



PORT OF OAKLAND

UPDATED TO INCLUDE E-MAIL COMMENT SUBMISSIONS

March 16, 2009
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Subject: Release for Public Review and Comment:
Draft Economic Impact Analysis prepared by Beacon Economics, LLC
for the Port of Oakland Comprehensive Truck Management Program

Dear Reader:

In Summer 2008, the Port of Oakland commissioned Beacon Economics to perform an Economic Impact Analysis (“the Study”) to inform the development of certain elements of the Port of Oakland’s Comprehensive Truck Management Program (CTMP). A Draft report of the Study (enclosed) is available for public review and comment.

The purpose of the Study is to provide economic insight into the current drayage (trucking) system that serves the Port of Oakland’s marine terminals and intermodal facilities, and to provide recommendations for how this system may be altered to support the goals of the CTMP. For more information on the CTMP, please visit the Port’s website at <http://www.portofoakland.com/environm>.

The Port of Oakland will be accepting comments on the Study and the CTMP through 5:00 PM on April 2, 2009. Please submit your comments in writing by mail or fax to:

Port of Oakland
Attn: Delphine Prévost
530 Water Street
Oakland, CA 94607
Fax: 510-835-1641

UPDATE: You can also submit your comments by sending e-mail correspondence to CTMP@portoakland.com

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**COMPREHENSIVE TRUCK MANAGEMENT PROGRAM:
ECONOMIC IMPACT ANALYSIS**

By

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Presented to

Port of Oakland

MARCH 6, 2009

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I. EXECUTIVE SUMMARY

This report was commissioned by the Port of Oakland (Port) to provide economic insight into the current functioning of the drayage, or trucking, system at the Port. The Port also requested recommendations that will help to inform the development of a Comprehensive Truck Management Program (CTMP). The CTMP is intended to identify and address shortcomings in the drayage services provided to Port customers. The Port has outlined a set of 10 key elements that include increasing drayage productivity, reducing community impacts, and developing a sustainable drayage workforce, among others.

Our methods of analysis included extensive surveys of drivers, licensed motor carriers, and other supply chain participants, discussions with industry participants and Port staff, and a reliance on fundamental economic principles. Through this process, we have gained significant insight into the functioning of the drayage sector at the Port. This includes a better understanding of driver compensation and costs, operational inefficiencies, potential impacts of security and regulatory (environmental) constraints, market structure, and other key conditions and issues.

Some Key Findings:

- We estimate that the Port is currently being served by approximately 1,989 drivers.
- Drayage services are being provided by independent owner-operators (IOOs) as well as employee drivers. Two-thirds of the fleet of trucks servicing the Port are driven by IOOs and one-third by employee drivers. On an hourly basis, net compensation of IOOs is comparable to that of employee drivers, but because IOOs are found to work fewer hours, the weekly earnings of employee drivers are significantly higher (\$1,265 compared to \$1,050 for IOOs). Both IOOs and employee drivers earn significantly more than the mean of truck drivers in the region overall.
- Critical inefficiencies have been discovered in the drayage market. In particular, excess time between dispatches, and excessive time spent waiting both to get into the terminals at the Port and to get loaded once inside, often leaves drivers idle. Among all drivers, the average wait time per day is 1.5 hours. Greater wait times exist among IOOs than employee drivers. These inefficiencies result in the Port being over-trucked by as much as 25%.
- The drayage market faces serious challenges in its ability to comply with both pending security constraints (the onset of the Transportation Worker Identity Credential (TWIC) program), and air emissions restrictions that will become increasingly stringent over time and imply the replacement of much of the fleet.

- In a worst-case scenario we estimate that 81% of the trucks servicing the Port will have to be replaced or retrofitted under California Air Resources Board (CARB) regulations scheduled to go into effect on January 1, 2010.
- Under the status quo, it is likely that adjusting to these new regulatory constraints will be disruptive, unless there is some financial or other intervention on the part of the Port or regulatory body.

Given the underlying goals of the CTMP and the inability of the status quo to meet those goals or to address potential future disruption, we recommend that significant change be implemented in the functioning of the Port's drayage system.

Recommendations:

- The lack of resources among IOOs and the inefficiencies in the current system strongly favor a more employee-oriented drayage sector.
- Container fees should be avoided to the extent possible, with industry being held responsible for the costs directly.
- Significant changes to the drayage market should be phased in to minimize disruption to the market.

Finally, it is important to note certain key limitations in this study. First, this report does not serve as a benefit-cost analysis. Estimates of the costs of CARB, TWIC, and an employee driver requirement are provided, but there is no attempt to evaluate whether the benefits exceed the costs. Second, there is a fundamental reliance on data collected through surveys; such data are subject to important limitations. Third, the study was undertaken during poor economic conditions. The extent to which this has clouded the data collected is unclear. Fourth, there are influences on industry structure that were beyond the scope of work, and are not discussed in detail. These include, but are not limited to, the implications of potential unionization of the drayage workforce.

II. INTRODUCTION AND BACKGROUND

The Port of Oakland (Port) is an important resource for both the California and national economies. It is the fifth busiest container port in the United States, and the primary node for Northern California's maritime trade. The Port is a key gateway for import and export products, facilitating a substantial flow of goods and generating employment for thousands of workers. These vital activities, however, do not come without a cost. The transportation of goods from one place to another imposes a burden on those not directly involved in the transaction. Nowhere is this more evident than within the Port's drayage, or trucking, sector. Indeed, as the link in the supply chain with the most apparent impact on local communities, drayage has come under close scrutiny in Oakland and at other major seaports.

The Port, in its commitment to participating in the local economy in an efficient and socially responsible manner, is developing a Comprehensive Truck Management Program (CTMP). The CTMP is dedicated to making the drayage sector more efficient, while at the same time reducing its local impact on land use and the environment. More specifically, CTMP elements include:

- **Clean Trucks:** Reduce air emissions through DPF retrofits and truck replacements, both in a first phase early action program and in subsequent phases. Includes developing the financial and systemic capacity of truck operators or companies to acquire and maintain drayage trucks and accessory equipment that meet current air quality and safety standards.
- **Truck Registry:** Establish a truck database and outfit trucks with GPS, RFID or other technology to report on compliance with clean truck standards, security and geo-fencing efforts and to facilitate possible fee collection.
- **Safety and Security:** Ensure that truck security information is available to terminal and Port authorities. Also, ensure that trucks and drivers meet mandatory safety and security standards.
- **Community Impacts:** Remove trucks from neighboring community streets by enforcing specific driving routes and by making truck route information readily available. Additionally,

promote opportunities for local employment and local business participation to help the Port meet its priority goals.

- **Stakeholder Participation:** Draw input from a broad spectrum of port, business, community, environmental/public health, and labor stakeholders.
- **Customer Service:** Improve operational interfaces between truckers and terminal operators and between truckers and shippers to improve overall service through the Port of Oakland.
- **Increased Productivity:** Assist truckers in making their time as productive as possible by reducing idling and wait times and by increasing the efficiency of drayage transport related to Port operations.
- **Sustainable Drayage Truck Workforce:** Ensure an adequate workforce of drayage truck operators that is sufficiently trained for safe, efficient and legal truck operations.
- **Funding:** Identify sources, short- and longer-term from, local, state, federal and private sector entities to fund clean truck and other elements, as appropriate.
- **Political Support:** Enlist the support of elected officials and their staffs for CTMP measures.

This study was commissioned by the Port of Oakland to provide an economic analysis of the Port's drayage sector and to study the economic and competitive impacts that potential components of a CTMP could have on Port operations.

In carrying out the CTMP analysis, this study also provides an in-depth look at the economics of drayage at the Port of Oakland. In particular, the study addresses the following key topics:

- Features of the supply and demand for drivers in the drayage market
 - In particular, is driver supply elastic enough to accommodate significant changes in the structure of Port drayage and spikes in demand?
- Wages and earnings of drivers
 - In particular, what are the compensation profiles of independent owner-operators relative to employee drivers?
- Expenses associated with providing drayage services
 - This report provides a detailed cost analysis of Licensed Motor Carriers in the market.
- Transportation Worker Identification Credential

- Evaluating the extent to which the introduction of this security measure at the Port may disrupt service and affect the drayage sector within the context of CTMP goals.
- CARB Emissions Regulations
 - How extensively might CARB regulations disrupt drayage services?
- The Southern California Los Angeles and Long Beach Clean Truck Programs
 - Changes in the structure of drayage at the Ports of Los Angeles and Long Beach may be informative in developing the Oakland CTMP
- Supply chain decisions
 - How might significant changes in the structure of port drayage affect the supply chain?

The analysis in this report work was carried out through intensive surveying of the drayage market, and the Port's supply chain, discussions with individuals in the field, appeal to the current literature, and a reliance on fundamental principals of economics. This analysis includes a discussion of policy options for developing a more efficient, sustainable, and accountable drayage sector, within the context of CTMP goals.

The results are compelling – finding a drayage system that, although providing adequate service to its clients, can benefit significantly from this evaluation and from the structural reforms that may result. In particular, the findings presented below indicate significant inefficiencies and accountability issues in the drayage system. These issues result primarily from a disconnect between the ownership of productive resources (primarily trucks) and the control over the use and allocation of those resources. Were they more closely linked, it is entirely possible that simple economic incentives would address these inefficiencies and lead to greater accountability.

Reducing inefficiencies and enhancing accountability has the potential to increase the sustainability and stability of the drayage system overall. Sustainability should be considered a critical goal given the significant challenges facing the Port's drayage sector in the relatively near term. These challenges include the need to enhance security at the Port as well as the

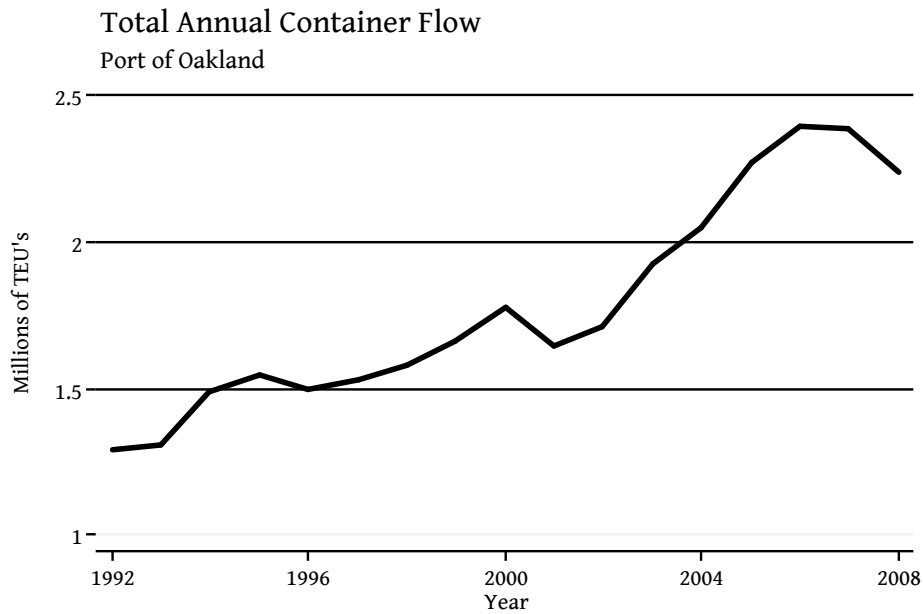
need to respond to state emissions requirements and reduce the local impact of drayage activity. More broadly, if the Port is to continue to grow and provide maximum benefit to the local, state, and national economies, it has an imperative to promote the most productive and responsive system for transporting goods to, from, and through the local economy.

The results presented in this report indicate that there is significant scope for reforming the drayage sector while risking relatively little disruption to both the short-term and long-term functioning of the Port. The movement towards a more employment-based system could enhance the efficiency of the current system, the ability to respond to pressing and future challenges, and the Port's ability to grow.

A. GOODS MOVEMENT

As the fifth busiest container port in the United States, and primary node for Northern California's maritime trade, the Port of Oakland facilitates a substantial flow of goods. In 2008, almost 2,000 cargo vessels distributed over 2.2 million twenty-foot equivalent units (TEU) through its eight container terminals. Reflecting the current recession, however, this is below the 2006 peak of almost 2.4 million.

FIGURE II-1: TOTAL ANNUAL CONTAINER FLOW THROUGH PORT OF OAKLAND

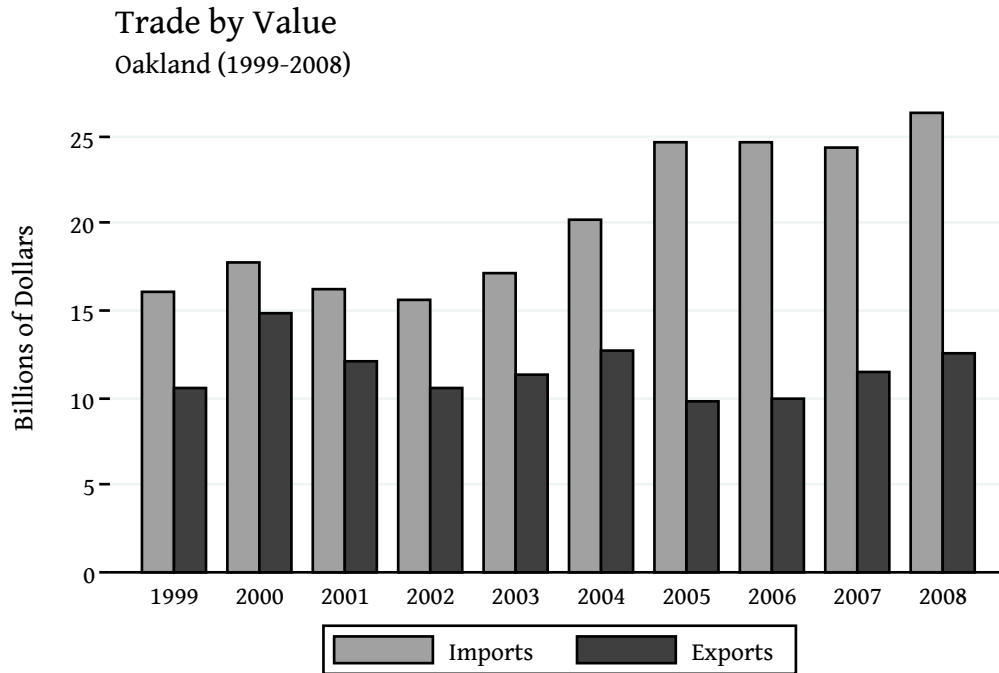


Source: Port of Oakland website (www.portofoakland.com)

The leading type of good flowing into the port is machinery, followed by beverages, furniture, and vehicles. These arrive primarily from Asia, particularly China and Japan. However, many European countries fall within the top 10 importing countries, including France and Germany. In sum, over \$26.4 billion worth of imports flowed through the Port in 2008 (figure II-2).

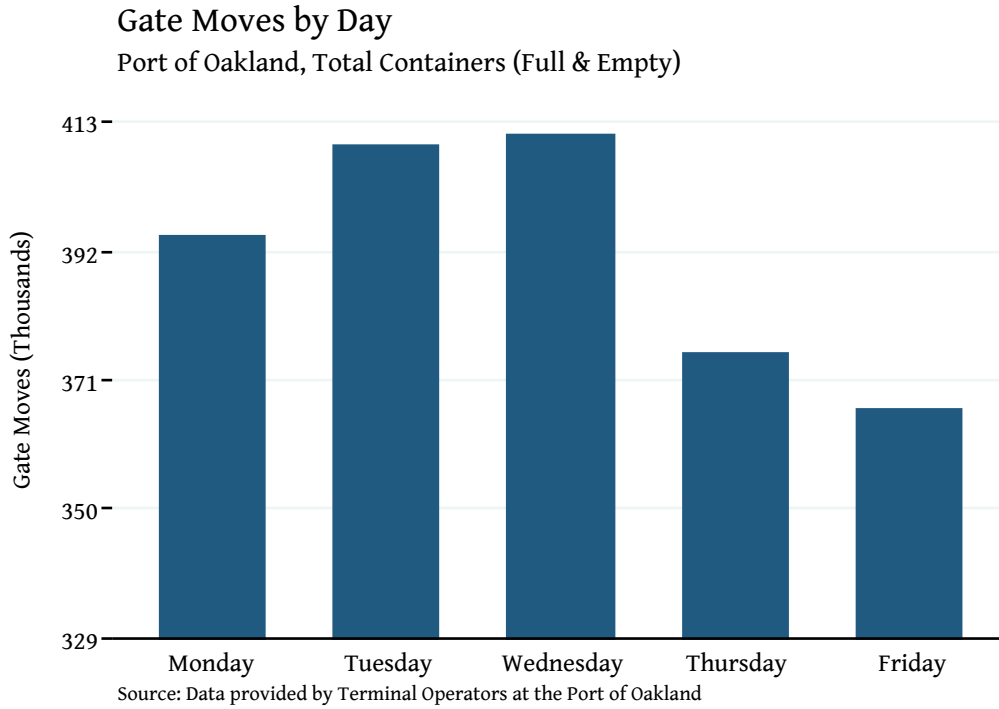
Exports flowing out of the port are lead by food items including fruits and nuts, and fish and meats. In total, the \$12.5 billion worth of exports that flowed out of the port amount to almost half of those flowing in. The Port's export trade partners are very similar to its import partners, with Japan and China again topping the list, followed by other Asian and European countries.

FIGURE II-2: TOTAL ANNUAL VALUE OF GOODS FLOWING THROUGH THE PORT



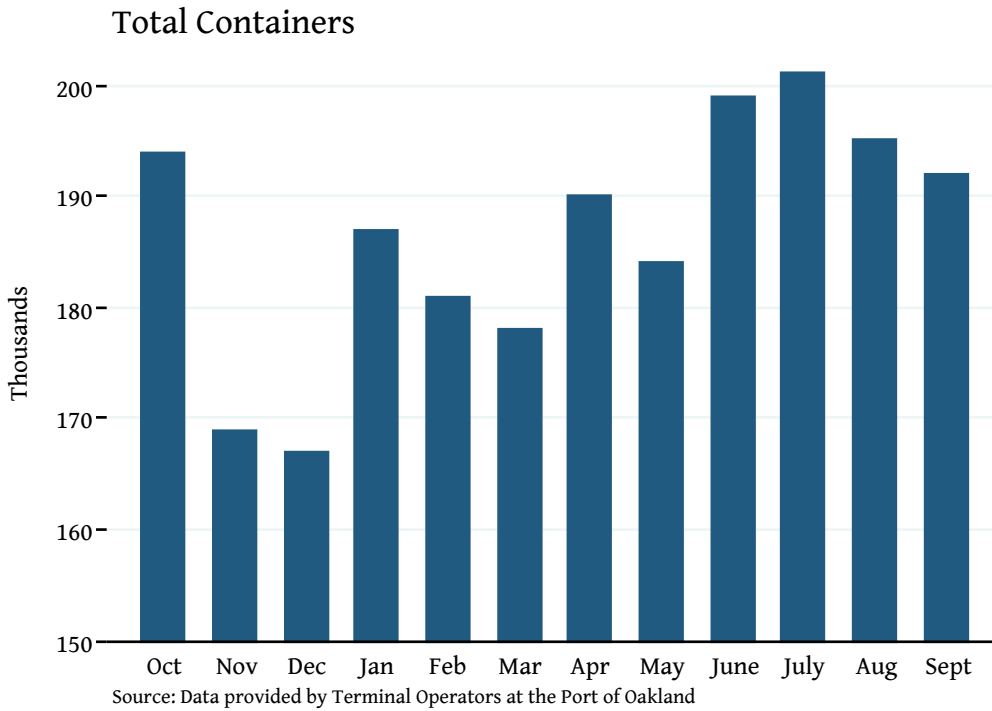
The drayage industry servicing the port is typically busiest mid-week (Figure II-3). Between October 2007 and September 2008, containers entering and leaving the port totaled 409,000 and 411,000 on Tuesdays and Wednesdays respectively (averaging 1,158 and 1,144), with volumes dwindling into the weekend.

FIGURE II-3: ESTIMATED ANNUAL CONTAINER FLOWS BY DAY OF WEEK (OCT. 2007-SEP. 2008)



During the same period, the summer months were busiest (Figure II-4). Indeed summer often represents the onset of the Port's busy season. However, during the period for which we have data (Oct. 2007 – Sep. 2008), the U.S. economy was experiencing the onset of recession. The declining container flows over the following months may be due to the continuing economic downturn, both in the United States and abroad, rather than being an indication of more general patterns at the Port.

FIGURE II-4: TOTAL GATE MOVES OF CONTAINERS (FULL & EMPTY) BY MONTH (OCT. 2007-SEP. 2008)



B. AIR QUALITY

The air pollutants of greatest concern in the goods movement industry are those associated with diesel-fueled engines, which apply to nearly all the trucks used in drayage services. Diesel exhaust includes over 40 substances that are listed as hazardous air pollutants (HAPs) by the U.S. EPA and by the California Air Resource Board (CARB).

The Maritime Port of Oakland, the Union Pacific (UP) Rail yard and three major freeways surround the 22 thousands residents of West Oakland, increasing health risks from high exposure to Diesel PM. ¹

The majority of the Port's diesel PM emission (78.9 percent) comes from ocean-going vessels. Drayage trucks contribute only eight percent of the Port's diesel PM emissions, and only 2 percent of the total diesel PM emissions in West Oakland.² Despite the relatively low diesel PM emissions compared to other sources in the Port, drayage trucks emissions still pose health risks to residents in West Oakland. CARB estimates that 16 percent of all contributors to the risk of cancer in West Oakland arises from the Port's activity. A quarter of this is due to drayage activity associated with the port.

On a more regional scope, the Ports' emissions of diesel PM result in a potential cancer risk of 27 cancer cases per million³. Port diesel PM emissions are estimated to contribute to 18 premature deaths per year, 8 hospital admissions for respiratory and cardiovascular problems, and about 290 cases of asthma-related cases.⁴ The East Bay Alliance for a Sustainable Economy and Pacific Institute (EBASE) estimate the economic cost of health impacts from Port emissions to the Bay Area is at least \$153 million annually.⁵

Recognizing the health risks associated with diesel PM emissions, the Port has set forth a goal of reducing the health risk associated with maritime-related activities by 85 percent by the year 2020 (as compared to 2005). As outlined in the Port's Maritime Air Quality

¹ CARB (2008)

² Ibid.

³ CARB defines their regional domain as a 100km by 100km area around the Maritime Port of Oakland (1,564,000 acres).

⁴ CARB (2008)

⁵ EBASE (2009)

Policy Statement and Maritime Air Quality Improvement Plan (MAQIP), one contributor to achieving the goal of reduced health risks is the CTMP currently under development. The CTMP is intended to be comprehensive, addressing a number of issues including but not limited to business and operational benefits, enhancement of port security and safety, reducing emissions of diesel particulate matter, and lessening the impacts of Port-related trucking on nearby residents.

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III. SUMMARY OF FINDINGS

Port drayage, or trucking, plays a vital role in moving goods through the Port of Oakland and transporting them to destinations across California and the western United States. Lacking on-dock rail facilities, the Beneficial Cargo Owners (BCOs), Ocean Carriers, and Terminal Operators all rely on a fleet of trucks to transport ocean-going goods containers to and from the Port. This section summarizes findings about the basic economics of the port drayage sector and about key issues affecting the Port of Oakland's drayage market.

A. BASIC ECONOMICS OF THE PORT DRAYAGE SECTOR

1. LICENSED MOTOR CARRIERS (LMCs)

We estimate that the Port is served by approximately 121 Licensed Motor Carriers (LMCs). These LMCs vary significantly in their approach to drayage. Some employ no drivers at all and rely on independent contractors or independent owner operators (IOOs), others rely entirely on employees in providing trucking services, while a third group uses both strategies and employs some fraction of their drivers while also using IOOs.

They also vary significantly in size (Table III-1). Of the LMCs currently serving the port, nearly half are Class III, with annual operating revenues of less than 3 million dollars. The rest are split evenly between Class I (operating revenue in excess of 10 million dollars) and Class II (operating revenue of 3-10 million dollars). Table III-2 illustrates the distribution of drays provided by LMCs of different sizes as measured by the number of drivers dispatched by the LMC.

TABLE III-1: BREAKDOWN OF LMCs BY CLASS OF CARRIER (%)

	Only Employee Drivers	Only IOOs	Both IOOs and Employee	All LMCs
Class I (over \$10M annual revenue)	23.1	23.8	33.3	26.9
Class II (\$3-\$10M annual revenue)	15.4	28.6	33.3	26.9
Class III (less than \$3M annual revenue)	61.5	47.6	33.3	46.2
Total	100.0	100.0	100.0	100.0

**Source: Calculations by Beacon Economics*

TABLE III-2: PERCENTAGE OF DRAYAGE WORK DONE BY TYPE AND SIZE OF LMC

LMC Size	Employees	IOOs	Both	Total
1 - 5	0.9	0.8	0.0	1.7
6 - 10	0.1	0.8	0.6	1.5
11 - 25	1.9	5.6	4.7	12.2
26 - 50	0.4	20.8	12.7	33.9
51+	1.6	20.9	28.3	50.8
Total	4.9	48.8	46.3	100.0
LMCs Surveyed (#)	13.0	23.0	18.0	54.0
Size of Fleet (#)	29.0	52.0	40.0	121.0

**Source: Calculations by Beacon Economics*

These LMCs generally have some facility for dispatching drivers near the Port (Figure III-1). More than one half (51.65 percent) are located in Alameda County. Close to half of the LMCs surveyed (48.15 percent) have their closest LMC location in the Port Local Impact Area (LIA). Within the LIA, 84.62 percent of LMCs are located in the City of Oakland. The next largest concentration is in San Joaquin County (11.11 percent). Generally, the LMCs are located in the Southern half of the Bay Area or along the I-80 corridor through Reno, Nevada. The insert in the Figure III-1 graphic indicates that some LMCs also are located in Southern California, in particular, in Orange County.

Figure III-2 presents the distribution of drivers dispatched by LMCs to the Port of Oakland. This is essentially the distribution of LMC services weighted by numbers of drivers dispatched. This

figure and Figure III-3, weighted by the number of drays carried out by each LMC, show a further clustering of LMC services near the port. Specifically, more than 70 percent of all drays are provided by LMCs located in Alameda County.

FIGURE III-1: DISTRIBUTION OF LMCs SERVING THE PORT OF OAKLAND BY COUNTY (%)

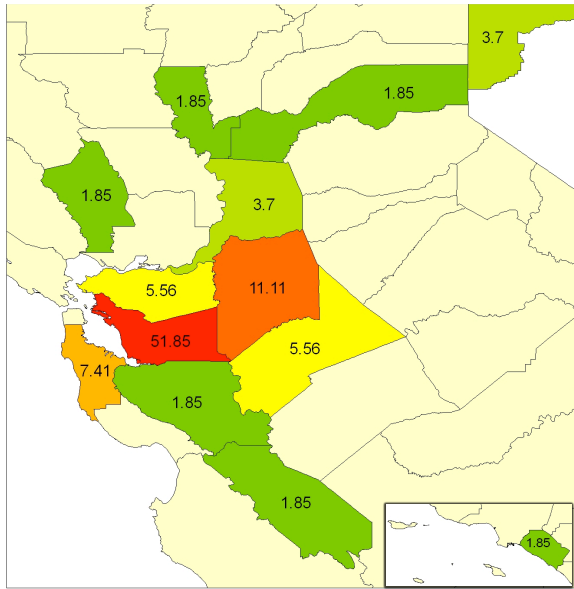


FIGURE III-2: DISTRIBUTION OF DRIVERS DISPATCHED BY LMCs SERVING THE PORT OF OAKLAND BY COUNTY (%)

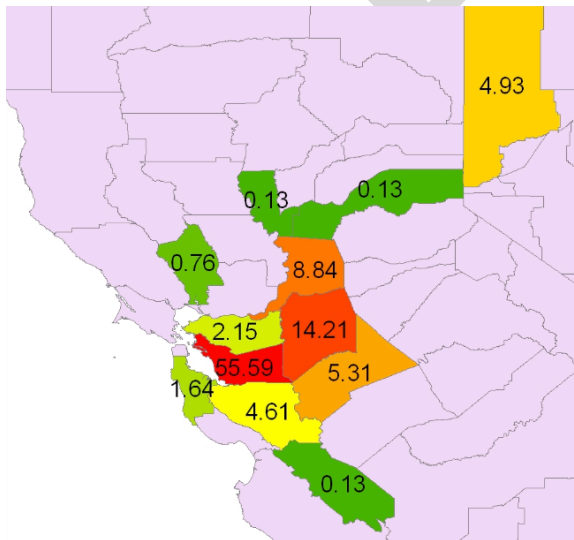
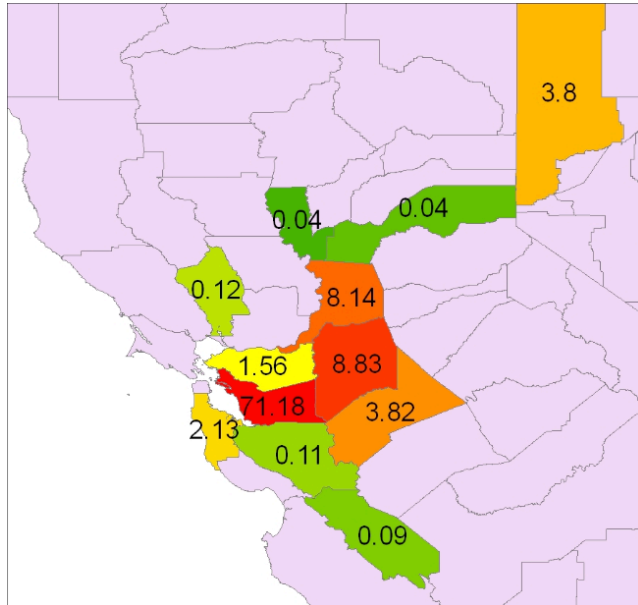


FIGURE III-3: DISTRIBUTION OF LMCs SERVING THE PORT OF OAKLAND BY COUNTY (%)



a) LMC OPERATING COSTS

LMC costs vary by both type of labor used and type of service provided. Among the LMCs surveyed, 24.1 percent use only employee drivers, 42.6 percent use only IOOs, and 33.3 percent use a combination of both. The number of non-driving positions varies as well. Among those firms using only employee drivers, non-driving jobs account for 28 percent of all labor positions; among those using only IOOs, non-driving jobs were 18.1 percent; and among those using a mix of IOO and employee drivers, non-driving jobs account for 17.1 percent.

As mentioned, costs also vary substantially by type of service provided. Few firms report true “specialization”, providing, for example, only shuttle haul service. While most firms provide some combination of shuttle, short, regional, and long haul, there is some tendency to focus on particular segments. For example, firms that provide shuttle haul services, tend to also provide high levels of service (measured by weekly dispatches) in short hauls and low levels of service in

long hauls. Because of this, we estimate cost models by type of haul provided as well as driver type used.

TABLE III-3: ESTIMATED COSTS BY TYPE OF SERVICE PROVIDED AND TYPE OF DRIVER (\$)

	Shuttle Service Provided	Short Service Provided	Regional Service Provided	Long Service Provided
I/O Drivers Only				
Annual Cost	3,640,942	2,429,688	2,934,395	3,755,922
Daily Cost	14,004	9,345	11,286	14,446
Annual Cost per driver	101,137	80,990	86,306	96,306
Employee Drivers Only				
Annual Cost	4,637,263	3,132,825	3,815,928	4,957,470
Daily Cost	17,836	12,049	14,677	19,067
Annual Cost per driver	128,813	104,428	112,233	127,115
Mix of I/O and Employee Drivers				
Annual Cost	4,282,573	2,882,508	3,502,103	4,529,719
Daily Cost	16,471	11,087	13,470	17,422
Annual Cost per driver	118,960	96,084	103,003	116,147

**Source: Calculations by Beacon Economics*

It should be noted that the cost per driver represents the average cost per unit of driving labor (not the share of costs paid to drivers) as overhead for non-driver labor and other costs are included.

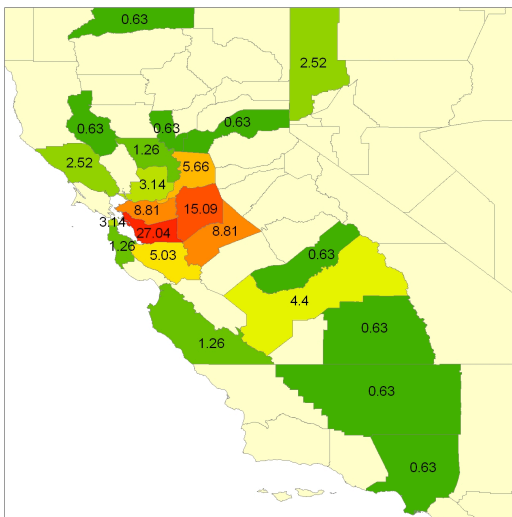
Regardless of the type of service provided, there emerges a very clear trend in the type of drivers used and in the firm's cost structure. Firms that exclusively use I/Os have costs between 27 percent and 33 percent lower than those that use only employee drivers. Those that use a mix of driver types have costs that are roughly 10 percent less than those LMCs using exclusively employee drivers.

2. DRIVERS

We estimate that the Port is served by approximately 1,989 drivers. Many are directly employed by the LMCs, but most are not. Indeed, approximately two-thirds or 1,313, of the drivers function as IOOs. As independent operators, these drivers are responsible for owning or leasing a truck, insurance and registration of the truck, and all associated repair and maintenance expenses.

Unlike the LMCs they work for, drivers tend to be spread out across the Bay Area and then Central Valley. While some live close the Port, in general, they are much more geographically dispersed than are the LMCs (Figure III-4). Only 27 percent of drivers surveyed indicated living in Alameda County. Of those drivers, 16.67 percent reside in the Port Local Impact Area; of those, 81.48 percent of them indicate residing in the City of Oakland.

FIGURE III-4: LOCATION OF PORT DRIVERS BY COUNTY OF RESIDENCE (%)



Drivers at the port tend to be male, married, and are on average 44 years old (Table III-4). They also tend to be primarily of minority race. This is more true for IOOs than for employee drivers:

only 18 percent of IOOs report white as their race, compared to 44% of employee drivers. Whereas employees tend to be predominantly white, IOOs are 41 percent Hispanic, and just over one-third are of Asian-Pacific origin.

TABLE III-4: DEMOGRAPHIC CHARACTERISTICS OF PORT DRIVERS (%)

	All	IOOs	Empl.
Male (%)	98	98	98
Married (%)	76	82	67
Mean Age	44	43	46
Race (%):			
<i>White</i>	28	18	44
<i>African-American</i>	6	5	6
<i>API</i>	32	36	26
<i>Hispanic</i>	34	41	24

**Source: Calculations by Beacon Economics*

Drayage drivers also tend to participate in drayage activities on a full time basis. Less than 10 percent of those surveyed indicated working less than 5 days per week. Of those who are part time, three-quarters of them are IOOs. In addition to working full weeks, drayage drivers also tend to work very long days. In general, drivers at the Port work in excess of 11 hours each day, with employees working slightly longer days than IOOs.⁶

IOO drivers are paid by the load (performance), while employee drivers may be paid either by performance or on an hourly or weekly basis. On an hourly basis, IOOs and employees tend to be compensated similarly (Table III-5). However, once the difference in hours per day and days per week are factored in, weekly earnings for employees are higher than for IOOs, \$1,265 and \$1,050, respectively. Note that this is a comparison of net earnings. When gross earnings are

⁶ This is true of the driver survey. However, results from the LMC Survey indicate virtually no difference in hours worked per day.

considered, IOOs receive significantly more compensation to account for the use of their truck and its associated expenses.

TABLE III-5: AVERAGE HOURLY WAGES AND THEIR COMPONENTS FROM THE DRIVER SURVEY

	Empl.	IOOs
Weekly Gross Earnings (\$)	1,265	2,182
Days Worked in a Week	5.1	5.0
Weekly Hours	59.6	53.7
Weekly Expenses (\$)		1,132
Weekly Earnings net of Expenses (\$)	1,265	1,050
Hourly Wages (\$)	21.2	20.8

**Source: Calculations by Beacon Economics*

Numbering approximately 2,000, these drivers make up a small fraction of the region’s overall truck driving labor force. In all, there are some 100,000 drivers in the region, approximately 12,000 of which are independent operators. Of the region’s independent truckers, the Port’s IOOs make up more than 10 percent. With annual wages of more than \$59 thousand for employees and \$57 thousand for IOOs, the Port drivers are well compensated relative to other drivers in the region. The median wages in the region for IOOs is \$42 thousand and \$36 thousand for employee drivers.⁷ Both the Port’s IOOs and employee drivers are in the upper half of the earnings distribution for truck drivers in the region.

In terms of additional benefits, though most LMCs report providing health insurance to their employee drivers, only half of these drivers report having health insurance through their LMC and close to one-third report not having health insurance at all. Most IOOs do not have health insurance from any source. Employee drivers also generally receive paid vacation, while IOO

⁷ See Table VI-39 for additional wages for truck drivers in the region.

drivers do not. Overall, the hourly compensation received by employees is of higher value than that received by IOOs.⁸

3. *RATE STRUCTURE*

Compensation of IOOs is usually a percent of the revenue generated by the LMC for each dray. Table III-6 provides an indication of the rates charged by LMCs for drays of various lengths. Rates increase with the distance of the haul. Shuttle hauls are essentially a land bridge between a Port marine terminal and a nearby rail yard. Short hauls are less than 100 miles from the Port, regional hauls involve distances between 100 and 249 miles, and long hauls are anything over 250 miles from the Port.

TABLE III-6: WEIGHTED AVERAGE BASELINE TRUCKING CHARGES BY HAUL AND TYPE OF LMC (\$)

	LMCs Using:			All LMCs
	Only Employee Drivers	Only IOO Drivers	Both Employee and IOO Drivers	
<i>Shuttle</i>	NA	66.9	88.0	86.1
<i>Short</i>	330.7	288.9	329.2	315.3
<i>Regional</i>	634.7	444.1	698.6	582.8
<i>Long</i>	750.0	908.4	907.9	874.8
<i>Total</i>	571.8	427.1	505.9	464.8

**Source: Calculations by Beacon Economics*

Rate structures do vary according to the type of LMC. Those using only employee drivers tend to be, on average, more expensive for hauls of shorter distances and less expensive for “Long”

⁸ Considering the value of health insurance, vacation time, and payroll taxes, these likely amounts to about 15 to 20 percent of overall compensation. Employees receive these benefits and IOOs generally do not.

hauls. Conversely, those using only IOO drivers are on average less expensive for drays up to 249 miles. Whether this is due to inherent differences in cost structures, or a reflection of more efficient driver usage – shorter distances for IOOs, longer distances for employees – is unclear. Close to one-half of all the Port’s hauls are short hauls, of which 35.3 percent are hauls of less than 40 miles.

TABLE III-7: PERCENTAGE OF DRAYAGE HAULS BY LENGTH AND TYPE OF LMC

	Employee	IOOs	Both	All
Shuttle	0.0	16.1	12.4	28.5
Short	2.0	21.3	25.6	48.9
Local	43.7	43.2	28.0	35.3
Regional	1.8	9.6	6.7	18.1
Long	0.9	1.9	1.6	4.4
Total	4.8	48.9	46.3	100.0

Note: A local haul is a subset of a short haul (less than 40 miles)

**Source: Calculations by Beacon Economics*

There is a compelling potential reason for this preference structure to exist, and that is the general state of the truck. In particular, being on average four years older, trucks operated by IOOs may be less reliable and the risk associated with long hauls are greater than those associated with shorter hauls. The expense of an IOO breaking down more than 250 miles from the Port is considerable, and likely more risk than an IOO or their dispatcher would care to take on unless they are well compensated for it. LMCs with employees then might find this segment of the market more profitable as IOOs tend not to serve it.

4. EFFICIENCY OF OPERATIONS

An important issue at the Port of Oakland is the extent to which it is currently over-trucked. That is, there are more trucks currently serving the Port than are strictly necessary. As has been found elsewhere (Beacon, 2008), the Ports of Los Angeles and Long Beach are likely

heavily over-trucked because of significant inefficiencies in the system. At these ports, it was found that significant wait time at the terminals resulted in turns of longer duration, and hence more idle trucking capacity than necessary to provide adequate service.

At the Port of Oakland, we have also found significant inefficiencies in the system, stemming from three sources in particular: 1) is time spent waiting between dispatches, 2) is time spent waiting to enter the terminal, and 3) is time spent inside the terminal either picking up or dropping one a load.

Table III-8 presents an indication of the amount of time spent waiting for dispatch. Several patterns are worthy of note. First, employee drivers report waiting less time between dispatches than do IOOs. On average, employee drivers wait just 1.3 hours, with more than one-third reporting zero wait time between drays. IOOs report an average wait time of nearly one and three-quarters of an hour, and less than one-fifth report zero wait time. Among all drivers, average wait time is 1.5 hours with 25 percent reporting zero wait time between completion of one dray and dispatch of the next.

TABLE III-8: DRIVER TIME SPENT WAITING FOR DISPATCH BETWEEN DRAYS

	Mean (hours)	Percent of Drays with Zero Wait Time
Employee Drivers	1.3	36.0
<i>Shuttle and Short Hauls</i>	1.4	28.6
<i>Regional and Long Hauls</i>	1.2	38.9
Independent Operators	1.7	19.2
<i>Shuttle and Short Hauls</i>	1.8	21.1
<i>Regional and Long Hauls</i>	1.6	17.5
All Drivers	1.5	25.6
<i>Shuttle and Short Hauls</i>	1.7	23.1
<i>Regional and Long Hauls</i>	1.4	27.3

**Source: Calculations by Beacon Economics*

Time spent waiting to enter the terminal and time spent waiting inside the terminal is similar

for IOOs and employee drivers at the Port. On average, drivers wait 2 hours outside the marine terminal gate and 1.6 hours once inside the gate to get out⁹. These results indicate a further inefficiency in current drayage operations that, if improved, would reduce the demand for additional drivers to meet the forecast expansion of traffic through the Port.

Overall, time spent waiting is a significant inefficiency. With an average dray taking 6.4 hours, drivers are only able to complete an average 2.3 turns each day. Furthermore, of the 6.4 hours, some 3.6 hours are spent waiting at or in the terminal on average. While some of this wait time is clearly necessary, much is not. As has been suggested in interviews with marine terminal operators (MTOs), it might be possible to reduce this wait time by an average of one half. Were that to occur, the time on an average turn could be reduced by 1.8 hours, or by as much as 25 percent. It also seems likely that the time spent waiting for dispatch could be significantly reduced. Evidence for this can be found in the discrepancy between wait times of IOOs and employee drivers – though this discrepancy may be the result of the different types of drays performed by IOOs and employees.

In general, we conclude that the Port of Oakland is currently over-trucked by as much as 25 percent, or as many as 500 trucks. Were greater efficiencies achieved, the Port's current business could be accomplished with significantly fewer trucks.

⁹ This is in start contrast with the Port's 2005 emissions inventory, which found that turn times averaged approximately 30 minutes. In conversations with LMCs and marine terminal operators, we have found that a half hour is likely the best achievable performance. The average, especially as some terminals are significantly more efficient than others, is likely to be somewhat higher. It has also been found that drivers often tend to overstate their wait times. It is therefore quite possible that our measured average of 1.6 hours inside the gate of the Terminal is high.

B. KEY ISSUES IN THE PORT OF OAKLAND DRAYAGE MARKET

1. GROWTH IN CONTAINER VOLUMES

Container volumes at the Port of Oakland are expected to more than double to 5.4 million TEUs by 2030. Recent economic events have called this forecast into question, but this section discusses the implications for the drayage sector of such growth at this level and at lesser levels over the course of the next 22 years. Growth to 5.4 million TEUs implies that container volumes must increase by 2.45 times their 2008 level of 2.2 million TEUs. The number of drivers providing drayage services to the Port in 2008 was estimated to be 1,989. If the efficiency with which drivers deliver containers does not improve between 2008 and 2030, the implication is that another 2,893 drivers will have to be attracted to drayage activity, bringing the crew of drivers to a total of 4,882.

An increase in drivers of this magnitude appears to be a significant challenge. However, when put into perspective, this increase need be accomplished over a 22-year period, implying that drivers need only be added to the labor force at a rate of 4.2 percent per year. In the post-regulation era of trucking in the United States, the driver population has been growing at an annual rate of 3 percent. Accommodating the forecast growth in container flows requires that the Port's drayage market grow each year by 1.2 percent more than the driver market generally.

Given recent economic events, and the likelihood that the current recession marks a significant change in the way that the U.S. economy functions, it is quite likely that this forecast is significantly higher than will be realized in 2030. Should container growth be only 80 percent of what is forecast, or 4.3 million TEUs, the driver pool at the Port would only have to increase at the rate of growth of the driver pool in the United States in order to accommodate growth.

2. TRANSPORTATION WORKER IDENTITY CREDENTIAL (TWIC)

On February 28, 2009, the Federal Government is scheduled to implement a policy of allowing only individuals equipped with a TWIC onto Port of Oakland marine terminals. Through surveys of drivers and LMCs, we have found that as many as 18 percent of the current set of drivers may not apply for or receive a TWIC. This suggests that as many as 357 drivers who currently provide drayage services at the Port may not be admitted onto Port premises on Monday, March 1. Although this might suggest that there are also 357 fewer trucks serving the Port, this need not be the case because there appear to be more drivers who have applied for a TWIC than currently serve the Port, so the trucks of those who do not receive a TWIC may be available to other drivers.¹⁰

TWIC could affect the basic structure of drayage at the Port in two different ways. It could disproportionately affect LMCs of a particular size or it could affect IOOs and employee drivers in different ways. Results from the LMC survey suggest that there is little in the way of a systematic effect on LMCs of different size. The expectations of managers at Class III LMCs are comparable to expectations at larger LMCs regarding the proportion of their drivers that will apply for and receive a TWIC.

With regard to IOOs versus employees, however, at the time of the survey, there seemed to be somewhere more uncertainty among employees than among IOOs as to whether or not they would apply for TWIC. While comparable numbers indicated that they would not apply for a TWIC, more than twice as many employees indicated that they did not know whether they would apply (17.5 percent for employees and 7.0 percent for IOOs). This difference is still quite

¹⁰ More generally, TWIC is about drivers, not about trucks. So extrapolating from the number of current drivers ineligible for TWIC to the number of trucks taken out of service is inappropriate.

small, and likely attributable to the fact that for IOOs, the TWIC is a matter of their livelihood, while it may not loom so large for employees and they have simply given it less thought.

3. CALIFORNIA AIR RESOURCES BOARD (CARB) EMISSIONS REGULATIONS

On January 1, 2010, meaningful emissions restrictions will be put in place that will limit the ability of a sizeable number of trucks that currently provide services to the Port of Oakland to continue doing so. Based on the distribution of truck ages and number of trucks (1,989) currently serving the Port, we have found that some 197 of the current fleet of trucks will have to be replaced, and another 1,332 will have to be retrofitted or replaced to comply with Phase I CARB regulations¹¹.

These figures indicate that in a worst-case scenario, some 81 percent of the trucks serving the Port may be affected on January 1st, 2010. This is 1,529 out of an estimated fleet of 1,891 (Table III-9).¹² 46 percent may have to be replaced, while 35 percent will be retrofitted.

TABLE III-9: IMPACT OF CARB REGULATIONS ON THE OAKLAND DRAYAGE MARKET¹³

Year	Number			Cost (\$Millions)		
	Affected	Replaced	Retrofitted	Total	Replaced	Retrofitted
2010	1,529	863	666	166.7	149.9	16.8
2014	797	559	238	103.1	97.1	6.0
TOTAL	2,326	1,422	904	269.8	247.0	22.8

¹¹ It is estimated that there are currently 338 trucks serving the Port that are pre-1994, and 1,566 trucks aged between 1994 and 2003. By 2010, these numbers are expected to decline to 197 and 1,332, respectively, through reduced container volumes and attrition at the older end of the fleet.

¹² These estimates provide fleet size will shrink with trade in 2009 and into 2010.

¹³ 2014 numbers are dependent about assumptions made regarding the proportion retrofit in Phase I. This table assumes that 50 percent of trucks of vintage 1994-2003 are replaced.

It is also possible that this transition to compliance will be extremely expensive. We have estimated that the replacement of 863 trucks will cost in excess of \$149.9 million. Further, the retrofitting of the additional 666 trucks will cost an additional \$16.8 million. Though CARB has committed to providing subsidies to cover up to half the cost, the current budget environment in Sacramento calls into question the likelihood that these funds will be released in a timely manner. Should these funds be available, the costs could be reduced to \$75.0 million and \$8.4 million for replacement and retrofitting, respectively.

Regardless of the cost, this requirement has the potential to significantly affect the supply of drivers and trucks to the Port. Although there is likely to be significant overlap between those ineligible for a TWIC and those not planning to retrofit or replace their trucks, it is possible that the CARB requirements could reduce the supply of drivers and trucks to the Port by an additional 300, resulting in a significant decline in driver supply that must be replaced in the next nine months.

This represents an upper bound, or worst-case scenario, for several reasons. Principal among these is the possibility that container flows through the Port will continue to decline through 2009 and into 2010, further reducing the number of trucks needed to service the Port. Other reasons include some key assumptions involved include:¹⁴

- The cost of a new truck, inclusive of taxes and interest payments is \$173,669
- The cost of a retrofit is likely to be approximately \$25,207 thousand per truck¹⁵
- Among drivers who have the choice of retrofitting or replacing their truck, we assume that 50 percent replace their truck

¹⁴ The full set of assumptions is spelled out more completely in Task 6A.

¹⁵ The raw cost of a new 2007 truck is assumed to be \$120,000 and the cost of a retrofit, \$20,000. The \$174,000 and \$25,000 figures reflect the costs inclusive of interest on the loan and sales taxes.

There are several ways in which these estimates could be reduced. First, if fewer trucks were replaced and more were retrofitted, the cost would be lower. Second, by 2010 used 2007 trucks will be readily available. The purchase of used trucks rather than new could also reduce the cost.

The Phase II CARB requirements, which take effect on 1/1/2014, imply a further need to replace and retrofit trucks. An additional 559 trucks will have to be replaced at a cost of \$97.1 million and an additional 238 will be retrofitted at a cost of \$6.0 million. The total cost of Phase II is \$103.1 million.

The total cost of both phases combined is estimated to be \$269.8 million. This includes 1,422 truck replacements and 904 truck retrofits.¹⁶ This is, again, a worst-case scenario, because it assumes a relatively high rate of replacement – 50 percent of those who have the option – and because it does not consider that drivers will buy used 2007 model vehicles, many of which should be available by 2010, and even more by 2014. Assuming, however, that costs are this high, it is estimated that the effect on drayage rates could range from 3.8 to 30 percent of the cost of a dray, depending on the distance travelled. This represents a much smaller proportion of longer drays than it does of shorter drays. Note, however, that if these costs are internalized to the LMC, the cost per dray will likely be an increasing function of distance given that the costs will be spread out across the time and mileage of the trip.

Table III-10 illustrates the change resulting from the delaying the replacement of trucks until absolutely necessary. With the delay in replacing trucks, there are significant changes in the timing and level of costs. In particular, the cost of Phase I is reduced from \$166.8 million to \$67.8 million. The cost of Phase II is increased from \$103.1 million to \$123.7 million, and the

¹⁶ There is some double-counting in these numbers as all of the trucks that were retrofitted in Phase I will have to be replaced in Phase II.

total cost is reduced from \$269.8 million to just \$191.5 million. This reduced cost, however, comes at the expense of increased dislocation in 2014, when it affect 1,118 trucks rather than 797 under the previous assumption of 50 percent retrofit and 50 percent replacement.

TABLE III-10: IMPACT OF CARB REGULATIONS ON THE OAKLAND DRAYAGE MARKET WITH DELAYED REPLACEMENT

Year	Number			Cost (\$Millions)		
	<i>Affected</i>	<i>Replaced</i>	<i>Retrofitted</i>	<i>Total</i>	<i>Replaced</i>	<i>Retrofitted</i>
2010	1,529	197	1,332	67.8	34.2	33.6
2014	1,118	643	475	123.7	111.7	12.0
TOTAL	2,647	840	1,807	191.5	145.9	45.6

Unlike TWIC, CARB regulations are likely to have an impact on the structure of drayage at the Port. In particular, IOO drivers currently drive trucks that are on average 3 years older than are trucks driven by employee drivers. The Phase I CARB requirement will force 15 percent of the current IOOs to replace their truck or exit the market because their truck is older than 1994. Just 6 percent of trucks driven by employees will have to be replaced. Additionally, about 90 percent of the trucks driven by IOOs are older than 2004 and will have to be retrofitted, compared to just 62 percent of employee driven trucks. The numbers for Phase I and Phase II combined are 98 percent and 82 percent for IOOs and employees, respectively. While the preponderance of all trucks and drivers will be affected, nearly all of the IOOs will have to either endure the burden of truck replacement, retrofit, or leave the market.

The implications of CARB are therefore more severe for IOOs than for the owners of the trucks driven by employee drivers. Couple this with the fact that IOOs have less access to credit than do LMCs generally, and this requirement poses a significant problem for the drayage sector. One option is for the IOOs to obtain financing assistance from their primary LMC. However, in surveys, the LMCs overwhelmingly indicate that they will not be able to provide financing

assistance to their IOOs. Unless the current credit constraints begin to ease in the near future, and it is not expected that they will, IOOs will find it very difficult to replace their trucks with new or used 2007 models by 2010.

