BEACON ECONOMICS

COMPREHENSIVE TRUCK MANAGEMENT PROGRAM:

ECONOMIC IMPACT ANALYSIS

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LIST OF ACRONYMS

ACS	American Community Survey
ATA	American Trucking Trends
BCO	Beneficial Cargo Owner
CARB	California Air Resource Board
CDL	Commercial Drivers License
CPS	Current Population Survey
CTMP	Comprehensive Truck Management Program
CTP	Clean Trucks Program
DPF	Diesel Particulate Matter Filter
EBASE	East Bay Alliance for a Sustainable Economy
EPA	Environmental Protection Agency
HAP	Hazardous Air Pollutants
IOO	Independent Owner-Operator
LBA	Port Local Business Area
LIA	Port Local Impact Area
LMC	Licensed Motor Carrier
MAQIP	Maritime Air Quality Improvement Plan
MATES III	Multiple Air Toxics Exposure Study III
MCMIS	Motor Carrier Management Information System
MTO	Marine Terminal Operator
OES	Occupational Employment Statistics
POLA	Port of Los Angeles
POLB	Port of Long Beach
Port	Port of Oakland
RFID	Radio Frequency Identification
SCAQMD	South Coast Air Quality Management District
TEU	Twenty-foot Equivalent Unit
TWIC	Transportation Worker Identification Credential

LIST OF SUBSTANTIVE CHANGES FROM DRAFT DATED 3/6/09

1. The report has been edited throughout to improve clarity and consistency
2. Additional license plate data have become available. The implications for the report are the following:
    a. The Marstel-Day study included in Appendix 5 has been revised.
    b. The age distribution of trucks has been updated in Table VI-54.
    c. The results for cost and truck replacements and retrofitting under CARB have been updated throughout.
3. The Port has uneventfully transitioned to the use of the TWIC.
    a. All sections discussing the TWIC, including Section III-D2 and Section VI-E4, have been updated to reflect this.
4. The discussion of diversion in Section III-D6 and Section VI-D3 have been updated to more fully reflect the survey responses from BCOs.
5. Measures of the statistically significant differences in various statistics have been included throughout the document.
6. The discussion of the Ports of Los Angeles and Long Beach in Section IV-E and F now includes a brief discussion of the implications of activity pertaining to the lawsuits brought by both the American Trucking Association and the Federal Maritime Commission.
7. The list of limitations of the report (Section V) has been updated.
8. Footnotes 22 and 37 have been added to indicate that although the report's authors do not view container fees as an appropriate long-term means of paying for the truck upgrades at the Port of Oakland, this should not be interpreted as a blanket condemnation of container fees.
9. Kristen Monaco has been added to the title page as a co-author of the study. That she was not included on the title page of the draft submissions was merely an oversight. She has played an instrumental role in the development of this report.

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.

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, with a better understanding of driver compensation and costs, operational inefficiencies, market structure, the potential effects of security and regulatory (environmental) constraints, and other 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 per week compared to $1,050 for IOOs). Both IOOs and employee drivers earn significantly more than the mean earnings 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 leave 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 pending security constraints, such as the onset of the Transportation Worker Identification Credential (TWIC) program, and increasingly stringent air emissions restrictions that may require 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 assistance or other intervention on the part of the Port or regulatory body.

Given the underlying goals of the CTMP and the inability of the current system to meet those goals or to address potential future disruption, we recommend that significant changes 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 in cleaning up the drayage sector, with the 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 cost-benefit 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) remains an important resource for both the California and national economies. The fifth busiest container port in the United States, it is the primary node for Northern California's maritime trade. As a key gateway for import and export products, the Port facilitates a substantial flow of goods and generates 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 reducing its local impact on land use and the environment. More specifically, CTMP development to date has involved 10 planning elements:

- **Clean Trucks**: Reduce air emissions through diesel particulate matter filter (DPF) retrofits and truck replacements, both in a first phase early action program and in subsequent phases. Develop 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 Global Positioning System (GPS), radio-frequency identification (RFID), or other technology to report on compliance with clean truck standards, security, and geo-fencing efforts, as well as 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 (both short- and long-term) from local, state, federal, and private sector entities to fund clean truck efforts and other elements of the program, 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 impact and effect on competition 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 topics:

- Features of the supply and demand for drivers in the drayage market
    - Is driver supply elastic enough to accommodate significant changes in the structure of Port drayage and spikes in demand?
- Wages and earnings of drivers
    - What are the compensation profiles of independent owner-operators relative to employee drivers?
- Expenses associated with providing drayage services
    - What can we learn from a detailed cost analysis of Licensed Motor Carriers in the market?

- Transportation Worker Identification Credential
    - To what extent will the introduction of this security measure at the Port disrupt service and affect the drayage sector within the context of CTMP goals?
- California Air Resources Board (CARB) Emissions Regulations
    - How extensively might CARB regulations disrupt drayage services?
- The Southern California Los Angeles and Long Beach Clean Truck Programs
    - How do the changes in the structure of drayage at the Ports of Los Angeles and Long Beach inform the development of 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 was carried out through intensive surveying of the drayage market and the Port's supply chain participants, discussions with individuals in the field, an appraisal of the current literature, and a reliance on fundamental principles 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 – revealing a drayage system that, while providing adequate service to its clients, can benefit significantly from re-evaluation and structural reform. 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. In particular, the movement toward a more employment-based system, or one with tighter links between drivers and carriers, could enhance the efficiency of the current system, increase the Port's ability to respond to current and future challenges, and encourage its growth.

A. GOODS MOVEMENT

As the fifth busiest container port in the United States, and the 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 (TEUs) through its eight container terminals. Reflecting the current recession, however, this is below the 2006 peak of almost 2.4 million TEUs (Figure II-1).

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 led by food items, including fruits and nuts, 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-1: TOTAL ANNUAL CONTAINER FLOW THROUGH PORT OF OAKLAND

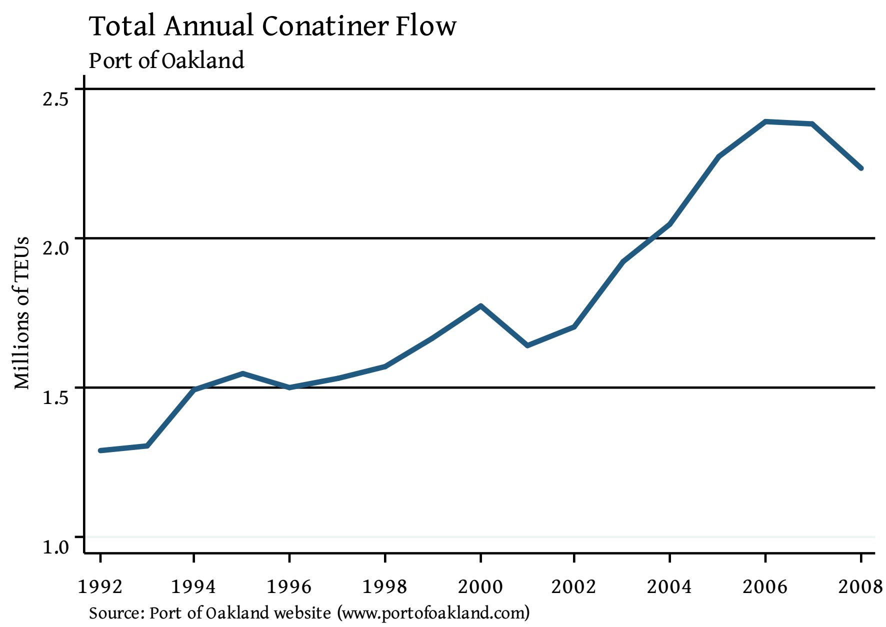
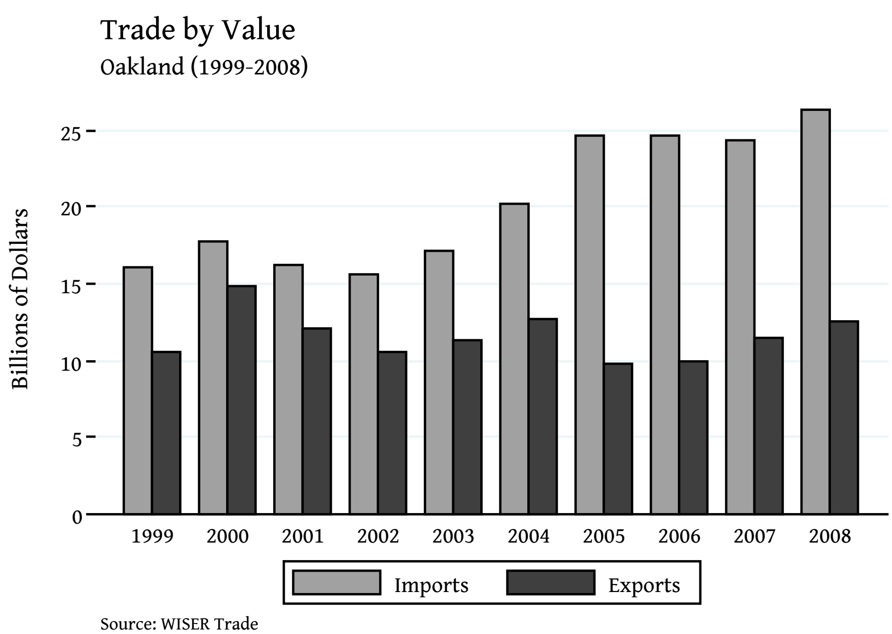
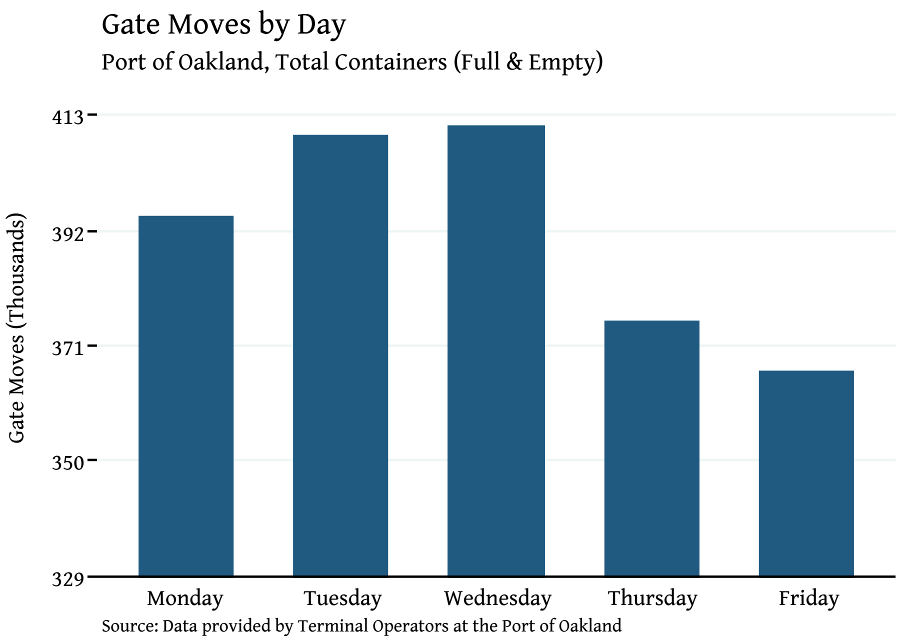


FIGURE II-2: TOTAL ANNUAL VALUE OF GOODS FLOWING THROUGH THE PORT



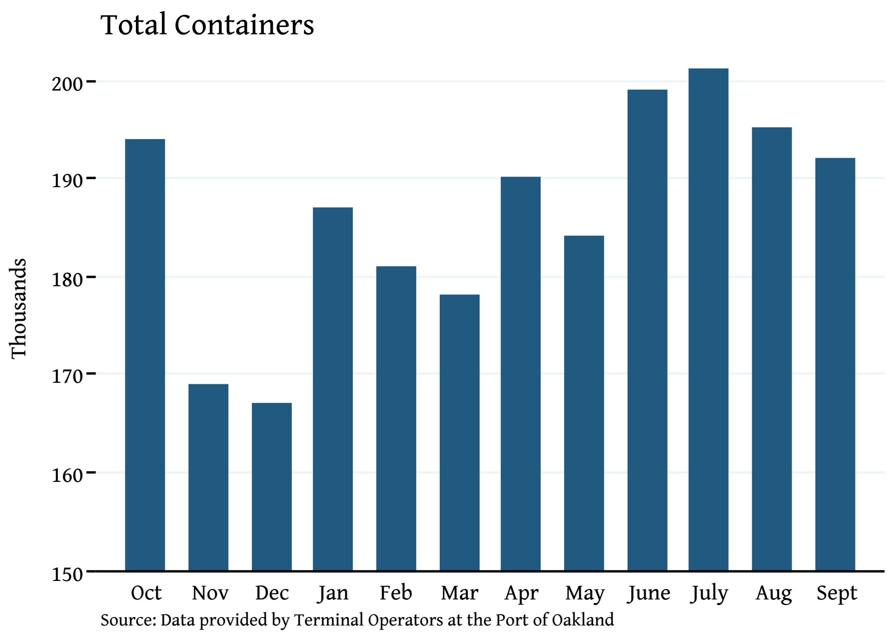
Goods entering and exiting the Port are all served by a sizable fleet of trucks providing drayage service to the Port. The drayage industry servicing the port is typically busiest mid-week (Figure II-3). From October 2007 to September 2008, containers entering and leaving the port totaled 409,000 and 411,000 on Tuesdays and Wednesdays, with volumes dwindling into the weekend.

FIGURE II-3: ESTIMATED ANNUAL CONTAINER FLOWS BY DAY OF WEEK (OCT. 2007-SEPT. 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 (October 2007 to September 2008), the U.S. economy was experiencing the onset of a 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.[1]

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



B. AIR QUALITY

The air pollutants of greatest concern in the goods movement industry are those associated with diesel-fueled engines, which are used by nearly all the trucks 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 Resources Board (CARB).

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[1] See Appendix 14 for more on the decline in container flows at the Port of Oakland both over time and relative to other West Coast ports.

Currently, five of the six pollutants used by the EPA to determine air quality exist within diesel emissions: ground-level ozone (O_3), nitrogen oxides (NO_x), carbon dioxide (CO_2), sulfur oxides (SO_2), and particulate matter (PM) (Monaco, 2007). According to the Multiple Air Toxics Exposure Study III (MATES III) report, diesel particulate matter (DPM) is highly related to drayage and imposes the greatest health risks. It is also five times more prevalent than the next four most toxic risks combined. In its most recent investigation of California's pollution sources, the Southern California Air Quality Management District (SCAQMD) found diesel emissions highest in and around port areas (MATES III). Though in overall decline, emissions have become more clustered along transportation corridors emanating from the port, indicating a concentration of these emissions in the drayage sector.

The Maritime Port of Oakland, the Union Pacific (UP) Rail Yard, and three major freeways surround the 22,000 residents of West Oakland, increasing health risks from high exposure to diesel particulate matter (PM) (CARB, 2008).

The majority of the Port's diesel PM emissions (78.9%) comes from ocean-going vessels. Drayage trucks contribute only 8% of the Port's diesel PM emissions, and only 2% of the total diesel PM emissions in West Oakland (CARB, 2008). Despite their relatively low levels of diesel PM emissions, when compared to other emissions sources in the Port, drayage trucks still pose health risks to residents in West Oakland. The California Air Resources Board estimates that the Port's activity accounts for 16% of all contributors to the risk of cancer in West Oakland. A quarter of this figure is due to drayage activity associated with the port.

The potential health risks from the exposure of diesel PM emissions in West Oakland and the region around the Port poses a great concern. Diesel PM emissions from the Port operations have an estimated potential cancer risk of 200 excess cancer cases per million in West Oakland. Pollutants from the Port have a regional effect, with emissions of diesel

PM resulting in a population-weighted potential cancer risk of 27 excess cancer cases per million.[2] 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 asthma-related cases (CARB, 2009). The East Bay Alliance for a Sustainable Economy (EBASE) and the Pacific Institute estimate the economic cost of health impacts from Port emissions to the Bay Area is at least $153 million annually (EBASE, 2009).

