A close-up photograph of a yellow truck's front end, focusing on the chrome exhaust stack and side mirror. The truck is yellow, and the chrome parts are highly reflective. The background is a clear blue sky.

Final Report

**The Minnesota Interstate Truck
Parking Study**

**for
*Minnesota Department of Transportation***

**by
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**and the
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Research and Education at
Iowa State University***

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Executive Summary

Beginning in the mid-1990's, truck parking was identified as a potential nationwide problem in the United States after Congress requested the issue be examined by the USDOT. Since then many states have undertaken activities to expand truck parking supplies, both on their own or in conjunction with the private sector. Other initiatives have attempted to make more efficient use of existing parking through Intelligent Transportation System (ITS) technology. For example, the Federal Motor Carrier Safety Administration's (FMCSA) "SmartPark" program that started in 2006 is attempting to demonstrate how technology can be used to identify and convey real time parking availability information to truck drivers.

Under the last federal highway reauthorization act: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), funding was made available for states to construct new parking facilities, modify existing ones, develop ITS systems to improve the efficiency of systems (section 1305), designate and sign for facilities (Interstate Oasis) that provide specific services and free parking for automobiles and trucks (section 1310), and permit electrification or other idling reduction facilities and equipment for use by commercial motor vehicles in rights-of-way on the Interstate System, and allow charging of fees for use (section 1412).

The *Minnesota Interstate Truck Parking Study* was undertaken to help Mn/DOT develop the information necessary to support decisions regarding future approaches to the truck parking issues in Minnesota. The issues examined by the study effort include determining what the state's role should be in the provision of truck parking; which provisions of long term truck parking will provide the greatest support to the state's economy, and what actions will provide the greatest impact on traffic safety, while taking maximum advantage of effective technology and available federal programs.

The Minnesota Interstate Truck Parking Study examined the supply and demand of public and private commercial vehicle parking along Minnesota's three primary interstate corridors: I-90, I-35, and I-94. The study was conducted through three primary tasks:

1. **An inventory of Minnesota's Interstate Truck Parking Supply:** This inventory established the basis for the collection of data regarding truck parking demand by time of day. The project team used a variety of information sources to obtain the supply of commercial vehicle parking spaces. Aerial photographs, the web-based geographic program Google Earth™, The Trucker's Friend; a national truck stop directory, and direct contact with truck stops were used. The project team used Google Earth™ and Mn/DOT maps, to search along each interstate corridor to find areas that could accommodate commercial vehicle parking. Areas within one mile of interstate exits were examined to look for parking facilities, rest areas, truck stops, vacant lots, or large parking lots at retail centers.
2. **Truck Parking Demand Analysis:** Data compiled on parking facilities was then given to a field data collection team for use during facility site visits. A sampling methodology was created to guide the data collection process for both public and private facilities. Field researchers recorded truck parking supply information including facility layout descriptions and total parking

spaces, the number of available spaces, parking duration and limits and facility ownership (public/private).

Field staff then gathered additional vehicle observation information at each site including:

- The USDOT number,
- Truck ID number (if applicable)
- Ownership information on the truck
- The Interstate exit number (e.g. I-94, Exit 49-A)
- Type of parking facility
- The time of day when the truck was observed.

To develop a more robust picture of overall demand at public facilities, field observations were supplemented with records from the *Truck Parking Capacity Usage Database* developed for and maintained by the Mn/DOT Rest Area Program. The database uses truck count data collected by rest area maintenance crews during late night hours between 11:00 P.M. and 3:00 A.M. to count the number of trucks parked at each facility. Once this data was summarized, the team worked with the Mn/DOT Rest Area Program Manager to develop a measure that would effectively identify facilities that had reached, or were over capacity during the busiest hours of the day. Therefore, over capacity was defined as those facilities that observed more trucks parked than there were spaces to accommodate them. Finally, the project team identified “problem” facilities that were over their parking capacity at least 15, 25, and 50 percent of the time. The tables below illustrate the truck parking capacity at each interstate rest area and the corresponding percentage of weeknights the facility was observed over its capacity.

Table 1: Capacity Constraints on Interstate 90

Interstate 90 Rest Areas	Truck Parking Capacity				Truck Stalls
	Adequate	15%	25%	50%	
Beaver Creek (E.B.) Exit 0	X				16
Adrian (E.B.) Exit 25		X			6
Adrian (W.B.) Exit 26			X		7
Clear Lake (E.B.) Exit 69			X		10
Des Moines River (W.B.) Exit 72	X				9
Blue Earth (E.B.) Exit 118		X			10
Blue Earth (W.B.) Exit 119	X				11
Hayward (E.B.) Exit 161		X			10
Oakland Woods (W.B.) Exit 171			X		10
Highforest (E.B.) Exit 202			X		6
Marion (W.B.) Exit 220				X	20
Enterprise (E.B.) Exit 244	X				11
Dresbach TIC (W.B.) Exit 275	X				5

Table 2: Capacity Constraints on Interstate 94

Interstate 94 Rest Areas	Truck Parking Capacity				Truck Stalls
	Adequate	15%	25%	50%	
Moorhead (E.B.) Exit 2	X				12
Lake Iverson (E.B.) Exit 59			X		11
Hansel Lake Exit 68			X		10
Lake Latoka (E.B.) Exit 99			X		18
Burgen Lake (W.B.) Exit 105				X	12
Big Spunk Lake (E.B.) Exit 151	X				17
Middle Spunk Lake (W.B.) Exit 152	X				18
Fuller Lake (W.B.) Exit 177			X		17
Enfield (E.B.) Exit 186	X				18
Elm Creek (E.B.) Exit 214				X	10
St. Croix T.I.C. (W.B.) Exit 255				X	35

Table 3: Capacity Constraints on Interstate 35

Interstate 35 Rest Areas	Truck Parking Capacity				Truck Stalls
	Adequate	15%	25%	50%	
Albert Lea TIC (N.B.) Exit 1				X	29
Straight River (S.B.) Exit 34			X		12
Straight River (N.B.) Exit 35			X		13
Heath Creek (N.B.) Exit 69			X		20
New Market (S.B.) Exit 75			X		15
Forest Lake (S.B.) Exit 131	X				15
Goose Creek (N.B.) Exit 154	X				12
Kettle River (N.B.) Exit 198	X				10
General Andrews (S.B.) Exit 208	X				10
Thompson Hill Exit 250	X				10

Overall, 20 facilities were identified to have significant capacity issues during the busiest time of day. Specific attention should therefore be given to facilities that are over capacity more than 50 percent of the time. These facilities would best benefit from additional investment or capacity additions. There are five rest area facilities on Minnesota's interstates that are at or over capacity at least 50 percent of the time. They are identified in the table below. Three of them are located on Interstate 94. The first is located at exit 105 near Alexandria. The second is located at exit 215, which is the closest East bound rest area to the Twin Cities Metropolitan area. The third is located at exit 256, which is also a rest area on the urban fringe, near the Wisconsin border. The fourth rest area facility is located at exit 222 on Interstate 90, near Marion. Additionally, there is one rest area located at exit 1 on Interstate 35, very near the Iowa border.

Table 5: Rest Areas at or Over Capacity at Least 50 Percent of the Time

<i>Site Name</i>	<i>Trunk Highway</i>	<i>Mile Post</i>	<i>Truck Stalls</i>	<i>Max # Trucks In Site</i>	<i>Avg. Trucks In Site</i>	<i>Total # Days Open</i>	<i># of Days at or Over Capacity</i>	<i>% of Weekdays at or Over Capacity</i>	<i>% Days at or Over Capacity</i>
Burgen Lake (W.B.)	I94	105	12	413	8.2	2331	1663	71.3%	59.5%
Marion (W.B.)	I90	222	20	330	17.1	1999	1579	79.0%	64.9%
Albert Lea TIC (NB)	I35	1	29	213	9.5	1933	1370	70.9%	58.0%
St. Croix T.I.C. (W.B.)	I94	256	35	536	24.7	2220	1363	61.4%	50.8%
Elm Creek (E.B.)	I94	215	10	136	8.6	2177	1801	82.7%	65.2%

The project team also sought additional information about demand at private facilities, but operators were unwilling to state how often their parking lots were at or over their intended capacity. For future truck parking implementation efforts, it will be essential to attract additional involvement from private industry representatives such as NATSO (National Association of Truck Stop Operators).

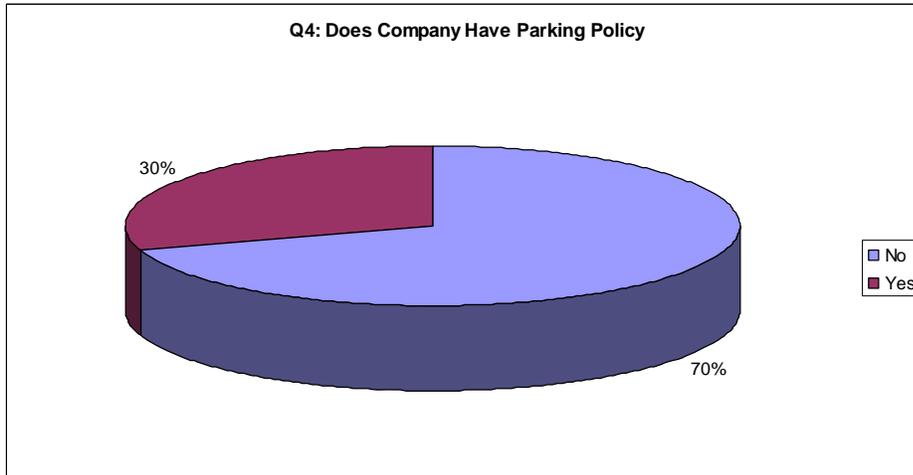
Using all the available information the project team produced maps showing the supply and demand on public rest area facilities, with indications of how often public rest area parking facilities for commercial vehicles are filled to capacity during week-night hours. These maps can be located on page 28 of this report.

3. Survey Results of Trucking Company Practices and Attitudes Regarding Truck Parking:

Vehicle information was turned over to researchers who contacted the motor carrier companies responsible for the trucks observed to find out more about why their drivers were parked in a particular location, and the nature of their stop. An attempt was made to contact the operating motor carrier within 48 hours of the vehicle observation. The interview consisted of nine survey questions sent to 433 of motor carriers throughout the Midwest and Canada. Of the 433 carriers identified, 178 responded (41% response rate) to the survey by telephone, fax, US mail or email. In general, the purpose of the interviews was to determine reason for parking selection. For example, in making a parking selection, what were the determining factors; positioning for targeted delivery window, instruction on where to park by dispatcher or general availability of parking location? Moreover, during the interview, we tried to get a sense of truck parking availability and its effect on their business. A detailed evaluation of company responses can be found beginning on page 35 of this report and a copy of the survey is provided in Appendix A. Some of the most important responses are included below.

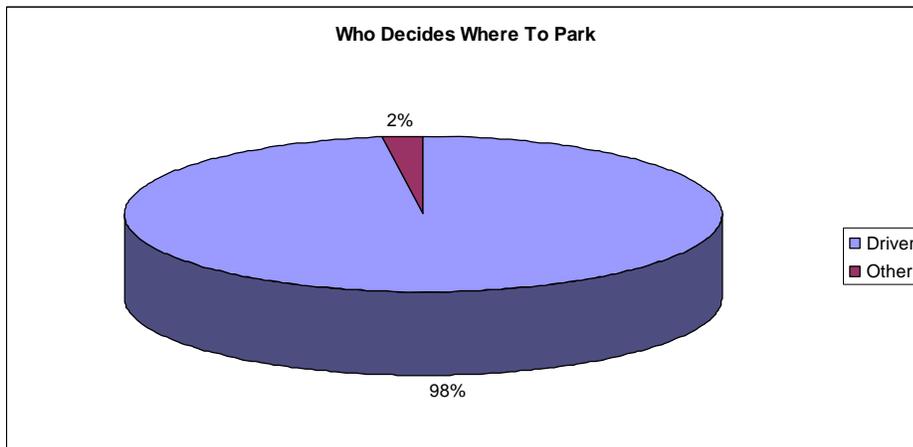
Carriers were asked if the company had a parking policy or practice for the drivers to follow. The study showed that over two-thirds of the carriers (70%) stated that there was no company policy regarding where their drivers should park. The results can be seen in **Figure 1** below.

Figure 1: Parking Policies and Practices



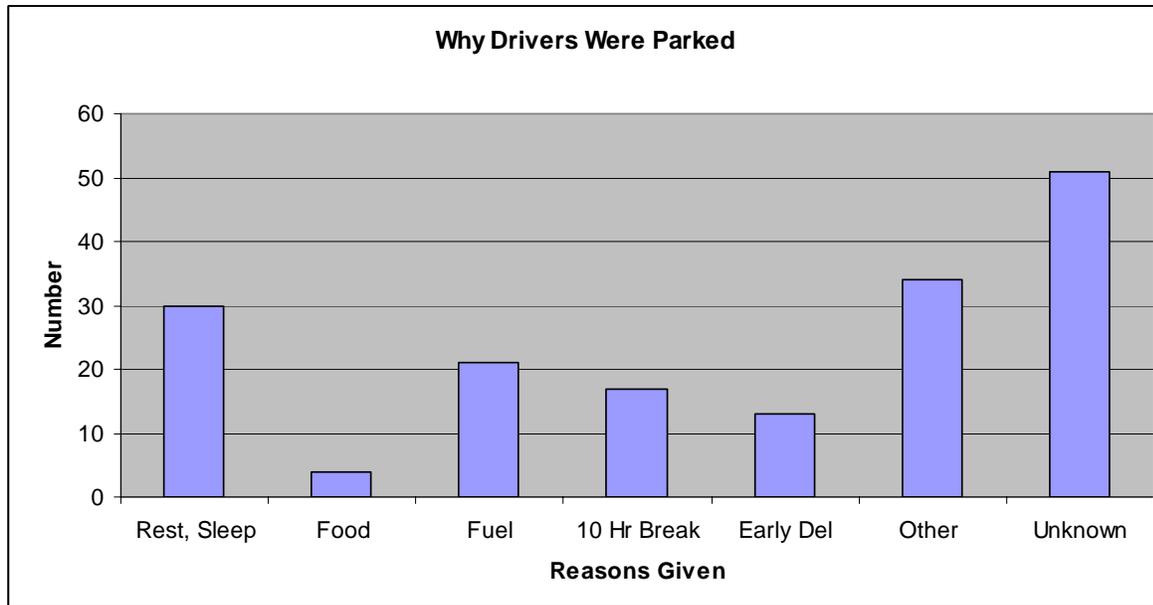
Additionally, the survey responses showed that 98% of the companies surveyed do not provide assistance to drivers when looking for potential parking locations. Many stated that drivers were responsible for finding their own parking. The results can be seen in **Figure 2** below.

Figure 2: Parking Decision



The survey also explored the reason drivers were parked at a specific location. The most popular responses to this question included rest, fuel, or ten hour required breaks. A graph of the driver responses is included below as **Figure 3**.

Figure 3: Reasons Drivers were parked



Currently, the project team is developing a framework for future discussions regarding the impacts of various options including, financial impacts, safety impacts, impacts the motor carrier industry nationally, regionally, and locally, and impacts to Minnesota shippers. This parking study essentially set the stage for future research implementing solutions to solve the state's truck parking issues.

