and pavement markings. This standardization

ensures that these devices are uniform and easily understood by drivers who travel nationwide.

According to the MUTCD, signs must meet five fundamental requirements to be effective:

1. Fulfill a need;
2. Command attention;
3. Convey a clear, simple meaning;
4. Command respect from travelers; and
5. Give adequate time for proper response.

MUTCD Sign Categories

The MUTCD identifies four sign categories, grouped according to their function. These categories include Regulatory, Warning, Guide, and Emergency Management signs.

Regulatory Signs

Regulatory signs communicate the rules of the road. They inform drivers of the type of regulation(s) as well as when and where they apply. "Stop" signs, "Yield" signs, Speed Limit signs, turn prohibition signs, and lane control signs are examples of regulatory signs. With the exception of "Stop" signs, "Yield" signs, "Wrong Way" and "Do Not Enter" signs, most regulatory signs assume a color scheme of a white, retroreflective background with black, green, or red legend text.

Figure 6.1 A Selection of Regulatory Sign Examples

Warning Signs

Warning signs alert drivers to unexpected conditions on or near the roadway that require heightened driver awareness or a response such as a reduction in speed. Warning signs are divided into three categories related to the types of conditions they communicate. The Roadway Related category consists of signs that alert drivers to changes in horizontal or vertical alignment, the roadway cross section, or roadway surface conditions. Signs that warn of advance traffic control ("Signal Ahead," for example), traffic flow, change in speed ahead, intersection behaviors, vehicular traffic behavior, or non-vehicular hazards such as pedestrian crossings, animal crossings, or playgrounds fall into the Traffic Related category. The third category, Supplemental Plaques, includes plaque signs that display additional information such as advisory speed, distance to or through the warning area, or street names.

Most Warning signs are diamond-shaped, though many are rectangular. Railroad Crossing warning signs are circular. The "No Passing" sign has a pennant shape. All of these signs use the color scheme of black text on a bright yellow, retroreflective background. This color scheme promotes the visibility of warning signs.

Figure 6.2 A Selection of Warning Sign Examples

Guide Signs

Guide signs direct drivers along highways and streets; identify features of interest such as rivers, parks, historic sites, and jurisdictional boundaries; and direct roadway users toward highways, cities, towns, and other destinations. Guide Signs may take the form of Destination guide signs, which direct drivers toward a route or place; Route Marker signs, which identify highway routes; Specific Service signs which indicate the presence of gasoline, food, lodging and other services; Tourist-Oriented Directional signs, which direct drivers toward tourist sites and qualifying businesses that cater to tourism; and Recreational and Cultural Interest Area signs, which guide drivers to attractions that are "open to the general public for the purpose of play, amusement, or relaxation."[1]

Guide signs vary in shape and color scheme based on their category and the authority and jurisdiction in which they are posted. The most widely accepted standard colors and shapes for each category are illustrated in the Figure 6.3 below.

[1] *Manual on Uniform Traffic Control Devices*, Federal Highway Administration, 2003 Edition, Section 2H.01.

Figure 6.3 A Selection of Guide Sign Examples

Emergency Management Signs

Emergency management signs communicate regulations or guide drivers during emergency situations. State and local authorities are charged with developing a contingency plan that accounts for controlled operation of highways, expedition of essential and emergency traffic, and the provision of emergency centers for civilian aid. Specific sign types in the emergency management signs category include Evacuation Route Guide signs, Traffic Control Point signs, road closure signs, and guide signs that direct drivers to emergency centers.[2]

[2] MUTCD, Chapter 21.

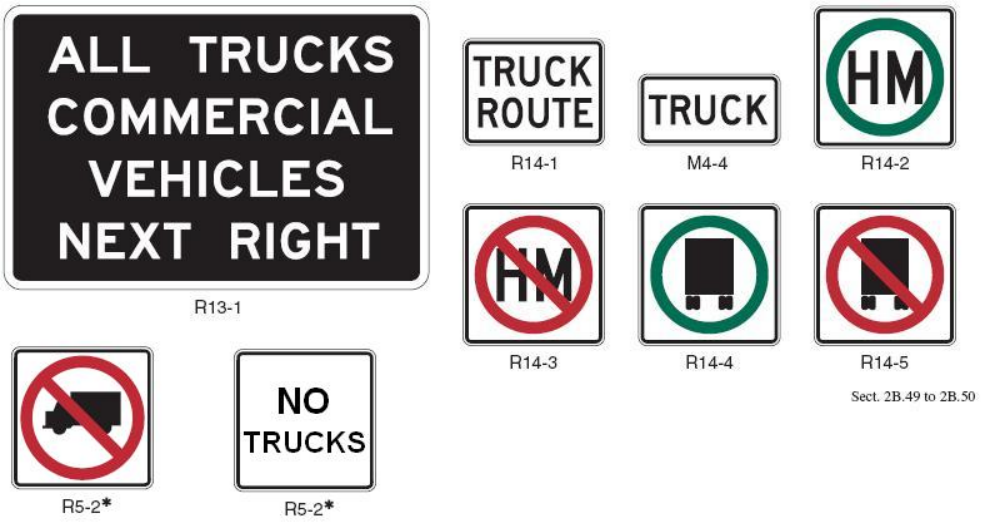
Figure 6.4 A Selection of Emergency Management Sign Examples

Sign Types Applicable to Truck Routing

Most signs that communicate truck route information fall into either the Regulatory Signs category or the Guide Signs category, depending upon the truck route policy in the jurisdiction. Regulatory signs are used to communicate weight limits, commercial vehicle prohibitions, and allowable truck routes, the disregard of which is punishable by law. When a sign makes a route recommendation that is not enforceable by law, it acts as a guide sign, which identifies a preferred or recommended truck route.

Truck route guide signs are typically placed at or near intersections that are critical decision points for truck drivers. These signs are often included as an auxiliary sign in a route marker assembly.

Figure 6.5 MUTCD Truck Signs



Signs R14-1 and M4-4 are the most commonly used sign types to designate truck routes. Sign R14-1 also is often used in combination with route markers and trailblazers. This sign can be a stand-alone truck route marker or trailblazer as well. The sign is designed with black text on a white, retroreflective background.

Sign M4-4 is used as a banner placed above or below a route marker sign. It is also used for trailblazer signs with a route shield. The M4-4 sign is often used to designate an alternative branch of a numbered route that is intended for truck use. The sign is designed with black text on a white, retroreflective background. The photographs below offer examples of how these two signs are generally used to identify truck routes.

Figure 6.6 Examples of Sign Assemblies Featuring M4-4 and R14-1 Signs

State of Connecticut – State Traffic Commission Regulations

State highway and transportation departments have the option to adopt the Federal guidelines outright or to add a state supplement that details specific state guidelines that conform with the MUTCD. The State Traffic Commission (STC), a division of the Connecticut Department of Transportation (ConnDOT), has adopted a set of regulations as a supplement to the Federal MUTCD. The STC Regulations provide a set of standards for signage and pavement marking practices Statewide that uniformly comply with the MUTCD. The STC Regulations offer detailed guidelines for regulatory, guide, and warning signs posted in the State of Connecticut.

Legal Authority and Responsibility

According to Section 14 of the STC Regulations, the legal authority to post signs rests with the body or official that maintains jurisdiction over a given roadway. The posting of signs to designate truck routes on municipal streets therefore lies within the authority of the appropriate municipal departments, as sign postings on state highways lie within the authority of ConnDOT. These bodies also have the authority to post prohibitive signage such as weight limits, through truck prohibitions, and commercial vehicle restrictions, provided engineering analysis warrants such restrictions and alternate routes can be established for truck traffic to use.[3]

State Regulatory Sign Guidelines

The State's definition of a regulatory sign is consistent with that of the Federal Highway Administration. The State Regulations distinguish four series of regulatory signs: Right-of-way Series, including "Stop" and "Yield" signs; Speed Series; Movement Series, including turning, alignment, exclusion, and "One Way" signs; and Parking Series. Regulatory signs affecting trucks would be included in the Exclusion group within the Movement Series.