Recognizing the health risks associated with diesel PM emissions, the Port has set forth a goal of reducing the health risk associated with all maritime-related activities and maritime-related sources of diesel PM by 85% by the year 2020 (as compared to 2005). As outlined in the Port's Maritime Air Quality 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 business and operational benefits, the enhancement of port security and safety, the reduction of diesel PM emissions, and a decrease in the negative impacts of Port-related trucking on nearby residents.

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

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 economies of the port drayage sector and about key issues affecting the Port of Oakland's drayage market.

C. Basic Economics of the Port Drayage Sector

1. Licensed Motor Carriers (LMCs) and Operating Costs

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.

Motor carriers 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. The rest are split evenly between Class I (with operating revenues in excess of $10 million) and Class II (with operating revenues of $3 million to $10 million). 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 (number of drivers)	Only Employee Drivers	Only IOOs	Both IOOs and Employee	All LMCs
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
All LMCs	4.9	48.8	46.3	100.0
LMCs Surveyed (#)	13.0	23.0	18.0	54.0
Est. Size of Fleet (#)	29.0	52.0	40.0	121.0

Source: Calculations by Beacon Economics.

These LMCs generally have a facility for dispatching drivers near the Port (Figure III-1). More than one-half (51.9%) are located in Alameda County. Close to half of the LMCs surveyed (48.2%) have their closest LMC location in the Port Local Impact Area (LIA).[3] Within the LIA, 84.6% of LMCs are located in the City of Oakland. Beyond the LIA, the next largest concentration is in San Joaquin County (11.1%). 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-

[3] The Local Impact Area includes the cities of Alameda, Emeryville, Oakland, and San Leandro.

1 graphic indicates that some LMCs are located in Southern California, especially in Orange County.

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

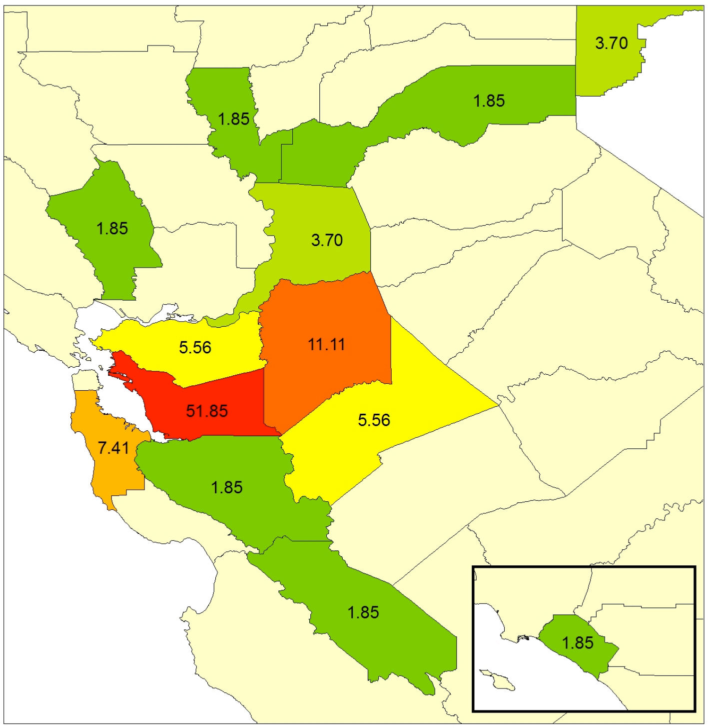


Figure III-2 presents the distribution of drivers dispatched by LMCs to the Port of Oakland. This is essentially the distribution of LMC services weighted by numbers of drivers dispatched. This figure and Figure III-3, weighted by the number of drays carried out by each LMC, show a further clustering of LMC services near the port. Specifically, more than 70% of all drays are provided by LMCs located in Alameda County.

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

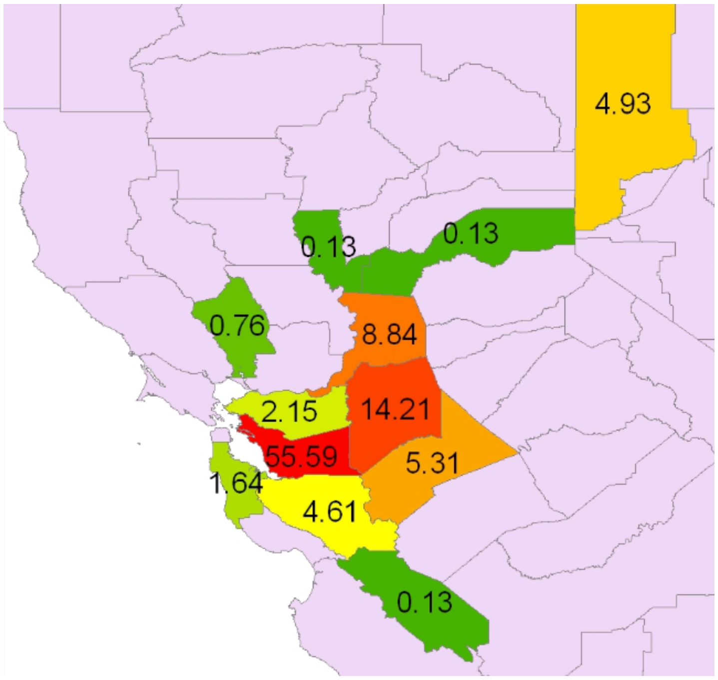
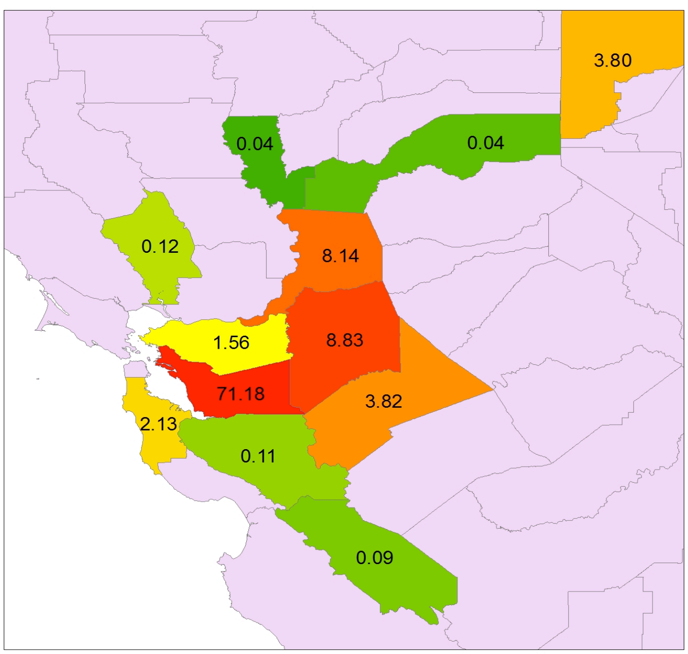


FIGURE III-3: DISTRIBUTION DRAYS BY LMCS SERVING THE PORT BY COUNTY (%)



LMC costs vary by both type of labor used and type of service provided. Among the LMCs surveyed, 24.1% use only employee drivers, 42.6% use only IOOs, and 33.3% 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% of all labor positions; among those using only IOOs, non-driving jobs account for 18.1%; and among those using a mix of IOO and employee drivers, non-driving jobs account for 17.1%.

LMC costs range substantially by type of service provided. Very few firms report true “specialization,” providing, for example, only shuttle haul service. But while most firms provide some combination of shuttle, short, regional, and long haul service, 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 by driver type.

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 the firm’s cost structure. Firms that exclusively use IOOs have costs between 28 and 32% lower than those that use only employee drivers. Those that use a mix of driver types have costs that are roughly 10% less than those LMCs using exclusively employee drivers.

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
IOO 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	4,834,148	3,264,211	3,974,606	5,160,572
Daily cost	18,593	12,555	15,287	19,848
Annual cost per driver	134,282	108,807	116,900	132,322
Mix of IOO and employee drivers				
Annual cost	4,409,367	2,967,121	3,604,291	4,660,517
Daily cost	16,959	11,412	13,863	17,925
Annual cost per driver	122,482	98,904	106,009	119,500

Source: Calculations by Beacon Economics.

The cost differential between IOOs and employees is striking. The difference likely results in significant measure from three sources. First, IOO drivers are more likely to make more efficient use of their time as their earnings are directly related to their productivity. This provides them with a clear economic incentive to do so. Second, IOOs have a tendency to “accept” costs that should be borne by the market. For example, many do their own maintenance on their own time. As such, it does not show up as a “cost” of doing business when evaluating rates that they accept. Inspecting their trucks daily is another item that is done on their own time that under an employee model is done on company time. Though the apparent cost differential is quite large, it clearly overstates the true differences in costs. Finally, the absence of employees permits a smaller back office staff.

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 the Central Valley. Although some live close to the Port, they are, in general, much more geographically dispersed than the LMCs (Figure III-4). Only 27.0% of drivers surveyed indicated that they live in Alameda County. Of those drivers, 16.7% reside in the Port Local Impact Area; of those, 81.5% live in the City of Oakland.

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

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

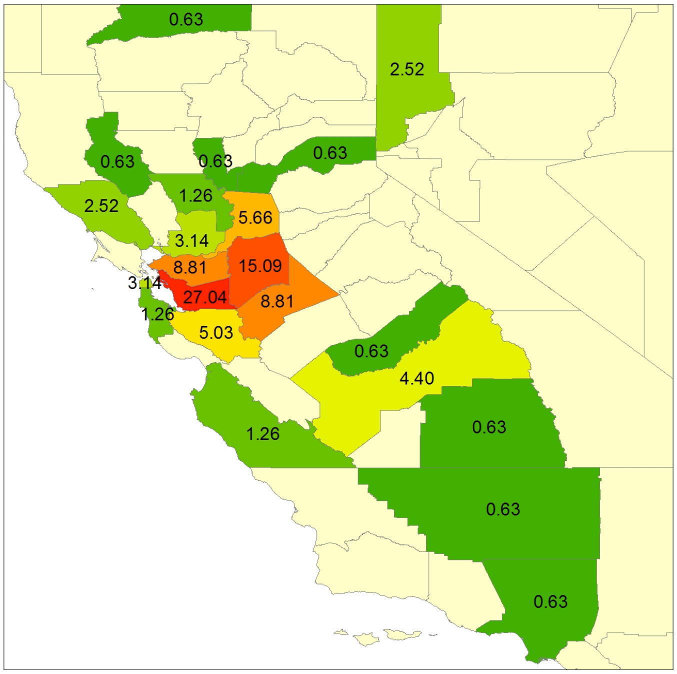


TABLE III-4: DEMOGRAPHIC CHARACTERISTICS OF PORT DRIVERS (%)

	All	IOOs	Employees
Male (%)	98	98	98
Married (%)	76	82	67
Mean Age	44	43	46
Race (%):			
White	28	18	44
African-American	6	5	6
Asian and Pacific Islander	32	36	26
Hispanic	34	41	24

Source: Calculations by Beacon Economics.

[4] Nearly 91% of all drivers surveyed indicated California as their state of residence. Another 2.52 indicated Nevada (pictured), with the remaining 6.5% indicating some other state (most commonly Colorado) as their place of residence.

Drayage drivers also tend to participate in drayage activities on a full-time basis. Less than 10% 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.[5]

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, at $1,265 and $1,050 per week, respectively. Note that this is a comparison of earnings, net of expenses. When gross earnings are 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

	Employees	IOOs
Weekly gross earnings ($)*	1,265.0	2,182.0
Days worked in a week	5.1	5.0
Weekly hours*	59.6	53.7
Weekly expenses ($)		1,132.0
Weekly earnings net of expenses ($)	1,265.0	1,050.0
Hourly wages ($)	21.2	20.8

Source: Calculations by Beacon Economics.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

Numbering approximately 2,000, Port 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

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

12,000 of which are independent operators. Of the region's independent truckers, the Port's IOOs make up more than 10%. With annual wages of more than $59,000 for employees and $57,000 for IOOs, Port drivers are well compensated relative to other drivers in the region. The median wages in the region for IOOs is $42,000 and $36,000 for employee drivers.[6] Mean income of 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, although 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 drivers do not. Overall, the hourly compensation received by employees is greater than that received by IOOs.[7]

3. *Rate Structure*

Compensation of IOOs is usually a percentage 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 trips over 250 miles from the Port.

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[6] See Table VI-39 for additional wages for truck drivers in the region.

[7] Considering the value of health insurance, vacation time, and payroll taxes, these benefits likely amount to about 15 to 20% of overall compensation. Employees receive these benefits and IOOs generally do not.

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

	LMCs Using			
	Only Employee Drivers	Only IOO Drivers	Both Employees and IOOs	All LMCs
Shuttle	NA	67	88	86
Short	331	289	329	315
Regional	635	444	699	583
Long	750	908	908	875
Mean of all hauls	572	427	506	465

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 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% are hauls of less than 40 miles.

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

	Only Employee Drivers	Only IOOs	Both IOOs and Employee	All LMCs
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
All haul types	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 potentially compelling reason for this preference structure to exist – the general state of the truck. In particular, being on average three years older, trucks operated by IOOs may be less reliable, making the risks associated with long hauls 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. Thus LMCs with employees might find this segment of the market more profitable as IOOs tend not to serve it.

4. *EFFICIENCY OF OPERATIONS*

The Port of Oakland 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) time spent waiting between dispatches, (2) time spent waiting to enter the terminal, and (3) time spent inside the terminal either picking up or dropping off 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 IOOs. On average, employee drivers wait just 1.3 hours, with more than one-third reporting zero wait time between drays. Independent owner-operators report an average wait time of nearly 1.7 hours, and less than one-fifth of IOOs report zero wait time. Among all drivers, average wait time is 1.5 hours, with 25% 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)	Percentage of Drays with Zero Wait Time
*Employee Drivers**	1.3	36.0
Shuttle and Short Hauls	1.4	28.6
Regional and Long Hauls	1.2	38.9
*Independent Operators**	1.7	19.2
Shuttle and Short Hauls	1.8	21.1
Regional and Long Hauls	1.6	17.5
All Drivers	1.5	25.6
Shuttle and Short Hauls	1.7	23.1
Regional and Long Hauls	1.4	27.3

Source: Calculations by Beacon Economics.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

Time spent waiting to enter the terminal and time spent waiting inside the terminal is similar for IOOs and employee drivers at the Port. Drivers reported waiting on average 2 hours outside the marine terminal gate and 1.6 hours once inside the gate to get out.[8] 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 reported completing an average 2.3 turns each day.[9] 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

[8] This is in stark contrast with the Port's 2005 emissions inventory, which found that turn times averaged approximately 30 minutes. See Section VI-C, Task 3, for more on this apparent contradiction.

[9] These statistics taken together suggest that the drivers are working nearly 15 hour days, strongly suggesting that the hours spent waiting are overstated.

25%. 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%, or as many as 500 trucks. Were greater efficiencies achieved, the Port's current business could be accomplished with significantly fewer trucks.

D. 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.[10] Recent economic events have called this forecast into question, but this section discusses the implications for the drayage sector of 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, 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, with the result that drivers need only be added to the labor force at a rate of 4.2% per year. In the post-regulation era of trucking in the United States, the driver population has been growing at an

[10] This forecast was provided by the Port.

annual rate of 3%. Accommodating the forecast growth in container flows requires that the Port's drayage market grow each year by 1.2% 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 likely that this forecast is significantly higher than will be realized in 2030. Should container growth be only 80% 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 IDENTIFICATION CREDENTIAL (TWIC)

On February 28, 2009, the Federal Government implemented a policy of allowing only individuals equipped with a TWIC onto Port of Oakland marine terminals. Through surveys of drivers and LMCs, we found that, as late as October of 2008, 18% of drivers indicated that they would 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, 2009. 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.[11]

TWIC could have affected 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 a different manner. Results from the LMC survey suggest that there is little in the way of a systematic effect on LMCs of different sizes. The expectations of managers at Class III LMCs

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[11] 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.