It is also the case that smaller LMCs own and operate older trucks (Table III-11). Among Class III carriers, nearly 70 percent of their trucks are 2003 or older, all of which will have to be replaced by 2014 under the CARB guidelines. The largest LMCs will also have to replace nearly 70 percent of their trucks. Class II LMCs are in a good position, with just one-third of their trucks being older than 2004 model year. The CARB regulations may therefore promote a compressing of the size range of LMCs by encouraging both some of the largest and the smallest LMCs to discontinue providing drayage services.

TABLE III-11: DISTRIBUTION OF TRUCK AGES WITHIN LMC CLASS (%)

	Class I	Class II	Class III
Pre-1994	31.2	4.1	5.2
1994-2003	35.0	29.7	63.6
2004-2006	25.6	40.7	20.8
2007+	8.2	25.5	10.4
Total	100.0	100.0	100.0

**Source: Calculations by Beacon Economics*

4. AN EMPLOYEE DRIVER REQUIREMENT

The most efficacious approach to cleaning up and minimizing inefficiencies in the drayage sector at a given port has yet to be established. However, in the coming years, the potential contribution of an employee driver requirement – that all drivers serving the Port be employees of an LMC – will become clearer in addressing these issues. The employee driver requirement

is the principal feature that differentiates the efforts at the Port of Los Angeles from the efforts at the Port of Long Beach to clean up their trucking sectors.¹⁷

In the context of the Port of Oakland, implementing an employee driver requirement is marginally easier than at the Southern ports because the proportion of drivers who are currently employees is higher, one-third rather than one-fifth.¹⁸ However, at current levels, this still implies either replacing or transitioning some 1,300 IOOs into employees. Surveys indicate that as many as 60 percent of these IOOs would not be willing to enter into an employee relationship with an LMC. This suggests that as many as 800 new truckers would have to be brought into port drayage service.

Worthy of note in this discussion is the fact that, on average, LMCs contract with 73 percent more IOOs than they currently use in providing drayage services to the Port. So, for every 100 IOOs that service the Port, these firms contract with an additional 73. If these IOOs have the same preferences as those providing drayage to the Port, this pool of IOO drivers is likely to yield at least 381 drivers willing to be directly employed by the LMC. This could reduce the overall decline in drivers due to an employee driver requirement from the aforementioned 800, to 400.

In addition, there is also likely to be significant overlap between the TWIC, CARB, and employee driver requirement that would reduce the needs identified above. The burden could be reduced were the requirement to be phased in over the course of five years, as has been done at the Port of Los Angeles. This would mean replacing between 80 and 160 drivers per year, or about one per LMC.

¹⁷ The Port of Los Angeles has also defended the requirement on security and efficiency grounds in addition to facilitating the cleanup of the drayage fleet.

¹⁸ See Monaco (2008) for the one-fifth figure at the Southern Ports. We have found the one-third number for the Port of Oakland through surveys of both drivers and LMCs.

There is a further complementarity between CARB regulations and an employee driver requirement. Under an employee requirement, the LMC is responsible for the purchase, or lease, of the trucks used to serve the Port and any expenses associated with operating the truck. Our estimates indicate that when Phase II of the CARB requirements becomes effective in 2014, there will be as many as 797 additional trucks that may need replacement or retrofitting. The estimated cost associated with this phase is on the order of \$103 million, with a total cost of the CARB regulations estimated to be \$269.8 million.

The complementarity lies in the greater ability of an LMC to borrow funds and finance the replacement or retrofitting of trucks and in the ability of LMCs to price the need for newer and better trucks into their published and negotiated rates. Generally, LMCs have greater access to capital than do independent truckers. This access may manifest itself in better borrowing terms (ie, lower interest rates for LMCs), or in the inability of IOOs to obtain loans at all. This is a general principle in financial markets that has been exacerbated by the current credit crisis. How the access to capital for IOOs evolves in the coming months and years is as yet unclear.

The implementation of an employee requirement is therefore a double-edged sword. An employee requirement will almost certainly raise total labor and non-labor costs in the Port's drayage sector. An employee has associated costs including health insurance and vacation time in addition to unemployment compensation and workers compensation costs. In the aggregate, we estimate that these costs would add 27 percent to the cost of a driver when they transition from being an IOO to an employee.

It is unlikely that the cost per employee driver will increase significantly. Although an increase in demand usually leads to an increase in price, if supply is sufficiently elastic, the increase in price may be small or zero. As the demand for drivers at the Port is very small relative to the supply of drivers in the region, and Port drivers are relatively well compensated, it is presumed that drivers who are currently serving other markets could be enticed into drayage without

bidding compensation rates up significantly. As a consequence, total labor costs should increase on the order of only 18 percent. This is so because the increase in compensation costs applies only to IOOs, who represent two-thirds of drivers. Total labor costs will therefore increase by two-thirds of 27 percent, or 18 percent.

This cost is likely to be further offset somewhat by the greater ability of the LMC to manage the transition to cleaner trucks and to more efficiently distribute the burden of this cost throughout the market. Allowing the market to distribute the cost is significantly more efficient than a flat container fee imposed at the Port. Such a fee is essentially a subsidy of containers moving long distances by containers moving short distances due to the difference in environmental impacts. The fee per mile travelled or hour of the employee's time is surely much less for a long haul than for a shuttle haul. However, impact on the environment is higher for long hauls as they cover more miles and generate more air pollution than short hauls. Short hauls should therefore be subject to a smaller fee than long hauls and if they are not, they are subsidizing the burdens imposed by long drays.

5. SPIKES IN DEMAND FOR DRAYAGE SERVICES

The flow of containers through the Port is subject to periodic spikes in volume. The last such significant spike occurred in 2003, following the reopening of West Coast ports at the culmination of an intense round of labor negotiations.¹⁹ When the West Coast ports were reopened, much of the traffic bound for the San Pedro Bay ports was diverted to Oakland, where there was more capacity to unload them and get the ships underway faster. An increase in throughput results in an increase in the demand for drayage. However, discussions with

¹⁹ Although we are considering spikes of shorter duration, on the order of months, rather than over the course of a year, it should be noted that volumes at the Port increased by 14 percent in 1994, 12.6 percent in 2003, and 11.1 percent in 2005 without difficulty.

LMCs and Terminal operators have suggested that the flow of containers through the terminals in 2003 was not able to expand fast enough to challenge the existing fleet of drayage drivers.

Nonetheless, it is possible that a spike could occur and that the drayage sector would be forced to expand its capacity relatively quickly. There are several features of the current drayage environment that suggest responding to a sudden, perhaps even 25 percent increase in container flows would not challenge the existing corps of drivers. As discussed above, there is likely a surplus of drivers and trucks serving the Port. It is possible that the current supply could manage a 25 percent increase in demand for its services provided they were able to access the terminals more efficiently and receive their dispatches in a timelier manner. It is also the case that there are significant numbers of drivers who drive less than the maximum of 14 hours per day. For limited periods, simply expanding the hours worked among drivers could potentially increase supply by 10 percent.

The challenge of meeting spikes in demand will grow with the implementation of TWIC, adoption of CARB standards, and an employee requirement. In particular, the TWIC program purposefully limits the number of drivers who have access to the Port. In the event that efficiencies could not be reduced nor hours increased, expanding the number of drivers and trucks would be necessary. In the absence of a significant supply of drivers with a TWIC, it may be more difficult to meet the demands of a temporary spike in container flows. However, it is likely that the savvy LMC would have a supply of drivers on hand, each possessing a TWIC, to meet just such a spike in supply.

The early adoption of CARB regulations could further increase the challenge in responding to a temporary spike in container flows, because it will limit the supply of trucks available to service the Port.

An employee driver requirement will similarly limit the supply of drivers available to serve the Port. However, this limitation is likely to be less binding than either the TWIC or CARB

regulations. This is due to the fact that LMCs serving the port generally also provide other services in addition to port drayage. For these other services, we estimate that the LMCs currently employ an additional 1578 drivers. In times of scarcity, and with an employee driver requirement in place, it is reasonable to assume that LMCs would divert these drivers from their other tasks to drayage, providing the potential to offset a short term dearth of supply due to volatility in container flows.²⁰

C. OTHER ISSUES AND FINDINGS

1. CARGO DIVERSION

Though our analysis of diversion is still preliminary, our findings indicate that the range of cost increases that may result from TWIC, CARB, and a potential employee driver requirement should not result in widespread diversion. This is true for several reasons.²¹ In particular, it is intermodal trade that is the most prone to diversion. Estimates indicate that roughly 20 percent of the container flows through the Port of Oakland are intermodal. Assessing the likelihood of significant diversion of these flows requires more information, but early indications are that shippers choose the Port of Oakland for a variety of reasons other than cost. From an intermodal perspective, exporters may prefer Oakland to Los Angeles because they can put their cargo on the same ship three to four days after the ship leaves Los Angeles. Other reasons include the desire to avoid the congestion associated with moving container through the Port of Los Angeles.

²⁰ In the event that these drivers could not be diverted to Port drayage, there is scope for IOOs to provide an “escape valve” during temporary periods of high demand. This is discussed further in the next chapter.

²¹ These conclusions are more fully discussed in Task 3A.

It is also true that drayage rates can increase significantly without having a large impact on total transport costs. We estimate that even with a 21 percent increase in drayage rates, the average impact on transportation costs would be less than 1 percent. At this low level, it is unlikely that significant diversion will result.

In terms of local cargo, much of it travels a distance less than 100 miles from the Port. For this segment of the market, there would have to be a very significant increase in drayage rates to the Port of Oakland because diverting the cargo to Los Angeles is approximately four times more expensive. The majority of goods further away from the Port originate from locations around Sacramento, the Central Valley, and Reno. Diverting these goods to Los Angeles would also involve an increase in drayage rates of at least 100 to 200 percent, if not more.

As with anything in economics, when the price of something increases, the demand for it usually falls. The remaining question is then to what degree it is likely to fall. It will fall to the extent that there are good alternatives for the item in question (here: drayage) and it will fall to the extent that the demand for the final product is elastic. That is, if the shipper cannot pass the cost on to the ultimate consumer. It is relatively clear that for most local cargo there is no good alternative. It is also evident, from interviews, that for some commodities, waste paper, for instance, the demand is relatively elastic, meaning that the shipper is not able to pass the cost on to the final consumer, and less of the product will be shipped.

It is clear that an increase in costs will result in a reduction in the demand for Port services. However, it is unlikely that the reduction in demand will be significant. It is also possible that inefficiencies in the current drayage market will be reduced, offsetting some of the potential rate increases, further reducing the potential for diversion.

IV. DISCUSSION AND RECOMMENDATIONS

The primary motivation for this study is to more fully understand the economics of the drayage sector serving the Port of Oakland. The need for greater understanding comes from the Port's intention to implement a comprehensive truck management program (CTMP). Key goals of the CTMP include promoting the efficiency, sustainability, and flexibility, of Port trucking while addressing aspects of trucking activities that impose undue burden on local communities.

Policies that may serve as a guide to the Port in developing the CTMP include those recently developed by the two major ports in Southern California. Addressing primarily the need for a cleaner drayage system, they have taken similar approaches to the problem, with one crucial difference. The Port of Los Angeles is phasing in an employee driver requirement. By 2013, all drivers serving that Port must be formally employed by a Licenced Motorized Carrier (LMC). An important consequence of this requirement is that LMCs are legally responsible for providing their drivers with trucks and for all expenses related to operating the truck.

This chapter includes a discussion of the situation in Southern California, followed by a discussion and analysis of the pros and cons of policy alternatives as they pertain to the Port of Oakland. The policy options considered draw on the, to-date, limited experience with the programs in Southern California for guidance. The chapter ends with a discussion of our recommendations.

In each of these discussions, we consider five characteristics of a CTMP:

1. **Accountability:** the ability to ensure that trucks and LMCs are compliant with the requirements of the program, including truck age and maintenance requirements.

2. **Ease of implementation:** the ability to implement a program with a minimum of disruption to service levels.
3. **Sustainability:** a program that will result in a drayage system that is able to maintain a stable labor force and to keep up with increased environmental demands, without additional intervention.
4. **Efficiency:** a program that will result in the optimal allocation of drivers and trucks.
5. **Cost:** a program that will not unduly increase costs, causing potential diversion of discretionary freight.

A. EVALUATION OF PORT OF LOS ANGELES AND PORT OF LONG BEACH CLEAN TRUCKS PROGRAM

While the Clean Trucks Program (CTP) in Southern California was slated to begin on October 1, 2008, a series of obstacles prevented a full implementation of the first phase of the program until February 18, 2009, leading to confusion and frustration on the part of the stakeholders. Part of the delay was due to inquiries by the Federal Maritime Commission (FMC), which delayed the start of the fee collection. The FMC raised concerns about the anticompetitive nature of the program. There is also a pending lawsuit filed by the American Trucking Association alleging anti-competitiveness in the program, with a particular focus on the employee driver requirement adopted by the Port of Los Angeles (POLA), but not by the Port of Long Beach (POLB).

The truck age provisions of the POLA and POLB plans are nearly identical and involve the following timeline for implementation:

- October 1, 2008: all pre-1989 trucks were banned from the two ports.
 - This is 1 year and 3 months ahead of the CARB requirements.

- January 1, 2010: all 1989-1993 trucks will be banned, as will 1994-2003 trucks that have not been retrofitted.
 - This timing is the same as the timing of the CARB requirement, but exceeds them by also banning un-retrofitted 1994-2003 trucks.
- January 1, 2012: all trucks that do not meet 2007 U.S. EPA standards will be banned from the two ports.
 - This is two years ahead of comparable CARB requirements.

The two ports are similar in that they both require trucks to be equipped with Radio Frequency Identification (RFID) tags to ensure compliance and that they require LMCs to apply for concessions in order to operate at terminals at the ports. It is important to note that LMCs have to apply for separate concessions for the two ports due to different provisions in the concession agreements outlined below:

- The POLB concession consists of a one-time \$250 fee as well as an annual cost of \$100 per truck.
- The POLA concession consists of a one-time \$2500 fee as well as an annual cost of \$100 per truck.
- The POLA concession requires that LMCs convert to employee drivers according to the following timeline:
 - December 31, 2009: 20% employees
 - December 31, 2010: 66% employees
 - December 31, 2011: 85% employees
 - December 31, 2012: 95% employees
 - December 31, 2013: 100% employees
- The POLB concession does not require the use of employee drivers.

In both plans, the clean trucks fee is \$35 per loaded TEU (with exemptions for on-dock rail and freight headed to the Union Pacific Intermodal Container Transfer Facility), however, there are different provisions for exemptions to the \$35 fee.

- Both ports require a \$35 fee for diesel or alternative energy trucks with engine year 2006 or earlier.
- Both ports require a \$35 fee for trucks purchased with CTP funds.
 - These funds are in the form of state grants and other subsidies made available by the ports.
- Both ports exempt the fee for 2007 model year trucks purchased without CTP funds (either diesel or alternative fuel trucks).²²
- POLA exempts the fee for alternative fuel trucks purchased with CTP funds, however, POLB charges \$35 per TEU for these trucks.

With these provisions in mind (and with the caveat that the full CTP was only implemented one week ago), we consider the following criteria to assess the CTP program:

- Accountability
- Ease of implementation
- Sustainability
- Efficiency
- Cost

1. ACCOUNTABILITY

As both plans require RFID to track trucks and have contracted with PortCheck to administer the program, the plans appear to have a good deal of accountability. There will be a permanent

²² Though POLB only exempts 50% of the fee if the truck was purchased after 10/1/2008.

truck drayage registry, which will provide information on the trucks accessing the ports, filling an important information gap. Both Ports' concession agreements are detailed and require LMCs to provide information on, among other things, maintenance and parking facilities. In addition, in order for new trucks to be exempt from the fees, they must provide proof of scrapping of old trucks, which should ensure that older trucks are removed from the basin and not used for other purposes.

2. *EASE OF IMPLEMENTATION*

As previously mentioned, there have been significant delays in program implementation, with fee collection beginning on February 18, 2009. On that day, approximately 20% of trucks were unable to access terminals at the ports and were redirected to an information center, creating a traffic jam on every road in and out of Terminal Island (Journal of Commerce, 2/18/2009). Some of this was caused by trucks not registering with the ports or not affixing RFID tags to their trucks, however, there were reports that some RFID tags were not working properly. This signals the need to phase in an RFID tag requirement to alert drivers to problems ahead of time, and also the need to divert non-compliant trucks to a remote location that will not cause traffic jams in the port complex.

Another difficulty was caused by the delay in implementing the container fees: the Port of Los Angeles was delayed in paying incentives to LMCs that adopted clean trucks early. These incentives were to be paid with initial revenues from the POLA container fees and with assistance of state funds. Due to the state budget crisis, these funds were, and continue to be, held up. Combined with the delay in collecting the clean truck fees, POLA was forced to use its own general funds to begin paying incentives. One of the first payments was made to Swift, a large national carrier, which raised concern among smaller LMCs regarding when they would receive their incentive payments (Cunningham Report, 1/12/2009). These incentives have still not been fully paid to qualifying LMCs.

3. SUSTAINABILITY

It is assumed that the problems outlined above will be mitigated as time passes and more truck fees are collected. Meanwhile, some LMCs report concern about the impact of the declining economy, and port volumes, on their business at a time when they have committed to investing in new, clean trucks (Los Angeles Times, 1/27/2009).²³ For example, POLA recruited Swift Transportation into port drayage with the offer of incentive payouts, however, the company has been in financial distress due to the state of the economy and Standard and Poor has lowered their credit rating from B- to CCC+, signaling a higher risk for debt default. Given the current state of credit markets and the economic downturn, there are questions as to whether the increased costs of port drayage will lead to firms exiting the industry. This would be particularly concerning if these firms were recipients of truck subsidies.

4. EFFICIENCY

It is too soon to determine whether the system is efficient. The technology in use has not fully been tested, however, assuming that it works as expected, the boost in information technology and the ability to “track” trucks has the potential to lead to efficiency gains. As the RFID tags are only read at the terminal gates, they will only shed light on inefficiencies of truck movements within the terminal gates. At a minimum, there should not be hold-ups in the future as were witnessed on February 18 and 19 when the CTP was first implemented.

5. COST

In his economic analysis of the Clean Trucks Program, Husing (2007) estimates that the increase in drayage prices resulting from a combination of TWIC and the CTP (without employee

²³ Between 2007 and 2008, combined volumes at the Port of Los Angeles and Long Beach were down 9 percent from 15.7 million TEUs to 14.3 million TEUs.

requirements) would be 48.6%. If an employee driver requirement were added, he estimates that drayage rates would increase 80%. These are likely overstated as volumes were considerably higher at the time his report was written, which likely resulted in an overestimate of the impact on labor supply by factors such as TWIC. In a later report, Boston Consulting Group (BCG) estimated that the total cost of the CTP (without an employee provision) would be \$600M and an employee driver requirement would increase these costs by \$1.1B. These figures are higher than Husing's estimated breakdown as BCG assumed that there would be increased costs due to additional diversion under the employee driver requirement.

B. ANALYSIS OF CTMP AT THE PORT OF OAKLAND

Our evaluation of the efficacy of a CTMP includes the five components discussed above:

- Ease of implementation
- Sustainability
- Accountability
- Efficiency
- Cost

In this analysis we consider three potential business/operational structures that the drayage sector might take under the CTMP:

- LMC Concession (C)
- LMC Sponsorship (LS)
- Employee driver requirement (EDR)

All this must be considered with respect to the status quo – a system wherein LMCs hold relatively little market power, are price takers, and have low margins, leading to over-reliance

on Independent Owner Operator (IOO) labor. As drivers are paid by the trip, there is little incentive for drivers' time to be managed efficiently by LMCs. This leads to considerable waiting time often for dispatch and to pick up and drop off loads. The lack of rents accruing to either LMCs or IOOs leads to reliance on old trucks for port drayage, leading to negative externalities, including air pollution.

The LMC concession model follows the model adopted by POLB (described above) in which LMCs must apply for concessions to operate at the marine terminals, register all trucks used in drayage, and attach RFID tags to these trucks. Under this plan, either LMCs or IOOs would be eligible to apply for subsidies to finance clean trucks and these would be paid for through truck fees (a fee and subsidy, FS, system). All LMCs and IOOs would have to provide proof of maintenance on an annual basis.

A second possible model is an LMC sponsorship model. Under this model, not only would LMCs have to satisfy the concession requirements, but IOOs would have to be sponsored by an LMC to service MTOs. Under this arrangement, the LMC would assume some responsibility for the driver's truck, including regular inspections and possibly maintenance, and might also be required to assist IOOs in acquiring financing for the unsubsidized portion of their trucks.

The final model is the employee driver requirement, which follows the model enacted by POLA. Under this model LMCs would have to satisfy the requirements under the concession model, and would also be required to transition all drivers to employee status by the end of the second phase of the CARB requirements (the end of 2013).

These policies are intended to reflect a continuum of policies that impose an increasing burden placed on LMCs.²⁴ Each of these policy options are discussed here within the context of the five evaluation components listed above.

1. *EASE OF IMPLEMENTATION*

Implementing any of these alternative policies will require a phase-in period. Were any of these three policy alternatives imposed with no adjustment period, there would likely be a significant shock to drayage service at the Port. This shock would manifest itself in a reduced level of service as LMCs reorient their business models to accommodate the new policy environment. As the implications for LMCs under the concession model are relatively minor, it requires the shortest transition time, perhaps as little as three to six months.

Implementation of either the LMC sponsorship or employee driver requirement options would each require a longer phase-in period. Under the sponsorship model, there is a time component for LMCs as they sift through the driver pool to find drivers they feel comfortable sponsoring. As sponsorship involves a significant commitment on the part of LMCs, this may take some time. A phase-in period of up to two years may be necessary to avoid significant disruptions of service.

The employee driver requirement model imposes the most significant changes for an LMC and therefore requires the longest transition period. This transition not only involves the employment of new drivers, but the acquisition of additional trucks and maintenance capabilities for LMCs. Accordingly, a transition period of up to four years may be necessary to accommodate these changes. This transition period is shorter than that imposed by the POLA as the share of drivers currently serving the Port currently exceeds that serving the Southern

²⁴ It should also be noted that as this is an economic analysis, the legal issues will not be discussed.

California port complex. One-third of drivers serving the Port are currently employees, while the same figure for POLA/LB is just one-fifth. It is also the case that a higher proportion of LMCs dispatching drivers to the Port of Oakland already employ drivers and have systems in place to facilitate the hiring of more drivers.

From a long-term perspective, it is quite likely that an employee relationship would be the easiest to implement. Although the employee model involves the highest increase in costs (25%-50% versus 20%-30% to enact only the concession or sponsorship model), the sponsorship system implies greater uncertainty for the LMCs.²⁵ This is because the employee model is familiar to the majority of LMCs (31 out of 54 interviewed). Implementing the employee model implies merely expanding an activity that they are already undertaking. Implementing an LMC Sponsorship model, while clearly less intrusive and less financially burdensome for LMCs, involves entering into a new type of contract with the IOO drivers. This new contract involves the LMC taking on responsibilities for the driver's behavior when the LMC has relatively little control over the driver.

Such a relationship might be a difficult one for LMCs to readily accept. It is quite possible that rather than taking on this type of relationship, LMCs would simply hire the drivers. Accordingly, the sponsorship model may well have greater transition difficulties and could suffer from more significant setbacks than an employee model might. Although this model has been applied successfully on a limited basis in Southern California, it is this uncertainty that calls into question the sponsorship model over the employee model. Its ability to persist over the long term when applied to larger numbers of LMCs is unknown.

²⁵ These costs are the combination of increased labor and truck expenses. The labor expenses are greater under the EDR, while truck costs are largely similar across the three plans, reflecting the impact of the CARB regulations.

2. ACCOUNTABILITY

The status quo accountability rests largely on the shoulders of IOOs at the Port of Oakland. As only one-third of all drivers are employed by an LMC, the LMCs are formally accountable for only the trucks that they send to the Port, or roughly one-third of all calls. Given the incentive structure of the current system, there is every reason to assume that IOO drivers would minimize the time and resources devoted to truck maintenance and might drive faster than employee drivers. An LMC, with accountability for multiple trucks and multiple drivers, is more likely to properly and promptly address maintenance and safety issues with a particular truck. This is true because multiple violations attributable to a single LMC may be more likely to have more significant implications for the LMC than would independent violations by an IOO. Therefore, movement towards LMC control of drivers and trucks brings with it an increase in accountability relative to the status quo.

The concession model improves accountability over the status quo, as there would be a current truck registry. This registry would ideally be maintained by the Port, but would be CARB compliant. This would allow the tracking of all trucks entering Port property. Inclusion in the registry would require reports on truck inspections and maintenance. Failure to participate in the registry would preclude LMCs and IOOs from continuing to serve the MTOs.

Under the status quo, accountability resides with IOO drivers, approximately two-thirds of the drivers, and LMCs (and their one-third of the drivers who are employees). In general, the cumulative obligation on the part of LMCs for more than a single driver encourages greater accountability in terms of maintaining vehicles and encouraging safety among its drivers, as compared to IOOs. Therefore, moving toward a greater proportion of LMCs being accountable for their drivers, as employees or otherwise, increases accountability. An LMC sponsorship model potentially adds more accountability by ensuring that LMCs take an active interest in the on-going maintenance and safety of their fleet. The employee driver model should have the

highest level of accountability as LMCs directly own the trucks, making them far more vested in maintaining a clean, safe fleet.

Safety and security at the Port are closely linked to accountability. Increased accountability has the potential to augment other safety and security issues. The more accountability is lifted from the shoulders of individuals and placed on formal entities, the more it can serve as an additional layer of the Port's security system. An EDR, therefore, contributes more to safety and security than might a concession or sponsorship arrangement.

3. EFFICIENCY

As identified elsewhere in this report, considerable inefficiencies exist in the Port's drayage system. These inefficiencies range from time spent waiting for the next dispatch to time spent waiting at the terminal gates, and then within the gates while picking up or dropping off a container. There are three potential sources of this inefficiency: LMC dispatch policies, MTO inefficiencies, and driver inefficiency.

Under the concession model, there is no clear incentive for this inefficiency to dissipate. The LMC sponsorship and employee driver models clearly have a built-in incentive to make LMC dispatch policies more efficient as the LMC has a financial incentive to keep the trucks in its fleet moving.²⁶ Under the status quo, LMCs finding themselves with greater demand for their services than they have drivers to accommodate, will likely find that the lowest cost means of expanding capacity is to find another IOO. The concession model does little to change this, other than to impose a fee, \$100 in the case of POLA and POLB, on bringing this additional

²⁶ IOOs currently have similar incentives, but do not control the nature and timing of dispatches. Therefore, the driver does not have as much control over the truck as an LMC would if the LMC were to own the truck.

driver into service. Both the sponsorship and employee models increase the cost of adding another driver relative to utilizing the existing fleet more efficiently.

This may result in the driver labor force shrinking as LMCs maximize the productivity per driver. As the cost to add to the labor pool rises, the incentive to use existing drivers more efficiently rises. This incentive, then, should be greater in an employee model than an LMC sponsorship model, as the cost of sponsorship is less than that of hiring the employee.²⁷ Under the employee driver model, however, it is possible that driver inefficiency might increase, as an employee driver may have less incentive to use their time efficiently than an IOO.

It is important to note that none of the models address the third source of inefficiency, MTO inefficiency. Most terminals at the Port of Oakland have limited gate hours, which are further limited by closing for lunch.²⁸ This inevitably adds waiting time for most drivers, especially those engaged in shuttle hauls. As the lunch break is a function of the ILWU labor contract, there is little that can be done to alter it. It is a persistent inefficiency, and it is not readily apparent that any of the models has an advantage in mitigating it. It is possible that under an employee driver requirement, the increased costs of driver time could push LMCs to bill BCOs for waiting time at the terminals, which will place pressure on MTOs to increase flexibility. This, however, is far from certain.

Finally, it should also be noted that there are potential cost savings in insurance and maintenance that apply to the LMC sponsorship and employee driver models that are not currently being exploited and would likely remain unexploited under a concession model. In

²⁷ These costs include not only that of the truck, but the additional labor expenses of benefits, unemployment insurance, and worker's compensation.

²⁸ The lunch break at terminals imposes a discontinuity of service for most drivers. Should they find themselves at the Port during the lunch hour, there is no recourse but to wait until the terminal opens its gates.

the Driver Survey, we found that IOOs tend to pay significantly more for insurance than do LMCs for their employee drivers. IOO respondents indicated that, on average, they paid \$7,225 in annual insurance costs. Conversely, LMCs reported paying \$4,080. Similar differences have been found with regard to the cost of maintenance. LMCs performing maintenance in-house had substantially lower annual maintenance costs than did LMCs that contracted it out. The in-house costs reflect what an employee-only LMC might incur for annual operating expenses while the contracted costs more closely approximate the costs that an IOO might incur for a given level of maintenance.

The benefits of the efficiency improvements and cost savings possible through the LMC sponsorship or employment models are important as they not only reduce the cost of drayage and cost savings to Port customers, but they further reduce emissions – by reducing idle time – and lower the cost of keeping up with CARB requirements by reducing the number of trucks needed to serve the Port. More efficient drayage implies the need for fewer trucks to move a given number of containers. This implies that fewer trucks would need to be retrofitted or replaced to meet CARB standards within the drayage fleet.

4. SUSTAINABILITY

Sustainability is the potential for a model to sustain itself without continued Port intervention. All three models will require Port or State intervention initially, in the form of subsidies for truck replacements and retrofits. Given the number of replacements and retrofits that will be necessary prior to January 1, 2010, it is unlikely that any one of the three models will move with sufficient speed to avoid significant disruption of service. In particular, the large corps of IOOs will be unlikely to have taken sufficient action by the deadline to avoid a shortage of trucks.

Survey data indicate that subsidies would be a powerful motivator for not only action, but for encouraging replacement rather than retrofit, which is a better long-term solution.²⁹ This also suggests that subsidies could go a long way towards avoiding a shortage of trucks on January 1, 2010.

Despite initial adjustment issues, the LMC sponsorship and the employee driver models may allow continuous upgrading of trucks as environmental standards become increasingly stringent – without further subsidy from the Port. The mechanism through which this happens is far more transparent and certain with an employee driver requirement. The transparency is derived from the fact that the LMC makes the decision regarding the timing of retrofits and/or replacements. The LMC will be constantly monitoring the age of its fleet and evaluating the need to purchase new trucks to replace outdated trucks, either because they are becoming a maintenance problem or because of the need to comply with coming changes in emissions standards.

Crucial to compliance with CARB requirements is access to credit markets. It is likely that LMCs will have easier access to credit markets than might a pool of IOO drivers. It is possible then that a concession policy would limit participation in the drayage sector to IOOs with good credit. This represents a potential barrier to entry that may limit the ability of the drayage sector to grow over time and can be ameliorated through an LMC sponsorship or employee driver model. These latter two, however, are constrained by LMCs having to hire employee drivers they trust or being willing to co-sign loans for their IOOs, which might also exclude certain people from the market.

²⁹ Trucks with model year between 2994 and 2003 that are retrofit in 2010 will have to be replaced in 2014.

Limiting market access has the advantage of permitting drayage rates to rise, enhancing the ability of LMCs or IOOs to effectively respond to CARB requirements. In the absence of significant barriers to entry, some drivers will use older trucks up until the point at which they are no longer compliant and then will simply exit the market. This action will keep rates down, reducing investment in new trucks and increasing disruption when emission requirements are increased. The disruption results from the uncertainty surrounding the market once new regulations are put into place. LMCs and IOOs will be less likely to invest in new equipment if there is uncertainty over their ability to recoup their investment in the future through higher drayage rates. Hence the need for subsidies in this initial period as subsidization will reduce the effects of the initial uncertainty.³⁰

While the concession policy has the most open entry, there are limited barriers (concession applications, investment in RFID, and information sharing) that should protect the industry from destructive competition. This protection grows under the LMCs sponsorship model and is highest under the employee driver model. Although there is still room for competition, through the short-term entry of LMCs with emissions compliant trucks that do not plan to stay in the market through the next phase of emissions standards, this entry would be more difficult in the face of an employee requirement than under a basic concession model.

5. Cost

Regardless of the model chosen, costs are going to rise substantially. The upper bound of just truck replacement costs (not including any support from Prop 1B funds) will total \$269.8 million for both phases of CARB regulation implementation. On a per dray basis, this amounts to an

³⁰ This is an important lesson from the experience in Southern California. It is reasonably clear that uncertainty over the timing and ultimate form of the LA and LB CTPs has slowed action on the part of some industry participants.

increase of 3%-24% of the cost of the dray (the longer the haul, the lower the percentage of the total cost).

The concession model should increase costs on this order, with some additional costs for administering the concession system, which should not add more than an additional 1%-2% to the cost of the program. Rather than financing these costs on a per dray basis, they can be implemented with a fixed fee plus annual fee per truck, as the Southern California ports have done.

The employee driver requirement model will entail an additional increase in costs as unemployment and disability insurance, and other employee benefits are included in this model. This will increase the compensation costs of drivers who are now IOOs by 28%, which we expect will increase rates by 20%. Thus, the employee model will increase costs to the system (or drayage rates) an estimated 20% over the concession model. It is important to note that these cost estimates are based on the status quo, which is a non-union employee model. A union employee model may increase costs substantially, with increased rates, benefit levels, and the potential to introduce work rules that would diminish some of the productivity enhancement assumed in our employee driver requirement cost estimates.

The LMC sponsorship model lies somewhere in between the concession and employee models, but closer to the concession model, as little would be required in additional costs. Under a sponsorship model cost increases would mostly be administrative as LMCs expend resources to monitor drivers more closely and take some financial responsibility for truck maintenance.

C. RECOMMENDATIONS

In recommending a particular course of action for the Port of Oakland, the first consideration is the consistency of the status quo with the desired goals of the CTMP. The status quo has difficulty measuring up to any of the three alternatives discussed above. In particular, the

status quo is unlikely to be sustainable over the long-term as emissions requirements increase without heavy subsidization. From the Port's perspective, keeping the system as it is, is likely to be the most costly.

So we look to the alternatives. In this Chapter, we have considered three alternative policies or models to the status quo. These include a concession model, an LMC sponsorship model, and an employee driver requirement model. Each successive model imposes a greater burden in terms of compliance with Port policy than the previous model. In the table below, we have ranked the policies according to the evaluation criteria of the previous sections. A ranking of "1" indicates the most favorable policy under the specific criteria, while a ranking of "3" indicates the least favorable ranking.

A relatively clear and consistent pattern emerges. That is, that an LMC sponsorship model is largely a hedge between a concession model and an employee driver model. With the exception of the ease of implementation, we rank LMC sponsorship consistently number 2, behind either the concession or employee models. The lone exception is with respect to ease of implementation. Here, the LMC sponsorship model is ranked number 3, for the primary reason that it involves greater uncertainty resulting from the foreign nature of this relationship to both drivers and LMCs. Their willingness to participate in this model is unclear. While there is little reason to think that drivers would object to the relationship, the LMCs "commitment without control" has the potential to reduce their willingness to participate.

TABLE IV-1: A RANK ORDERING OF POLICIES BY EVALUATION CRITERIA

Criteria	Policy Alternatives		
	Concession	LMC Sponsorship	Employee Drivers
Ease of Implementation	1	3	2
Accountability	3	2	1
Efficiency	3	2	1
Sustainability	3	2	1
Cost	1	2	3

Between the concession and employee models, the employee model dominates in three of the five categories. Because of the intertwining of the interests of owners, capital, and labor, the employee model dominates in the accountability, efficiency, and sustainability categories. Accountability because the relationship between actors (drivers) and agents (LMCs) is closer under the employee model, so that each is more likely to act in the best interest of the other. Efficiency because the LMCs own the capital and want to maximize its return. And sustainability because LMCs making the capital and labor commitments to participate in this market are more likely to make business decisions that allow them to survive over the long-term. This includes, importantly, building the expense of regular truck upgrades into the rates charged to customers.

The concession model dominates with regard to ease of implementation and cost. As discussed above, the transition to a concession model is much easier for LMCs than acquiring trucks and employees to drive them. With regard to cost, the ranking is largely due to the fact that, all else equal, operating a drayage business is simply cheaper with IOOs than employees. With an employee comes a variety of additional costs that are not present when contracting with an

IOO. That said, all else is not necessarily equal. Under an employee requirement, there are cost savings available with regard to maintenance, insurance, and even potentially the purchase of the trucks and the diesel make them run.³¹ Survey data indicate that these savings may be substantial, though they likely do not exceed the increased costs of employing drivers.

Survey results also indicate significant inefficiencies in current drayage activities. Crucial in the determination of the most effective policy is the ability to reduce these inefficiencies. Of the three policy options, the employee requirement has the greatest potential to reduce inefficiencies. Standard economic models suggest that a smaller set of LMCs serving the port would have greater market power when dealing with customers (BCOs and Carriers).³² However, given the intertwining of a variety of interests in the supply chain, it is not clear the extent to which the market power of LMCs would result in anything more than higher drayage rates, reflecting the higher labor and capital costs of the industry.

As stated, the employee model dominates both the concession and sponsorship models on three of five criteria – and potentially on a fourth. The preferred model then depends on how these criteria are weighted. This weighting is beyond the scope of this work and is a matter of policy for the Port. It is also the case that although the employee model dominates with regard to accountability, we are unable to evaluate the benefits associated with increased accountability relative to the cost implications of the employee model.

Regardless of the model chosen, the following are vital elements for improving the structure of Port drayage:

³¹ Anecdotal evidence does indicate that some LMCs do obtain discounts on diesel from vendors for their IOOs as well as employees under the status quo system, though we have no way of knowing how widespread this practice may be.

³² A smaller set of carriers is the likely outcome of each of these three models, but is particularly likely in the case of the EDR.

1. Accountability on the part of LMCs – ability to confirm truck maintenance and safety.
2. Barriers to entry – Reductions in the number of LMCs/trucks serving the port so that those left in place can afford new trucks more often.
3. Information – the ability to use information systems to identify drivers (trucks) at the Port and the LMCs they are linked to.
4. Outreach/marketing – disseminating information on the CTMP in advance to LMCs and drivers. Planning for phase-in implementation, and developing outreach centers with some staffing and tech support to deal with implementation issues (like RFID reader problems and other issues faced by POLA/POLB).
5. Flexibility – the ability to deal with increases or decreases in demand without major disruptions to the workforce or level of service.
6. Efficiency: distortions to economic decisions should be kept to a minimum.

These criteria strongly suggest a drayage model that is more heavily reliant on employee drivers, but with a continued role for IOOs in limited circumstances. In particular, a employee based model may not, on its own, be capable of effectively responding to spikes in traffic. Some allowance for an “escape valve” to be provided by the admission of IOOs onto the Port would provide this relief in times of scarce drivers. The “escape valve” should, however, be used sparingly or it will undercut the long-term sustainability of the system by reducing the market power of the existing LMCs.

Relying on the supply chain as much as possible to pay for necessary changes is also indicated by these recommendations. In particular, efficiency calls for the costs of changes to the market to be internalized, or absorbed by the supply chain wherever possible. Container fees and the subsidization of truck retrofits distort the choices of economic agents in inefficient ways. For example, if the purchase of a truck is subsidized, the owner is going to be less concerned with recouping its full cost than if they had paid the full cost. Further, the owner will be more likely to purchase the truck when economic conditions are not favorable to recouping the full cost. In this latter case, the truck should probably not be purchased as it could result in an inefficiently large number of trucks devoted to providing drayage services.

It is also true that container fees, with which truck purchases may be subsidized, have the potential to distort the market. As the fee is generally a fixed dollar amount, it cannot account for the fact that some containers will be drayed further than others. A \$35 per TEU fee, for example, will have a greater percentage impact on the costs of a short or shuttle dray than on a regional dray. In effect, the shorter drays would be subsidizing the longer drays as the cost per mile traveled or time spent carrying out the dray will be higher for shorter than for longer drays. Alternatively, if the costs are internalized, the proportional impact is likely to be the same across different types of drays. A container fee may therefore have the potential to distort the relative numbers of short and long hauls.

For these reasons, a container fee distorts the efficient functioning of the drayage market. To the extent possible, costs associated with TWIC, CARB, or other changes to the market should be internalized, or paid for directly by market participants. An important exception is when significant market disruption might occur, as may well be the case with Phase I of the CARB regulations.

Additional recommendations come from the Southern California experience. The Clean Truck Programs of the Los Angeles and Long Beach Ports are still in their infancy, so it is difficult to draw firm conclusions, but some early lessons are clear. First, uncertainty is unproductive. It is reasonably clear that the uncertainty surrounding the implementation of the programs is creating some of the difficulty in adjusting to the new market structure. Market participants will resist adjusting to change until it is clear that the change is permanent.

Second, markets require time to adjust. Significant changes in the market should be phased in if possible. The Port of Oakland is better situated to absorb an employee driver requirement than are the Southern California Ports. This is true because the proportion of drivers who are IOOs is lower, and there are fewer small LMCs serving Oakland. Nonetheless, were an employee requirement to be implemented at the Port, it should be phased in over time.

Finally, a recent announcement by the Southern California Ports that a planned 5-year duration for their container fee may end within a year indicates that the markets, as is often the case, have adjusted more quickly and readily than anticipated.³³

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³³ Mongelluzzo, March 2009, Journal of Commerce.

V. LIMITATIONS

This report serves as an economic analysis of the drayage sector serving the Port of Oakland. While we attempt to comprehensively analyze the current state of the sector and estimate the changes inherent in the regulatory changes of TWIC, CARB requirements, and a potential employee driver requirement, there are several limitations to this study.

The main limitation is the report does not serve as a benefit-cost analysis. While the costs associated with TWIC, CARB, and an employee driver requirement have been estimated in dollar terms, there is no attempt to quantitatively estimate the benefits from this program. The negative externalities from port drayage have been well-documented in other sources. We do not claim that these benefits are either greater to or less than the costs outlined in our report.

The limitations of the various survey instruments are outlined in an appendix, so they are not repeated here, however, it is important to discuss the limitations inherent in primary data collection, particularly when participants are asked to recollect facts. Surveying both drivers and LMCs in port drayage led to roughly comparable figures on compensation and work which leads us to believe that the earnings and hours of work figures are representative of the sector as a whole.

Stated preferences in survey work are somewhat less reliable. For example, asking 100 drivers whether they would continue to work in drayage under an employee driver requirement or asking ocean carriers whether an increase in fees would cause them to divert freight may yield responses that do not reflect reality. In these cases, the responses are interpreted in a more qualitative way. If the CTP program at LA and Long Beach had been implemented sooner, it would have been beneficial to combine the response data with actual data on labor supply impacts or diversion due to the actual fee implementation. In the absence of this, we use the

responses given to us by the stakeholders at the Port of Oakland, with caveats that the actual effects might be quite different.

Another caveat is that all data collection and surveying was done during poor economic conditions, which worsened after surveying and are unlikely to improve until after the CTMP is enacted. As the economic climate in trucking, in particular, worsens, we may have underestimated the stress placed on business by the implementation of the CTMP and, therefore, have underestimated the number of LMCs that may go out of business as a result of the new requirements.

Finally, we do not consider the costs associated with an employee driver requirement that leads to unionization. This would clearly have substantial impacts on industry structure (LMC costs and survival rate), driver productivity (if drivers were paid by the hour), the price of drayage, and diversion.

VI. DETAILED FINDINGS BY TOPICAL/ANALYTICAL AREA

This chapter presents specific responses to the tasks outlined in the RFP and requested by the Port. The details provided in these responses provide the background for the previous chapters.

The information provided here is based on a variety of sources, including:

- The extant literature on port drayage services,
- Extensive surveys performed by the contractor and subcontractors,
- Data collected from individual terminals at the Port,
- National surveys, including the American Community Survey and Current Population Survey,
- Trade flow data provided by the Port and through the WiserTrade data portal,
- Analysis performed using the ImPlan model for economic analysis.

The survey instruments used to carry out this study are included as Appendices 6-11. In all, seven separate surveys were implemented. This includes separate surveys of Drivers and Licensed Motor Carriers in addition to four surveys of key players in the supply chain:

- Beneficial Cargo Owners (BCO)
- Ocean Carriers
- Marine Terminal Operators (MTO)
- Licensed Motor Carriers (LMC)

There were two distinct surveys administered to the LMCs, one for general responses regarding the economics of Port drayage and another to better understand their part in the supply chain. The following table illustrates the number of responses accumulated and the time period of the survey:

TABLE VI-1: SURVEY CHARACTERISTICS

Survey Target	Sample Size	Beginning of Survey	End of Survey
- Drivers	235	9/23/08	10/16/08
- Drivers: Supplement	63	1/1/09	1/31/09
- LMCs	54	10/8/08	2/10/09
- Supply Chain			
<i>BCO</i>	18	11/3/08	Ongoing
<i>Carriers</i>	6	11/3/08	Ongoing
<i>MTO</i>	9	11/3/08	12/18/08
<i>LMC</i>	25	11/3/08	12/17/08

A second, supplemental, survey of dishes was conducted by telephone. These contacts were obtained from a local LMC and the Port. This survey was conducted on IOOs to confirm responses acquired through the primary driver survey and to provide some insight into responses to CARB regulations. The representativeness of the sample cannot be verified and any results drawn from it are suggestive only.

A. TASK 1: A VALID METHODOLOGICAL ESTIMATION OF THE CURRENT SUPPLY OF TRUCKERS IN THE PORT OF OAKLAND AREA

A valid estimate is presented of the total number of drayage truck drivers that move containerized cargo to or from Port of Oakland marine terminals and to or from the BNSF intermodal yard in the Port Area (Oakland International Gateway). It is assumed that trucks doing business between the Port marine terminals and the Union Pacific Railyard (Railport), which is not located on Port property, will be captured through representative sampling of trucks serving the marine terminals, thereby appropriately excluding trucks that haul cargo to/from Railport without marine terminal interaction. This task includes the following sub-tasks:

- a) A valid estimate of the current supply of truck drivers serving the Port, broken down by those who are independent owner operators (IOOs) and those who are employees of a trucking enterprise.
- b) A valid estimate of the number of licensed motor carriers (LMCs) whose drivers serve the Port.
- c) An estimate of the current supply of drayage truck drivers and trucking enterprises serving the Port, broken down by the geographic location of the business enterprise: Port Local Impact Area; Port Local Business Area; California and outside California. In the event of multiple locations for a trucking enterprise, the location nearest the Port from which drivers are dispatched is used.

1. RESULTS

Key to understanding the economics of the drayage services provided to the Port of Oakland is an estimate of the size of the market. This size is characterized by three elements: 1) the number of containers moved, 2) the number of drivers moving those containers, and 3) the number of motor carriers dispatching drivers to the Port.

Table VI-2 provides an estimate of the number of drivers (1.a), the number of motor carriers (1.b), and their geographic distribution (1.c). Though not reported in Table 1, we estimate that 66 percent of drivers serving the Port are independent owner/operators and that 34 percent are employed (“employees”) by a motor carrier. We also estimate that only 8 percent of drivers are members of a union.

TABLE VI-2: SUPPLY OF TRUCK DRIVERS AND LMCs BY GEOGRAPHICAL LOCATION

	Number	Percent
Drivers		
<i>Port Local Impact Area</i>	332	16.7
<i>Port Local Business Area</i>	368	18.5
<i>California</i>	1,117	56.2
<i>Outside California</i>	172	8.6
Total	1,989	100.0
LMC		
<i>Port Local Impact Area</i>	58	48.1
<i>Port Local Business Area</i>	11	9.3
<i>California</i>	47	38.9
<i>Outside California</i>	4	3.7
Total	121	100.0

**Source: Calculations by Beacon Economics
 Port Local Impact Area (LIA) includes the cities of Oakland, Alameda, Emeryville and San Leandro. Port Local Business Area (LBA) includes the rest of Alameda County and Contra Costa County. Note that the 4 geographies are exclusive in this table. Port LBA includes LMCs that are not in the Port’s LIA, and California includes only LMCs that are not in either the Port’s LIA or LBA.*

The LMC counts reflect the location closest to the Port from which drivers are dispatched to the Port. Of those surveyed, 22.2 percent had headquarters located further from the Port.

We find that there are approximately 2,000 drivers presently serving the Port. Our estimates indicate that just 121 motor carriers direct these drivers. The vast majority of these drivers

reside in California (91.4 percent), and work for motor carriers that are also primarily in California (96.3 percent). Over one-third of the drivers are within the Port Local Business Area (LBA), while over one-half of the LMCs have operations within this area. Of the 16.7 percent of all drivers living in the LIA, 81 percent live in the City of Oakland. Of the LMCs surveyed, almost half have dispatch operations in the LIA. We also found little evidence of LMCs located outside of California.

The vast majority of drivers reside in California, 5.8 percent of IOO live outside of California. These states include Colorado, Georgia, Nevada, Tennessee and Texas. The location of LMCs, however, has a much smaller percentage outside of California. Only two LMCs in our sample are located out of state, both of which are located in Nevada.

2. METHODS

a) ESTIMATING THE NUMBER OF DRIVERS

Our estimates of the number of drivers serving the Port come largely from two sources:

- A survey of drivers taken as they enter a port marine terminal
- Data solicited from the terminals pertaining to container moves between the beginning of October 2007 and the end of September 2008.

Key information from the driver survey (DS) includes responses to the following questions:

*25. How many round trips to the Port of Oakland do you complete in a typical **day**?*

TABLE VI-3: SUMMARY STATISTICS ON ROUND TRIPS

	All Drivers	I00s	Employee
Mean	2.3	2.5	2
Median	2	2	2
Max	15 (8 is next highest)	15 (8 is next highest)	7
# of Respondents	170	107	63

The number of respondents listed above (170) is less than the number of drivers surveyed (236) because some did not provide a meaningful answer to this question.

**Source: Calculations by Beacon Economics*

These responses were then combined with counts of containers moving through each of the 8 marine terminals at the Port during the same period of time. These data were solicited from each terminal and pertain to the daily (sometimes weekly, if daily data were not available) movement of full, empty, and chassis-only movements for both imports and exports.

The number of drivers was calculated by estimating the number of round trips that occur on an average day at the Port and dividing this number by the average number of round trips a driver makes in each day.

Each of the container counts generally represents one half of a roundtrip for a driver.³⁴ However, the container counts do not account for each and every part of a round trip. The

³⁴ For an imported container, the first half of a round trip is the delivery of the full container to its inland destination and the second half is the return of the empty container to the port. For an export container, the first half of the round trip is the delivery of the empty container to the exporter and the second half is the return of the now full container to the port. There is sometimes coordination in the movement of empties so that they do not always return to the port. To the extent that this happens, the terminal container counts will understate the number of drayage trips.

driver survey results indicate that nearly one-third of all round trips include some amount of bobtailing. Bobtailing is the act of driving the truck with no trailer/chassis attached. While bobtails are counted as trucks leaving without a container or chassis, or arriving without a container or chassis, the bobtails are not accounted for in the container/chassis count data provided by the terminals. Estimating the number of gate moves in an average day then amounted to taking the maximum of all of the import (delivered) related moves (full, empty, chassis) and export (received) moves each day (or week). The average of these maximum values throughout the year was then used as the estimate of the average number of round trips each day.

This average number of roundtrips from the container data was found to be 4,602, which when divided by 2.3 (the number of roundtrips the average driver makes in a day), results in our estimate of 1,989 as the number of drivers serving the Port.

There are several ways that one could estimate this number. An alternative is to estimate the number of containers moved through the Port each day. In 2008, the Port reports having processed 2.2 million twenty-foot equivalent units of containers (TEUs), both full and empty. There are approximately 260 working days (Monday through Friday) at the Port, meaning that on average, 8,462 TEUs moved through the Port on a given day. Multiplying by a factor of 1.85, this implies that an average 4,574 containers move through the Port daily, implying slightly less than 1,989 drivers serving the Port.

b) RELATIVE NUMBERS OF EMPLOYEE DRIVERS AND IOOs

Discerning the breakout of these drivers between IOOs and employees was accomplished by solving the following equations:

- $X + Y = 1$
- $2.4X + 2.1Y = 4,602$

where x is the proportion of independent operators and y is the proportion of employee drivers. Employee drivers make on average 2.0 round trips per day while IOOs make on average 2.5 round trips per day. This implies that either employee drivers are generally used for longer distance drays or that their time is used more efficiently. The values of x and y that satisfy each of these equations are: 0.66 and 0.34, indicating that employee drivers make up just over one-third of the drivers serving the Port.

c) ESTIMATING THE NUMBER OF MOTOR CARRIERS

The number of LMCs providing drayage services to the Port is calculated using the average number of drivers found to serve the Port, 1,989, and dividing that by the average number of drivers at each LMC serving the Port, 24 (question 11 of the LMC Survey). This calculation results in an estimate of 121 LMCs providing drayage services to the Port.

d) GEOGRAPHIC BREAKDOWN OF DRIVERS AND MOTOR CARRIERS

Drivers were asked their city, county, and state of residence in the driver survey and motor carriers were asked the nearest location to the Port from which they provide drayage services. Using these responses, we were able to locate drivers and LMCs in the following regions:

- Port Local Impact Area (LIA)
 - The cities of Oakland, Alameda, Emeryville, and San Leandro
- Port Local Business Area (LBA)

- Alameda and Contra Costa Counties
- California
- Outside of California

The results are presented in Table VI-2.