Several statewide solutions have been identified that will form the framework for future implementation studies. Upcoming phases of this study will evaluate the effectiveness of several options including, but not limited to:

- 1) Public Private Partnerships
- 2) Parking Capacity Additions
- 3) Parking Policy Revisions
- 4) Information Technology Systems (ITS)

Background

"The Interstate Highway System was planned in the 1950's for the traffic volumes of the 1980's. Today, truck and traffic congestion is a daily occurrence which will grow to staggering rates in the next 20 years..."¹

The demand for trucking services has grown rapidly in the past two decades. In 1990, freight movements by truck, measured in ton-miles was 23 percent of total national goods movements. By 1998 truck ton-miles increased to 28 percent. In 2002 (the most current available data), truck ton-miles accounted for 34 percent of total goods movements nationally. When measured in value, trucking accounts for 70 percent of all U.S. goods movements.² In addition to the growth of truck traffic in the past two decades, highway freight movements have become more complex and increasingly time critical due to Just-In-Time (JIT) inventory management and globalization of the world economy.

Truck parking was identified as a potential nationwide problem in the United States (U.S.) in the mid 1990's. An examination of the issue was conducted by the USDOT at the request of Congress. Many states have undertaken activities to expand truck parking supplies on their own and in conjunction with the private sector. Kentucky has developed the *Truck Haven Program* that allows trucks to park at weight and safety inspection facilities. Other states have built rest areas with additional truck parking spaces. Iowa has closed several permanent weigh stations and turned them into truck parking locations, and has rebuilt several rest areas with expanded truck parking. California, New York and other states have plans to develop rest areas that provide safe off-road parking for trucks.

Other initiatives utilize Intelligent Transportation System (ITS) technology to make efficient use of existing parking spaces. The Federal Motor Carrier Safety Administration's (FMCSA) "Smart Park" program began in 2006 to demonstrate how to use technology to identify and convey real time parking availability.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) governs federal surface transportation funding through 2010. SAFETEA-LU makes funds available to the states to address several freight related issues including: to construct new truck parking facilities; modify existing truck parking facilities; improve the efficiency of transportation systems through ITS (Section 1305); designate and sign for facilities that provide specific services and free parking for automobiles and trucks (Interstate Oasis) (section 1310), and permit electrification or other idling reduction facilities and equipment for use by commercial motor vehicles to be placed in rights-of-way on the Interstate System, and allow charging of fees for use (section 1412).

Current projections of truck parking demand indicate severe shortages over the next 20 years. The Minnesota Interstate Truck Parking Study is designed to provide background data to support planning and decisions on future approaches to truck parking supply and demand within the state.

¹ *Transportation Invest in Our Future; America's Freight Challenge*, American Association of State Highway and Transportation Officials. May 2007, pg. 1

² *Freight In America: A New National Picture*. US Department of Transportation, January 2006

Truck Parking Literature Review

The first task for the Minnesota Interstate Truck Parking Study was a review of existing relevant literature. The following is a synopsis of the literature analyzed as a precursor to the study.

Commercial Driver Rest and Parking Requirements: Making Space for Safety.

U.S. Department of Transportation Federal Highway Administration. Report No. FHWA-MC-96-0010. May 1996.

In 1996, the American Transportation Research Institute (ATRI), a research arm of the affiliated American Trucking Association (ATA), commissioned Apogee Research, Inc. and Wilbur Smith Associates to evaluate truck driver rest and parking needs along the National Interstate system. The research team first assessed the current status of nationwide public rest area parking by developing analytical models to estimate the demand for truck parking spaces. Through this analysis, the project team identified a shortfall of 28,400 truck parking spaces in public rest areas nationwide and predicted the shortage would grow to 39,000 in ten years. A similar analysis was conducted to assess the supply and demand for long-term truck parking at private truck stops. This analysis found that a portion of the shortfall at public rest areas might be satisfied by planned private parking facility expansion. There was no conclusive evidence that private truck stops and public rest areas are direct substitutes for each other, but are complementary. A lack of truck parking continues to be a problem for both the public and private sectors and requires additional attention and research to solve this shortfall.

The Transportation Equity Act for the 21st Century (TEA-21), enacted in 1998 identified truck parking as an issue for public and private parking facilities, and required a study of the adequacy of these facilities under Title IV, section 4027. The studies intend to extend the 1996 study, *Making Space for Safety*, by determining the location and quantity of parking facilities that could be used by motor carriers to comply with Federal hours of service rules, identify where shortages exist, and propose a plan to reduce the shortages.

FHWA Rest Area Forum: Summary of Proceedings.

Accessed through TRB online. <http://www.tfhr.gov/safety/00034.pdf>. 1999.

Atlanta, Georgia was the site of the Federal Highway Administration (FHWA) hosted Rest Area Forum, June 29-30, 1999. The forum assembled key stakeholders to discuss the availability and safety of parking for commercial vehicles along the Nation's highway network. Forum participants included more than 70 state departments of transportation and enforcement officials, representatives of the commercial motor vehicle (CMV) industry, private truck stop operators, and safety officials. The stated objectives of the forum included:

- Review various issues pertaining to parking for commercial motor vehicles
- Discuss best practices being employed to alleviate truck parking issues
- Consider technologies that can provide real-time information on parking availability at private truck stops and public rest areas
- Identify actions and initiatives that could facilitate parking improvements

Concerns were discussed in several breakout sessions with industry representatives that covered many varied topics. The main focus was the need for additional parking spaces for CMV operators to rest. Seven key topics were presented in the Forum's closing session as recommendations:

- 1) Provide safety and security in public rest areas and privately owned truck stops
- 2) Support privately owned truck stops' ability to meet the parking need
- 3) Provide alternative parking sites
- 4) Improve provision and location of public rest areas and private truck stops
- 5) Improve Federal, State, and local financial support for CMV parking
- 6) Eliminate time limits imposed by states on legal CMV parking
- 7) Increase driver education and available information

Truck Parking Areas: Highway Special Investigation Report.

National Transportation Safety Board (NTSB). 2000.

A 2000 NTSB special investigation report, *Truck Parking Areas* looks at the lack of available safe commercial vehicle parking. The NTSB report acknowledges a shortage of parking spaces and information on parking for CMVs, and includes information on state-enforced parking time limits and restriction. Report conclusions include:

- Shippers and brokers both influence truck schedules and therefore should both be an integral part of any solution to the truck parking dilemma.
- CMV operators who are unable to find available parking is a major safety hazard because it often requires operators to illegally park on highway shoulders and entrance/exit ramps; which further impedes traffic that would normally use these facilities.
- Commercial vehicle operators often cite their reasons for illegally parking as: “not finding available legal parking spaces” or “not knowing where parking would be available”³, which is a major safety issue that requires federal and state governments to maintain highway safety by providing truck parking spaces that can be safely and easily located in advance and during trips.
- The prohibition against private development of rest area facilities on interstates may be an impediment to the construction of adequate truck parking facilities, and therefore, state governments should investigate the feasibility of developing privately owned rest area facilities.

Study of Adequacy of Commercial Truck Parking Facilities.

Fleger, Haas, Trombly, Cross, Noltenius, Pecheux, and Chen. Federal Highway Administration. March 2002.

³ Garber, Wang, and Charoenphol. *Estimating the Supply and Demand of Commercial Heavy Truck Parking on Interstate Highways*. Virginia Transportation Research Council. 2003.

This 2002 report documents the findings of a FHWA study to investigate commercial truck parking facilities serving the National Highway System (NHS) in response to Section 4027 of the Transportation Equity Act for the 21st Century (TEA-21). The report conclusions include:

- Nearly half of truck operators surveyed reported available parking spaces at public rest areas are rare.
- CMV operators preferred commercial truck stops and travel plazas for activities that required them to park their vehicles, but preferred public rest areas when stopping for a short nap. The project team concluded that public rest areas account for 23 percent of truck parking demand and 77 percent of demand is for commercial truck stops and travel plaza parking.
- The estimated public facility parking demand far outweighs the supply, while commercial facility supply seems sufficient to meet estimated demand.
- 35 states had a shortage of parking at public facilities, while only 8 states had a shortage at commercial facilities.
- Parking shortages at public rest areas will continue to worsen, while a surplus of spaces at privately owned truck stops will develop.
- Public rest facilities offer convenient access to the highway and certainty of parking space availability. Private facilities offer more amenities but may be more difficult to access.
- Truck parking shortages are more common in the Northeast and Midwest

Recommendations from the project team provide possible actions to address commercial vehicle parking deficiencies. The recommendations are:

- That states identify the types of parking spaces currently available and determine what influences operator parking facility selection.
- States attempt to make parking readily available and evenly distributed based on operator needs.
- Development of a program to provide information on parking availability to drivers by a variety of methods
- Public/private partnerships to provide access to staging areas for local deliveries.

Synthesis 317 – Dealing With Truck Parking Demands.

National Cooperative Highway Research Program. March 2002.

NCHRP's Synthesis 317 – Dealing With Truck Parking Demands identifies practices used to manage truck parking demand. Report goals included the identification of successful and innovative strategies. Data was gathered through a survey distributed to highway engineers in all 50 states. The synthesis report estimated that Minnesota had a total of 40 public facilities with 535 parking spaces and 60 private facilities with 4,505 parking spaces. The study concluded that a number of states were experiencing significant shortages in roadside truck parking. The report cited several recommendations similar to those of previous studies, including:

- Expanding or improving public rest areas
- Educating or informing drivers about available spaces, and
- Making better use of the private sector and private truck spaces

National Case Studies and Research

The following case studies present a number of alternative approaches that several states have implemented to address an ever growing demand for commercial vehicle parking. Several case studies are summarized below and outline state's strategies to solve the parking problems. Extensive internet research was conducted for this analysis.

Minnesota

Mn/DOT conducted several market research studies during 1997 and 1998 to improve their rest area services.⁴ These studies included surveys, focus groups, telephone surveys, and commercial truck usage and nighttime parking demand analysis. The purpose of the studies was to identify areas where parking demand exceeds availability. The results suggested that 26 of the 50 rest areas operated by MnDOT had potential truck parking capacity issues.

In 2000, Mn/DOT conducted another parking study to determine how operators use state owned rest areas along Interstate 94 during nighttime hours.⁵ This study concluded that commercial drivers who arrived at the rest areas before 11:00 p.m. tended to be able to find available parking spaces. Once parked, those drivers usually stayed for most of the night. Commercial vehicle drivers that arrived later in the evening, after the lots were fully occupied, stayed a much shorter time. Based on surveyors' observations, drivers usually passed through full rest areas without stopping, and would often drive on to park in locations outside of rest areas; usually highway shoulders or on/off ramps.

New York

In 1997, the New York State Department of Transportation (NYDOT) adopted a rest area policy requiring its state rest facilities to meet the future needs of commercial motor vehicle users.⁶ As a result of this policy, NYSDOT increased the number of commercial vehicle parking spaces by about 300 spaces. NYDOT also worked to develop a county-owned rest area that would be located within the state-owned right-of-way, but accessed from the local road system.

NYDOT asked their regional offices prepare rest area plans that considered the needs of truck operators.⁷ Some of these plans recommended the conversion of closed rest areas into commercial vehicle parking. Others proposed the construction of new rest areas on heavily used corridors. The state initiated multi-region corridor studies to obtain more detailed input into a statewide rest area plan. They then developed a plan to provide a framework for a system of rest areas. NYDOT's recommendations include: increased yearly truck registration fees with the stipulation that these additional fees could be used only on initiatives to address truck parking

⁴ Office of Technical Support, Site Development Unit, Minnesota Department of Transportation. *Commercial Truck Usage Nighttime Parking Demand Analysis*. December 1998.

⁵ Office of Technical Support, Site Development Unit, Minnesota Department of Transportation. *Market Research Nighttime Truck Parking Length of Stay Study*. March 2000.

⁶ Hammer, McCartt, Meherka. *Study of Use of Limited Service Rest Areas by Commercial Vehicle Drivers in New York State*. New York Department of Transportation. 1997.

⁷ Schneider, Alexander, Baker, and McCartt. *New York's Research and Program Approach to Address the Needs of the Motor Carrier Industry at Public Roadside Rest Areas*. Proceedings, Second International Truck and Bus Safety Symposium. October 1999.

issues, to shift rest area funding from locations that are well served by private businesses to areas where additional development is necessary, and encourage the formation of public-private partnerships through working groups, low interest loans, and lease agreements.

California

California Department of Transportation (CALTRANS) created the Caltrans Safety Roadside Rest Area System Team in 1999, to develop a vision and recommendations to improve California's Safety Roadside Rest Area System.⁸ The team was also tasked with creating a new master plan to address the state's growing truck parking problem. In response to the rest area team's recommendations, Caltrans established an In-Route Truck Issues Task Force, chaired by the Traffic Operations Program. Other task-force members included the California Highway Patrol, California Trucking Association, the California chapter of the National Association of Truck Stop Operators, and the California State Automobile Association.

The task force proposed a privatization-partnership to create fenced, lighted parking lots, built adjacent to commercial developments near overcrowded rest areas. These auxiliary lots would be free to all motorists and have signage directing drivers from the highway and nearby rest areas. The proposal called for the State to lease or purchase the land for these lots and the private sector to provide restrooms, clean up litter, and provide security at the auxiliary lots through competitive, negotiated, agreements.

Maryland

The Maryland Department of Transportation (MDDOT) created a similar task force to study commercial vehicle parking demand. Their study found commercial vehicles parked illegally along Interstate routes during the night, even though an adequate supply of public rest areas, commercial truck stops, commuter park-and-ride lots, and weigh stations were available.⁹ In response, the region implemented a strategy to educate commercial vehicle operators about available legal parking spots. MDDOT added signs along the I-95 corridor to advise drivers of facilities with available parking during overnight hours. A truckers' map with public and private parking locations was published and distributed to the commercial driver community.

Kentucky

The Transportation Cabinet of Kentucky developed a "safe haven" concept different from many other states parking solutions. "Safe haven" permits commercial vehicle operators to park at weigh stations during overnight hours. Historically, truck operators have been reluctant to park at weigh station facilities for fear of being interrupted by enforcement officials. State officials have been able to provide approximately 225 additional parking spaces. through the safe haven

⁸ NCHRP Synthesis 317. *Dealing With Truck Parking Demands – A Synthesis of Highway Practice*. Chapter 4 – State Practices and Potential Solutions. 2003.

⁹ Pecheux, Chen, Farbry, and Fleger. Federal Highway Administration. *Model Development for National Assessment of Commercial Vehicle Parking*. 2002.

concept which provides that drivers are not disturbed by enforcement officials except in the case of an emergency.

Connecticut

The Connecticut Department of Transportation (ConnDOT) undertook a statewide truck parking study in 2001.¹⁰ Their investigation and analysis examined existing truck parking capacity and capacity for the year 2020. They determined that there are 375 available truck parking spaces statewide and estimated the current shortage to be nearly 1,200 spaces. By the year 2020, the shortage of public parking spaces was estimated to increase to over 1,600 spaces. The lack of CMV parking in Connecticut often led to state law violations and trucks parked on the side of highways. A truck stop and rest area parking study completed in 2000 found, 43 percent of truck drivers reported the State Police had asked them to move when they parked in an undesignated area to rest. Large numbers of illegally parked trucks present significant safety issues for other motorists using Connecticut's highways.

ConnDOT considered the use of intelligent transportation system communications to display of parking availability. They concluded that "using electronic display boards to provide real time information regarding parking space availability and/or direct drivers to other facilities does not appear to be beneficial."¹¹ This conclusion was based on the inability to continuously update changes in parking availability. The ConnDOT study also examined the option to reconfigure, expand, or build new truck parking facilities along Connecticut's highway network. The study team found these options to be viable ways to address truck parking deficiencies along the state's corridors. The ConnDOT study also examined the use of alternative sites for truck parking. The study team was unable to find any locations that met design requirements for a truck parking facility.