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 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% for employees and 7.0% for IOOs). This difference is still quite 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 hence they have given it less thought.

Despite the early indications that there may be some difficulty in TWIC implementation, the transition has gone very smoothly. In the first week, perhaps 5% of all trucks were turned away. In subsequent weeks, there has been no disruption whatsoever. It is possible that there are implications of this easy transition for the adjustment process to the CARB regulations or to a different IOO/LMC relationship in the drayage sector, but relative to buying a new truck or employing an driver, obtaining an identification card is relatively cheap and easy. We are reluctant therefore to translate this experience into the likelihood that other adjustments discussed in this report will also be without disruption.

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 the number of trucks (1,989) currently serving the Port, we have found that some 215 of the current fleet of trucks will have to be replaced, and another 1,315 will have to be retrofitted or replaced to comply with Phase I CARB regulations.[12]

These figures indicate that in a worst-case scenario, some 78% of the trucks serving the Port may be affected on January 1, 2010. This represents 1,530 out of an estimated fleet of 1,959 (Table III-9).[13] Up to 45% may have to be replaced, while 34% will be retrofitted.

TABLE III-9: THE POTENTIAL IMPACT OF CARB REGULATIONS ON THE OAKLAND DRAYAGE MARKET[14]

	Number			*Cost ($Millions)*		
Year	Affected	Replaced	Retrofitted	Total	Replaced	Retrofitted
2010	1,530	873	657	168.1	151.5	16.6
2014	827	586	241	107.9	101.8	6.1
Total	2,357	1,459	898	276.0	253.3	22.7

It is also possible that this transition to compliance will be extremely expensive. We have estimated that the replacement of 873 trucks will cost in excess of $151.5 million. Further, the retrofitting of the additional 657 trucks will cost an additional $16.6 million. Although CARB has committed to providing subsidies to cover up to half of these costs, 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 $75.8 million and $8.3 million for replacement and retrofitting, respectively.

[12] It is estimated that there are currently 343 trucks serving the Port that are pre-1994, and 1,533 trucks aged between 1994 and 2003. By 2010, these numbers are expected to decline to 215 and 1,315, respectively, through reduced container volumes and attrition at the older end of the fleet.

[13] These estimates assume fleet size will shrink with trade in 2009 and into 2010.

[14] The 2014 numbers are dependent upon assumptions made regarding the proportion retrofit in Phase I. This table assumes that 50% of trucks of vintage 1994-2003 are replaced. Please see Sections VI.E or VI.G for more on these assumptions.

Regardless of the cost, this requirement has the potential to significantly affect the supply of drivers and trucks to the Port. It is possible that the CARB requirements could reduce the supply of drivers and trucks to the Port significantly, resulting in a decline in driver supply that must be replaced in the next nine months. To some extent, however, this reduction in supply may be taken care of by declining container volumes and a corresponding reduced demand for drayage services.

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 key assumptions include:[15]

- 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 per truck.[16]
- Among drivers who have the choice of retrofitting or replacing their trucks, we assume that 50% replace their trucks.

Thus 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 January 1, 2014, set in motion the next wave of truck replacement and retrofitting. An additional 586 trucks will have to be replaced at a cost of $101.8 million, and an additional 241 trucks will need to be retrofitted at a cost of $6.1 million, bringing the total for Phase II to $107.9 million.

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[15] The full set of assumptions is spelled out more completely in Section VI-G, Task 6A.

[16] 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.

The total cost of both phases combined is estimated to be $276.0 million, comprising 1,459 truck replacements and 898 truck retrofits.[17] This is, again, a worst-case scenario, because it assumes a relatively high rate of replacement – 50% 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% 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 delaying the replacement of trucks until absolutely necessary. When truck replacement is stalled, there are significant changes in the timing and level of costs. In particular, the cost of Phase I is reduced from $168.1 million to $70.5 million. The cost of Phase II is increased from $107.9 million to $131.9 million, and the total cost is reduced from $276.0 million to just $202.4 million. This reduced cost, however, comes at the expense of increased dislocation in 2014, when it affects 1,173 trucks rather than 827 under the previous assumption of 50% retrofit and 50% replacement.

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

Table III-10: Impact of CARB Regulations on the Oakland Drayage Market with Delayed Replacement

	Number			*Cost ($Millions)*		
Year	Affected	Replaced	Retrofitted	Total	Replaced	Retrofitted
2010	1,530	215	1,315	70.5	37.4	33.1
2014	1,173	690	483	131.9	119.7	12.2
Total	2,703	905	1,798	202.4	157.1	45.3

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 trucks driven by employee drivers. The Phase I CARB requirement will force 15% of the current IOOs to replace their trucks or exit the market because their trucks are older than 1994. Just 6% of trucks driven by employees will have to be replaced. Additionally, about 91% of the trucks driven by IOOs are older than 2004 and will have to be retrofitted, compared to just 63% of employee-driven trucks. The numbers for Phase I and Phase II combined are 98% and 82% for IOOs and employees, respectively. While the preponderance of all trucks and drivers will be affected, nearly all of the IOOs will have to endure the burden of truck replacement or retrofit, or else leave the market.

The implications of CARB regulations are therefore more severe for IOOs than for the owners of the trucks driven by employee drivers. Coupled with the fact that IOOs in general have less access to credit than LMCs, this requirement poses a significant challenge 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 the smallest and largest LMCs own and operate older trucks (Table III-11). Among Class III carriers, nearly 70% of their trucks are from 2003 or before, all of which will have to be replaced by 2014 under the CARB guidelines. The largest LMCs will also have to replace 66% of their trucks. Class II LMCs are in a good position, with just one-third of their trucks being older than the 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.[18]

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.

[18] Although it might not seem likely that Class I carriers would exit the market, having adapted to many and varied regulations over the years, for many, serving the Port is not their primary line of business. Of the Class I carriers providing drayage services to the Port, only 20% of their drivers (both IOO and employees) are dispatched to the Port and revenues from drayage activity are only 20% of their total revenues. If the trucks used in drayage are also old, they may discontinue providing drayage services in the face of CARB regulations.

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. 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.[19]

In the context of the Port of Oakland, implementing an employee driver requirement is marginally easier than at the Southern California ports because the proportion of drivers who are currently employees is higher, one-third rather than one-fifth.[20] However, at current levels, this still requires either replacing or transitioning some 1,300 IOOs into employees. Surveys indicate that as many as 60% of these IOOs would not be willing to enter into an employee relationship with an LMC, suggesting 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 some LMCs contract with IOOs to provide services other than just drayage. Among the LMCs surveyed, more than 1 in 5 LMCs contract with significantly more IOOs than they dispatch to the Port. This increases the pool of IOO drivers from which employees could be obtained by almost 70%. If these IOOs have the same preferences as those providing drayage to the Port, this pool of IOO drivers may yield an additional 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.

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[19] 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.

[20] See Monaco (2008) for the one-fifth figure at the Southern California ports. We have found the one-third figure for the Port of Oakland through surveys of both drivers and LMCs.

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.

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 trucks. Our estimates indicate that when Phase II of the CARB regulations become effective in 2014, there will be as many as 827 additional trucks that may need replacement or retrofitting. The estimated cost associated with this phase is on the order of $108 million, with the total cost of the CARB regulations estimated to be $276 million.

The complementarity lies in the greater ability of an LMC to borrow funds and finance the replacement or retrofitting of trucks, as well as 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 (i.e., lower interest rates for LMCs) or in the inability of IOOs to obtain loans at all. Varying access to credit is a general principle in financial markets that has been exacerbated by the current credit crisis. Although this general principle is not new and many IOOs have obtained loans in the past, it will likely be more difficult for them to obtain the much larger loan needed to purchase a new truck than it has been to purchase a $20-30,000 used truck. 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. In the aggregate, we estimate that these expenses would add 27% to the cost of drivers when they transition from being IOOs to employees.

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 as 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%. This is 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%, or 18%.

With such a significant increase in labor costs, there is the potential to impact other aspects of the Port's business, for example overall shipping traffic. However, labor costs represent only 45% of total drayage costs. An increase in labor costs of 18%, therefore, will lead to an increase in overall drayage rates of at most 8%. We have also found that there are significant economies of scale, related to maintenance, insurance, and other costs that will to some extent offset these cost increases. Given these facts and the relatively small roll of drayage costs in overall shipping costs, this change is unlikely to have a large effect on overall shipping traffic or other Port business.

This cost is likely to be further offset 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.[21] Allowing the market to distribute the cost is significantly more efficient than a flat container fee imposed at the Port.[22] Such a fee is essentially a subsidy of containers moving long distances by containers moving short distances due to the difference in their environmental impact. 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, the impact on the environment is higher for long hauls because 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, or else they would be implicitly subsidizing the abatement of pollution emitted during 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.[23] 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

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[21] An increase in the costs associated with one part of the supply chain will generally be distributed throughout the supply chain according to the market power of each part of the supply chain and the relevant elasticities. In particular, some of the increase in drayage costs will result in lower profits for LMCs, while some will result in higher costs for BCOs. To the extent possible, these BCOs will pass the increased costs on to consumers. In the end the higher drayage costs are distributed throughout the supply chain.

[22] It should be noted that this applies perhaps uniquely to drayage. There are certainly other instances where using fees to support cleaning up port activity are not as market distorting as is the case with trucking. This discussion should not be interpreted as a general condemnation of the use of container fees in facilitating the mitigation of emissions from port activity.

[23] 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% in 1994, 12.6% in 2003, and 11.1% 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 that responding to a sudden increase, perhaps even a 25% bump, 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% increase in demand for its services provided drivers 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%.

The challenge of meeting spikes in demand will grow with the implementation of TWIC, the 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 sufficient 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. There appears to be an ample supply of TWIC credentialed truckers in the region. As of this writing, there were 3,876 drivers in possession of a TWIC.

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

An employee driver requirement will likewise 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, because 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 1,578 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 due to volatility in container flows.[24]

6. *CARGO DIVERSION*

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.[25] In particular, intermodal trade is the most prone to diversion. Estimates indicate that roughly 20% 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. Furthermore, by choosing the Port of Oakland, shippers avoid the congestion associated with moving containers through the Port of Los Angeles.

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% increase in drayage rates, the average

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[24] In the event that these drivers could not be diverted to Port drayage, there is always to potential for IOOs to provide an "escape valve" during temporary periods of high demand. This is discussed further in the next section.

[25] These conclusions are more fully discussed in Task 3A.

impact on transportation costs would be less than 1%. At this low level, it is unlikely that significant diversion will result.

Most local cargo travels a distance of 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 would be 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%, if not more.

Following the law of supply and demand, which is fundamental to economics, when the price of something increases, the demand for it usually falls. The remaining question, then, is to what degree it is likely to fall. In this case, when the price of drayage increases, drayage demand will fall to the extent that there are good alternatives, 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.

Reliability is another issue that was indicated. Consistent with the experience of the ports of Los Angeles and Long Beach, it was suggested that congestion or other disruptions to service could lead to a reduced reliance on the Port of Oakland. Following the port closure in 2003 and the service disruptions of 2004, many BCOs recognized the need to diversify their shipments and to use other ports. It is reasonably clear that these two events have lead to a reduction in the share of goods moving through Southern California's major ports. It is quite possible that short term disruptions of service at a port could be a bigger motivator for diversion than a small increase in shipping costs. There is an implied tradeoff. If policies are implemented that may reduce the likelihood of service disruptions, due to CARB regulations as an example, there is a small chance of diversion. If, on the other hand, these policies are not implemented, a significant disruption in service could occur, with a potentially greater risk of 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 an 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 Licensed 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 trucks.

This section 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 section ends with a discussion of our recommendations.

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

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

2. **Ease of implementation**: 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.

E. 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 provisions for truck age in 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 occurred 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 requirements.
- 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 $2,500 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).[26]
- 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 at the end of February, 2009), we consider accountability, ease of implementation, sustainability, efficiency, and cost in order to assess the CTP program.

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 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 scrappage 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*, February 18, 2009). Some of this confusion was caused by trucks not registering with the ports or not affixing

[26] The Port of Long Beach only exempts 50% of the fee if the truck was purchased after October 1, 2008.

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, alerting drivers to problems ahead of time. Noncompliant trucks should be diverted to a remote location to avoid 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, with the assistance of state funds. Owing to the state budget crisis, these funds were, and continue to be, held up. The lack of state funds, combined with the delay in collecting the clean truck fees, forced POLA to use its own general funds to begin paying incentives. One of the first payments was made to Swift Transportation, a large national carrier, which raised concern among smaller LMCs regarding when they would receive their incentive payments (*Cunningham Report*, January 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 as more truck fees are collected. Meanwhile, some LMCs are concerned about the effects of the worsening economy and declining port volumes on their businesses at a time when they have committed to investing in new, clean trucks (*Los Angeles Times*, January 27, 2009).[27] 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 the economy and the credit markets, it is valid to

[27] From 2007 to 2008, combined volumes at the Port of Los Angeles and Long Beach were down 9%, from 15.7 million TEUs to 14.3 million TEUs.

ask whether the increased costs of port drayage will lead to firms exiting the industry, which 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 been fully tested. Assuming that it works as expected, however, 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 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 regulations (without employee requirements) would be 48.6%. If an employee driver requirement were added, he estimates that drayage rates would increase 80%. These increases are likely overstated, as volumes were considerably higher when 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 $600 million and an employee driver requirement would increase these costs by $1.1 billion. These figures are higher than Husing's estimated breakdown because BCG assumed that there would be increased costs due to additional diversion under the employee driver requirement.

F. SUMMARY OF THE SOCAL CLEAN TRUCK PROGRAMS

The Southern California CTPs are still in their infancy. Many aspects of the programs have been implemented, but others have yet to phase in. In particular, the employee requirement will not be fully in place until 2014. The remarkable elements of the experience thusfar include the rapidity with which the market has responded to the provisions of the plan and the incentives offered and the uncertainty that has slowed their adoption. The uncertainty is largely derived from pending litigation. There are presently two actions against the CTPs. One has been brought by the American Trucking Association (ATA) and is currently in the U.S. District Court of Los Angeles. Another has been brought by the Federal Maritime Commissions (FMC) and is currently in Federal Court. Both parties have sought an injunction against the continuing implementation of the CTP and in particular, the employee requirement on the part of the Port of Los Angeles.

Within the last several weeks, there has been significant action in both courts. In mid March, the 9th Circuit Court of Appeals remanded the issue of the injunction back to the District Court, which had originally denied the injunction, with the ruling that the District Court had acted improperly in denying the injunction (Journal of Commerce, March 20, 2009). In mid April, the Federal Court ruled against the FMC's motion for injunction arguing that the agency failed to prove the clean truck program reduced competition, raised prices or caused irreparable economic harm (Mercury News, April 15, 2009).

At the present time, very little is known about the likelihood of survival of these programs. What is certain is that these court cases, regardless of their soundness, are injecting significant uncertainty into the drayage sector at the Ports. This uncertainty adds to the difficulty in achieving the Port's goals of cleaning up the air in and around the ports. The uncertainty leads to problems for drivers and LMCs. LMCs, in particular, cannot be expected to properly set their rates and make investment decisions without knowing whether they will be required to alter both their use of labor and capital. In addition, the delay in fee collection and therefore the subsidies for early adopters of the clean trucks technology has been disastrous for several LMCs, who expected to be rewarded for being "ahead of the curve." This uncertainty, combined with the substantial decreases in port volumes, has led to increased pressure on the drayage sector, which can potentially undermine the underlying goals of the CTP, which is clean trucks and a stable market.