B. TASK 2: ANALYSIS OF THE OPERATIONAL CHARACTERISTICS OF TRUCKERS IN THE PORT OF OAKLAND AREA

The task involved the following work:

- a. A breakdown of the percentage of drayage work done by LMCs using only IOOs, LMCs using only employee drivers, and LMCs using both IOOs and employee drivers. LMCs are differentiated by size (number of drivers).
- b. A set of baseline trucking rates charged by LMCs using employee drivers for port drayage and those charged by LMCs using IOOs, showing the rates for both short-haul and for long-haul moves.
- c. Comparison of the average number of daily trips into marine terminals at the Port for employee drivers of LMCs vs. IOOs, broken down by length of haul and location of the LMC.
- d. An evaluation of the income, driver expenses (such as wages and benefits), truck expenses and average weekly or monthly hours of driving per driver at LMCs using employee drivers vs. LMCs using IOOs.
- e. A breakdown of wages and driver benefits received by IOOs and employee drivers serving the Port.
- f. A daily operating cost model for LMCs using employee drivers vs. LMCs using IOOs.
- g. Identification of the factors likely to impact the employee totals of the LMCs using employee drivers, including current cost parameter models & estimated changes due to a potential mandated inclusion of owner-operators into these models. Where/how LMCs recruit new IOO or employee drivers is also identified.
- h. Related to (a), a contact list of trucking enterprises with more than 5 drivers that perform (i) only drayage at the Port and (ii) Port drayage and domestic non-drayage hauling, including domestic movements to or from the Union Pacific intermodal yard

adjacent to the Port. Further information about whether these enterprises use (i) IOOs, (ii) employee drivers, or (iii) both is provided.

- i. An evaluation of the average length of tenure in Port of Oakland drayage for drivers, broken down by IOOs and employee drivers.
- j. A breakdown of where truck drivers (both IOOs and employees) park, in and around the Port area.
- k. A survey, list, and map of available off-street parking at and adjacent to the Port for drayage trucks. This shows the number of spaces for tractors and for chassis/trailers. The area to be covered is generally bounded by I-580 to the North and by I-980 to the East.

1. RESULTS

- a) *A BREAKDOWN OF THE PERCENTAGE OF DRAYAGE WORK DONE BY LMCs USING ONLY IOOs, LMCs USING ONLY EMPLOYEE DRIVERS AND LMCs USING BOTH IOOs AND EMPLOYEE DRIVERS. LMCs ARE DIFFERENTIATED BY SIZE (NUMBER OF DRIVERS).*

Information describing the motor carriers serving the Port of Oakland was obtained through a detailed survey (See Appendix). In all, 54 LMCs were surveyed and asked the number of drays they perform in a given week, the number of drivers they employ, and the number of independent contractors (IOOs) they use. In Task 1, it was estimated that 121 LMCs provide significant services to the Port of Oakland. Given this estimate, we have surveyed approximately 45 percent of the LMCs serving the Port. This high percentage provides us with a sample of LMCs that is more than sufficient to address the issues in this task.

Table VI-4 provides detail on the distribution of drays across LMCs by size and type of driver. The majority of drays provided is split fairly evenly between LMCs that use IOOs only, and LMCs that employ IOOs and employee drivers, 48.8 percent and 46.3 percent respectively. Only 4.9 percent of drayage is done by LMCs exclusively using employee drivers.

TABLE VI-4: PERCENTAGE OF DRAYAGE WORK DONE BY LMC, DIFFERENTIATED BY SIZE AND TYPE OF DRIVER

LMC Size	Employees	IOOs	Both	Total
1 - 5	0.9	0.8	0.0	1.7
6 - 10	0.1	0.8	0.6	1.5
11 - 25	1.9	5.6	4.7	12.2
26 - 50	0.4	20.8	12.7	33.9
51+	1.6	20.9	28.3	50.8
<i>Total</i>	4.9	48.8	46.3	100.0
LMCs Surveyed (#)	13.0	23.0	18.0	54.0
Size of Fleet (#)	29.0	52.0	40.0	121.0

**Source: Calculations by Beacon Economics*

These results were gleaned from questions in the LMC survey regarding the numbers of drivers employed by the LMC and the number of independent operators with which they work. The numbers of drivers were limited to those providing drayage services; a significant proportion of the carriers surveyed (62.96 percent) also provide non-drayage related services.

The cells in the Table V1-4 are based on counts of drays and not on the length of drays. Table VI-4, therefore provides evidence on the distribution of drayage activity by type of LMC based on the number of drays each type provides.

- b) *A SET OF BASELINE TRUCKING RATES CHARGED BY THE LMCs USING EMPLOYEE DRIVERS FOR PORT DRAYAGE AND THOSE CHARGED BY LMCs USING IOOs, SHOWING THE RATES FOR BOTH SHORT-HAUL AND LONG-HAUL MOVES.*

The rates in Table VI-5 were calculated as averages of responses to the following question in the Motor Carrier survey (See Appendix H):

22. What is your typical charge for hauling a loaded import container from a Port of Oakland marine terminal to:

- A. *A railyard in Oakland (shuttle/landbridge)?* _____ (21)
- B. *A destination less than 100 miles away (short haul) ?* _____ (38)
- C. *A destination 100-249 miles away (regional haul)?* _____ (31)
- D. *A destination over 250 miles away (long haul)?* _____ (18)

The number in parenthesis to the right of each distance indicates the number of motor carriers providing rate information for each question. Not all LMCs provided rates for each distance.

Table VI-5 presents just the simple averages reported by the LMCs. Table VI-6 presents the trucking charges weighted by the number of drays performed each week by each type of LMC for the distance category. There is no rate reported in Table VI-6 for Employee-only companies for the shuttle distance because no such company reported performing shuttle hauls.

TABLE VI-5: AVERAGE BASELINE TRUCKING CHARGES BY HAUL AND TYPE OF LMC (\$)

	LMCs Using:			All LMCs
	Only Employee Drivers	Only IOO Drivers	Both Employee and IOO Drivers	
<i>Shuttle</i>	125.0	87.0	121.6	105.3
<i>Short</i>	342.5	271.8	345.9	323.5
<i>Regional</i>	517.9	520.9	711.5	624.8
<i>Long</i>	750.0	890.6	772.8	823.9
<i>Total</i>	433.9	442.6	488.0	469.4

**Source: Calculations by Beacon Economics*

TABLE VI-6: WEIGHTED AVERAGE BASELINE TRUCKING CHARGES BY HAUL AND TYPE OF LMC (\$)

	LMCs Using:			All LMCs
	Only Employee Drivers	Only IOO Drivers	Both Employee and IOO Drivers	
<i>Shuttle</i>	NA	66.9	88.0	86.1
<i>Short</i>	330.7	288.9	329.2	315.3
<i>Regional</i>	634.7	444.1	698.6	582.8
<i>Long</i>	750.0	908.4	907.9	874.8
<i>Total</i>	571.8	427.1	505.9	464.8

**Source: Calculations by Beacon Economics*

- c) *A COMPARISON OF THE AVERAGE NUMBER OF DAILY TRIPS INTO MARINE TERMINALS AT THE PORT FOR EMPLOYEE DRIVERS OF LMCs vs. IOOs, BROKEN DOWN BY LENGTH OF HAUL AND LOCATION OF THE LMC.*

Table VI-7 provides an estimate of the number of daily trips into marine terminals for employee and IOO drivers. On average, IOOs report completing more turns in a given day than do

employee drivers.³⁵ This holds true for each distance other than “Long” hauls, where the average number of trips is the same. The higher number of round trips for IOOs can either be explained by the longer workdays of IOO drivers relative to employee drivers,³⁶ more efficient dispatching of IOO drivers, or because employee drivers tend to perform longer hauls with shorter hauls thrown in to make maximal use of their time. The second explanation is refuted in Task 3 by evidence from the driver survey that IOOs tend to wait longer for their next dispatch than do employee drivers.

TABLE VI-7: AVERAGE NUMBER OF DAILY TRIPS BY TYPE OF HAUL AND TYPE OF DRIVER

Type of Haul	Employee	IOO	All
<i>Shuttle</i>	2.9	4.1	3.5
<i>Local</i>	2.6	3.5	3.2
<i>Short</i>	2.5	3.3	2.9
<i>Regional</i>	2.3	2.4	2.4
<i>Long</i>	1.6	1.6	1.7
Total	2.1	2.4	2.3

**Source: Calculations by Beacon Economics*

Table VI-7 above displays the average number of trips per day for port drivers. The total line provides an estimate that is based on each driver’s response, in the driver survey, to the direct question:

*25. How many round trips to the Port of Oakland do you complete in a typical **day**?*

³⁵ This difference on all hauls, 0.3 (2.4 – 2.1) may not be statistically different from zero. However, the difference for Short and Shuttle hauls is statistically significantly different from zero.

³⁶ See Table VI-7 below. This finding is clear from the driver survey, but is contradicted by results from the LMC survey.

The type of haul, shuttle, short, regional, and long is determined by following question in the driver survey:

32. What was the origin and destination of that trip?

This question solicited a location for both the origin and destination of the driver’s last trip. These answers were recoded into the four types of haul presented in the table.

Table VI-8 presents another approach in comparing the average number of daily trips into the Port for employee drivers and IOOs. Rather than averaging the number of trips according to the last trip, we have used the number of hours that the last trip took and combined it with the number of hours the driver works in a day to arrive at an estimate of the number of trips a driver could make in a given day if they were to perform **only the same type of haul** as their last dispatch.

TABLE VI-8: DAILY CAPACITY FOR DRIVERS TO PROVIDE A SINGLE TYPE OF HAUL EACH DAY

Type of Haul	Employee	IOO	All
<i>Shuttle</i>	8.0	8.8	8.4
<i>Local</i>	6.2	5.5	5.7
<i>Short</i>	4.7	4.8	4.8
<i>Regional</i>	2.8	2.7	2.7
<i>Long</i>	1.5	1.6	1.5
Total	3.1	3.4	3.3

**Source: Calculations by Beacon Economics*

This table indicates that a driver who performs only shuttle hauls throughout the day would perform 8 shuttle hauls if they are an employee and 8.8 if they are an IOO driver. In all categories other than “Regional”, IOOs will regularly perform more of a given type of haul in a single day than will employee drivers. This finding furthers the notion that it is longer workdays performed by IOOs than employees that explains the differences found in Table VI-7.

Table VI-9 provides an indication of the location of LMCs and the distribution of drayage activity by location. LMCs are placed into regions according to the nearest location to the Port from which they dispatch drivers for drayage activity. Note that the 4 geographies are exclusive in Table VI-9. LBA includes LMCs that are not in the Port’s LIA, and California includes only LMCs that are not in either the Port’s LIA or LBA.

TABLE VI-9: AVERAGE NUMBER OF DRAYS PER WEEK BY LOCATION AND TYPE OF LMC

	Employee	IOOs	Both	All
Oakland	12.0	397.3	639.4	474.9
LIA	30.0	0.0	45.0	37.5
LBA	0.0	98.8	35.0	86.0
California	14.3	122.5	197.5	162.5
Outside California	250.0	0.0	277.0	263.5

**Source: Calculations by Beacon Economics*

LIA: Includes the cities of Oakland, Alameda, Emeryville, and San Leandro

LBA: includes the rest of Alameda and Contra Costa counties

Note: the ‘Outside CA’ number is currently based on the response of two carriers.

d) AN EVALUATION OF THE INCOME, DRIVER EXPENSES (SUCH AS WAGES AND BENEFITS), TRUCK EXPENSES AND AVERAGE WEEKLY OR MONTHLY HOURS OF DRIVING PER DRIVER AT LMCs USING EMPLOYEE DRIVERS VS. LMCs USING IOOs.

Wage and expense data were collected as a part of both the driver and LMC surveys. From the driver survey, information on earnings was collected in three different ways. The drivers were asked the following questions:

7. In a typical **week**, what is your gross income from driving? \$ _____

8. How many days do you work as a truck driver? _____ days

9. How many hours do you work as a truck driver? _____ hours

22. Approximately how much money did you earn in the last year (12 months) as a truck driver, **net** of truck expenses, from your work driving at the Port of Oakland?

\$ _____

23. How much did you make in the last pay period? \$ _____

23A. How long was this pay period _____ weeks

Table VI-10 presents selected mean responses to these questions. The top panel present results for all respondents who answered all four questions (including the length of the pay period), while the bottom panel present responses from all survey participants who answered at least one of the questions. The top panel provides a better comparison of responses as it includes results from a matched set of drivers for each question. Allowing for different sets of driver responses to be included in the means, as in the bottom panel, may result in misleading inferences that are simply due to the different sample of drivers for each question.³⁷

³⁷ For instance, note the difference between answers to questions 22 and 23 for all employee drivers. This might suggest that drivers were responding with gross earnings to question 23, while the matched column suggests that drivers are responding to both questions by quoting net earnings.

TABLE VI-10: AVERAGE WEEKLY INCOME RESPONSES FROM INCOME QUESTIONS IN THE DRIVER SURVEY (\$)

	All	IOOs	Employees
Matched Observations			
7. <i>Gross Earnings</i>	1,574	1,951	1,127
22. <i>Net Earnings</i>	981	1,106	870
23. <i>Last Pay Period</i>	1,359	1,670	872
<i>Number of Observations</i>	55	34	21
All Observations			
7. <i>Gross Earnings</i>	1,636 (159)	1,862 (99)	1,265 (60)
22. <i>Net Earnings</i>	973 (100)	1,050 (70)	807 (29)
23. <i>Last Pay Period</i>	1,355 (92)	1,663 (56)	885 (36)

Number in parenthesis are survey responses

**Source: Calculations by Beacon Economics*

Several observations from this table are worthy of note:

- Gross earnings for IOOs are considerably higher than for employee drivers. This is necessary to compensate for the additional expenses that they incur in maintaining their own truck.
- Net earnings are also higher for independent owner/operators, indicating that IOOs likely responded with earnings net of expenses, but not of taxes.
- For both Employees and IOOs, their pay in the last period, in October, 2008, was substantially less than what they reported as their usual gross earnings. This likely reflects the declining economic environment.

Similar information was collected from the LMCs. The following questions were asked:

13D. On average, how much does a typical driver earn in a week (please report gross for owner operators)?

13J. On average, what are your combined monthly wage and benefit expenditures for one employee driver?

Table VI-11 presents selected results from the responses to these questions. Unfortunately, we were not able to solicit responses from all LMCs surveyed. The number who answered each question is listed in parenthesis just to the right of the mean values.

TABLE VI-11: MEAN WEEKLY INCOME RESPONSES FROM INCOME QUESTIONS IN THE LMC SURVEY (\$)

	Only Employees	Only IOOs	Both Employees and IOOs	All LMCs
Employees				
13D. Weekly Earnings	922 (13)	-	1,136 (16)	1,056 (32)
13J. LMC's Total Wage Expenditures	957 (10)	-	1,207 (15)	1,122 (27)
IOOs				
13D. Weekly Earnings	-	1,911 (18)	2,394 (17)	2,131 (37)

Number of survey responses in parenthesis

*Source: Calculations by Beacon Economics

These data reveal the same patterns between IOO and employee incomes, but suggest that the difference is in fact larger than was found in the driver survey. Gross income responses from the LMC Survey indicate that IOOs are paid \$40 less per week than was indicated by the driver survey responses.

Information on hours worked was also collected in both surveys. Table VI-12 presents a summary of the responses collected.

TABLE VI-12: EVIDENCE ON HOURS WORKED BY IOO AND EMPLOYEE DRIVERS

	Driver Survey Results			LMC Survey Results			
	Hours/Day	Hours/Week	Number of Obs.	All LMCs	Dispatch Both IOOs and Employees	Dispatch Only Employees	Dispatch Only IOOs
All Drivers	11.3	57.1	216				
IOOs	11.1	55.7	139	49.8 (39)	53.2 (18)		56.8 (19)
Employees	11.6	59.6	76	55.5 (34)	56.1 (18)	54.3 (13)	

*Source: Calculations by Beacon Economics

The driver survey suggests that employee drivers work more hours per day and more hours per week, 11.6 rather than 11.1 for IOOs. This is consistent with the LMC survey, with the exception of LMCs that only dispatch IOOs. Employee-only LMCs work slightly less hours in a week compared to LMCs that only contract with owner-operators. However, the differences

are small in both cases, leading us to the conclusion that hours worked are comparable. The small difference found in hours per day in the driver survey translates into nearly four hours on a weekly basis. Employee drivers are on average more likely to work right up to their 60 hour maximum each week than are IOO drivers.³⁸ Part of this difference is explained by our finding that employees tend to work more days per week than do IOOs, though the difference is again small.

Annual cost information regarding expenses was collected on both surveys.

TABLE VI-13: AVERAGE ANNUAL COST ESTIMATES FOR IOOs AND LMCs (\$)

	Driver Survey	LMC Survey			
	IOOs	Both Employees and IOOs	Only Employees	LMCs using Inhouse Maintenance	LMCs using Outside Maintenance
Repairs	6,848				
Maintenance	5,246				
Total R&M	12,094	6,900	5,100	6,492	7,341
Insurance	6,964	6,168	4,000	4,546	7,925
Sub Total	19,058	13,068	9,100	11,038	15,266
Fuel	38,883	31,200	31,200	31,200	31,200
Registration	1,200	1,200	1,200	1,200	1,200
Total Costs	59,141	45,468	41,500	43,438	47,666
# of Survey Respondents		25	7	13	12

Note: LMCs contracting only IOOs are excluded from these calculations.

**Source: Calculations by Beacon Economics*

Several patterns emerge from the cost data presented above. In particular, total costs are significantly higher for IOOs than for employee drivers. A primary contributor to this is significantly higher repair and maintenance costs. These items were broken out separately in the driver survey, but combined in the LMC survey. Although LMCs tend to use newer trucks (See Table VI-49), it is unlikely that these costs would be twice as high for an IOO as an LMC.

³⁸ By Federal law, drivers are allowed to work a maximum of 60 hours in any 7 day period.

Drivers were asked the following questions:

14. In a **typical month** how much do you spend on routine truck maintenance (oil change, tires, etc.)? \$ _____

15. In the **past year**, how much have you spent on major truck repairs? \$ _____

Although these were intended to solicit different sets of information, we suspect that the answer to question 15 generally included the amounts indicated in question 14. The response regarding “repairs” is taken as the more reliable indication of the total amount spent in a year by drivers on repairs and maintenance combined. This interpretation is consistent with the findings in the LMC survey as the amount is significantly more than reported by LMCs with employee drivers only and between the values reported for LMCs with maintenance performed in-house versus those who contract it out.

Other items of note include insurance. Insurance for an IOO tends to cost roughly \$800 more per year. IOOs pay on average \$6,964 in insurance costs, while LMCs pay on average \$6,168. Though significant, it is our suspicion that this gap understates the difference. Some LMCs provide access to their insurance for IOOs with which they have a close relationship. This may well be biasing the LMC’s insurance number upwards. LMCs that use only employee drivers report average insurance costs of \$4,000 per truck per year, substantially less than the \$6,168 reported by LMCs using both employees and IOOs. It appears as though LMCs that contract with IOO drivers, and perhaps offer them access to their insurance, pay higher premiums that do LMCs with only employee drivers. As there were only 7 LMCs surveyed that do not contract with IOOs, this number is only suggestive of the notion that the gap in insurance costs between IOO driven trucks and employee driven trucks exceeds \$800.

It is also evident, in responses from the driver survey, that fuel costs are higher for the IOOs than for employee drivers. This is plausibly explained by the combination of longer wait times

for dispatch, shorter on average hauls (meaning more waiting at the terminal as a proportion of miles travelled and more frequent starting and stopping), and older trucks – three years older, on average³⁹.

Table VI-14 presents hourly wages derived from the above data on earnings, hours worked, and operating costs. The calculation for employees is straightforward, but the calculation for IOOs is more complex as it requires the inclusion of the cost data presented above. The first column provides the simple calculation of employee driver income divided by hours worked in a week and finds that employee drivers earn approximately \$21.22 per hour, before taxes. This translates into annual gross wages of \$59,638.

TABLE VI-14: DRIVER HOURLY WAGES AND THEIR COMPONENTS FROM THE DRIVER SURVEY

	Employees	Independent Owner Operators		
		(1)	(2)	(3)
Weekly Gross Earnings (\$)	1,265	2,182	1,862	1,862
Weekly Hours	59.6	53.7	55.7	55.7
Weekly Expenses (\$)		1,132	1,193	1,058
Weekly Earnings net of Expenses(\$)	1,265	1,050	669	804
Hourly Wages (\$)	21.2	20.8	12.0	14.4
Annual Wages (\$)	59,638	57,966	33,353	40,024

*Note: Weekly Hours are estimated within each sample scenario and may differ with other estimates in this report
Source: Calculations by Beacon Economics

Three separate estimates are provided for IOOs. The first, column (1), is presented as the most plausible. The evidence presented above suggests that the responses to the net earnings question are the most reliable. The gross earnings data presented in this column is calculated from the net earnings responses, with weekly expenses added in, indicating gross earnings for IOOs of \$2,182, per week, a figure that is very consistent with results from the LMC survey,

³⁹ See Table VI-45 for Truck Age Distributions by Driver Type

which reports weekly earnings for IOOs of \$2,131. Accordingly, we find that IOOs earn \$20.84 per hour. This value translates to \$57,936 in annual gross earnings for IOO drivers.

Columns (2) and (3) provide alternative estimates of hourly wages for the drivers. Column (2) is calculated using the driver responses to question 7 above on gross earnings. Total expenses are subtracted from this, including values for both maintenance and repairs. This calculation indicates an hourly wage of only \$12.01. Column (3) removes the separate entry for maintenance, as the inclusion of this value may be double-counting, resulting in an estimated hourly wage of \$14.43.

Column (1) is presented as our preferred estimate given that a) it is consistent across surveys and b) it is quite plausible that a driver would provide a better estimate for annual net income than for weekly income because weekly income is likely to be highly variable.⁴⁰

Table VI-15 provides an indication of the expenses and driver incomes for drivers providing drayage services to the Port of Oakland broken out by type of LMC. The table provides results based on survey responses by LMCs using only employees, LMCs using only IOOs, LMCs using a mix of employees and IOOs, all LMCs – and for comparison purposes – directly from drivers through the driver survey. Where the data indicate a type of LMC (top panel and left side of the bottom panel) the results are from the LMC survey. Otherwise, they are from the driver survey.

⁴⁰ The lower figures are, however, consistent with the findings of another survey (EBASE, 2007).

TABLE VI-15: COMPARISON OF LMC EXPENSES FOR IOOs AND EMPLOYEES FROM THE LMC AND DRIVER SURVEYS

	Only Employees	LMCs Using:		
		Only IOOs	Both (Employees)	Both (IOO)
<i>Average Weekly Hours</i>	54 (13)	47 (19)	56 (18)	53 (18)
<i>Weekly Earnings (\$)</i>	922 (13)	1,911 (18)	1,135 (16)	2,394 (17)
<i>Weekly Expenses (\$)*</i>	957 (10)	-	1,207 (15)	-
<i>Annual Truck Insurance Costs (\$)</i>	3,835 (8)		4,167 (14)	
<i>Annual Maintenance/Repair Costs (\$)</i>	3,462 (10)		5,379 (13)	
<i>Weekly Fuel Expenses (\$)</i>	-	-		
<i>Number of Drivers</i>	13 (13)	29 (23)	17 (18)	31 (18)

**Expenses include Wage and Benefits for LMCs with only Employees*

**Expenses include Truck related costs for IOOs*

Numbers in parenthesis are sample size

Source: Calculations by Beacon Economics

	All LMCs:		Driver Survey:	
	Employees	IOOs	Employees	IOOs
<i>Average Weekly Hours</i>	55 (34)	50 (39)	60 (76)	56 (139)
<i>Weekly Earnings (\$)</i>	1,056 (32)	2,131 (37)	1,265 (60)	2,182 (38)
<i>Weekly Expenses (\$)*</i>	1,122 (27)	-		1,132 (38)
<i>Annual Truck Insurance Costs (\$)</i>	4,080 (32)			6,964 (132)
<i>Annual Maintenance/Repair Costs (\$)</i>	4,571 (31)			12,094 (91)
<i>Weekly Fuel Expenses (\$)</i>			686 (8)	824 (122)
<i>Number of Drivers</i>	9 (54)	23 (54)	80	154

**Expenses include Wage and Benefits for LMCs with only Employees*

**Expenses include Truck related costs for IOOs*

Numbers in parenthesis are sample size

Source: Calculations by Beacon Economics

Table VI-15 reports information on weekly earnings for drivers. Data from the LMC survey indicate the gross pay of drivers employed by the LMC and gross pay of the IOOs dispatched by the LMC. Data from the driver survey similarly indicate gross income. For employee drivers, this simply means before taxes whereas for the IOOs, it is constructed from net earnings and

total expense, making it gross earnings per week. Weekly expenses from the LMC survey are those reported and incurred by the LMC, including all labor related costs. The figure for IOOs under the driver survey indicates the weekly amount of expenses associated with running and maintaining their truck.

The table illustrates several interesting patterns. First, LMCs using only employee drivers appear to have their drivers operating significantly more hours than do LMCs using only IOOs. This is also true of employees at LMCs utilizing both types of drivers, where hours are greater for employees than IOOs.

Second, we believe that we have captured the weekly earnings for drivers quite closely as the results from the LMC survey are very close to those from the driver survey. According to the LMC survey, IOOs gross \$2,131 dollars per week. According to the driver survey, these earnings are approximately \$2,182.

Third, it appears to be quite a bit more expensive for an IOO to maintain and operate a truck than it is for an LMC. This is a common thread in conversations with LMCs associated with the survey: LMCs are able to obtain insurance much more cheaply for their fleet of trucks than are IOOs for their single truck. Although some IOOs are able to obtain insurance through their LMC, this is clearly not the case for many. It also appears that maintenance costs are lower for employee driven trucks than for IOO driven trucks, though our results do not control for the age of the vehicle. Survey results from the driver survey do suggest that trucks driven by IOOs are on average four years older than those driven by employees.

The first 6 columns of Table VI-15 are taken from the survey of LMCs. In order to ensure consistency of the calculations, the information on hours worked was computed rather than asked directly. It is unlikely that the LMCs would have direct knowledge of the number of hours driven by IOOs. Average weekly hours were calculated using the total hours worked in a week on the various hauls (LMC Survey, Question 9). The hours are multiplied to get the round trip

hours and then added up across all haul types. Average weekly earnings are obtained from responses to Question 13 of the LMC survey. Insurance and maintenance costs are both reported as annual values and are taken directly from responses to questions 16E and 16F of the LMC survey.

The final panel in the table, that from the driver survey, produces results for comparison and validation of the results from the LMC survey. Weekly Earnings for IOOs are constructed using net weekly earnings from the survey responses.⁴¹ To net weekly earnings, we add costs for insurance, maintenance and repairs, and fuel to arrive at a gross weekly earnings figure. The weekly expenses reported for IOOs from the driver survey reflect the sum of insurance, maintenance and repairs, and fuel. For employee drivers, we report the average of their responses to our question regarding gross weekly earnings.

e) AN EVALUATION OF WAGES AND DRIVER BENEFITS RECEIVED BY IOOs AND EMPLOYEE DRIVERS SERVING THE PORT.

Tables VI-16 and VI-17 illustrate the difference in wages and benefits between employee drivers and IOOs serving the Port. Table VI-16 merely reproduces information from the previous section. Table VI-17 indicates that while most employee drivers receive paid vacations and health insurance, only 1/3 of IOOs have health insurance and the majority of them purchase this insurance on their own.

⁴¹ Drivers were asked their gross earnings, but responses were not consistent with data collected through the LMC survey.

TABLE VI-16: EARNING AND BENEFIT COMPARISONS BETWEEN IOOs AND EMPLOYEE DRIVERS

	Employee	IOO
Weekly Gross Income	1,265	
Weekly Expenses		1,132
Calculated Weekly Gross Income		2,182
Reported Net Earnings		1,050
Tax Adjustment		75
Net of Expenses	1,265	1,050
Average Weekly Earnings	59.6	53.7
Net Hourly Wages	21.2	20.8

**Source: Calculations by Beacon Economics*

TABLE VI-17: PERCENTAGE OF DRIVERS THAT RECEIVE BENEFITS

	Employees	IOOs
Paid Vacation from LMC	98.9	0.0
Health Insurance from LMC	96.3	0.0
Percent of Drivers who have Health Insurance by Source:		
<i>From Any Source</i>	69.0	33.3
<i>Firm</i>	56.3	1.1
<i>Self Purchase</i>	3.6	20.0
<i>Spouse</i>	9.1	12.2

Source: Calculations by Beacon Economics

The information on health and vacation benefits in the top two rows of Table VI-17 is from the LMC survey (Question 13). Although the question is asked of individual motor carriers, the figures presented in the table are an average that is weighted by the number of drivers of each type at the LMC, yielding the proportion of drivers that have the benefit. The bottom half of the table is reported by the drivers in the driver survey. It is striking that the vast majority of

LMCs report offering their employee drivers health insurance, but less than 70 percent of drivers report having health insurance and only 56.3 percent report receiving coverage from their employer. While we can't know the cause of this disparity, employees declining coverage could be due to the fact they are covered by a spouse's insurance. This explanation still leaves a gap of 27 percent that can not be explained.

f) DAILY OPERATING COST ESTIMATES

Daily operating costs for the drayage operations of LMCs serving the terminals at the Port of Oakland are estimated for three groups: all LMCs, LMCs that use only IOOs in their drayage operations, and LMCs that use only employee drivers in their drayage operations. Data on services provided and rates charged were obtained from the LMC survey. Of the 54 respondents, 13 (24.1%) indicate exclusively using employee drivers in their operations and 23 (42.6%) report exclusive use of IOOs; the remainder (33.3%) use a mix of owner operator and employee drivers.

These three categories of LMCs differ significantly in the distribution of revenues. Table VI-18 presents the distribution of revenue for all firms and separately for those who use only employee drivers, only owner operators, or a combination of both.

TABLE VI-18: CLASS OF CARRIER (%)

	Only Employee Drivers	Only IOOs	Both IOOs and Employee	All LMCs
Class I (over \$10M annual revenue)	23.1	23.8	33.3	26.9
Class II (\$3-\$10M annual revenue)	15.4	28.6	33.3	26.9
Class III (less than \$3M annual revenue)	61.5	47.6	33.3	46.2
Total	100.0	100.0	100.0	100.0

**Source: Calculations by Beacon Economics*

Firms that specialize in one type of labor (either all IOO or all employee drivers) tend to be smaller than firms that use both types of labor.

There is considerable variation in the number of weekly hauls by the type of service firms provide. Table VI-19 presents the average number of weekly hauls by distance. Each category only includes the mean number of hauls for firms that provide at least some service in that category; for example, firms that offer no shuttle hauls will not have their 0 in shuttle hauls counted in that category.

Among the LMCs in the sample, 33% provide shuttle hauls, 87% provide short hauls, 72% provide local hauls, 72% provide regional hauls, and 41% provide long hauls.

TABLE VI-19: AVERAGE WEEKLY HAULS BY DISTANCE

	Shuttle Haul service provided	Local Haul service provided	Short Haul service provided	Regional Haul service provided	Long Haul service provided
Shuttle Hauls	220.0	90.5	75.3	91.1	92.8
Local Hauls	62.3	61.4	50.9	49.0	55.8
Short Hauls	179.2	152.9	144.4	149.4	180.1
Regional Haul	51.8	42.1	47.1	64.5	84.8
Long Hauls	23.3	7.7	9.4	15.2	27.9

**Source: Calculations by Beacon Economics*

There is little evidence of specialization by length of haul. For example, those firms providing shuttle haul services and providing many shuttle hauls have relatively low levels of regional and long hauls. Those firms that provide long haul service tend to also provide high levels of regional hauls and low numbers of shuttle hauls.

Given the disparate distribution of service, we provide operating cost estimates for the four categories outlined above. We use the means presented above to model a “typical” company that provides services across all lengths of haul. As most of the cost elements have been

generated either per mile or per hour, we first examine the mean miles and hours for the four lengths of haul, presented in Table VI-20. All data are obtained from the LMC survey.

TABLE VI-20: AVERAGE MILES AND HOURS BY LENGTH OF HAUL

	Mean Miles per haul	Mean hours per haul	Miles per hour at the mean
Shuttle Hauls	10.9	1.6	6.8
Local Hauls	31.6	2.0	15.8
Short Hauls	65.7	3.2	20.5
Regional Hauls	179.8	5.5	32.7
Long Hauls	319.7	9.1	35.1

**Source: Calculations by Beacon Economics*

Operating Costs for Firms Dispatching Only IOOs

For firms using only IOO drivers, the operating cost is assumed to be the gross paid to the driver, plus overhead estimated at 18%. This number is estimated from the ratio of support workers to drivers in the LMC survey results. Based on this assumption, the hourly cost of operation is assumed to be \$52.30, given the mean hourly gross of IOOs of \$44.32 as found in the LMC and Driver Surveys.

Table VI-21 presents total hours, cost per hour, annual cost, and daily cost for each of the four “hypothetical” firms assuming the use of IOOs.

TABLE VI-21: ANNUAL AND DAILY COST FIGURES UNDER IOO OPERATIONS

Total Weekly Hours	Shuttle service provided	Short Haul service provided	Regional Haul service provided	Long Haul service provided
Shuttle	232	71	86	41
Short Haul	616	483	502	615
Regional	279	256	354	470
Long Haul	212	83	137	255
TOTAL	1,339	893	1,079	1,381
Cost per hour (\$)	52.3	52.3	52.3	52.3
Annual Cost (\$)	3,640,942	2,429,688	2,934,395	3,755,922
Daily Cost (\$)	14,004	9,345	11,286	14,446

**Source: Calculations by Beacon Economics*

Combining the information above with the data on average number of drivers dispatched, Table VI-22 presents the annual cost per driver for the four hypothetical firms, assuming they only dispatch IOO drivers.

TABLE VI-22: ANNUAL OPERATING COST PER DRIVER, LMCs WITH IOOs ONLY

	Shuttle service provided	Short Haul service provided	Regional Haul service provided	Long Haul service provided
Number of Drivers Dispatched	36	30	34	39
Annual Cost per driver (\$)	101,137	80,990	86,306	96,306

**Source: Calculations by Beacon Economics*

It should be noted that the cost per driver is simply the average total annual cost divided by the number of drivers and is not a measure of the amount paid to drivers (as it also includes the firm's overhead costs).

Operating Costs for Firms Dispatching Only Employee Drivers

Estimating the operating costs for LMCs that employ drivers is more complicated as it requires estimating labor, benefits, and capital separately (whereas for IOOs all aspects of the truck driving job should be reflected in the gross earnings).

The costs of driver labor and benefits are estimated using data from the LMC survey. The overhead is estimated to be 28% (based on the LMC's non-driving labor costs). Diesel is assumed to be \$3.50 per gallon (which may be a high estimate, however, during the survey period the price of diesel peaked at over \$4 per gallon). The costs of tires, maintenance, trucks, and insurance are based on estimates from the American Transportation Research Institute (ATRI).

The cost assumptions are presented in Table VI-23.

TABLE VI-23: COST COMPONENTS UNDER EMPLOYEE DRIVER MODEL

Expenditure Category	Amount	Unit of measure	
Gas	0.60	mile	source: \$3.50/gallon assumption
Tires	0.03	mile	Source: ATRI report
Repairs/Maintenance	4.79	hour	Source: ATRI report
Truck	10.72	hour	Source: ATRI report
Insurance	3.12	hour	Source: ATRI report
Driver Pay	28.28	hour	Source: Calculated hourly plus 27% benefits from LMC survey
Overhead	28	percent	

**Source: Calculations by Beacon Economics*

Due to the differing lengths of hauls the cost per hour calculation varies by type of haul, as presented in Table VI-24.

TABLE VI-24: HOURLY COSTS BY LENGTH OF HAUL

Length of Haul	Cost Per Hour
Shuttle	56.53
Short Haul	65.29
Regional	72.43
Long Haul	73.78

*Source: Calculations by Beacon Economics

Analogous to Table VI-21 (for IOOs), Table VI-25 presents the total weekly hours, annual cost, and daily cost for the four “hypothetical firms.”

TABLE VI-25: ANNUAL AND DAILY COST FIGURES UNDER EMPLOYEE DRIVER OPERATIONS

	Shuttle service provided	Short Haul service provided	Regional Haul service provided	Long Haul service provided
Shuttle	232	71	86	41
Short Haul	616	483	502	615
Regional	279	256	354	470
Long Haul	212	83	137	255
TOTAL	1,339	893	1,079	1,381
Annual Cost (\$)	4,637,263	3,132,825	3,815,928	4,957,470
Daily Cost (\$)	17,836	12,049	14,677	19,067

*Source: Calculations by Beacon Economics

The cost per driver dispatched is presented in Table VI-26.

TABLE VI-26: ANNUAL COST PER DRIVER, LMCs WITH EMPLOYEES ONLY

	Shuttle service provided	Short Haul service provided	Regional Haul service provided	Long Haul service provided
Annual Cost per driver (\$)	128,813	104,428	112,233	127,115

*Source: Calculations by Beacon Economics

As mentioned in the IOO section, the cost per driver is not intended to represent the wages paid to drivers, but the average cost per unit of driver labor employed. What is notable is that this is considerably higher than the operating costs under the IOO model, even when assuming the same level of service. This suggests that under an employee driver requirement model firms might alter service to find the “optimal” level of drivers employed and market segment served.

Operating Costs for Firms Dispatching Both IOOs and EDs

In the *LMC survey*, the average proportions of drivers were 65% IOOs and 35% employee drivers in LMCs employing both types. Using these means, we take the weighted average of the IOO and ED cost models to estimate the operating costs for firms using a mix of drivers. The estimated overhead is 17%.

These results are presented in Table VI-27.

TABLE VI-27: COMPARISON OF COSTS

	Shuttle service provided	Short Haul service provided	Regional Haul service provided	Long Haul service provided
Annual Cost (\$)	4,282,573	2,882,508	3,502,103	4,529,719
Daily Cost (\$)	16,471	11,087	13,470	17,422
Number of Drivers Dispatched	36	30	34	39
Annual Cost per driver (\$)	118,960	96,084	103,003	116,147

**Source: Calculations by Beacon Economics*

- g) IDENTIFICATION OF THE FACTORS LIKELY TO IMPACT THE EMPLOYEE TOTALS OF THE LMCs USING EMPLOYEE DRIVERS, INCLUDING CURRENT COST PARAMETER MODELS & ESTIMATED CHANGES DUE TO A POTENTIAL MANDATED INCLUSION OF OWNER-OPERATORS INTO THESE MODELS. WHERE AND HOW LMCs RECRUIT NEW IOO OR EMPLOYEE DRIVERS IS ALSO IDENTIFIED.*

Employee Driver Requirement

The cost-based estimation finds significantly higher costs for LMCs using only employee drivers versus those using only IOOs, holding level of service constant. Comparison of Tables VI-22 and VI-26 from Task 2f shows that the difference in costs per driver ranges from 27% for shuttle hauls to 32% for long hauls. Those using a mix of IOOs and employees have costs on average 8-10% lower than those using only employees.

An employee driver requirement, then, will certainly increase the cost of operations substantially. This will result in one or more of the following outcomes:

- An increase in rates on the order of the cost differences outlined above (i.e., 27-32 percent increase).
- A decrease in level of service, such as more delays in picking up or dropping off containers as more work is being done by fewer drivers.
- Economic hardship to existing carriers using either exclusively IOOs or a mix of employee and owner operator drivers.

Sustainability of Firms in the Absence of the Employee Driver Requirement

There is some evidence of different rates of turnover by size of the fleet. We used the MCMIS database (described in detail elsewhere in this report) to develop a list of all LMCs located in Northern California and Western Nevada that offered intermodal services. There were 320 firms that had registered with the Federal Motor Carrier Safety Administration at some point in between 2004-2008, but over half had numbers that were no longer in service when called.

Among the LMCs surveyed, the average number of years the firm had been in service was 21.8 years, with a median of 16.5. The distribution varies markedly by class of carrier and size as shown in the tables below.

TABLE VI-28: YEARS LMC IN BUSINESS BY CLASS OF CARRIER

	Mean	Median
Class I (over \$10M annual revenue)	34.1	25.5
Class II (\$3-\$10M annual revenue)	23.2	19.0
Class III (less than \$3M annual revenue)	15.3	10.0

**Source: Calculations by Beacon Economics*

TABLE VI-29: YEARS LMC IN BUSINESS BY TYPE OF DRIVERS USED

	Mean	Median
Employee drivers only	27.7	26.0
IOOs only	14.5	10.0
Mix of driver types	26.9	22.0

**Source: Calculations by Beacon Economics*

The larger carriers and carriers that use some or all employees in their drayage operations have been in business considerably longer than smaller carriers or those that use exclusively IOO drivers.

These differences aside, it appears that the bulk of active carriers (those who are still in business) have been in the market for a relatively long period of time. Across all carriers, the bottom 10% had been in business for 5 years or less and none had been in business less than two years, providing evidence that there is a fair amount of stability currently in the system. It is, however, impossible at this time to assess whether these survival patterns will be affected by the current economic downturn.

TABLE VI-30: METHODS OF RECRUITING DRIVERS

	All LMCs	IOO specialized	Employee specialized	Mix of IOO and Employees
Driver referral	79.5	78.9	66.7	88.9
LMC referral	22.4	15.8	16.7	33.3
Newspaper Ads	34.7	21.1	58.3	33.3
Local Driver Training Centers	8.2	0.0	25.0	5.6
Ads to other workers	2.0	0.0	8.3	0.0
Sample size	49	19	12	18

**Source: Calculations by Beacon Economics*

In the sample, two LMCs do not indicate any recruitment strategies. Among those that do have a strategy, driver referral is by far the most common. Firms that use only employee drivers report they are more likely to place ads in local newspapers or advertise at local driver training centers. LMCs using both types of drivers report a greater likelihood of using referrals from other LMCs than firms exclusively employing either type of driver.

- h) RELATED TO (A), A CONTACT LIST IS PROVIDED OF TRUCKING ENTERPRISES WITH MORE THAN 5 DRIVERS THAT PERFORM (I) ONLY DRAYAGE AT THE PORT AND (I) PORT DRAYAGE AND DOMESTIC NON-DRAYAGE HAULING, INCLUDING DOMESTIC MOVEMENTS TO OR FROM THE UNION PACIFIC INTERMODAL YARD ADJACENT TO THE PORT. INFORMATION ABOUT WHETHER THESE ENTERPRISES USE (I) IOOs, (II) EMPLOYEE DRIVERS, OR (III) BOTH IS FURTHER PROVIDED.*

[See Appendix A1 for Contact List.]

j) AN EVALUATION OF THE AVERAGE LENGTH OF TENURE IN PORT OF OAKLAND DRAYAGE FOR DRIVERS, BROKEN DOWN BY IOOs AND EMPLOYEE DRIVERS

Table VI-31 presents the average number of years that IOOs and employee drivers have been serving the Port. On average, IOOs have two more years of tenure than do employee drivers. These data were derived from the driver survey in response to the question:

1A. How many years have you driven a truck at the Port of Oakland?

TABLE VI-31: AVERAGE NUMBER OF YEARS DRIVING AT THE PORT

Driver	Years
<i>Employees</i>	5.6
<i>IOOs</i>	7.6
<i>All Drivers</i>	6.9

**Source: Calculations by Beacon Economics*

j) A BREAKDOWN OF WHERE TRUCK DRIVERS (BOTH IOOs AND EMPLOYEES) PARK, IN PARTICULAR IN AND AROUND THE PORT AREA

Unfortunately, the results from the driver survey were not particularly helpful in this regard. What we have found relevant is that over 90 percent of LMCs provide parking for their drivers. Of the LMCs that provide parking to their drayage drivers, over 40 percent provide parking on facility premises. Over 12 percent provide parking for their drivers at a facility on Port of Oakland premises.

TABLE VI-32: LOCATION OF PARKING FOR LMCs WHO PROVIDE PARKING TO THEIR DRIVERS (%)

	LMCs using:			All LMCs
	Employees	IOOs	Both	
On Facility Premises	33.3	16.7	55.0	43.8
Port of Oakland	16.7	50.0	0.0	12.5
Other Location	50.0	33.3	45.0	43.8

Source: Calculations by Beacon Economics

- k) *A SURVEY, LIST AND MAP OF AVAILABLE OFF-STREET PARKING AT AND ADJACENT TO THE PORT FOR DRAYAGE TRUCKS. THIS SHOWS THE NUMBER OF SPACES FOR TRACTORS AND FOR CHASSIS/TRAILERS. THE AREA TO BE COVERED IS GENERALLY BOUNDED BY I-580 TO THE NORTH AND BY I-980 TO THE EAST.*

See the study produced by Marstel-Day as a subcontractor to Beacon Economics in Appendix A2.

C. TASK 3: ANALYSIS OF THE SUPPLY AND DEMAND FOR TRUCK DRIVERS AT THE PORT OF OAKLAND

This task involves three principal sub-tasks, as follows:

- a) Presentation of current driver demand patterns by day of the week and by month.
- b) An evaluation of the degree to which driver supply could affect actual and projected container volume growth at the Port over ten years. For the purpose of this analysis, the Port's estimated future maximum throughput in 2030 is approximately 5.4 million TEUs.
- c) An assessment of the size, availability and characteristics of the potential driver pool from which drayage drivers could realistically be drawn to meet growth in demand at the Port. It is assumed that drivers would have to meet TWIC requirements.
(Addition) Assess the economic impacts of restructuring the Port's trucking services around LMCs with employees within the Port Local Impact Area (LIA).

1. RESULTS

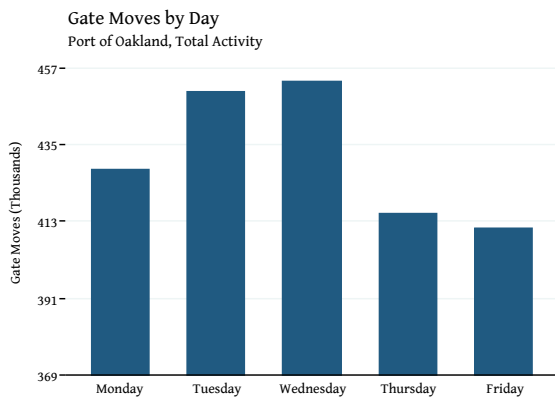
a) PRESENTATION OF CURRENT DRIVER DEMAND PATTERNS BY DAY OF THE WEEK AND BY MONTH

Charts VI-1 and VI-2 illustrate the variability of container flows through the Port of Oakland on a daily and monthly basis, respectively. These charts are based on data collected from the eight container terminals at the Port of Oakland. Six of the eight terminals provided daily counts of container flows through their gates, both inbound and outbound during the period of October 2007 through September 2008. The other terminals were unable to provide data on a daily basis, but were able to provide data on a weekly basis. Accordingly, the data in Chart VI-1 reflect only the data collected from the six terminals on a daily basis. The daily counts are therefore an understatement of the daily totals. As we are not able to identify the seventh and eighth terminals, we are not able to ascertain the extent to which this omission might bias the distribution of container moves across days of the week.

Daily Counts

Charts VI-1 through VI-4 present daily counts of the total number of gate moves at the six terminals reporting daily gate moves. The numbers have been inflated by 16.7 percent to account for the two terminals that only report in weekly numbers.⁴² The data run from October 1, 2007 to September 30, 2008.

FIGURE VI-1: TOTAL ANNUAL GATE MOVES BY DAY (OCT. 07 –SEP. 08)



Gate moves are the highest on Tuesday and Wednesday, and the lowest on Fridays. This is a pattern that is largely driven by the movement of loaded containers and offset, to some extent, by the movement of bare chassis, primarily out of the Port, on Fridays.

⁴² These two terminals represent 16.7 percent of goods movement. Inflating the numbers in the tables by this amount was necessary to have the gate moves in the chart reflect the total volume. To the extent that these two gates have daily patterns that differ from the other terminals, their particular daily patterns are not reflected in this chart.

FIGURE VI-2: TOTAL ANNUAL GATE MOVES OF FULL CONTAINERS, BY DAY (OCT. 07 –SEP. 08)

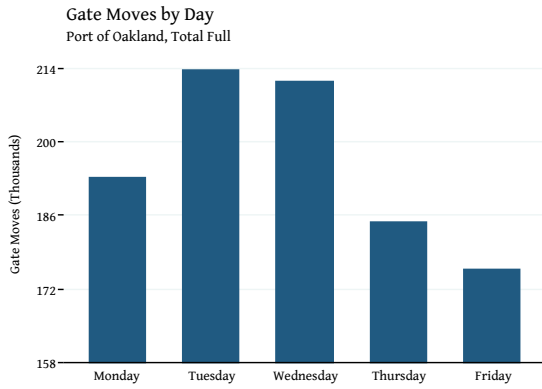
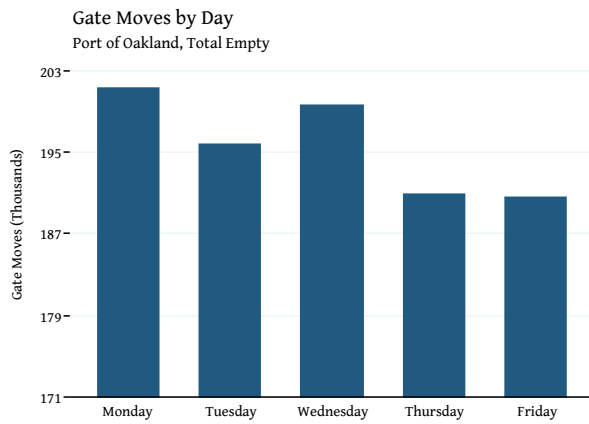


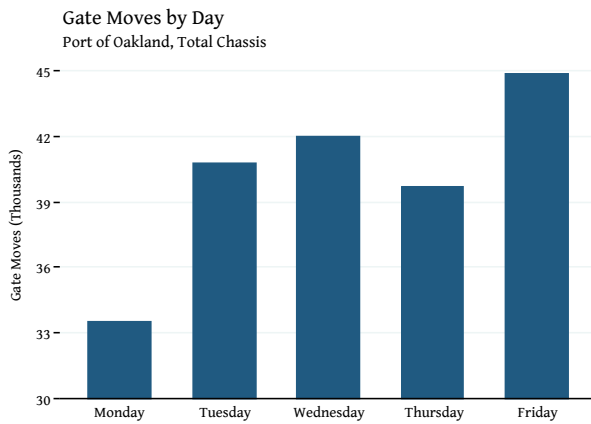
Figure VI-2 illustrates the high mid-week flow of loaded containers described above.

FIGURE VI-3: TOTAL ANNUAL GATE MOVES OF EMPTY CONTAINERS, BY DAY



In contrast with loaded containers, empty containers move through the Port predominantly in the early days of the week, supporting the subsequent influx of loaded containers.

FIGURE VI-4: TOTAL ANNUAL GATE MOVES OF BARE CHASSIS, BY DAY



Bare chassis movements grow throughout the week, ending strong on Fridays.

Weekly counts

Charts VI-5 through VI-8 present weekly counts of the total number of gate moves at all eight terminals. Week 1 is the first week in October 2007 and week 52 is the last week in September 2008.

FIGURE VI-5: TOTAL GATE MOVES BY WEEK

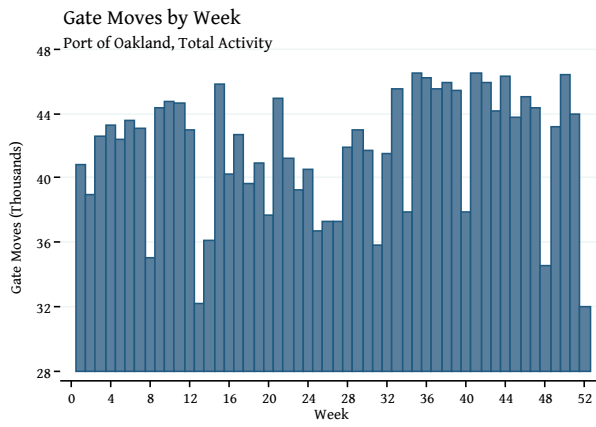


FIGURE VI-6: TOTAL GATE MOVES OF FULL CONTAINERS BY WEEK

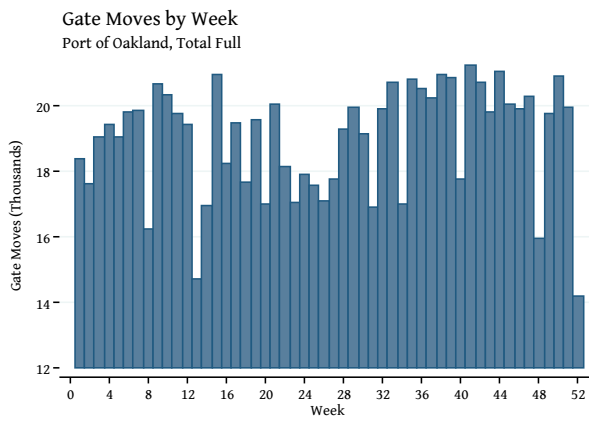


FIGURE VI-7: TOTAL GATE MOVES OF EMPTY CONTAINERS BY WEEK

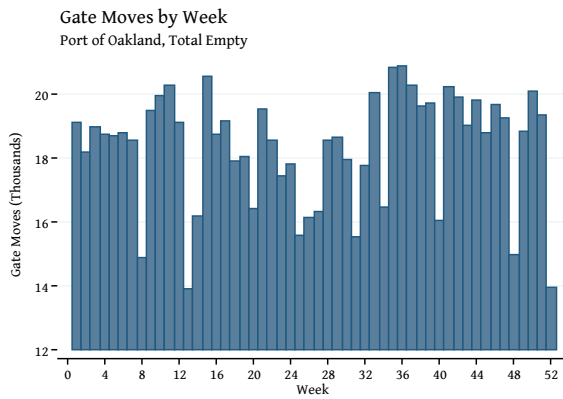
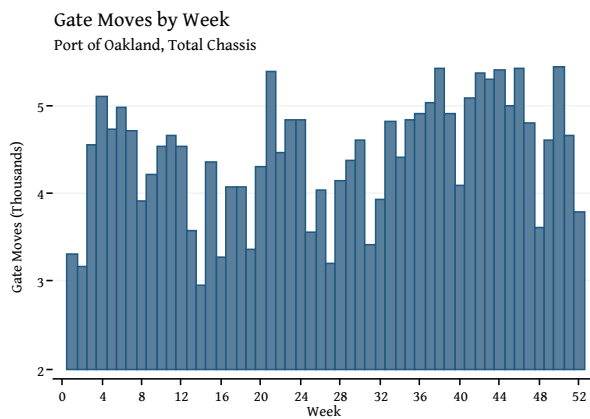


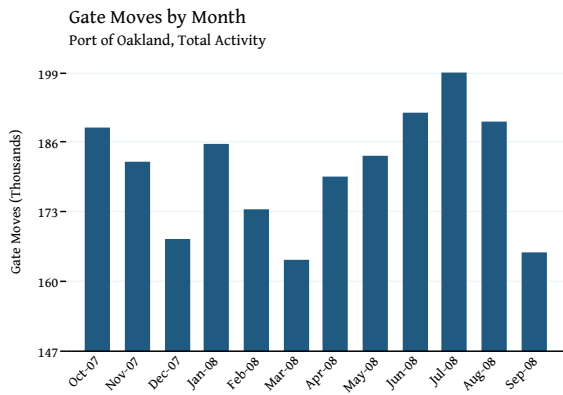
FIGURE VI-8: TOTAL GATE MOVES OF CHASSIS BY WEEK



Monthly counts

Charts VI-9 through VI-12 present monthly counts of the total number of gate moves at all eight terminals.