Iowa

In 1999, the Iowa General Assembly charged the Iowa Department of Transportation (IADOT) to conduct a study of Iowa public policy regarding overnight truck parking.¹² In response, IADOT formed a task force to study commercial vehicle parking. The task force members included corporate and independent trucking firms, representatives from highway groups, enforcement officials, and IADOT. The Center for Transportation Research and Education (CTRE) reviewed the study data and recommended that the state prioritize locations where greatest the demand for overnight parking existed, and then focus development of overnight parking facilities at the high-demand locations. CTRE's analyses lead to the identification of several strategies and goals including: evaluate existing facilities to determine how to accommodate more truck parking at these facilities, use Intelligent Transportation Systems (ITS)

¹⁰ Goods Movement Planning/ Office of Intermodal Project Planning. State of Connecticut Department of Transportation. *Truck Stop and Rest Area Parking Study*. April 2001.

¹¹ *Truck Stop and Rest Area Parking Study*. State of Connecticut Department of Transportation. April 2001.

¹² Maze, Taylor, and Nelson. *Commercial Vehicle Parking*. Center for Transportation Research and Education Management Project 99-56, Center for Transportation Research and Education. Iowa State University. December 1999.

to inform truck operators of available parking spaces, and upgrade existing rest areas to meet increasing parking demand based on a 20-year plan.

Michigan

The Michigan Department of Transportation (MDOT) partnered with Michigan State University in 1999, to conduct a study of rest areas in the state of Michigan.¹³ The study created an inventory of 82 rest areas including the number of parking spaces, facilities offered, distance from previous rest area and nearest city, and parking time limits. Study results showed that although 42 percent of rest areas had space available, 19 percent of the rest areas were overcrowded. A model was developed to evaluate the utilization of Michigan's rest areas. The results of the model analysis showed that for parking space utilization between 12:00 a.m. and 2:00 a.m., average daily truck traffic determined the amount of available parking. However, between 4:00 a.m. and 8:00 a.m., the factor that determined parking space utilization was the distance to the nearest city. These model results identify a strong correlation between parking demand and the distance to the nearest city during the early morning hours. This correlation is most likely due to the delivery schedules of truck operators who are required to make early morning deliveries to a nearby city.

Recent Legislation/Programs Adding to Truck Parking Issues

Interstate Oasis Program

The Interstate Oasis Program was a provision included in SAFETEA-LU legislation that requires the Secretary to establish standards for designating a facility as an Interstate Oasis. An Interstate Oasis is defined as an off-freeway facility, such as a truck stop, that supplements rest areas and is not within public right-of-way.¹⁴ In order to be eligible for this designation the identified facility must offer products and services to the public including phones, fuel, oil, and water, provide 24-hour access to restroom facilities, have parking for heavy trucks and automobiles, and be staffed 24/7.¹⁵ The designated facility must also include criteria relating to the appearance and layout of the facility, and its proximity within 3 miles of nearby Interstate Highways. A facility shall be eligible for designation as Oasis if it meets these standards established by the Secretary.

“Smart Park” Intelligent Transportation System

The Federal Motor Carrier Safety Administration (FMCSA) has undertaken recent initiatives to address truck parking issues. They are developing an ITS technology called “Smart Park” that will provide real time truck parking availability information to truckers on the road. Phase 1 of the study demonstrated the technology for collecting data on space occupancy at a truck parking

¹³ Taylor, Sung, Kolody, Jawad. *A Study of Highway Rest Area Characteristics and Fatigue Related Truck Crashes*. Michigan Department of Transportation. July 1999.

¹⁴ Interstate Oasis Program. Talking Freight Seminar. July 19,2006. Hari Kalla. FHWA.

¹⁵ Fact Sheets on SAFETEA-LU Highway Provisions. Interstate Oasis Program. FHWA.

facility.¹⁶ Some of these technologies included using loop detectors and overhead sensors to determine if spaces are in use, or collecting occupancy data based on the number of entries to and exits from a facility and comparing those numbers to the overall capacity to determine available spaces. Phase 2 of the study demonstrated technologies for broadcasting the parking information using Highway Advisory Radio, Traveler Information Systems, 511, or variable message signs so that truck operators can pull into the location if there is parking available, or bypass the location if all of its spaces are currently in use.

Hours of Service Legislation

The U.S. Department of Transportation's Federal Motor Carrier Safety Administration (FMCSA) recently revised the Federal hours of service regulations in August 2005. The new rules replace HOS (hours of service) regulations that were last updated in 2003. A detailed description of up to date regulations can be found on the FHWA website in Section 49 of the Code of Federal Regulations, Part 395. The new rules spell out the length of time commercial drivers can operate trucks before they are required to take a break. Portions of the rule, including the maximum driving time and minimum rest limits remain the same. However, the new rules include several changes that affect short-haul operators as well as longer distance drivers who use in-cab sleeper units for their rest facilities.

The newly created rules prohibit truckers from driving more than eleven hours in a row, working longer than 14 hours in a shift, and driving more than 60 hours over a seven day period or 70 hours over an eight day period. In addition, the new regulation requires truck operators to rest for at least ten hours between shifts and provides a 34 hour period to recover from fatigue. Another important change implemented under the new rule allows short-haul operators that are not required to hold a commercial vehicle drivers license the opportunity to extend their work day twice a week. They are also no longer required to maintain logbooks. Finally, the new rule addresses truck operators who previously broke their required rest times into multiple smaller periods. The new rule now requires truck operators to split sleeper-birth time into two periods, provided neither is less than two hours. This means that operators must now use sleeper cabs to for at least eight contiguous hours of rest, which many believe will significantly reduce driver fatigue and increase the overall safety of the nation's roadways. In addition to hours of service regulations, Minnesota restricts overnight parking and camping at its wayside and rest areas. The restriction came into effect in September 1990 by commissioner order as a means to exclude overnight camping at rest areas. The restriction limits motorists (including truck operators) to park no more than six hours at Minnesota Department of Transportation rest areas.¹⁷

Research Leading to Demand Methodology

To effectively evaluate commercial motor vehicle parking space availability, truck parking spaces and parking demand must be measured along specified corridors. Public rest stop parking space data is available, but a similar data for private facilities is more difficult to gather. Truck parking availability differs significantly over a 24 hour period.

¹⁶ Quon Kwan. Truck Parking Issues and Programs. July 19, 2006. Talking Freight Transcript. FHWA.

¹⁷ Minnesota Department of Transportation. Commissioner's Memorandum No. 108.

Several models have been developed to accurately measure truck parking demand. Mn/DOT uses a model based on one recommended by the American Association of State Highway and Transportation Officials (AASHTO). The model estimates truck parking space needs for statewide rest area planning based on overall traffic flow and on the percent of heavy commercial traffic. Mn/DOT's model estimates the need for short-term resting opportunities to address driver fatigue. It does not consider the additional parking demand caused by other factors such as CMV hours of service or CMV staging.

Many other factors can affect truck parking demand. These influences include availability of food and amenities, lighting, location, and proximity to delivery and pick-up locations. Apogee, Inc. developed guidebook for a more complicated space estimation model in 1996 that addresses these additional factors. This more complicated model is based on recommendations to the 1981 Mn/DOT model for estimating truck parking spaces. It uses coded factors that include: distance from the previous rest area, distance to the next interchange, type of truck parking spaces, available food facilities, rest area lighting, and the availability of a rest area attendant, to estimate truck parking availability. Then the model incorporates these design parameters into the model to develop a design hourly volume ratio which can be effectively used to estimate the number of truck parking spaces required at a specific facility.

Most case studies identified for this literature review followed similar approaches to estimating the truck parking demand. Each one identifies and inventories truck parking facilities. Data sources included aerial photography and reference materials that list the truck parking locations and available amenities and field data collection. Field data was gathered by researchers who drove study corridors to identify additional truck parking locations. Locations identified through field observation were then mapped using a global positioning system (GPS).

Field researchers also recorded the number of spaces available, different parking layout descriptions, facility ownership (public/private), available services, amenities and entertainment, and parking duration and limits. Field research was conducted between 11:00 P.M. and 3:00 A.M., when the maximum numbers of trucks were present. Some studies included additional estimated truck parking counts and/or mainline traffic data.

Several of the studies included in this literature review identified difficulties in facilitating surveys/interviews with truck stop owners, operators, and users. Field researchers were often instructed to leave surveys with stamped envelopes for truck drivers to complete at their own convenience. These surveys were used to gather information about what influenced the selection process for particular truck stops, the adequacy of those facilities and where truckers would park if no parking spaces were available. The information obtained from returned surveys was then used to determine the time of day when parking facilities are most often overloaded.

Truck Parking Supply

The 2004 Minnesota Department of Transportation legislative report, “Mn/DOT Rest Area Program” provided detailed information for the 62 Mn/DOT maintained rest area facilities. “The Minnesota Interstate Truck Parking Study” examines public and private commercial vehicle parking space inventory and availability along the three primary interstate freight corridors. Study data will be synthesized to give an accurate picture of current truck parking space availability and to predict future truck parking demand. This data will be used to identify system and facility system improvements that will support the Department’s planning efforts.

This section provides an overview of commercial vehicle parking supply for Minnesota along interstate I-94, I-90, and I-35. An estimate of the available parking supply is presented and includes an inventory of total public spaces and commercial truck stop and plaza spaces along these corridors.

The project team used a variety of information sources to obtain the supply of commercial vehicle parking spaces. Aerial photographs, the web-based geographic program Google Earth™, *The Trucker’s Friend* a national truck stop directory, and direct contact with truck stops were used. Aerial photos of the interstate corridors obtained from the Minnesota Department of Transportation were high resolution and very detailed, but cumbersome to use. The photo files were large and slow to load onto computers. The project team used Google Earth™ and Mn/DOT maps, to search along each interstate corridor to find areas that could accommodate commercial vehicle parking. Areas within one mile of interstate exits were examined to look for parking facilities, rest areas, truck stops, vacant lots, or large parking lots at retail centers. When these facilities were found, the photo was saved and filed. These pictures were then sent to the field data collection team members for later use.

The Trucker’s Friend was used to gather essential information about each of the truck stops along the corridors. Hours of operation, types of fuel available, food options, retail stores, communications options offered, repair shop availability, permit services, availability of scales, and financial services offered are contained in the guide. *The Trucker’s Friend* also provides approximate numbers of parking spaces at each location and lists fees for overnight parking. If overnight parking information was not included for a specific location, the facility was contacted to obtain the missing data.

Data compiled on parking facilities was given to the field data collection team for use during facility site visits. Supplemental data was collected by survey teams that scoured the I-94, I-90, and I-35 corridors in an attempt to find truck parking spaces not identified through aerial photos and other sources. A sampling methodology was created to guide the data collection process. Field researchers recorded truck parking supply information including facility layout descriptions and total parking spaces, the number of available spaces, parking duration and limits and facility ownership (public/private). The field research staff then began to gather additional information based on vehicle observations at parking locations. The information gathered includes:

- The USDOT number,
- Truck ID number (if applicable)
- Ownership information on the truck

- The Interstate exit number (e.g. I-94, Exit 49-A)
- Type of parking facility
- The time of day when the truck was observed.

State Patrol enforcement officers were contacted to identify time periods that would best illustrate the dynamics of parking variability at Minnesota facilities. Their suggestions and initial parking observations led to identification of three targeted time periods:

- 1) 4 A.M. - 10 A.M.
- 2) 12 P.M. - 6 P.M.
- 3) 8 P.M - 2:00 A.M.

Inventory of truck parking facilities along Minnesota's Interstate corridors to date shows varied amounts of available truck parking spaces. To maintain consistent samples throughout the study a sampling methodology will be maintained. The sample size each facility was dictated by the total number of occupied spaces at each site, prescribed as follows.

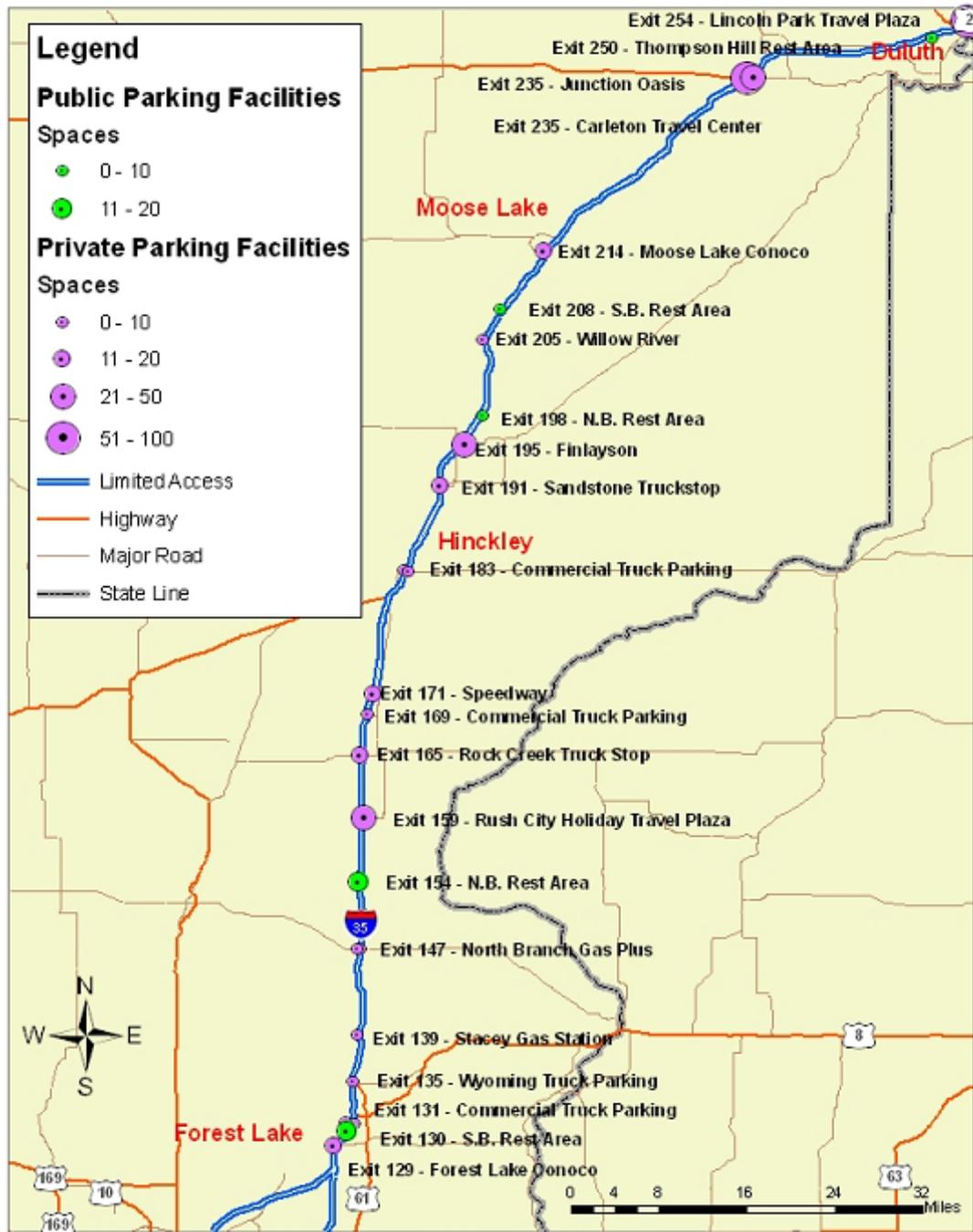
- | | |
|-------------------------------|--------------------|
| • 1- 10 occupied spaces | 100 percent sample |
| • 10 - 20 occupied spaces | 50 percent sample |
| • 20 - 50 occupied spaces | 25 percent sample |
| • 50 - 100 occupied spaces | 20 percent sample |
| • 100 or more occupied spaces | 10 percent sample |

Initial corridor analysis identified several commercial truck parking areas such as Wal-Mart or shopping mall parking lots. These parking lots were often not designed to accommodate large vehicle traffic. However, one vehicle was observed parked in a Wal-Mart location. Therefore, Wal-Mart and shopping mall parking locations similar to it have been included in the map documents created by the project team and are labeled as “Commercial Truck Parking”.