G. 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, and Cost.

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

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

These potential operational structures 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 an overreliance 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 market power on the part of either LMCs or IOOs leads to reliance on older trucks for port drayage, leading to negative externalities, including air pollution.

The LMC concession model follows the model adopted by the Port of Long Beach (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 subsidies would be paid for through truck fees (a fee and subsidy, or 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 marine terminals. 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 the Port of Los Angeles. 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 first phase of the CARB requirements (the end of 2013).

These policies are intended to reflect a continuum, imposing an increasing burden on LMCs.[28] 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. If any of these three policy alternatives were imposed with no adjustment period, there would be a significant shock to drayage service at the Port. This shock would manifest itself in a reduced level of service as LMCs reoriented their business models to accommodate the new policy

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[28] It should also be noted that as this is an economic analysis, the legal issues will not be discussed in any detail.

environment. Because the implications for LMCs under the concession model are relatively minor, the concession model would require 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, LMCs would need time to sift through the driver pool to find drivers they felt comfortable sponsoring. Since sponsorship involves a significant commitment on the part of LMCs, this could 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 involves 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 Port of Los Angeles as the share of employee drivers currently serving the Port of Oakland currently exceeds that serving the Southern California port complex. One-third of drivers serving the Port are currently employees, compared to one-fifth of the drivers serving POLA/LB. It is also the case that a higher proportion of the LMCs who dispatch 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. Recall that ease of implementation is defined as leading to little disruption in service. Although the employee model involves the highest increase in costs (25% to 50% compared to perhaps as much as 20% to 30% to enact only the concession or sponsorship model), the sponsorship system implies greater uncertainty for the LMCs.[29] Unlike the sponsorship system, 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 even though 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. Although this model has been applied successfully on a limited basis in Southern California, questions remain regarding the potential pitfalls of the sponsorship model over the employee model. Its long-term viability when applied to larger numbers of LMCs is unknown.

The concession model would likely be a more difficult path to take. In particular, as CARB regulations become increasingly stringent, competition in the drayage sector would impede the ability of LMCs and IOOs to accumulate the resources necessary to upgrade their trucks. Under the concession model, there would likely have to be continuing Port subsidy of emissions improvements.

[29] These costs stem from the combination of increased labor and truck expenses. Labor expenses are greater under the EDR, while truck costs are largely similar across the three plans, reflecting the impact of the CARB regulations. The range stems from the potential need for more back office personnel to accommodate the new employees.

2. *Accountability*

At the Port of Oakland, accountability rests largely on the shoulders of independent owner-operators. Because 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 somewhat less than 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 would be more likely to have significant repercussions for the LMC than would independent violations by an IOO. Thus, movement toward LMC control of drivers and trucks brings with it an increase in accountability relative to the current system.

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. All trucks entering Port property would be tracked. 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 Port.

Under the current system, 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. Moving toward a greater proportion of LMCs answering for their drivers (as employees or otherwise) would increase accountability. An LMC sponsorship model potentially adds more accountability by ensuring that LMCs take an active interest in the ongoing 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.

An increase in 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*

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, marine terminal 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 built-in incentives to make dispatch policies more efficient; the LMC has a financial incentive to keep the trucks in its fleet moving.[30] 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 driver into service. Both the sponsorship and employee models increase the cost of adding another driver relative to utilizing the existing fleet more efficiently.

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[30] 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.

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 in an LMC sponsorship model, as the cost of sponsorship is less than that of hiring the employee.[31] 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, marine terminal inefficiency. Most terminals at the Port of Oakland have limited gate hours, which are further limited by closing for lunch.[32] 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 beneficial cargo owners for waiting time at the terminals, which will place pressure on marine terminals 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 will likely remain unexploited under a concession model. In 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

[31] These costs include not only that of the truck but the additional labor expenses of benefits, unemployment insurance, and workers' compensation.

[32] 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.

with regard to the cost of maintenance. LMCs performing maintenance in-house reported 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. 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 reduces the number of trucks needed to move a given number of containers. Thus fewer trucks would need to be retrofitted or replaced to meet CARB standards within the drayage fleet.

4. Sustainability

A model's sustainability is a measure of its potential to support 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 a 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, not only for action but also for encouraging replacement rather than retrofit, which is a better long-term solution.[33] This

[33] Trucks with model years between 2994 and 2003 that are retrofit in 2010 will have to be replaced in 2014.

finding also suggests that subsidies could go a long way toward helping the drayage system avoid a shortage of trucks on January 1, 2010.

Despite initial adjustment issues, the LMC sponsorship and the employee driver models may allow for the continuous upgrading of trucks as environmental standards become increasingly stringent – without further subsidies 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 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 upcoming 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 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, a problem which could be ameliorated through an LMC sponsorship or employee driver model. These latter two models, however, are constrained; LMCs would have to hire employee drivers they trusted or be willing to co-sign loans for their IOOs, which might also exclude certain people from the market.

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, such as in the concession model, 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 to reduce the effects of the initial uncertainty.[34]

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) who 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 Proposition 1B funds) will total $276 million for both phases of CARB regulation implementation. On a per dray basis, this amounts to an increase of 3.8% to 30% 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% to 2% to the cost of the program. Rather than financing these costs on a per dray basis, they can be

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[34] This is an important lesson from the experience of the ports in Southern California. It is reasonably clear that uncertainty over the timing and the ultimate form of the Los Angeles and Long Beach CTPs has slowed action on the part of some industry participants.

implemented with a fixed fee plus an 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 as well as 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 21%. Thus, the employee model will increase costs to the system (or drayage rates) an estimated 21% over the concession model. It is important to note that these cost estimates are based on the status quo, which is a nonunion employee model. A union employee model may increase costs substantially, with increased rates, higher 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, with LMCs expending resources to monitor drivers more closely and taking some financial responsibility for truck maintenance.

H. 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 existing state of the drayage system has difficulty measuring up to any of the three alternatives discussed above. In particular, the current system is unlikely to be sustainable over the long term, as emissions requirements increase, without heavy subsidization. For the Port, keeping the system as it is would likely be the most costly choice.

So we look to the alternatives. In this section, we have considered three alternative policies or models: 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 (Table IV-1), 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.

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

A relatively clear and consistent pattern emerges: 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.

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. The employee model receives a high ranking for accountability because the relationship between actors (drivers) and agents (LMCs) is closer under this model, with each more likely to act in the best interest of the other. The model receives a high ranking for efficiency because the LMCs own the capital and want to maximize its return. And finally, the employee model dominates with respect to sustainability because the 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. However, there will be an ongoing need for subsidization from the Port as emissions standards become increasingly stringent. With regard to cost, the high 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 to make them run.[35] Survey data indicate that these savings may be substantial, though they likely do not exceed the increased costs of employing drivers. Important to note is that from the Port's perspective, the concession model is likely to be the high cost model as it will require the ongoing need for subsidization of the purchase of new trucks.

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

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).[36] However, given the intertwining of a variety of interests in the supply chain, 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, is not clear.

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:

1. Accountability on the part of LMCs – the ability to confirm truck maintenance and safety.
2. Barriers to entry – reductions in the number of LMCs 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 (and trucks) at the Port and the LMCs they are linked to.
4. Outreach and marketing – disseminating information on the CTMP in advance to LMCs and drivers. Planning for phase-in implementation and developing outreach centers

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[36] 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.

with some staffing and tech support to deal with implementation problems (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, an 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.

An important caveat to this recommendation stems from the experience with the employment requirement at the Port of Los Angeles. This aspect of POLA’s implementation of a CTP is a lightning rod for the plan’s opponents. It is not the sole target of lawsuits, but is certainly front and center in the litigants minds. These lawsuits have been disruptive to the implementation of the plan and are likely to continue to be disruptive for some time. This is particularly true if a preliminary injunction barring the plan from going forward is issued, but will be true regardless. The uncertainty facing industry participants reduces the likelihood that investments employees and capital that will facilitate the success will be made in a timely manner. Should the Port of Oakland choose to go this route, it will likely face the same uncertainty.

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 the owner 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. Container fees always have this potential, but the distortion is particularly acute when applied to drayage activities.[37] 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 would 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.

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[37] Container fees, when applied by a single port, have the potential to divert traffic to other ports. This diversion is a result of the now higher costs of accessing the port with the fee in place. It is possible, however, that using revenues from a container fee to subsidize pollution mitigation could be less disruptive to port activity than other market oriented or regulatory mechanisms. As discussed at the end of Section III and elsewhere in this report, disruptions to port activity, should they be large enough, could lead to more diversion than might a small container fee.

Additional recommendations come from the experiences of the ports in Southern California. 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, there are fewer small LMCs serving Oakland, and there is a higher proportion of LMCs that are already familiar with managing the employment relationship. 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 (Mongelluzzo, 2009).

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 that will be necessary subsequent to TWIC regulations, CARB requirements, and a potential employee driver requirement, there are several limitations to this study.

The main limitation is that the report does not serve as a cost-benefit 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 benefits are either greater than or less than the costs outlined in our report.

The limitations of the various survey instruments are outlined in appendix 6. In addition, it is important to note 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 IOO 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 Los Angeles 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 subsequent to the fee implementation. In the absence of this data, 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.

It is also the case that this study and accompanying surveys were carried out in a very politically and emotionally charged atmosphere. It is quite likely that this atmosphere affected both response rates to our surveys and the responses that were given. We have no way of knowing the magnitude or the nature of the bias that the present atmosphere may have generated nor how it has affected our results and conclusions.

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 and Analytical Area

In this chapter we present 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 the Current Population Survey,
- Trade flow data provided by the Port and through the WISER trade data portal,
- Analysis performed using the IMPLAN model for economic impact analysis.

The survey instruments used to carry out this study are included as Appendices 6-13. 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 (BCOs)
- Ocean Carriers
- Marine Terminal Operators (MTOs)
- Licensed Motor Carriers (LMCs)

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	238	9/23/08	10/16/08
Drivers: Supplement	73	1/1/09	1/31/09
LMCs	54	10/8/08	2/10/09
Supply Chain			
BCO	23	11/3/08	3/20/09
Carriers	7	11/3/08	3/24/09
MTO	10	11/3/08	12/18/08
LMC	24	11/3/08	12/17/08

A second, supplemental survey of drivers 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 Methodical 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 Rail Yard (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 and from the Railport without marine terminal interaction. This task includes the following subtasks:

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 largely 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. This Task presents insight into elements (2) and (3), while the first element is addressed in Task 3, Section VI.C of the report.

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

TABLE VI-2: SUPPLY OF TRUCK DRIVERS AND LMCS BY GEOGRAPHIC LOCATION

	Number	Percentage
Drivers		
Port Local Impact Area	332	16.7
Port Local Business Area	368	18.5
California	1,117	56.2
Outside California	172	8.6
Total	1,989	100.0
LMC		
Port Local Impact Area	58	48.1
Port Local Business Area	11	9.3
California	48	38.9
Outside California	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 four geographic areas 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% had headquarters located further from the Port.

We find that there are approximately 1,989 drivers presently serving the Port. Our estimates suggest that just 121 motor carriers direct these drivers. The vast majority of these drivers reside in California (91.4%) and work for motor carriers that are also primarily in California

(96.3%). 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% of all drivers living in the Local Impact Area (LIA), 81% live in the City of Oakland. Of the LMCs surveyed, almost half have dispatch operations in the local impact area. We also found little evidence of LMCs located outside of California.

The vast majority of drivers reside in California, with only 5.8% of IOOs living outside of California, in states such as Colorado, Georgia, Nevada, Tennessee, and Texas. A much smaller percentage of LMCs are located outside of California. Only two LMCs in our sample hail from 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	IOOs	Employees
Mean number of round trips*	2.3	2.5	2.0
Median number of round trips	2.0	2.0	2.0
Max	15 (8 is next highest)	15 (8 is next highest)	7
# of respondents	170	107	63

Source: Calculations by Beacon Economics.

Note: The number of respondents listed above (170) is less than the number of drivers surveyed (238) because some did not provide a meaningful answer to this question.

*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

These responses were then combined with counts of containers moving through each of the eight 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 round trip for a driver.[38] However, the container counts do not account for each and every part of a round trip. The 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 without an attached trailer or chassis.

[38] 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.

Although 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 round trips from the container data was found to be 4,602, which when divided by 2.3 (the number of round trips 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, 8,284 TEUs moved through the Port on a given day. Multiplying by a factor of 1.8, this implies that an average 4,602 containers move through the Port daily, implying slightly fewer than 1,989 drivers serving the Port.

b) Relative numbers of employee drivers and IOOs

Discerning how many drivers are IOOs and how many are employees was accomplished by solving the following equations:

- $X + Y = 1$
- $2.5X + 2.0Y = 4,602$

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 less 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 estimated 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, from 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 rates charged by LMCs using IOOs, showing the costs for both short-haul and long-haul moves.

c. Comparison of the average number of daily trips into marine terminals at the Port for employee drivers of LMCs versus 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 and at 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 versus LMCs using IOOs.

g. Identification of the factors likely to affect the employee totals of the LMCs using employee drivers, including current cost parameter models and estimated changes due to a potential mandated inclusion of owner-operators into these models. Where and how LMCs recruit new IOOs or employee drivers are 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 nondrayage hauling, including domestic movements to or from the Union Pacific intermodal yard adjacent to the Port. Further information about whether these enterprises use IOOs or employee drivers, or 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 8). In all, 54 LMCs were surveyed and asked the number of drays their drivers 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% 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 (48.8%), and LMCS that employ IOOs and employee drivers (46.3%). Only 4.9% of drayage is done by LMCs exclusively using employee drivers.

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 (63.0%) also provide nondrayage-related services.

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

LMC Size (number of drivers)	Only Employee Drivers	Only IOOs	Both IOOs and Employees	All LMCs
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
All LMCs	4.9	48.8	46.3	100.0
LMCs Surveyed (#)	13.0	23.0	18.0	54.0
Est. Size of Fleet (#)	29.0	52.0	40.0	121.0

Source: Calculations by Beacon Economics.

The cells in 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 RATES CHARGED BY LMCS USING IOOS, SHOWING THE COSTS 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 8):

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

A. A rail yard 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 numbers in parentheses to the right of each distance indicate the number of motor carriers providing rate information for each question. Not all LMCs provided rates for each distance.

Table VI-5 presents 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. While the first table provides an indication of the dispersion in rates across LMCs, the second provides a better indication of the rates that are paid, on average. So, although rates for a Shuttle haul average $105 across the LMCs surveyed, the second table indicates clearly that the lower cost providers of shuttle services are used with greater frequency. Table VI-6, therefore, provides a better indication of the rates paid by users of the Port.

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

	LMCs Using			
	Only Employee Drivers	Only IOO Drivers	Both Employees and IOOs	All LMCs
Shuttle	125	87	122	105
Short	343	272	346	324
Regional	518	521	712	625
Long	750	891	773	824
Mean of all hauls	434	443	488	469

Source: Calculations by Beacon Economics.

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

	LMCs Using			
	Only Employee Drivers	Only IOO Drivers	Both Employees and IOOs	All LMCs
Shuttle	NA	67	88	86
Short	331	289	329	315
Regional	635	444	699	583
Long	750	908	908	875
Mean of all hauls	572	427	506	465

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 VERSUS 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 by employee drivers and IOO drivers. On average, IOOs report completing more turns in a given day than do employee drivers.[39] 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 be explained by the longer workdays of IOO drivers relative to employee drivers,[40] the 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
Shuttle	2.9	4.1	3.5
Local	2.6	3.5	3.2
Short	2.5	3.3	2.9
Regional	2.3	2.4	2.4
Long	1.6	1.6	1.7
All haul types*	2.0	2.5	2.3

Source: Calculations by Beacon Economics.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

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[39] This difference on all hauls (0.3, or 2.4 – 2.1) is statistically different from zero. However, the differences in means for individual haul categories are not.