FIGURE VI-9: TOTAL GATE MOVES BY MONTH



On a monthly basis, container flows exhibit considerable month to month volatility, peaking in July and reaching lows in March, September, and December. It should be remembered that the September data may not be a reflection of normal patterns as it was observed in 2008, a year of very slow traffic for the season due to the economic recession.

FIGURE VI-10: TOTAL GATE MOVES OF FULL CONTAINERS BY MONTH

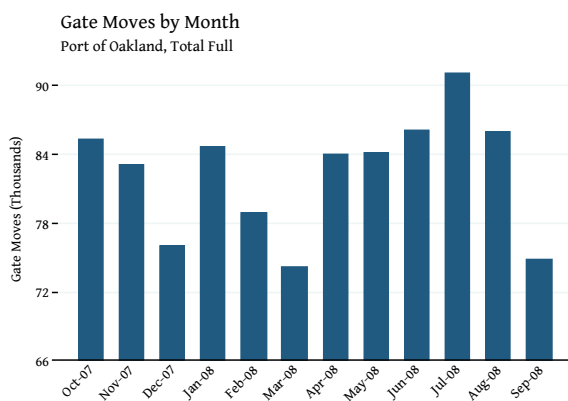


FIGURE VI-11: TOTAL GATE MOVES OF EMPTY CONTAINERS BY MONTH

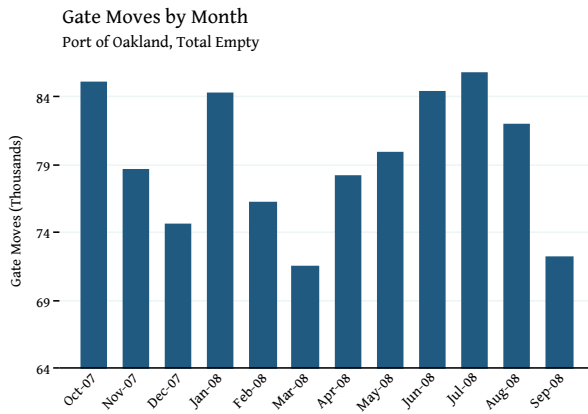
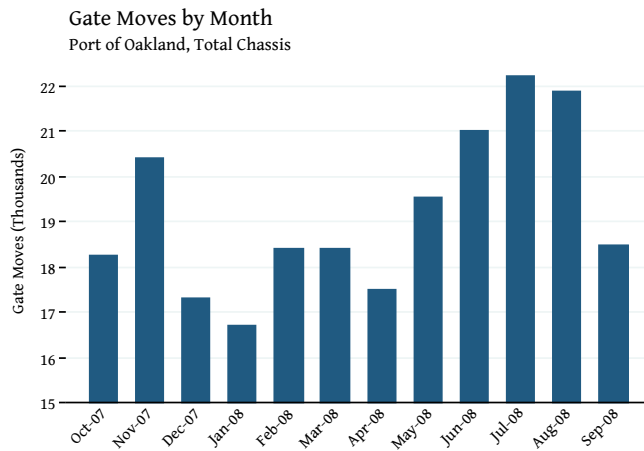


FIGURE VI-12: TOTAL GATE MOVES OF BARE CHASSIS BY MONTH



- b) *AN EVALUATION OF THE DEGREE TO WHICH DRIVER SUPPLY COULD AFFECT ACTUAL AND PROJECTED CONTAINER VOLUME GROWTH AT THE PORT OVER TEN YEARS. FOR THE PURPOSE OF THIS ANALYSIS, THE PORT'S ESTIMATED FUTURE MAXIMUM THROUGHPUT IN 2030 IS APPROXIMATELY 5.4 MILLION TEUS.*

Ultimately, the question of driver supply affecting actual and projected growth comes down to

four issues. First, the importance of drayage as a cost item, particularly container moves. Second, IOO drivers may choose to leave the market in large numbers following an employee requirement. Third, the potential for driver replacement and increased supply from the local market. Finally, it is possible that eliminating existing inefficiencies could alleviate the need for additional drivers to meet future demand.

Contribution of labor costs to total shipping charges

In this section, we address the importance of drayage as a cost item in container moves. Drayage costs play a smaller roll in intermodal shipments than in regional or longer hauls. The distance characteristics of container volumes through the Port over 10 years will determine the extent to which driver supply (and hence drayage rates) could affect volumes.

Table VI-33 illustrates that most of the container moves from the Port of Oakland, 78 percent, are within 100 miles, falling in the shuttle and short haul categories. Of these, most are short haul, with shuttle trips making up just 20 percent of all Port drays. Of the longer moves, regional and long hauls, just 16.8 percent of the moves are between 100 and 250 miles from the Port (Regional) while 5.1 percent are more than 250 miles away(Long).

TABLE VI-33: THE DISTRIBUTION OF DRAYAGE LENGTHS AND RATES FROM THE PORT OF OAKLAND

Type of Haul	Share of all Drays:		Average Rates (\$)
	Percent	Cummulative	
<i>Shuttle</i>	20.3	20.3	81.1
<i>Short</i>	57.8	78.1	316.4
<i>Regional</i>	16.8	94.9	582.8
<i>Long</i>	5.1	100.0	874.8
All Distances	100.0		463.8

**Source: Calculations by Beacon Economics*

The costs associated with moving containers different distances naturally increase with

distance. Table VI-33 also provides an indication of the drayage charges by distance. The values presented in the column are weighted averages of the rates reported by LMCs in the survey for each type of haul. The LMC responses are weighted by the number of hauls of each type that each LMC reported providing in an average week. From the 3rd column of the table, we see that the average charge for 78 percent of the drays is \$255⁴³ and that the average charge for all container moves is \$464.

These figures can give us an indication of the contribution of drayage costs to the overall costs of moving a container. This, in turn, yields an indication of the likelihood that increases in drayage charges will lead to either a simple reduction in flows through the Port or the diversion of cargo to other points of entry or exit. An increase in drayage rates leaves an importer or exporter with three choices:

- Reduce the amount that they export/import
 - Higher transport costs either raise the price at which exporters/importers must sell the goods in the foreign market or the total cost of importing.
- Divert trade to another port
 - Higher transport costs through one port, holding costs at other ports constant, may make other ports more attractive.

In either case, higher drayage rates have the potential to reduce the flow of goods through the Port. With regard to the first effect, it has been estimated that the demand elasticity of traded goods with respect to transportation costs is very low.⁴⁴ On average, it would require at least a five percent change in transportation charges to lead to a one percent change in the volume of goods shipped.

⁴³ This is a weighted average over shuttle and short hauls.

⁴⁴ Hummels ().

With regard to the second effect, it was found for the Ports of Los Angeles and Long Beach that a fee of more than \$100 would need to be imposed on container flows before there would be significant diversion of trade from the Port. Relative to the Port of Oakland, these Southern California Ports have features that make them both more and less likely to experience significant diversion of trade volumes. First, the goods that flow through the Southern California ports are largely intermodal. Intermodal traffic is generally regarded as more easily diverted than is local traffic, thus increasing the potential of diversion from POLA/LB relative to the Port of Oakland. Second, the market into which and from which these traded goods are flowing is substantially larger than the Bay Area market, making the appeal of shipping goods directly into or out of these ports greater and the potential for diversion lower.⁴⁵

Table VI-34 presents an indication of the impact on overall transportation costs of an increase in drayage rates resulting primarily from a potential employee driver requirement. Estimates of long run average rates for container movements, both ocean and rail, are used as the basis for these calculations. Rates are higher for imports as there is more demand in this direction, with ocean shipping rates assumed to be \$2050 for a 40-foot container and rail rates for an imported container of \$1,650. Ocean shipping rates are assumed to be \$500 for an exported 40-foot container, with corresponding rail rates about 75% of those for imports at \$1,250. It is only certain that rail is associated with Shuttle hauls, so the rail component is assumed zero for hauls other than Shuttle.⁴⁶

⁴⁵ More on diversion will be included in later drafts of this report.

⁴⁶ This may understate the importance of rail as some goods may come into the Port, be unloaded from the container and repackaged for rail transport. It is not known how frequently this occurs, so it is not included in the analysis. This may lead to a small overstatement of the role of increased labor costs in raising transportation costs.

TABLE VI-34: THE EFFECT OF AN INCREASE IN LABOR COSTS AND CONTAINER FEES ON TRANSPORTATION COSTS

	Drayage Charge	Labor Cost in Drayage	Ocean	Rail	Labor Share (%)	% Inc in overall costs		
						Inc Labor Costs (\$)	21% (%)	Container Fee \$70 (%)
Import								
<i>Shuttle</i>	81	36	2050	1650	0.96	8	0.20	1.85
<i>Short</i>	316	142	2050	0	6.01	30	1.26	2.96
<i>Regional</i>	583	262	2050	0	9.96	55	2.09	2.66
<i>Long</i>	875	394	2050	0	13.46	83	2.83	2.39
Export								
<i>Shuttle</i>	81	36	500	1250	1.99	8	0.42	3.82
<i>Short</i>	316	142	500	0	17.43	30	3.66	8.58
<i>Regional</i>	583	262	500	0	24.22	55	5.09	6.46
<i>Long</i>	875	394	500	0	28.64	83	6.01	5.09

Drayage charges are from the LMC Survey. Labor costs are calculated by the authors. Ocean and rail rates were determined in consultation with Port staff.

*Source: Calculations by Beacon Economics

We have found that, on average, labor costs account for roughly 45 percent of total drayage costs.⁴⁷ As the average drayage charge is \$464, we estimate that labor costs are, on average, \$209 per dray. For 80 percent of the drays, however, these costs amount to less than \$90.

In Task 2, the increase in labor costs associated with employee drivers rather than IOOs has been estimated to be 27 percent. This includes vacation pay, health insurance, workers and unemployment compensation and other costs associated with full time employment. We analyze this increase in particular, because it is an indication of the likely impact of an employee driver requirement on drayage costs, and hence rates.⁴⁸

If labor costs were to increase by 21 percent to \$253, on average, this would imply a corresponding increase in total shipping charges of between \$8 and \$83, depending on the

⁴⁷ See the cost model presented in Task 2.

⁴⁸ This increase does not reflect the increased burden on LMCs from having to provide trucks. However, this change from driver ownership of the trucks to LMC ownership would more than likely reduce overall drayage costs.

length of the dray. We use 21 percent rather than 27 percent because as many as one-third of the drays are already provided by employee drivers. This increase would manifest itself in between a 0.2 and 2.83 percent increase in total transportation costs. This is a very small increase, indicating that changes in the cost of labor associated with drayage will have a relatively small effect on overall shipping charges through the Port of Oakland.

This change in rates is quite different for shuttle and short hauls relative to long hauls. This suggests that the likely impact of a 21 percent increase in labor costs on drayage would have the smallest effect on intermodal traffic, which is likely to be the most footloose of the shipments through the Port of Oakland. It is the effect on long haul traffic that is the most troubling as it is the most likely to be diverted to an alternative port. This diversion depends largely on the relative distances to the Port of Oakland and the next best alternative. The further the BCO is from the Port of Oakland, the weaker their preference will be for the Port of Oakland over either ports in Southern California, Oregon, or Washington.

Because drayage rates increase relatively rapidly with distance, short haul traffic and regional traffic is the least likely to be diverted from the Port.

For contrast, we have also provided an analysis of the effect of a \$70 container fee.⁴⁹ The effects of such a fee are more evenly distributed drayage types. In particular, the percentage increase in drayage costs for a shuttle haul resulting from a container fee is more than 9 times the impact of a 21 percent increase in labor costs. In addition, the percent change in transportation costs associated with a long haul dray are less with a fee than with an increase in labor costs.

In the context of a clean truck effort, whether a fee or an employee driver requirement is the

⁴⁹ A fee of \$70 was chosen as that is the fee currently charged at the Southern California ports for a 40 foot container.

preferred means depends on where the burden of the cost should most appropriately fall. For shuttle hauls, the fee poses a disproportionate burden of the effort. With an employee driver requirement, the burden is more closely related to the distance a container is moved and hence more economically efficient. Of course, a fee that is commensurate with the distance a container is to be moved would also have such efficiency properties. Such a fee, however, would be easily evaded by transferring the load from one truck to another at a designated point close to the Port. This activity is inefficient and would have adverse effects for the local community.

Driver exodus

Second, the likelihood that some drivers discontinue providing drayage services will also affect the ability to accommodate forecast growth in port volumes. For instance, an employee requirement could result in a significant number of drivers exiting the business. Through the driver survey, we have gained a better understanding of driver response to this and other possible reasons drivers may leave the market.

According to results from a survey of drivers, more than 60 percent of the IOO drivers surveyed indicated that they would no longer provide drayage services to the Port if an employee requirement were in place. In particular, only 40 percent of the independent drivers surveyed indicated that they would be willing to sell their truck and work as an employee of an LMC. Through the supplemental driver survey, it has subsequently become apparent that the phrasing of the question, in particular, including “sell your truck” may have biased respondents against agreeing to be an employee. These estimates may, therefore, overstate the loss of drivers in the event of an employee driver requirement. An employee requirement could therefore be an impediment to the Port reaching its forecast targets.

Similarly, TWIC and the CARB requirements also have the potential to reduce the supply of drivers. Some of the existing drivers will not apply for or receive a TWIC, and some will elect to drive elsewhere or find alternative employment rather than retrofit or replace their truck under the CARB requirements. There is, therefore, significant potential for the Port to lose large numbers of drivers in the near future.

The potential for driver replacement

Third, the size of the pool of potential truck drivers (to be addressed in sub-Task c) will have an influence on whether driver supply can expand to meet demand without significantly affecting drayage rates and hence driving cargo volumes elsewhere.

Over the near term, there appears to be a significant supply of drivers affiliated with the LMCs that currently provide drayage services. On average, the LMCs surveyed work with more than twice as many drivers as they dispatch to the Port. This is an overstatement of the likely close at hand driver supply, as many IOOs will work with more than one LMC, but provides an indication that if LMCs need additional drivers on a short term basis they do have access to significantly more than currently serve the Port.

Task 3.c sheds light on the port drayage sector's ability to meet longer-term future demand. In particular, we find that there are in excess of 100,000 individuals with the necessary qualifications for driving draying at the Port living and working in the relevant region.⁵⁰ The forecast demand requires the addition of up to 2,893 drivers to the activity in the next 20 years. This is a 145 percent increase, and requires that just 2.5 percent of the local driving population transfer to port drayage. Drivers providing drayage services to the Port are in the upper half of the earnings distribution for all drivers in the region, the supply of port drivers could likely

⁵⁰ See the map in the next section for the relevant region. Drivers must possess at a minimum a commercial drivers license. See Task 3.c for more information.

expand without a significant increase in driver compensation.

There is the potential for an employee driver requirement to add significantly to the need for new drivers in the drayage sector. According to the driver survey carried out for this project, approximately 60 percent of the owner operators surveyed would not be willing to sell their truck and work for a licensed motor carrier as an employee.⁵¹ This indicates a further shortage of nearly 800 drivers, which would require that approximately 3 percent of the local driving population switch to providing drayage services.

It is important to note, however, as we discuss in the summary, these increases need not occur immediately, but can be phased in over the course of 20 years, implying between 2.6 and 5 percent growth in the corps of drayage drivers per year.

Inefficiencies

Finally, the extent to which there are inefficiencies in the existing structure of the drayage market – e.g., drivers sitting idle – has the potential to offset any reduction in the number of drivers participating in the market at the prevailing wage. We have assessed these inefficiencies through survey responses obtained from drivers and LMCs.

There are essentially four stages at which a driver is being unproductive: first, waiting for a dispatch, second, waiting at the terminal gate, third, waiting inside the terminal; and fourth, waiting in traffic. From the driver survey, we have evidence on the first three of these periods.

⁵¹ Further supplemental surveying of IOOs indicated results that were quite different. In particular, the supplemental survey indicated that as many as 61 percent would continue to serve the port. The primary difference is in the question asked. The primary survey asked if the driver would be willing to sell their truck and be an employee. The supplemental survey did not mention selling their truck, asking instead: If the employee model is passed, would you continue to drive to the Port?. As the supplemental surveying was perhaps not random or representative, this is merely evidence that the way the questions is asked is very important for the answers received.

The fourth was not covered in the survey. We discuss each in turn.

Waiting for dispatch

The driver survey contained the following question regarding wait for dispatch:

33. *How long did you wait for a dispatch for that trip?* _____ hours

Table VI-35 provides evidence of the distribution of responses to this question for IOOs, employee drivers and combined. On average, drivers wait 1.5 hours between dispatches. This wait is somewhat longer for IOOs, at 1.7 hours and less for employee drivers at 1.3 hours. This represents a significant portion of a driver's time spent waiting. On average, an independent operator takes 6.4 hours for a dray. Our data suggest that the time spent waiting for dispatch is the equivalent of about 25 percent of the time it takes to make a single dray. For employees, the wait time is equivalent to just under 20 percent, which is still considerable.

This represents a significant inefficiency in the drayage market, such that if it were removed, would indicate the need for 20 percent fewer IOO drivers, and 12.5 percent fewer employee drivers.

TABLE VI-35: DRIVER TIME SPENT WAITING FOR DISPATCH BETWEEN DRAYS

	Mean (hours)	Percent of Drays with Zero Wait Time
Employee Drivers	1.3	36.0
<i>Shuttle and Short Hauls</i>	1.4	28.6
<i>Regional and Long Hauls</i>	1.2	38.9
Independent Operators	1.7	19.2
<i>Shuttle and Short Hauls</i>	1.8	21.1
<i>Regional and Long Hauls</i>	1.6	17.5
All Drivers	1.5	25.6
<i>Shuttle and Short Hauls</i>	1.7	23.1
<i>Regional and Long Hauls</i>	1.4	27.3

**Source: Calculations by Beacon Economics*

TABLE VI-36: TIME DURATION OF AN AVERAGE DRAY

	Hours/ Trip	Trips/ Day	Hours/ Day
Employee Drivers	6.9	2.1	11.0
<i>Shuttle and Short Hauls</i>	5.1	2.6	10.1
<i>Regional and Long Hauls</i>	7.8	1.8	11.9
Independent Operators	6.0	2.5	11.2
<i>Shuttle and Short Hauls</i>	4.4	3.3	10.7
<i>Regional and Long Hauls</i>	7.3	1.8	11.3
All Drivers	6.4	2.3	11.1
<i>Shuttle and Short Hauls</i>	4.6	3.0	10.5
<i>Regional and Long Hauls</i>	7.6	1.8	11.5

**Source: Calculations by Beacon Economics*

FIGURE VI-13: HOURS SPENT WAITING FOR DISPATCH BY SHARE OF DRIVERS

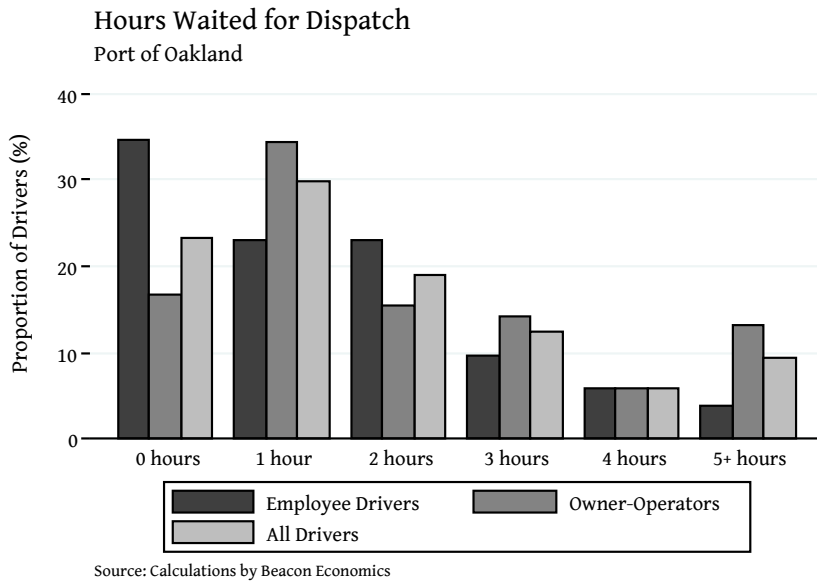
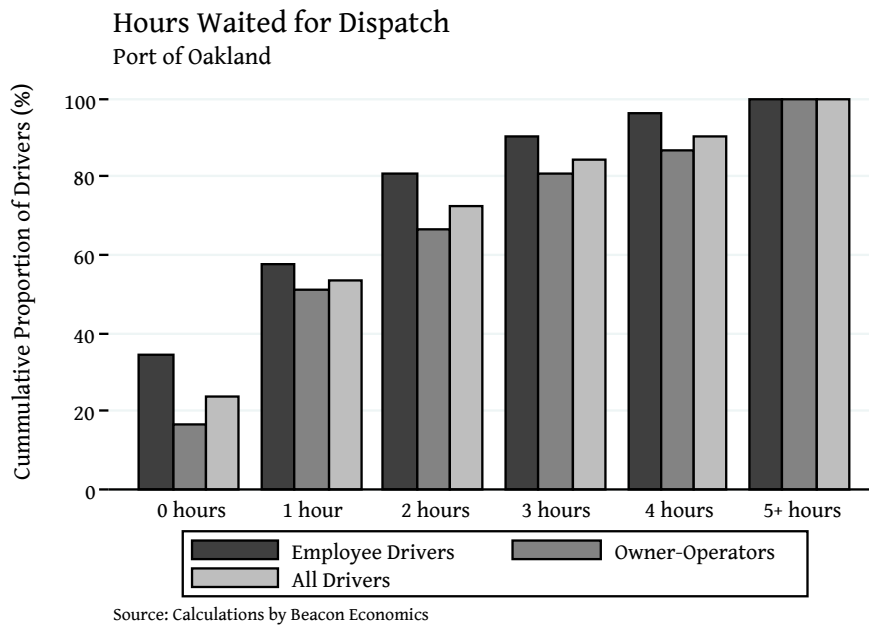


FIGURE VI-14: HOURS SPENT WAITING FOR DISPATCH, CUMULATIVE SHARE



Waiting outside and inside the gate

The driver survey contained the following questions regarding wait times at the Port:

39. How much time was spent waiting *OUTSIDE* the Port to either pick up or drop off a load? _____ hours

40. How much time was spent waiting *INSIDE* the Port to either pick up or drop off a load? _____ hours

The responses to these questions indicate that wait times are similar for IOOs and employee drivers at the Port and that, on average, drivers wait 2 hours outside the gate and 1.6 hours once inside the gate to get out.⁵² These results indicate a further inefficiency in the current drayage operations that if it were improved would reduce the demand for additional drivers to meet the forecast expansion of traffic through the Port.

Traffic

Very little is known about the impact of regional traffic patterns on the efficiency of container movements at the Port of Oakland. What is relatively certain is that traffic will continue to worsen throughout the region as infrastructure development fails to keep pace with population growth. Over time, traffic is likely to play a growing role in drayage sector efficiency and the number of trucks that are needed to support the container traffic through the Port. It is perhaps a long way off, but in order to meet its long term growth goals, the Port may have to consider more flexible gate hours, allowing drivers to avoid the heavy traffic periods, allowing

⁵² This is in start contrast with the Port's 2005 emissions inventory, which found that turn times averaged approximately 30 minutes. In conversations with LMCs and marine terminal operators, we have found that a half hour is likely the best achievable performance. The average, especially as some terminals are significantly more efficient than others, is likely to be somewhat higher. It has also been found that drivers often tend to overstate their wait times. It is therefore quite possible that our measured average of 1.6 hours inside the gate of the Terminal is high.

the Port's needs to be met by a smaller fleet of drivers and trucks.

Summary

Port volumes are forecast to increase to 5.4 million TEUs by the year 2030. Of concern is the ability of the drayage sector serving the Port to grow and provide sufficient numbers of drivers to facilitate this growth. In the coming years, it is possible that the drayage sector will have to deal with policies that reduce the number of drivers in service as well as the forecast increases in container flows. In particular, should the Port adopt an employee requirement, it is quite possible that up to 60 percent of the IOO drivers would choose to leave the market. This represents 40 percent of all drivers currently involved in port drayage.⁵³

The current supply of drivers is estimated at 1989, with two-thirds of this number, 1308, being independent operators. These drivers were involved in the movement of approximately 2.24 million TEUs in 2008.⁵⁴ Using these figures, we estimate that one million TEUs requires approximately 885 drivers. Therefore, growth to 5.4 million TEUs would require 4,882 drivers, more than a doubling of today's number. Should an employee requirement be instituted between now and 2030, there will be an additional 793 drivers that would need to be replaced.⁵⁵ This implies a need for between 2,893 and 3,686 drivers attracted to port drayage in the next 22 years. This implies an average annual growth rate of at most 5.0 percent in each of the next 20 years.

⁵³ IOOs currently constitute 66 percent of the drayage drivers. If 60 percent of the IOOs represents 40 percent of the drivers involved in drayage.

⁵⁴ This is an approximation. The number of drivers is estimated based on patterns in the month of October. The number of TEUs is the number actually moved through the Port in all of 2008, as published on the Port website.

⁵⁵ 793 is the proportion of current drivers who have indicated that they would not continue to work at the Port under an employee driver requirement.

It should be noted that this represents an upper bound on the need for drivers. This simple calculation assumes that the status quo operation and facilities of the Port remains as it currently is. This seems implausible, as significant infrastructure improvements in and around the Port would be necessary to facilitate this growth. As part of the CTMP, this infrastructure investment would be undertaken with the awareness of the need to improve the efficiency of the drayage market. These investments, raising the efficiency of the drayage market, would lead to the need for fewer trucks and drivers to move a given number of containers. Nonetheless, we will work with these estimates to ascertain the ability of the local market to supply sufficient drivers to accommodate the forecast growth.

A simple formula for expanding the drayage fleet is to increase the compensation of drivers. Above, we calculated that a 21 percent increase in the compensation of drivers would lead to, on average, a 1.2 percent increase in cost of the average dray (0.2 percent for shuttle hauls, and 2.83 percent for long hauls). This calculation indicates that there is likely significant leeway in increasing driver compensation without substantially affecting container flows. Given the very small impact on IPI or intermodal freight, the effect is likely to be negligible. The larger effect on goods being trucked in from longer distances may be of some concern. However, the expense of shipping containers to another port, i.e., diversion, is very likely to exceed the 1.2 percent increase that may arise from a 21 percent increase in driver compensation.

It is also true that significant inefficiencies exist in current drayage dispatch practices. In particular, there is significant excess capacity in the current market. This is evidenced by the fact that on occasion, 50 percent of an IOO's time is spent waiting for dispatch, and up to 25 percent of an employee driver's time is spent waiting for dispatch. Using even the lower number of 25 percent, if this inefficiency were removed from the system, this would reduce our range of required additions to driver supply to between 1,336 and 2,129. This represents an increase in the number of drivers of between 70 and 107 percent, or an average annual growth of between 2.6 and 3.8 percent per year over the next 20 years. Improving wait times at the

port gates would further reduce the need for increasing the number of drivers providing port drayage services.

In sum, the supply of drivers will have to increase at an average annual rate of between 2.6 and 5 percent per year to accommodate the increased flow of containers through the Port. Given the ample supply of drivers in the region, this does not pose a significant challenge to the port drayage sector. This is especially true given that driver compensation could likely increase by as much as 21 percent without leading to significant diversion from the Port of Oakland. It is also the case that the total supply of drivers in the United States has grown by 3 percent annually in the post deregulation period. Therefore, the growth rates indicated at the Port are not out of line with expected overall growth in the supply of drivers. The excess demand will likely be between -0.4 percent and 2.0 percent, the difference between the range above and 3 percent.

- c) *AN ASSESSMENT OF THE SIZE, AVAILABILITY AND CHARACTERISTICS OF THE POTENTIAL DRIVER POOL FROM WHICH DRAYAGE DRIVERS COULD REALISTICALLY BE DRAWN TO MEET GROWTH IN DEMAND AT THE PORT. IT IS ASSUMED THAT DRIVERS WOULD HAVE TO MEET TWIC REQUIREMENTS.*

Driver Analysis

Number of drivers

The number of truck drivers is estimated for the “regional area” defined in the map below:

FIGURE VI-15: MAP OF COUNTIES WHERE DRIVERS LIVE



Two data sources were used to obtain estimates, the American Community Survey (ACS) and the OES (Occupational Employment Statistics). A brief description of both is presented in Appendix B1.

The ACS data was restricted to non-government workers, ages 21-65. The minimum age for the cut-off was chosen based upon the required age for obtaining a commercial drivers license (CDL).

OES data can not be restricted by age categories, nor does it contain any information on self-employed individuals, therefore it cannot be used to give estimates of IOOs, only employee drivers.

Table VI-37 presents estimates of driver numbers for both data sets.

TABLE VI-37: DRIVER ESTIMATES

Estimated Population of Truck Drivers in the ACS		
	Total	Males Only
All Truck Drivers	117,098	113,176
Employee Truck Drivers	104,394	100,786
IOOs	12,704	12,390

**Source: U.S. Census Bureau, ACS*

Estimated Population of Employee Truck Drivers in the OES		
	Total	Percent
Truck Driver, Heavy Trucks	48,240	50.3
Truck Driver, Light Trucks or Delivery Service	33,240	34.7
Driver/Sales Worker	14,390	15.0
All Truck Drivers	95,870	

**Source: U.S. Bureau of Labor Statistics, OES*

The OES estimate of 95,870 drivers is higher than the ACS estimate of 104,394. The ACS estimates 12,704 owner operators, for a total of 117,098 drivers in the region.

Only the OES is able to provide more specific occupational information on the driver: 48,240 drive heavy trucks (50.3% of all drivers), 33,240 drive light trucks and delivery trucks (34.7%) and 14,390 are drivers/sales workers (for example, drivers who deliver soda/snack products to convenience stores/gas stations; 15% of the total).

If we assume the same distribution of truck driver types in the ACS as in the OES, there would be 52,510 heavy truck drivers. Though the ACS does not provide information on how many owner operators are driving heavy trucks, it is unusual for firms to use IOOs as part of their driver/sales worker force⁵⁶, thus we assume that all IOOs in the ACS estimates are heavy or light truck drivers (a range of 7517-12,704 heavy truck drivers; the lower bound occurring if they have the same share estimated by the OES and the upper bound if they are all heavy truck drivers). In sum, we estimate 60,027-65,214 heavy truck drivers using the ACS data.

Wages and Hours of Truck Drivers

Hours of truck drivers tend to be higher, on average, than other workers, as they are exempt from the overtime provisions of the Fair Labor Standards Act and subject to the federal Hours of Service Regulations, which limit drivers to 70 hours of work in a seven-day period.

The weekly hours of work for truck drivers and weeks per year are obtained from the ACS and presented in Table VI-38.

⁵⁶ Drivers/sales workers are truck drivers who also perform a sales function such as customer service, product promotion, or collection of bills.

TABLE VI-38: DRIVER STATISTICS

	Employee Drivers		IOOs	
	Weekly hours	Weeks per year	Weekly hours	Weeks per year
Mean	45.72	47.23	49.46	45.93
25th percentile	40	48	40	43
Median	40	52	50	52
75 th percentile	50	52	60	52

*Source: U.S. Census Bureau, ACS

Hourly wages and annual earnings are available in both the ACS and OES and presented in Tables VI-39 and VI-40. IOO earnings represent their income net of truck expenses.

TABLE VI-39: ACS TRUCK DRIVER WAGES (\$)

	Employee	IOOs
Hourly		
Mean	23.40	33.62
25th percentile	11.54	12.15
Median	16.72	19.23
75th percentile	23.35	34.62
Annual		
Mean	40,248	59,500
25th percentile	23,000	25,000
Median	36,000	42,000
75th percentile	53,000	72,000

*Source: U.S. Census Bureau, ACS

TABLE VI-40: OES TRUCK DRIVER WAGES (\$)

	Truck drivers, heavy and tractor-trailer	Driver/sales workers	Truck drivers, light or delivery services
Hourly			
<i>Mean</i>	19.11	12.79	14.76
<i>25th percentile</i>	15.43	7.93	11.00
<i>Median</i>	18.90	10.03	13.79
<i>75th percentile</i>	22.45	15.81	17.58
Annual			
<i>Mean</i>	39,759	26,596	30,704
<i>25th percentile</i>	32,104	16,492	22,875
<i>Median</i>	39,311	20,855	28,677
<i>75th percentile</i>	46,699	32,876	36,569

*Source: U.S. Bureau of Labor Statistics, OES

There is divergence in the hourly and annual earnings estimated in the ACS and OES, however, both data sets estimate mean annual earning close to \$40,000 for employee truck drivers in the ACS and heavy truck drivers in the OES. The mean hourly wages in these reference groups range from \$19-\$23. According to the OES, light truck drivers and sales drivers earn less (\$12.79-14.76 per hour, corresponding to averages of \$26,596-\$30,704 per year).

“Potential” truck drivers

To estimate potential additions to the pool of drayage drivers, we analyze the employment and earnings of three groups:

1. Light truck and sales/delivery drivers
2. Alternative occupations identified by O-Net (a Department of Labor sponsored website of occupational information – see Appendix B1)
3. Alternative occupations identified using Current Population Survey data

We will refer to these by their group number. Group 1 represents the most logical group to recruit from for two reasons. First, these drivers are already “truck drivers” by occupations.

Second, as evidenced above, they tend to earn less than heavy truck drivers and, combined, represent 40-50% of the total 117,000 truck drivers identified in the ACS.

Group 2 consists of occupations identified in O-Net as having skill sets similar to truck drivers (see Appendix B1 for a description of O-Net). These occupations include: industrial truck and tractor operators; refuse and recyclable material collectors; paving, surfacing, and tamping equipment operators; hazardous materials removal workers; agricultural equipment operators; logging equipment operators; operating engineers and other construction equipment operators; highway maintenance workers; pile driver operators; and bus drivers. In addition to being identified by O-Net, these occupations appear sensible as they contain workers who would typically hold a specialized drivers license and typically would have training on light or heavy trucks.

It should be noted that the lack of detailed occupations in the ACS data necessitated removing agricultural equipment operators and logging equipment operators from that data set; though they can be identified in the OES data.

The ACS and OES estimates of the numbers working in these occupations diverge considerably. This is likely due to the ACS sample being restricted to male workers. We chose this restriction as the truck driving occupation is male-dominated (approximately 3 percent of drayage drivers are female). The range of workers in the occupations for group 2 is 32,703-50,890. The hourly and annual wages for these workers is presented in Table 4.

TABLE VI-41: HOURLY AND ANNUAL EARNINGS (\$) - GROUP 2

	OES	ACS
Employment	50,890	32,703
Hourly		
<i>Mean</i>	19.68	17.38
<i>25th percentile</i>	15.73	10.07
<i>Median</i>	19.29	14.42
<i>75th percentile</i>	23.23	20.83
Annual		
<i>Mean</i>	40,925	32,609
<i>25th percentile</i>	32,708	20,000
<i>Median</i>	40,119	29,400
<i>75th percentile</i>	48,311	41,950

**Source: U.S. Census Bureau and U.S. BLS*

The mean hourly earnings vary from 17.38 per hour in the ACS data to \$19.68 in the OES data; the annual earnings have a larger range - \$32,609-\$40,925. At the upper end evidenced in the OES data, these earnings are similar to those of heavy truck drivers, and substantially higher than light truck or sales drivers, indicating that it would likely be more effective to recruit from Group 1 than Group 2.

Group 3 is a set of alternative occupations derived from the Current Population Survey. The CPS is described in Appendix B1. We use the CPS from 2002-2006 to identify occupations from which individuals trucking or to which they exited trucking. This is possible due to the ability to construct “short panels” in the CPS, observing the same individuals over a one-year span.

Table VI-42 shows the annual trends in workers entering, leaving, and staying in trucking (%).

TABLE VI-42: ANNUAL TRENDS IN WORKERS ENTERING, LEAVING, AND STAYING IN TRUCKING (%)

	2001	2002	2003	2004	2005	2006
Enter	22.48	24.47	22.34	22.2	25.18	24.22
Leave	21.85	21.3	22.38	23.2	20.38	21.5
Stay	55.67	54.23	55.28	54.6	54.44	54.29

**Source: U.S. Census Bureau, Current Population Survey*

It is clear that there is considerable occupational migration. Table VI-43 presents broad occupational groups that drivers entered from or left to.

TABLE VI-43: BROAD OCCUPATIONAL CATEGORIES OF TRUCK DRIVER MIGRATION (%)

Occupation	Entry	Leave
Executive/Manager	7.56	7.81
Professional/Specialist	1.36	1.03
Technical	1.97	2.02
Sales	9.60	11.00
Administrative Support	9.77	9.71
Professional Services	1.84	1.83
Service Occupation	8.15	8.10
Farming	3.78	3.45
Precision Production, and Craft	10.99	14.08
Machine Assembly and Inspection	7.15	6.20
Transportation (other than truck driver)	7.69	6.01

**Source: U.S. Census Bureau, Current Population Survey*

What is most notable is the variety of occupations, though a large share of drivers enter from or exit to manufacturing, construction, or other transportation occupations (the last three occupational groups in Table VI-43). Thus, the potential labor pools from which to recruit drivers extend beyond the “usual suspects” of manufacturing and construction to sales and other occupations.

Appendix B2 presents detailed occupational codes of truck driver migration. We calculate the weighted averages of the hourly and annual earnings of these groups, using the ACS data for

these occupations. Among those who entered trucking, their pre-trucking earnings were \$23.78 per hour and \$47,868 per year. Among those who left trucking, their post-truck driving wages were \$23.95 per hour and \$47,253 per year. These figures are important as they provide one metric of the level of earnings necessary to attract workers into a new occupation.

ASSESS THE ECONOMIC IMPACTS OF RESTRUCTURING THE PORT'S TRUCKING SERVICES AROUND LMCs WITH EMPLOYEES WITHIN THE PORT LOCAL IMPACT AREA (LIA).

An employee driver requirement would likely have an economic impact beyond merely affecting the structure of Port drayage. In particular, driver compensation would increase for the pool of drivers in the Port's LIA. This would be the case whether existing IOOs become employee drivers or they are replaced with other drivers. In the latter case, it is assumed that the net effect on local driver compensation is zero as some drivers that previously served the Port no longer do, but some drivers who did not serve the Port, now do. It is assumed that the implications of this swap are negligible.

Table VI-44 presents driver incomes and compensation packages for employee and IOO drivers. As discussed above, we have found that average annual earnings for employee drivers are approximately \$63,250, while average annual incomes of IOOs are \$61,500. We have estimated that, in the case of employees, benefits amount to approximately 20 percent of annual earnings. This implies a value of \$12,650 for the benefits package. Given this value and the difference in initial incomes between employees and IOOs, this implies an increase in the value of the compensation package for IOOs of \$19,950.

TABLE VI-44: CHANGE IN IOO DRIVER INCOME, PER DRIVER

Driver Type	Avg. Annual Earnings (\$)	Share of Benefits (%)	Value of Benefits (\$)	Total Compensation (\$)
LMC Employee	63,250	20	12,650	75,900
IOO	61,500	0	0	61,500
Difference	1,750		12,650	14,400

Sources: Beacon Economics; BAE, 2009.

The implications of the switch to employees, and the accompanying change in local aggregate compensation can be modeled through ImPlan. This model will indicate the resulting change in local output and employment. To model this effect, we must first indicate the household incomes of drivers. From our driver survey, we have found the distribution of household income that is indicated in Table VI-45. This apportioning of drivers into different household income groups is necessary because the different groups have different tax rates and spending patterns.

TABLE VI-45: DRIVER HOUSEHOLD INCOME GROUPINGS

Income	Number of Drivers	Percentage
Under \$35,000	15	16.0
\$35,000 - \$49,999	19	20.2
\$50,000 - \$59,999	14	14.9
\$60,000 - \$74,999	10	10.6
\$75,000 - \$94,999	13	13.8
\$95,000 - \$114,999	6	6.4
\$115,000 - \$149,999	10	10.6
\$150,000 or more	7	7.4
Total Sample	94	100.0

Once apportioned to these income categories, the economic impact of the increased compensation of the estimated 353 drivers who live in Alameda County can be evaluated.

Table VI-46 presents the results of this evaluation. The results from two different exercises are presented. The first, assuming that compensation increases by only 15 percent and the second assumes that compensation increases by 20 percent. The underlying assumption is that total compensation changes by \$5.9 million with an increase of 15 percent and by \$7.0 million with an increase of 20 percent.

The total output effect is found to be \$3.1 million for a 15 percent increase, with \$2.1 million of this being the direct increase in compensation. The total output effect is less than the total increase in compensation because not all is received in the form of cash and some is saved. With a 20 percent increase, the output effect is \$3.8 million, with \$2.5 being the direct increase in compensation. Employment effects are very small, just 19 new jobs are created through the indirect and induced effects with a 15 percent increase and 24 with a 20 percent increase.

TABLE VI-46: STATISTICS RELATED TO ALAMEDA COUNTY

Indicator	Estimate
GDP (SF MSA, 2006, bn\$)	292.078
Med HH Inc. (\$)	66,430
Population (2007)	1,454,159
Med Age (2007)	36.7
Total Tax Sales (2005, bn\$)	24.243

Sources: BEA, ACS, DOF

In the context of the greater Alameda County economy (above), this is a reasonably negligible impact.

TABLE VI-47: SUMMARY OF ECONOMIC IMPACTS

Economic Impacts	Direct	Indirect	Induced	Total
Benefits Represent 15 Percent of Total Earnings				
Output (\$)	2,094,000	550,000	475,000	3,119,000
Employment (a)	0	3	16	19
Benefits Represent 20 Percent of Total Earnings				
Output (\$)	2,514,000	674,000	585,000	3,773,000
Employment (a)	0	4	20	24
Benefits Represent 27 Percent of Total Earnings				
Output (\$)	3,394,000	910,000	790,000	5,094,000
Employment (a)	0	5	27	32

Note:

(a) Direct employment is zero because the analysis assumes that all Alameda County resident IOO drivers will become LMC employees.

Sources: IMPLAN; BAE, 2009.

D. TASK 3A: ENHANCED EVALUATION OF POTENTIAL FOR CARGO DIVERSION

Enhanced evaluation of Diversion

- a) Beacon Economics enhanced the work previously scoped through an analysis of the results obtained from more extensive and numerous surveys of beneficial cargo owners, carriers, and marine terminal operators, as well as literature review. Beacon has identified diversion factors, as well as estimate and discuss the likelihood that current customers/users of the Port of Oakland would choose to use an alternative port in the face of increased drayage costs potentially associated with the CTMP (i.e., potential for cargo diversion).
- b) Both local and intermodal cargo are considered in the analysis under (a).

1. INTRODUCTION

The introduction of a new program at a Port that has the potential to raise the cost of shipping goods through the Port always brings with it the likelihood that some of the Port's current customers will decide to ship through a competing port. The CTMP, and in particular, the CARB requirements and a potential employee driver requirement, has the potential to raise the costs of drayage services at the Port of Oakland. This section discusses what is known about port diversion generally, primarily with respect to the Ports of Los Angeles and Long Beach, which provides some context for a discussion of the Port of Oakland and the potential for diversion, or the loss of business, subsequent to an increase in drayage rates.

Diversion is most frequently a concern when it comes to intermodal freight. That is, containers arriving at the port and then being immediately, or after a brief shuttle by truck, placed on a train for delivery to some distant location. It is commonly referenced that 500 miles is the limit

for truck delivery and that anything destined for a location further than 500 miles beyond the port gates will likely move by rail.

The potential for diversion then arises because at the inland railyard, whether for imports or exports, it matters little what is on the other end. There are concerns regarding the proximity of the port to markets of origin for imports or of destination for exports, but all else equal, ports substitute reasonably well for each other. It is in this sense that diversion is a concern stemming from policies that may increase the costs of using one port vis a vis another.

However, it is seldom the case that all else is equal across ports. First, is the proximity to the foreign market mentioned above. Second, there are issues of productivity and quality of service more generally. Differing levels of service will also cause shippers to choose one port over another. Third, a shipper with a long history of doing business at one port may find it difficult or costly to make the switch to another port, implying a significant upfront or fixed cost of switching ports. However, this is not a problem for shippers already using multiple ports, making diversion easier for larger shippers than small. Finally, there are other aspects of port service that come into play. For instance, some ports are first port of call, meaning that ships from abroad stop there first. Others, the Port of Oakland, may generally be served as a second port of call, meaning that they will arrive only after unloading and loading at another Port.

Ports that are first call, have an advantage with respect to imports and a disadvantage with respect to exports. With regard to imports, goods unloaded at the first port of call can hit U.S. soil several days before they will at a second port of call. For imports that are time critical, this can make a significant difference. At the same time, ports that are second call, can have an advantage with regard to exports. As the same ship will leave this port several days after it leaves the first port, exporters have additional time to get their goods to the port. For goods that are time sensitive or perishable, this may make a significant difference, in that it reduces

the time between which the goods leave the domestic point of origin and arrive at the foreign port.

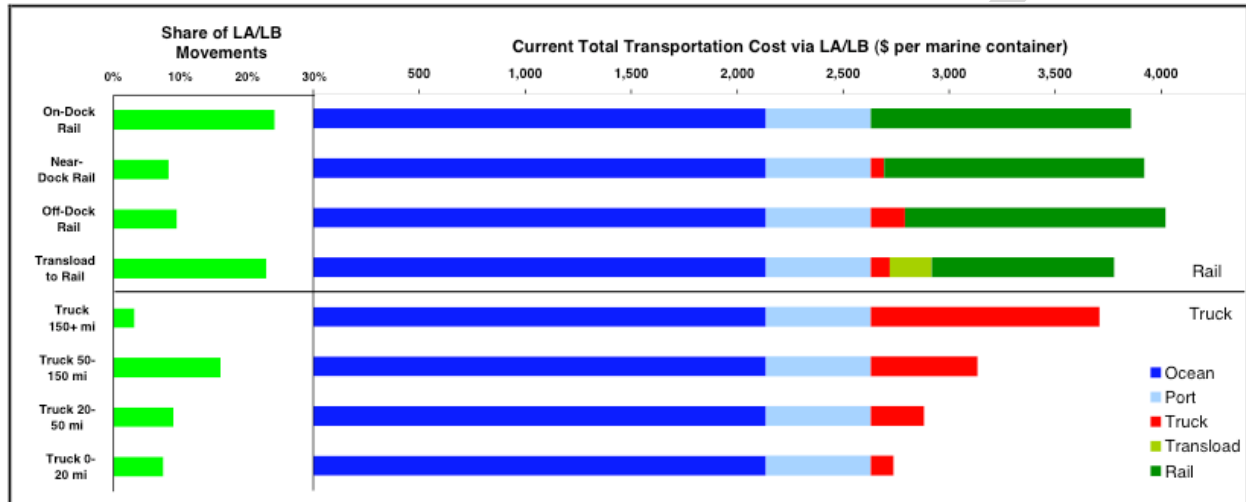
Local freight is also prone to diversion, though is in general more difficult to displace. For these goods, the relative distance between ports plays a larger role. If costs rise at one port, the options available include: trucking it to another port or putting it on a train to another port. Both options are more expensive than for intermodal shipments, where the shipper need only putting a container on a train destined for a different port. For local shipments, diversion will often entail two different costs, as will intermodal shippers. The first cost is the due to the added distance that the container will travel. If the diversion is also by truck, trucking rates increase significantly with distance. If the diversion is to rail, the will not necessarily be significantly higher, though it will likely be as the goods are travelling a greater distance. The second cost is, as with intermodal freight, gaining familiarity with the operations of a second port. A common refrain in the shipping community is “If you’ve seen one port, you’ve seen one port.” There are significant differences in operations across ports.

There is also potentially a third cost. Many shippers will locate distribution centers in close proximity to a port. The decision to move freight from one port to another may also entail the decision to move the distribution center. This is a substantial cost, but is clearly not prohibitive. It is largely believed that major shippers have diversified their shipments in the wake of the 2003 West Coast port closure by building distribution centers in close proximity to a number of other ports around the country.

For the reasons expressed above, intermodal freight is significantly more footloose than is local freight. There is an additional reason. The propensity of an increase in drayage rates to divert freight is related to the importance of drayage charges in the total shipping charges. As discussed in Hummels (2001), it is the percentage increase in the total shipping charges that plays a role in altering decisions. As displayed in Table VI-16, drayage fees make up a much

smaller proportion of the overall cost of shipping an intermodal container than they do for a local container. Therefore, a given percent change in drayage rates will imply a smaller percent change in total intermodal transportation charges than in local charges.

FIGURE VI-16: TRANSPORTATION COSTS AND SHARE OF LA-LB THROUGHPUT



Source: Moffatt & Nichol, 2007, pg 5.

Previous evidence on diversion is difficult to find other than as pertains to the Ports of Los Angeles and Long Beach. In the context of the CTMP, two studies are particularly relevant: and Leachman (2005) and Moffatt and Nichol (2007). The Leachman study is an elasticity study of diversion at the POLA/LB complex. The study is primarily concerned with the net effect of the imposition of container fees in conjunction with congestion relief. Their relevant conclusion is that even a small container fee would drive some traffic away from the ports in the absence of congestion relief. In particular, a fee of \$30 per TEU would reduce trade volumes on the order of 5-7 percent.

Moffatt and Nichol perform an analysis focused on the effects of higher drayage costs at the San Pedro ports, which is more directly relevant. In particular, they evaluate the likely diversionary effect of a 40 percent increase in trucking costs. Their finding is that the ports

would experience less than a 1.2 percent decline in throughput because of this increase in drayage. Their conclusion is that higher drayage rates need not lead to significant diversion. Key to this conclusion is that change occur slowly.

2. PORT OF OAKLAND

Of significant concern in the CTMP process is the likelihood that overall drayage rates may increase at the Port. This is quite likely the case as much of what is coming will cause LMCs and IOOs to incur greater costs and may limit entry into the market. At the same time, however, it is likely that the outcome of the process will also result in increased efficiency of the drayage sector. The extent to which these two forces will offset each other is unknown. It seems likely, however, that some increase in drayage rates will occur. We have estimated that in the absence of efficiency benefits, drayage rates may increase by as much as 20-30 percent. For intermodal shipments, this amounts to an increase of 0.2 – 0.4 percent in total transportation costs, while for the average local shipment, this amounts an increase of 1.5 – 2.5 percent in total transportation costs (see Table VI-34).

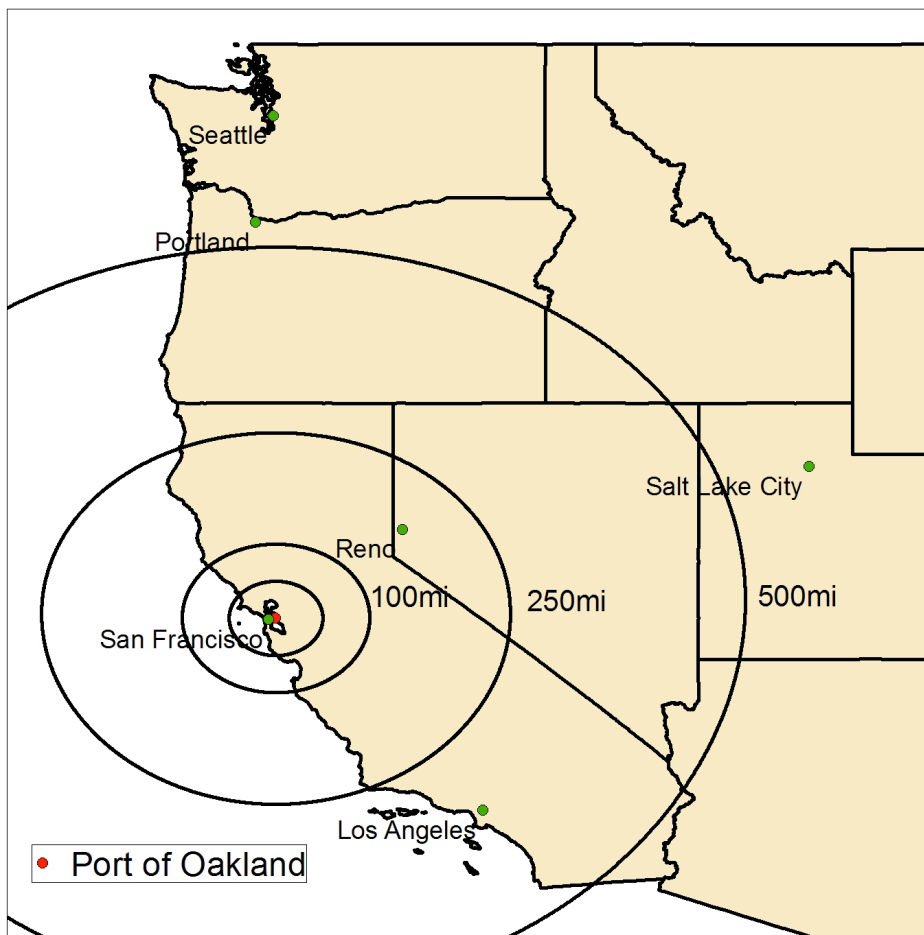
Through our surveys, we have found that approximately 20 percent of shipments through the Port of Oakland are intermodal and the rest are local, meaning served by truck. The implication of this pattern of business is the following:

1. The most price sensitive form of shipment (intermodal) is a relatively small share of total shipments
2. The most price sensitive form of shipment (intermodal) is likely to be subject to the smallest percent increase in transportation costs
3. Local shipments are likely to experience the most pressure for diversion

With regard to the distance to alternative ports, Figure VI-17 illustrates geographically, the range of various haul types from the Port. As nearly 80 percent of the drays to and from the Port are short haul, it is clear from the figure that diverting this traffic to an alternative port

would not make financial sense unless drayage rates were to increase dramatically. In particular, diverting to Los Angeles or Long Beach would turn a shuttle haul to a long haul, more than 250 miles. According the rates that we have gleaned from our survey data, this implies an increase in drayage rate from \$255 on average for a short haul to \$854. In order for this to be a sensible economic decision, there would have to be an enormous increase in drayage rates to the Port of Oakland.