Several changes were made to the initial list of Minnesota truck parking facilities as the research team conducted the supply analysis. Locations were added to or deleted from the list of Minnesota truck parking facilities according to their availability of truck parking space and were verified with on-site field observations. Some locations were initially identified that could not accommodate any trucks. Field researchers found many of these smaller facilities never accommodated any trucks and therefore deleted them from the state parking supply inventory.

Truck Parking Supply Maps

Interstate 35 North Segment



Interstate 35 South Segment

Legend

Public Parking Facilities

Spaces

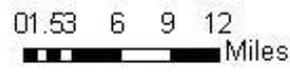
- 0 - 10
- 11 - 20
- 21 - 30

Private Parking Facilities

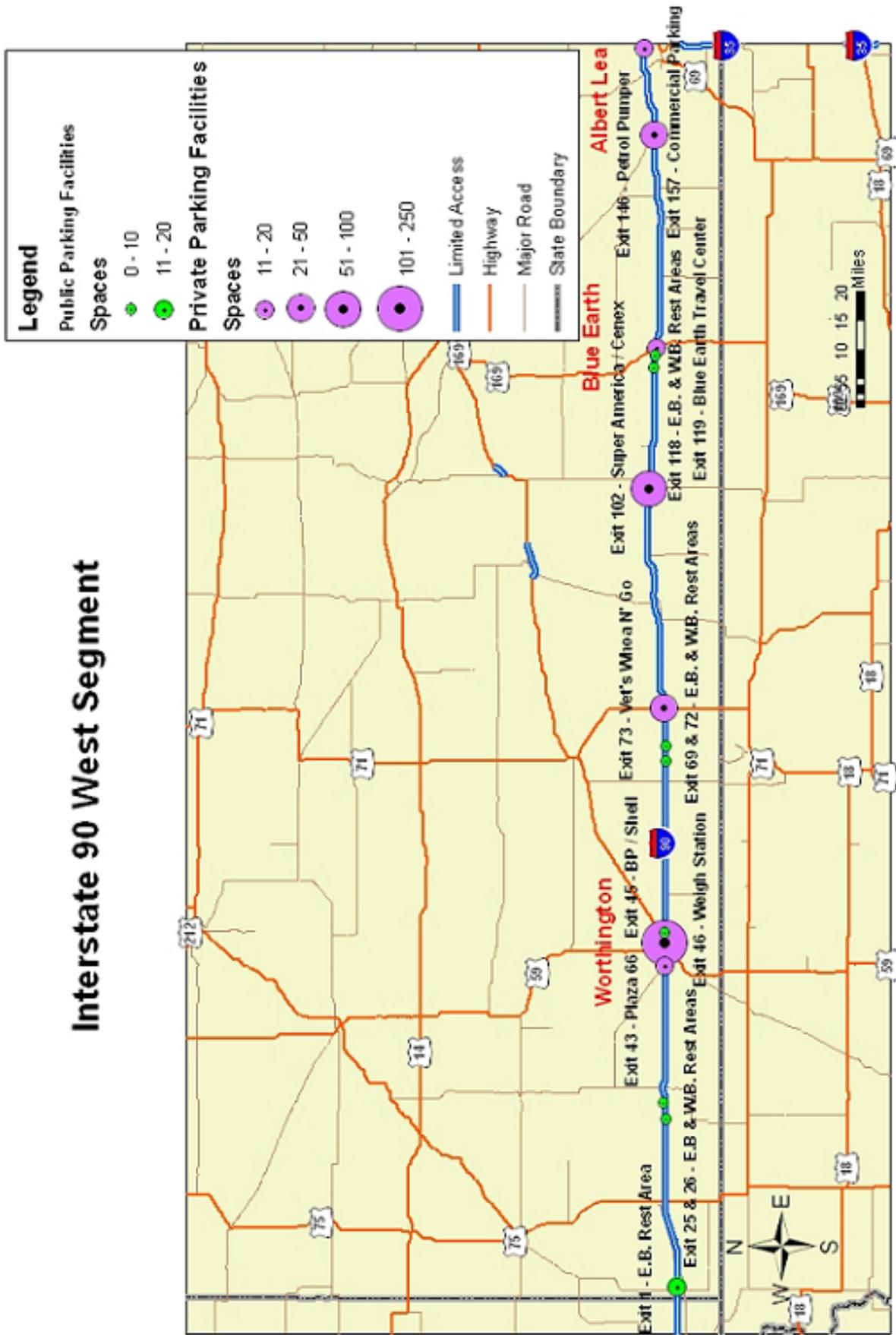
Spaces

- 0 - 10
- 11 - 20
- 21 - 50
- 51 - 100
- 101 - 500

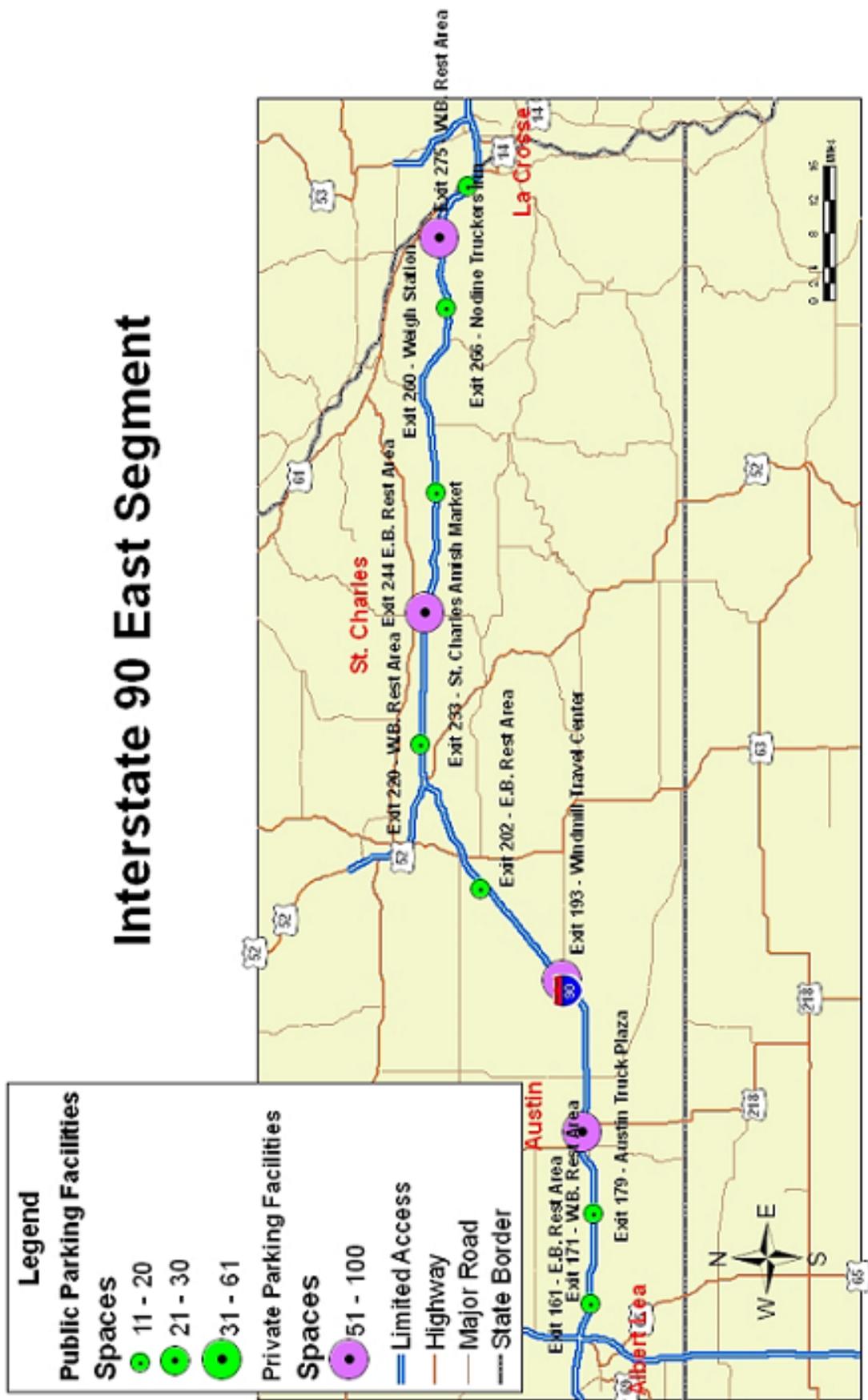
—— Limited Access
—— Highway
—— Major Road
—— State Boundary



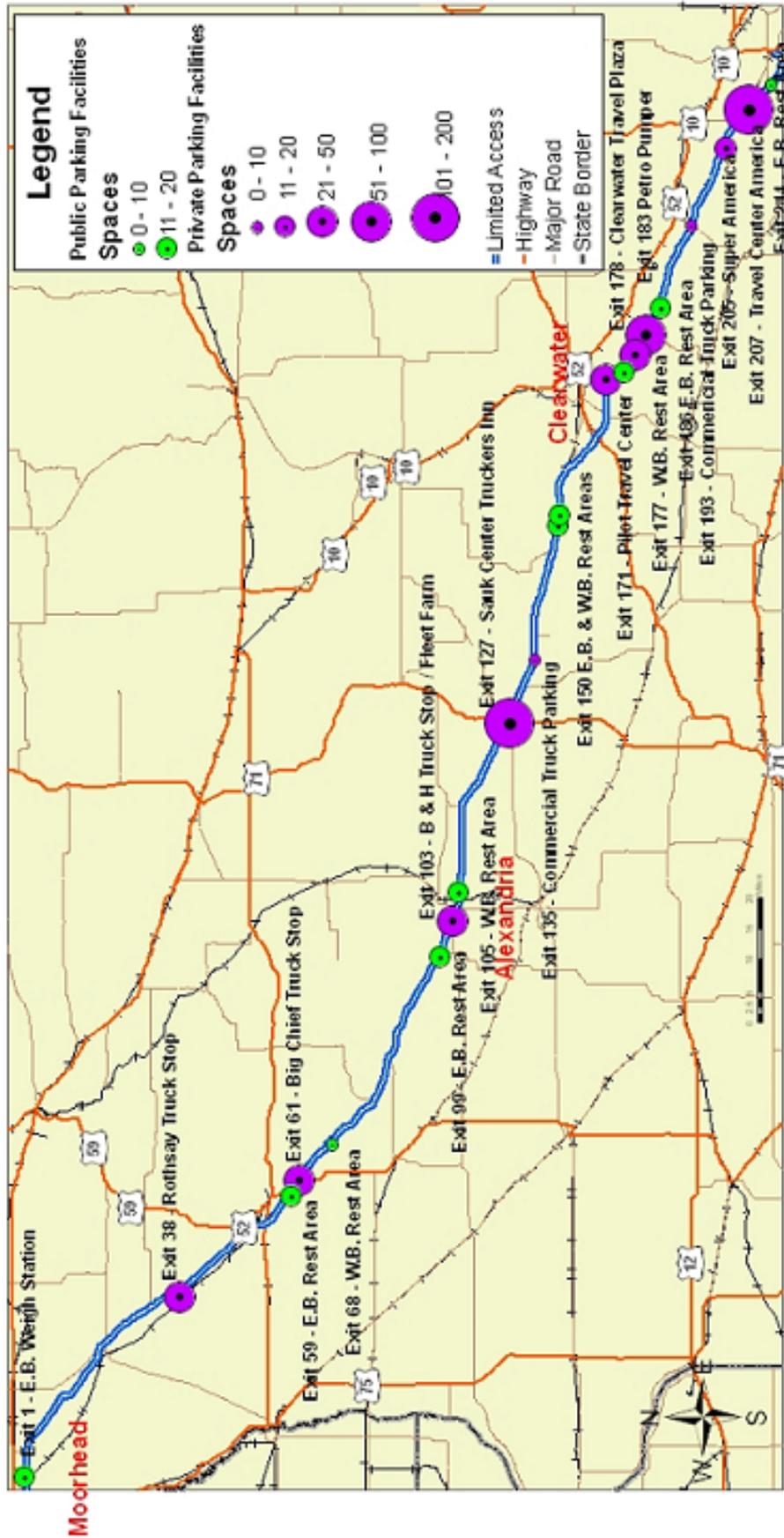
Interstate 90 West Segment



Interstate 90 East Segment



Interstate 94 West Segment

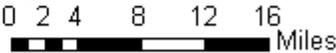


Interstate 94 East Segment

Legend

Public Parking Facilities

- 35 Spaces
- Limited Access
- Highway
- Major Road



Truck Parking Demand

In addition to the motor carrier survey conducted for Task 3, the project team was required to identify the demand for truck parking among the state's parking facilities. During the summer months of July through August field staff collected information about the demand for parking in public and private facilities along the identified Minnesota Interstate routes. During site visits, field researchers recorded information about the number of spaces available, differing layout descriptions, ownership (public/private), services/entertainment available, and parking duration and limits. The field research team gathered detailed vehicle observation information for several trucks parked at parking locations. This information included: The federal DOT number, individual truck number, the owner of the truck, the trucks origin, the exit number and type of facility, and the time of day when the truck was observed.

Field researchers coupled their on-site field observations with the Truck Parking Capacity Usage Database developed for and maintained by the Mn/DOT Rest Area Program. The database uses truck count data collected by rest area custodial staff during late night hours between 11:00 P.M. and 3:00 A.M. to count the number of trucks parked at each facility. This truck count data was instrumental to the project team in determining demand at specific facilities within each interstate corridor. It was essential information because the one-time field visits to each facility did not provide the project team with enough data to extrapolate across different days of the week.

Once this data was summarized, the team worked with the Mn/DOT Rest Area Program Manager to identify a measure that would effectively identify facilities that had reached, or were over capacity during the busiest hours of the day. Therefore, over capacity was defined as those facilities that observed more trucks parked than there were spaces to accommodate them. Finally, the project team identified the degree of the problem at each rest area based on whether the rest area was over capacity 15 (yellow color), 25 (orange color), or 50 (red color) percent of the time. These parking facilities with significant parking demand problems have been mapped and are included beginning on page 29 of this technical memorandum. The Mn/DOT Truck Parking Capacity Usage Summary appears on the following page and is color coded to match the demand maps beginning on page 29.