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

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**?*

The type of haul – shuttle, short, regional, or long – is determined by the 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 for 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
Shuttle	8.0	8.8	8.4
Local	6.2	5.5	5.7
Short	4.7	4.8	4.8
Regional	2.8	2.7	2.7
Long	1.5	1.6	1.5
All haul types	3.1	3.4	3.3

Source: Calculations by Beacon Economics.
Note: None of the differences are statistically different for IOOs and employees.

This table indicates that a driver who performs only shuttle hauls throughout the day would perform 8.0 shuttle hauls if an employee driver and 8.8 if an IOO driver. In all categories other than "regional", and its subcategory of "local", 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 (compared to 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 four geographic areas are exclusive in Table VI-9. Local business area includes LMCs that are not in the Port's local impact area, and California includes only LMCs that are not in either the Port's local impact area or local business area.

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

	Only Employee Drivers	Only IOOs	Both IOOs and Employees	All LMCs
Oakland	12.0	397.3	639.4	474.9
Local Impact Area (LIA)	30.0	0.0	45.0	37.5
Local Business Area (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
Total	52.1	294.7	314.0	271.6

Source: Calculations by Beacon Economics.

Note: LIA includes the cities of Oakland, Alameda, Emeryville, and San Leandro; LBA includes the rest of Alameda and Contra Costa counties. The "Outisde California" number is 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 AND AT 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 shows results for all respondents who answered all four questions (including the length of the pay period), while the bottom panel presents 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.[41]

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

	All Drivers	IOOs	Employee Drivers
Matched observations			
7. Gross earnings*	1,574	1,951	1,127
22. Net earnings*	981	1,106	870
23. Last pay period*	1,359	1,670	872
Number of observations	55	34	21
All observations			
7. Gross earnings*	1,636 (159)	1,862 (99)	1,265 (60)
22. Net earnings*	973 (100)	1,050 (70)	807 (29)
23. Last pay period*	1,355 (92)	1,663 (56)	885 (36)

Source: Calculations by Beacon Economics.
Note: Number of survey responses is in parentheses.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

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 trucks.
- Net earnings are also higher for independent owner-operators, indicating that IOOs likely responded with earnings net of expenses, but not of taxes.[42]
- For both Employees and IOOs, their pay in the last period (October 2008) was substantially less than what they reported as their usual gross earnings, likely reflecting the declining economic environment.

[41] For instance, note the difference between answers to questions 22 and 23 for employee drivers. The discrepancy might suggest that drivers are responding with gross earnings to question 23, while the matched column suggests that drivers are responding to both questions by quoting net earnings.

[42] That IOOs are reporting their earnings net of expenses, but inclusive of taxes is helpful in making the comparisons below.

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 parentheses just to the right of the mean values.

TABLE VI-11: MEAN WEEKLY INCOME RESPONSES FROM 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)

Source: Calculations by Beacon Economics.
Note: Number of survey responses is in parentheses.

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: SURVEY RESULTS ON HOURS WORKED BY DRAYAGE DRIVERS

	Driver Survey Results			LMC Survey Results: Weekly Hours			
	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.
Note: Number of survey responses is in parentheses.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

The driver survey suggests that employee drivers work more hours per day (11.6) and more hours per week than IOOs (11.1 hours per day). This is consistent with the LMC survey, with the exception of LMCs that only dispatch IOOs. Employee-only LMCs work slightly fewer 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.[43] 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.

These results are also in conflict with the observation in the previous section that IOOs perform more trips per day. This conflict is explained by some combination fo the following: (1) IOOs spend more of the hours worked per day moving cargo, (2) IOOs are more likely than employees to over-report the number of turns made in a day, or (3) IOOs are more likely than employees to work over the legal limit, but they are unwilling to report it in response to a

[43] By federal law, drivers are allowed to work a maximum of 60 hours in any 7-day period.

survey. We do not have sufficient information to indentify with certainty the source of the discrepancy.

Annual cost information regarding expenses was collected on both surveys. Several patterns emerge from the cost data presented in Table VI-13. 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 were combined in the LMC survey. Although LMCs tend to use newer trucks (see Table VI-50), it is unlikely that these costs would be twice as high for an IOO as an LMC.

TABLE VI-13: AVERAGE ANNUAL COST ESTIMATES FOR IOOS AND LMCS ($)

	Driver Survey	LMC Survey			
	IOOs	Both Employees and IOOs	Only Employees	LMCs using In-House 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
Subtotal	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

Source: Calculations by Beacon Economics.

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

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 amount 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 amounts reported by LMCs with employee drivers only and is between the values reported for LMCs with maintenance performed in-house versus those who contract it out.

Insurance for an IOO tends to cost roughly $800 more per year on average than for an LMC. 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 whom they have close relationships. This may well be biasing the LMCs’ 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 than do LMCs with only employee drivers. As there were only 13 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 average.[44]

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($)	1,265	1,050	669	804
Hourly wages ($)	21.22	20.84	12.01	14.43
Annual wages ($)	59,638	57,966	33,353	40,024

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

Three separate estimates are provided for IOOs. The first, column (1), is presented as the preferred estimate. The evidence presented above suggests that the responses to the net earnings question are the most reliable.[45] The gross earnings data presented in this column are calculated from the net earnings responses, with weekly expenses added in, indicating gross

[44] See Table VI-50 for age distributions of trucks by driver type.

[45] Recall that this net earnings question includes taxes. It is net in the sense that it excludes expenses associated with driving the truck.

earnings for IOOs of $2,182 per week, a figure that is very consistent with results from the LMC survey, 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 it is consistent across surveys and that 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.[46]

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 results stem from survey responses by LMCs who use only employee drivers, LMCs who use only IOOs, LMCs who use a mix of employees and IOOs, and all LMCs. For comparison purposes, we include responses 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.

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

[46] The lower figures, presented in columns (2) and (3), are consistent with the findings of another survey (EBASE, 2007).

from net earnings and total expenses, 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. Figures in the driver survey include IOO weekly expenses associated with running and maintaining their trucks.

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

	LMCs Using			
	Only Employees	Only IOOs	Both (Employees)	Both (IOOs)
Average weekly hours	54 (13)	47 (19)	56 (18)	53 (18)
Weekly earnings ($)	922 (13)	1,911 (18)	1,135 (16)	2,394 (17)
Weekly expenses ($)	957 (10)	-	1,207 (15)	-
Annual truck insurance costs ($)	3,835 (8)		4,167 (14)	
Annual maintenance/repair costs ($)	3,462 (10)		5,379 (13)	
Weekly fuel expenses ($)	-	-		
Number of drivers	13 (13)	29 (23)	17 (18)	31 (18)

	All LMCs		Driver Survey	
	Employees	IOOs	Employees	IOOs
Average weekly hours	55 (34)	50 (39)	60 (76)	56 (139)
Weekly earnings ($)	1,056 (32)	2,131 (37)	1,265 (60)	2,182 (38)
Weekly expenses ($)	1,122 (27)	-		1,132 (38)
Annual truck insurance costs ($)	4,080 (32)			6,964 (132)
Annual maintenance/repair costs ($)	4,571 (31)			12,094 (91)
Weekly fuel expenses ($)			686 (8)	824 (122)
Number of drivers	9 (54)	23 (54)	80	154

Source: Calculations by Beacon Economics.

Note: *Weekly expenses* include wage and benefits for LMCs with only employees, and include truck-related costs for IOOs.

Note: Number of survey responses is in parentheses.

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 results 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 independently owned trucks. Although some IOOs are able to obtain insurance through their LMC, this is clearly not the case for many. Maintenance costs appear to be 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 three years older than those driven by employees.

The first six 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, 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.[47] 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) A breakdown 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 one-third of IOOs have health insurance, and the majority of them purchase this insurance on their own.

Table VI-16: Earning and Benefit Comparisons between IOOs and Employee Drivers

	Employee	IOO
Weekly gross income	1,265.0	
Weekly expenses		1,132.0
Calculated weekly gross income		2,182.0
Reported net earnings		1,050.0
Tax adjustment		75.0
Net of expenses	1,265.0	1,050.0
Average weekly hours	59.6	53.7
Net hourly wages	21.2	20.8

Source: Calculations by Beacon Economics.

[47] Drivers were asked their gross earnings but responses were not consistent with the data collected through the LMC survey.

TABLE VI-17: PERCENTAGE OF DRIVERS RECEIVING BENEFITS

	Employees	IOOs
Paid vacation from LMC	98.9	0.0
Health insurance from LMC	96.3	0.0
Percentage of drivers who have health insurance	69.0	33.3
Broken down by source:		
Firm	56.3	1.1
Self-purchase	3.6	20.0
Spouse	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 that they offer their employee drivers health insurance, but only 69% of drivers report having health insurance, and only 56.3% report receiving coverage from their employer. While we can't know the cause of this disparity, employees might decline coverage if they are covered by a spouse's insurance.

This explanation still leaves an unexplained gap of 27%. An explanation probably lies in the fact that the results are from two different surveys. The numbers presented for LMCs are from the LMC survey and the numbers for the drivers are from the driver survey. The LMC results may well be biased towards those LMCs who are providing insurance, though there is nothing inherent in our survey methodology that would produce this bias. It may also be the case that of the employee drivers surveyed, they work disproportionately for firms that do not offer health insurance. It is possible that surveying only in the morning produces such a bias, though we have nothing that indicates this to be the case. Further, it is possible that some LMCs provide access to an insurance plan rather than insurance. If many drivers opt not to participate, at their own expense, and LMCs offering access rather than insurance indicated that they provide insurance, this would also contribute to the observed gap.

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, 23 respondents (42.6%) report exclusive use of IOOs, and 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 combined, in addition to showing the distribution of revenue for firms who use only employee drivers, firms who use only owner-operators, and firms who use a combination of both. 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.

TABLE VI-18: CLASS OF CARRIER (%)

	Only Employee Drivers	Only IOOs	Both IOOs and Employees	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.

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 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.

TABLE VI-19: AVERAGE WEEKLY HAULS BY DISTANCE

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

Source: Calculations by Beacon Economics.

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.

There is little evidence of specialization by length of haul. Although no firm offers only one kind of service, many tend to provide services for either longer or shorter distances. For example, those firms providing shuttle haul services and providing many short 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 included in Table VI-19, excluding the "Local" category. 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: MILES AND HOURS BY LENGTH OF HAUL

Type of Haul	Mean Miles Per Haul	Mean Hours Per Haul	Miles Per Hour at the Mean
Shuttle	10.9	1.6	6.8
Local	31.6	2.0	15.8
Short	65.7	3.2	20.5
Regional	179.8	5.5	32.7
Long	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, which is 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. First, weekly drays by length of haul and the average hours by type of dray are used to estimate weekly hours by length of haul. Next, the hourly cost of operations is multiplied by hours per week and weeks per year to generate the annual cost.

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

Total Weekly Hours	Shuttle Haul Service Provided	Short Haul Service Provided	Regional Haul Service Provided	Long Haul Service Provided
Shuttle haul	232	71	86	41
Short haul	616	483	502	615
Regional haul	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 Haul 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. (This estimate may be high; 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. Due to the differing lengths of hauls, the cost per hour calculation varies by type of haul, as presented in Table VI-24. 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. The cost per driver dispatched is presented in Table VI-26.

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.

Table VI-24: Hourly Costs by Length of Haul

Length of Haul	Cost per Hour
Shuttle	59.36
Short	68.12
Regional	75.26
Long	76.61

Source: Calculations by Beacon Economics.

Table VI-25: Annual and Daily Cost Figures under Employee Driver Operations

Total Weekly Hours	Shuttle Haul Service Provided	Short Haul Service Provided	Regional Haul Service Provided	Long Haul Service Provided
Shuttle haul	232	71	86	41
Short haul	616	483	502	615
Regional haul	279	256	354	470
Long haul	212	83	137	255
TOTAL	1,339	893	1,079	1,381
Annual cost ($)	4,834,148	3,264,211	3,974,606	5,160,572
Daily cost ($)	18,593	12,555	15,287	19,848

Source: Calculations by Beacon Economics.

Table VI-26: Annual Cost per Driver, LMCs with Employees Only

	Shuttle Haul Service Provided	Short Haul Service Provided	Regional Haul Service Provided	Long Haul Service Provided
Annual cost per driver ($)	134,282	108,807	116,900	132,322

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. Thus, 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 Employee Drivers

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 employee-driver cost models to estimate the operating costs for firms using a mix of drivers. The estimated overhead is 21.6%.

These results are presented in Table VI-27.

TABLE VI-27: COMPARISON OF COSTS

	Shuttle Haul Service Provided	Short Haul Service Provided	Regional Haul Service Provided	Long Haul Service Provided
Annual cost ($)	4,409,367	2,967,121	3,604,291	4,660,517
Daily cost ($)	16,959	11,412	13,863	17,925
Number of drivers dispatched	36	30	34	39
Annual cost per driver ($)	122,482	98,904	106,009	119,500

Source: Calculations by Beacon Economics.

g) THE IMPACT OF AN EMPLOYEE DRIVER REQUIREMENT ON LMCS USING IOO DRIVERS, INCLUDING CURRENT COST PARAMETER MODELS, ESTIMATED CHANGES, AND RECUIRTMENT

Employee Driver Requirement

The cost-based estimation finds significantly higher costs for LMCs using only employee drivers compared to those using only IOOs, holding level of service constant. A comparison of Tables VI-22 and VI-26 shows that the difference in costs per driver ranges from 28% for shuttle hauls to 32% for long hauls. Those firms using a mix of IOOs and employees have costs on average 8% to 10% lower than those using only employees.

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

- An increase in rates on the order of the cost differences outlined above (28% to 32%).
    - Note that this increase applies only to the two-thirds of the market that is currently served by IOOs. The overall increase in rates would therefore be on the order of 19 to 21%.
- 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 in Appendix 6.5) to develop a list of all LMCs located in Northern California and Western Nevada that offered intermodal services. Over 320 firms registered with the Federal Motor Carrier Safety Administration from 2004 to 2008, but over half of these have numbers that are no longer in service.[48]

Among the LMCs surveyed, the average number of years 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 Number of Years	Median Number of Years
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
All Carriers	21.8	16.5

Source: Calculations by Beacon Economics.

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

	Mean Number of Years	Median Number of Years
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.

[48] These missing firms might have registered with FMCSA and been denied a license; they might have decided not to enter the market; or they might have left the market. We are unable to distinguish the reasons for their absence.

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	Only Employee Drivers	Only IOOs	Mix of Driver Types
Driver referral	75.9	69.2	69.6	88.9
LMC referral	20.4	15.4	13.0	33.3
Newspaper ads	31.5	61.5	17.4	27.8
Local driver training centers	9.3	23.1	0.0	11.1
Ads to other workers	1.9	7.7	0.0	0.0
Sample size	54	13	23	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 (Table VI-30). 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 a contact list is provided of trucking enterprises with more than five drivers that perform (i) only drayage at the Port and (i) Port drayage and domestic nondrayage 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 1 for Contact List with over five drivers and for additional information as to whether these firms employ IOOs or employee drivers, or both. This list is derived from the sample of LMCs that participated in the survey.

i) *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 about one and a half 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*
Employees	5.5
IOOs	7.1
All Drivers	6.5

Source: Calculations by Beacon Economics.

*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

j) A breakdown of where truck drivers (both IOOs and employees) park, in and around the Port area

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

Table VI-32: Location of Parking for LMCs who Provide Parking for their Drivers (%)

	LMC Survey			
	Only Employees	Only IOOs	Both IOOs and Employees	All LMCs
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 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 1.2.

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

Task 3 involves four principal subtasks:

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.

d) Assess the economic impact of restructuring the Port's trucking services around LMCs with employee drivers within the Port Local Impact Area (LIA).