FIGURE VI-17: GEOGRAPHICAL RANGE OF HAULS TO AND FROM THE PORT OF OAKLAND



3. SURVEY RESULTS⁵⁷

In general, Beneficial Cargo Owners (BCO), or shippers, are the primary decision-makers with respect to the port used for importing and exporting their product. In some cases, however, it will be a freight forwarder or even ocean carrier who makes the decision, particular in the case of intermodal freight. Accordingly, we have conducted surveys of BCOs in an effort to ascertain the sensitivity of their choice of the Port of Oakland for either importing or exporting cargo. To this point, our surveying has been limited to 18 BCOs which are primarily local rather than intermodal users of the Port.

These BCOs were asked several questions regarding their use of the Port of Oakland:

14. What are the primary factors that affect the selection of the port through which you ship?

14A. Why do you choose the Port of Oakland?

Their responses to 14 were too varied to summarize in a table, but the essence is as follows. The most common response indicated that proximity to either a factory or distribution center is paramount in their selection of a port. Ease of operation, cost, and transit time were also frequently mentioned. Regarding their choice of Oakland, these same factors were clearly mentioned.

The following questions specific to drayage rates were also asked:

20. If you **import** through the Port of Oakland, how much would current drayage rates have to increase before you would consider switching existing Port of Oakland traffic to another port? Which port would it be?

⁵⁷ These surveys results are preliminary and incomplete. Surveying of carriers and BCOs is ongoing at the time of this writing. Results presented here are meant to be suggestive only.

IPI _____ Port _____

Local _____ Port _____

21. If you *export* through the Port of Oakland, how much would current drayage rates have to increase before you would consider switching existing Port of Oakland traffic to another port? Which port would it be?

IPI _____ Port _____

Local _____ Port _____

The responses varied significantly, with some indicating that the market is very competitive and would divert with a small change. The majority, however indicated that it would take a significant increase in drayage rates to get them to change their shipping patterns. In general, the proximity issue appears to carry more weight than the cost of drayage.

4. SUMMARY

Shipments through the Port of Oakland are primarily (80%) from local sources, those within 500 miles. Our evidence suggests that it would take a significant increase in drayage rates to result in diversion of their trade to other ports. The 20% that is intermodal is more footloose. However, depending on the means through which drayage costs increase, whether a container fee or through increased costs to the LMCs, there might be little diversion resulting from the CTMP. A fee, which imposes a disproportionate burden on the intermodal freight would have a larger diverting effect than would a simple increase in costs to LMCs.

E. TASKS 4 AND 5: THE IMPACT ON PORT DRAYAGE OF POTENTIAL CHANGES TO THE DRAYAGE MARKET STRUCTURE

An estimation of impacts of different regulatory and economic scenarios on:

- The supply of drivers over a 10 year period
- Structure of port drayage
- Congestion and delays
- Drayage rates
- Safety and security at the Port

The policy and economic scenarios considered are:

- TWIC
- CARB truck regulations
- Diesel prices
- A, B, and C combined
- An employee driver requirement
- All scenarios combined

1. DRIVER SUPPLY AND DEMAND

The Port of Oakland forecasts that TEUs will increase from 2.4M in 2007 to 3.5M in 2017. Assuming 1989 full-time drayage drivers serving the Port of Oakland in 2008, the increase in volumes would require approximately 2400 full-time drivers by 2017 (an increase of 1160 drivers), assuming no other changes in labor supply or demand. Given the ACS estimates of 117,098 truck drivers in the relevant labor market area, 12,704 of which are IOOs (independent owner operators), the increased demand for drivers would represent an increase of less than 1 percent in driver demand in the region. Given the split between IOOs and employee drivers in the driver survey, this would represent an increase of 767 IOO drivers at the Port of Oakland, an

increase of 6.0 percent of the current labor supply of 100 truck drivers. If we anticipate that the supply of drivers in the region grows at the rate that the national supply of truckers has grown since deregulation, the increase in IOO demand falls to just 4.6 percent.

Given the relatively small numbers this increase represents, this increase in labor demand would not, in itself, likely increase wages in any appreciable way, nor would it cause drayage rates to increase appreciably, save for any costs of recruitment. If there were to be upward pressure on wages and rates, they would likely occur toward the latter end of the period when the increase in driver demand is especially acute. However, the likelihood that these growth rates can be achieved is relatively small, reinforcing our belief that status quo growth will not lead to an appreciable increase in wages and or rates.

TABLE VI-48: FORECASTS OF TEU GROWTH AND THE ACCOMPANYING NEED FOR DRIVERS

Year	Forecast Growth		Drivers	
	Containers (TEU) Percent	Total Volume	Change	# Drivers
2008		2.2		
2009	-2.5	2.1	-50	1933
2010	1.0	2.2	19	1952
2011	2.5	2.2	49	2001
2012	4.0	2.3	80	2081
2013	6.0	2.4	125	2206
2014	8.0	2.6	176	2382
2015	9.0	2.9	214	2597
2016	10.0	3.2	260	2856
2017	10.0	3.5	286	3142
Total		1.3	1160	

**Source: Calculations by Beacon Economics*

a) *TWIC*

Impact on labor supply

The Transportation Worker Identification Credential is expected to have a significant impact on the current population of drivers. According to the Driver Survey, 7.6% of drivers surveyed stated that they did not intend to apply for a TWIC, and another 10.8% indicated that they were not sure whether they would apply. Over three-quarters (81.5%) indicated that they would apply. LMC owners were more optimistic about the probability of their drivers applying for the TWIC. Managers indicated that they expected 84.8% of IOOs and 89.5% of employee drivers to apply. Thus, the range of drivers who will not apply for the TWIC ranges from 8-18%. Using this range, LMCs would require an additional 159-357 drivers compared to 2008 levels.

Impact on the structure of port drayage

There is no correlation between the anticipation of applying for TWIC and firm size in the LMC survey. This suggests that the imposition of the TWIC requirement should not affect the structure of port drayage. There is also not a substantial difference between the expected levels of TWIC applications between IOOs and employee drivers, further supporting the assumption that the structure of the port drayage industry would not be significantly affected by this rule.

Impact on congestion and level of service

The main problem posed by TWIC implementation in terms of level of service is due to the short-term shortage of drivers. As volumes at the Port of Oakland are down roughly 7% between 2007 and the end of 2008, with further decreases expected in 2009, much of the initial shortage due to reduction in labor supply is expected to be mitigated by the lack of volumes. Additional relief can be attained by temporarily increasing driver hours. In the driver survey 25% of drivers report working (driving and non-driving work) 10 hours or less per day.

Given that drivers can legally drive 14 hours in a day, additional short run shortage may be made up with a temporary increase in driver hours, resulting in limited impacts on level of service, but may come with additional labor costs (i.e. overtime).

The additional contribution of TWIC to congestion and structure is dependent upon the ability of the TSA to provide readers to the terminals and the ability of the terminals to keep these readers operational. This should not significantly affect the productivity of drivers or cause specific congestion concerns with respect to the drayage portion of container moves. This report does not consider the impact of congestion due to potential future labor disruptions from longshore workers.

Impact on drayage rates

The extent to which TWIC implementation would increase drayage rates depends upon the cost of replacing the anticipated reduction in the labor supply (159-357 drivers). According to the data from the American Community Survey, employee drivers in the area average \$40,248 annual salary, with a median of \$36,000. IOOs average \$59,500 (net of truck expenses), with a median of \$42,000. In the Driver Survey, we find that employee drayage drivers serving the Port of Oakland average \$1,265 per week (\$63,250 per year); the corresponding figures are \$1,230 per week (\$61,500 per year) for IOOs⁵⁸.

As the earnings of drayage drivers are higher than the average earnings of all drivers in the labor market, recruiting new employee drivers into this pool to replace drivers who do not apply for TWIC should not require additional labor costs. Thus, the costs of increasing the supply of port drayage drivers would primarily be recruiting and advertising costs, which are likely to be minimal and not affect drayage rates substantially. In the LMC survey, managers

⁵⁸ Annual earnings are calculated by multiplying recorded weekly earnings by 50 (assuming two weeks of unpaid holiday).

indicated that the bulk of their recruiting was done through word of mouth and newspaper advertising.

Impact on safety and security of the Port

TWIC is a crucial first layer of security at the Port of Oakland. The events of 9/11 clearly indicated that the terrorist threat on domestic soil is quite real. Further, 9/11 indicates the high likelihood that significant engines of economic growth are among terrorist targets. In this regard, TWIC is an important step in restricting access to the Port to those that have a legitimate reason to be there. In so doing, it enhances security significantly. TWIC also has the potential to provide safety benefits, stemming from the fact that TWIC significantly limits access to the Port to regular users. Though drivers who occasionally serve the Port will continue to do so, it is quite likely that there will be fewer of them. As the Port is a complex and often dangerous place, regularity breeds familiarity, and familiarity breeds safety.

b) CARB

The California Air Resources Board's Final Regulation Order regarding drayage trucks was filed with the Secretary of State on November 24th, 2008. These regulations require that:

- Phase 1: By 12/31/2009 all drayage trucks must be equipped with 1994-2003 model year engine and a level 3 VDECS, OR a 2004 model year engine that meets state and federal emission standards, OR a 1994 or newer model year engine that meets 2007 standards.
- Phase 2: By 12/31/2013 all drayage trucks must be equipped with a 1994 or newer model year engine that meets 2007 standards.

In addition, CARB has announced funding opportunities that would use State of California funds to subsidize approximately half of the cost of becoming compliant with the final rule (\$5,000 towards the VDEC retrofit, \$20,000 to repower a truck, and \$50,000 to replace a truck). Thus the assumed costs of retrofitting is \$10,000-\$20,000, repowering is \$20,000-\$40,000 and

replacing is \$60,000-\$120,000 (where the lower bound represents the cost after CARB grant and the upper bound represents no subsidy). Note: these figures represent the price of the VDEC or new truck and not the total cost, including financing and taxes. These figures are presented later in our analysis.

The truck age distribution from the LMC and Driver Surveys is presented in Table VI-49.

TABLE VI-49: TRUCK AGE DISTRIBUTIONS BY DRIVER TYPE

Years	LMC Survey		Driver Survey	
	Employee Drivers	IOOs	Employee Drivers	IOOs
Pre-1994	12.5	6.9	5.5	14.7
1994-2003	53.2	75.7	57.2	76.2
2004-2006	19.7	15.0	20.6	7.0
2007 or newer	14.6	1.9	17.8	2.1

**Source: Calculations by Beacon Economics*

Overall, these follow roughly similar distributions. It is notable that both surveys show that employee drivers tend to drive newer trucks than owner operators.

A survey of license plates generated a different distribution of truck ages. Since it is impossible to delineate trucks driven by IOOs from those driven by employees in the license plate data, we aggregate the DS distribution across all drivers and compare with the license plate survey distribution.

TABLE VI-50: COMPARISON BETWEEN DRIVER SURVEY AND LICENSE PLATE SURVEY DISTRIBUTIONS

Years	Driver Survey	License Plate Survey
Pre-1994	11.6	17.0
1994-2003	69.4	79.0
2004-2006	11.6	3.0
2007 or newer	7.4	1.0

**Source: Calculations by Beacon Economics*

In our analysis of CARB impacts we will use the License Plate Survey data as it was generated from a larger sample size. As the distribution in this data set skews older, the estimates derived will represent the upper bound.

For the purpose of our analysis, we assume a proportional change in the truck age distribution between now and the first phase of CARB requirements (slated for 12/31/2009). We also assume that the optimal size of the truck fleet is proportional to volumes at the Port of Oakland. Thus, while we estimate 1,989 full-time truck drivers in 2008, we estimate a reduction in the number of full-time drivers needed to 1,891 by the end of 2009/beginning of 2010. We further assume that trucks that call at the Port of Oakland only occasionally will not have an incentive to meet these standards, which will reduce the number of trucks serving the Port to the point where this converges with the number of full-time truck drivers, or 1,891 trucks and drivers at the end of 2009/beginning of 2010.

There are two phases of costs to estimate:

A. Phase 1

For Phase 1 implementation we make the following assumptions:

- All pre-1994 trucks (197) will be replaced with new trucks that meet 2007 standards.
- Half of the 1994-2003 truck fleet (1,332 trucks fall into this category) will be replaced with new trucks that meet 2007 standards (666) and half will be retrofitted (666)⁵⁹. This assumption is based on the fact that earlier model year trucks are more likely to be replaced than retrofitted given that they will be over 10 years old at the time the regulation takes effect.
- No changes will be made to the trucks that are 2004 or later.
- The interest rate on a new truck is assumed to be 10% with a six year loan.
- The sales tax on the truck is assumed to be 8.5%.
- The interest rate on a retrofit is assumed to also be 10% with a three year loan. As retrofitting is significantly lower in cost, those pursuing this option may not finance at all, leading to lower cost estimates than those presented below.
- Drayage drivers work 20 days per month and complete, on average 2.3 drays per day. The latter figure was calculated from the Driver Survey data.

Under these assumptions, 863 trucks will be replaced and 666 retrofitted. The total **replacement** cost with no subsidy will be \$149.9 million, with a cost per truck of \$173,669 over the length of the loan, which corresponds to a cost per dray of \$48 over the six-year life of the loan. Under a truck subsidy (the CARB) plan, the total cost would be roughly halved, resulting in an additional \$24 per dray for the five-year period.

⁵⁹ The age distribution is from the Marstel-Day study in Appendix 1. 1,332 is the appropriate share of the estimated fleet size in 2010.

An important caveat is that the lifespan of a truck is well in excess of six years, which implies that amortizing the costs over the truck life, rather than the life of the loan would substantially decrease the fee per dray.

The cost of **retrofitting** 666 trucks is estimated to be \$16.8 million without any subsidy, with a cost per truck of \$25,207 over a three-year period and a cost per dray of \$14. With subsidy, the cost per dray would again be halved to \$7 over a three-year period.

Thus, taking the upper end of all the estimates, the **total cost of phase 1** would be \$166.7 million.

B. Phase 2

For Phase 2 implementation we make the following assumptions:

- Traffic grows at the Port of Oakland, resulting in a demand for 2,158 truck drivers.
- All remaining 1994-2003 (559) trucks will be replaced with new trucks. Though used 2007 compliant trucks will be available by 2013, the purchase of new trucks is incorporated into this analysis. If used trucks were purchased, this would decrease costs.
- All 2004-2006 model year trucks (238) will be retrofitted. Though no such device currently appears to exist, we assume there will be one by this time and the cost will be approximately the same as the retrofit cost used in Phase 1.
- The interest rates, loan horizons, days per month, and trips per day are the same as assumed in Phase 1.

Under these assumptions, 559 trucks would be replaced at a total cost of \$97.1 million, or \$48 per dray. 238 trucks would be retrofitted at a total cost of \$6.0 million, or \$14 per dray. The total combined cost would be \$103.1 million.

It is also important to note that the Phase 1 truck replacements would still be financed during the first two years of Phase 2.

The **total cost of both phases** is \$269.8 million. Again, we believe this represents an upper bound on the true costs, as we assume the distribution from the License Plate Survey (which has an older distribution than the other surveys) and we assume that only new trucks are purchased as replacement trucks (instead of late model used trucks). Finally, this estimate assumes no CARB subsidies; assuming subsidies could potentially halve the amount.⁶⁰

Impact on labor supply

The impact of CARB regulations on labor supply is dependent on the availability of credit for drivers and their willingness to take on additional debt. It should be noted that, on average, the IOOs earn \$61,500 per year, which implies that IOOs who receive CARB funding to retrofit a truck would likely not have to borrow the full amount of the cost of the retrofit. It is also important to note that drivers who undertake the replacement option would have higher costs for the six years of the loan, but as the truck life extends well beyond 6 years, they would be able to see a return on their investment for approximately 8-10 years after the loan is completely paid off.

⁶⁰ The intention of the subsidies is to offset one half of the cost of retrofitting or replacement, but the size of the subsidy may only permit a 40 percent subsidy. However, there are currently used 2007 trucks available and the subsidy will likely be the same for a used truck as for a new one, so the size of the subsidy may well be on the order of 50 percent, on average.

The reasons above, combined with the fact that the CARB regulations are phased in over a four-year period lead us to conclude that there would be minimal effect on the labor supply of truck drivers.⁶¹

Impact on the structure of port drayage

As Table VI-49 illustrates, only 12.5% of trucks used by firms that employ drivers are ineligible for either retrofitting or replacement. Retrofitting trucks to meet the first phase of CARB requirements may cause small firms with employee drivers to leave the market, given that these firms may not have adequate capital to obtain financing for truck replacement.

There is some evidence that IOOs will be disproportionately affected, as they tend to drive older trucks than employee drivers. Without some type of subsidy, it is likely that IOOs will leave the market, given that Phase 1 requires only that trucks are retrofitted to meet 2004 standards, the impact will likely be small in Phase 1, but potentially larger in Phase 2, particularly if subsidies are not made available.

In the LMC survey, 47.9% of firms reported that they are Class III Carriers (those with less than \$1 million revenue per year). Of those, none used employee drivers exclusively. Among Class III carriers, the mean number of employee drivers dispatched for port drayage is two, compared to a mean of seven for IOOs. This suggests that a possible structural change under the CARB requirements is that very small carriers would shift to the use of IOOs who owned compliant trucks.

⁶¹ This conclusion depends, of course, on a loosening of current lending standards. As of the writing of this report, lending standards may preclude many drivers (and LMCs) from qualifying for the loans.

Impact on congestion and level of service

As the first phase of CARB requirements will affect a substantial number of drivers, it has the potential to cause major disruption of service. CARB has, however, actively publicized the requirements to drivers and firms and has approved several vendors for VDECs. The publicity, combined with the relatively low cost of acquiring a VDEC, implies that the major obstacle may be for the trucks that need to be replaced. This consists of 869 trucks, however, this is an upper bound as most of these trucks could be retrofitted instead of replaced. In 2010, 197 trucks will be older than 1994 and must be replaced. It is possible that there will be a shortage of anywhere from 200-400 trucks, which could be addressed by drivers working more hours until all trucks have been retrofitted or replaced (as discussed above, there are a considerable number of drivers who drive less than the legal maximum and could temporarily drive more hours to meet any temporary shortage).

Impact on drayage rates

The impact of CARB regulations on drayage rates is a function of the impact on capital costs, given that we assume there will be little impact the labor supply. The costs of retrofitting are estimated at \$14 per dray and the cost of replacement at \$48 per dray. The total cost estimated for both phases of the implementation, without any subsidies, is \$269.8 million.

There are multiple ways that these increased costs can be paid. One is for LMCs to attach a “green fee” to all contracts with BCOs or shipping lines. These fees would sunset with the end of the loan payment period (6 years). Firms replacing trucks rather than retrofitting would have to assess fees of at least \$48 per dray. These figures represent 3-24% of the cost of an average container move at the Port of Oakland (a higher percent for cheaper, shorter hauls and a lower percent for more expensive, longer hauls).

A second option would be for the Port of Oakland to collect a truck-related user fee for all trucks not meeting 2007 emissions standards (i.e. the 2nd CARB deadline). This currently consists of 93-99% of the trucks serving the terminals at the Port of Oakland. If this were used to fully subsidize all truck replacements and retrofitting needed across the two Phases of the program, it would require generation of \$269.8 million between June 2009 and December 2013 (54 months). Assuming only 2.4 million TEUs annually over this entire period (a low estimate), this amounts to a total of 10.8 million TEUS and a fee of \$26 per TEU or \$48 per container (assuming one container = 1.8 TEUs) in 2009 dollars. There are also options available that could reduce these costs. Such options include bulk purchasing orchestrated by the Port or Port subsidized or sponsored low cost financing.

Neither of these scenarios incorporates subsidies from CARB using California Proposition 1B fees, which would decrease the effective increase in drayage rates by roughly half. Assuming these funds are released to CARB to subsidize the costs of retrofitting and replacement, the “green fees” imposed by firms to recoup LMCs and IOOs investment could be cut in half.

It is important to note that the figures above are estimates for the cost of the trucks, not the cost of administration. We assume that administrative costs will be lowest under a “green fee” scenario, as each LMC will be responsible for billing its customers. The Port and its tenants will have to assess the administrative costs of verifying that the proper trucks are accessing the terminals, however, they will not have to contract with an entity to collect the truck fees and disburse revenues.

Impact on safety and security of the Port

The CARB requirements discussed above have limited security implications, but do provide another layer of safety for the Port. As a broad generalization, newer trucks tend to be safer, better maintained, and have better safety equipment than do older trucks. If for no other reason than newer trucks, when leaving the assembly line, tend to have stronger safety

measures than do older trucks, this leads to enhanced safety at the Port. The CARB requirements will clearly have the effect of lowering the average age of the fleet, inherently increasing the safety of the equipment used at the Port.

c) *DIESEL PRICES*

According to data from the Energy Information Administration (<http://www.eia.doe.gov>), the average price of ultra low sulfur diesel was \$4.69 per gallon in June 2008, dropping to \$2.89 per gallon in November 2008 (not including state or local taxes). The forecast for diesel prices is presented in Table VI-51.

TABLE VI-51: DIESEL PRICES

Year	Price per gallon (in 2008 cents per gallon)
2008	333.90
2009	301.41
2010	299.63
2011	309.93
2012	309.96
2013	318.40
2014	325.22
2015	328.36
2016	333.68
2017	343.00

**Source: EIA forecast adjusted to 2008 levels using CPI-U*

From these forecasts, it appears that, barring changes in federal, state, or local taxes, the price of diesel will decrease in real terms from 2008 levels until 2016. Though we do not necessarily expect these lower fuel prices to cause drayage rates to decrease, as rates tend to be “sticky”, we anticipate that the relief from the increases in fuel prices experienced over the last two

years will result in no appreciable changes to labor supply, firm performance, congestion, drayage rates, or safety.

d) COMBINED IMPACT

Impact on labor supply

While diesel prices are not expected to have significant impact on the port drayage sector, the concurrent implementation of Phase 1 of the CARB regulations with TWIC have the potential to substantially affect the labor supply of drivers. We anticipate that 8-18% of drivers will not apply for the TWIC and, in addition, that the implementation of CARB's first phase of regulations will require replacement of at least 197 trucks and likely over 800 trucks in the first phase. We anticipate that retrofitting trucks will not cause a substantial problem, as the cost to the driver or firm is relatively low (\$10,000-\$20,000), and drivers and LMCs have substantial advance notice. We anticipate a temporary shortage of less than 300 trucks due to CARB. It is quite possibly the case that there is overlap between those who will not apply for TWIC and those who would be affected by CARB, in which case, the total decrease in the labor supply may be far less than the anticipated reduction of 459 drivers.

As volumes are down 10% and this decline in volumes is expected to continue, and as many current port drayage drivers drive less than the legal maximum, we anticipate that the combined impact on the labor supply is likely to require an increase of only 10% of drivers (an additional 189) to address TWIC and Phase 1 of CARB. These drivers will likely come from other trucking jobs in the region or other jobs where individuals operate heavy equipment (such as construction). As illustrated in Task 2 of this report, the workers who could be recruited into port drayage make wages comparable to (in many cases less than) port drayage drivers, which means the likely costs of attracting these workers will not be wages, but advertising, recruiting, and some minimal training.

Impact on the structure of port drayage

We anticipate that TWIC will not have an impact on the structure of port drayage. However, CARB regulations may have substantial impacts. It is not immediately clear what this impact will be, absent any idea of whether the Proposition 1B funds will be made available and to whom. If they are made available to IOO drivers, we anticipate that firms will increase their use of IOO labor. If funds are not made available, then we expect the number of LMCs to decrease and that medium and larger size firms will have an advantage negotiating green fees with their clients, assuming they also have access to capital markets for the upfront cost of the trucks.

Impact on drayage rates

The main impact on drayage rates should be the cost of retrofitting and replacing trucks. The costs of retrofitting are estimated at \$14 per dray and the cost of replacement at \$48 per dray. The weighted average of these is \$31.54 per dray in Phase 1 and \$39.35 per dray in Phase 2 (assuming no subsidies). Regardless of whether the additional costs are recovered through a surcharge from LMCs or through a Port of Oakland fee, the cost per dray ranges but is likely to be close to \$40 per dray, 3.8-30% of the cost of an average container move at the Port of Oakland. It should be noted that this is an upper bound estimate and would be substantially lower with CARB subsidies or if fewer trucks are replaced in Phase 1 and late-model used trucks purchased in Phase 2. Also note that these percent changes imply that the increase in rates would be the same dollar amount for each distance. If these costs are internalized to the LMC, they will likely be higher for long distance drays and lower for shuttle hauls as the costs would be spread out according to the number of miles the truck is driven and the time it takes to drive them.

Impact on safety and security of the Port

The TWIC requirement along with the tracking requirement that is part of CARB should result in safer and more secure terminals. There is no necessary complementarity between the two programs.

e) *EMPLOYEE DRIVER REQUIREMENT*

Impact on labor supply

Imposing an employee driver requirement has the potential to substantially disrupt the labor supply of port drayage drivers. Approximately two-thirds (66%) of the drivers in the Driver Survey are IOOs (representing 1,308 drivers). These drivers were asked whether they would become employee drivers if such a requirement were implemented at the Port of Oakland. Sixty percent of IOO drivers reported that they would not become employee drivers (representing 785 drivers). There is substantial evidence that this figure is a reasonable approximation. All of these drivers provided examples of what jobs they would do instead of port drayage (most responding that they would drive their trucks elsewhere).

This suggests that 40% of the driver workforce would have to be replaced under a driver requirement. While this represents a small percentage of the total labor force in the region, it is likely to cause substantial recruitment costs for firms, though not likely to increase compensation, as the average wage of employee drivers working in drayage is comparable to other workers with similar skills in the area.

Impact on the structure of port drayage

The employee requirement is likely to cause considerable upheaval in the port drayage sector. As noted earlier, 46.5% of LMCs surveyed are Class III carriers, who tend to contract with both IOOs and employee drivers.

ATA's American Trucking Trends (p. 18) indicates that the distribution of costs for Class I and II carriers is as follows:

- 55.4% salaries, wages, and fringes
- 12.4% equipment rentals and purchases
- 16.6% total operating supplies
- 3.5% depreciation and amortization
- 2.4% insurance
- 2.9% operating taxes and licenses
- 6.8% miscellaneous

While the current drayage rates appear to cover operating expenses, the requirement for small carriers to purchase trucks that are compliant with CARB standards is likely to place a burden on smaller carriers, who might be less likely to have access to favorable terms of credit.

In addition, while all of the Class I and II carriers surveyed reported providing non-drayage trucking services, 41% of Class III carriers specialized in drayage services at the Port of Oakland. These Class III carriers are therefore less likely to be able to use labor and capital in other trucking services during any lulls in port volumes. Assuming 121 LMCs serve the Port of Oakland at any point in time, this would lead to a loss of up to 50 firms, each of which uses, on average, 11 drivers. Though the drivers would migrate to other firms, this would result in a substantial loss of small businesses and back office jobs (an average of 3 at the Class III carriers).

Impact on congestion and level of service

An employee driver requirement is likely to adversely affect quality of service in the short run as small firms are likely to leave the market and the remaining firms could have substantial problems securing enough employee drivers. We anticipate that replacing 40% of drivers will take at least one year and cause firms to experience substantial recruiting costs. Alternatively,

were the requirement to be phased in, as it has been at the Port of Los Angeles, this disruption could be substantially mitigated. Phasing in over 5 years would reduce the necessary increase in employee drivers to 175 in each year. While still a significant increase, this would smooth out the pressure, were there to be any, on wages to increase and on the urgency with which LMCs need advertise for drivers. It is also possible that this void would be filled through new entry, minimizing the search costs of existing LMCs.

It is possible in the long run that additional efficiency might result from the employee model, by firms using drivers and capital in a more productive way. However, this is highly unlikely to immediately offset the shock to the labor market that is anticipated.

Impact on drayage rates

There are two components of the costs of an employee requirement on drayage rates: recruitment costs and labor costs. While we estimated that recruiting costs would be negligible for TWIC and Phase I of CARB requirements, the impact of these was estimated as 10% of the labor force, while replacing 40% of the labor force would be considerably more challenging. Firms may have to attract non-trucking labor by financing training, or provide incentives to existing truck drivers outside of drayage.

In addition, while the annual net earnings of IOOs and EDs in the data sets are comparable, the LMCs that used employee drivers tended to provide some level of benefits, at a cost of 27%, on average, of the wages paid out. In addition, the cost of Unemployment Insurance and State Disability Insurance is estimated at \$941 per driver per year (assuming earnings of \$63,250 per year and a 3.4% UI rate). This will add another 1.5 percentage points to the cost of labor, for a total expenditure of \$81,269 per driver, assuming no changes to the number of office staff at LMCs.

Thus, we estimate the cost of labor to increase 28.5% for those LMCs only utilizing IOOs (slightly less for those employing a mix of IOO and ED labor). We estimate an increase in drayage rates on the order of 20%. As mentioned above, a portion of the increase in costs may be offset by productivity increases, thus mitigating the impact on drayage rates, however, it is unlikely that a 20% increase in productivity could be achieved, especially as waiting to get in and out of terminals is a substantial portion of time, some of which will inevitably persist in this system (due to limited gate hours, closing the gates at lunch, and other factors).

Impact on safety and security of the Port

An employee requirement is not designed to improve port safety or security. However, it has characteristics that do tend to enhance both safety and security. From a safety standpoint, an employee requirement will likely reduce turnover among drivers providing drayage services to the Port. This, as with the TWIC, breeds familiarity with port activities among the fleet, resulting in a safer port environment. An additional safety result is that Licensed Motor Carriers, by vetting and hiring their drivers are providing a layer of scrutiny over their drivers. They will be putting their drivers behind the wheel of a \$100,000 investment and will tailor their hiring practices so as to target those who will treat that investment well, resulting in a safer environment at the Port. This vetting and scrutiny is also valuable from a security perspective. Again, the LMC will likely have higher barriers to employment than there are barriers to entry into the business of drayage as an independent operator. Additionally, there is the issue of accountability, which works to enhance both safety and security at the Port. In the event of a safety or security violation at the Port, it will be the LMC that is accountable for the driver's actions. Such accountability does exist with independent drivers, but is likely strengthened when it is placed on the shoulders of a known entity by the many drivers under its employ.

f) ALL SCENARIOS COMBINED

Impact on labor supply

As outlined above, there is the potential for a shortage of 10% of drivers due to the combined impact of CARB Phase 1 and TWIC. There is also the potential for a substantial reduction in the number of drivers due to the employee requirement. This is on the order of 40%. Given that IOOs are less likely to have newer trucks, and are also less likely to indicate that they will apply for TWIC, it would be misleading to aggregate all these numbers. The cumulative effect on labor supply is likely to be on the order of 35%, a substantial number of drivers, which will take some time to recruit into the labor force. As previously noted, this problem is likely to only cause short term disruptions in the labor supply (on the order of approx. one year), as there are large numbers of workers in the area who could transition into port drayage with a minimum of training, and also currently earn less in their jobs than the average salary of an employee driver in port drayage.

Looking forward to Phase 2 of the CARB requirements, it is possible that there are some synergies between this and an employee requirement. Were a requirement phased in over the next 5 years, there would be 100% employee service to the Port in the year 2014. It is likely that LMCs bringing new employee drivers online would, in anticipation of the Phase 2 requirement, equip them with trucks that satisfy that requirement. This would substantially alleviate the potential for disruption in 2014 when the Phase II requirements take affect.

The combined effects on driver demand between 2008 and 2017 are illustrated in Table VI-52

TABLE VI-52: COMBINED EFFECT OF TWIC, CARB, EMPLOYEE REQUIREMENT ON NEED FOR NEW DRIVERS

Year	Status Quo Growth of Drivers		Additional Drivers Needed			
	Absolute Growth	Level	TWIC	Additional CARB	Empl Required	Total
2009	-50	1932	300		175	425
2010	19	1952		150	175	344
2011	49	2001			175	224
2012	80	2081			175	255
2013	125	2205			175	300
2014	176	2382		200		376
2015	214	2596				214
2016	260	2856				260
2017	286	3142				286
Total	1160		300	150	875	2685

**Source: Calculations by Beacon Economics*

Impact on the structure of port drayage

The CARB policies alone may increase the use of IOOs by smaller LMCs, who may be less likely to afford the capital payments on new trucks. The CARB policies, combined with an employee requirement is likely to cause considerable problems from smaller LMCs, who will be expected to access capital to purchase a fleet of trucks and pay drivers as employees (which according to the data are more expensive than IOOs). This means that smaller LMCs are likely to exit port drayage, resulting in fewer, larger firms (it should be noted that this consolidation will likely be the result of bankruptcies, not due to mergers and acquisitions).

Impact on congestion and level of service

As outlined above, the cumulative effect on labor supply is likely to be on the order of 30-35%, which may lead to a short term congestion problem, on the order of 1 year, decreasing service levels over this time period.

Impact on drayage rates

The estimated impact of the CARB requirements is anticipated to be close to \$42 per dray (\$50 including the overhead costs of administering the program), 3.8-30% of the cost of an average container move at the Port of Oakland, assuming no truck subsidies from the State. The additional labor costs of recruiting employee drivers and the additional cost of employee drivers is likely to add another 20%. Thus, the cumulative impact is anticipated to increase drayage rates by 25-50%, with the lower bound more likely if more retrofitting of trucks is employed and late model used trucks are purchased, rather than new trucks. These also assume no subsidies for replacement and retrofitting.

It is important to note that the compound increases in drayage rates may have the effect of diverting discretionary freight to other ports that do not have these same requirements. This potential for diversion is explored further in the Task 3a and 8 reports.

Impact on safety and security of the Port

In the field of security, a layered approach is often indicated as providing the greatest returns. It is in this sense that the TWIC and employee requirement are complementary. TWIC provides a first layer of security at the Port, and an employee relationship provides a secondary layer. The TWIC reduces the presence of people on the Port to those who are eligible for the credential. Through the accountability of the LMC, the employee requirement further refines the pool of individuals who make it onto port grounds and provides a greater likelihood that

those making it through both checks will be a smaller security risk than with only one or another of the layers.

DRAFT

F. TASK 6: PROFILE OF THE PORT DRAYAGE TRUCK FLEET BY AGE

In addition to profiling truck age, this task also reports the frequency of drayage trips (measured by gate entrances or exits) at the Port by age group, broken down as follows: pre-1994 trucks; 1994 through 2003; 2004 through 2006; and 2007 or newer. The fleet of trucks providing drayage services to the Port of Oakland is estimated to be 1989.

This is the same number of trucks as estimated in Task 2. We arrive at this estimate by assuming that each driver serving the Port makes use of a single truck. This assumption is supported by conversations with local LMCs and by data from the Driver and LMC Surveys. In particular, conversations with LMCs have indicated that for their employee drivers, it would be the exceptional case where one driver would not drive the same truck to the Port each day.

From the Driver Survey, we have evidence that each of the IOOs providing drayage services to the Port has access to only one truck and that this truck is generally only driven by a single person. From the survey, IOO drivers indicated that 90 percent own their truck and 10 percent lease their truck. Further, only three of the 153 IOO respondents indicated that somebody else ever drove their truck.

From the LMC Survey, we find that LMCs that own trucks own on average 18.5 trucks and employ 21 drivers. This does suggest that perhaps the number of trucks is slightly less than the number of drivers serving the Port, however, these same LMCs report that they dispatch on average 8 drivers to the Port and 8 trucks.

When coupled with the anecdotal evidence from LMCs that drivers generally drive the same truck, we find this to be a close approximation of the assumption that the fleet of trucks serving the Port is equal to the number of drivers. Certainly going forward, with the imposition of the CARB regulations and a possible employee driver requirement, this is likely to be the steady

state. We assert this as it represents the most efficient use of labor and capital in the provision of Port drayage services.

The truck age distribution was developed by Marstel-Day as a subcontractor to Beacon Economics and is displayed in Table VI-53. Please see Appendix E for the details of this study.

[Table: Truck age (model year) estimated for drivers currently serving port area]

TABLE VI-53: TRUCK AGE (MODEL YEAR) ESTIMATED FOR DRIVERS CURRENTLY SERVING PORT AREA

Truck Age Range	Estimated Current Drivers	
	Number of Trucks	% of Total
Pre-1994	338	17
1994-2003	1,571	79
2004-2006	60	3
2007+	20	1
Totals:	1,989	100

**Source: Calculations by Beacon Economics*

The table reflects our estimate that there are 1,982 trucks serving the Port. Of these, the vast majority are between the ages of 1994 and 2003. Just 4 percent of the trucks are newer than 2003.

Table VI-54 presents results from the Driver Survey on the age distribution and the frequency with which trucks of each age cycle through the Port.

TABLE VI-54: NUMBER OF DRAYS BY TRUCK AGE IN A WEEK

Truck Vintage	Shuttle	Short	Regional	Long	Total
<i>Pre-1994</i>	263	278	15	29	585
<i>1994-2003</i>	614	2,325	102	117	3,159
<i>2004-2006</i>	59	293	29	73	453
<i>2007+</i>	44	380	59	44	527
Total	980	3,276	205	263	4,724

**Source: Calculations by Beacon Economics*

TABLE VI-55: DISTRIBUTION OF DRAYS BY HAUL TYPES AND TRUCK AGE (%)

Truck Vintage	Shuttle	Short	Regional	Long	Total
<i>Pre-1994</i>	5.57	5.88	0.31	0.62	12.38
<i>1994-2003</i>	13.00	49.23	2.17	2.48	66.87
<i>2004-2006</i>	1.24	6.19	0.62	1.55	9.60
<i>2007+</i>	0.93	8.05	1.24	0.93	11.15
Total	20.74	69.35	4.33	5.57	100.00

**Source: Calculations by Beacon Economics*

Table VI-56 provides an indication of the intensity of use of various trucks by age across haul types. Not surprisingly, the distance of the haul decreases with the increasing age of the truck.

TABLE VI-56: DISTRIBUTION OF DRAYS ACROSS HAUL TYPES OF TRUCK AGE (%)

Truck Vintage	Shuttle	Short	Regional	Long	Total
<i>Pre-1994</i>	45.00	47.50	2.50	5.00	100.00
<i>1994-2003</i>	19.45	73.61	3.24	3.70	100.00
<i>2004-2006</i>	12.90	64.52	6.45	16.13	100.00
<i>2007+</i>	8.34	72.22	11.11	8.33	100.00

**Source: Calculations by Beacon Economics*

G. TASK 6A: EVALUATION OF THE ECONOMIC EFFECTS OF EARLY ADOPTION OF CARB STANDARDS

The California Air Resources Board (CARB) has implemented new truck standards (“Port Truck Rule”) that are coming online in the near future. As part of its future Comprehensive Truck Management Program (CTMP), the Port of Oakland is contemplating an acceleration (or “early adoption”) of the CARB deadlines.

- Through the use of the license plate survey performed by Marstel-Day (Task 6 of the original scope of work), we provide an indication of the numbers of trucks that would be affected by several acceleration scenarios, and the economic impact of these scenarios (costs of retrofits/replacement of trucks and subsequent potential effect on drayage truck supply/demand).
- We also provide the results from a limited survey of truck (drayage) drivers serving the Port to obtain supplementary information about the potential impacts of the CARB regulation and subsidies.

a) CARB EARLY ADOPTION SCENARIOS

As discussed in Tasks 4 and 5, there are CARB Port truck regulations coming on line in 2010, with an incremental increase in restrictiveness coming in 2014. This section examines the estimated impact of these regulations both in terms of the number of trucks that need be retrofitted or replaced in each year and the cost of purchasing new trucks and retrofitting old trucks.

Results

Table VI-57 provides our current estimates of this impact. The table presents two different scenarios. The first scenario is intended to measure the impact of the CARB regulations as they are written and the second is intended to model the implications of an early adoption plan. Turning to the estimates under the CARB regulations, the first line of the table indicates the

number of trucks that would have to be replaced or retrofitted in 2010 in addition to the associated costs. The total number of trucks affected is found to number 1,529, with 863 being replaced and 666 retrofitted. The associated costs are \$166.7 million in total, with \$149.9 going to truck replacement and \$16.8 million for retrofit.

TABLE VI-57: IMPACT OF CARB REGULATIONS ON THE OAKLAND DRAYAGE MARKET

Year	Number			Cost (\$Millions)		
	<i>Affected</i>	<i>Replaced</i>	<i>Retrofitted</i>	<i>Total</i>	<i>Replaced</i>	<i>Retrofitted</i>
2010	1,529	863	666	166.7	149.9	16.8
2014	797	559	238	103.1	97.1	6.0
TOTAL	2,326	1,422	904	269.8	247.0	22.8

Our assumptions under this scenario are the same as those in Task 4. We assume that in 2010, trucks older than the 1994 model year will have to be replaced, while those of model years between 1994 and 2003 will either have to be retrofitted or replaced. Trucks older than 1994 are replaced with a 2007 model truck. It is assumed that one-half of the trucks serving the port with model years between 1994 and 2003 will be retrofitted and the other half will be replaced with, again, a 2007 model year truck.

In 2014, trucks of model year 2003 or earlier will be banned from the Port, and will need to be replaced. Those with model years between 2004 and 2006 will either be replaced or retrofit. It is again assumed that one half of these 2004-2006 vehicles will be replaced with the other half receiving a retrofit. This requirement affects an additional 797 trucks at an additional cost of \$103.1 million. The total cost of the CARB requirements is estimated to be \$269.8 million. This cost could be reduced if fewer trucks were to be replaced. However, this will be left to the market, with a heavy influence by the subsidies that may be available. As indicated below, there is evidence that decisions will be heavily influenced by the availability of subsidies and that subsidies are more likely to push IOOs toward replacement than toward retrofit.

Table VI-58 presents an alternative scenario. In this scenario, the CARB regulations are assumed to hold, but in 2012, there is an additional constraint that the minimum age of a truck is raised to 2000, from the 1994 minimum age imposed by the 2010 regulations. Under this scenario a set of 294 trucks, aged between 2004 and 1999 are replaced at a cost of \$51.0 million. This reduces the cost in 2014 from \$103.1 million to just \$66.2 million.

TABLE VI-58: IMPACT OF ACCELERATED CARB REGULATIONS ON THE OAKLAND DRAYAGE MARKET

Year	Number			Cost (\$Millions)		
	<i>Affected</i>	<i>Replaced</i>	<i>Retrofitted</i>	<i>Total</i>	<i>Replaced</i>	<i>Retrofitted</i>
2010	1,529	863	666	166.7	149.9	16.8
2012	294	294	0	51.0	51.0	0.0
2014	585	347	238	66.2	60.2	6.0
TOTAL	2,408	1,504	904	284.0	261.2	22.8

Although the incremental cost of the 2014 regulation is reduced, the overall costs associated with the regulations are increased from \$273.2 million to \$287.4 million. This increased cost arises from the result that under this scenario 2,408 trucks are affected overall, while under the plain CARB requirement, only 2,326 trucks are affected.

That the number of trucks affected increases with the intermediate restriction is due to the fact that the fleet decays and is restocked. Replacing the portion of the fleet with model years 1994-2000, in 2012 rather than 2014, causes replacement of some older trucks that might well leave the market of their own volition. This raises the overall costs of the transition to cleaner trucks.

However, what this analysis does not consider is the fact that replacing newer trucks means replacing trucks that have value in the market. Because a model 2000 truck is no longer permitted to service the port, does not mean that it does not have other productive uses. As

such, the market value of the truck that is being driven out of drayage should be considered in an overall assessment of the costs. The analysis presented here does not permit such a thorough benefit cost analysis.

In addition, there is an unmeasured benefit to replacing older trucks early. The resulting reduction in emissions has value in the reduction of illness and premature deaths. Despite the higher price tag of the program, the early adoption may still be a net win when considering the reduction in externalities that it is paying for.

There are a host of assumptions underlying these estimates. In particular, it is assumed that a new truck costs \$120,000, that the sales tax is 8.5 percent, that the driver or LMC acquires the truck with a loan at an interest rate of 10 percent, with duration of 6 years. Similarly, a retrofit costs \$20,000, and is acquired with a loan at 10 percent interest, with duration of 3 years.

Further, it is assumed that trade grows at the rates illustrated in Column 1 of Table VI-48 of Tasks 4 & 5. It is also assumed that there is 20 percent turnover in the fleet each year. This may be high, but is consistent with turnover in the trucking industry generally. This losses the fleet experiences each year is replaced by new entrants into the drayage market. These entrants are assumed to have trucks evenly spread out in age over the last 15 years. This last assumption is true where CARB regulations, or their absence, permit trucks 15 years old into the market. The age distribution of new trucks is truncated in years where CARB places binding limits on the age of trucks participating in drayage. For instance, any trucks entering drayage after 2014 must be at least a 2004 model year. This will restrict trucks entering the market to being less than 10 years old.

Summary

As is clear from this section, the CARB requirements will necessitate the replacement of a large proportion of the drayage fleet by 2014. By 2010, at least 197 trucks will have to be replaced

and as many as 1,422 trucks may be replaced by 2014⁶². As discussed in Tasks 4 and 5, this will likely result in an increase in drayage rates as the potential price tag of \$269.8 million is spread out across 2.2 to 3.4 million containers between 2010 and 2018.

As discussed in Task 6, this burden does disproportionately fall on independent drivers, as they currently driver trucks that are on average three years older than do employee drivers. It also falls disproportionately on smaller LMCs and larger LMCs. Class II LMCs appear to have been the most progressive in terms of buying new trucks in recent years.

The CARB requirements, if absorbed or internalized by the LMCs and IOOs directly, will likely lead to some consolidation of the industry. In the absence of significant subsidies, it is likely that more IOOs will be displaced than will employee drivers and that smaller LMCs will also feel the brunt of the burden.

b) SURVEY RESULTS

In addition to the formal driver survey that was carried out last fall, Beacon Economics obtained a contact list of IOO drivers from a local LMC. This contact list was a general list and not just a list of IOOs used by the LMC. The survey was carried out by telephone and some 73 drivers were contacted. The survey was carried out between November 1, 2008 and December 8, 2008. Thirteen of the drivers are now employees, leaving 60 IOOs as the sample.

The drivers were asked questions regarding their income and activities. These responses were used to verify information collected from the larger survey. In addition, questions were asked regarding the awareness on the part of these drivers of the CARB "Port Truck Rule". Of these

⁶² There are currently 197 pre-1994 trucks serving the Port and all will have to be replaced by January 1, 2010.

drivers, 50 owned trucks that were older than 2004, indicating that they have a truck that will be affected by the first round of CARB regulations in 2010.

Of these 50, all were generally aware of the pending regulation, but most do not know what they will do about it. In particular, 32 responded “Don’t Know” when asked what option they would choose – retrofit or replacement – to comply. Roughly equal numbers indicated that they would retrofit their truck (7 respondents) or replace their truck (9 respondents).

When informed of the possibility of a subsidy, many of these drivers changed their answers. In particular, 14 changed their answer to “Replace Truck”, 12 from don’t know, and 2 from “Install DPF”. On the other hand, only 3 indicated that they would install a DPF, rather than that they do not know. This suggests that a subsidy could be a powerful tool for encouraging drivers to replace their older trucks with new. At the same time, a subsidy for installing a DPF appears to be somewhat less compelling.

These results are based on a relatively small sample of drivers and are meant to be suggestive only. We have no way of validating the representativeness of this sample, nor of fully understanding the decisions indicated. These responses were also generated for a non-specific subsidy, so it is unclear how large the subsidy need be to change the actions of the drivers.

H. TASK 7: ASSESSMENT OF THE ABILITY OF A PORT TRUCKING NETWORK TO MEET SPIKES IN DEMAND

Assessment of the ability of a Port trucking network to meet spikes in demand. This Task was performed given two conditions:

- a. With an employee driver requirement
- b. Without an employee driver requirement

Additionally, this Task includes analysis of the potential impact on various employment sectors of a potential truck driver shortage.

1. FINDINGS

Spikes in demand for trucking services are quite infrequent at the Port of Oakland.⁶³

Nevertheless, through diversion from some other port closure somewhere, or through a temporary increase in demand for a material input or consumption good that arrives in the United States through the Port of Oakland could, in principle, lead to a spike in the demand for drayage services. In contemplating a significant change in the drayage market at the Port, such as an employee requirement, it is worth considering the impact that such a policy might have on the drayage sector's ability to service the increased need.

As a baseline, against which an employee driver requirement could be judged, is the status quo of the drayage sector. It is currently the case that some 2/3 of the drivers providing drayage to the Port are independent operators. The other one-third are employees of Licensed Motor Carriers (LMCs). Together, these drivers moved some 2.2 million TEUs through the Port of

⁶³ This is the general consensus of terminal operators at the Port of Oakland.

Oakland. Of these, 1.7 million, or 76 percent were loaded. The remaining containers moved through the port empty. It is unlikely that a time critical increase in the movement of empty containers would occur, so here we consider only a spike in the movement of loaded containers.

a) BASELINE

As we have no real evidence of recent spikes in demand for drayage services, we turn the question around and ask how much slack there is in the current system. This slack would present itself as wait time for the drivers. In particular, time spent waiting for dispatch, time spent waiting to enter the terminal gate, and time spent inside the gate waiting to exit with a full load, or having dropped off a load.

From the driver survey, we have evidence on the length of time drivers spend in each of these states, as well as the duration of the average dray. Identifying excess capacity is then reduced to the question of excessive wait time in the driver's schedule. Our survey results indicated that the average dray takes 6.4 hours (Table VI-59). Decomposing this time into time spent waiting and time spent driving provides a rough indication of the inefficiency in the current system

TABLE VI-59: TIME DURATION OF AN AVERAGE DRAY

	Hours/ Trip	Trips/ Day	Hours/ Day
Employee Drivers	6.9	2.1	11.0
<i>Shuttle and Short Hauls</i>	5.1	2.6	10.1
<i>Regional and Long Hauls</i>	7.8	1.8	11.9
Independent Operators	6.0	2.5	11.2
<i>Shuttle and Short Hauls</i>	4.4	3.3	10.7
<i>Regional and Long Hauls</i>	7.3	1.8	11.3
All Drivers	6.4	2.3	11.1
<i>Shuttle and Short Hauls</i>	4.6	3.0	10.5
<i>Regional and Long Hauls</i>	7.6	1.8	11.5

*Source: Calculations by Beacon Economics

TABLE VI-60: DRIVER TIME SPENT WAITING FOR DISPATCH BETWEEN DRAYS

	Mean (hours)	Percent of Drays with Zero Wait Time
Employee Drivers	1.3	36.0
<i>Shuttle and Short Hauls</i>	1.4	28.6
<i>Regional and Long Hauls</i>	1.2	38.9
Independent Operators	1.7	19.2
<i>Shuttle and Short Hauls</i>	1.8	21.1
<i>Regional and Long Hauls</i>	1.6	17.5
All Drivers	1.5	25.6
<i>Shuttle and Short Hauls</i>	1.7	23.1
<i>Regional and Long Hauls</i>	1.4	27.3

*Source: Calculations by Beacon Economics

From Table VI-60, we find that drivers spend on average 1.5 hours waiting for dispatch between drays. Despite some unavoidable delay inside the terminal (customs etc.), much of this time could be eliminated in the event of a surge in demand. The other components, waiting inside and outside of the terminal also appear to add significantly to the time it takes to complete an

average dray.

The driver survey contained the following questions regarding wait times at the port:

39. How much time was spent waiting *OUTSIDE* the Port to either pick up or drop off a load? _____ hours

40. How much time was spent waiting *INSIDE* the Port to either pick up or drop off a load? _____ hours

The responses to these questions indicate that wait times are similar for IOOs and employee drivers at the port and that, on average, drivers wait 2 hours outside the gate and 1.6 hours once inside the gate to get out.⁶⁴ These results indicate a further inefficiency in the current drayage operations that if improved would reduce the demand for additional drivers to meet the spike in traffic at the port.