The project team also analyzed the truck parking demand at private parking facilities. Through field research the team identified several private parking facilities that were often observed with near maximum numbers of parked trucks. Researchers found it difficult, however, to find the necessary data to complement our field observations. The project team found that private facility owners were unwilling to publicize such information that would identify demand shortages at their facilities because it would eventually have a negative impact on their business. If our research and analysis identified a specific facility that was often at maximum capacity, private owners feared that truck drivers would begin to bypass their facility in search of others that may have more available parking spaces. Therefore, maps were created that will allow readers to identify (and evaluate) both public and private facilities according to their regional location and the capacity constraints of its nearby (local) facilities.

Table 4: Mn/DOT Truck Parking Capacity Usage Summary

<i>Site Name</i>	<i>Maint. Area</i>	<i>Trunk Highway</i>	<i>Mile Post</i>	<i>Truck Stalls</i>	<i>Max # Trucks In Site</i>	<i>Avg. Trucks In Site</i>	<i>Total # Days Open</i>	<i># of Days at or Over Capacity</i>	<i>% of Weekdays at or Over Capacity</i>	<i>% Days at or Over Capacity</i>
Kettle River (N.B.)	1A	I35	198	10	61	2.2	1716	19	1.1%	1.1%
General Andrews (S.B.)	1A	I35	208	10	13	2.7	1685	23	1.4%	1.4%
Culkin (N.B.)	1A	I35	226	11	32	1.9	1269	2	0.2%	0.2%
Thompson Hill TIC (S.B.)	1A	I35	250	10	44	1.4	1853	30	1.6%	1.1%
Baptism River	1A	MN61	59	11	0	0.0	0	0	0.0%	0.0%
Anchor Lake TIC	1B	US53	50	8	0	0.0	0	0	0.0%	0.0%
Cass Lake	2A	US2	131	10	11	1.2	2014	7	0.3%	0.3%
Fishers Landing TIC	2B	US2	12	10	0	0.0	0	0	0.0%	0.0%
Oak Lake	2B	US2	59	7	0	0.0	0	0	0.0%	0.0%
Brainerd Lakes Area Welcome Center	3A	MN37	21	0	11	1.5	394	0	0.0%	0.0%
Big Spunk Lake (E.B.)	3B	I94	152	17	169	8.3	1679	238	14.2%	10.8%
Middle Spunk Lake (W.B.)	3B	I94	152	18	136	8.2	1715	175	10.2%	9.6%
Fuller Lake (W.B.)	3B	I94	177	17	230	10.8	1715	902	52.6%	45.8%
Enfield (E.B.)	3B	I94	187	18	112	6.4	1513	26	1.7%	1.5%
Central Minnesota (St Cloud) TIC	3B	US10	181	18	0	0.0	0	0	0.0%	0.0%
Rum River	3B	US169	203	8	0	0.0	0	0	0.0%	0.0%
Moorhead TIC (E.B.)	4A	I94	2	12	60	4.3	1633	43	2.6%	1.6%
Lake Iverson (E.B.)	4A	I94	60	11	66	6.6	2075	1214	58.5%	45.0%
Hansel Lake	4A	I94	69	10	36	4.8	2181	1105	50.7%	38.9%
Frazee	4A	US10	55	6	29	1.5	1025	44	4.3%	4.0%
Lake Latoka (E.B.)	4B	I94	100	18	219	11.6	2241	1361	60.7%	45.7%
Burgen Lake (W.B.)	4B	I94	105	12	413	8.2	2331	1663	71.3%	59.5%
Highforest (E.B.)	6A	I90	202	10	26	5.1	1702	787	46.2%	39.7%
Marion (W.B.)	6A	I90	222	20	330	17.1	1999	1579	79.0%	64.9%
Enterprise (E.B.)	6A	I90	244	17	132	6.6	2224	171	7.7%	7.4%
Dresbach TIC (W.B.)	6A	I90	275	13	12	2.0	2233	0	0.0%	0.0%
Albert Lea TIC (NB)	6B	I35	1	29	213	9.5	1933	1370	70.9%	58.0%
Straight River (S.B.)	6B	I35	35	12	146	6.3	2261	763	33.7%	32.2%
Straight River (N.B.)	6B	I35	35	13	111	5.8	2238	933	41.7%	33.1%
Heath Creek (N.B.)	6B	I35	68	20	265	9.6	2047	823	40.2%	30.6%
New Market (S.B.)	6B	I35	75	15	131	9.1	2137	976	45.7%	41.1%
Hayward (E.B.)	6B	I90	162	10	110	4.1	1831	356	19.4%	17.5%
Oakland Woods (W.B.)	6B	I90	171	10	40	5.0	1920	771	40.2%	34.6%
Lake Pepin	6B	US61	78	6	0	0.0	0	0	0.0%	0.0%
Blue Earth (W.B.)	7A	I90	119	10	31	4.5	1955	316	16.2%	15.3%
Blue Earth (E.B.)	7A	I90	119	11	36	4.3	1989	226	11.4%	9.9%
Minnesota Valley	7A	US169	80	16	17	4.4	1045	6	0.6%	0.5%
Beaver Creek TIC (E.B.)	7B	I90	0	16	17	3.2	1677	11	0.7%	0.4%
Adrian (E.B.)	7B	I90	24	6	52	2.6	1978	516	26.1%	20.0%
Adrian (W.B.)	7B	I90	25	6	62	2.8	1955	675	34.5%	29.2%
Clear Lake (E.B.)	7B	I90	69	7	57	4.4	1987	1249	62.9%	47.4%
Des Moines River (W.B.)	7B	I90	72	9	140	2.7	1922	158	8.2%	7.6%
Worthington T.I.C.	7B	MN60	5	8	65	2.8	1297	186	14.3%	13.3%
Watonwan River	7B	MN60	74	10	0	0.0	0	0	0.0%	0.0%

Forest Lake (S.B.)	ME	I35	131	15	111	4.3	1053	23	2.2%	2.2%
Goose Creek (N.B.)	ME	I35	154	12	16	4.2	1519	64	4.2%	3.4%
St. Croix T.I.C. (W.B.)	ME	I94	256	35	536	24.7	2220	1363	61.4%	50.8%
Stillwater - Boomsite	ME	MN95	101	7	0	0.0	0	0	0.0%	0.0%
Elm Creek (E.B.)	MW	I94	215	10	136	8.6	2177	1801	82.7%	65.2%
Daytonport	MW	US10	218	4	0	0.0	0	0	0.0%	0.0%

Truck Parking Demand Maps

The following pages show maps that identify public parking facilities investigated through our field research and data analysis process. There were no facilities identified with significant capacity issues on Interstate 35 W North of Minneapolis, therefore, it has not been included in the maps section of this technical memorandum. Overall, 20 facilities were identified to have significant capacity issues during the busiest time of day and are identified according to several categories. Facilities that were over capacity 15 percent of the time during weeknight hours are mapped using yellow dots. Facilities that were over capacity 25 percent of the time are mapped using orange dots. Facilities that were over capacity 50 percent of the time are identified in red. The map dots were scaled according to the number of spaces at each parking location. Specific attention should therefore be given to facilities that are over capacity more than 50 percent of the time (red dots) and are marked using a small dot (showing little parking capacity). These facilities would best benefit from additional investment or capacity additions.

Interstate 35 South Segment

Legend

- Over Capacity 25% of Weeknights
- Over Capacity 50% of Weeknights

Public Parking Facilities

Spaces

- 0 - 10
- 11 - 20
- 21 - 30

Private Parking Facilities

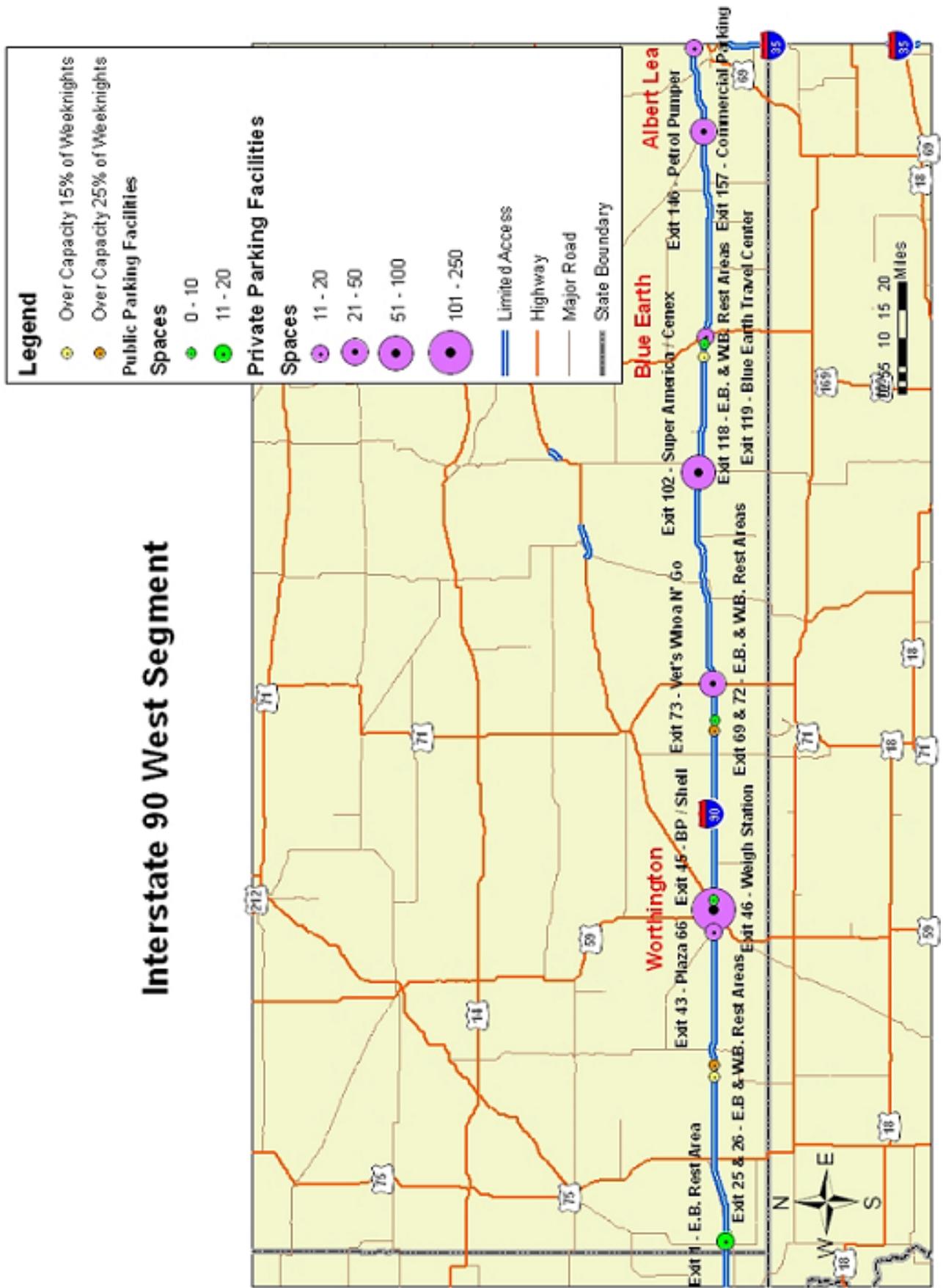
Spaces

- 0 - 10
- 11 - 20
- 21 - 50
- 51 - 100
- 101 - 500

- Limited Access
- Highway
- Major Road
- State Boundary



Interstate 90 West Segment



Interstate 90 East Segment

Legend

- Over Capacity 15% of Weeknights
- Over Capacity 25% of Weeknights
- Over Capacity 50% of Weeknights

Public Parking Facilities

Spaces

- 11 - 20
- 21 - 30
- 31 - 61

Private Parking Facilities

Spaces

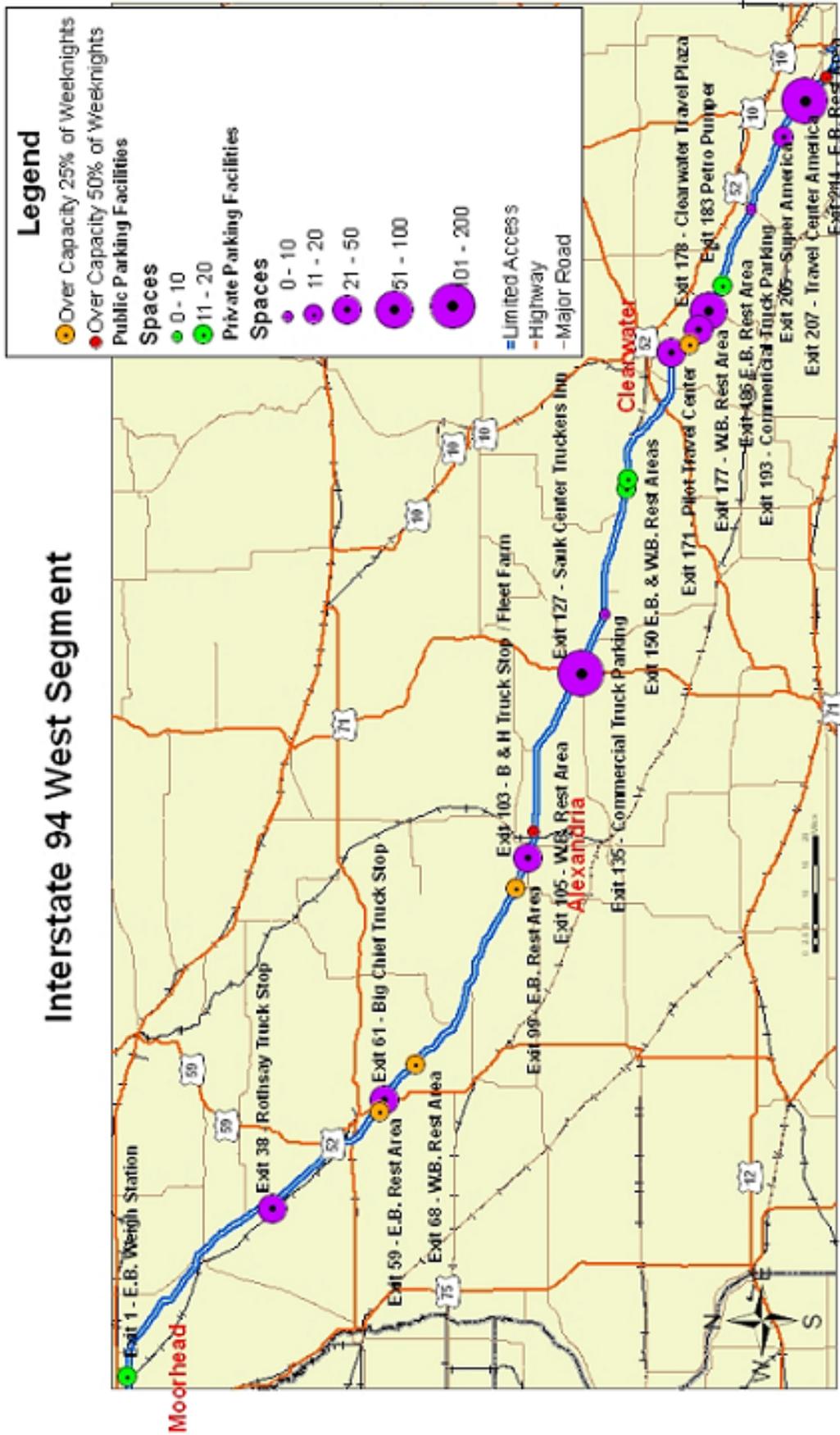
- 51 - 100

Limited Access

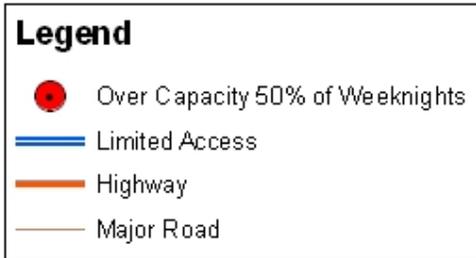
- Highway
- Major Road
- State Border



Interstate 94 West Segment



Interstate 94 East Segment



Demand Analysis and Recommendations

There are five rest area facilities on Minnesota’s interstates that are at or over capacity at least 50 percent of the time. They are identified in the table below. Three of them are located on Interstate 94. The first is located at exit 105 near Alexandria. The second is located at exit 215, which is the closest East bound rest area to the Twin Cities Metropolitan area. The third is located at exit 256, which is also a rest area on the urban fringe, near the Wisconsin border. The fourth rest area facility is located at exit 222 on Interstate 90, near Marion. Additionally, there is one rest area located at exit 1 on Interstate 35, very near the Iowa border. These rest areas should be the direct focus of any future capacity additions or other investment opportunities.