1. *RESULTS*

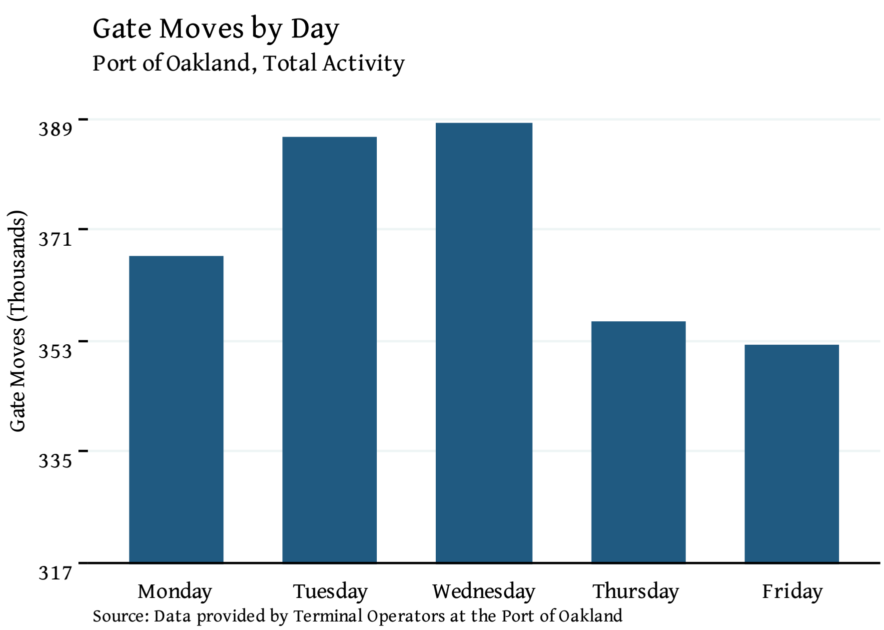
a) PRESENTATION OF CURRENT DRIVER DEMAND PATTERNS BY DAY OF THE WEEK AND BY MONTH

Figures VI-1 and VI-2 illustrate the variability of container flows through the Port of Oakland on a daily and monthly basis, respectively. These figures 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. Daily variability reflects only the data collected from the six terminals on a daily basis. The daily counts are therefore an understatement of the daily totals. Because 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

Figures VI-1 through VI-4 present daily counts of the total number of gate moves at the six terminals that report daily gate moves. The data run from October 1, 2007, to September 30, 2008.

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

Figure VI-2 illustrates the high midweek flow of loaded containers. Figure VI-3 indicates the daily distribution of moves for empty container and Figure VI-4 provides the distribution for bare chassis movements. Empty containers move through the Port predominantly in the early days of the week, but are less variable on a daily basis than are loaded containers. Bare chassis movements grow throughout the week, ending strong on Fridays.

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

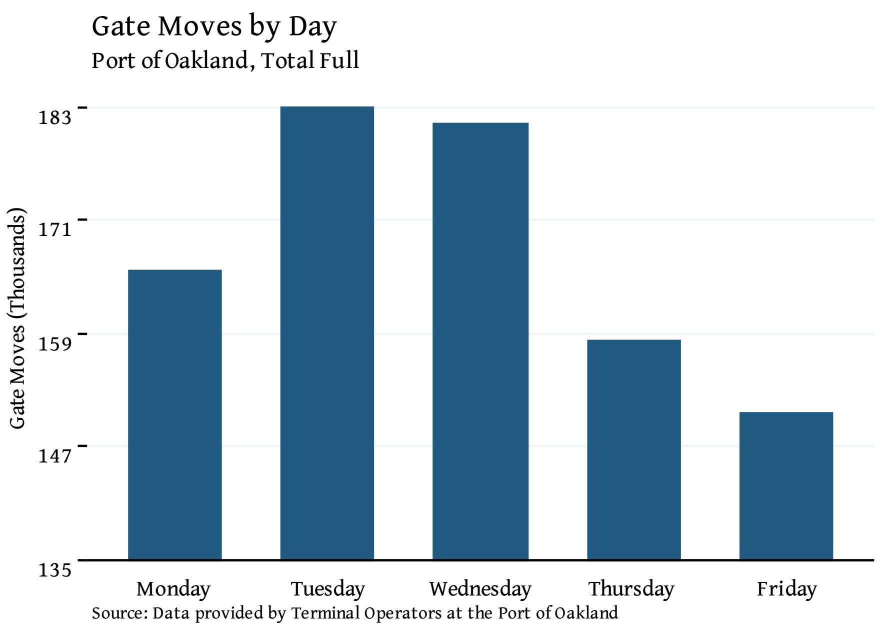


FIGURE VI-3: TOTAL ANNUAL GATE MOVES OF EMPTY CONTAINERS, BY DAY

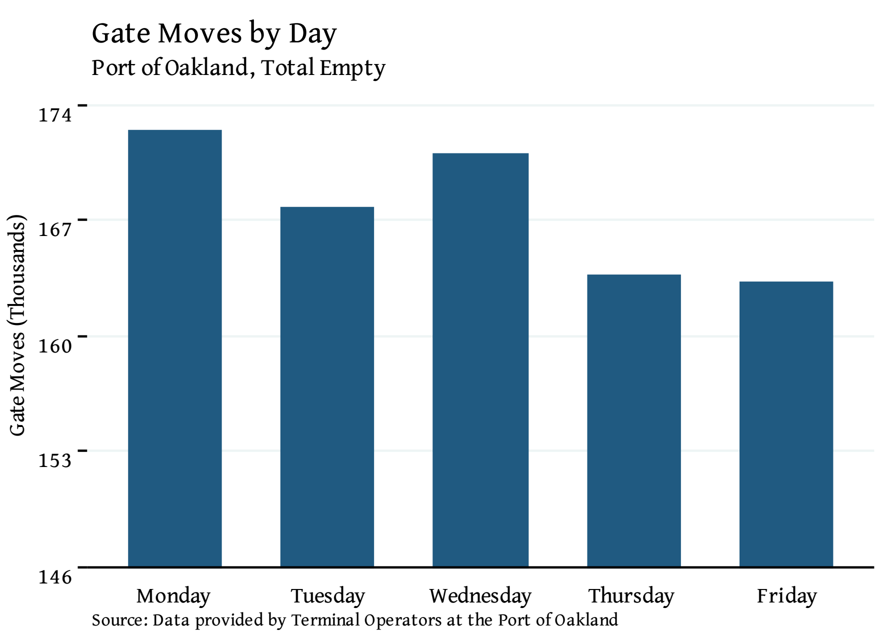
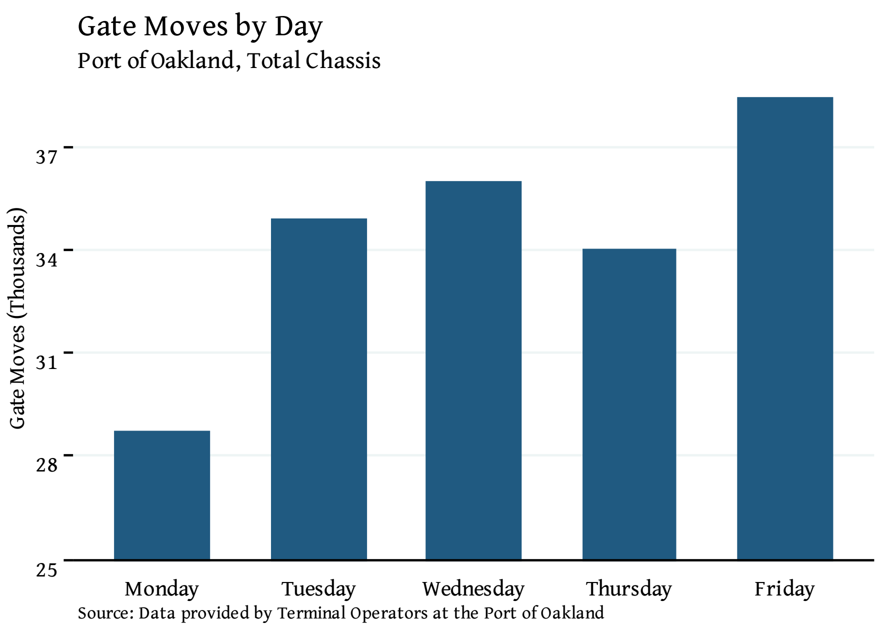


FIGURE VI-4: TOTAL ANNUAL GATE MOVES OF BARE CHASSIS, BY DAY



Weekly Counts

Figures 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

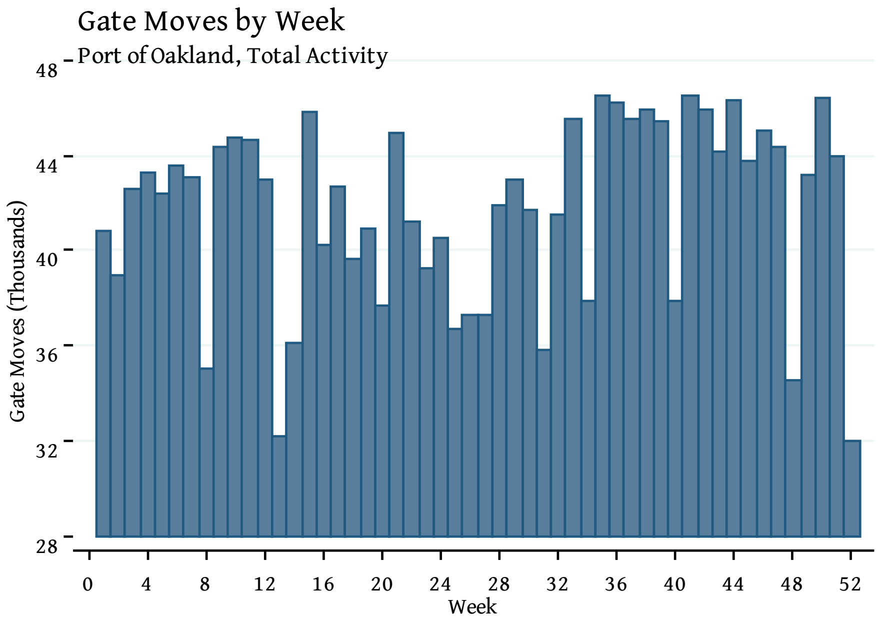


Figure VI-6: Total Gate Moves of Full Containers by Week

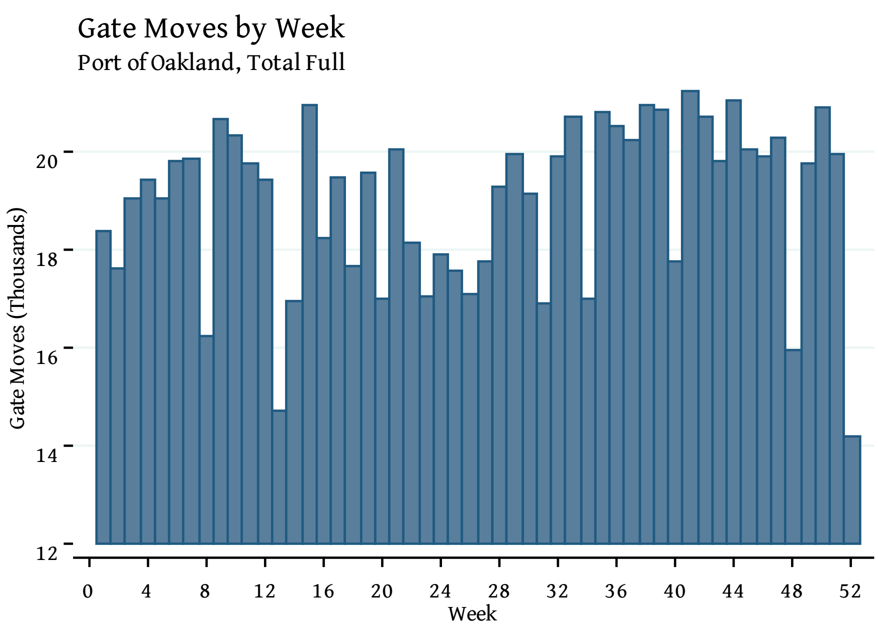


Figure VI-7: Total Gate Moves of Empty Containers by Week

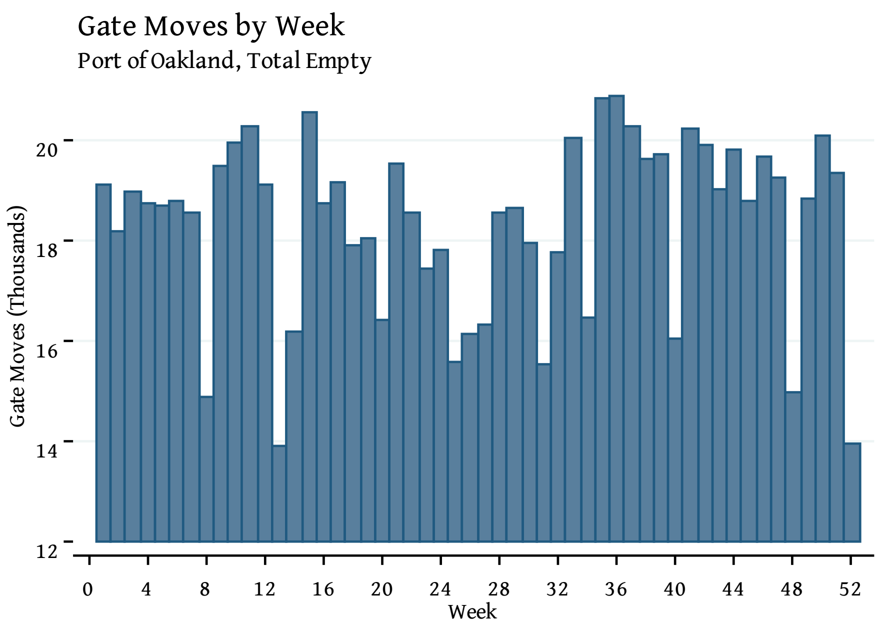
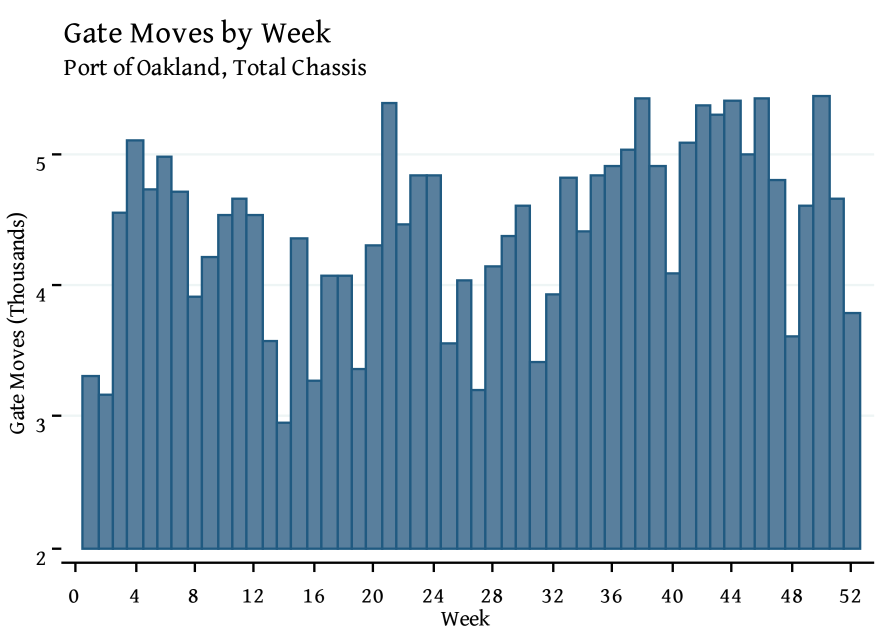