The State Regulations offer guidelines for the size and placement of weight limit signs specifically. Weight limit signs should be placed immediately in advance of the section of highway where the restriction applies. It is advised that these signs be no smaller than 24 inches by 30 inches. Other than "Stop" signs, "One Way" signs, certain weigh station signs and nighttime speed limit signs, regulatory signs should have white, retroreflective backgrounds with black, green or red text.

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[3] Connecticut Department of Transportation, *State Traffic Commission Regulations*, Section 14-298-507 and Section 14; "Through Truck Prohibitions," Connecticut Department of Transportation. 6 Sep 2005; [website]; available from http://www.ct.gov/dot/cwp/view.asp?a=1380&Q=259748; Internet; accessed 14 May 2007.

Enabling Legislation for Through Truck Prohibitions

In addition, the State of Connecticut makes use of unique through truck prohibition regulatory signs. According to Section 14-298 of the General Statutes of Connecticut, the STC has authority to "…make regulations, in cooperation and agreement with local traffic authorities, respecting the use by through truck traffic of streets and highways within the limits of and under the jurisdiction of any city, town or borough of this state for the protection and safety of the public." For the purposes of these prohibitions, a "through truck" is defined as a commercial vehicle that travels through a municipality without making a service stop within the municipality.[4]

Upon request for a through truck prohibition, the STC's Division of Traffic Engineering staff engages in a traffic study to assess whether or not the roadway in question is geographically situated such that trucks operating on it are making through trips, and if there are reasonable and sufficient alternate routes, should through trucks be prohibited. Next, an assessment of whether or not a prohibition would further "the protection and safety of the public" is undertaken. The characteristics and geometry of the roadway in question and intersecting roadways, presence or absence of traffic control devices, and the volume and character of vehicles traveling on the roadway in question are considered. A similar study is conducted for potential alternate routes.

STC will only pursue a through truck prohibition if the route in question is deemed undesirable, an alternate route proves more desirable, and all affected towns agree with the prohibition. In the event that a through truck prohibition is enacted, signs communicating the ban must be posted before the prohibition may take effect.

Figure 6.7 below illustrates acceptable through truck prohibition signs in Connecticut. These signs may not be used if a prohibition based upon weight limit or weight class is enacted on municipal roadways.[5]

Figure 6.7 Connecticut through Truck Prohibition Signs

[4] STC Regulations, Section 14-298.

[5] "Through Truck Prohibitions."

State Guide Sign Guidelines

The STC Regulations describe the color schemes and shapes that guide signs should assume, with the goal of establishing statewide uniformity. Most guide signs, with the exception of route marker signs and certain recreational area guide signs, should be rectangular in shape with the longer edges being on the horizontal sides. For guide sign backgrounds, green, brown, blue, and white are acceptable colors. The legend text and borders may be white on green, brown, or blue signs, or black on signs with white backgrounds. All signs with white backgrounds are expected to include silver-colored reflective coatings or other elements that reflect white light.[6]

State Warning Sign Guideline

According to Section 14-298-553 of the STC Regulations, a warning sign is used for "…the purpose of warning traffic of the existing or potentially hazardous conditions either on or adjacent to the road." All warning signs in the State of Connecticut that have applicability during nighttime hours are required to have retroreflective backgrounds that reflect the proper color. With a few notable exceptions, warning signs should have a yellow, retroreflective background, and black legend. Advance stop, yield, and signal signs may have additional colors displayed in the legend to reflect the colors in the sign or signal they indicate. Pedestrian, bicycle, playground, and school bus warning signs may have a fluorescent yellow-green background color.

Exceptions to the diamond-shaped warning signs include large arrow signs and supplemental plaques, which may be horizontal rectangles; chevron alignment signs and advisory ramp or exit speed signs which may be vertical rectangles; advisory speed plaques which shall be squares; advance weight limit warning signs which may be square or vertical rectangles; round railroad advance warning signs; school advance warning and school crossing signs which should be pentagons; and "No Passing" signs which are to be pennant-shaped. These signs are to have black legend text and borders on yellow, retroreflective backgrounds. School warning and crossing signs may have yellow-green fluorescent backgrounds.[7]

City of New Haven

According to Section 29-5 of the City's Signage Code, the City's Traffic Authority shall have "…all powers and duties concerning the regulation and control of traffic in the city…." The Code continues, stating that such regulations are not effective until adequate traffic control devices are in place to give notice to vehicle operators and pedestrians. The responsibility of erecting and

[6] STC Regulations, Section 14-298-507 and Section 14-298-508.

[7] STC Regulations, Section 14-298-554.

maintaining traffic control devices such as signals, signs, and pavement markings rests with the city's traffic engineer, at the direction of the Traffic Authority.[8]

The City's Comprehensive Plan for Development calls for the city to take advantage of transportation connections and encourage the growth of port facilities within the New Haven Port Authority district. At the same time, the Plan acknowledges concerns about the preservation of neighborhoods, environmental protection, and traffic congestion. To those ends, the Plan recommends a "…truck routing system which curtails truck traffic on local streets and promotes the use of designated arterial connections."[9]

The city may therefore act within its right to establish a truck route network and, according to the STC, use weight limit restrictions to limit truck activity in sensitive areas, so long as the restrictions do not amount to a through truck prohibition on roads that cross municipal boundaries.[10] Such a routing system will require a citywide network of select routes that are preferred for truck use. The network will have to be easy for vehicle operators to recognize and follow in order to expect a reasonable level of compliance. Therefore a signage program that promotes the use of uniform, recognizable, and understandable signs should be developed and adopted. The following section presents recommended signage schemes.

6.2 RECOMMENDED SIGNAGE

The recommended truck signage program for the City of New Haven consists of two primary sign types: guide or regulatory signs for route identification and trailblazing and prohibitive regulatory signs. "Positive" signage, such as trailblazer and route identification signs, may be regulatory or guide signs that direct drivers to and through the truck route network. Prohibitive signage, on the other hand, consists of regulatory signs intended to discourage truck drivers from using roads that are not preferred truck routes.

Trailblazer (Positive) Signage

The City of New Haven's objective is to direct truck traffic to a set of preferred routes without establishing truck route regulations that are enforceable and punishable by law. Therefore, the city should adopt a truck route signage scheme that acts as a set of guide signs. These guide signs would advise truck drivers to use routes that are preferable for truck travel while avoiding routes

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[8] *The Code of Ordinances,* City of New Haven, Connecticut, Section 29-5.

[9] *Comprehensive Plan of Development Summary,* City of New Haven, Connecticut, Page 18.

[10] "Through Truck Prohibitions."

with physical constraints such as low clearances and sharp curves and sensitive receptors such as residential areas, parks, and schools.

In accordance with city, state, and Federal signage guidelines, the trailblazer guide signs that are recommended for the City of New Haven should be rectangular in shape and no less than 24 inches by 30 inches in size. Three alternatives have been prepared to illustrate wording and color scheme options for the trailblazer signs.

MUTCD R14-1 Sign

The first alternative is the standard R14-1 "Truck Route" sign included in the Federal MUTCD. This sign type identifies a statutory truck route that drivers must use to make through trips. The R14-1 sign consists of a white, retroreflective background with black text reading, "TRUCK ROUTE" and a black border around the edge of the sign. The text is in all capital letters. The R14-1 sign should be accompanied by arrow auxiliary signs that advise trucks to make turns in order to enter or stay on the truck route. These signs may be placed on their own assembly or on an assembly featuring route marker guide signs.