Taken together, these three wait times imply that a significant proportion of the driver's time is spent waiting. Some of this wait time is inevitable. From conversations with MTOs and LMCs, we have gotten the sense that terminals fundamentally need on average a half hour to receive the truck and then a half hour inside the terminal to either take delivery, or to load the truck with the inbound container. Therefore, of the 3.6 hours spent waiting at the terminal, perhaps as much as 2.6 hours is unnecessary and could potentially be eliminated in the event of a

⁶⁴ This is in start contrast with the Port's 2005 emissions inventory, which found that turn times averaged approximately 30 minutes. In conversations with LMCs and marine terminal operators, we have found that a half hour is likely the best achievable performance. The average, especially as some terminals are significantly more efficient than others, is likely to be somewhat higher. It has also been found that drivers often tend to overstate their wait times. It is therefore quite possible that our measured average of 1.6 hours inside the gate of the Terminal is high.

significant spike in demand.

The wait time for dispatch is in large part unnecessary. There is no reason that a driver could not receive his or her next dispatch prior to the completion of the previous dispatch. This would require a great deal more coordination among the various parties, marine terminal operators, licensed motor carriers, and drivers, than the current model exhibits, but under the strain of a spike in demand, would not be unreasonable.

In sum, it is conceivable that up to 5.3 hours of the average dray could be eliminated. This represents the majority of the driver's time. However, it would not be reasonable to assume that all of this inefficiency could be eliminated in the event of a spike in demand. The issues that create this inefficiency are many and complicated. At the same time, it seems likely that under extreme circumstances, coordination among the parties involved could eliminate up to a half of this inefficiency. This leads us to the conclusion that the current drayage sector would be fully capable of handling a surge in demand of between 25 and 40 percent.

These results should be tempered by the notion that such a surge in demand for drayage services is extremely unlikely. In particular, in conversations with both terminal operators and LMCs, it was indicated that during the spike of traffic in 2003, once the West Coast Ports had reopened following the closure related to the labor dispute, that there was not a tremendous increase in the demand for drayage services. The movement of containers through the terminals was sufficiently slow that drayage services were not at all strained.

b) EMPLOYEE DRIVER REQUIREMENT

Were the Port to develop an employee driver requirement, much of this slack would likely be removed from the system. The cost to LMCs of much of the slack is not sufficient to remove it. Were they to own the trucks, there would be substantial incentives to reduce it.

As a first estimate of the remaining slack, we perform the same calculations as above, but with

the evidence on wait time for only employee drivers. We find the average dray for employee drivers to take 6.9 hours. Of this, 1.9 hours are spent waiting for dispatch and, as with all drivers, 3.6 hours are spent waiting either inside or outside the gate at the terminal. This suggests that 5.5 of the 6.9 hours for a dray are spent waiting. Of this, the 1.9 hours spent waiting for dispatch and 2.6 hours of the terminal wait could be eliminated. This 4.5 hours represents fully 65 percent of the driver's time, indicating that even for employee drivers alone, significant slack remains.

However, it is unlikely that the status quo would remain under a universal employee driver requirement. In particular, it is highly likely that the bulk of these inefficiencies would be removed under 100 percent ownership. It would be unwise to count on this slack remaining under a driver requirement. In other industries, this problem could be remedied by extending the number of hours worked by each driver, but it is likely that drivers will already be working their legally mandated maximum of 60 hours in a 7 day period. Expanding capacity from within the market is likely to be difficult. This was possible when IOOs were present as they often work less than the legally required maximum

However, given the significant supply of independent operators in the general Bay Area market -- As identified in Task 3, there are in excess of 12,000 independent operators in the region -- it may be possible to avoid a significant slowdown in container movement through temporarily relaxing the employee driver requirement. For a period of limited duration, IOOs not normally participating in Port operations could be used to supplement the existing stock of drivers.

Bringing in IOOs from outside drayage may not be not a panacea, however, on at least two counts. First, familiarity with Port operations on the part of drivers is important for efficient and safe interactions on terminal grounds, though not crucial. Second, is the issue of the Transportation Worker Identity Credential (TWIC). These issues will have to be dealt with during any rapid expansion of port activity.

An employee requirement may restrict the trucking sector in responding quickly to rapid changes in the flow of containers. The additional capacity of many LMCs to respond to a short term spike, may provide the needed buffer that the drayage sector needs between being shorthanded and handling a spike. As reported elsewhere, the LMCs currently participating in drayage have half again as many drivers with which they contract that do not regularly perform drayage. Many LMCs will maintain some of these drivers as Port ready because they will recognize that in times of shortage, there is money to be made.

However, it is possible that the impediment to dealing effectively with a spike may not be the drayage sector. In survey discussions with various participants in the supply chain, it was made clear that the terminals were the primary impediment to accommodating the increased flow in 2003, the last time that volumes spiked at the Port. Until the Port's terminals become more able to respond to a spike in flows, the possible shortcomings of an employee driver requirement are unlikely to be tested.

c) *LOCAL ECONOMIC IMPACT OF A DRIVER SHORTAGE*⁶⁵

Although we have concluded that the drayage sector is not likely to be a significant impediment to growth at the Port, or to handling a spike in demand, we have nonetheless evaluated the employment and output effects of a reduction in Port activity of 25 percent for a calendar year. This exercise can equivalently be thought of as the failure of the drayage sector, or the supply chain more generally, to deal effectively with a sudden 25 percent increase in container flows.

Tables VI-61 and VI-63 present the results from an ImPlan simulation of a 25 percent reduction in flows through the Port of Oakland.⁶⁶ The first table indicates the employment consequences

⁶⁵ For a clear exposition of the methodology used in producing these results, please see the memo from Bay Area Economics in Appendix 3.

for the sectors that lose at least 25 jobs, either directly, indirectly, or induced. Direct job impacts are those of individuals who work at the Port. Indirect jobs are lost in industries that provide significant support for Port activities. The usual suspect, warehousing and storage, suffers from remarkably few job losses. This is likely due to the fact that the sector is not that reliant on Port activity relative to the local economy and does not provide a tremendous number of jobs per dollar of goods processed. Induced jobs are those that are either created or destroyed because of a change in income due to job gains or losses elsewhere.

TABLE VI-61: EMPLOYMENT CONSEQUENCES OF A 25 PERCENT REDUCTION IN PORT ACTIVITY

Industry Employment	Direct	Indirect	Induced	Total
Scenic and sightseeing transportation and support	-2,470	-34	-3	-2,507
Food services and drinking places	0	-11	-108	-119
Employment services	0	-86	-16	-102
Couriers and messengers	0	-96	-4	-100
US Postal Service	0	-85	-6	-91
Real estate establishments	0	-20	-35	-55
Offices of physicians, dentists, and other health	0	0	-52	-52
Wholesale trade businesses	0	-7	-45	-52
Private hospitals	0	0	-49	-49
Services to buildings and dwellings	0	-32	-10	-42
Nursing and residential care facilities	0	0	-31	-31
Retail Stores - General merchandise	0	-1	-29	-30
Private household operations	0	0	-30	-30
Warehousing and storage	0	-22	-3	-25
Other	0	-211	-535	-746
Total	-2,470	-605	-955	-4,031

**Source: Calculations by Beacon Economics*

⁶⁶ This analysis was provided by Bay Area Economics as a subcontractor to Beacon Economics in carrying out this study.

The first category includes Port operations (NAICS 488) and reflects a decline in employment of about 25 percent of the Port workforce. The 2005 level of employment in various categories associated with Port Maritime businesses is included in Table VI-52. This employment accounts for nearly 10,000 jobs directly related to Port maritime activity. In all, a decline of 25 percent in Port activity would result in the loss of just over 4,000 jobs. The model is linear, so we could contemplate a loss of 5 percent of Port maritime activity resulting in a loss of just 800 jobs, one fifth of the scenario depicted in the table.

TABLE VI-62: PORT OF OAKLAND MARITIME-RELATED EMPLOYMENT, 2005⁶⁷

	Employment
Rail	153
Truck (not specific about these are 'drayage' only)	3,636
Terminal employees	276
ILWU (longshore)	1,329
Towing	92
Pilots	95
Steamship line agents	168
Maritime SVCS	378
Freight forwarders/customshouse brokers/3rd party carriers	1,592
Warehouse/distribution centers	1,325
Government	208
Marine construction/ship repair	237
Barge/bunkering	110
Dependent shippers/consignee	88
Port of Oakland	159
Banking insurance	34
Total	9,880

**Source: Calculations by Beacon Economics*

⁶⁷ Minnesota IMPLAN Group, Inc. 2007 California Data.

The output effects of a reduction in Port activity are perhaps more striking in Table VI-63. In all, Alameda County would suffer a reduction in output of some \$577 million. Curiously, the most significantly affected industry other than the direct effect on the Port is the rental units that many of these employees would otherwise occupy. The effects are otherwise not large. Outside of the effects on the Port sector, output losses total roughly \$200 million. This is a very small fraction of the local economy.

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TABLE VI-63: THE OUTPUT CONSEQUENCES OF A 25 PERCENT REDUCTION IN PORT ACTIVITY

Industry Output	Direct	Indirect	Induced	Total
Scenic and sightseeing transportation and support	-357,379,264	-4,901,888	-375,502	-362,656,640
Imputed rental activity for owner-occupied dwellings	0	0	-17,003,924	-17,003,924
Real estate establishments	0	-4,183,882	-7,231,112	-11,414,993
Wholesale trade businesses	0	-1,488,788	-9,406,787	-10,895,575
US Postal Service	0	-9,541,635	-640,070	-10,181,705
Couriers and messengers	0	-7,965,638	-297,936	-8,263,574
Private hospitals	0	-31	-7,871,641	-7,871,672
Food services and drinking places	0	-735,851	-6,970,771	-7,706,622
Insurance carriers	0	-2,591,888	-4,772,435	-7,364,323
Offices of physicians, dentists, and other health	0	-17	-6,795,747	-6,795,764
Monetary authorities and depository credit	0	-1,463,374	-3,852,507	-5,315,881
Management of companies and enterprises	0	-2,986,999	-1,644,316	-4,631,314
Employment services	0	-3,748,307	-687,648	-4,435,955
Telecommunications	0	-1,212,725	-2,722,785	-3,935,510
Services to buildings and dwellings	0	-2,427,639	-780,540	-3,208,179
Transport by truck	0	-1,747,739	-1,299,699	-3,047,438
Securities, commodity contracts,	0	-940,193	-2,062,907	-3,003,100
Retail Stores, Motor vehicle and parts	0	-92,338	-2,880,229	-2,972,567
Retail Stores, Food and beverage	0	-71,589	-2,706,359	-2,777,948
Other state and local government enterprises	0	-994,862	-1,674,880	-2,669,742
Legal services	0	-925,976	-1,732,812	-2,658,788
Maint & repair construct of nonresident structures	0	-2,024,496	-591,231	-2,615,727
Natural gas distribution	0	-1,537,530	-1,055,117	-2,592,647
Warehousing and storage	0	-2,276,382	-299,657	-2,576,038
Medical and diagnostic labs and outpatient care services	0	-1,319	-2,529,521	-2,530,840
Management, scientific, and technical consulting	0	-1,789,099	-735,945	-2,525,044
Office administrative services	0	-2,000,153	-404,488	-2,404,642
Waste management and remediation services	0	-1,883,591	-439,945	-2,323,536
Retail Stores - General merchandise	0	-55,504	-2,063,631	-2,119,135
Other	0	-17,493,068	-50,995,021	-68,488,092
Total	-357,379,264	-77,082,501	-142,525,163	-576,986,915

*Source: Calculations by Beacon Economics

I. TASK 8: THE INFLUENCE OF SHIPPING COMPANY DRAYAGE PROCUREMENT PRACTICES ON DRAYAGE RATES

1. EVALUATE THE INFLUENCE OF SHIPPING COMPANY DRAYAGE PROCUREMENT PRACTICES ON DRAYAGE RATES.

To fulfill this task, Supply Chain survey instruments were developed and administered to Ocean Carriers, Marine Terminal Operators (MTOs), licensed motor carriers (LMCs), and beneficial cargo owners (BCOs). Below we present a summary of the findings.

a) CARRIER SURVEY

Six major carriers who call at the Port of Oakland were surveyed. As large carriers, all call at various West Coast, East Coast, and Gulf Ports. In addition, all call at either the Port of Los Angeles or the Port of Long Beach. For many, the vessel call at the Port of Oakland represents the second port of call after freight has been discharged at a Southern California port.

All carriers report offering both “door to door” and “port to port” rates to their customers, with the customer typically deciding the type of rate. All ocean carriers contract directly with licensed motor carriers (LMCs). All state that they have a stable core of a few LMCs with whom they contract directly and in addition accept “nominated carriers”, LMCs chosen by their customers. The core LMCs used by ocean carriers are chosen based on a combination of prices and service levels.

Most carriers report that drayage rates for their core LMCs are determined through periodic negotiations. When considering new LMCs, they issue requests for proposals (RFPs) and upon choosing LMCs, negotiate rates based primarily on distance, with variations by equipment type and other service factors.

Shipping rates between carriers and BCOs are typically negotiated annually and all report that rates fluctuate automatically based on variations in fuel prices. Most carriers also indicate that their payments for drayage services also have built-in fuel price adjustments and that the fuel surcharge for the dray portion of goods movement is passed along to LMCs.

The percentage of inland point intermodal (IPI) traffic varies considerably by carrier, though most carriers report that the majority of freight moving through the Port of Oakland is destined for points outside the region. Customer preference is cited as the most common reason that IPI traffic moves through the Port of Oakland. In addition, carriers indicate that they make an effort to achieve economies of density through Oakland by combining IPI freight with the local freight moving on their ships.

Carriers were asked the most important factors in choosing a West Coast port. Freight volumes and customer preferences are the two most important, in addition to the availability of rail and terminal productivity and throughput. The carriers indicated that the primary obstacles in using the Port of Oakland were lack of rail infrastructure and lack of volumes, both of which made Southern California ports more attractive.

Carriers indicated that they expect traffic volumes moving through Oakland to decline in the next year due to the economy. When asked their concerns about the Comprehensive Truck Management Program (CTMP), carriers indicated that they were concerned with the potential for freight diversion as well as the uncertainty regarding the dollar amount of a potential “container” or “user” fee.

b) MTO SURVEY

Eight MTOs and one rail terminal were surveyed. Of the eight MTOs, six are affiliated with ocean carriers either as subsidiaries or through joint ventures. Those that are affiliated with

ocean carriers tend to serve only their carriers or members of the carrier's alliance. Only one of the MTOs provides in-house trucking services.

The hours of operation vary by terminal; however, most have operations five days a week, approximately 10 hours per day. The busiest days of the week vary by terminal, but most listed Monday and Friday. Late summer and early fall months (August-November) were listed as the peak months. Most MTOs reported that they had not experienced any spikes in traffic outside the usual peaks. Those that experienced spikes reported no problems with drayage firms accommodating the spikes.

Similar to the carriers, the MTOs report working with a core set of LMCs. About half of the MTOs report concerns that the Transportation Worker Identification Credential (TWIC) will cause slowdowns due to a decline in labor supply. Other efficiency concerns pertaining to port drayage include issues with the geography of the area surrounding the port (as they pertain to traffic flows and road congestion), the lack of technology used by LMCs, and differences in hours of operation between the MTOs and area warehouses/distribution centers/consignees. MTOs also indicated that language barriers might also reduce drayage efficiency.

Though most MTOs have some form of appointment system, they appear to be underutilized due to the relatively high level of wheeled operations at the Port of Oakland terminals.

The MTOs indicated that there were few security concerns that would not be addressed by the implementation of TWIC. Their safety concerns mainly centered on traffic safety in the area surrounding the port.

c) LMC SURVEY

The LMC supply chain survey was administered to 25 LMCs, all of whom are located in California. Approximately half (13 LMCs) report providing non-drayage trucking services in addition to drayage at the Port of Oakland.

Most LMCs report negotiating rates directly with the BCO or with a freight forwarder/NVOCC. Only six of the 25 report negotiating with the ocean carrier.⁶⁸ Most LMCs report that rates are negotiated infrequently; either annually or on an “as needed” basis. Nearly two-thirds report that when diesel prices rise they are able to adjust their fuel surcharges to completely cover this increase in cost. They report that this adjustment typically takes anywhere from one week to one month. Among the firms that report they are unable to recuperate the full cost of the fuel price increase, they report getting between 60 and 90 percent of the cost covered through a fuel surcharge.

Nearly three-quarters (18 LMCs) report using IOOs in their drayage services at the Port of Oakland. This is slightly higher than the rate reported in the LMC survey and the Driver Survey and likely due to the smaller sample size in this survey. The LMCs indicate that they pay their drivers typically by the length of the haul or as a percent of revenue (which is also a proxy for the length of the haul).

Exclusive contracts with any BCOs or MTOs are rare; only two firms indicated this type of relationship. LMCs indicated that there were few premiums paid in port drayage, primarily only for hazardous materials, specialized equipment, and overweight hauls.

LMCs indicated that the major factor decreasing productivity at the Port of Oakland terminals are the long lines and perceived holdups due to terminal inefficiency. Some indicated that extended hours might ameliorate this problem, though most did not provide suggestions for how the productivity may be improved.

⁶⁸ It should be noted that though an LMC may negotiate rates with the BCO, that does not mean they do not contract with a carrier; most carriers report that they contract with LMCs that are nominated by BCOs.

As in the larger survey of LMCs, the LMCs in the supply chain survey indicate that they recruit both IOOs and employee drivers primarily through word of mouth. They were largely split in their opinions of whether IOOs are more productive than employee drivers; eight firms indicated IOOs were more productive and five indicated that drivers had similar productivity.

LMCs overwhelmingly indicated that they did not and would not be able to provide IOO drivers with truck financing. Two indicated that they were concerned whether a truck retrofit and/or replacement grant program would benefit their drivers, or whether preference would be given to larger firms.

LMCs largely agreed that the peak time at the Port of Oakland is in the summer and fall months (which we also found in the surveys of other companies) and only two LMCs reported having difficulty meeting peak demand. They also indicated that unanticipated spikes are rare and occur infrequently. Most LMCs indicated they would typically only need a few days to get extra drivers to deal with peak demand, which is likely due to the flexibility that IOO labor affords.

Most LMCs are not reliant on computing technology for dispatching and routing. Most dispatch using a phone (including Nextel and walkie talkie equipment) and only six report using the internet. Similar results were found for routing, where seven firms indicate using a computer or GPS technology.

The LMC concerns with the CTMP centered on the potential for more adverse impact on smaller firms and the concern that it would not address the inefficiency in the marine terminals.

d) BCO SURVEY

Eighteen BCOs were interviewed: eight importers, five exporters, and five firms who both import and export. There is considerable variance across the sample in the amount of TEUs imported (8-1,200 in a typical month) and exported (15-800 in a typical month). While the importers indicate that summer and fall are peak periods for the Port of Oakland, there appears

to be no consistent peak period for the exporters. Both importers and exporters tend to use a mix of carriers and, therefore, a mix of terminals.

The container moves for both importers and exporters tend to be short haul (100 miles or less), which is consistent with the fact that most BCOs indicate that they use the Port of Oakland due to its proximity to DCs, manufacturing facilities, or other players in the supply chain. Roughly half of the BCOs contract directly with LMCs and those that do tend to use multiple LMCs. They report choosing LMCs based on price and service level.

For most, the rate for shipping a container through a terminal at Oakland includes the domestic truck portion of the move and most negotiate contracts directly with the ocean carrier (or a subsidiary). These contracts tend to be negotiated annually. The majority (11 of 18) report that their shipping costs will increase before the next negotiation period if fuel prices increase and all LMCs indicate that a fuel surcharge will be assessed on the dray portion of shipping costs if fuel prices increase. Though four of the BCOs have an in-house trucking fleet, none use this fleet for drayage at the Port of Oakland.

The percent of freight moving through the Port of Oakland varies considerably among BCOs in the sample (from 3%-100%). Other ports used by these BCOs are Los Angeles, Long Beach, Seattle, and Prince Rupert on the West Coast, New York/New Jersey on the East Coast, and Houston in the Gulf.

As previously mentioned, most BCOs use the Port of Oakland due to its proximity to the firm's facilities, supply chain partners, or the final market. A much smaller share (only four of 18) report price as a factor in their choice of Oakland. An additional four BCOs report that they wish to skip the Southern California ports due to fees and congestion.

The amount of time sensitivity of freight varies considerably in the sample, however all but two BCOs indicate that they do not have trouble getting their freight moved in or out of the

terminal at the Port of Oakland. Only two of the BCOs expect to ship more freight through Oakland next year; eight expect the same amount and another eight expect less. Survey respondents indicated that this is largely attributed to economic conditions.

BCOs were asked how much drayage rates would have to increase before they would divert freight. Many did not answer this question, however, among those who indicated they chose Oakland due to its location there appears to be very little sensitivity to price changes in the drayage portion of the shipping costs. The BCOs did not voice much concern with the conceptual elements of the CTMP.

e) *SUMMARY AND CONCLUSIONS*

While the surveys of BCOs and carriers are on-going, there are some conclusions that can be drawn. First, though rates are negotiated infrequently (for both ocean transport and drayage), they are routinely adjusted to deal with fluctuations in fuel prices. Second, unlike larger ports, congestion is not a reported problem at the Port of Oakland. Though there are clear spikes in demand reported by stakeholders, most indicated that these did not cause delays in freight movement.

The area of concern for carriers and LMCs centered on infrastructure and terminal efficiency. In particular, ocean carriers were concerned about the availability of rail infrastructure, and LMCs expressed concern regarding hold-ups at MTOs and problems with traffic moving in and out of the port complex (street condition, stop lights, etc.).

The CTMP did not appear to be an issue of particular concern for BCOs and MTOs, there were issues of concern raised by carriers and LMCs. Carriers were concerned about the exact quantity of the fee and whether this would lead to diversion, which would affect their scheduling. LMCs were also concerned about the costs of the program, particularly given the current economic climate.

VII. OVERALL APPENDICES

A. APPENDIX 1: ADDENDUMS TO TASK 2

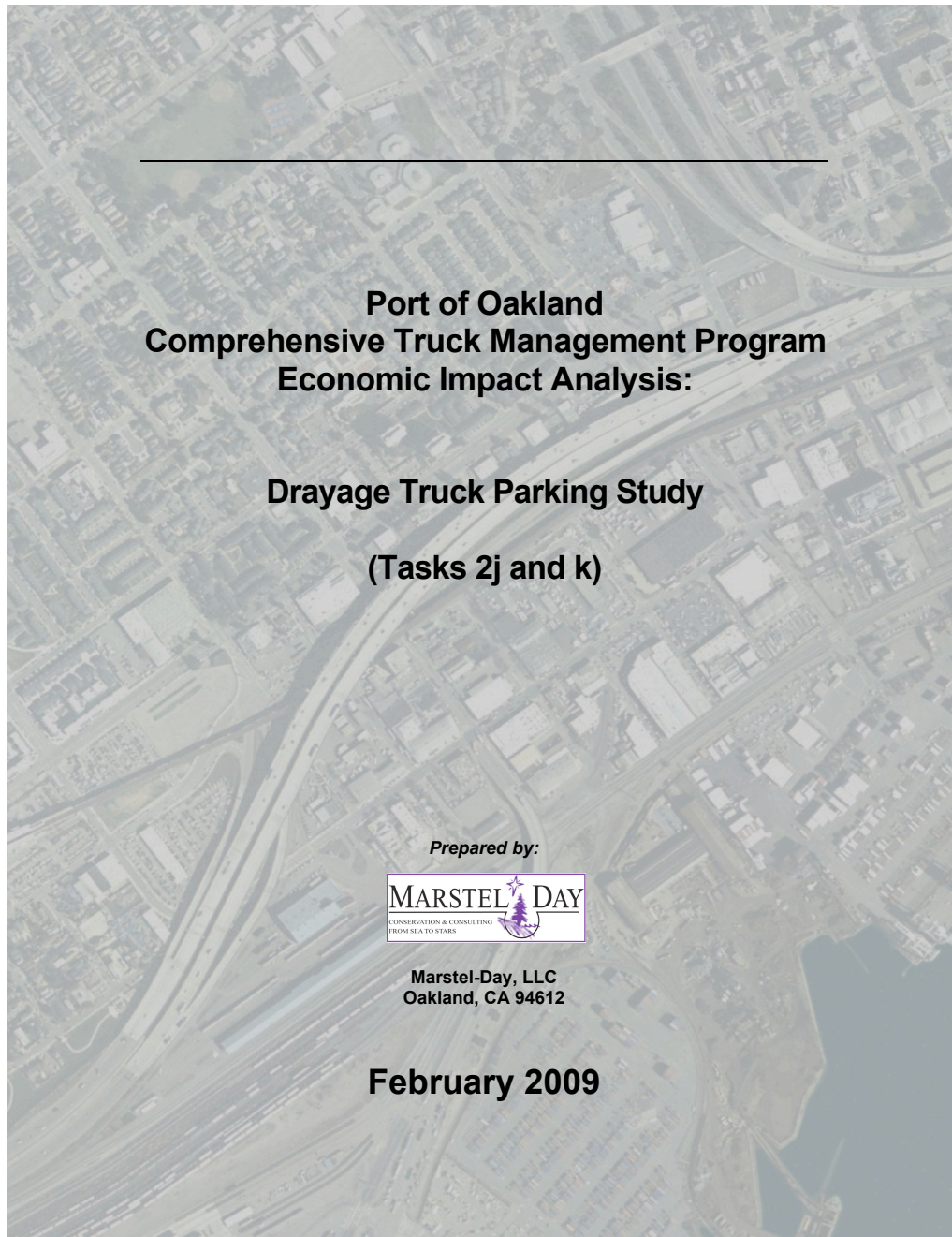
1. *TASKS 2H: A CONTACT LIST OF TRUCKING ENTERPRISES WITH MORE THAN 5 DRIVERS THAT PERFORM (I) ONLY DRAYAGE AT THE PORT OR (II) PORT DRAYAGE AND OTHER SERVICES AND TYPE OF LMC (I) IOOs, (II) EMPLOYEE DRIVERS, OR (III) BOTH.*

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LMC	Contact Name	Contact Number	Number of Drivers	LMC Type	Services
AFS CARGO EXPRESS INC	Christine Lee	650-827-7297	15	Both	Only Drayage
KAMAL TRUCKING CORPORATION	Kamal Boushehri	510-451-5034	70	Both	Only Drayage
AB TRUCKING	Bill Aboudi	209-915-8999	16	Both	Only Drayage
Stockmyer Trucking, Inc.	Gloria Stockmyer	510-839-6206	17	IOOs	Only Drayage
RELIABLE EXPRESS TRANSPORTATION, INC	RAYMOND PAN	510-268-8816	10	IOOs	Only Drayage
BRIDGE TERMINAL TRANSPORT	FRED MCNEAR	800-909-7784	50	IOOs	Only Drayage
ONLINETRUCKINGINC INC.	OSCAR		18	IOOs	Only Drayage
TGS Transportation, Inc.	Peter Schneider	559-486-1100	70	Both	Drayage and Other Services
MUTUAL EXPRESS COMPANY	Hiko Shimamoto	510-465-1711	27	Both	Drayage and Other Services
Advantage Logistics	Steve Allen	408-943-6300	100	Both	Drayage and Other Services
CHEMICAL TRANSFER	CATHY CORRALEJO	209-466-3554	300	Both	Drayage and Other Services
CTP TRANSPORT INC	Cory Peters	209-824-8007	59	Both	Drayage and Other Services
BRIDGEPORT TRANSPORTATION & WAREHOUSING INC	Rajiv Jan	510-251-6500	65	Both	Drayage and Other Services
Rocha Transportation	Grant Hannink	209-538-1302	68	Both	Drayage and Other Services
GOLDEN VALLEY TRUCKING CORP	John Dabra	209-491-5555	15	Both	Drayage and Other Services
MC TRANSPORTATION INC.	Gretchen Moore	916-648-7430	32	Both	Drayage and Other Services
United Bridge Transportation	Annie Huang	510-836-3825	8	Both	Drayage and Other Services
Devine Intermodal	Richard Coyle	916-371-4430	200	Both	Drayage and Other Services
DEPENDABLE HIGHWAY EXPRESS INC	Avi Singh		55	Both	Drayage and Other Services
BUSTOS TRUCKING	ROSE	714-964-9844	31	Both	Drayage and Other Services
MANNING DISTRIBUTION SERVICES INC	Tim Manning	650-692-9918	7	Both	Drayage and Other Services
Airwolf Express Inc.	Carla Powers	916-645-6299	6	Both	Drayage and Other Services
Antonini Freight Express	Gene Etcheverry	209-466-9041	130	Both	Drayage and Other Services
ROADSTAR TRUCKING INC	Keith Flowers	510-487-2404	35	Both	Drayage and Other Services
VPL Inc.	Mike Mcweemey	209-368-1369	40	Both	Drayage and Other Services
GSC Logistics	Scott Taylor	510-844-3700	150	Both	Drayage and Other Services
Rodgers Trucking Co.	Alan Osofsky	510-483-7000	145	Employee	Drayage and Other Services
BILLET TRANSPORTATION INC	George Francis	707-649-9200	20	Employee	Drayage and Other Services
High Mountain Transport llc	Mark Menezes	775-342-0414	17	Employee	Drayage and Other Services
Lopes Trucking Svc. Inc.	Michael Lopes	209-537-8901	8	Employee	Drayage and Other Services
Pacific Commodities Transportation Inc	Mark William Caipo	510-433-0405	27	IOOs	Drayage and Other Services
R & G EXPRESS INC	Peter Preet	510-758-8903	15	IOOs	Drayage and Other Services
Fargo	Thomas Ma		30	IOOs	Drayage and Other Services
Puget Sound International, Inc.	Kelly Watson		14	IOOs	Drayage and Other Services
Forward Intermodal Systems, Inc.	Filex Fok	650-873-3888	6	IOOs	Drayage and Other Services
KACH ENTERPRISES	NICK KACHADLORIAN	559-233-4221	45	IOOs	Drayage and Other Services
Impact Transportation LLC	Ron Cancilla	510-215-8911	60	IOOs	Drayage and Other Services
HERMAN TRUCKING INC	Randy Grewal	559-781-4110	45	IOOs	Drayage and Other Services
PACIFIC COAST CONTAINER INC	Steve Gardner	510-433-1875	150	IOOs	Drayage and Other Services

*Source: Beacon Economics

2. TASKS 2J AND K: DRAYAGE PARKING STUDY, PRODUCED BY MARSTEL-DAY



**Port of Oakland
Comprehensive Truck Management Program
Economic Impact Analysis:**

**Drayage Truck Parking Study
(Tasks 2j and k)**

Prepared by:



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1 INTRODUCTION

Marstel-Day, working as a subcontractor to Beacon Economics, LLC, performed work associated with the Port of Oakland Comprehensive Truck Management Plan Economic Impact Analysis. As a part of this work, Marstel-Day researched issues related to off-street drayage truck parking available at trucking-related businesses in the Port Area (which, for the purposes of this study, is defined as including the Port Maritime area and an area adjacent bounded by I-880 to the east and 10th Avenue to the south); the former Oakland Army Base (OAB); and West Oakland (collectively known as the Study Area). This report presents the results of this task, including an estimate of available truck parking spaces (stalls).

2 BACKGROUND INFORMATION

Current research indicates that about 2,000 truck drivers operate in the Port Area, serving active Port terminals and the Burlington Northern and Santa Fe and Union Pacific rail yards. Research performed by the Port, the City of Oakland, the Bay Area Air Quality Management District, and others (EBASE 2007, Pacific Institute 2003, Tioga Group, Inc. and Dowling Associates, Inc. 2008) indicates that many truck drivers (including but not limited to drayage trucks) park overnight on local streets in West Oakland near or in the Port area, despite a municipal ordinance prohibiting such parking in numerous locations. The Port's Comprehensive Truck Management Plan is intended, in part, to address parking for the drayage truck fleet in order to avoid or minimize impacts to neighboring residential areas (Port of Oakland 2007).

The Port has cooperated with the Alameda County Congestion Management Agency (ACCMA) on a study to investigate the feasibility of establishing truck-parking facilities along major highway corridors in Oakland and elsewhere in Alameda County (Tioga Group Inc. and Dowling Associates Inc. 2008, Port of Oakland 2007). Conclusions of this study (in draft form

as of the date of this report) include that there is a shortage of stopping and parking facilities for drayage and other trucks in Alameda County, and that there are no authorized, public, truck-parking facilities in locations convenient to those drayage operators serving Port of Oakland Maritime facilities.

As part of environmental mitigation for redevelopment of the former OAB imposed by the San Francisco Bay Conservation Development Commission (BCDC), the Port and the City are each required to provide 15 acres of truck parking, anticipated to be located on the former OAB (Peterson 2008). Currently, the Oakland Maritime Support Services (OMSS) yard, a private facility located on City land adjacent to the Port Maritime Area, provides parking services to truck drivers (see Figure 1 for the location of the OMSS). Plans to improve the OMSS facility (and for its potential expansion to help meet this mitigation requirement) are under discussion as of the date of this report.

Truck parking is also currently provided on approximately 21 acres of Port land on the former OAB, at a site operated by Ampco System Parking (see Figure 1 for the location of the Ampco-operated parking area). The location of this facility is not considered permanent, and some alteration of its existing configuration is likely in the future as the Port continues to fulfill BCDC's mitigation requirement.

3 SUMMARY OF FINDINGS

Initially, Marstel-Day undertook research, with the intent of developing a map of the Study Area that would show the location of truck parking facilities. During the course of this research, Marstel-Day learned that existing information on truck parking, especially in the West Oakland area, is informal and changeable in nature and, further, that truck parking facilities do not lend themselves to precise characterization or mapping. The Study Area is shown on Figure 1.

Port of Oakland CTMP Economic Impact Analysis:
Drayage Truck Parking Study

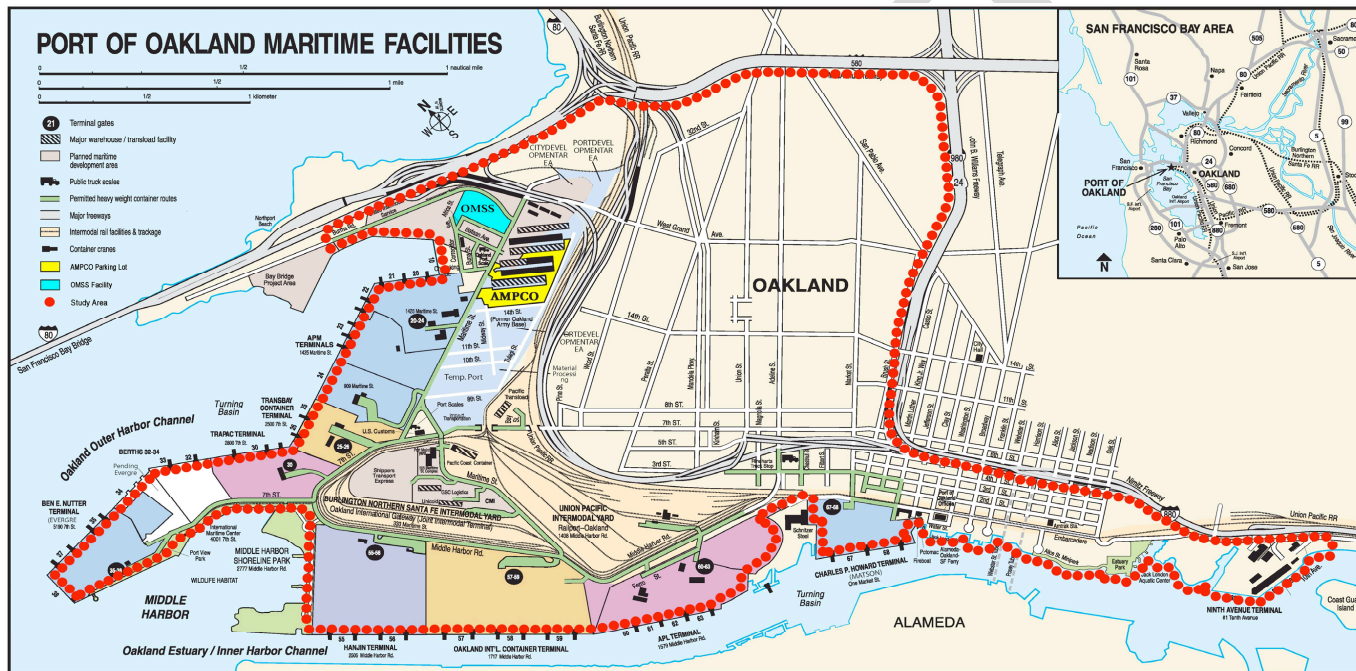


Figure 1: Study Area (SOURCE: Port of Oakland, April 2008)

3.1 DATA SOURCES

Marstel-Day staff compiled both formally-documented and anecdotal information relating to existing truck parking for this study. Data sources included the following:

- Conversations with Port staff, including Port Maritime Division project managers and wharfingers;
- Conversations with City of Oakland staff, including staff in the Community and Economic Development Agency and Public Works; and
- Conversations with owners/operators of truck facilities and a “windshield survey” of truck parking areas in the Study Area.

Data obtained from City of Oakland staff consisted mainly of a spreadsheet prepared in 2006 that listed existing truck-related companies and services located in West Oakland. Attempts to confirm the validity of collected data were made using information sources such as the FMCSA Licensing and Insurance website (FMCSA 2008), through review of aerial photography of the Study Area, and through contacting the managers of truck parking facilities directly.

3.2 FINDINGS

Information on truck parking at the OMSS and Ampco facilities was found to be readily available, as was information on truck-related businesses in the Port Area that provide parking for their drivers (a total of 15 tenants). However, limited information currently exists regarding available truck parking in the West Oakland area adjacent to the Port. One reason that existing truck parking in this area of West Oakland is difficult to verify may be related to an 18-percent tax levied by the City of Oakland on any businesses classified explicitly as parking facilities. Some companies may self-define as trucking businesses that accommodate parking or storage of their own vehicles, rather than as “parking facilities” per the City’s definitions under this tax; documentation of truck parking at these businesses may therefore be less reliable (i.e., stalls actively used for truck parking may be understated).

For the reasons stated above, the estimates that Marstel-Day has prepared for the number of parking stalls in the West Oakland area are based only on data that have been verified with some degree of confidence, which probably results in some under-estimation of the actual truck parking available in West Oakland. Table 1 presents the estimates of parking stalls compiled by Marstel-Day. “Other Counted Stalls” include stalls that could be used for tractor, chassis, container, or other parking/storage uses; Marstel-Day could not confirm the current or potential future uses of these stalls.

**Table 1: Estimated Drayage Truck Parking Stalls,
 Port of Oakland and City of Oakland**

Location	Truck Stalls	Container Stalls
Port of Oakland Land		
Ampco Parking Area (Former Oakland Army Base)	256	235
Other Counted Stalls	700	NA
City of Oakland Land		
Oakland Maritime Support Services (OMSS) Facility	400	500
Other Counted Stalls (West Oakland)	450	NA
Estimated Totals:	1,800	735
NA: Not Available		

REFERENCES

Port of Oakland CTMP Economic Impact Analysis:
Drayage Truck Parking Study



4 REFERENCES AND PERSONS CONSULTED

4.1 REFERENCES

- Bay Area Air Quality Control Board. 2007. West Oakland Diesel PM Emission Inventory: Truck-Related Businesses and Construction Projects. Presentation for Community Air Risk Evaluation (CARE) Task Force Meeting. Presented by Dr. Phil Martien, CARE Program Manager. 24 July.
- East Bay Alliance for a Sustainable Economy (EBASE). 2007. Taking the Low Road: How Independent Contracting at the Port of Oakland Endangers Public Health, Truck Drivers, and Economic Growth. Produced by the Coalition for Clean and Safe Ports. September.
- Pacific Institute. 2003. Summary of Studies, West Oakland Diesel Truck Emissions Reduction Initiative. 1 May. Pacific Institute. 2003. West Oakland Diesel Emissions Inventory and Air Quality Monitoring Study, West Oakland Diesel Truck Emissions Reduction Initiative. 14 November.
- Pacific Institute (in conjunction with the Coalition for West Oakland Revitalization). 2003. Clearing the Air: Reducing Diesel Pollution in West Oakland. November.
- Port of Oakland Maritime Division. 2007. Report to Port Commissioners Kenneth Katzoff, Mark McClure, David Kramer Re: Comprehensive Truck Management Program. Prepared by Joseph Wong, Interim Maritime Director. 7 June.
- TIAX. 2003. Container Truck Traffic Assessment and Potential Mitigation Measures for the West Oakland Diesel Truck Emission Reduction Initiative. Report to Pacific Institute. Technical Report TR-03-176. 14 September.
- Tioga Group, Inc. and Dowling Associates, Inc. 2008. Truck Parking Facility Feasibility and Location Study. Draft Final Report. Prepared for Alameda County Congestion Management Agency. September.

REFERENCES

Port of Oakland CTMP Economic Impact Analysis:
Drayage Truck Parking Study



4.2 PERSONS CONSULTED

Aboudi, Bill. 2008. Manager, Oakland Maritime Support Services Facility. November.

Chun, Peter. 2008. Public Works, City of Oakland. November.

Dunnigan, Lawrence. 2008. Business Development Manager, Port of Oakland. October.

Lautze, Steven. 2008. Urban Economic Analyst, City of Oakland. November.

Peterson, Chris. 2008. Chief Wharfinger, Port of Oakland. October.

DRAFT

B. APPENDIX 2: ADDENDUMS TO TASK 3

1. DATA DESCRIPTIONS

a) ACS

The American Community Survey is conducted annually by the U.S. Census Bureau. The ACS is a nationally representative micro dataset that collects detailed individual and household-level data. For the purpose of our analysis, we use individual sample data, which can be extrapolated to population data by using the sample weights provided.

The advantage of the ACS is that the sample size is large enough to restrict our sample to the geographical area relevant to the Port of Oakland (see map appendix). The disadvantage of the ACS is that it lacks the full detail embodied in the standard occupation codes. For example, the code does not distinguish between the three types of truck drivers typically identifiable in the SOC: heavy truck driver, light truck driver, and sales driver.

b) OES

The Occupational Employment Statistics are generated by the Bureau of Labor Statistics based on employer-level surveys. The advantage of this data set is that they use the most detailed SOC codes (overcoming a shortcoming of the ACS), however, although we can geographically constrain our sample, we can not identify other characteristics of drivers (such as age and gender). Further, there is no mechanism for estimating the number of self-employed drivers (IOOs), however the ACS allows us to do this.

c) *O-NET*

The Occupational Information Network is a website maintained by the U.S Department of Labor to identify occupational skill levels, and detailed information about job prospects in various occupations.

d) *CPS*

The Current Population Survey is a monthly survey conducted by the Bureau of Labor Statistics. The files used for this study are the Outgoing Rotations Groups (ORG) files. When an individual is chosen to participate in the CPS, (s)he is interviewed for 4 consecutive months, dropped from the sample for 8 months, and then interviewed again for 4 months. In the final month in each “spell” (s)he is asked a series of labor market questions. Due to this structure of the data, we can construct “short panels” of individuals exactly 12 months apart. We can use this data to examine whether an individual has stayed in their initial occupation, left the occupation, or entered the occupation. In the latter two cases, we can analyze the occupations exited to or entered from.

2. DETAILED OCCUPATIONS OF TRUCK DRIVER ENTRY AND EXIT

Occupations	ENTER		LEAVE	
	Aggregate	Percent	Aggregate	Percent
10 Chief executives	11	0.82	17	1.06
20 General and operations managers	2	0.15	2	0.12
50 Marketing and sales managers	2	0.15	6	0.37
100 Administrative services managers	0	0.00	1	0.06
110 Computer and information systems managers	1	0.07	0	0.00
120 Financial managers	1	0.07	1	0.06
130 Human resources managers	1	0.07	0	0.00
140 Industrial production managers	2	0.15	2	0.12
160 Transportation, storage, and distribution managers	6	0.45	10	0.62
200 Farm, ranch, and other agricultural managers	1	0.07	1	0.06
210 Farmers and ranchers	8	0.60	21	1.31
220 Construction managers	4	0.30	11	0.69
310 Food service managers	10	0.75	10	0.62
340 Lodging managers	0	0.00	1	0.06
350 Medical and health services managers	1	0.07	0	0.00
410 Property, real estate, and community association managers	2	0.15	3	0.19
430 Managers, all other	41	3.06	41	2.56
500 Agents & business managers of artists, performers, athletes	0	0.00	1	0.06
510 Purchasing agents and buyers, farm products	1	0.07	1	0.06
520 Wholesale and retail buyers, except farm products	3	0.22	3	0.19
530 Purchasing agents, exc. wholesale, retail, & farm products	4	0.30	3	0.19
560 Compliance officers, exc. agriculture, construction, health	0	0.00	1	0.06
600 Cost estimators	0	0.00	1	0.06
620 Human resources, training, & labor relations specialists	0	0.00	1	0.06
700 Logisticians	1	0.07	1	0.06
710 Management analysts	1	0.07	0	0.00
800 Accountants and auditors	1	0.07	2	0.12
840 Financial analysts	0	0.00	1	0.06
910 Loan counselors and officers	0	0.00	2	0.12
940 Tax prepares	1	0.07	0	0.00
1000 Computer scientists and systems analysts	1	0.07	1	0.06
1010 Computer programmers	0	0.00	1	0.06
1020 Computer software engineers	1	0.07	1	0.06
1040 Computer support specialists	1	0.07	4	0.25
1110 Network systems and data communications analysts	1	0.07	0	0.00
1300 Architects, except naval	1	0.07	0	0.00
1410 Electrical and electronic engineers	1	0.07	0	0.00
1420 Environmental engineers	0	0.00	1	0.06
1460 Mechanical engineers	1	0.07	0	0.00
1520 Petroleum engineers	0	0.00	1	0.06
1530 Engineers, all other	0	0.00	1	0.06
1540 Drafters	1	0.07	1	0.06
1550 Engineering technicians, except drafters	3	0.22	1	0.06
1560 Surveying and mapping technicians	1	0.07	3	0.19
1600 Agricultural and food scientists	1	0.07	0	0.00
1810 Market and survey researchers	0	0.00	1	0.06
1920 Chemical technicians	1	0.07	1	0.06
1960 Other life, physical, and social science technicians	1	0.07	0	0.00
2010 Social workers	1	0.07	3	0.19
2020 Miscellaneous community and social service specialists	1	0.07	0	0.00
2040 Clergy	1	0.07	3	0.19
2060 Religious workers, all other	0	0.00	1	0.06
2100 Lawyers, Judges, magistrates, & other judicial workers	2	0.15	1	0.06
2140 Paralegals and legal assistants	1	0.07	1	0.06
2200 Postsecondary teachers	1	0.07	1	0.06

2300	Preschool and kindergarten teachers	0	0.00	1	0.06
2310	Elementary and middle school teachers	2	0.15	3	0.19
2320	Secondary school teachers	0	0.00	1	0.06
2340	Other teachers and instructors	3	0.22	5	0.31
2540	Teacher assistants	1	0.07	1	0.06
2600	Artists and related workers	1	0.07	3	0.19
2630	Designers	3	0.22	2	0.12
2700	Actors	0	0.00	2	0.12
2710	Producers and directors	1	0.07	0	0.00
2720	Athletes, coaches, umpires, and related workers	2	0.15	2	0.12
2750	Musicians, singers, and related workers	0	0.00	1	0.06
2760	Entertainers & performers, sports & related workers, other	1	0.07	0	0.00
2800	Announcers	2	0.15	0	0.00
2900	Broadcast & sound engineering technicians & radio operators	1	0.07	0	0.00
2910	Photographers	1	0.07	1	0.06
3050	Pharmacists	1	0.07	0	0.00
3220	Respiratory therapists	1	0.07	0	0.00
3240	Therapists, all other	0	0.00	1	0.06
3300	Clinical laboratory technologists and technicians	2	0.15	1	0.06
3320	Diagnostic related technologists and technicians	2	0.15	0	0.00
3400	Emergency medical technicians and paramedics	0	0.00	2	0.12
3410	Health diagnosing & treating practitioner support techs	0	0.00	2	0.12
3500	Licensed practical and licensed vocational nurses	1	0.07	0	0.00
3600	Nursing, psychiatric, and home health aides	2	0.15	4	0.25
3620	Physical therapist assistants and aides	1	0.07	0	0.00
3630	Massage therapists	0	0.00	1	0.06
3650	Medical assistants & other healthcare support occupations	2	0.15	1	0.06
3710	First-line supervisors/managers of police and detectives	0	0.00	1	0.06
3730	Supervisors, protective service workers, all other	1	0.07	0	0.00
3740	Fire fighters	4	0.30	5	0.31
3750	Fire inspectors	1	0.07	1	0.06
3800	Bailiffs, correctional officers, and jailers	3	0.22	4	0.25
3850	Police and sheriff's patrol officers	3	0.22	7	0.44
3920	Security guards and gaming surveillance officers	16	1.19	16	1.00
3950	Lifeguards and other protective service workers	0	0.00	1	0.06
4000	Chefs and head cooks	5	0.37	2	0.12
4010	First-line supervisors/managers of food preparation and	5	0.37	10	0.62
4020	Cooks	16	1.19	16	1.00
4030	Food preparation workers	4	0.30	6	0.37
4040	Bartenders	2	0.15	5	0.31
4050	Combined food preparation & serving workers, including fast	1	0.07	1	0.06
4060	Counter attendants, cafeteria, food concession, and coffee sh	3	0.22	1	0.06
4110	Waiters and waitresses	6	0.45	11	0.69
4130	Dining room & cafeteria attendants & bartender helpers	5	0.37	6	0.37
4140	Dishwashers	3	0.22	4	0.25
4150	Hosts and hostesses, restaurant, lounge, and coffee shop	3	0.22	0	0.00
4210	First-line supervisors/managers of landscaping, lawn	17	1.27	3	0.19
4220	Janitors and building cleaners	30	2.24	4	0.25
4230	Maids and housekeeping cleaners	1	0.07	31	1.93
4240	Pest control workers	0	0.00	1	0.06
4250	Grounds maintenance workers	16	1.19	27	1.68
4300	First-line supervisors/managers of gaming workers	1	0.07	2	0.12
4340	Animal trainers	2	0.15	0	0.00
4400	Gaming services workers	1	0.07	1	0.06
4410	Motion picture projectionists	1	0.07	0	0.00
4420	Ushers, lobby attendants, and ticket takers	1	0.07	0	0.00
4430	Miscellaneous entertainment attendants and related workers	3	0.22	2	0.12
4460	Funeral service workers	0	0.00	1	0.06
4500	Barbers	0	0.00	1	0.06
4520	Miscellaneous personal appearance workers	1	0.07	1	0.06
4530	Baggage porters, bellhops, and concierges	0	0.00	3	0.19
4550	Transportation attendants	1	0.07	0	0.00
4600	Child care workers	2	0.15	5	0.31

4610 Personal and home care aides	0	0.00	4	0.25
4650 Personal care and service workers, all other	0	0.00	3	0.19
4700 First-line supervisors/managers of retail sales workers	22	1.64	26	1.62
4710 First-line supervisors/managers of non-retail sales workers	19	1.42	25	1.56
4720 Cashiers	15	1.12	12	0.75
4740 Counter and rental clerks	4	0.30	6	0.37
4750 Parts salespersons	5	0.37	4	0.25
4760 Retail salespersons	24	1.79	45	2.81
4800 Advertising sales agents	1	0.07	0	0.00
4810 Insurance sales agents	1	0.07	4	0.25
4820 Securities, commodities, & financial services sales agents	1	0.07	1	0.06
4840 Sales representatives, services, all other	4	0.30	6	0.37
4850 Sales representatives, wholesale and manufacturing	33	2.46	43	2.68
4920 Real estate brokers and sales agents	2	0.15	4	0.25
4940 Telemarketers	1	0.07	2	0.12
4950 Door-to-door sales workers, news and street vendors, and	6	0.45	10	0.62
4960 Sales and related workers, all other	5	0.37	3	0.19
5000 First-line supervisors/managers of office & administrative	7	0.52	10	0.62
5100 Bill and account collectors	2	0.15	1	0.06
5110 Billing and posting clerks and machine operators	0	0.00	1	0.06
5120 Bookkeeping, accounting, and auditing clerks	2	0.15	1	0.06
5160 Tellers	0	0.00	2	0.12
5230 Credit authorizers, checkers, and clerks	1	0.07	0	0.00
5240 Customer service representatives	10	0.75	11	0.69
5250 Eligibility interviewers, government programs	1	0.07	0	0.00
5260 File Clerks	2	0.15	1	0.06
5300 Hotel, motel, and resort desk clerks	1	0.07	1	0.06
5310 Interviewers, except eligibility and loan	1	0.07	0	0.00
5330 Loan interviewers and clerks	1	0.07	0	0.00
5350 Order clerks	1	0.07	1	0.06
5400 Receptionists and information clerks	1	0.07	3	0.19
5410 Reservation & transportation ticket agents & travel clerks	1	0.07	0	0.00
5500 Cargo and freight agents	1	0.07	0	0.00
5510 Couriers and messengers	78	5.82	105	6.55
5520 Dispatchers	6	0.45	5	0.31
5530 Meter readers, utilities	1	0.07	0	0.00
5540 Postal service clerks	1	0.07	0	0.00
5550 Postal service mail carriers	3	0.22	7	0.44
5560 Postal service mail sorters, processors, and processing machine	2	0.15	4	0.25
5600 Production, planning, and expediting clerks	4	0.30	4	0.25
5610 Shipping, receiving, and traffic clerks	14	1.04	14	0.87
5620 Stock clerks and order fillers	18	1.34	24	1.50
5630 Weighers, measurers, checkers, & samplers, recordkeeping	0	0.00	2	0.12
5700 Secretaries and administrative assistants	2	0.15	3	0.19
5800 Computer operators	0	0.00	1	0.06
5810 Data entry keyers	3	0.22	2	0.12
5850 Mail clerks & mail machine operators, except postal service	0	0.00	1	0.06
5860 Office clerks, general	3	0.22	0	0.00
5900 Office machine operators, except computer	1	0.07	1	0.06
5930 Office and administrative support workers, all other	3	0.22	2	0.12
6000 First-line supervisors/managers of farming, fishing, and	0	0.00	1	0.06
6040 Graders and sorters, agricultural products	0	0.00	1	0.06
6050 Miscellaneous agricultural workers	21	1.57	32	2.00
6100 Fishers and related fishing workers	1	0.07	2	0.12
6130 Logging workers	11	0.82	13	0.81
6200 First-line supervisors/managers of construction trades and	15	1.12	16	1.00
6220 Brickmasons, blockmasons, and stonemasons	4	0.30	2	0.12
6230 Carpenters	20	1.49	30	1.87
6240 Carpet, floor, and tile installers and finishers	3	0.22	3	0.19
6250 Cement masons, concrete finishers, and terrazzo workers	3	0.22	3	0.19
6260 Construction laborers	48	3.58	67	4.18
6300 Paving, surfacing, and tamping equipment operators	3	0.22	3	0.19
6310 Pile-driver operators	0	0.00	1	0.06