Figure VI-8: Total Gate Moves of Chassis by Week



Monthly Counts

Figures VI-9 through VI-12 present monthly counts of the total number of gate moves at all eight terminals. 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-9: TOTAL GATE MOVES BY MONTH

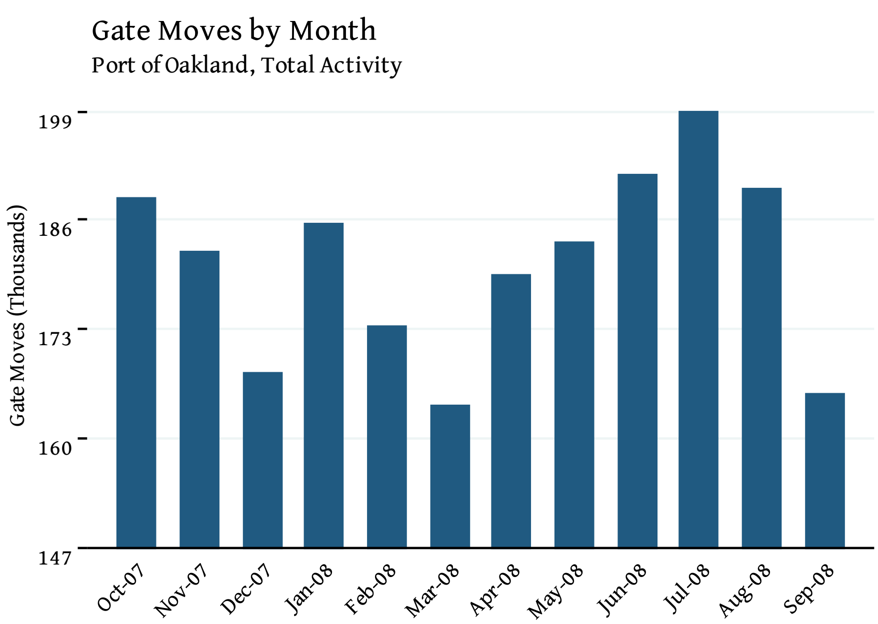


FIGURE VI-10: TOTAL GATE MOVES OF FULL CONTAINERS BY MONTH

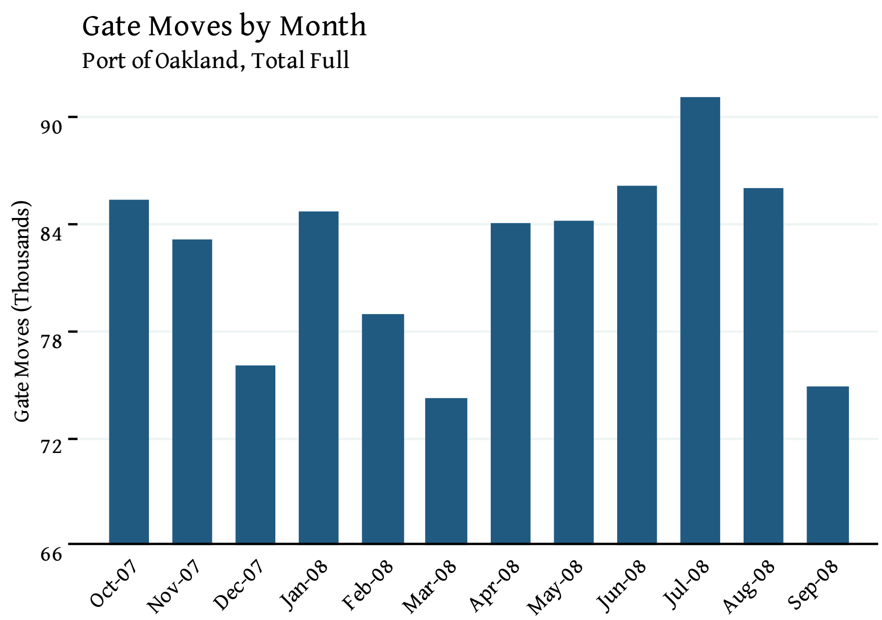


FIGURE VI-11: TOTAL GATE MOVES OF EMPTY CONTAINERS BY MONTH

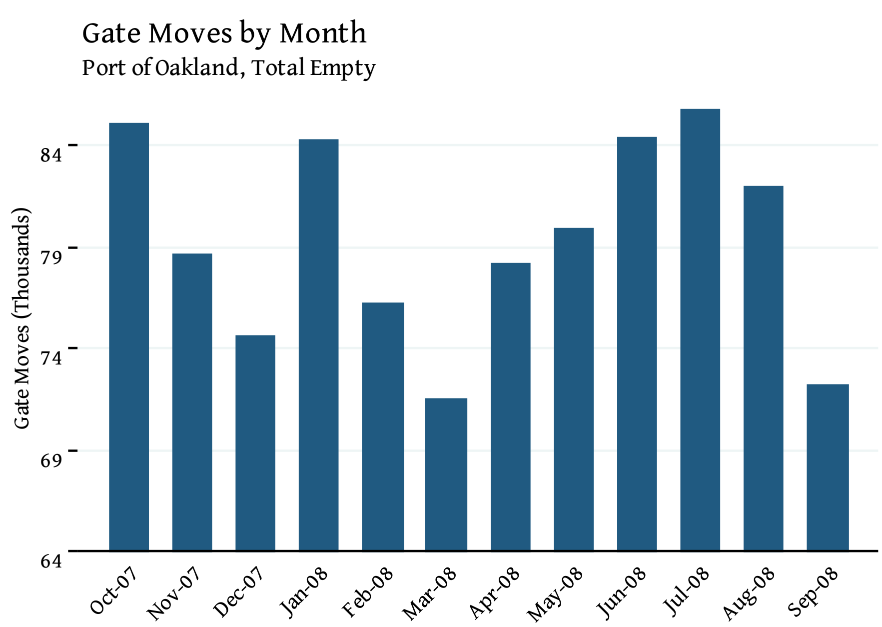
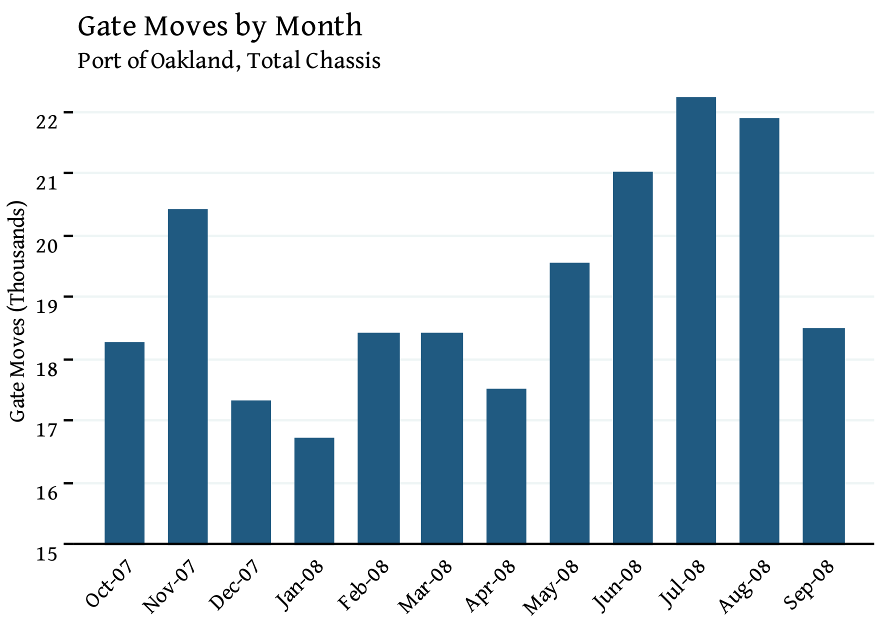


FIGURE VI-12: TOTAL GATE MOVES OF BARE CHASSIS BY MONTH



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, how driver supply affects actual and projected growth comes down to four issues. First, we must assess the importance of drayage, particularly container moves, as a cost item. Second, the employee driver requirement may cause IOO drivers to leave the market in large numbers. Third, growth in the drayage sector will depend on the potential for driver replacement and an increased supply of drivers from the local market. Finally, eliminating existing inefficiencies could alleviate the need for additional drivers to meet future demand.

Contribution of Labor Costs to Total Shipping Charges

How important is 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 (78.1%) fall within 100 miles, in the shuttle and short-haul categories. Of these, most are short haul, with shuttle trips making up just 20.3% of all drays. Only 16.8% of the drays are regional, between 100 and 250 miles from the Port, while 5.1% are long hauls, more than 250 miles away.

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 third column of the table, we see that the average charge for 78.1% of the drays is $255 and that the average charge for all container moves is $464.[49]

[49] This is a weighted average over shuttle and short hauls.

Table VI-33: The Distribution of Drayage Lengths and Rates from the Port of Oakland

	Share of All Drays		
Type of Haul	Percentage	Cummulative	Average Rates ($)
Shuttle	20.3	20.3	86.1
Short	57.8	78.1	315.3
Regional	16.8	94.9	582.8
Long	5.1	100.0	874.8
All distances	100.0		464.8

Source: Calculations by Beacon Economics.

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 would likely cause one or both of the following responses among importers and exporters alike:

- Reduce the amount shipped
    - Higher transport costs either raise the price at which exporters and importers must sell the goods in the foreign market or the total costs of exporting and 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. However, a small increase in drayage rates is not likely to cause a commensurate reduction in imports and exports. Estimates indicate that the demand elasticity of traded goods with respect to transportation costs is very low (Hummels, 2001). On average, it would require at least a 5% change in transportation charges to lead to a 1% change in the volume of goods shipped.

Higher transportation costs may cause shippers to divert cargo to other ports. For the Ports of Los Angeles and Long Beach, research indicates that a fee of more than $100 would need to be imposed on container flows before there would be significant diversion of trade from these ports.[50] 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 for diversion from POLA/LB relative to the Port of Oakland. Second, the Southern California 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.

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 $2,050 for a 40-foot container and rail rates for an imported container assumed to be $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.[51] Because there is not a clear link with rail travel for all hauls, the rail component is assumed zero for hauls other than shuttle hauls.[52]

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[50] Diversion was found to occur at all levels, but was not significant with increases of less than $100.

[51] These shipping rates were determined through consultation with Port staff.

[52] This may understate the importance of rail, as some goods may come into the Port, be unloaded from the container, and then 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

						% Inc in overall costs		
						Inc Labor Costs 21%		Container Fee $70
	Drayage Charge ($)	Labor Cost in Drayage ($)	Ocean ($)	Rail ($)	Labor Share (%)	($)	(%)	(%)
Import								
Shuttle	81	36	2,050	1,650	1.0	8	0.2	1.9
Short	316	142	2,050	0	6.0	30	1.3	3.0
Regional	583	262	2,050	0	10.0	55	2.1	2.7
Long	875	394	2,050	0	13.5	83	2.8	2.4
Export								
Shuttle	81	36	500	1,250	2.0	8	0.4	3.8
Short	316	142	500	0	17.4	30	3.7	8.6
Regional	583	262	500	0	24.2	55	5.1	6.5
Long	875	394	500	0	28.6	83	6.0	5.1

Source: Calculations by Beacon Economics.

Note: 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.

We have found that, on average, labor costs account for roughly 45% of total drayage costs.[53] As the average drayage charge is $464, we estimate that labor costs are, on average, $209 per dray. For 80% 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 between 28 and 32%. 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.[54]

If labor costs were to increase by 21% to $253, on average, total shipping charges would see a corresponding increase of between $8 and $83, depending on the length of the dray. (We use a

[53] See the cost model presented in Task 2f in Section B.

[54] 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.

21% increase in labor costs rather than a 27% increase because as many as one-third of the drays already utilize employee drivers.) This increase in total shipping charges would lead to a 0.2% to 2.83% increase in total transportation costs for imports and up to 6.0% for exports. 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.

Rate changes will vary depending on the distance traveled, with long hauls experiencing greater increases. A 21% increase in labor costs for drayage would have a small effect on intermodal traffic, which is likely to be the most footloose of the shipments through the Port of Oakland. Because drayage rates increase relatively rapidly with distance, short-haul traffic and regional traffic are the least likely to be diverted from the Port. The effect on long-haul traffic is more troubling, as these hauls are the most likely candidates for diversion. Whether a shipper chooses to send cargo through another port depends largely on the relative distances to the Port of Oakland and the next best alternative. The farther BCOs are from the Port of Oakland, the weaker their preferences will be for the Port of Oakland over ports in Southern California, Oregon, or Washington.

For contrast, we can consider the effect of a $70 container fee.[55] The effects of a flat fee are not evenly distributed across drayage types. On the one hand, the percentage increase in drayage costs when a container fee is imposed on a shuttle haul is more than 9 times the impact of a 21% increase in labor costs. On the other hand, the percentage change in transportation costs associated with a long-haul dray is less with a flat 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 preferred means of change depends on a determination of where the burden of the cost should

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[55] A fee of $70 was chosen as that is the fee currently charged at the Southern California ports for a 40-foot container.

fall. For shuttle hauls, the fee poses a disproportionate burden. With an employee driver requirement, the burden is more closely related to the distance a container is moved and hence more economically efficient. A fee that is commensurate with the distance a container is to be moved would also be fair and efficient. Such a fee, however, could easily be evaded by transferring the load from one truck to another at a designated point close to the Port, a maneuver that would undercut the intent of the fee and have adverse effects on the local community.

Driver Exodus

An exodus of drivers from trucking will affect the ability of the drayage sector to accommodate the forecast growth in port volumes. An employee requirement could result in a significant number of drivers exiting the business. In the survey, drivers relate their possible responses to change and explain what might cause them to leave the market.

According to survey results, more than 60% of the IOO drivers surveyed indicate that they will no longer provide drayage services to the Port if an employee requirement is put in place. In particular, only 40% of the independent drivers surveyed say that they would be willing to sell their trucks and work as employees of an LMC. Through the supplemental driver survey, it has subsequently become apparent that the phrasing of the question, in particular, the phrase "sell your truck," may have biased respondents against agreeing to be an employee. These estimates, therefore, may overstate the loss of drivers in the event of an employee driver requirement. Nonetheless, an employee requirement has the potential to be an impediment to the Port reaching its forecast targets.

Similarly, the California Air Resources Board (CARB) requirements also have the potential to reduce the supply of drivers. Some of the existing drivers will elect to drive elsewhere or find alternative employment rather than retrofit or replace their trucks under the CARB requirements. There is, therefore, the potential for the Port to lose large numbers of drivers in the near future. But if these transitions are managed well and phased in over time, replacing these drivers need not be disruptive.

The Potential for Driver Replacement

The size of the pool of potential truck drivers (to be further addressed in Section C) will help determine whether driver supply can expand to meet demand without significantly affecting drayage rates, which might push cargo to other ports. In the near future, there appears to be a significant supply of drivers affiliated with the LMCs who 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 at-hand driver supply, as many IOOs will work with more than one LMC, but it indicates that when LMCs need additional drivers on a short-term basis, they do have access to significantly more drivers than currently serve the Port.

As discussed further in Section C, we find that there are in excess of 100,000 individuals living and working in the area with the necessary qualifications for driving at the Port.[56] The forecast demand requires the addition of up to 2,893 drivers in the next 20 years. This is a 145% increase, requiring that just 2.5% of the local driving population transfer to port drayage. Because 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 expand without a significant increase in driver compensation.

An employee driver requirement might add significantly to the need for new drivers in the drayage sector. According to the driver survey carried out for this project, approximately 60% of the owner-operators surveyed would not be willing to sell their trucks and work for licensed motor carriers as employees. The industry could thus face a shortage of nearly 800 drivers,

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[56] See the map in the next section for the relevant region. Drivers must possess at a minimum a commercial driver's license.

which would require that approximately 3% of the local driving population switch to providing drayage services.