Figure 6.8 MUTCD R14-1 Sign

Because the R14-1 sign is a regulatory sign, it should not be used if there is no mandated, enforceable network of truck routes. In the event that the City of New Haven wishes to use signage to recommend a set of advised routes for truckers to use as an alternative to undesirable routes, the disregard of which is not punishable by law, the city should adopt a signage scheme based on guide signs. The Federal MUTCD and the STC Regulations do not provide standards or templates for such guide signs, other than the M4-4 Sign, which is ordinarily posted only as part of a route marker assembly. It is recommended, therefore, that the city adopt a guide sign type that conforms in color, shape, and dimension with similar types of guide signs to be posted on city roadways. The use of this sign type may require STC approval where necessary because it is not presently included as a recognized sign in the STC Regulations.

"Truck Route" Guide Sign, White on Green

The guide sign alternative appears similar to the MUTCD R14-1 Sign. However, the color scheme has been changed to more closely match other types of guide

signs. In this alternative, the sign background is green and retroreflective. The text and border stripe are white. In order to comply with state and Federal sign regulations, this sign should be no smaller than 24 inches tall by 30 inches wide. The horizontal edge should be longer than the vertical according to state guidelines. This sign may be posted on an assembly with auxiliary signs such as arrow auxiliary signs or "TO" auxiliary signs to assist in the guidance of truck traffic.

Figure 6.9 "Truck Route" Guide Sign Alternative, White on Green

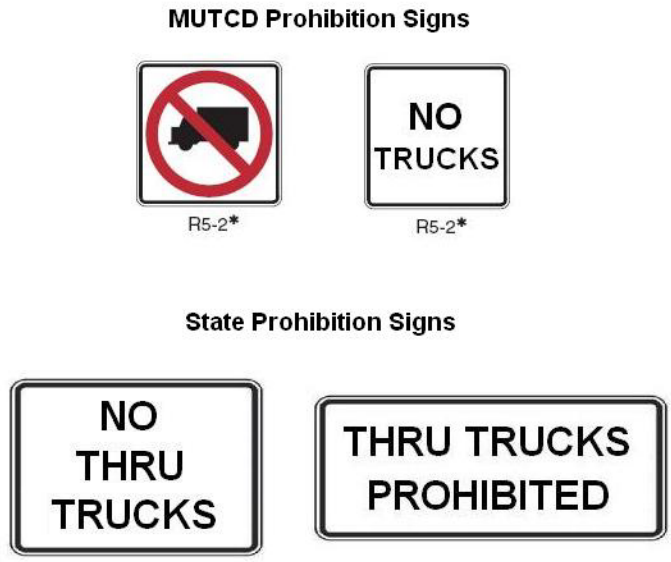
Prohibitive Signage

With the establishment of a network of preferred truck routes throughout the city that provides adequate route options for truck traffic, the city may install prohibitive signage in areas where truck traffic cannot safely pass due to physical roadway constraints or the presence of sensitive receptors such as residential communities, parks, and schools. The prohibitive signage should be placed only in areas where through truck traffic poses a real and significant threat to the safety of other drivers, residents, and the transportation infrastructure.

Prohibitive sign types that may be used within the City of New Haven include MUTCD weight limit signs and Federal and state commercial vehicle prohibition signs.

Figure 6.10 MUTCD Weight Limit Signs

Figure 6.11 Federal and State through Truck Prohibition Signs



6.3 RECOMMENDED TRUCK ROUTE SIGNAGE PROGRAM

Signs that communicate acceptable truck routes and necessary truck prohibitions must be posted in a manner that clearly communicates the traffic regulations and allows vehicle operators adequate opportunity to become aware of the regulation and make a decision to select an alternate route. It is therefore recommended that signs be placed at or near intersections that are key decision points.

Intersection Route Identification Guide Signs and Trailblazer Signage Locations/Route Identification

The truck route network will have to be identified by a system of Intersection Route Identification guide signs, leading vehicle operators to and along the designated truck routes. If a truck route is a state or Federal highway, truck route guide signs should be posted on the route marker assembly in the appropriate location. At intersections where truck operators must make or have the option to make a turn to remain on a truck route, auxiliary directional arrow signs should be posted below the "TRUCK ROUTE" guide sign to indicate the necessary turning movement. Advance turn assemblies should be posted no less

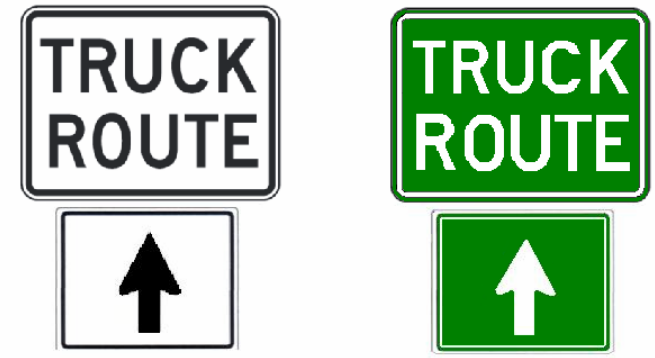
than 200 feet ahead of the turn in order to provide vehicle operators an opportunity to maneuver into a position to make the required turn.[11]

Where a truck route is not part of a designated state or Federal highway or where the posting of a "TRUCK ROUTE" guide sign on a route marker assembly is impractical or impossible, the guide sign and accompanying auxiliary directional arrow signs may be placed on their own assembly. These assemblies should be positioned at critical decision points such as major intersections and interchanges.

Confirmation sign assemblies should be posted between 25 feet and 200 feet beyond major intersections from which many vehicles will enter the route, and Reassurance signs should be posted periodically along the route as necessary in order to maintain drivers' awareness and to assure them that they are indeed following an appropriate route.[12] The spacing between reassurance sign locations can vary from several blocks to several miles between signs, depending upon the environment and need for reassurance that exists in a given area. On long stretches between intersecting truck routes, it is recommended that reassurance signs be posted at roughly one-half mile intervals.

Trailblazer guide signs also may be placed at certain locations outside the truck route network in order to guide trucks on an appropriate path to the nearest truck route. These trailblazer guides should be accompanied by auxiliary directional arrow signs that point drivers in the appropriate direction. The auxiliary "TO" sign also should accompany these signs, being placed above the "TRUCK ROUTE" sign, to inform drivers that they are not yet on a truck route, but will reach one by following the trailblazer sign. The map in Section 4.4 illustrates the intersections and other locations where guide signs are recommended.

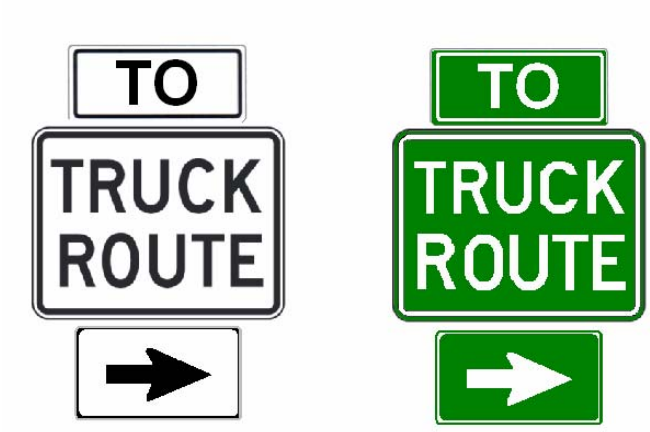
Figure 6.12 Recommended Confirmation and Reassurance Sign Assemblies



[11] MUTCD, Section 2D.29.