6530 Structural iron and steel workers	2	0.15	2	0.12
6600 Helpers, construction trades	5	0.37	3	0.19
6660 Construction and building inspectors	1	0.07	0	0.00
6710 Fence erectors	2	0.15	4	0.25
6720 Hazardous materials removal workers	0	0.00	1	0.06
6730 Highway maintenance workers	14	1.04	16	1.00
6740 Rail-track laying and maintenance equipment operators	2	0.15	1	0.06
6750 Septic tank servicers and sewer pipe cleaners	1	0.07	1	0.06
6760 Miscellaneous construction and related workers	0	0.00	1	0.06
6800 Derrick, rotary drill, and service unit operators, oil, gas,	2	0.15	2	0.12
6820 Earth drillers, except oil and gas	1	0.07	3	0.19
6830 Explosives workers, ordnance handling experts, & blasters	3	0.22	1	0.06
6840 Mining machine operators	0	0.00	2	0.12
6910 Roof bolters, mining	1	0.07	0	0.00
6940 Other extraction workers	4	0.30	1	0.06
7000 First-line supervisors/managers of mechanics, installers,	5	0.37	2	0.12
7010 Computer, automated teller, and office machine repairers	6	0.45	3	0.19
7020 Radio & telecommunications equipment installers & repairers	2	0.15	1	0.06
7110 Electronic equipment installers & repairers, motor vehicles	1	0.07	1	0.06
7130 Security and fire alarm systems installers	2	0.15	1	0.06
7140 Aircraft mechanics and service technicians	1	0.07	0	0.00
7150 Automotive body and related repairers	1	0.07	2	0.12
7200 Automotive service technicians and mechanics	26	1.94	19	1.18
7210 Bus and truck mechanics and diesel engine specialists	14	1.04	27	1.68
7220 Heavy vehicle & mobile equipment service technicians and mechanics	6	0.45	8	0.50
7240 Small engine mechanics	1	0.07	0	0.00
7260 Miscellaneous vehicle & mobile equipment mechanics, installer,	2	0.15	2	0.12
7300 Control and valve installers and repairers	0	0.00	1	0.06
7310 Heating, air conditioning, & refrigeration mechanics & installers	10	0.75	11	0.69
6320 Operating engineers & other construction equipment operators	44	3.28	51	3.18
6330 Drywall installers, ceiling tile installers, and tapers	3	0.22	2	0.12
6350 Electricians	2	0.15	5	0.31
6400 Insulation workers	1	0.07	0	0.00
6420 Painters, construction and maintenance	6	0.45	13	0.81
6430 Paperhangers	0	0.00	1	0.06
6440 Pipelayers, plumbers, pipefitters, and steamfitters	10	0.75	12	0.75
6510 Roofers	4	0.30	3	0.19
6520 Sheet metal workers	3	0.22	1	0.06
6530 Structural iron and steel workers	2	0.15	2	0.12
6600 Helpers, construction trades	5	0.37	3	0.19
6660 Construction and building inspectors	1	0.07	0	0.00
6710 Fence erectors	2	0.15	4	0.25
6720 Hazardous materials removal workers	0	0.00	1	0.06
6730 Highway maintenance workers	14	1.04	16	1.00
6740 Rail-track laying and maintenance equipment operators	2	0.15	1	0.06
6750 Septic tank servicers and sewer pipe cleaners	1	0.07	1	0.06
6760 Miscellaneous construction and related workers	0	0.00	1	0.06
6800 Derrick, rotary drill, and service unit operators, oil, gas,	2	0.15	2	0.12
6820 Earth drillers, except oil and gas	1	0.07	3	0.19
6830 Explosives workers, ordnance handling experts, & blasters	3	0.22	1	0.06
6840 Mining machine operators	0	0.00	2	0.12
6910 Roof bolters, mining	1	0.07	0	0.00
6940 Other extraction workers	4	0.30	1	0.06
7000 First-line supervisors/managers of mechanics, installers,	5	0.37	2	0.12
7010 Computer, automated teller, and office machine repairers	6	0.45	3	0.19
7020 Radio & telecommunications equipment installers & repairers	2	0.15	1	0.06
7110 Electronic equipment installers & repairers, motor vehicles	1	0.07	1	0.06
7130 Security and fire alarm systems installers	2	0.15	1	0.06
7140 Aircraft mechanics and service technicians	1	0.07	0	0.00
7150 Automotive body and related repairers	1	0.07	2	0.12
7200 Automotive service technicians and mechanics	26	1.94	19	1.18
7210 Bus and truck mechanics and diesel engine specialists	14	1.04	27	1.68
7220 Heavy vehicle & mobile equipment service technicians and mechanics	6	0.45	8	0.50

7240	Small engine mechanics	1	0.07	0	0.00
7260	Miscellaneous vehicle & mobile equipment mechanics, installer,	2	0.15	2	0.12
7300	Control and valve installers and repairers	0	0.00	1	0.06
7310	Heating, air conditioning, & refrigeration mechanics & installers	10	0.75	11	0.69
7320	Home appliance repairers	3	0.22	2	0.12
7330	Industrial and refractory machinery mechanics	5	0.37	8	0.50
7340	Maintenance and repair workers, general	4	0.30	8	0.50
7350	Maintenance workers, machinery	2	0.15	1	0.06
7360	Millwrights	3	0.22	1	0.06
7410	Electrical power-line installers and repairers	2	0.15	2	0.12
7420	Telecommunications line installers and repairers	1	0.07	4	0.25
7510	Coin, vending, & amusement machine servicers & repairers	7	0.52	16	1.00
7550	Manufactured building and mobile home installers	2	0.15	4	0.25
7560	Riggers	1	0.07	1	0.06
7620	Other installation, maintenance, and repair workers	9	0.67	8	0.50
7700	First-line supervisors/managers of production & operating workers	7	0.52	8	0.50
7720	Electrical, electronics, and electromechanical assemblers	0	0.00	3	0.19
7730	Engine and other machine assemblers	2	0.15	0	0.00
7740	Structural metal fabricators and fitters	0	0.00	1	0.06
7750	Miscellaneous assemblers and fabricators	9	0.67	14	0.87
7800	Bakers	4	0.30	3	0.19
7810	Butchers & other meat, poultry, & fish processing workers	4	0.30	3	0.19
7830	Food & tobacco roasting, baking, & drying machine operators and	1	0.07	0	0.00
7840	Food batchmakers	1	0.07	0	0.00
7850	Food cooking machine operators and tenders	0	0.00	2	0.12
7900	Computer control programmers and operators	2	0.15	1	0.06
7940	Rolling machine setters, operators, & tenders, metal and plastic	0	0.00	1	0.06
7950	Cutting, punching, & press machine setters, operators, and	1	0.07	1	0.06
7960	Drilling and boring machine tool setters, operators, and	0	0.00	1	0.06
8000	Grinding, lapping, polishing, and buffing machine tool	1	0.07	1	0.06
8010	Lathe and turning machine tool setters, operators, and	1	0.07	1	0.06
8030	Machinists	4	0.30	6	0.37
8040	Metal furnace and kiln operators and tenders	1	0.07	1	0.06
8060	Model makers and patternmakers, metal and plastic	0	0.00	1	0.06
8130	Tool and die makers	0	0.00	1	0.06
8140	Welding, soldering, and brazing workers	11	0.82	20	1.25
8220	Metalworkers and plastic workers, all other	1	0.07	10	0.62
8250	Prepress technicians and workers	1	0.07	1	0.06
8260	Printing machine operators	3	0.22	3	0.19
8300	Laundry and dry-cleaning workers	3	0.22	2	0.12
8320	Sewing machine operators	1	0.07	1	0.06
8350	Tailors, dressmakers, and sewers"	1	0.07	0	0.00
8420	Textile winding, twisting, and drawing out machine setters,	1	0.07	1	0.06
8460	Textile, apparel, and furnishings workers, all other	0	0.00	1	0.06
8500	Cabinetmakers and bench carpenters	2	0.15	0	0.00
8510	Furniture finishers	0	0.00	2	0.12
8530	Sawing machine setters, operators, and tenders, wood	2	0.15	1	0.06
8540	Woodworking machine setters, operators, & tenders, except sawing	1	0.07	0	0.00
8600	Power plant operators, distributors, and dispatchers	1	0.07	0	0.00
8610	Stationary engineers and boiler operators	1	0.07	0	0.00
8620	Water & liquid waste treatment plant & system operators	3	0.22	2	0.12
8630	Miscellaneous plant and system operators	0	0.00	2	0.12
8640	Chemical processing machine setters, operators, & tenders	0	0.00	2	0.12
8650	Crushing, grinding, polishing, mixing, and blending workers	6	0.45	4	0.25
8710	Cutting workers	0	0.00	1	0.06
8720	Extruding, forming, pressing, & compacting machine setters,	1	0.07	1	0.06
8740	Inspectors, testers, sorters, samplers, and weighers	11	0.82	5	0.31
8760	Medical, dental, and ophthalmic laboratory technicians	0	0.00	1	0.06
8800	Packaging and filling machine operators and tenders	2	0.15	1	0.06
8810	Painting workers	3	0.22	3	0.19
8830	Photographic process workers & processing machine operators	0	0.00	1	0.06
8860	Cleaning, washing, & metal pickling equipment operators and	0	0.00	2	0.12
8920	Molders, shapers, and casters, except metal and plastic	0	0.00	1	0.06

8930 Paper goods machine setters, operators, and tenders	1	0.07	1	0.06
8950 Helpers--production workers	3	0.22	1	0.06
8960 Production workers, all other	18	1.34	18	1.12
9000 Supervisors, transportation and material moving workers	13	0.97	11	0.69
9030 Aircraft pilots and flight engineers	2	0.15	0	0.00
9040 Air traffic controllers and airfield operations specialists	1	0.07	1	0.06
9110 Ambulance drivers & attendants, except emergency medical	1	0.07	0	0.00
9120 Bus drivers	16	1.19	17	1.06
9140 Taxi drivers and chauffeurs	23	1.72	17	1.06
9150 Motor vehicle operators, all other	11	0.82	9	0.56
9200 Locomotive engineers and operators	3	0.22	2	0.12
9230 Railroad brake, signal, and switch operators	1	0.07	1	0.06
9240 Railroad conductors and yardmasters	0	0.00	3	0.19
9310 Ship and boat captains and operators	1	0.07	1	0.06
9350 Parking lot attendants	0	0.00	5	0.31
9360 Service station attendants	7	0.52	1	0.06
9410 Transportation inspectors	1	0.07	0	0.00
9420 Other transportation workers	1	0.07	0	0.00
9500 Conveyor operators and tenders	0	0.00	2	0.12
9510 Crane and tower operators	0	0.00	2	0.12
9520 Dredge, excavating, and loading machine operators	10	0.75	11	0.69
9560 Hoist and winch operators	1	0.07	1	0.06
9600 Industrial truck and tractor operators	22	1.64	27	1.68
9610 Cleaners of vehicles and equipment	8	0.60	7	0.44
9620 Laborers and freight, stock, and material movers, hand	84	6.27	95	5.92
9640 Packers and packagers, hand	4	0.30	7	0.44
9650 Pumping station operators	3	0.22	3	0.19
9720 Refuse and recyclable material collectors	20	1.49	21	1.31
9740 Tank car, truck, and ship loaders	1	0.07	1	0.06
9750 Material moving workers, all other	6	0.45		0.00

C. APPENDIX 3: TASK 3: LOCAL ECONOMIC IMPACT ANALYSIS OF INCREASED IOO DRIVER INCOME



Memorandum

To: Delphine Prevost, Port of Oakland
From: Sherry Rudnak, Bay Area Economics
Re: Economic Impact Analysis of IOO Drivers Becoming LMC Employees
Date: March 5, 2009

Purpose of Study

This memo estimates the economic impacts from an increase in employee compensation among independent owner operator (IOO) drivers currently working at the Port, who would become LMC employees. As IOOs, drivers must bear all of the costs associated with taxes, health insurance, and other benefits that a typical employer would provide. As LMC employees, drivers would receive employee benefits, resulting in a de facto increase in employee compensation and post-tax earnings. This analysis assumes that LMCs would hire all IOOs as employees, and uses the IMPLAN input-output model to estimate the impacts on the Alameda County economy of Port-serving IOOs becoming LMC employees.

Methodology

According to IOO survey respondents and Beacon Economics, in 2008, there were approximately 1,982 truck drivers serving the Port of Oakland. Of these drivers, approximately 34 percent, or 674 drivers were LMC employees, while the remaining 66 percent, or 1,308 drivers, were IOOs.

In order to estimate the net economic impacts of IOOs becoming LMC employees, the analysis must determine the wages and household incomes of IOOs, the total value of LMC employee wages and benefits, and the percentage of IOOs that live in Alameda County.

The IMPLAN input-output model treats households as industries, and estimates earnings impacts using national household expenditure patterns for each income cohort. Since LMC employees earn different wages than IOOs and also receive benefits in the form of healthcare, employer contributions to taxes, and paid vacation, the analysis subtracts the post-tax wages of IOO drivers from the Alameda County economy, and adds the total employee compensation (wages and benefits) that LMCs would pay their new employees.

Bay Area Economics

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The analysis follows these steps in order to estimate the economic impacts:

1. Determine IOO household income distribution
2. Estimate average annual driver earnings for LMC and IOO drivers
3. Estimate total LMC employee compensation (including benefits)
4. Estimate average post-tax IOO earnings
5. Estimate share of IOO drivers that live in Alameda County
6. Input decreased IOO post-tax earnings and increased employee compensation estimates into IMPLAN model

These steps are described in greater detail below.

Determine IOO Household Income Distribution

In October 2008, Berkeley Policy Associates conducted a survey of IOO drivers serving the Port of Oakland and Bay Area Economics (BAE) conducted a survey of LMCs serving the Port of Oakland. A total of 94 drivers responded to the IOO survey and reported their total household incomes. As the IMPLAN model uses income cohorts to determine household expenditure patterns and the countywide economic impacts of changes in household income, this model uses the IOO drivers' household income distribution as inputs for this analysis. Table 1 shows the IOO drivers' 2008 household income distribution.

Table 1: IOO Drivers' Household Incomes

Income	Number of Drivers	Percentage
Under \$35,000	15	16.0%
\$35,000 - \$49,999	19	20.2%
\$50,000 - \$59,999	14	14.9%
\$60,000 - \$74,999	10	10.6%
\$75,000 - \$94,999	13	13.8%
\$95,000 - \$114,999	6	6.4%
\$115,000 - \$149,999	10	10.6%
\$150,000 or more	7	7.4%
Total Sample	94	100.0%

Sources: Berkeley Policy Associates' IOO Survey, 2008;
Beacon Economics, 2009; BAE, 2009.

Estimate Average Annual Driver Wages and LMC Employee Compensation

During the IOO driver and LMC surveys, drivers were asked to report their earnings. As Table 2 shows, on average, LMC employees were paid more than IOOs, earning approximately \$63,250 per year, compared to \$55,950 in gross, pre-tax pay.

Table 2: Average Driver Annual Earnings

Type of Driver	Avg. Weekly Earnings	Avg. Annual Earnings	Number of Drivers	Share of Drivers
LMC Employee	\$1,265	\$63,250	674	34%
IOO	\$1,119	\$55,950	1,308	66%
Total			1,982	100%

Sources: Berkeley Policy Associates' IOO Survey, 2008; BAE's LMC Survey, 2008; Beacon Economics, 2009; BAE, 2009.

According to Beacon Economics, LMCs pay their employees an additional 15 to 20 percent of their average earnings in benefits. Using these figures, the analysis estimates total employee compensation for LMC employees and IOO drivers.

Table 3: LMC and IOO Driver Total Compensation

Driver Type	Avg. Annual Earnings	Share of Benefits	Value of Benefits	Total Compensation
LMC Employee (a)	\$63,250	20%	\$12,650	\$75,900
LMC Employee (b)	\$63,250	15%	\$9,488	\$72,738
IOO	\$55,950	0%	\$0	\$55,950

Notes:

- (a) Assumes benefits are roughly 20 percent of average annual earnings.
- (b) Assumes benefits are roughly 15 percent of average annual earnings.

Sources: Berkeley Policy Associates' IOO Survey, 2008; BAE's LMC Survey, 2008; Beacon Economics, 2009; BAE, 2009.

As Table 3 shows, LMC drivers actually earn between \$72,700 and \$75,900 per year in total compensation, compared to IOO drivers who earn \$55,950 per year. If benefits account for 15 percent of total compensation, IOO drivers would realize a \$16,800 increase in total compensation. If benefits account for 20 percent, the compensation increase would be approximately \$20,000 per driver.

The analysis uses this differential to estimate the economic impacts of LMCs hiring IOO drivers as employees.

Estimate Aggregate Change in IOO Income

In order to estimate the economic impacts of IOO drivers becoming LMC employees, this analysis subtracts IOO drivers' post-tax earnings from the Alameda County economy, and adds total new LMC payments to employee compensation. This requires estimating the share of IOO drivers that live within Alameda County, as well as their post-tax earnings.

According to Beacon Economics, approximately 27 percent of total IOO drivers, or 353 drivers, live within Alameda County. Although LMCs would hire IOO drivers residing outside the County as well, this analysis only looks at the impacts to the Alameda County economy. As such, it only examines the impacts of IOO drivers who reside, and therefore spend their wages, within Alameda County.¹

The analysis looks at IOO drivers' post-tax earnings because IMPLAN assumes that state and federal taxes are not able to flow through the local economy. In addition, the analysis assumes that households' saving rates are zero. If households savings rates were greater than zero, this analysis would also exclude household savings in its estimate of earnings available to flow through the local economy.²

¹ To the extent that other IOO drivers who live outside of Alameda County would also realize increased employee compensation, and spend a portion of their earnings within Alameda County, this analysis presents a conservative estimate of the impacts of increased IOO driver earnings within Alameda County.

² To the extent that some IOO drivers begin saving after becoming LMC employees and realizing an increase in earnings, the IMPLAN model may overestimate the economic impacts in this analysis.

Table 4: Aggregate Change in IOO Driver Income

Loss of Alameda County Resident IOO Wages					
Household Income	Number of IOO Drivers (a)	Number of Alameda County Resident IOO Drivers (b)	Gross Alameda County Resident IOO Earnings (c)	Total Earnings to Taxes (d)	Net Lost Alameda County Resident IOO Earnings (e)
Under \$35,000	209	56	\$3,153,369	\$1,119,446	(\$2,033,923)
\$35,000 - \$49,999	264	71	\$3,994,268	\$1,417,965	(\$2,576,303)
\$50,000 - \$59,999	195	53	\$2,943,145	\$1,044,816	(\$1,898,328)
\$60,000 - \$74,999	139	38	\$2,102,246	\$956,522	(\$1,145,724)
\$75,000 - \$94,999	181	49	\$2,732,920	\$1,243,479	(\$1,489,441)
\$95,000 - \$114,999	83	23	\$1,261,348	\$573,913	(\$687,435)
\$115,000 - \$149,999	139	38	\$2,102,246	\$956,522	(\$1,145,724)
\$150,000 or more	97	26	\$1,471,572	\$713,713	(\$757,860)
Total	1,308	353	\$19,761,115	\$8,026,376	(\$11,734,739)

New Alameda County Resident LMC Total Employee Compensation (f)			
	Total Compensation Per Driver	New Alameda County Resident LMC Employees	Total Compensation Alameda County Resident LMC Drivers
Total Compensation - Benefits @ 20%	\$75,900	353	\$26,807,303
Total Compensation - Benefits @ 15%	\$72,738	353	\$25,690,332
Net Change in Total Driver Compensation, 20 percent Benefits (g):			\$7,046,188
Net Change in Total Driver Compensation, 15 percent Benefits (g):			\$5,929,217

Notes:

- (a) Household income distribution based on survey of 94 IOO drivers.
 (b) Share of total drivers that live in Alameda County: 27%
 (c) Total wages of IOO drivers, including amount payable to taxes. Average wage per driver: \$55,950
 (d) Based on 2008 Federal income tax rates, includes 13.5 percent social security taxes, seven percent CA income taxes, and Federal income taxes.
 (e) Represents the loss of IOO wages, net of taxes, when drivers become LMC employees.
 (f) Includes wages and benefits paid to LMC employee drivers.
 (g) Equals Total Compensation for LMC drivers minus Gross IOO Income.

Sources: IRS; Beacon Economics; BAE, 2009.

As Table 4 shows, Alameda County resident IOO drivers would give up approximately \$11.7 million in household income available to flow through the County economy. However, new LMC compensation payments would add between \$25.7 million and \$26.8 million to the local economy, depending on whether employee benefits represent 15 or 20 percent of total compensation. These changes in household income and total compensation payments represent the economic events that IMPLAN uses to estimate the impacts of IOO drivers becoming LMC employees.

IMPLAN Input-Output Model

Regional and national input-output models have been used for years by economists as a tool to understand the extremely complex interactions among the various parts of an economy. There are two basic types of models available to assess the economic impacts an activity including regional input-output models and customized dynamic econometric models. The economic model used in this analysis, IMPLAN (“Impact analysis for PLANning”), is a PC-based computer software

package that automates the process of developing input-output models for regions within the United States. The IMPLAN model is well respected as the industry standard for projecting economic impacts resulting from future “events.” In this study, the decreased post-tax IOO wages and increase in total LMC employee compensation payments make up the “events” in the IMPLAN model.

What is IMPLAN?

In 1976, the USDA Forest Service in conjunction with the University of Minnesota developed the IMPLAN model in response to the National Forest Management Act, which required the USDA Forest Service to create five-year management plans that estimated the local socio-economic impacts associated with various land use alternatives. In 1988, the University of Minnesota began offering the use of the IMPLAN model to non-Forest Service users. Finally, in 1993, through a technology transfer agreement, the Minnesota IMPLAN Group, a private enterprise, was formed with the purpose of maintaining and distributing the IMPLAN software and databases.

At the heart of the model is a national input-output dollar flow table called the Social Accounting Matrix (SAM). Unlike other static input-output models, which just measure the purchasing relationships between industry and household sectors, SAM also measures the economic relationships between government, industry, and household sectors, allowing IMPLAN to model transfer payments such as unemployment insurance. Thus, for the specified region, the input-output table accounts for all of the dollar flows between the different sectors within the economy.

National Industry Data

The model uses national production functions for nearly 500 industries, including government and households, to determine how an industry spends its operating receipts to produce its commodities. Using household income as an example, IMPLAN uses a consumption function based on the average national household for a given income cohort to determine how a firm in the household *industry*³ spends “each dollar of outlay on goods and services to produce a dollar of output.”⁴ The model also uses a national matrix to determine the *byproducts*⁵ that each industry generates. IMPLAN couples the national production functions with a variety of county-level economic data to determine the impacts of the economic “event.”

County-Level Economic Data

In order to estimate the county-level impacts, IMPLAN combines national industry production functions with county-level economic data. IMPLAN collects data from a variety of economic data

³ An industry consists of businesses or households that produce goods and services. The goods and services are known as commodities. IMPLAN Pro User’s Guide, 2000.

⁴ IMPLAN Pro User’s Guide, 2000.

⁵ The byproducts refer to any secondary commodities that the industry creates.

sources to generate average output, employment, and productivity for each of the industries in a given county. It also collects data on average prices for all of the goods sold in the local economy. In addition, IMPLAN gathers data on the types and amount of output that each industry generates within the County. This allows the model to determine how much of each production input the firm can buy locally, within the County. In the case of labor, the model accounts for county and regional commute patterns, so as not to overestimate the impacts from labor spending its income in the local economy. Finally, the IMPLAN model uses county-level data on the prices of goods and household expenditures to determine the consumption functions of county households and local government, taking into account the availability of each commodity within the specified geography.

Multipliers

IMPLAN combines the county and national data to generate a series of multipliers for the local economy. The multiplier measures the amount of total economic activity that results from an industry (or household) spending an additional dollar in the local economy. IMPLAN uses the national and county-level data to generate type-SAM multipliers, which include the *direct*, *indirect*, and *induced* impacts to the local economy.

Direct impacts refer to the dollar value of economic activity available to circulate through the economy. The direct impacts may equal the operating budget (or revenues) of an industry, or less, depending on several factors. First, the direct impacts do not include payments to capital, inventory, federal taxes, or state and local taxes, as payments of these types do not circulate through the economy. In this analysis, the reduction in local households' post-tax incomes and increase in the portion of new employee compensation payments available to flow through the local economy (net of tax payments) represent the direct impact.

Indirect impacts refer to the "inter-industry impacts of the input-output analysis."⁶ In the driver income example this would include payments for inputs such as healthcare, insurance, and any other non-labor payments that the LMCs would pay to maintain their payroll and staffing operations.

Induced impacts refer to the impacts of household expenditures in the model.⁷ When households earn income, they spend part of that income on goods and services. The model treats households as an "industry" in determining their local expenditure patterns in the model, based on the availability of goods and services within the geography. In the driver income example, the induced impacts include the expenditures of LMC employees' compensation, as well as the expenditures of the

⁶ IMPLAN Pro User's Guide, 2000.

⁷ Ibid.

wages of persons who work in industries represented in the indirect impacts. As with industries, the model excludes payments to federal and state taxes and savings based on the geography's average local tax and savings rates. Thus, only the post-tax wages from local workers' households are included in the model.

Summarizing the Impacts

Once the model is run, IMPLAN generates a series of output tables to show the direct, indirect, and induced impacts within each of the model's 500 sectors. IMPLAN generates these tables for two types of impacts: output and employment.

Output refers to the total economic value of new LMC employee compensation payments in the local economy.

Employment shows the number of employees needed to support the economic activity in the local economy. It should be noted that for annual impacts of ongoing operations, the employment figure shown represents the amount of employment needed to support that activity for a year. Thus, IMPLAN reports the total number of workers required to support the economic activity over the course of a year. However, IMPLAN reports the number of jobs based on average output per employee for a given industry within the geography, which is not the same as the number of full-time positions.

Economic Impact of IOOs Becoming LMC Employees

Table 5 shows the direct, indirect, and induced countywide impacts from IOOs becoming LMC employees. As the table shows, the if employee benefits represent 15 percent of total compensation, LMCs hiring all IOO drivers would result in a countywide total economic impact of \$3.1 million and 19 jobs. However, if benefits represent 20 percent of total compensation, LMCs hiring all IOO drivers would result in a countywide total economic impact of \$3.7 million and 24 jobs.

Table 5: Summary of Economic Impacts

Economic Impacts	Direct	Indirect	Induced	Total
Benefits Represent 15 Percent of Total Earnings				
Output	\$2,094,000	\$550,000	\$475,000	\$3,119,000
Employment (a)	0	3	16	19
Benefits Represent 20 Percent of Total Earnings				
Output	\$2,514,000	\$674,000	\$585,000	\$3,773,000
Employment (a)	0	4	20	24

Note:

(a) Direct employment is zero because the analysis assumes that all Alameda County resident IOO drivers will become LMC employees.

Sources: IMPLAN; BAE, 2009.

Direct Impacts

Using the decreased post-tax earnings from IOOs and increased LMC employee compensation payments as a proxy for economic activity, IMPLAN estimates that the direct countywide impact of LMCs employing IOO drivers would be between \$2.1 million and \$2.5 million in revenues, depending on employee benefits' share of total compensation.

It should be noted that there are no direct employment impacts associated with LMCs hiring IOO drivers because the analysis assumes that LMCs would hire all existing Alameda County IOO drivers, and thus, the direct change in jobs would be zero.

Indirect and Induced Impacts

The changes in IOO earnings and LMC total employee compensation act as inputs to the IMPLAN computerized input-output model to generate the indirect and induced impacts of economic activities within Alameda County.

Indirect Impacts. According to IMPLAN, the hiring of IOOs as LMC employees would generate between \$550,000 and \$674,000 in indirect activity, or business to business expenditures, and accounts for between three and four jobs in Alameda County. The greatest increases in output occur in the Real Estate Establishments, Wholesale Trade, and Insurance Carrier sectors, while the greatest shares of employment occur in the Real Estate Establishments, Employment Services, and Services to Buildings and Dwellings Sectors, which typically have the highest indirect impacts of changes in household spending.

Induced Impacts. If LMCs hire IOOs as employee drivers, they would also generate induced

impacts between \$475,000 and \$585,000 in countywide household expenditures, and would generate between 16 and 20 jobs in Alameda County. The greatest induced output impacts would occur in the Owner-Occupied Dwellings, Wholesale Trade, and Private Hospitals sectors, while the greatest shares of employment would occur in the Food and Drinking, Offices of Physicians, and Private Hospital sectors. As households spend their incomes on purchasing retail goods, eating out, medical treatment, and housing-related expenditures, these impacts tend to dominate induced impacts.

Multiplier. Dividing the total output (\$3.2 million) by the direct output (\$2.1 million) yields a countywide economic multiplier of approximately 1.49. Thus, every dollar of economic activity that would occur from LMCs hiring IOOs as employees would generate approximately \$1.49 in total countywide economic activity.

D. APPENDIX 4: TASK 7: METHODS FOR THE LOCAL ECONOMIC IMPACT ANALYSIS, PRODUCED BY BAY AREA ECONOMICS AS A SUBCONTRACTOR TO BEACON ECONOMICS



Memorandum

To: Delphine Prevost, Port of Oakland
From: Sherry Rudnak, Bay Area Economics
Re: Potential Driver Shortage Economic Impact Analysis
Date: March 3, 2009

Purpose of Study

This memo examines the economic opportunity costs to Alameda County that would occur in the wake of a shortage of truck drivers serving the maritime operations at the Port of Oakland. The analysis assumes that Port demand increases, but due to a lack of drivers, the Port cannot absorb the new demand and has to turn business away. In effect, this methodology assumes that driver shortages represent the limiting factor to an increase in Port operations.

The analysis further assumes that Port maritime operations demand grows by 25 percent, but that the LMCs cannot increase truck driver employment, thereby restricting the Port and its tenants to continue operations at their current levels, and uses the IMPLAN input-output model to determine the countywide multiplier effects of the Port and their tenants *not* increasing employment by 25 percent.

According to the March 2006 "Economic Impact Study of Port of Oakland Maritime Operations," prepared by Martin and Associates, in 2005, the Port and its maritime tenants employed 9,880 workers. As the IMPLAN model is linear, and therefore assumes a constant level of worker productivity (output per worker) for every worker, this analysis modeled the countywide economic impacts of 25 percent of the 2005 workforce, or 2,470 jobs.

IMPLAN Input-Output Model

Regional and national input-output models have been used for years by economists as a tool to understand the extremely complex interactions among the various parts of an economy. There are two basic types of models available to assess the economic impacts an activity including regional input-output models and customized dynamic econometric models. The economic model used in this analysis, IMPLAN ("IMPact analysis for PLANning"), is a PC-based computer software package that automates the process of developing input-output models for regions within the

Bay Area Economics

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United States. The IMPLAN model is well respected as the industry standard for projecting economic impacts resulting from future “events.” In this study, the projected opportunity cost of increasing maritime employment by 25 percent due to the driver shortage makes up the “event” in the IMPLAN model.

What is IMPLAN?

In 1976, the USDA Forest Service in conjunction with the University of Minnesota developed the IMPLAN model in response to the National Forest Management Act, which required the USDA Forest Service to create five-year management plans that estimated the local socio-economic impacts associated with various land use alternatives. In 1988, the University of Minnesota began offering the use of the IMPLAN model to non-Forest Service users. Finally, in 1993, through a technology transfer agreement, the Minnesota IMPLAN Group, a private enterprise, was formed with the purpose of maintaining and distributing the IMPLAN software and databases.

At the heart of the model is a national input-output dollar flow table called the Social Accounting Matrix (SAM). Unlike other static input-output models, which just measure the purchasing relationships between industry and household sectors, SAM also measures the economic relationships between government, industry, and household sectors, allowing IMPLAN to model transfer payments such as unemployment insurance. Thus, for the specified region, the input-output table accounts for all of the dollar flows between the different sectors within the economy.

National Industry Data

The model uses national production functions for nearly 500 industries, including government and households, to determine how an industry spends its operating receipts to produce its commodities. Using Port Operations as an example, IMPLAN uses a production function based on the average national port to determine how a firm in the port *industry*¹ spends “each dollar of outlay on goods and services to produce a dollar of output.”² The model also uses a national matrix to determine the *byproducts*³ that each industry generates. IMPLAN couples the national production functions with a variety of county-level economic data to determine the impacts of the economic “event.”

County-Level Economic Data

In order to estimate the county-level impacts, IMPLAN combines national industry production functions with county-level economic data. IMPLAN collects data from a variety of economic data sources to generate average output, employment, and productivity for each of the industries in a given county. It also collects data on average prices for all of the goods sold in the local economy.

¹ An industry consists of businesses that produce goods and services. The goods and services are known as commodities. IMPLAN Pro User’s Guide, 2000.

² IMPLAN Pro User’s Guide, 2000.

³ The byproducts refer to any secondary commodities that the industry creates.

In addition, IMPLAN gathers data on the types and amount of output that each industry generates within the County. This allows the model to determine how much of each production input the firm can buy locally, within the County. In the case of labor, the model accounts for county and regional commute patterns, so as not to overestimate the impacts from labor spending its income in the local economy. Finally, the IMPLAN model uses county-level data on the prices of goods and household expenditures to determine the consumption functions of county households and local government, taking into account the availability of each commodity within the specified geography.

Multipliers

IMPLAN combines the county and national data to generate a series of multipliers for the local economy. The multiplier measures the amount of total economic activity that results from an industry (or household) spending an additional dollar in the local economy. IMPLAN uses the national and county-level data to generate type-SAM multipliers, which include the *direct*, *indirect*, and *induced* impacts to the local economy.

Direct impacts refer to the dollar value of economic activity available to circulate through the economy. The direct impacts may equal the operating budget (or revenues) of an industry, or less, depending on several factors. First, the direct impacts do not include payments to capital, inventory, federal taxes, or state and local taxes, as payments of these types do not circulate through the economy. In this analysis, the forgone Port of Oakland maritime operations revenues represent the direct impact.

Indirect impacts refer to the “inter-industry impacts of the input-output analysis.”⁴ In the Port of Oakland example this would include payments for inputs such as office supplies, insurance, and any other non-labor payments that the Port and its tenants would pay to maintain their operations.

Induced impacts refer to the impacts of household expenditures in the model.⁵ When households earn income, they spend part of that income on goods and services. The model treats households as an “industry” in determining their local expenditure patterns in the model, based on the availability of goods and services within the geography. In the Port of Oakland example, the induced impacts include the expenditures of Port employees’ and their tenants’ employees’ incomes, as well as the expenditures of the incomes of persons who work in industries represented in the indirect impacts. First, the model accounts for local commute patterns in the geography. If 20 percent of workers in the county live outside of the county, the model will allocate 80 percent of labor’s disposable income into the model to generate induced impacts. In addition, as with industries, the model

⁴ IMPLAN Pro User’s Guide, 2000.

⁵ Ibid.

excludes payments to federal and state taxes and savings based on the geography's average local tax and savings rates. Thus, only the disposable incomes from local workers' households are included in the model.

Summarizing the Impacts

Once the model is run, IMPLAN generates a series of output tables to show the direct, indirect, and induced impacts within each of the model's 500 sectors. IMPLAN generates these tables for two types of impacts: output and employment.

Output refers to the total economic value of Port operations in the local economy.

Employment shows the number of employees needed to support the economic activity in the local economy. It should be noted that for annual impacts of ongoing operations, the employment figure shown represents the amount of employment needed to support that activity for a year. Thus, IMPLAN reports the total number of workers required to support the economic activity over the course of a year. However, IMPLAN reports the number of jobs based on average output per employee for a given industry within the geography, which is not the same as the number of full-time positions.

Economic Impact of Opportunity Costs

Table 1 shows the direct, indirect, and induced countywide impacts from forgone economic activity expansion that could occur at the Port. As the table shows, the forgone expansion would result in a countywide total lost economic impact of \$577.0 million and 4,030 jobs.

Table 1: Forgone Economic Impacts of Port of Oakland Expansion Due to Truck Driver Shortage

Economic Impacts	Direct	Indirect	Induced	Total
Output (a)	(\$357,379,000)	(\$77,083,000)	(\$142,525,000)	(\$576,987,000)
Employment	(2,470) (b)	(605)	(955)	(4,030)

Notes:

- (a) Output based on employment figures. Reported in 2009 dollars.
- (b) From Martin and Associates 2006 Economic Impact Study of Port of Oakland Maritime Operations. Represents 25 percent of direct employment.

Sources: Martin and Associates, 2006; IMPLAN, 2009; BAE, 2009.

Direct Impacts

Using the opportunity cost of adding 2,470 Port related jobs as a proxy for economic activity,

IMPLAN estimates that the opportunity cost of expansion within Alameda County would be approximately \$357.4 million in lost revenues.

Indirect and Induced Impacts

The forgone Port related employees act as inputs to the IMPLAN computerized input-output model to generate the indirect and induced impacts of economic activities within Alameda County.

Indirect Impacts. According to IMPLAN, the opportunity cost of Port tenants' expansion is approximately \$77.1 million in indirect activity, or business to business expenditures, and accounts for approximately 600 jobs in Alameda County. The greatest opportunity costs of output occur in the Postal Service,⁶ Couriers and Messengers,⁷ and Water Transportation Support⁸ sectors, while the greatest shares of employment occur in the Couriers and Messengers, Employment Services, and Postal Service Sectors.

Induced Impacts. The opportunity cost of Port tenants' expansion also includes approximately \$142.5 million in induced or household expenditures, and accounts for approximately 960 jobs in Alameda County. The greatest opportunity costs of output occur in the Owner-Occupied Dwellings, Wholesale Trade, and Private Hospitals sectors, while the greatest shares of employment occur in the Food and Drinking, Offices of Physicians, and Private Hospital sectors. As households spend their incomes on eating out, medical treatment, and housing-related expenditures, these impacts tend to dominate induced impacts.

Multiplier. Dividing the total opportunity cost (\$577.0 million) by the direct opportunity cost (\$357.4 million) yields a countywide economic multiplier of approximately 1.61. Thus, every dollar of economic activity that would occur from Port tenants' expansion generates approximately \$1.61 in total countywide economic activity.

⁶ NAICS 491110

⁷ NAICS 492

⁸ The IMPLAN sector is called Scenic and Sightseeing Transportation and Support, but includes all water transportation support services, including Port operations, and trucking services. NAICS 4883

E. APPENDIX 5: ADDENDUM TO TASK 6

**Port of Oakland
Comprehensive Truck Management Program
Economic Impact Analysis:**

**Drayage Truck Fleet Age Distributions
(Task 6)**



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1 INTRODUCTION

Marstel-Day, working as a subcontractor to the Beacon Economics, LLC team, performed work associated with the Port of Oakland Comprehensive Truck Management Plan Economic Impact Analysis. As a part of this work, Marstel-Day performed a survey of the drayage truck fleet serving Port operations, profiling the age of the fleet (Task 6 of the scope of work). This profile included the breakdown of drayage trips (measured by marine terminal gate entrances or exits) at the Port by truck age (model year) group, broken down as follows: pre-1994 trucks; 1994-2003 trucks; 2004-2006 trucks; and 2007 or newer trucks. This report presents the results of this task.

2 TECHNICAL APPROACH

For this task, Marstel-Day, with the coordination of Port and marine terminal staff, conducted “license plate surveys” of trucks entering and leaving Port marine terminals. The surveys took place over four weeks and collected data based on trucks operating at all active Port terminals. In addition, two Port terminals submitted license plate information that they had collected for their own purposes to Port staff, and these data were also used by Marstel-Day to aid in this task. Truck license plate information was sent by the Port to the Bay Area Air Quality Management District (BAAQMD) to confirm the validity of each plate and to determine the age of each associated truck. BAAQMD staff provided these age data approximately one week after submittal. This information was compiled to determine an age distribution for trucks working at terminals in the Port area.

2.1 TRUCK LICENSE PLATE SURVEYS

The license plate surveys were completed under the following conditions:

1. Survey work took place during daylight hours (7:00 am to 4:00 or 4:30 pm), when it is estimated that the majority (~70 percent) of truck trips through the maritime area take place (Dowling 2001).
2. Surveys took place at the entrance, exit, or both gates of each of the eight active marine terminals in the Port area (see Figure 1, Port of Oakland Maritime Facilities):
 - APM Terminals
 - Transbay Container Terminal (TBCT)
 - Trapac Terminal
 - Evergreen (Ben E. Nutter) Terminal
 - Hanjin Terminal
 - Oakland International Container Terminal (OICT)
 - American President Lines (APL) Terminal
 - Howard (Matson) Terminal

Surveys were not undertaken at the Burlington Northern Santa Fe (BNSF) or Union Pacific (UP) rail yards, since drayage trucks performing shuttles between marine terminals and the rail yards would otherwise be sampled at the marine terminals. Surveys were also not undertaken at the entrance to the Schnitzer Steel terminal, as this site is private property and does not serve Port maritime operations.

3. Two-axle trucks, local delivery vehicles and buses were excluded from the survey because they are not considered part of the drayage truck fleet.
4. License plate information was collected using digital image capture (photography) or voice dictation. Most surveys (11 out of 15) were conducted using a digital camera; 4 out of the 15 surveys were conducted using a voice-dictation device, instead.

5. Surveys took place over a four-week period, with a start date of 4 November 2008. Surveys were generally conducted on Tuesdays, Wednesdays and Thursdays, which were determined, per Port of Oakland Maritime Division staff (Peterson 2008), to be the days of the week when the highest number of trucks were expected to be entering and exiting the terminals. (Exceptions to this general rule were the Howard and APL Terminals, which were determined, through conversations with Port of Oakland Maritime Division staff, to have higher numbers of trucks entering and exiting on Thursdays, Fridays and Mondays, based on regularly scheduled vessel calls.)

Two surveys, one morning survey and one afternoon survey, were conducted at a location near the entrance or exit point of each terminal where truck traffic could be observed, with the exception of the OICT terminal as discussed below. When possible, surveys were scheduled for the time of day and week when each terminal was predicted to be busiest, based on information provided by Port Maritime Division personnel and Beacon Economics. On any given day, morning surveys took place at a different terminal than afternoon surveys. As appropriate, the survey schedule was adapted each day to coordinate with vessel calls and terminal activity. The final schedule is presented below.

Because of the availability of additional truck license plate data from two terminal managers provided directly by Port of Oakland staff, the second OICT survey was deemed unnecessary to fulfill the sampling requirements.

License plates located on the truck tractor (not the trailer chassis) were recorded during the surveys.

After surveys were completed, digital-image information and voice-dictation data were transcribed by Marstel-Day staff and provided to Beacon and Port staff for submittal to BAAQMD for the purpose of verifying the validity of each license plate and obtaining the age of each associated truck, through access and use of the California Department of Motor Vehicle's (DMV's) database of currently registered license plates. Prior to submitting these license plate data, Marstel-Day performed a Quality Assurance/Quality

Control (QA/QC) review of the data, to ensure that transcription had been performed accurately; in addition, out-of-state license plates, which represented about 4 percent of the total plates collected during the license plate surveys (78 out of 2,000), were removed from the data at this time, because the DMV's database of license plates does not include information on trucks registered out-of-state. A total of 2,000 unique truck license plates that were collected during the surveys were submitted to BAAQMD.

Table 1: License Plate Surveys Schedule (November 2008)

Sun	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
						1
2	3	4 Hanjin	5 Ben E. Nutter Trapac	6 OICT TBCT	7 APL	8
9	10	11 APM T (Maersk) Howard (Matson)	12 Trapac Hanjin	13 Howard	14	15
16	17	18	19	20	21	22
23	24 APL* Ben E. Nutter*	25 TBCT* APM T (Maersk)*	26	27	28	29
30						

NOTES: The first terminal listed for each survey day was surveyed in the morning, the second in the afternoon. Morning surveys generally took place from 7:30 to 11:30 am; afternoon surveys between 1:00 and 4:00, or between 1:00 and 4:30.

* Surveys marked with an asterisk (24 and 25 November) were completed using the voice-dictation method.

2.2 ISSUES AND RESOLUTION

Some modifications to the technical approach were made as a result of changed conditions or issues requiring resolution, including the following:

1. Change to Voice-Dictation Method. License plate surveys were begun using a digital camera to capture images of license plates. This method was chosen because it provided significant accuracy of information capture and greatest ease of data transcription. The survey method was changed to voice dictation near the end of the surveys, in order to avoid confrontations that emerged with some truck drivers over privacy issues. This change/interruption resulted in the cancelation of surveys planned for the third week in November; surveys were completed using only the voice-dictation method without apparent adverse effect either to observational capability or data capture by the end of November and without further incident.
2. Data Provided by Terminal Managers. During the performance of the surveys, Port staff succeeded in obtaining license plate data, representing up to three months of truck movements in 2008 and 2,530 unique license plates, directly from the managers of two of the terminals. These data were then provided to Marstel-Day, and compiled in a separate file and analyzed separately, as described below. As a result, the second survey scheduled for the OICT terminal was canceled.
3. Missing Truck DMV Records from CARB. In order to obtain truck-age data, BAAQMD staff coordinated with California Air Resources Board (CARB) staff to match license plates to truck ages, using the DMV's database of registered California license plates. License plates both from the surveys and as provided by managers of two of the terminals were sent by BAAQMD staff to CARB. Truck age data submitted by CARB back to BAAQMD, however, were incomplete; over 30 percent (1,456 out of a total of 4,530) of all the license plates submitted were not matched by CARB staff to an actively registered (2005, 2006 or 2007) California license plate in the DMV database. Out of the 2,000 license plates recorded during

the license plate surveys, CARB staff were able to match 1,467 (about 73 percent) to actively registered truck license plates; out of the 2,530 license plates submitted by terminal managers, CARB staff were able to match 1,607 (about 64 percent) to actively registered truck license plates.

Upon the suggestion of BAAQMD staff (Martien 2008), Marstel-Day staff performed a second QA/QC review of a sample of the license plate data collected from the surveys. Marstel-Day staff was able through this review to confirm both that the data were transcribed accurately, and that license plates submitted to BAAQMD were from drayage trucks with California plates, serving Port terminals. Marstel-Day staff also performed a review of a sample of the digital images of license plates that were missing from CARB's database, and confirmed that these license plates, too, were recorded from drayage trucks with California license plates. Port Maritime Division staff continues to remain in contact with BAAQMD and CARB staff to obtain the records missing from the truck age data initially provided by CARB. As of the date of this report, BAAQMD staff has indicated that these records may be available in March 2009 (Lau 2009).

It should be noted that the truck-age data provided by CARB were for the age of the truck tractor model, and did not capture the age of the truck engine, if different from the tractor. Generally, it is expected that tractor and engine model years match (or are close in age).

3 DISTRIBUTIONS OF TRUCK AGE DATA FROM LICENSE PLATE SURVEYS

A distribution of the age of trucks in the Port drayage truck fleet, broken down by pre-1994 trucks; 1994-2003 trucks; 2004-2006 trucks; and 2007 or newer trucks, based on license plate data collected by Marstel-Day as described earlier (and not including the license plates submitted by the terminal managers), is presented below in Table 2 and

Figure 2. This distribution includes truck model age data represented by 1,467 unique, California-registered license plates collected from the surveys conducted at the marine terminals (the number of license plates matched by CARB to the ages of actively registered trucks, representing about 73 percent of the total license plates collected during the survey). As shown in Table 2 and Figure 2, most (96 percent) of the trucks surveyed were model year 2003 or older. Trucks with model year 2007 or newer represented only one percent of the data.

Table 2: Truck Age (Model Year), 2008 License Plate Data

Truck Age Range	Terminal Surveys	
	Number of Trucks	% of Total
Pre-1994	242	17
1994-2003	1,155	79
2004-2006	49	3
2007+	21	1
Totals:	1,467	100

NOTE: The number of trucks shown above (1,467) is the total license plates matched by CARB to the ages of actively registered trucks, representing about 73 percent of the total license plates collected during the survey.

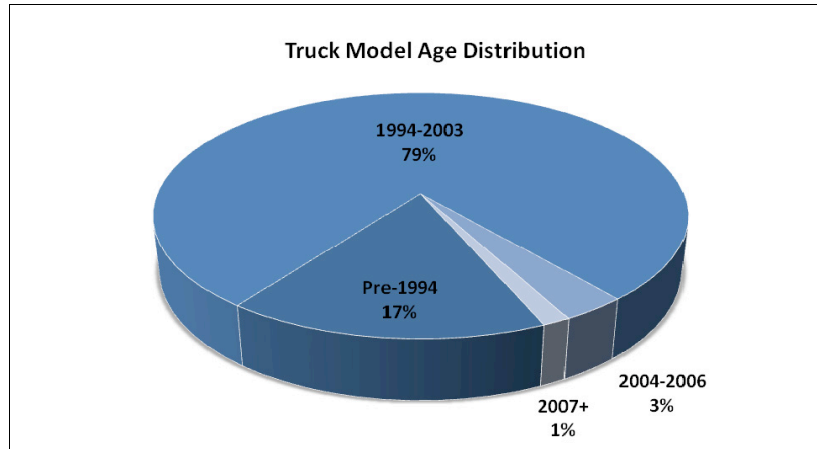


Figure 2: Truck Model Age Distribution, 2008 License Plate Survey Data

The data from the 2008 license plate surveys were also used to generate a cumulative age distribution for the Port's drayage truck fleet, presented below in Figure 3. As shown in this figure, the 90th percentile of these data is represented by the year 1991, and the 50th percentile is represented by the year 1997.

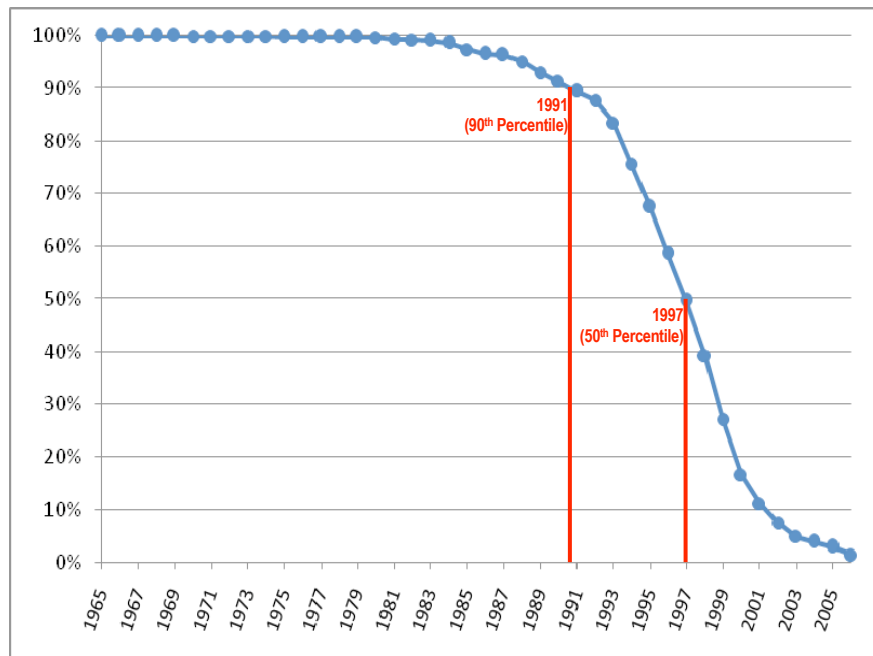


Figure 3: Cumulative Age Distribution at the Port of Oakland, Truck Model Age, 2008 Surveys

A distribution of the age of trucks in the Port drayage truck fleet based on license plate data submitted by managers of two of the terminals was also completed, and is presented in Attachment A.

4 PRE-EXISTING TRUCK AGE DATA COMPARISON

Existing information relating to the age of drayage trucks serving the Port area was reviewed prior to the completion of the truck license plate surveys, and included:

1. A license plate survey conducted in 2006 at the Port of Oakland to profile the age of drayage trucks (ENVIRON 2006);
2. Information from 2008 collected by Bill Aboudi, manager of the Oakland Maritime Support Services (OMSS) site, which provides parking for truck drivers; and,
3. Other reports and information relating to the age of the Port's drayage truck fleet (Pacific Institute 2003, TIAX 2003).

Comparisons of the drayage truck fleet age distribution prepared for the 2008 license plate survey data and the truck age information as provided in the ENVIRON report and the OMSS data are presented below.