Table 5: Rest Areas at or Over Capacity at Least 50 Percent of the Time

Site Name	Trunk Highway	Mile Post	Truck Stalls	Max # Trucks In Site	Avg. Trucks In Site	Total # Days Open	# of Days at or Over Capacity	% of Weekdays at or Over Capacity	% Days at or Over Capacity
Burgen Lake (W.B.)	I94	105	12	413	8.2	2331	1663	71.3%	59.5%
Marion (W.B.)	I90	222	20	330	17.1	1999	1579	79.0%	64.9%
Albert Lea TIC (NB)	I35	1	29	213	9.5	1933	1370	70.9%	58.0%
St. Croix T.I.C. (W.B.)	I94	256	35	536	24.7	2220	1363	61.4%	50.8%
Elm Creek (E.B.)	I94	215	10	136	8.6	2177	1801	82.7%	65.2%

Additionally, there are several rest area facilities that are at or over capacity at least 25 percent of the time. They are identified in the table below. Four of these facilities are located on Interstate 94, four are located on Interstate 35, and four are located on Interstate 90. A few of these rest areas are very nearly at or over their capacity 50 percent of the time, and should require investment consideration similar to the locations listed above.

Table 6: Rest Areas at or Over Capacity at Least 25 Percent of the Time

<i>Site Name</i>	<i>Trunk Highway</i>	<i>Mile Post</i>	<i>Truck Stalls</i>	<i>Max # Trucks In Site</i>	<i>Avg. Trucks In Site</i>	<i>Total # Days Open</i>	<i># of Days at or Over Capacity</i>	<i>% of Weekdays at or Over Capacity</i>	<i>% Days at or Over Capacity</i>
Fuller Lake (W.B.)	I94	177	17	230	10.8	1715	902	52.6%	45.8%
Lake Iverson (E.B.)	I94	60	11	66	6.6	2075	1214	58.5%	45.0%
Hansel Lake	I94	69	10	36	4.8	2181	1105	50.7%	38.9%
Lake Latoka (E.B.)	I94	100	18	219	11.6	2241	1361	60.7%	45.7%
Straight River (S.B.)	I35	35	12	146	6.3	2261	763	33.7%	32.2%
Straight River (N.B.)	I35	35	13	111	5.8	2238	933	41.7%	33.1%
Heath Creek (N.B.)	I35	68	20	265	9.6	2047	823	40.2%	30.6%
New Market (S.B.)	I35	75	15	131	9.1	2137	976	45.7%	41.1%
Oakland Woods (W.B.)	I90	171	10	40	5.0	1920	771	40.2%	34.6%
Adrian (W.B.)	I90	25	6	62	2.8	1955	675	34.5%	29.2%
Clear Lake (E.B.)	I90	69	7	57	4.4	1987	1249	62.9%	47.4%
Highforest (E.B.)	I90	202	10	26	5.1	1702	787	46.2%	39.7%

There are also a number of rest area facilities that are at or over their parking capacity at least 15 percent of the time. They are identified in the table below. All of these rest areas are located on Interstate 90.

Table 7: Rest Areas at or Over Capacity at Least 15 Percent of the Time

<i>Site Name</i>	<i>Trunk Highway</i>	<i>Mile Post</i>	<i>Truck Stalls</i>	<i>Max # Trucks In Site</i>	<i>Avg. Trucks In Site</i>	<i>Total # Days Open</i>	<i># of Days at or Over Capacity</i>	<i>% of Weekdays at or Over Capacity</i>	<i>% Days at or Over Capacity</i>
Hayward (E.B.)	I90	162	10	110	4.1	1831	356	19.4%	17.5%
Blue Earth (W.B.)	I90	119	10	31	4.5	1955	316	16.2%	15.3%
Adrian (E.B.)	I90	24	6	52	2.6	1978	516	26.1%	20.0%

Survey

During the months of July, August and September 2007, 178 motor carriers were interviewed to obtain their opinions and observations regarding truck parking availability along the three interstate corridors in Minnesota. The interview consisted of nine survey questions sent to 433 of motor carriers throughout the Midwest and Canada. Carriers were identified at truck stops and rest areas along the corridors. Of the 433 carriers identified, 178 responded to the survey by telephone, fax, US mail or email. A copy of the survey is provided in Appendix A.

The survey feedback consisted of nine general responses that were more specific to each individual company and their opinions. The survey included statements requesting each respondent to provide parking policy information of their company and whether they provided this information to their drivers. The survey asked the respondents to specify what type of operation they were involved with (e.g. Truck Load, Less-than-Truck Load). Respondents were also asked to select the types of freight they hauled and what type and number of trucks they operated.

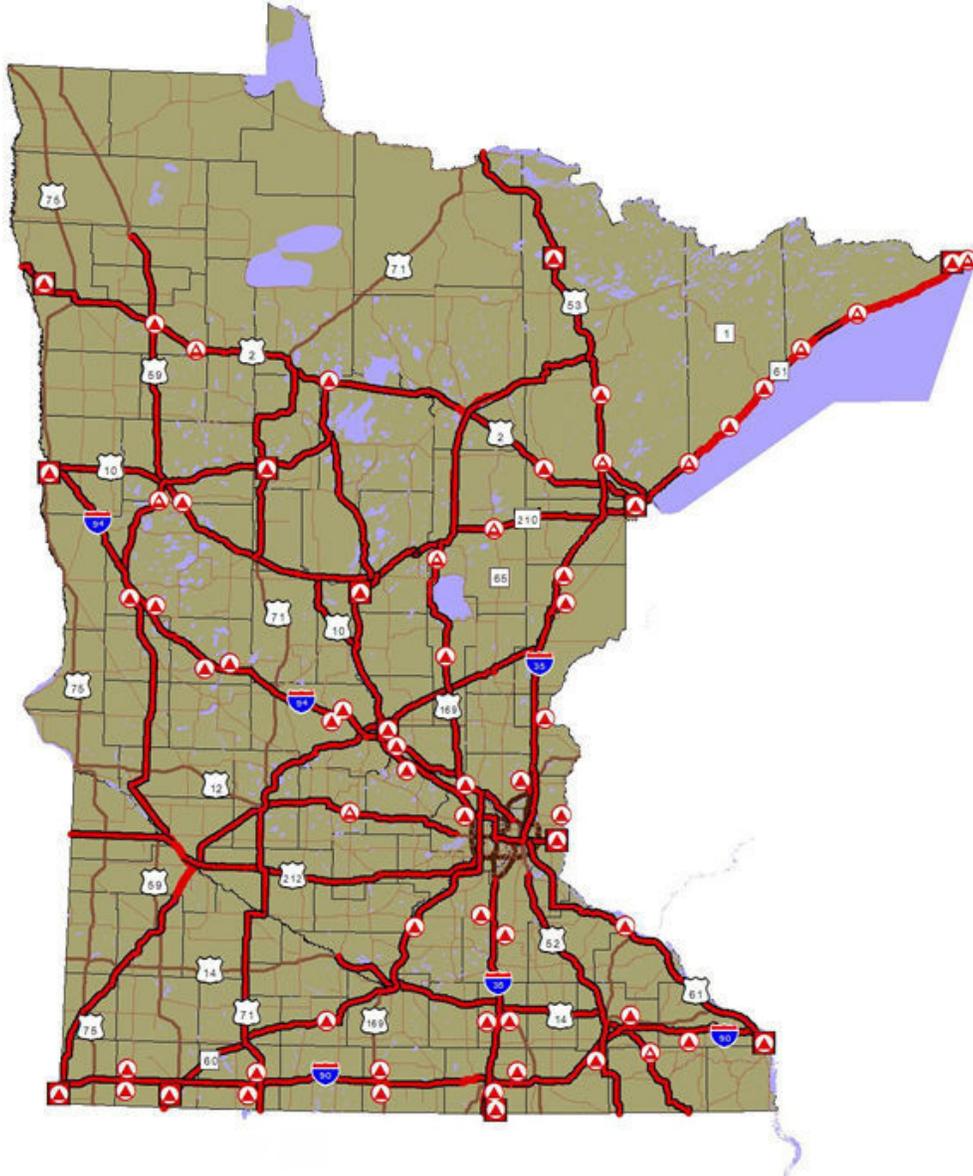
Prior to the conducting the interviews, site visits were conducted in each respective corridor to determine the extent of facility utilization by the truckers. The parking surveyors then counted parked trucks along each of the three corridors at various times of the day. To sufficiently understand overnight truck patterns, data were collected over a three month period between July and September 2007.

The surveyors then selected a sample of parked trucks and obtained identification information from the vehicle, e.g. name of the trucking company, USDOT number, tractor number, company telephone number, etc.). The identifying information was recorded along with the location and the time.

Following the field data collection, the motor carrier dispatchers were interviewed about their fleet's activities. In general, the purpose of the interviews was to determine reason for parking selection. For example, in making a parking selection, what were the determining factors; positioning for targeted delivery window, instruction on where to park by dispatcher or general availability of parking location? Moreover, during the interview, we tried to get a sense of truck parking availability and its effect on their business.

Figure 1 below shows a map of Minnesota with its rest areas locations. This map is available on Minnesota Department of Transportation website.
<http://www.dot.state.mn.us/restareas/locations/sitewidemap.html>

Figure 1: Map of Minnesota

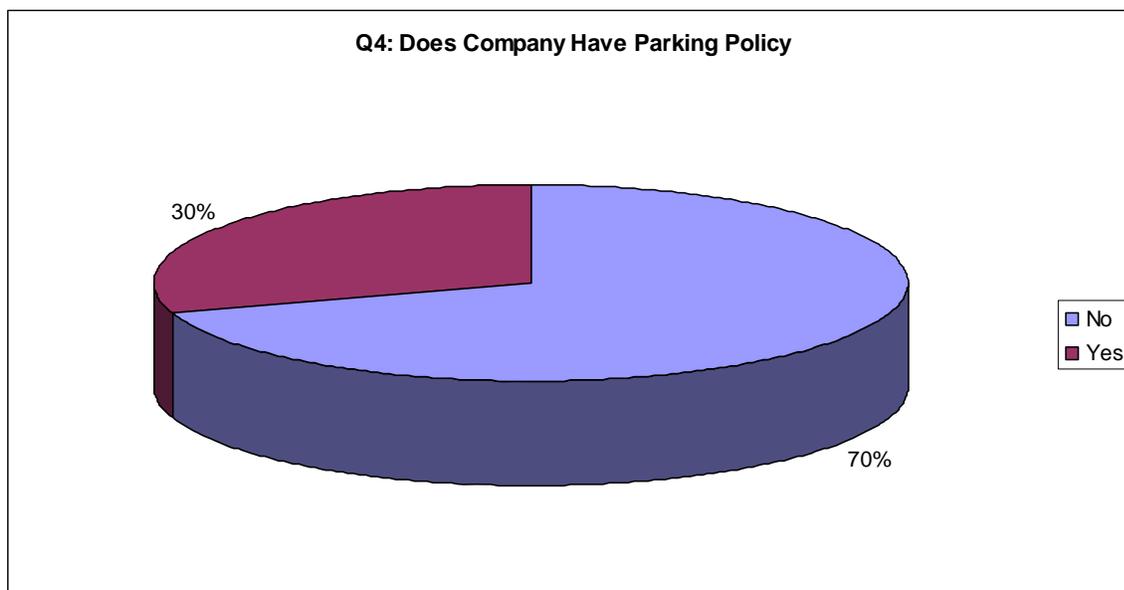


The survey was designed to gather information in three primary areas: The first section contained questions to carrier information, i.e., number of drivers, origin and destination information, and type of freight transported; the second section solicited opinions about specific company policies regarding “parking practices” that the company may have; and the third section asked for their opinions regarding the amount of truck parking available in the area and allowed respondents to provide any additional comments about operating along the interstate corridors in Minnesota. The survey document is included in the appendix of this document.

A total of 433 motor carriers were contacted for the survey. Of the 433 carriers, 178 answered our questions, either through telephone interviews, returned faxes or email responses. The following are the results of the survey.

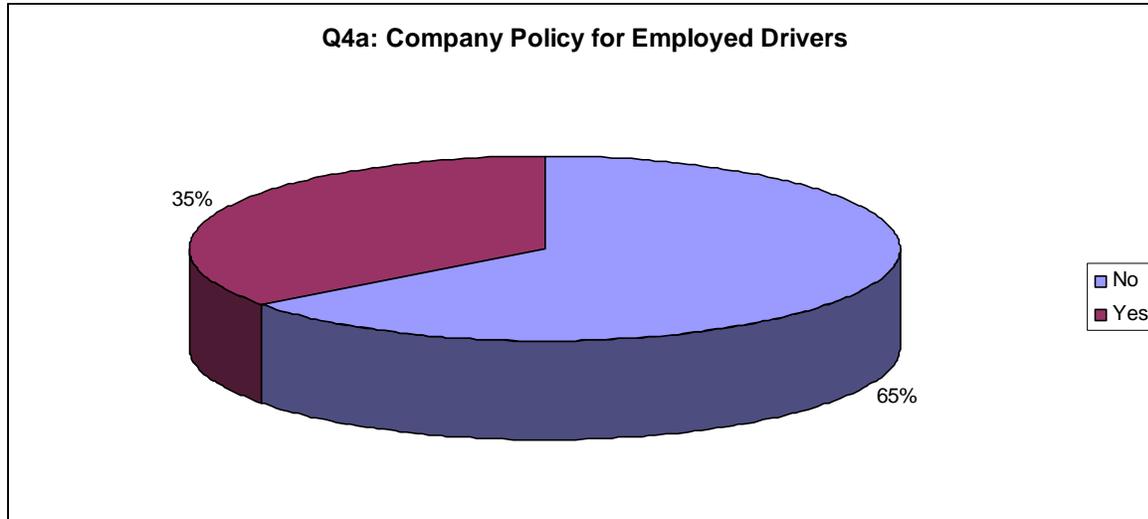
The carriers were asked if the company had a parking policy or practice for the drivers to follow. **Figure 2** shows that over two-thirds of the carriers (70%) stated that there was no company policy regarding where to park. The remaining carriers identified a policy to park in a safe, well lit, and legal area. Most recommended using rest areas or commercial truck stops. One company instructed drivers to use Wal-Mart parking lots, when possible. One company advised its drivers to use truck stops only for food and fuel and avoid truck stops for overnight rest (this policy was established to avoid accidents and vandalism that they incurred in commercial truck stops). Many of those interviewed stated preferred use of truck stops and rest areas so that drivers had facilities, such as showers, telephones, and rest rooms, to aid in the driver's comfort while on the road. A majority of respondents explained the driver's responsibility to find their own facilities for rest breaks.