[12] MUTCD, Section 2D.31.

Figure 6.13 Recommended Offroute Trailblazer Sign Assemblies



Prohibitive Signage Locations

On state and local roadways within the city that are deemed unfit for through truck traffic, the City's Traffic Authority may engage the services of the STC to study the roadways and enact through truck prohibitions if warranted. The city may act on its own accord to institute weight limits on municipal streets where necessary, provided the restrictions do not amount to a de facto through truck prohibition on streets that cross municipal boundaries.[13] On any roadway that is or becomes prohibited, necessary signage should be posted such that it is sufficiently visible, and gives vehicle operators an opportunity to select an alternate route. Through truck prohibitions or weight limits should therefore be posted at or before the last available truck route a driver encounters ahead of the restricted area.

Special Prohibitive Signage:

In certain instances, traditional prohibitive signage does not provide truck drivers adequate warning or directional information. In an attempt to increase truck driver awareness at designated intersections or route decision-making points, it is recommended that special prohibitive signage be implemented. A form of special prohibitive signage is utilized on state roadways, and acceptable alternatives are provided in the State's traffic signage catalog. For example sign

[13] "Through Truck Prohibitions."

number 31-1755 is current utilized as a measure to prohibit trough truck movements on State Route 22, as illustrated in Figures 7.14 and 7.15

Figure 6.14 Prohibitive Truck Signage: STC Alternative 31-1734 and 31-1755

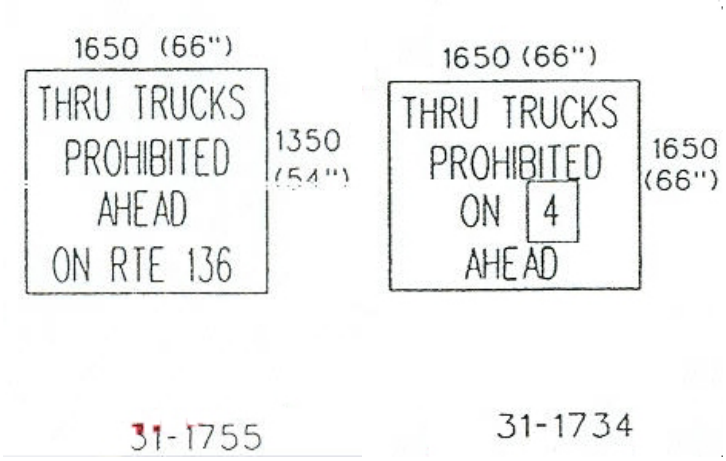


Figure 6.15 Utilization of Sign 31-1755 along State Route 22

With the City of New Haven, special prohibitive signage should be implemented on a case-by-case basis, and require additional examination that establishes appropriate reasoning. Based upon the findings of this report, Quinnipiac Avenue, between State Route 80 (Foxton Boulevard) and Fairmont Avenue, demonstrates features and roadway conditions that may result in the approval of special prohibitive signage.

Variable Message Sign Program

ConnDOT makes use of Variable Message Signs (VMS) on Interstate highways throughout the State. VMS allows ConnDOT to provide real-time travel and

advisory information that permits drivers to make route choices to avoid delays associated with incidents, roadway construction or closures, or special events.

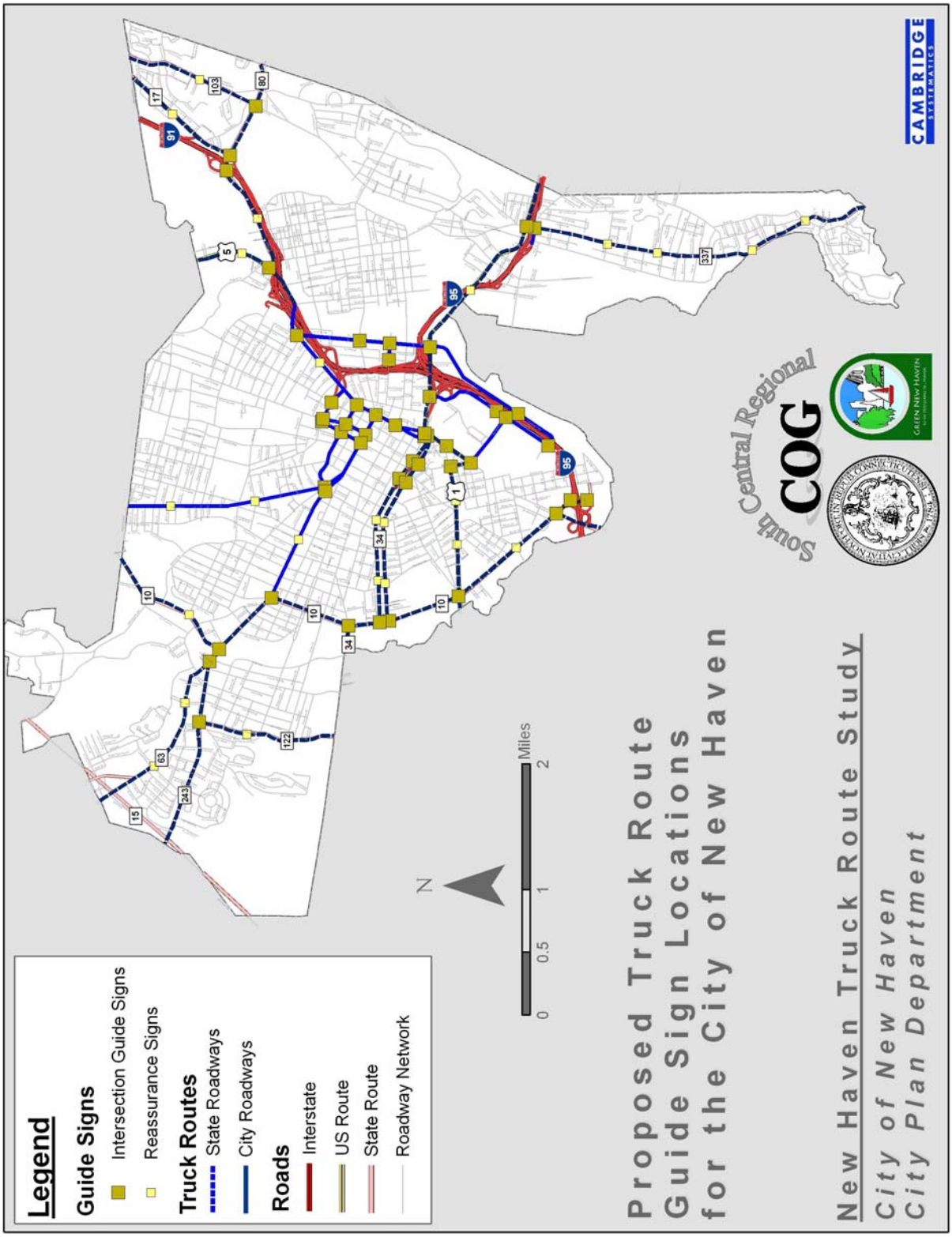
With the Interstate 95/Interstate 91 Interchange reconstruction project underway through 2015, delays associated with construction activities such as lane closures, ramp and exit closures, and roadway reconfiguration could possibly warrant the use of detour or recommended alternate routes to by-pass the construction area. The City of New Haven should work with ConnDOT to ensure that any potential detour or recommended alternate routes that are considered make use of the city's truck route network. ConnDOT also should make use of its VMS system, where possible and practical, to keep drivers informed of construction activity and detour or alternate route information when and where necessary.