4.1 TRUCK LICENSE PLATE SURVEY (ENVIRON 2006)

As part of the Port of Oakland's 2005 Seaport Air Emissions Inventory (Inventory), an assessment of the age of the truck drayage fleet at the Port was completed (ENVIRON 2006). For this assessment, truck license plate surveys were conducted at five locations throughout the Port terminals area, including major intersections such as the intersection of Adeline Street and 3rd Street. Truck license plate data were also provided to ENVIRON from managers at the Howard and OICT terminals. Approximately 2,344 unduplicated (unique) plates were collected from this effort, using a voice-dictation method. The truck age distribution created for this assessment was used to derive emission rate estimates for the Inventory.

Findings of the ENVIRON assessment included the conclusion that post-2000 trucks were nearly absent from the fleet. The sampled age distribution of the fleet was primarily between model years 1993 and 1999, inclusive, accounting for 80 percent of all truck trips. Figure 4, below, shows a cumulative truck age distribution generated for this effort, and shows 1994 as the truck age estimated to represent the 90th percentile, and 1998 as the truck age estimated to represent the 50th percentile, of these data.

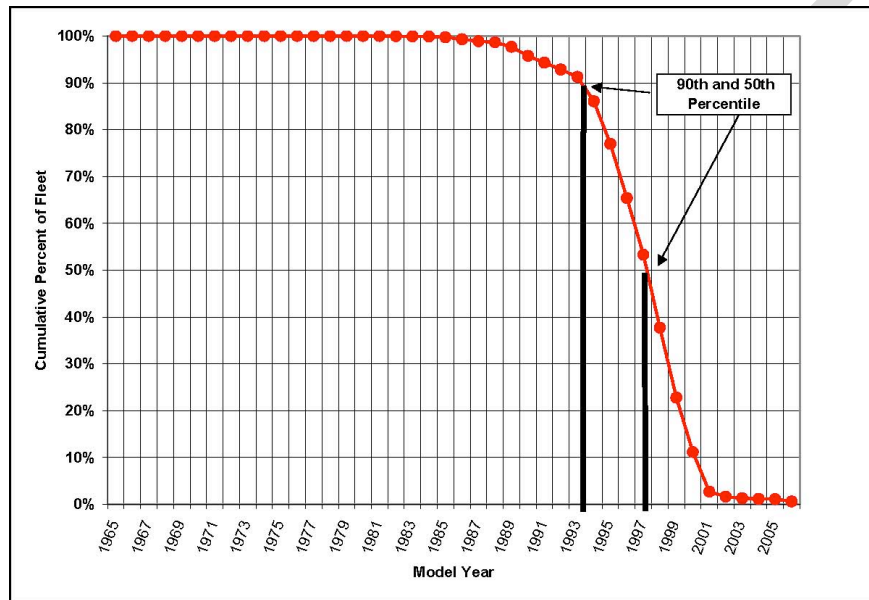


Figure 4: Cumulative Age Distribution at the Port of Oakland (SOURCE: ENVIRON 2006)

For the sake of comparison, the data from the 2008 license plate surveys were used to generate a cumulative age distribution for the Port's drayage truck fleet, as presented above in Figure 3. As shown in this figure, the 90th percentile of these data is represented by the year 1991, and the 50th percentile is represented by the year 1997.

The distribution of the 2008 survey data in Figure 3 indicates that the large (90 percent) majority of the trucks currently in the fleet are slightly older than indicated by the license plate data collected in 2006 by ENVIRON. Some of the difference between the 2008 and 2006 data may be due to normal changes in the characteristics of the drayage truck fleet between 2006 and 2008. It is also likely that some of this difference can be attributed to

specific variables of the 2008 surveys – for example, data for the 2008 surveys were collected at the entrances and exits of the Port terminals, and not on local streets, as was done for the ENVIRON study.

4.2 OMSS TRUCK AGE ESTIMATES

Information compiled by Bill Aboudi of the OMSS included model year data from 1,812 trucks that use or have used the OMSS facility. Grouping the OMSS data into trucks with model year groups pre-1994; 1994 to 2003; 2004 to 2006; and 2007 or newer yields the results shown in Table 3 (notably similar to the results shown in Table 2 for the 2008 license plate survey data).

Table 3: Truck Age (Model Year), OMSS Data

Truck Age Range	Number of Trucks	Percent of Total
Pre-1994	293	16
1994-2003	1,436	79
2004-2006	72	4
2007+	11	1
Totals:	1,812	100

A truck age distribution showing data from the 2008 license plate surveys and the OMSS data appears in Figure 5, below. Although it is difficult to compare the two data sets closely (due in part to differences in the technical approach of data collection), it can be seen that the characteristics of the OMSS data are generally similar to the age data collected during the 2008 license plate surveys.

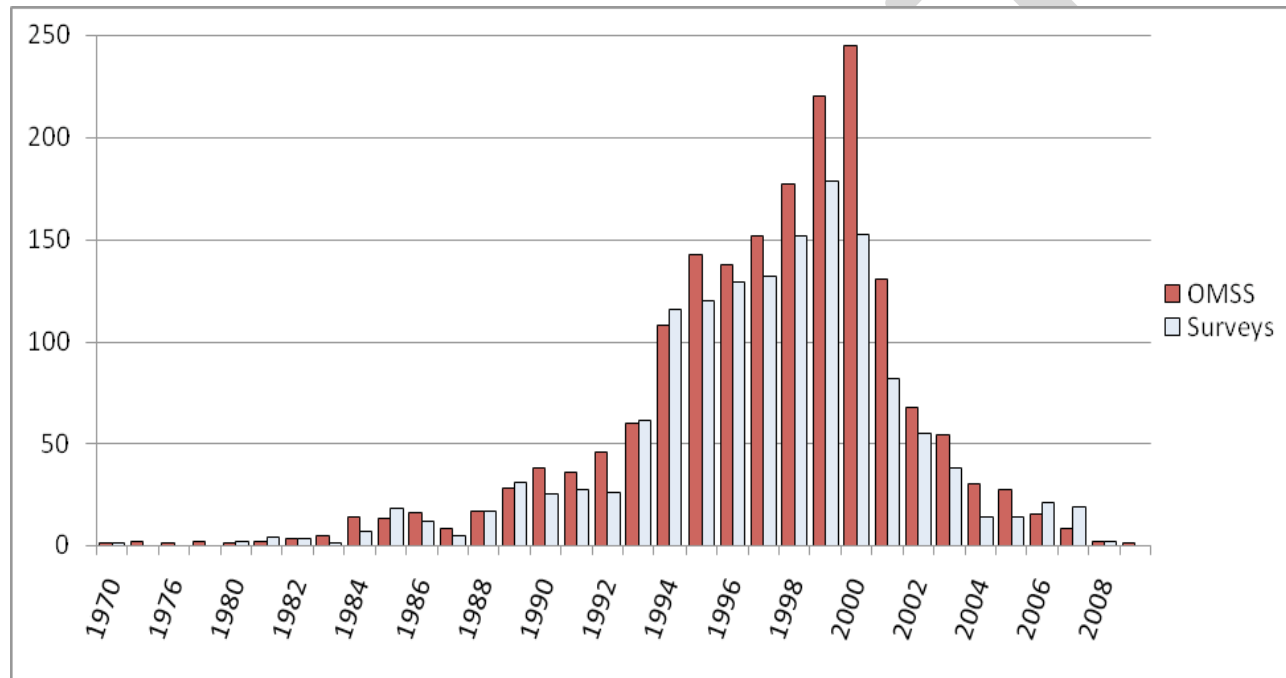


Figure 5: Truck Model Age Distribution, 2008 License Plate Survey and OMSS Data

5 FINDINGS AND CONCLUSIONS

Although truck age data compiled by CARB and sent to the Port by BAAQMD only included model ages for about three-quarters of all license plates recorded by Marstel-Day, analysis of the resulting data and age distributions generated indicate that the 2008 license plate surveys accurately represent the general age characteristics of the drayage truck fleet at the Port of Oakland. Comparisons to other age distributions of the Port's drayage truck fleet (provided by OMSS as discussed above, based on license plates provided by two of the Port's terminal managers, and as presented in ENVIRON's 2006 report) are generally consistent with this conclusion.

The age distributions created from the 2008 license plate surveys indicate that:

- Most (about 96 percent) of the trucks surveyed were model age 2003 or older, and about 17 percent were model age 1994 or newer; and
- Trucks with model age 2007 or newer represented only about one percent of the drayage fleet.

Current estimates indicate that 1,982 truck drivers serve the Port area; however, the combined total of unique truck license plates recorded during the license plate surveys and obtained from Port terminal managers indicate that over 3,500 (and possibly as many as 4,500) drayage trucks serve the Port area. This difference between the estimated number of truck drivers and the estimated number of trucks actively using the Port area is not as yet understood; the truck age distribution generated from the results of the license plate surveys as presented earlier in this report, however, is believed to accurately represent the current age distribution of the drayage truck fleet. If the proportions from this age range distribution are applied to the estimated 1,982 truck drivers that currently serve the Port area, this calculation yields the following age range distribution:

Table 4: Truck Age (Model Year) Estimated for Current Drivers Serving Port Area

Truck Age Range	Estimated Current Drivers	
	Number of Trucks	% of Total
Pre-1994	337	17
1994-2003	1,566	79
2004-2006	59	3
2007+	20	1
Totals:	1,982	100

If further attempts to obtain missing truck-age data from CARB yield additional information, Port Maritime Division staff has indicated that the age distributions presented above would be updated to capture that new information.

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**ATTACHMENT A TRUCK MODEL AGE DISTRIBUTION,
TERMINAL DATA**

DRAFT

ATTACHMENT A TRUCK MODEL AGE DISTRIBUTION, TERMINAL DATA

Distributions of the ages of trucks in the Port drayage truck fleet, broken down by pre-1994 trucks; 1994-2003 trucks; 2004-2006 trucks; and 2007 or newer trucks, based on license plate data submitted by two Port terminal managers, are presented below in Table A-1 and Figure A-1. These distributions include truck model age data represented by 1,607 unique license plates submitted by the terminal managers (the number of license plates matched by CARB to the ages of actively registered trucks, representing about 64 percent of the total license plates submitted by the terminals, and not including license plates that were already collected in the 2008 license plate surveys). As shown in Table A-1, 90 percent of the trucks surveyed were model age 2003 or older. Trucks with model age 2007 or newer represented about three percent of the data. These results are generally consistent with the results of the 2008 license plate surveys and other information on the estimated age of the Port's drayage truck fleet as discussed in the main body of this report.

Table A-1: Truck Age (Model Year), Terminal Data

Truck Age Range	OICT and Ben E. Nutter Terminal Data	
	Number of Trucks	% of Total
Pre-1994	244	15
1994-2003	1,213	76
2004-2006	100	6
2007+	50	3
Totals:	1,607	100
NOTE: The number of trucks shown above (1,607) is the total license plates matched by CARB to the ages of actively registered trucks, representing about 64 percent of the total license plates collected during the survey.		

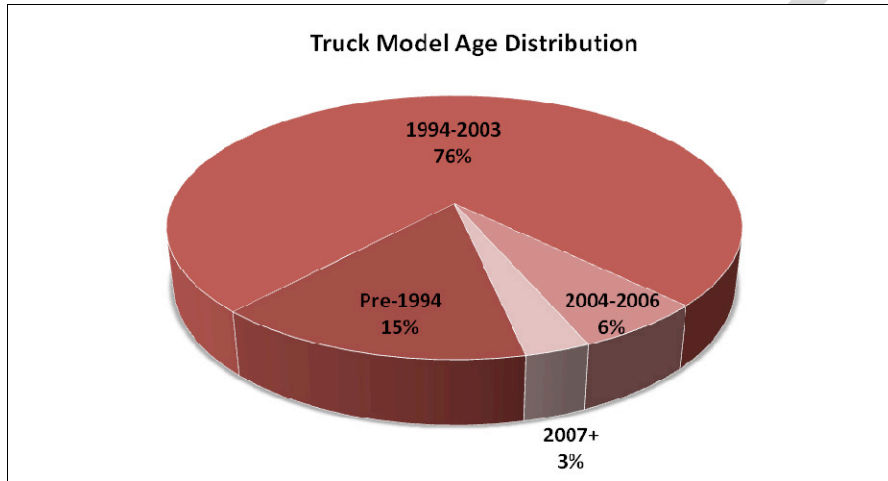


Figure A-1: Truck Model Age Distribution, Terminal Data

F. APPENDIX 6: SURVEY METHODS

1. MOTOR CARRIER SURVEY

Between October 20, 2008 and January 7, 2009, 54 Licensed Motor Carriers (LMCs) were surveyed regarding their activities with the Port of Oakland.

The sampling frame was constructed using the Motor Carrier Management Information System (MCMIS), which is maintained by the Federal Motor Carrier information and contains information on firms, with the primary intent to monitor carrier safety.

For our purpose, the MCMIS allowed us to identify firms located in Northern California and Western Nevada that performed intermodal drayage. These lists were supplemented with the names of firms that were mentioned by participants in the driver survey. Typically, the firms added in from the driver survey were not included in the original MCMIS list since they were out of the defined area (eg. there were a few carriers from Illinois and Southern California). The final set of carriers contained 349 LMCs.

All LMCs were contacted. 88 had phones that were no longer in service and could not be found either through internet or 411 inquiry, thus we assume they are no longer in business. An additional 37 LMCs indicated that they no longer provided port drayage services (though they still provide other trucking services). This leaves 224 LMCs. Of these, all were contacted and 54 completed the survey (a 25% response rate). We estimate that there are 191 carriers providing drayage service with at least 5 drivers, which implies the sample size is closer to 30% of the population of LMCs providing drayage with more than five drivers.

The survey collected information on:

- c. Firm location
- d. Firm size (class of carrier and number of drivers)
- e. Types of trucking services provided
- f. Use of labor (employee and owner operators as well as cargo handlers and office staff) and labor and capital costs.
- g. Distribution of truck ages
- h. Recruitment methods
- i. Drayage rates by length and type of haul

A copy of the survey instrument is provided elsewhere in this report.

While we believe the sample data gives insight into the characteristics of carriers, the following limitations apply:

- j. Carriers from out of state are under-represented
- k. Small carriers are also under-represented. The MCMIS provides data on number of drivers reported by an LMC. The mean number of total drivers (including non-drayage operations) for firms in the LMC data set is 59.6, substantially higher than the 32.6 mean for all firms in the MCMIS data set. This suggests that larger LMCs are over-represented in our data set.
- l. It also appears that firms that provide low levels of drayage service are under-represented. In the LMC data set, 24% of firms provide only drayage trucking services. Among all firms in the MCMIS sample, less than 20% provide only trucking services.
- m. These three facts suggest that there may have been some response bias; firms that had more interest in the provisions of the CTMP may have been more likely to respond to the survey. This includes regional and local firms, large firms, and firms that specialize in drayage.

2. DRIVER SURVEY

Between 9/23/2008 and 10/16/2008, 238 drayage drivers were interviewed outside the marine terminals at the Port of Oakland and outside the BNSF railyard. Surveys were conducted on Tuesdays, Wednesdays, and Thursdays between 5:30am and 7:30am. Surveyors approached all

drivers who were awake at their trucks. Surveys were self-administered and were available in English, Spanish, Vietnamese, and Punjabi.

The response rate was approximately 35%, which is typical for an in-person survey where the surveyors have one opportunity to approach respondents.

Drivers were asked about:

- Work history
- Driving experience
- Pay and benefits
- Driving expenses
- Truck age
- Hours of driving and non driving time
- Household income
- Attitudes towards employment

While the sample size is large enough to draw statistically meaningful conclusions about the attributes of the drivers in the sample, it is possible that the sample is not representative of the entire population of drayage drivers calling at the terminals at the Port of Oakland. The following shortcomings apply:

- Drivers who arrive at the gate immediately before the terminals open will not be in the sample. There is, however, no reason to believe the characteristics of these drivers are markedly different than those arriving early.
- Drivers who drive long hauls are unlikely to arrive at the terminals when they open in the morning, unless they stopped driving in Oakland the evening before. The same logic holds for regional haul drivers, who are likely to start the day at their point of origin, arriving at the port later in the afternoon. This suggests that regional and long haul drayage drivers are under-represented in our sample and inference on them should be supplemented with data from the LMC survey.

G. APPENDIX 7: DRIVER SURVEY

Survey of Port Drivers

Thank you for taking the time to fill out this survey! Your responses are completely anonymous and confidential. This information will be used for research purposes only and will help us learn more about truck drivers at the Port of Oakland.

If you have any questions or concerns about this survey, please contact either:

Jon Haveman
Beacon Economics
415-457-6006

or

Comprehensive Truck Management Program
Port of Oakland
510-627-1141

1. How many years have you worked as a truck driver? _____ years

1A. How many years have you driven a truck at the Port of Oakland?

_____ years

1B. What job, if any, did you have before becoming a truck driver?

2. Are you currently an owner operator or employee driver?

- owner operator
 employee

2A. If you are an employee, are you a member of a labor union?

- Yes No

3. Is truck driving at the Port of Oakland your only job?

- Yes (skip to question 5) No

3A. If not, what else do you do to earn money?

3B. How much did you earn last year from the work described in part 3A? (please include only **net** income)

4. How many months out of the year do you drive at the Port of Oakland?

_____ months

5. What model year is the truck you are driving today?

_____ year

In a typical **week**:

6. how many miles do you drive your truck? _____ miles

7. what is your gross income from driving? \$ _____

8. How many days do you work as a truck driver? _____ days

9. How many hours do you work as a truck driver? _____ hours

10. When you are not driving your truck, is it driven by anyone else for work at the Port of Oakland?

Yes No

10A. If yes, who?

- Another employee driver
- Family member/friend
- Other (please specify) _____

11. Do you own or lease your truck or is it provided by the company you work for?

- Own
- Lease
- Provided by my firm/employer (skip to **question 22**)

11A. If you own your truck, do you own more than one?

- Yes
- No

11B. If you own more than one truck, may we have your cell phone number to discuss your income and costs further?

12. In a **typical week** how much do you spend on fuel? \$ _____

13. When fuel prices rise, do you receive compensation for the higher cost of fuel?

- Yes
- No

14. In a **typical month** how much do you spend on routine truck maintenance (oil change, tires, etc.)?

\$ _____

15. In the **past year**, how much have you spent on major truck repairs? \$ _____

16. In a **typical year** how much do you spend on truck insurance? \$ _____

17. How many years have you owned or leased your truck? _____ years

18. How much did you pay for your truck (including both the down payment and any loan)?

\$ _____

19. If you own the truck or are buying the truck, how did you finance it when you first purchased it?(check all that apply)

- Through a loan from a bank or credit union
- Through a loan using equity from my house
- Through a loan from the truck manufacturing company
- Through a loan from a trucking company
- Through a loan from family or friends
- I paid cash for the full price of the truck(**skip to question 21**)

19A. What is/was the approximate interest rate on your truck? _____percent

19B. What is/was the duration of the truck loan? _____ years/months(circle)

19C. How many more months until you fully own your truck? (this number will be zero if you have already paid off your loan).

_____ months

19D. What is your current monthly truck payment? (this number will be zero if you have already paid off your loan)

\$ _____

20. When do you expect you will have to replace this truck? _____ (year)

21. Where do you most often park your truck when you are not driving?

_____ name of street or business/facility

The following questions apply only to your work at the Port of Oakland marine terminals and the BNSF rail yard (Oakland International Gateway).

22. Approximately how much money did you earn in the last year (12 months) as a truck driver, **net** of truck expenses, from your work driving at the Port of Oakland?

\$ _____

23. How much did you make in the last pay period? \$ _____

23A. How long was this pay period _____ weeks

24. How many hours do you work (including driving and non-driving/waiting time) in a typical **day**?

_____ hours

25. How many round trips to the Port of Oakland do you complete in a typical **day**?

_____ turns

26. How many companies do you currently drive for?

_____ firms

In order to compile a comprehensive list of trucking companies in the area, we are interested in the names of the companies you work for. We will not divulge any information provided in this survey to the companies, nor will we tell them that we surveyed any of their drivers.

27. Please list the names of the trucking companies you **currently** work for (and how many years you have worked for each)

Name: _____ Years: _____

Name: _____ Years: _____

Name: _____ Years: _____

28. How long have you worked for the firm you drive for most often?

_____ years

29. How many drivers (both employees and owner operators) work for the firm you drive for most often.

Less than 5	5-9	10-24	25-99	100-249	250 or more
-------------	-----	-------	-------	---------	-------------

Now we have some questions about your last trip (the last trip you completed) to or from the Port of Oakland or BNSF rail yard.

30. How long did you wait for a dispatch for that trip? _____ hours

31. How much were you paid for that trip (please report the amount you anticipate being paid if you have not been paid yet)?

_____ per _____

32. What was the origin and destination of that trip?

I started my trip at (name of city or terminal) _____

I ended my trip at (name of city or terminal) _____

33. Did you bobtail for any segment of that trip?

Yes No

33A. If yes, how many miles did you bobtail? _____ miles

34. How many hours did the trip take (please count all driving and non-driving work time, including time spent waiting or stuck in traffic)

_____ hours

35. How much time was spent waiting OUTSIDE the Port to either pick up or drop off a load?

_____ hours

36. How much time was spent waiting INSIDE the Port to either pick up or drop off a load?

_____ hours

The last questions are intended to tell us a little more about you.

37. How old are you?

_____ years

38. Are you male or female?

Male

Female

39. Are you currently married?

Yes

No

40. How many children do you have?

_____ children

41. Where do you live?

City _____ County _____ State _____

42. What racial/ethnic groups best describe you? (check all that apply)

White

African American

Asian

Native American

Pacific Islander

Hispanic

Other

43. What is your total household income? I.e., when you add it together, how much does everybody that you live with make in a year?

- | | |
|--|--|
| <input type="checkbox"/> Less than \$35,000 | <input type="checkbox"/> \$75,000 - \$94,999 |
| <input type="checkbox"/> \$35,000 - \$49,999 | <input type="checkbox"/> \$35,000 - \$114,999 |
| <input type="checkbox"/> \$50,000 - \$59,999 | <input type="checkbox"/> \$115,000 - \$149,999 |
| <input type="checkbox"/> \$60,000 - \$74,999 | <input type="checkbox"/> \$150,000+ |

44. What is the highest grade of school or college that you completed? (please include schooling both inside and outside of the U.S.)

- | | |
|--|---|
| <input type="checkbox"/> Less than High School | <input type="checkbox"/> Some High School |
| <input type="checkbox"/> High School Degree | <input type="checkbox"/> Some College |
| <input type="checkbox"/> Associate Degree | <input type="checkbox"/> College or Graduate Degree |

45. Do you have health insurance?

- Yes No

45A. If yes, is this through your firm, self purchase, your spouse, or some other source?

- Firm
 Self Purchase
 Spouse
 Other Source: please name _____

46. Have you ever been an employee at a job where you received health insurance?

- Yes No

47. Do you plan to apply for a TWIC when the time comes?

- Yes No
 Don't know

48. If the Port of Oakland adopted a plan where only employee drivers could drive at the ports, would you consider selling your truck and going to work for a trucking company as an employee?

Yes No

48A. If no, where would you work instead?

48B. If no, what is it about being an owner operator that appeals to you?

48C. If no, what is it about being an employee that you would not like?

48D. If YES, what is it about being an employee that appeals to you?

49. What is your preferred language and method of communication with terminal operators, LMCs, and the Port of Oakland?

49A. Language: _____

49B. Method of Communication: (Circle one)

Email

Phone

Website

Flyers

Other

H. APPENDIX 8: LICENSED MOTOR CARRIER (LMC) SURVEY

Survey of Licensed Motor Carriers

Thank you for taking the time to participate in this survey.

This survey is being undertaken as a part of an economic analysis that will inform the Port of Oakland's Comprehensive Truck Management Plan. This is a part of a project contracted for by the Port of Oakland. The information that you provide in your responses will be used for research purposes only and will help us learn more about the drayage services being provided at the Port of Oakland.

If you do not provide drayage services to the Port of Oakland, you need not participate in this survey.

If you have any questions or concerns about this survey, please contact either:

Jon Haveman		Comprehensive Truck Management Program
Beacon Economics	or	Port of Oakland
415-457-6006		510-627-1141

This survey will take place in 2 parts. The first part has questions that will not be confidential, but will not be released other than to the Port as a part of fulfilling our contract.

The second part will be entirely confidential. In the papers that we keep, it will not be possible for us or anybody else to link your responses to your company. This will also be the case with the computer database that we develop. Neither us, the Port of Oakland, nor anybody else will be able to link this information to your company.

Non-Confidential survey:

Motor Carrier: _____ Contact Name: _____

1. Where are you headquartered? City _____ State _____

2. What is the location closest to the port from which you dispatch drivers for drayage services at the Port of Oakland?

City _____ County _____ State _____

3. In addition to providing drayage services to the Port of Oakland (to or from the Port of Oakland marine terminals), do you also provide other domestic non-drayage hauling services?

- Yes No

4. Do you contract with independent operators to provide hauling services?

- Yes No

5. Do you have employee drivers who provide hauling services for your company?

- Yes No

6. How many drivers, both IOOs and employees provide hauling services for your company?

7. Would you be willing to provide us with a copy of your rate sheets? Yes No

Question 7 is here only so that we can keep track of firms willing to provide us with their rate sheets. We will in no way make this information public knowledge. These will be held confidential.

The following pages collect information that will be kept strictly confidential.

LMC Survey – CONFIDENTIAL SURVEY PORTION

1. Are you a Class I, Class II, or Class III carrier? (check one)

- Class I (10 million or more annual operating revenue)
 Class II (3-10 million annual operating revenue)
 Class III (less than 3 million operating revenue)

2. Where are you headquartered? City _____ State _____

We are interested in all trucking services you provide, but some questions will focus specifically on drayage to or from the Port of Oakland marine terminals.

3. What is the location closest to the port from which you dispatch drivers for drayage services at the Port of Oakland?

City _____ County _____ State _____

4. How many years have you been in operation? _____ years

5. Do you provide trucking services other than Port of Oakland drayage?

- Yes No (skip to number 6)

5A. What other types of services do you provide? (please check all that apply)

- Local pick up and delivery
- Domestic Rail intermodal
- Regional truckload haul
- Long-haul truckload
- Regional Less-than-truckload services
- Long-haul Less-than-truckload services
- Cross Dock / transloading
- Warehousing
- Other. Please indicate _____

5B. How many years have you been providing port drayage operations at Oakland?

_____ years

5C. What percent of your revenue is generated by port drayage at Oakland?

_____ percent

Please answer the following questions for your drayage operations only. **Please restrict your responses to drayage operations to or from the Port of Oakland marine terminals.**

6. In a typical **week**, how many drays do you and your drivers perform in the following categories

	Number per week
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.	
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	

D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

7. We understand that the amount of drays might vary considerably. In the table below, please indicate the number of drays in each of the following categories in slow week and in a busy week.

	Number in a slow week	Number in a busy week
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.		
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)		
C. Of the short haul drays, how many are local? (less than 40 miles)		
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)		
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)		

We are interested in the length of time it takes drivers to complete trips to and from the Port of Oakland. Please answer the questions below for the categories in which you regularly dispatch drivers.

We are especially interested in the time it takes drivers to complete tasks. For total hours to complete a trip, please include driving and non-driving work time, but do not include sleep time or break time (this is especially important for regional and long hauls)

8. How many miles is a typical trip in each of the following categories? Please indicate how many of these miles are spent deadheading/bobtailing.

	Miles in a typical trip	Miles spent deadheading/bobtailing
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.		
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)		
C. Local drays (within 40 miles)		
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)		
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)		

9. How many hours does it take a driver to complete a typical trip in each of the following categories? How many of those hours are spent waiting outside of a marine terminal? How many hours are spent waiting inside a marine terminal?

	Total Hours	Hours Spent Waiting Outside a Marine Terminal	Hours Spent Waiting Inside a Terminal
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.			
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)			
C. Local drays (within 40 miles)			
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)			

E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)			
---	--	--	--

10. Do your owner operator and employee drivers have access to parking at your facility or a facility you contract with?

- Yes, but only daytime parking
- Yes, but only nighttime parking
- Yes, both daytime and nighttime parking
- No (skip to number 11)

10A. If Yes, where is that facility located? (address or cross-streets)

11. Please give us the number of workers at your firm in each of the following categories:

	Total Trucking Operations	Port of Oakland Drayage Operations
A. Owner Operators (1099 Drivers)		
B. Employee Drivers		
C. Cargo Handlers		
D. Officers, Supervisors, Administrative, and Clerical		
E. Other Labor (such as maintenance workers and mechanics)		

12. How many of your owner operators are exclusive to your firm?

_____ drivers

13. Please answer the following questions separately for your owner operator and employee drivers in Port of Oakland drayage. If you do not have employee drivers, leave that section of the table blank.

	Owner Operators	Employee Drivers	
A. On average, how long have your drivers worked for your firm?			
B. How many drivers do you dispatch in a typical day?			
C. On average, how many hours per week do your drivers work (including driving and non-driving time)?			
D. On average, how much does a typical driver earn in a week (please report gross for owner operators)?			
E. Do you provide health insurance for your drivers? (please circle yes or no)		Yes	No
F. Do you provide paid vacation for your drivers? (please circle yes or no)		Yes	No
J. On average, what are your combined monthly wage and benefit expenditures for one employee driver?			
K. How many of your drivers do you expect will apply for TWIC?			

14. Do your owner operator and employee drivers perform drays of similar distances?

- Yes
- No, we are more likely to use owner operators on regional and long hauls
- No, we are more likely to use owner operators on short hauls
- We do not have employee drivers

15. How do you recruit drivers? (check all that apply)

- referrals from current drivers
- referrals from other LMCs
- advertisements in the paper
- advertisements at local driver training programs
- advertisements to workers in other industries
- other (please indicate) _____

16. Does your firm **own** any truck-tractors?

- Yes No (skip to number 17)

Please answer the following questions only for the trucks that you own.

16A. How many truck-tractors do you own? _____

16B. How many of these trucks are used in Port of Oakland dray operations?

16C. On average, how many years do you keep trucks in your fleet before replacing them?

_____ years

16D. Do you perform truck maintenance in-house or do you go through an outside vendor?

- In-House Outside Vendor

16E. What are the average annual costs of truck maintenance (per truck)?

\$ _____

16F. What are the annual insurance costs per vehicle (on average)?

\$ _____

16G. What is your weekly diesel expenditure per vehicle (on average)?

\$ _____

16H. In order to comply with CARB's January 1, 2010 deadline, do you plan on retrofitting or replacing your trucks that are model years 1994-2003?

- retrofit
 replace
 combination retrofit and replacement
 neither
 don't know

17. Have you installed tracking technology to track the trucks that you own or contract with?

- Yes, all drivers
- Yes, but only employee drivers
- No (skip to 18)

17A. If yes, for each of the following tracking devices, indicate how many of your trucks are equipped with each device:

	Number of trucks
Cell Phone	
RFID	
GPS	
Other (please indicate)	

18. Please indicate the number of trucks in the model year ranges below.

Years	Number you own	# driven by IOOs that you contract with
Pre-1994		
1994-2003		
2004-2006		
2007 or newer		

19. Do you **primarily** negotiate your rates with the beneficial cargo owner, with the ocean carrier/shipping line, with a freight forwarder/NVOCC or with some other party? (**please check only one**)

- beneficial cargo owner
- carrier/shipping line
- freight forwarder/NVOCC
- Other (please specify) _____

20. When diesel prices rise, are you able to adjust fuel surcharges to **completely** compensate for that price increase?

Yes (skip to 21)

No

20A. If No, what portion of the fuel cost are you able to recoup through a fuel surcharge?

_____ percent

21. Approximately how much of a lag is there between an increase in fuel price and the imposition of a higher fuel surcharge?

_____ (days, weeks, months – circle one)

The next questions are about your rate structures for serving the Port of Oakland. **If you would be willing to give us a copy of your rate sheet, please skip to question 25.**

22. What is your typical charge for hauling a loaded import container from a Port of Oakland marine terminal to:

A. A railyard in Oakland (shuttle/landbridge)? _____

B. A destination less than 100 miles away (short haul)? _____

C. A destination 100-249 miles away (regional haul)? _____

D. A destination over 250 miles away (long haul)? _____

23. Does the rate you charge for draying an import container include the rate for returning the empty container?

Yes (skip to 24)

No

23A. If No, what is the rate you charge for transporting an empty container back to a marine terminal at the Port of Oakland?

24. Does your typical charge for hauling a loaded export container to a Port of Oakland marine terminal differ from the import rates specified in 23?

- Yes (skip to 25) No

If yes, please provide rates for:

- A. a railyard in Oakland (shuttle/landbridge)? _____
- B. a destination less than 100 miles away (short haul)? _____
- C. a destination 100-249 miles away (regional haul)? _____
- D. a destination over 250 miles away (long haul)? _____

25. If the Port of Oakland were to implement an employee driver requirement as part of a Comprehensive Truck Management Program, would you continue to offer port drayage services?

- Yes, I would provide service at the same level I do today.
- Yes, but I would scale down my port drayage operations at Oakland.
- No

26. While we attempted to be comprehensive in our database of LMCs who serve the Port of Oakland, we may have missed some firms. Are there any LMCs you think we should contact? If so, please give us the name of the LMC, and, if possible, a contact name and phone number below.

I. APPENDIX 9: SUPPLY CHAIN SURVEY: LICENSED MOTOR CARRIERS

Firm: _____

Contact: _____

Title: _____

Telephone: _____

Email: _____

Address: _____

Date of Interview: _____

Type of interview: telephone or in person or mail:

Comments:

LMC

1. Where are you headquartered?

City _____ State _____

2. What is the location closest to the port from which you dispatch drivers for drayage services at the Port of Oakland?

City _____ County _____ State _____

3. How many years have you been in operation?

_____ years

4. Do you provide trucking services other than Port of Oakland drayage?

- Yes No (skip to number 6)

5A. What other types of services do you provide? (please check all that apply)

- Local pick up and delivery
- Domestic Rail intermodal
- Regional truckload haul
- Long-haul truckload
- Regional Less-than-truckload services
- Long-haul Less-than-truckload services
- Cross Dock / transloading
- Warehousing
- Other. Please indicate _____

5. In a typical **week**, how many drays do you and your drivers perform in the following categories

	Number per week
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.	
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

6. Do you generally negotiate your rates with the beneficial cargo owner, with the ocean carrier/shipping line, with a freight forwarder/NVOCC or with some other party?

- BCO – Beneficial Cargo Owner
- carrier/shipping line
- freight forwarder/NVOCC
- Other (please specify)_____

7. How often are rates negotiated?

- semi-annually
- quarterly
- monthly
- by the load
- other (please indicate)_____

8. When diesel prices rise, are you able to adjust fuel surcharges to **completely** compensate for that price increase?

- Yes (skip to 9)
- No

8A. If No, what portion of the fuel cost are you able to recoup through a fuel surcharge?

_____ percent

9. Approximately how much of a lag is there between an increase in fuel price and the imposition of a higher fuel surcharge?

_____ (days, weeks, months – circle one)

10. Do you contract with owner operator drivers for drayage services at the Port of Oakland?

- Yes
- No

10A. How are the rates paid to owner operators determined?

11. Do you have exclusive contracts with any BCOs or terminals? If yes, please describe.

12. Are there segments of the drayage market at the Port of Oakland that command premiums? If yes, please explain.

13. In your opinion, what are the major factors that negatively impact driver productivity at the Port of Oakland?

14. What strategies might be implemented by LMCs and terminal operators to ensure that trucker wait time (both inside turn time and outside wait time) is minimized?

15. What methods do you use to recruit employee drivers for your drayage and non-drayage operations? (if applicable)

16. What methods do you use to recruit owner operator drivers?

17. If you work with both, do you find productivity differences between owner operators and employee drivers in your operations? If yes, please explain.

18. Are owner operators and employees dispatched in the same types of drays? If different types of services, please explain.

19. Do you currently assist your owner operator drivers in obtaining truck financing? If owner operators were required to replace or retrofit their trucks, would you be willing/able to assist them in financing this?

20. How is the compensation provided to owner operators determined?

21. Are there pricing strategies that your firm could use to ensure that owner operator revenue would be able to cover the cost of purchasing a new truck?

22. What are the peak months at the Port of Oakland for your business? What are the peak days of the week for drayage services?

23. Are you able to provide the same level of service during peak times as during off-peak times?

Yes No

23A. If not, what is the source of the delay?

23B. If not, how much delay do customers experience during peak periods?

24. Have there been unanticipated spikes in demand that have significantly strained the drayage sector at the Port of Oakland?

- Yes No

24A. If yes, do these spikes occur frequently?

- Yes No

24B If no, is this because:

- Spikes do not happen often?
 the drayage sector is nimble enough to handle them

25. Do you typically hire/contract with more drivers during peak periods? If no, what strategies does your firm employ to ensure that pick ups and deliveries are made on time during peak periods?

26. How much advance notice do you need to get extra drivers for peak times?

27. What technology does your firm use for dispatching drivers? What technology does your firm use for routing drivers?

28. Does your firm utilize an appointment system at the Port of Oakland terminals? In your opinion what are the potential/actual costs and benefits of such a system?

J. APPENDIX 10: SUPPLY CHAIN SURVEY: MARINE TERMINAL OPERATORS (MTOs)

Firm : _____

Contact: _____

Title: _____

Telephone: _____

Email: _____

Address: _____

Date of Interview: _____

Type of interview: telephone or in person or mail:

Comments:

Terminal Operator Survey

The questions below pertain to your operations at the Port of Oakland

1. Is your company integrated with an ocean carrier?

Yes No

1A. If yes, which ocean carrier?

2. Which ocean carriers call at your terminal at the Port of Oakland?

3. Does your firm directly provide trucking services to the customers that utilize your terminal at the Port of Oakland?

Yes No

3A. What is the name and contact information for your trucking operation?
(follow up with section 2 of this survey)

4. What are your truck gate hours?

5. What days of the week are busiest at your terminal?

6. What months of the year are busiest at your terminal?

7. Approximately how many different LMCs dispatch truck drivers to your terminal in a typical week?

8. Do you anticipate slowdowns in terminal operations once TWIC is fully enforced? If yes, please explain.

9. What obstacles do you see in maximizing the efficiency of drayage operations at the Port of Oakland? Please include issues specific to terminals as well as issues you see outside of the terminals?

10. Does your terminal offer an appointment system for truck drivers?

10A. If yes, how long have you offered this system and how well is it utilized?

10B. If no, do you anticipate offering an appointment system in the future? Explain.

11. What strategies might be implemented by LMCs and terminal operators to ensure that trucker wait time, (inside turn time and outside wait time) is minimized?

12. In your opinion, what safety and security matters are most pressing at the Port of Oakland?

Section 2: Only for those terminals with trucking operations

1. How many years have you offered truck dray services? _____ years

2. In a typical **week**, how many drays do your drivers perform in the following categories

	Number per week
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.	
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

3. Do you generally negotiate your rates with the beneficial cargo owner, with the ocean carrier/shipping line, with a freight forwarder/NVOCC or with some other party?

- BCO (beneficial cargo owner)
- carrier/shipping line
- freight forwarder/NVOCC
- Other (please specify) _____

4. How often are trucking rates negotiated?

- semi-annually
- quarterly
- monthly
- by the load
- other (please indicate) _____

5. When diesel prices rise, are you able to adjust fuel surcharges to **completely** compensate for that price increase?

Yes (skip to 6)

No

5A. If No, what portion of the fuel cost are you able to recoup through a fuel surcharge?

_____ percent

6. Approximately how much of a lag is there between an increase in fuel price and the imposition of a higher fuel surcharge?

_____ (days, weeks, months – circle one)

7. Do you contract with owner operator drivers for drayage services at the Port of Oakland?

Yes No

7A. How are the rates paid to owner operators determined?

8. Do you offer drayage services to all customers using your terminal or only select ones? If only select customers, please describe how you decide whether to offer drayage service through your LMC.

9. Are there segments of the drayage market at the Port of Oakland that command premiums? If yes, please explain.

10. In your opinion, what are the major factors that negatively impact driver productivity at the Port of Oakland?

11. What methods do you use to recruit employee drivers for your drayage and non-drayage operations? (if applicable)

12. What methods do you use to recruit owner operator drivers?

13. Do you find productivity differences between owner operators and employee drivers in your operations? If yes, please explain.

14. Are owner operators and employees dispatched in the same types of drays? If different types of services, please explain.

15. Do you currently assist your owner operator drivers in obtaining truck financing? If owner operators were required to replace or retrofit their trucks, would you be willing/able to assist them in financing this?

16. Are there pricing strategies that your firm could use to ensure that owner operator revenue would be able to cover the cost of purchasing a new truck?

17. What are the peak months at the Port of Oakland for your business? What are the peak days of the week for drayage services?

18. Are you able to offer the same level of service during peak times as during off-peak times? If not, how much delay do customers experience during peak periods?

19. How much advance notice do you need to get extra drivers for peak times?

20. Have there been unanticipated spikes in demand that have significantly strained the drayage sector at the Port of Oakland?

Yes

20A. If yes, do these spikes occur frequently?

Yes No

No

20B. If no, is this because:

Spikes do not happen often?

the drayage sector is nimble enough to handle them

21. Do you typically hire/contract with more drivers during peak periods? If no, what strategies does your firm employ to ensure that pick ups and deliveries are made on time during peak periods?

22. What technology does your firm use for dispatching drivers? What technology does your firm use for routing drivers?

K. APPENDIX 11: SUPPLY CHAIN SURVEY: CARRIERS

CARRIER SURVEY INSTRUMENT

Firm : _____

Contact: _____

Title: _____

Telephone: _____

Email: _____

Address: _____

Date of Interview: _____

Type of interview: telephone or in person or mail:

Comments:

1. At which terminals at the Port of Oakland do you call?
2. At which other North American ports do you call?
3. Do you quote “door to door rates” or “port to port” rates to your customers?
 - door rates
 - port rates
 - both

3A. If you quote both rates, what determines which rate structure a customer uses?

4. Do you have in-house trucking services for drayage moves at the Port of Oakland other than through an affiliated terminal operator or motor carrier?

- yes no

4A. If yes, may we have the name and phone number of the person who oversees your drayage operations? **(Administer the second section of this survey to them)**

5. Do you contract directly with any LMCs to provide drayage services to your customers for their freight moving through the Port of Oakland?

- yes no

5A. If yes, how many LMCs do you contract with?

5B. What factors affect your selection of the LMCs with whom you contract?

5C. How are the drayage rates determined? (by distance, type of freight, customer, etc.)

5D. Which department/division of your company deals with negotiating the truck portion of the rate?

6. How often do you negotiate rates for ocean shipping on freight that moves through the Port of Oakland?

- semi-annually
 quarterly
 monthly
 by the load
 other (please indicate) _____

7. If fuel prices increase, will a surcharge be imposed on the ocean rate before the next negotiation period?
- Yes
 - No
8. If diesel prices increase, will a surcharge be imposed on the dray portion of the freight move before the next negotiation period?
- Yes
 - No
9. If your customers pay a fuel surcharge for the drayage portion of the freight move, will this be passed on in its entirety to the LMC?
- Yes
 - No
- 9A. If no, what percent is passed on to the LMC?
10. What percent of the import freight that moves on your ships through the Port of Oakland is destined for Canada, or any points east of Nevada?
11. What factors determine whether import freight destined outside of the western part of the U.S. is shipped into the Port of Oakland versus other ports?
12. In your opinion, what factors are the most important in selecting a West Coast US port?
13. In your opinion, what are the biggest challenges to efficiently moving freight through the Port of Oakland?
14. In the next 12 months, do you anticipate the amount of freight you move through the Port of Oakland to increase, decrease, or stay about the same. Please explain your response.

Section 2: Only for those ocean carriers with trucking operations

1. How many years have you offered truck dray services? _____ years

2. In a typical **week**, how many drays do your drivers perform in the following categories

	Number per week
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.	
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

3. Do you generally negotiate your rates with the beneficial cargo owner, with a freight forwarder/NVOCC or with some other party?

- BCO (beneficial cargo owner)
- freight forwarder/NVOCC
- Other (please specify)_____

4. How often are trucking rates negotiated?

- semi-annually
- quarterly
- monthly
- by the load
- other (please indicate)_____

5. When diesel prices rise, are you able to adjust fuel surcharges to **completely** compensate for that price increase?

- Yes (skip to 6)
- No

5A. If No, what portion of the fuel cost are you able to recoup through a fuel surcharge?

_____ percent

6. Approximately how much of a lag is there between an increase in fuel price and the imposition of a higher fuel surcharge?

_____ (days, weeks, months – circle one)

7. Do you contract with owner operator drivers for drayage services at the Port of Oakland?

Yes

7A. How are the rates paid to owner operators determined?

No

8. Do you offer drayage services to all your customers or only select ones? If only select customers, please describe how you decide whether to offer drayage service through your LMC.

9. Are there segments of the drayage market at the Port of Oakland that command premiums? If yes, please explain.

10. In your opinion, what are the major factors that negatively impact driver productivity at the Port of Oakland?

11. What methods do you use to recruit employee drivers for your drayage and non-drayage operations? (if applicable)

12. What methods do you use to recruit owner operator drivers?

13. Do you find productivity differences between owner operators and employee drivers in your operations? If yes, please explain.

14. Are owner operators and employees dispatched in the same types of drays? If different types of services, please explain.

15. Do you currently assist your owner operator drivers in obtaining truck financing? If owner operators were required to replace or retrofit their trucks, would you be willing/able to assist them in financing this?

16. Are there pricing strategies that your firm could use to ensure that owner operator revenue would be able to cover the cost of purchasing a new truck?

17. What are the peak months at the Port of Oakland for your business? What are the peak days of the week for drayage services?

18. Are you able to offer the same level of service during peak times as during off-peak times? If not, how much delay do customers experience during peak periods?

19. How much advance notice do you need to get extra drivers for peak times?

20. Have there been unanticipated spikes in demand that have significantly strained the drayage sector at the Port of Oakland?

Yes

20A. If yes, do these spikes occur frequently?

Yes No

No

20B. If no, is this because:

Spikes do not happen often?

the drayage sector is nimble enough to handle them

21. Do you typically hire/contract with more drivers during peak periods? If no, what strategies does your firm employ to ensure that pick ups and deliveries are made on time during peak periods?

22. What technology does your firm use for dispatching drivers? What technology does your firm use for routing drivers?

L. APPENDIX 12: SUPPLY CHAIN SURVEY: BENEFICIAL CARGO OWNERS (BCOs)

Firm: _____

Contact: _____

Title: _____

Telephone: _____

Email: _____

Address: _____

Date of Interview: _____

Type of interview: telephone or in person or mail:

Comments:

Section 1

1. Do you use the Port of Oakland for importing goods or exporting goods? (check all that apply)

- Import
- Export
- Both

Please answer the questions in the table below for the goods that you ship through terminals at the Port of Oakland

	Import Containers	Export Containers
A. How many TEUs do you ship through the Port of Oakland in a typical month?		
B. How many TEUs do		

you ship through the Port of Oakland in a busy month?		
C. What are your busy months at the Port of Oakland?		
D. Do you use a particular carrier for most of your containers?		
E. Which terminals at the Port of Oakland do your containers move through?		
F. What types of goods do you transport (answer as completely as possible)		

2. Please indicate the share of your **IMPORT** containers that move in the following ways:

	Share
A. Shuttle haul (land bridge) between a marine terminal at the Port of Oakland and a railyard.	
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

3. Please indicate the share of your **EXPORT** containers that move in the following ways in the transportation leg that ends at a marine terminal at the Port of Oakland.

	Share
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.	

B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

4. Do you contract directly with an LMC for drayage services?

- Yes No

4A. If yes, Please indicate how many LMCs you contract with in the following categories for both import and export containers moving through the Port of Oakland.

	Number of LMCs
A. Shuttle haul (land bridge) between a rail yard and a marine terminal at the Port of Oakland.	
B. Short haul dray serving a marine terminal at the Port of Oakland (less than 100 miles)	
C. Of the short haul drays, how many are local? (less than 40 miles)	
D. Regional haul dray serving a marine terminal at the Port of Oakland (100-249 miles)	
E. Long Haul serving a marine terminal at the Port of Oakland (250 + miles)	

5. For your containers moving through the Port of Oakland, does the rate for the container move from origin to destination include the domestic truck portion of the container move?

- Yes, for imports only (skip to 7)
 Yes, for exports only (skip to 7)
 Yes, for both imports and exports (skip to 7)

- No

5A. With whom do you negotiate the rate for the truck move?

- Not Applicable

6. With whom do you negotiate shipping rates for your containers that move through the Port of Oakland? (check all that apply)

- a freight forwarder/NVOCC
- directly with the ocean carrier or subsidiary
- with a 3PL (Third Party Logistics)
- other (explain) _____

7. How often do you negotiate rates for ocean shipping?

- semi-annually
- quarterly
- monthly
- by the load
- other (please indicate) _____

8. If fuel prices increase, will a surcharge be imposed before the next negotiation period?

- Yes
- No

9. If you negotiate trucking rates separately from the rest of the container move, how often do you negotiate rates for trucking?

- semi-annually
- quarterly
- monthly
- by the load
- not applicable
- other (please indicate) _____

10. If fuel prices increase, will a surcharge be imposed on the truck rate before the next negotiation period?

- Yes
- No
- not applicable

11. Do you have any in-house trucking services providing drayage services at the Port of Oakland?

- Yes
- No

12. Does your firm have in-house trucking services (other than drayage)?

- Yes
- No

Section 2: General questions

13. Do you currently use other U.S. or Canadian ports for transporting your international freight?

- Yes No

13A. If yes, which ports?

	Local	Intermodal/IPI
Imports	_____	_____
	_____	_____
	_____	_____
Exports	_____	_____
	_____	_____
	_____	_____

13B. What share of your total freight moving through ports moves through the Port of Oakland?

Imports _____% Exports _____%

14. What are the primary factors that affect the selection of the port through which you ship?

14A. Why do you choose the Port of Oakland?

15. Does your firm determine the LMCs used for drayage moves at the Port of Oakland or is the LMC determined by the ocean carrier/3PL/freight forwarder? If yes, what factors affect your choice of LMCs?

16. How do you determine the LMCs with which you contract for non-drayage services?

17. How time sensitive is your freight?

18. Do you currently have problems getting your freight picked up or dropped off at the Port of Oakland in a timely fashion? If so, how much time, on average, is any delay in the dray portion of the freight move?

19. Do you anticipate shipping more containers, less containers, or the same amount of containers through the Port of Oakland in the next year? Why?

20. If you **import** through the Port of Oakland, how much would current drayage rates have to increase before you would consider switching existing Port of Oakland traffic to another port? Which port would it be?

IPI _____ Port _____

Local _____ Port _____

21. If you **export** through the Port of Oakland, how much would current drayage rates have to increase before you would consider switching existing Port of Oakland traffic to another port? Which port would it be?

IPI _____ Port _____

Local _____ Port _____

M. APPENDIX 13: SHORT SURVEY OF PORT DRIVERS

Short Survey of Port Drivers – for Phone surveys

1. Are you currently an owner operator or employee driver?

owner operator

employee

2. How many years have you worked as a truck driver? _____ years

3. How many round trips do you make per day to or from the Port of Oakland? _____ # trips

4. How long, in miles, was your last trip to or from the Port of Oakland? _____ Miles

5. Did you bobtail either segment or a portion of that trip?

Yes

No

5A. If yes, how many miles did you bobtail? _____ Miles

End of survey if an employee

6. How much were you paid for that trip? \$ _____

7. What was your GROSS or total income from driving a truck at the Port of Oakland in the last year (12 months)?

\$ _____

8. Approximately how much money did you earn in the last year (12 months) as a truck driver, **net** of truck expenses, from your work driving at the Port of Oakland?

\$ _____

9. Do you own or lease your truck?

- Own
- Lease

10. If you own the truck or are buying the truck, how did you finance it when you first purchased it?(check all that apply)

- Through a loan from a bank or credit union
- Through a loan using equity from my house
- Through a loan from the truck manufacturing company
- Through a loan from a trucking company
- Through a loan from family or friends
- I paid cash for the full price of the truck **(skip to question 21)**

10A. What is your current monthly truck payment? (this number will be zero if you have already paid off your loan)

\$ _____

11. When do you expect you will have to replace this truck? _____ year

The next couple of questions are intended to tell us a little more about you.

12. How old are you? _____ years

13. Are you male or female?

- Male
- Female

14. What is the highest grade of school or college that you completed? (please include schooling both inside and outside of the U.S.)

- Less than High School
- High School Degree
- Associate Degree
- Some High School
- Some College
- College or Graduate Degree

At the end of 2009, the California state government will require that many of the trucks serving the ports and intermodal rail yards be retrofitted or replaced to reduce diesel emissions. Truck engines older than model year 1994 will have to be replaced with model year 2004 or newer. In addition, engines of model years 1994 through 2003 will have to be retrofitted with a state-approved retrofit device.

15. Were you aware of this requirement?

- Yes No

16. If your truck engine is older than 2004, please indicate which option you are most likely to choose to comply with the state requirement:

- My company provides my truck, so this does not apply to me.
 Install DPF retrofit device (go to B)
 Replace the truck (go to B)
 I will no longer drive at the port after 2009
 I don't know

16A. If you will no longer drive at the port, what will you do instead? (go to next question)

16B. How will you pay for the option chosen above?

- I will pay cash for the entire amount from my savings
 I will borrow money from a bank
 I will borrow money from friends/relatives
 Other (please indicate) _____

16C. How much of a down payment do you think you will be able to make on a DPF or new truck?

\$ _____

17. To help pay for these new requirements, truck owners may be eligible for state grants in an amount up to (a) \$5,000 towards the cost of a retrofit or (c) \$50,000 towards the cost of a new truck. If your truck engine is older than 2004 and this funding were available to you, would you change your answer to question 58?

- Yes No

17A. If yes, which option would you choose?

- Install DPF
 Replace the truck
 I will no longer drive at the port after 2009
 I don't know

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