Figure 2: Parking Policies and Practices



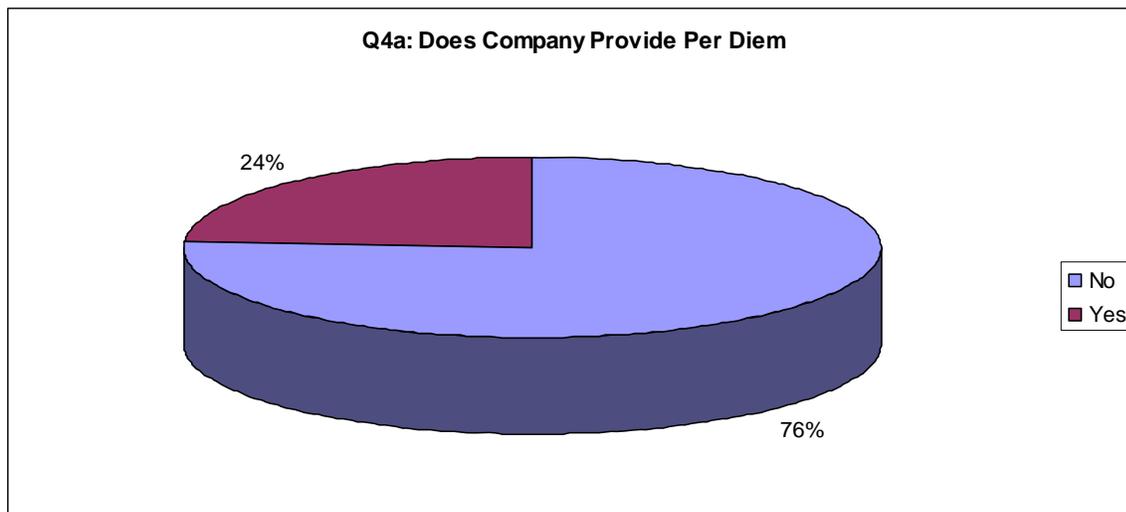
In the case of company parking policies, there was little difference between company (employed) drivers or owner-operators leased to the company. **Figure 3** describes the 68 companies that utilized only employed drivers. Of these companies, 65% did not have a parking policy for their drivers. Of the remaining companies, most had parking policies similar to the other fleets. Policies in use by the companies included, using truck stops and rest areas, and safe, well-lit areas.

Figure 3: Company Policies for Employed Drivers



The carriers were then asked if the drivers were provided with a per diem allowance for lodging expenses. Approximately, three fourths (76%) of the respondents did not provide for lodging expenses. Most of the remaining respondents, who replied no, stated trucks were equipped with sleeper berths that provided the lodging. The remaining twenty-four percent of the firms provide a per diem, ranged from \$0.05 per mile to a flat rate of \$150 per week.

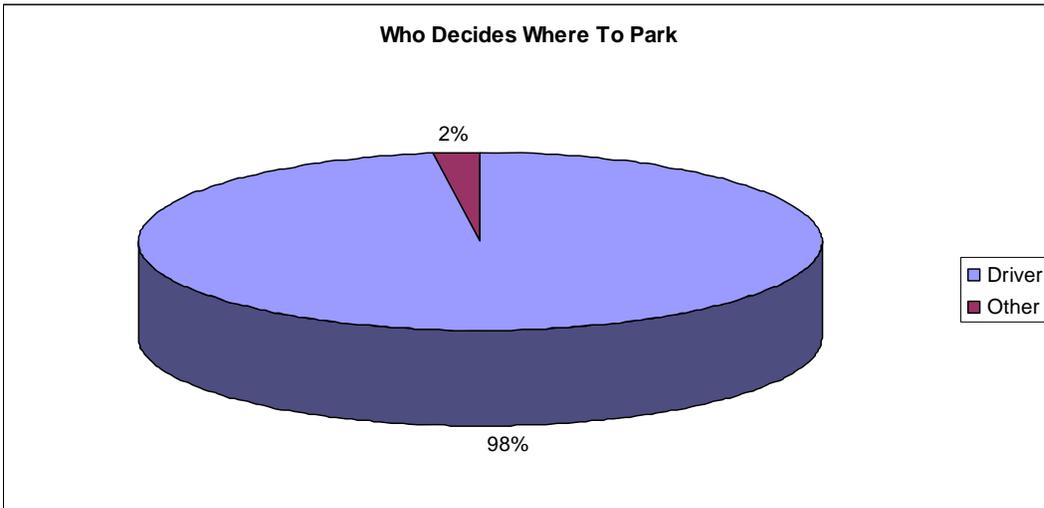
Figure 4: Does the Company provide per diem or lodging to drivers?



The carriers were then asked if the driver decided where to park or if they were given instructions for parking locations. As seen in **Figure 5**, 98% of the carriers stated it was the driver's discretion where to park. While some companies may have fuel purchase agreements with truck stops or travel plazas, the carriers leave the decision of where to park for rest purposes

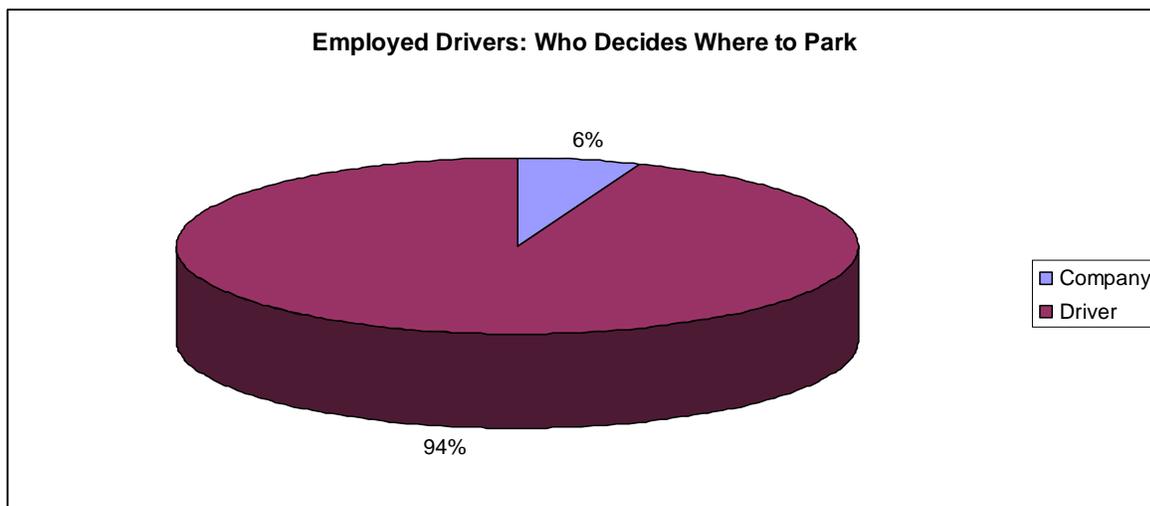
up to the driver. Even with tightly scheduled pick-ups and deliveries, the carriers give the drivers some flexibility with their schedule. The drivers are in control of the vehicle and freight and, thus, decide where and when to rest. However, our survey did find one instance of a driver with a load of placarded hazardous materials required to stop at a pre-destined location. All other stops were at the driver's discretion.

Figure 5: Who decides where to park?



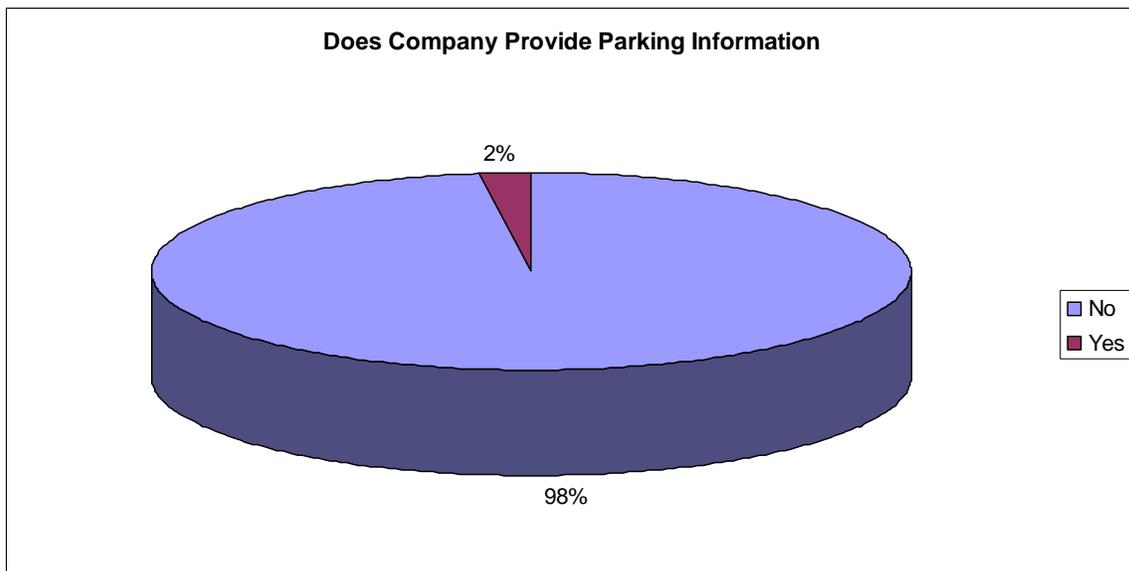
The ratio is much the same for employed drivers as well. Most companies leave the decision to the driver to determine the best place to park. As shown in **Figure 6**, the survey found that companies using employee drivers overwhelmingly leave it to those drivers to decide where to park for rest and recovery.

Figure 6: Employed Drivers



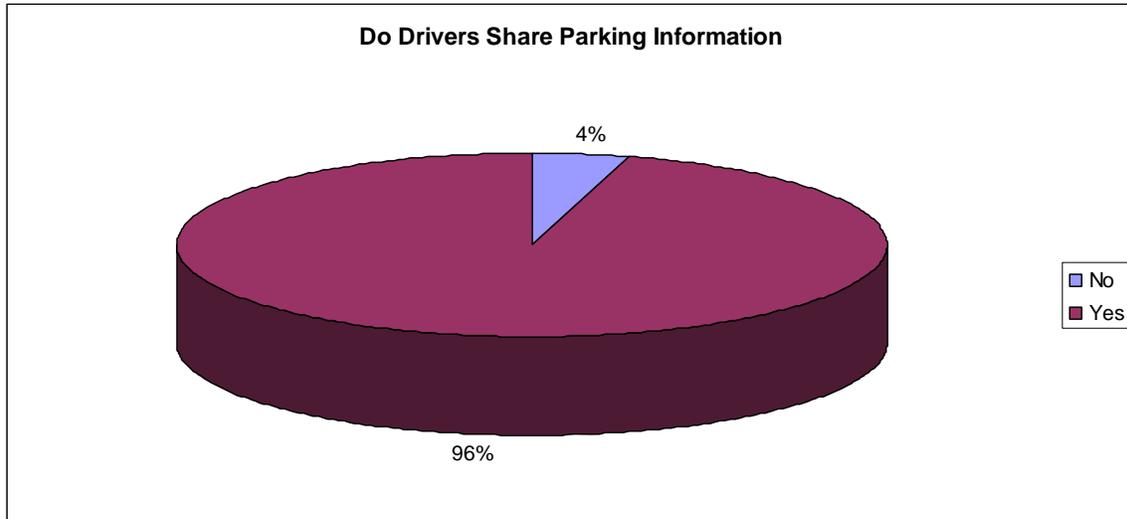
Regarding parking availability information; the carriers were asked if they provided this type of parking information to their drivers, such as in the form of a truck stop directory, atlas, or other means. As described in **Figure 7**, 98% of the respondents stated they did not provide any parking location information. Many stated the drivers were responsible for finding safe parking locations. Most of the responding carriers discouraged the practice of parking on entrance ramps, but stated drivers' choices are limited when they are fatigued or running out of available driving hours. Possible parking locations could be provided to the drivers; however, if those locations are full, that information would not be helpful. One dispatcher relayed, occasionally, some of his more experienced drivers will call the shipper or receiver to see if it is permissible to park at that location overnight. These drivers will try to reach their destination the evening before and take their break as close to their delivery destination as possible. This practice avoids being stuck in rush hour, or burning available hours trying to get to the location in the morning. Many times it is permissible to park at the shipper's dock. However, some shippers or receivers do not allow this practice.

Figure 7: Does company provide parking information?



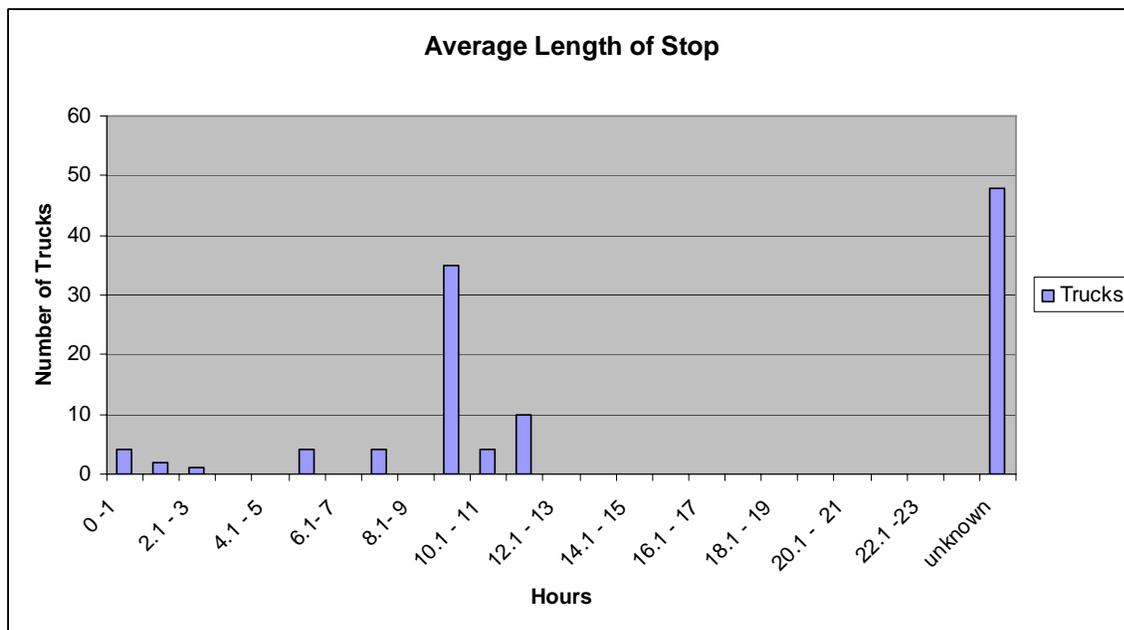
Carriers were also asked if their drivers share parking location information among one another. As described in **Figure 8** on the next page, most respondents said their drivers share such information. One respondent replied “drivers talk all the time”, so they share the information to help one another.