Recommended Sign Locations and Cost Estimate

Figure 6.16 illustrates the locations where intersection route identification guide signs are recommended. These locations are points where truck routes begin, end, and intersect with major roadways throughout the city. Signs placed at these locations will assist vehicle operators in making the necessary choices and maneuvers to enter and proceed on truck routes. It is estimated that approximately 120 to 130 of these Intersection Guide Sign assemblies will need to be installed at an estimated total cost of $9,600 to $10,400. The estimated cost includes $40 per assembly for estimated sign and post costs and $40 installation cost for each sign assembly, which are typical costs for the installation of similar signs in the city, according to city officials. Not all sign assemblies will require new posts, however, so the estimate is conservative.

In addition to the points illustrated on the map, further signage may be required near facilities that generate truck traffic in order to guide drivers onto the truck route network. Offroute trailblazing signs that lead trucks toward truck routes, confirmation, and reassurance guide signs also should be installed where necessary. It is estimated that between 90 and 100 confirmation sign assemblies are needed, at a cost of $7,200 to $8,000. The cost for the confirmation sign assemblies assumed the same unit costs as the intersection guide signs. Reassurance signs should be posted as necessary, preferably at intervals of one-fourth to one-half mile between each assembly.

Figure 6.16 Recommended Guide Sign Locations



7.0 Enforcement Plan

This technical memorandum is the fourth of four that are part of the New Haven Truck Route Study. The purpose of Technical Memorandum 4 is to provide recommendations for enforcing a truck route ordinance that the City of New Haven may adopt. The enforcement program will have four primary objectives – to adequately plan an enforcement strategy prior to the enactment of the ordinance; to educate law enforcement officials, including city and state police officers and Superior Court judges; to develop enforcement initiatives such as Target Enforcement Zones (TEZs) and performing state inspection spot-checks within the city; and to outline, step-by-step, the course that the enforcement program should follow in its development.

This section is organized as follows:

- Section 7.1 discusses the planning process that will have to be undertaken prior to the enactment of a city truck route ordinance. The planning process consists of the careful drafting of the ordinance itself, the development of a citywide traffic enforcement plan, and necessary education and training measures that will ensure that police officers and court judges sufficiently enforce the regulations.
- Section 7.2 discusses a set of enforcement initiatives that may be undertaken to enforce the city's truck route ordinance and state truck regulations. The New Haven Police Department and Connecticut State Police may cooperate on initiatives such as patrolling Target Enforcement Zones, spot-checking state truck inspection compliance, and enforcing the State's motor vehicle idling law.
- Section 7.3 provides an outlined, step-by-step Enforcement Program that consists of the elements presented in Sections 7.1 and 7.2. The program makes recommendations for establishing necessary partnerships, adequately preparing enforcement plans, and engaging in enforcement initiatives. Cost estimates for elements of the enforcement program also are provided in this section.

7.1 ENFORCEMENT PLANNING

Prior to the enactment of a truck route ordinance and the commencement of enforcement activities, the City of New Haven, together with the New Haven Police Department and the Connecticut Department of Public Safety, will have to engage in a preparatory planning exercise to ensure that all necessary agencies understand the truck regulations and how the agencies should work together to effectively enforce them. This planning stage begins with the careful drafting of the truck route ordinance, progresses through the development of a citywide

comprehensive traffic enforcement plan, and continues with the education of police officers and the courts.

Ordinance Drafting

The enforcement of the city's truck routes and accompanying policies will depend on the drafting of an ordinance that is clear in its meaning and applicability. As discussed in the Municipal Ordinance Development section of Technical Memorandum 2, the elements of the ordinance should include:

- Definition of the types of vehicles to which the ordinance applies, for example, vehicles over X tons in gross vehicle weight, or all commercial vehicles;
- The type of trips that are affected by the ordinance, such as through trucks;
- Definition of "truck routes," the purpose they serve, and how applicable vehicles should make use of them; and
- The city streets that are included in the truck route network. This list must be clear in its description of street names and segment boundaries.

Comprehensive Traffic Enforcement Plan

The first step in establishing an enforcement program is to develop a plan. The City of New Haven, in cooperation with the New Haven Police Department and the Connecticut Department of Public Safety, should draft a citywide traffic enforcement plan that takes a comprehensive approach to enforcing traffic regulations within the city that are applicable to all modes of vehicular, bicycle, and pedestrian traffic. The plan should result in the identification of targeted enforceable regulations, establish a standard set of enforcement methods, provide guidelines for how to engage in those methods, estimate the required materials, interagency cooperation, and estimated costs needed to undertake each method, and determine how the city may structure its resources in order to execute the enforcement program. The plan should detail the number of personnel required, how they shall be trained and deployed to enforce traffic regulations.

The exercise of engaging in this planning effort will establish dialogue between the City Traffic and Parking Department, Police Department, and the Court to ensure that traffic regulations are clearly understood by the departments and communicated to the public. With a single accepted interpretation of the regulations being enforced, the city and its public can expect fair and consistent enforcement.

Law Enforcement Education and Training

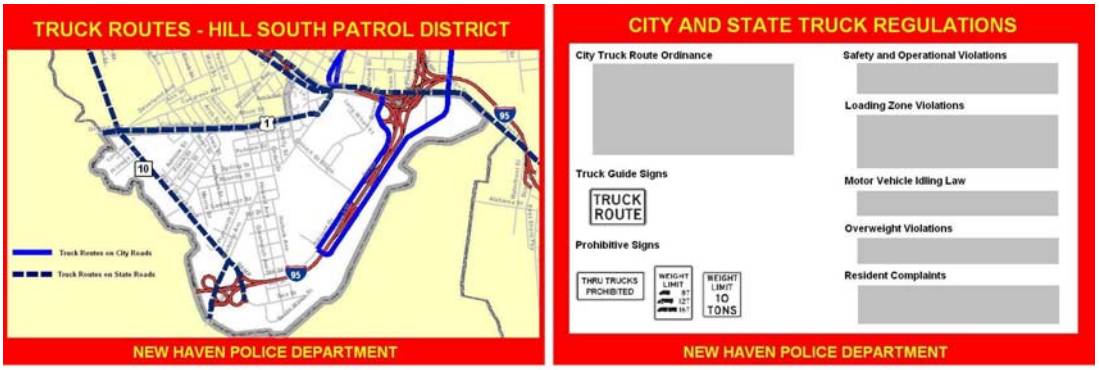
Enforcement of truck route regulations will become the responsibility of the New Haven Police Department and of judges in the Superior Court. Police officers must be made aware of what the truck route ordinance means, where the

designated truck routes within their precincts exist, how to recognize improper and illegal truck movements, and how to issue an appropriate summons based upon the infraction observed. Prior to the institution of truck route regulations in the City of New Haven, police officers who work in the Traffic Division will have to be trained on how to properly enforce the law. Training seminars should be conducted and education materials should be disseminated to all members of the police force who will be charged with enforcing the regulations. Additional officers are likely necessary in the division. Lesson plans for new police officer training sessions should incorporate the truck route regulations.

Additional training opportunities are offered by the Connecticut Department of Public Safety (DPS) in cooperation with the Connecticut State Police. DPS offers a training course called Trucks 101 that familiarizes police officers with state truck regulations and enforcement measures. These courses could provide an opportunity for New Haven police officers to be kept up-to-date on the latest state regulations, enforcement practices, and could lead to cooperative practices between New Haven and other jurisdictions within the State.

Officers working in the field should be equipped with wallet-sized cards that illustrate truck routes in their jurisdiction and the truck route ordinance and penalties. This information also could be made available digitally so that officers may access this information via computer or PDA while in the field. Having this information easily accessible at all times will help ensure that officers who spot improper truck activity may properly cite the infraction, so the charge may be upheld in court.

Figure 7.1 Proposed Truck Route Information Card for NHPD Use



Front Back

Judges and prosecutors in the courts who uphold the city's traffic laws will have to be educated as well. Giving the courts an opportunity to study the truck route ordinance, its meaning, and applicability will likely lead to consistency in their decision-making. Education materials for judges and prosecutors could include informational brochures and information sessions. The better understanding police officers and courts have of the city's traffic regulations, the more likely

offenders will be appropriately ticketed, and the courts will act in a fair and consistent manner in upholding the regulations.

7.2 ENFORCEMENT INITIATIVES

The City of New Haven Planning Department, the New Haven Police Department, and the Connecticut State Police will be critical partners in developing truck route enforcement initiatives on the city's roadways. Programs that these agencies can engage in to enforce city and state truck regulations include the improvement of data collection and management, the use of state truck inspection spot-checks to enforce regulations, enforcement of the State's motor vehicle idling law, and the establishment and patrolling of Target Enforcement Zones in known trucking "hot spots" and other sensitive areas.

Improve Data Collection and Management

An important element of monitoring the performance of the transportation network and the effectiveness of the laws and regulations governing it is the collection and management of representative data. Data that is of particular importance to the effectiveness of the truck route program include:

Traffic Count and Classification Data

In order to have an accurate indication of where trucks are traveling, and in what volume, it is important to collect traffic count and classification data. The data should be collected on roadways of particular interest to the city's transportation planners. Data should be kept as up-to-date as possible for the sake of accuracy.

Origin-Destination Data

The best way to determine truck drivers' route choice is to know where their trip origin and destination points are located. By conducting periodic roadside truck driver surveys and interviews with local industrial and commercial facilities which generate truck traffic, city planners may better understand observed truck driver behaviors. Additional information that can be collected using these methods include vehicle size, commodity information, and the precise route the drivers use while traveling within the City of New Haven. With this information, planners can prepare sufficient alternative routes in the event of road closures due to construction or emergencies.

Accident Data

In order to gauge the safety of roadways throughout the city, detailed vehicle accident data should be collected and maintained. This data will help indicate areas where vehicles, including trucks, are most likely to become involved in various types of collisions, and can lead planners to determine whether trucks should avoid certain high-risk areas.

Enforcement Data

Geographic data that represents traffic law enforcement also is of importance. The cataloging of issued summonses can show where particularly high occurrences of traffic violations occur. This information can lead planners to study the reasons for high occurrences of violations at specific locations, which may result in necessary changes to the regulations, to the physical roadway, or to the diversion of resources to better enforce regulations in problem areas.

State Truck Inspections

The New Haven Police Department and Connecticut State Police should cooperate to enforce city truck regulations and the State's truck inspection program. Together the police departments may perform spot-check inspections by pulling trucks over either in TEZ areas or elsewhere to question drivers and make sure that they are operating within compliance of state and city regulations. The State Police can seize the opportunity to enforce the state inspection law, and driver manifests can be viewed to see if they are operating appropriately within the truck route network.

State Vehicle Idling Law

The State of Connecticut has developed regulations that prohibit the idling of vehicles for more than three minutes while not in motion. The regulations are intended to reduce the emission of particulate matter (PM), ground-level ozone, and carbon, and to reduce the health risks attributable to diesel emissions. The regulations apply to all motor vehicles within the State, although exemptions are made for the several types of activities, such as:

- When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control;
- When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers;
- When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source;
- To bring the mobile source to the manufacturer's recommended operating temperature;
- When the outdoor temperature is below 20 degrees Fahrenheit (20°F);
- When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes; or
- When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.

The active enforcement of this restriction against private and commercial vehicles could contribute to the reduction of the impacts motor vehicle operations have on the natural environment. The New Haven Police

Department should be encouraged to enforce the State's idling regulations within the city. New Haven Police may coordinate with Connecticut State Police to enforce this regulation.

Target Enforcement Zones

Because an enforcement exercises that makes use of four city patrol officers for eight hours could cost of over $7,000 in wages alone,[14] it is important to focus enforcement so that effectiveness is maximized using as few patrol person hours as possible. An important element of the enforcement plan is the establishment of Target Enforcement Zones (TEZs) throughout the city. These zones will be the areas where the New Haven Police Department and Connecticut State Police can focus their enforcement resources to minimize the negative impacts of improper truck activity in the most sensitive areas of the city. Areas where there is a history of resident complaints about through truck traffic, where truck drivers have been known to abuse loading zone provisions, and other known "hot spot" locations should be considered for TEZ treatment. Suggested TEZ areas are presented in Table 7.1.

Table 7.1 Target Enforcement Zones

TEZ Area	Known Problem	Potential Enforcement Initiative(s)
Elm Street near Church Street	Loading Zone Abuse	Enforce State Idling Law. Enforce time limits on loading.
Cold Spring Street	Through Truck Traffic	Monitor truck activity in the area. Couple through truck enforcement with state inspection spot-checks.
Whitney Avenue	Through Truck Traffic	Monitor truck activity in the area. Couple through truck enforcement with state inspection spot-checks.
Howard Avenue south of U.S. Route 1	Through Truck Traffic	Monitor truck activity in the area. Couple through truck enforcement with state inspection spot-checks.
Sea Street	Through Truck Traffic	Monitor truck activity in the area. Couple through truck enforcement with state inspection spot-checks.
Quinnipiac Avenue south of Route 80	Through Truck Traffic	Monitor truck activity in the area. Couple through truck enforcement with state inspection spot-checks.

The TEZs should be located adjacent to these sensitive areas, and make use of sites such as abandoned parking lots or sufficiently wide stretches of roadway where truck drivers can be pulled over and questioned without negatively impacting traffic operations or driver or public safety. Enforcement Implementation Program.

[14] Office of the Controller, City of New Haven Department of Finance, June 2, 2007.

8.0 Truck Route Plan Implementation Program and Schedule

The recommendations made in the previous sections of this report with regard to truck route designation, signage, education and outreach, and enforcement, ought to be undertaken in a manner and sequence that is methodical and aware of the "big picture" and desired end result. The combination of the proposed truck route network, ordinance development, signage program, and enforcement plan works to the goal of accomplishing a truck management program that meets the needs of the city's industrial and commercial interests as well as the health, safety, and welfare needs of the city's residents.

In Section 8.1 a recommended schedule for the implementation of the elements that compose the truck management program.

In Section 8.2 potential cooperating agencies at the city, regional, state, and Federal levels are identified, along with the roles those agencies may perform.

8.1 IMPLEMENTATION SCHEDULE

Because city officials have expressed preparedness to engage in the truck management program and because there are no obvious, visible causes for delay, the first steps of implementation may occur almost immediately. The City Board of Aldermen begins its next legislative season in spring 2008. In order to incite legislative consideration during that period, preparatory actions should commence in 2007. The anticipated schedule of actions is provided below.

2007

Third and Fourth Quarter

Begin work with city, MPO, state, and Federal partners. The City Plan Department and Traffic and Parking Department should meet with city, MPO, state, and Federal partner agencies to discuss city's intentions to pursue a truck management program and secure the support and cooperation of the partner agencies.

Seek sources of additional financial and advocacy support from state and Federal programs. Federal and state funding sources may be used to assist the city in implementing its truck management program.

2008

First and Second Quarter

Introduce truck management program to the City Board of Aldermen. The city's Board of Aldermen hold their next legislative session in spring 2008. During this session, the proposed truck route ordinance should be presented for consideration. Advocacy materials and presentations should be made available to the Aldermen in order to educate them about the city's needs with regard to freight movement and community impacts.

Seek City Legislative action. By the end of the spring 2008 legislative session, an ordinance should be voted upon. If approved by the Board of Aldermen, the ordinance will supply the city Traffic and Parking Department and the New Haven Police Department with the legislative guidance necessary to continue developing the truck management program.