Figure 8: Parking information



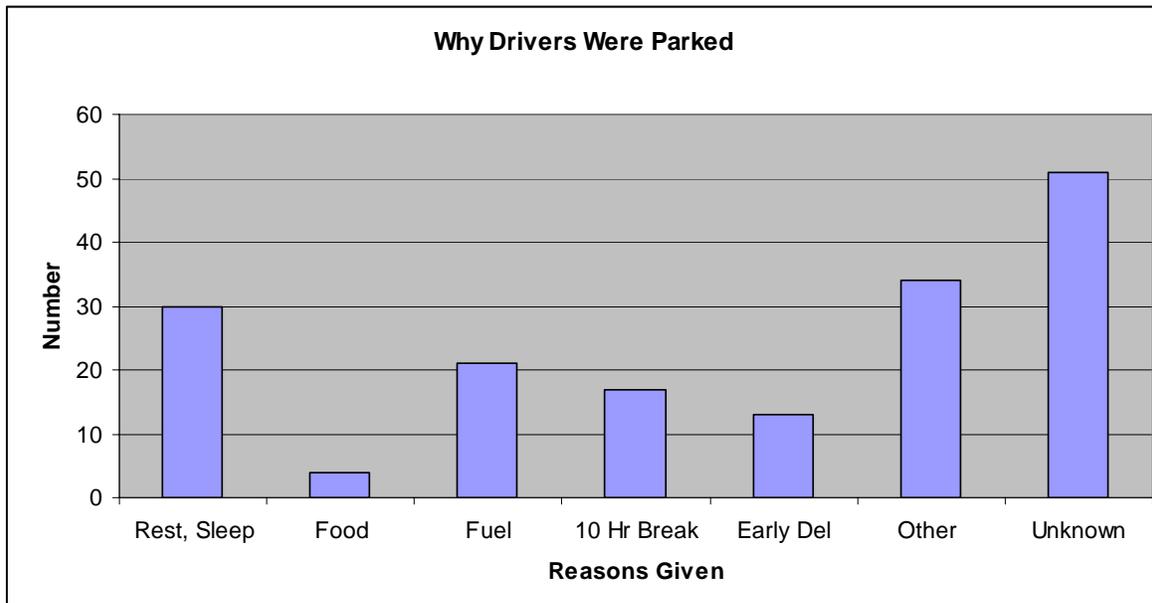
The respondents were also asked the duration of their stop for parking. If we were able to speak with the dispatchers or responsible parties within a few days of the observations we were able to determine the duration and reason of the stop. Generally, the observations were made at commercial truck stops and Mn/DOT rest areas. The duration of stops at these locations were generally reported around 10 hours. The drivers reported being there in order to meet the 10 hour rest requirements, as required by the hours of service regulations. **Figure 9** shows the duration of the stops reported. (Several times were reported as unknown, either the survey entry was returned blank, or the dispatcher simply did not know the duration of the stop at the time of the interview.)

Figure 9: Average length of stop



Question 9 asked the carriers the reason the driver stopped at the location where the driver was observed. In many instances, the carriers were unsure of the reason the drivers were stopped at a given time. About 10% of those surveyed stated the driver was waiting for a load, or positioning for an early deliver. Other reasons for stopping at a given location were mainly fuel, rest, and food. Generally, if the observations were made in the evening hours, the respondents stated that the driver was getting rest to meet the 10 hour break for the hours of service requirements. At other times, respondents indicated that the driver was taking a shorter rest break.

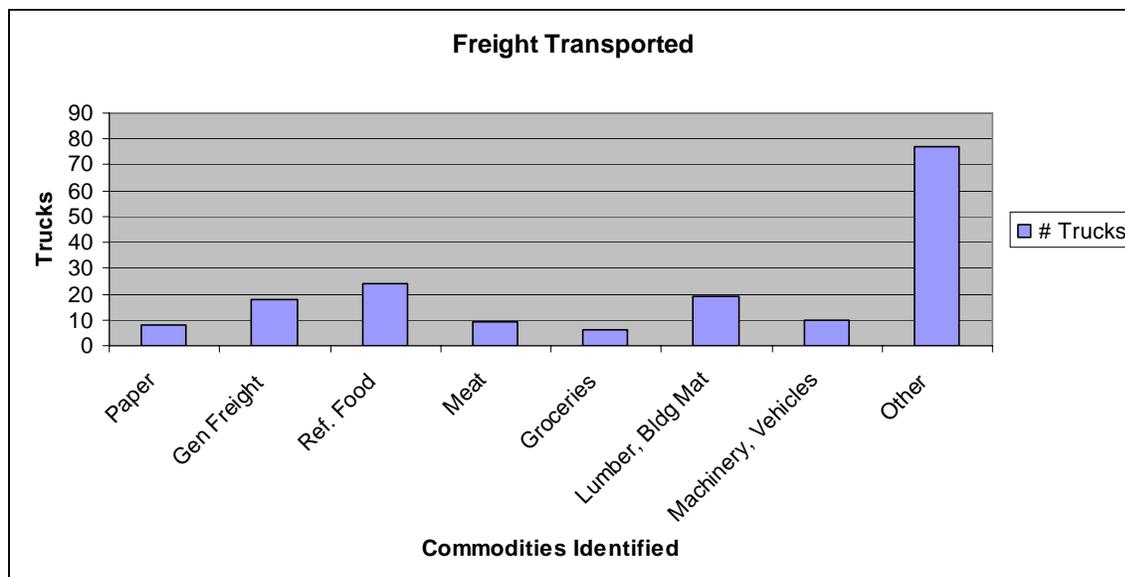
Figure 10: Reasons Drivers were parked



The last section of the survey was much more firm specific. The details of the firm would help to better analyze the results and verify the information was accurate.

The respondent carriers were asked the type of freight being transported during the time that the truck was recorded. **Figure 11** describes a sample of the type of freight transported the three interstate corridors. These data come from the carriers that were interviewed in the telephone surveys and those that returned surveys. Much of the freight transported by the carriers interviewed was categorized as “General Freight” or “Freight of All Kinds” (FAK).

Figure 11: Freight Transported on 3 Interstate Corridors



Other types of freight were machinery or heavy equipment, lumber and building materials and refrigerated products that included, cheese, pizza, ice cream, produce, and others. The “Others” category describes loads that were of miscellaneous freight, such as pipe, wire, electronics, etc. The freight categories listed used the freight classifications designated by the US Department of Transportation, based on the old ICC freight regulations. The graph shows the freight most identified by the respondents.

The carriers were asked to provide us with the origin and destination of the trip on the day it was recorded. With few exceptions, most of the routes reported by the respondents were within the upper Midwestern states. The table below lists the origin, destination, and commodities transported of the respondents. Approximately half of the carriers asked declined to provide this information.

Table 8: Origin and Destination of Freight

Origin	Destination	Commodity
Albert Lea MN	Ventura CA	Cooking Oil
Alexandria MN	Toledo OH	Meat
Ashland WI	S. St. Paul MN	Cement
Austin MN	Tucker GA	Refrigerated Food
Austin MN	Darien WI	Refrigerated Food
Bancroft IA	Saskatoon SK	Construction Materials
Becker MN	Appleton WI	Paper
Belle Fourche SD	Perryville MO	Bentonite
Bemidji MN	Owatonna MN	Lumber
Bettendorf IA	Plymouth MN	Steel
Bloomington MN	Cloquet MN	Building Materials
Boscobel WI	Sioux City IA	Refrigerated Food

Brokaw WI	Lakeville MN	General Freight
Bronx NY	New Hope MN	Refrigerated Food
Brooklyn Park MN	Totowa NJ	Bobcat Skid Loaders
Carmi IL	Sandstone MN	Groceries
Chicago IL	Rogers MN	Plastics
Chicago IL	Owatonna MN	Steel
Chicago IL	Minneapolis MN	Metal
Cloquet MN	Bloomington MN	Building Materials
Cold Spring MN	Omaha NE	Meat
Cook MN	Elkhart IN	Boards
Cottage Grove MN	Cheyenne WY	General Freight
Creston IL	Sandstone MN	Rock salt
Devils Lake ND	Bram MN	Fiberglass Tubes
Duluth MN	Oskaloosa IA	Building Materials
East Moline IL	Luverne MN	Tractors
Fairmont MN	Lenexa KS	General Freight
Fargo ND	Minneapolis MN	Empty
Fargo ND	Minneapolis MN	Lumber
Fargo ND	Clear water MN	Bobcats
Fond du Lac WI	N. Sioux City SD	Refrigerated Food
Fort Dodge IA	Worthington MN	Gypsum Wallboard
Garden City KS	Worthington MN	General Freight
Golden CO	LaCrosse WI	Cans
Grand Forks ND	Ft. Wayne IN	Empty
Grand Forks ND	Minneapolis-St. Paul MN	Metal
Greenville WI	Minneapolis-St. Paul MN	Groceries
Hampton IA	Effie MN	Pipe
Harrisburg SD	Marquette MI	Building Materials
Hopkins MN	Albert Lea MN	Groceries
Indianapolis MN	Hopkins MN	General Freight
Jasper OR	Merrill WI	Lumber
Kansas City MO	Duluth MN	Liquid
Kansas City MO	St Paul MN	Refrigerated Food
Kiel WI	Burnsville MN	Comm. Dry Bulk
Lake Norden SD	Elk Grove Village IL	Cheese
Leroy IA	St Paul MN	Refrigerated Food
London ON	Chatfield MN	General Freight
Madison WI	Chandler MN	Feed
Madison WI	LeCenter MN	Refrigerated Food
Manteno IL	Northfield MN	Candy
Manteno IL	Northfield MN	Refrigerated Food
Mendota IL	Huron SD	Animal Feed
Milford IA	Janesville WI	Refrigerated Food
Minneapolis MN	Cloquet MN	Paper
Minneapolis MN	Indianapolis IN	Meat
Monee IL	Fargo ND	Tires

Moorhead MN	Minneapolis MN	Agricultural Products
Morris IL	Morris MB	Paper
Mounds View MN	Los Angeles CA	General Freight
Mount Vernon IL	Lakeville MN	Building Materials
Mullica Hills NJ	Rogers MN	Frozen Seafood
Niwoalk MB	Addison IL	Paper
Oklahoma City OK	Minneapolis MN	Copper Sulfate
Owatonna MN	Harrisburg PA	Refrigerated Food
Rice MN	Dallas TX	Refrigerated Food
Romeoville IL	Chamberlain SD	ATVs
Roswell NM	Rice MN	Cheese
Shakopee MN	Hannibal MO	Cooking Oil
Shreveport LA	Brooklyn Park MN	Paper
Sioux Falls SD	Montgomery IL	Meat
Sioux Falls SD	Fridley MN	General Freight
Sioux Falls SD	Hibbing MN	Tractors
Spokane WA	Lake City MN	General Freight
St Joseph MO	Eagan MN	General Freight
St Paul MN	Siren WI	Plastic Toys
Stewartville MN	Laredo TX	Autos
unknown	unknown	Produce
unknown	unknown	Dry Bulk
unknown	Faribault MN	General Freight
unknown	Superior WI	Building Materials
Wanatchee WA	Clear Lake WI	Apples
Waterloo IA	Concord ON	General Freight
White Bear Lake MN	Baltimore MD	Boats
Worthington MN	Salem OH	Meat
Worthington MN	St Paul MN	Beverage

Survey Summary

The fleet size of the firms surveyed ranged from 1 driver to 22,000 drivers. The mean number of drivers of the firms surveyed was 471. Many of the firms utilized both company drivers and owner-operators. Of the 180 firms that responded, 92 utilized both company drivers and owner-operators, 20 fleets were wholly owner-operator fleets. The remaining 68 firms employed company drivers.

With regard to the parking policies of the firms, there is little discernible difference between the parking policies issued to company drivers or owner-operators. The survey found few formal policies issued to the drivers. Generally, firms stated their policy as instructing drivers to park in a “safe and legal” manner. Typically, however, it is driver’s discretion to determine the best location to park the vehicle.

The respondents were asked to add any additional comments they had at the end of the survey. Many of these comments were of a general nature, as many of the carriers surveyed were not based in Minnesota. This last question was an open-ended question designed to solicit information that would help to find specific problems or thoughts the trucking firms were having with the current parking availability, not only in Minnesota, but elsewhere. Several insightful comments were received. All of the comments received on the survey are shown in the Appendix. The most common and useful comments received are listed below.

- More staging areas for peak traffic times.
- Overnight parking is in short supply around Twin Cities area
- I-35 and I-94 near and around Minneapolis is the largest problem in Minnesota. Not nearly enough parking for drivers, especially entering the evening hours.
- Not enough parking in heart of Minneapolis. Nearest stop is 1 hour to 1 ½ hours away.
- Shortage for staging within 30 miles of shippers/receivers (Nationwide problem)
- Re-think rest area closures, especially in Northern Minnesota. Rest areas at Forest Lake are not nearly big enough.
- All interstate highways lack parking capacity. Drivers are required to stop, but then are chased from truck stops, rest areas and entrance ramps.
- Every large city needs additional parking (radius of 100 miles) to accommodate pick-up/delivery
- Need Eastbound rest area between Twin Cities and Hudson WI. Needs to be designed to allow more room for drivers to get in and out.

Appendix

RESULTS AND COMMENTS RECEIVED ON RETURNED SURVEYS

Contact: Date _____ Time _____

Mn/DOT Truck Parking Survey

Introduction: My name is _____ from the Center for Transportation Research and Education at Iowa State University. We are presently conducting a study for Minnesota Department of Transportation, examining freight movements, and truck parking availability along the (I-35, 94, 90) Corridor. The purpose of this survey is to gain an understanding of the locations where drives are parking and why they park at those locations. That information will then be used to develop possible solutions to parking supply and demand.

Your individual company data will not be released to anyone outside of the research team. We will provide a summary of the data, excluding any identifying details, to Mn/DOT to assist in the understanding any parking issues for trucks.

Do you have time for a few questions?

During the course of the study we have been gathering truck data along the (I35, 94,90) corridor. One of your trucks was observed at _____ EB WB on _____ (date) at _____ AM/PM.

1. On average, how many drivers does your company employ (utilize)?
 - 1.a Are your drivers company driver or owner/operators (under contract)?

2. Please identify the point of origin and destination for the truck observed on _____ (date) at _____ location

3. What was the primary type of freight was the driver hauling? (general category)

What other commodities were being hauled?

General Freight	Liquids/Gases	Chemicals
Household Goods	Intermodal	Commodities Dry Bulk
Metal: sheets, coils, rolls	Cont.	Refrigerated Food
Motor Vehicles	Passengers	Beverages
Drive/Tow away	Oilfield	Paper Products
Logs, Poles, Beams,	Equipment	Utilities
Lumber	Livestock	Agricultural/Farm

Building Materials	Grain, Feed,	Supplies
Mobile Homes	Hay	Construction
Machinery, Large Objects	Coal/Coke	Water Well
Fresh Produce	Meat	Haz Mat
	Garbage/Refuse	
	US Mail	

4. Does the company have a "parking" policy or practice? (types of areas to use, specific truck stops, vacant lots, etc).

4a. Does your company provide a per diem or lodging reimbursement to your drivers? What are the conditions for reimbursement?

5. Did the driver decide where to stop or was the stop scheduled by the dispatcher? (If driver then task next question.)

6. Does your company provide drivers with lists of approved parking locations? If not, do drivers share parking location information?

7. How long was your driver parked at the location on the date observed? (Time: From _____ AM/PM to _____ AM/PM.

8. Was this site selected to position the driver for an early delivery (or pick up?) If not, what was the purpose of the stop?

9. Is there a shortage of appropriate parking areas for your drivers along this corridor?
Yes/No

9a. If yes, can you identify other locations along this corridor where additional parking could be provided?

Any other comments?



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