Third and Fourth Quarter

Develop Citywide Comprehensive Traffic Enforcement Plan. Once the truck route ordinance is established, city traffic and law enforcement officials should work together to develop a plan for enforcing this and other traffic regulations.

Continue Outreach and Education. Once the ordinance is enacted, city officials should engage in outreach to law enforcement officials, the trucking industry, and community groups.

Collect and manage traffic data. Prior to the truck route network being enforced, baseline traffic data should be collected and managed. Traffic classification counts, turning movement counts at critical intersections, and accident data should be collected and managed by city officials.

2009

First and Second Quarter

Procure and install truck route guide signs and prohibitive signs. Truck route guide signs and prohibitive signs should be procured, and, provided all of the previous efforts have been undertaken, signage should be posted where necessary.

Begin enforcement in Target Enforcement Zones. Once all signage is in place and outreach and education efforts have been undertaken, enforcement of truck regulations may begin. Enforcement should be directed with special attention to the Target Enforcement Zones, where sensitivities to truck movements are the greatest.

Third and Fourth Quarter

Monitor program performance. As the truck route network comes on-line and drivers and law enforcement officials respond, it is important to monitor the performance of the network. Traffic data collection, law enforcement data, and

continued outreach to the trucking industry and community groups will provide indications of the network's effectiveness. Modifications to policies, signage locations, or enforcement practices may be made, if necessary, as a result of the monitoring effort.

8.2 PARTNERSHIPS WITH FEDERAL AND STATE AGENCIES

The truck route network implementation process will require the cooperation of various city and state agencies and departments. Each cooperating agency will have to be approached and through negotiation, understand the goals and needs outlined in the truck route program and the role of each agency in the program's execution. A summary of the roles that these agencies may perform is provided in Table 8.1.

Table 8.1 Recommended Agency Outreach and Cooperation

Level of Government	Agency Name	Role in Enforcement
City	Board of Aldermen	Draft and enact a City Truck Route Ordinance.
	City Plan Department	Produce public, industry, and law enforcement education materials. Engage in necessary outreach and education programs.
	City Traffic and Parking Department	Post all necessary signage.
	New Haven Police Department	Train officers to adequately enforce the law. Set up and execute enforcement initiatives. Monitor driver behaviors and enforce the regulations.
Regional	SCRCOG	Play cooperative role in the planning process and garner collaboration between neighboring municipalities
State	ConnDOT	Assist in developing and posting signage on state routes. Incorporate City's truck route network into state construction and contingency plans. Use state weigh stations to guard against overweight vehicles.
	Connecticut State Police	Assist New Haven Police Department in training police officers. Assist in the development of enforcement initiatives. Work with New Haven Police to enforce state inspection and clean air laws. Use state weigh stations to guard against overweight vehicles.
	Connecticut Department of Motor Vehicles	Perform truck safety inspections
	Connecticut Department of Environmental Protection	Partner with City, ConnDOT, and SCRCOG to engage in studies and programs that promote environmental and public safety issues associated with transportation.
	Superior Court	Uphold the laws in a fair and consistent manner.
Federal	FHWA, U.S. DOT, EPA	Supply funding sources via environmental, public safety, and security programs

9.0 Appendix

In order to solicit participation and input from various stakeholders, a Technical Advisory Committee (TAC) was assembled. The TAC met on two occasions during the course of the Study to discuss the Study's goals and objectives, progress, and planned courses of action. TAC members provided important recommendations, lessons from experience, and other types of valuable insight into the Study. This appendix includes a list of persons invited participate in the TAC and the meeting minutes from each of the two TAC meetings.

Table 9.1 TAC Invitees

Name	Affiliation	Location
Robert Smuts	CAO	New Haven, CT
Jennifer Pugh	CAO	New Haven, CT
Connie Mendolia	Department of Environmental Protection	Hartford, CT
A. Walter Edsaile	Traffic and Parking Department	New Haven, CT
Helen Rosenberg	Economic Development	New Haven, CT
Christine Bonnano	Economic Development	New Haven, CT
Peter Lozis	Engineering	New Haven, CT
Richard Miller	Engineering	New Haven, CT
Anthony Rescigno	Greater New Haven Chamber of Commerce	New Haven, CT
Paul Kowalski	Health Department	New Haven, CT
John Russo	New Haven Port Authority	New Haven, CT
Michael Morand	Office of New Haven and State Affairs	New Haven, CT
Captain Stephen Verelli	Police Department	New Haven, CT
Lt. Robert Lanza	Police Department	New Haven, CT
Stephen Dudley	South Central Regional Council of Governments	North Haven, CT
Robert Sheeley	Southern Connecticut State University	New Haven, CT
Bruce Fischer	Traffic and Parking Department	New Haven, CT
Stephen Merz	Yale New Haven Hospital	New Haven, CT
Julie Newman, Ph.D.	Yale University	New Haven, CT
Christopher Gallucci	Connecticut DOT	New Haven, CT
James Boice	Connecticut DOT	Newington, CT
Lt. Dennis Maurice	Commercial Safety Division	Wethersfield, CT
Christian Herb	Independent Connecticut Petroleum Association	Cromwell, CT
Michael Reilly	Motor Transport Association of Connecticut	Hartford, CT
Michael Vasaturo	Logistec USA	New Haven, CT
Tom Dubno	Gateway Terminal	New Haven, CT
Robert Schaeffer	Motiva Terminal	New Haven, CT
Daniel Stokes	Magellan Terminal	New Haven, CT
Ron Esposito	Roadlink USA	New Haven, CT
Lynn Bonnett	New Haven Environmental Justice Network	New Haven, CT
Giovanni Zinn	New Haven City Plan	New Haven, CT
Mayor John DeStefano, Jr.	City of New Haven	New Haven, CT
Kathryn Faraci	ConnDOT	
Rich Corona	ConnDOT	

SOUTH CENTRAL REGIONAL COUNCIL OF GOVERNMENTS NEW HAVEN TRUCK ROUTE STUDY TECHNICAL ADVISORY COMMITTEE #1 MARCH 29, 2007

Welcome and Introductions

Stephen Dudley from SCRCOG and Mike Piscitelli from City of New Haven welcomed the Technical Advisory Committee members and thanked them for attending the meeting. The following people were in attendance:

- Jennifer Pugh, City of New Haven;
- Ralph J. Carlo, Tracer Energy Services;
- Chris Herb, Ind. CT Pet. Assn;
- Helen Rosenberg, City of New Haven – Office of Economic Development;
- Heather Findlay, Quinnipiac River Community Group;
- Robert Lanza, NHDP;
- Michael Trahiotis, CT DEP;
- Dennis Maurice, DMV/CVSD;
- Cindy Zuerbeis, DMV/CVSD;
- Peter Lozis, City of New Haven – Engineering;
- Paul Kowalski, City of New Haven – Health Department;
- Bruce Fisher, City of New Haven – Traffic and Parking;
- Stephen Dudley, SCRCOG;
- Mike Piscitelli, City of New Haven – City Plan Department;
- Giovanni Zinn, City of New Haven – City Plan Department;
- Chris Titze, Cambridge Systematics, Consultant Support; and
- Brian ten Siethoff, Cambridge Systematics, Consultant Support.

Brian ten Siethoff provided an overview of the study participants, which include the South Central Regional Council of Governments (SCRCOG), the City of New Haven, the technical advisory committee (TAC), and Cambridge Systematics and Clough Harbour, providing consultant support.

Overview of Purpose, Goals, Objectives, and Scope of Work

Chris Titze reviewed the purpose, goals, and objectives of the study, as well as the study's scope of work. Detailed information about the project can be found (http://www.scrcog.org)

Technical Advisory Committee

Mr. Titze reviewed the purpose, goals, and duties associated with the TAC for this project.

Task 1 – Data Collection/Existing Conditions Review

When was original truck route map produced? 1960s to 1970s

Key points: One of key issues in study has been data collection

No truck routes on east side – Main Street will be impacted by construction on I-95; there are several truck route restrictions in area to guide trucks to certain routes

Are routes to Port included? Construction has impacted routes that trucks use to access Port from I-95 and I-91

How would the identification of truck corridors affect Federal aid designation?

West River community also concerned about traffic on Route 10 where it feeds into Route 34, number of accidents, accessibility to parks in area, air pollution problems

Mitchell Drive to Cold Spring also a problem

Why is Howard Street on the map? Is that a route trucks from New York City use to access northern parts of New Haven? A: Issue is that we don't have good data on truck origins and destinations, not sure. A: Howard Ave is used as a bypass when I-95 is backed up. Sometimes Howard Ave to Route 34.

How far in the future are we projecting the truck route needs? When I-95 and I-91 construction is completed, may have major changes in truck flows. A: Truck trips are expected to double in next 20 to 30 years; even with improvements on I-95 and I-91, there will still be larger trucks using local routes in New Haven. It is important to start identifying problem areas and potential truck routes today to guide these trucks to appropriate routes.

How do we know if trucks are through versus local trips? A: It is very hard to determine if trucks are through versus local. It would require an extensive data collection effort and study to pinpoint how many trucks are using New Haven streets for local deliveries versus through trips, and even then we might not have a complete picture.

City has lots of data on Quinnipiac Avenue corridor; need to add that to Slide 21.

How are "heavy vehicles" defined? UPS box trucks included? A: There are 13 classifications of trucks. Box trucks would be included in the definition of a truck.

Derby Avenue corridor: where was count made? A: EB only collected from ADT counts conducted prior to Route 10 Northbound and Southbound and Route 34 eastbound. Q: Would be useful to have ADT where the problem actually exists. A: One of biggest challenges in this study is to get data to help

us make decisions. We have to use ADT data, locations of truck accidents, other data that we have. This is a data gathering effort rather than a data acquisition effort, we have to work with what we have and get this accomplished by June 30, 2007.

Look at air quality issues in these corridors. For example, in Quinnipiac Avenue area, lots of residential areas, people have issues with air quality. A: Spatial resolution of air quality data will not be fine enough to look at specific corridors. City of New Haven has an air quality meter that we could use to measure air quality in some of these areas. Some of problems with air quality comes with idling trucks, congestion. Also some very small establishments (Dunkin Donuts, Walgreens) served by 18-wheelers.

Where has data come from in other studies we have done? A: State DOTs, MPOs, local municipalities.

There is an organization that has measures on their web site that has information about air quality measured in local areas around New Haven. None of them unfortunately are in the corridors identified in this study. A: Challenging to get this information, may be able to get this from the city. This is a transportation planning study, so while we have to worry about environmental issues, we can't recommend environmental standards. We have to recommend based on land use and transportation measures.

If we reroute vehicles, we may cause more damage to environment by forcing them to use routes that are less efficient. A: Could create pockets of extreme emissions issues – we found this in previous studies we have conducted.

Task 2 – Truck Routing "Best Practices"

What best practices have worked in other areas? What has been successful? A: Incentive side as well as enforcement/regulatory side.

Time-of-day is a separate issue. A: In that some restrictions could be implemented for time-of-day, could address some problems by shifting trucks to more appropriate routes by time-of-day.

Willow Street example: Trucks have to use that route. Implemented three-ton weight restriction, posted officers on both ends of bridge, still could not stop trucks. Willow Street may not be on the State's no truck route.

Cannot stop trucks from going on certain local roads. 1970s map is out of date, but may still be valid in some areas. A: Having trucks in a community is good. It is a sign of economic vitality. Truck restrictions are like squeezing a balloon – if we squeeze in one area, another area expands. If we move trucks from one area, will get complaints in another area.

Have we ever had success with ConnDOT getting signage installed to designate a truck route or ban trucks from a route? A: No

What is the scope and design of this study? I heard this is a data gathering not a data generation study. This is potentially the first study in a series. How can we

develop a plan if we know the data we are basing it on is incomplete? A: That is a challenge. Policies don't need to be rooted in traffic data. Regulations could come out of this study. Also recommendations to fill holes in the future. A: Given that this hasn't been done in a long time. Gather information that we have, identify holes, city will have to make a decision about whether to move forward. A: We could do a lot of work and spend a lot of money to count trucks, but then would have no money to do analysis.

Could part of this study be to determine ways to communicate better with the state and establish relationships? A: If we don't have a document to give DOT, we don't have a place to start the discussion. All the discussion today becomes part of the report and recommendations, build documentation necessary to build on the study and take to next step. First step is preparation of study, next step is City of New Haven to adopt specific actions, and then get state involved.

Will have limitations with the data. Those limitations that could be resolved by state will be included in final report? A: Yes. We will include recommendations based on data we have, also state that there is a need to collect more data to fill holes.

What can the communities do to help support this study? We could get volunteers to help count trucks. A: Perhaps we should do a one-day look at Forest Street. City and SCRCOG will look at what they can do to get data. Have time constraints, data collection is money and time intensive.

Is there a way to get ordinances to determine who is responsible for each area. Need to get a good look at all regulations. Who takes precedent – state or city? Who has the final say? A: Truck traffic is regulated at the Federal level, state has some impact, municipalities, and towns in Connecticut have very little power. State within last year has concurred with city to make Quinnipiac Avenue south of Route 80 a State no truck route but has not put up signage. Q: Quinnipiac Avenue is a through route short cut from I-95 to I-91. See caravans of dump trucks.

Next Steps/Schedule

Action Items

Data issue: Identify any way to collect more detail

Main Street, Cold Spring Street, Derby Avenue data,

Enforcement: Problems and weight issues, check enabling regulations to determine who is responsible for each portion of system.

We will have a community meeting in April, which everyone is invited to attend. Next TAC meeting scheduled for May 10, 10 a.m.-noon.

SOUTH CENTRAL REGIONAL COUNCIL OF GOVERNMENTS NEW HAVEN TRUCK ROUTE STUDY TECHNICAL ADVISORY COMMITTEE #2 JUNE 13, 2007

Welcome and Introductions

Chris Titze from Cambridge Systematics welcomed the Technical Advisory Committee members and thanked them for attending the meeting. The following people were in attendance:

- Mike Trahiots, CT DEP;
- Chris Herb, Independent CT Petroleum Association;
- Mark Simiola, Gateway Terminal;
- Nicholas Proto, Yale-New Have Hospital;
- Kathryn Faraci, ConnDOT;
- Pete Lewis, CNH ENO;
- Jennifer Pugh, City of New Haven-CAD;
- Bruce Fischer, Parking;
- Giovanni Zinn, New Haven City Plan Department;
- Chris Titze, Cambridge Systematics, Consultant Support;
- Chris Lamm, Cambridge Systematics, Consultant Support; and
- Brian ten Siethoff, Cambridge Systematics, Consultant Support.

Chris reviewed the meeting agenda and provided an overview of the study participants, which include the South Central Regional Council of Governments (SCRCOG), the City of New Haven, the technical advisory committee (TAC), and Cambridge Systematics and Clough Harbour, providing consultant support.

Review of Purpose, Goals, Objectives, and Scope of Work

Chris Titze reviewed the purpose, goals, and objectives of the study, as well as the study's scope of work. Detailed information about the project can be found (on SCRCOG's web site?):

Questions and Comments:

Mike Trahiotis from Connecticut DEP suggested that DEP's anti-idling laws be added to the table on slide 37.