It is important to note, however, that these increases need not occur immediately but can be phased in over the course of 20 years, requiring between 2.6% and 5% 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. 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 both combined. On average, drivers wait 1.5 hours between dispatches. This wait is somewhat longer for IOOs (1.7 hours) and less for employee drivers (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 owner-operators spend waiting for dispatch is the equivalent of about 25% of the time it takes to make a single dray.

For employees, the wait time is equivalent to just under 20%, which is still considerable.

This represents a significant inefficiency in the drayage market, such that if it were removed, 20% fewer IOO drivers and 12.5% fewer employee drivers would be needed.

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

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

Source: Calculations by Beacon Economics.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

TABLE VI-36: TIME DURATION OF AN AVERAGE DRAY

	Hours/ Trip	Trips/ Day	Hours/ Day
Employee Drivers	*6.9	*2.0	11.0
Shuttle and Short Hauls	5.1	2.6	10.1
Regional and Long Hauls	7.8	1.8	11.9
Independent Operators	*6.0	*2.5	11.2
Shuttle and Short Hauls	4.4	3.3	10.7
Regional and Long Hauls	7.3	1.8	11.3
All Drivers	6.4	2.3	11.1
Shuttle and Short Hauls	4.6	3.0	10.5
Regional and Long Hauls	7.6	1.8	11.5

Source: Calculations by Beacon Economics.
*Indicates results for IOOs and employee drivers are statistically different at the 10 percent level.

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

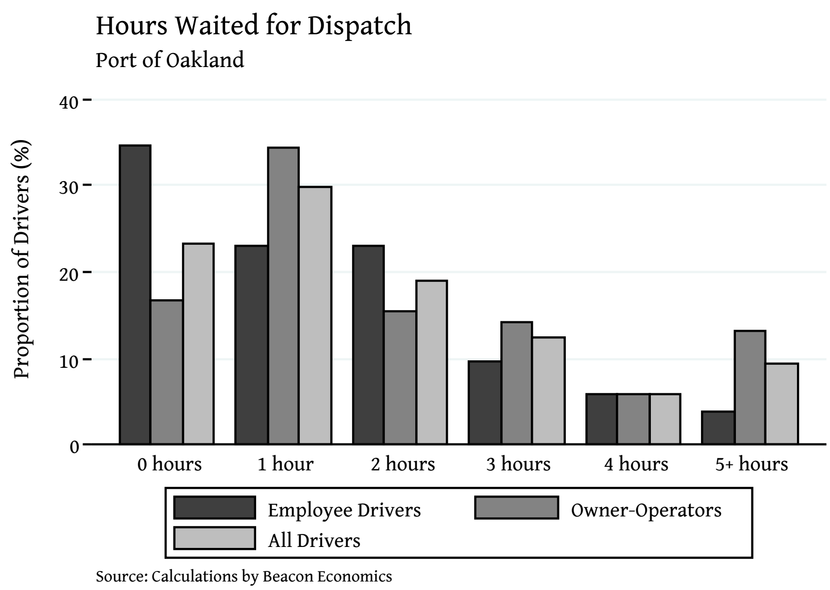
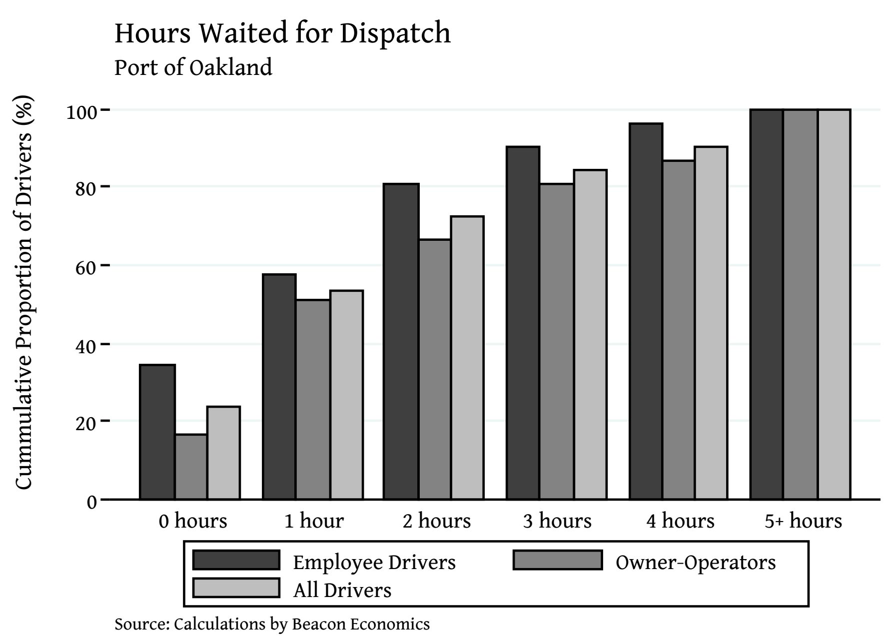


FIGURE VI-14: HOURS SPENT WAITING FOR DISPATCH, CUMULATIVE SHARE



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; on average, drivers wait 2 hours outside the gate and 1.6 hours once inside the gate to get out.[57] These results indicate a further inefficiency in the current drayage operations. If wait times were improved, it 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

[57] This is in stark 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. A further source of the difference is that surveying for this study took place only in the mornings. This was done out of safety concerns for those administering the surveys. The practical implication may be that because the drivers were all in the process of waiting in line for perhaps hours, this may have unduly influenced their answers to questions about wait time. This would likely lead to an overstatement of wait times outside the gate as well as inside – congestion inside the gate is likely to be relatively high first thing in the morning while the lines clear.

population growth. Over time, traffic is likely to hinder drayage sector efficiency, with increased congestion contributing to the need for more trucks to support the flow of container traffic through the Port. In the long-term, to meet its goals for growth, the Port and MTOs may have to consider more flexible gate hours, allowing drivers to avoid the heavy traffic periods, which would in turn enable the Port to utilize a smaller fleet of drivers and trucks.

Summary

Port volumes are forecast to increase to 5.4 million TEUs by 2030. Whether or not the drayage sector will be able to grow to meet the increase in demand is a concern. In the coming years, the drayage sector will be responding to policies that reduce the number of drivers in service at the same time as it endeavors to accommodate the forecast increase in container flows. Should the Port adopt an employee driver requirement, it is quite possible that up to 60% of IOO drivers would choose to leave the market. This represents 40% of all drivers currently involved in port drayage.[58]

The current supply of drivers is estimated at 1,989, with two-thirds of this number (1,308) being independent operators. These 1,989 drivers were involved in the movement of approximately 2.24 million TEUs in 2008.[59] Using these figures, we estimate that moving one million TEUs would require approximately 885 drivers. Therefore, growth to 5.4 million TEUs would require 4,882 drivers, more than doubling today's number. Should an employee requirement be instituted between now and 2030, there will be an additional 793 drivers needing to be

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[58] IOOs currently constitute 66 percent of the drayage drivers. Therefore, 60 percent of the IOOs (the proportion indicating that they would not remain as employees) represent 40 percent of the drivers involved in drayage.

[59] 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.

replaced.[60] Thus between 2,893 and 3,686 drivers must be attracted to port drayage in the next 22 years. This implies an average annual growth rate of up to 5.0% in each of the next 20 years.

It should be noted that this represents an upper bound on the need for drivers. This simple calculation assumes that the operation and facilities of the Port remain as they currently are. 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. Investments that improved 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 method for expanding the drayage fleet is to increase the compensation of drivers. Above, we calculated that a 21% increase in the compensation of drivers would lead to, on average, a 2.6% increase in the cost of the average dray (0.2% for shuttle hauls, 2.8% for long haul imports, and 6.0% for long haul exports). 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 diverting shipping containers to another port is very likely to exceed the 2.6% increase that may arise from a 21% 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

[60] 793 is the number of current drivers that we estimate would not continue to work at the Port under an employee driver requirement.

fact roughly 25% of a driver's time is spent waiting for dispatch. If this inefficiency were removed from the system, the range of required additions to driver supply would fall to between 1,336 and 2,129. This represents an increase in the number of drivers of between 70% and 107%, or an average annual growth of between 2.6% and 3.8% 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% per year to accommodate the increased flow of containers through the Port. Given the ample supply of drivers in the region, the need for drivers will not pose a significant challenge to the port drayage sector. This is especially true given that drayage costs could likely increase by as much as 21% 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% annually in the post-deregulation period. Therefore, the growth rates indicated by Port estimates are not out of line with expected overall growth in the supply of drivers. The required growth rates at the port of between 2.6 and 5.0% per year not terribly different from the average growth in trucking at the national level.

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

Truck drivers for port drayage at the Port of Oakland might be drawn from a large region. The number of truck drivers is estimated for the regional area defined in Figure VI-15.

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 2.1. The ACS data was restricted to nongovernment workers, ages 21-65. The minimum age for the cut-off was chosen based upon the required age for obtaining a commercial driver's license (CDL). OES data cannot 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	

Souce: 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 drivers: 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 and snack products to convenience stores and 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 force,[61] thus we assume that all IOOs in the ACS estimates are heavy or light truck drivers (a range of 7,517 to 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, using the ACS data, we estimate 60,027 to 65,214 heavy truck drivers.

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 60 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.

TABLE VI-38: DRIVER STATISTICS

	Employee Drivers		IOOs	
	Weekly hours	Weeks per year	Weekly hours	Weeks per year
Mean	45.7	47.2	49.5	45.9
25th percentile	40	48	40	43
Median	40	52	50	52
75th percentile	50	52	60	52

Souce: 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.

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

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

	Employees	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

Souce: 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			
Mean	19.1	12.8	14.8
25th percentile	15.4	7.9	11.0
Median	18.9	10.0	13.8
75th percentile	22.5	15.8	17.6
Annual			
Mean	39,759	26,596	30,704
25th percentile	32,104	16,492	22,875
Median	39,311	20,855	28,677
75th percentile	46,699	32,876	36,569

Souce: 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 earnings 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 to $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 (an occupational-information website sponsored by the Department of Labor – see Appendix 2.1)
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% to 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 2.1 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 for recruitment as they contain workers who would typically hold a specialized driver's 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 workers in these occupations diverge considerably, in part because the ACS sample is restricted to male workers. We chose this restriction as the truck driving occupation is male-dominated (approximately 3% of drayage drivers are female).[62] Group 2 is estimated to include 32,703 to 50,890 workers. The hourly and annual wages for these workers is presented in Table VI-41.

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

	OES	ACS
Employment	50,890	32,703
Hourly		
Mean	19.7	17.4
25th percentile	15.7	10.1
Median	19.3	14.4
75th percentile	23.2	20.8
Annual		
Mean	40,925	32,609
25th percentile	32,708	20,000
Median	40,119	29,400
75th percentile	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 of $32,609 to $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 (see Appendix 2.1). We use the CPS data from 2002-2006 to identify the occupations that workers left when entering trucking, as well as to identify the occupations that workers chose when

[62] Although the male-dominated nature of the industry could mean that recruiting women would be a good strategy. A female driver for Frito-Lay in Beloit Wisconsin was just awarded a ring for driving 2 million miles without an accident.

leaving 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	22.5	24.5	22.3	22.2	25.2	24.2
Leave	21.9	21.3	22.4	23.2	20.4	21.5
Stay	55.7	54.2	55.3	54.6	54.4	54.3

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	7.6	7.8
Professional/Specialist	1.4	1.0
Technical	2.0	2.0
Sales	9.6	11.0
Administrative support	9.8	9.7
Professional services	1.8	1.8
Service occupation	8.2	8.1
Farming	3.8	3.5
Precision production, and craft	11.0	14.1
Machine assembly and inspection	7.2	6.2
Transportation (other than truck driver)	7.7	6.0

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

The variety of occupations is notable, 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 2.2 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, or $47,868 per year. Among those who left trucking, their post-truck driving wages were $23.95 per hour, or $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.

d) Assess the economic impact of restructuring the Port's trucking services around LMCs with employees within the Port local impact area (LIA).

The economic impact of an employee driver requirement would resonate beyond the structure of Port drayage. In particular, driver compensation would increase for the pool of drivers in the Port's local impact area. The change in compensation would take place whether existing IOOs become employee drivers or whether 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 will no longer do so, but some drivers who did not serve the Port will. Thus it is assumed that the implications of the 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% 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 consequences 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 (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 assumes that compensation will increase by 15%, and the second assumes that compensation will increase by 20%. The underlying assumption is that total compensation will change by $5.9 million if there is a 15% increase in compensation and by $7.0 million if there is a 20% increase in compensation.

TABLE VI-46: SUMMARY OF ECONOMIC IMPACTS

Economics Impacts	Direct	Indirect	Induced	Total
Benefits represent 15 percent of total earnings				
Output ($)	2,094,000	550,000	475,000	3,119,000
Employment	0	3	16	19
Benefits represent 20 percent of total earnings				
Output ($)	2,514,000	674,000	585,000	3,773,000
Employment	0	4	20	24

Source: IMPLAN; BAE, 2009.
Note: Direct employment is zero because the analysis assumes that all Alameda County resident IOO drivers will become LMC employees.

The total output effect is found to be $3.1 million for a 15% 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% increase, the output effect is $3.8 million, with $2.5 million 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% increase and 24 new jobs with a 20% increase. In the context of the greater Alameda County economy, this is a reasonably negligible impact (Table VI-47).

TABLE VI-47: 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

D. TASK 3A: ENHANCED EVALUATION OF POTENTIAL CHANGES TO THE DRAYAGE MARKET

Enhanced evaluation of diversion

a) Beacon Economics has furthered its analysis with more extensive surveys of beneficial cargo owners, carriers, and marine terminal operators, in conjunction with a literature review. We identify potential cargo diversion factors, estimating and discussing the likelihood that current customers and 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.

b) Both local and intermodal cargo are considered in the analysis.

1. INTRODUCTION

If the cost to ship goods through the Port of Oakland increases subsequent to the implementation of new programs, some of the Port's current customers might decide to take advantage of competing ports. The CTMP, and in particular, new CARB regulations and the possible 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, providing some context for a discussion of the Port of Oakland and the potential loss of business subsequent to an increase in drayage rates.

Diversion is most frequently a concern for intermodal freight – those containers which are shipped by rail either to or from the port, sometimes with a shuttle by truck from the railyard to the port. In general, 500 miles is the limit for truck delivery; anything destined for or originating at a location further than 500 miles beyond the port gates will likely be moved by rail.

The potential for diversion, then, arises because for those at the inland rail yard, receiving either imports or exports, it matters little what is on the other end. There may be concerns regarding the proximity of the port to markets of origin for imports, or proximity of destination for exports, but all else equal, ports substitute reasonably well for each other. Because diversion is a concern for goods traveling long distances, we should carefully study policies that may increase the costs of using one port versus another.

However, it is seldom the case that all else is equal across ports. First, ports have different proximities to foreign markets. Second, the productivity of ports and the quality of service vary. Differing levels of service will 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 because of the significant upfront or fixed costs associated with the transition. However, shippers who already use multiple ports will face fewer barriers to change, making diversion easier for larger shippers than for smaller firms. Other aspects of port service also come into play. For instance, some ports are first port of call, meaning that ships from abroad stop there first. Others, such as the Port of Oakland, generally serve as a second port of call, meaning that ships 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 arrive at a second port of call. For imports that are time critical, this can make a significant difference. Similarly, ports that are second call have an advantage with regard to exports. As the same ship will leave the second port several days after leaving 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, reducing the time between when the goods leave the domestic point of origin and arrive at the foreign port.

Local freight can also be prone to diversion, though it 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 put a container on a train destined for a different port. For local shipments, diversion will often entail two different costs.[63] The first cost is due to the added distance that the container will travel. If the diversion is by truck, trucking rates increase significantly with distance. If the diversion is to rail, the rate will not necessarily be significantly higher, though it might be higher if the goods are travelling a greater distance. The second cost arises from the need to gain 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.

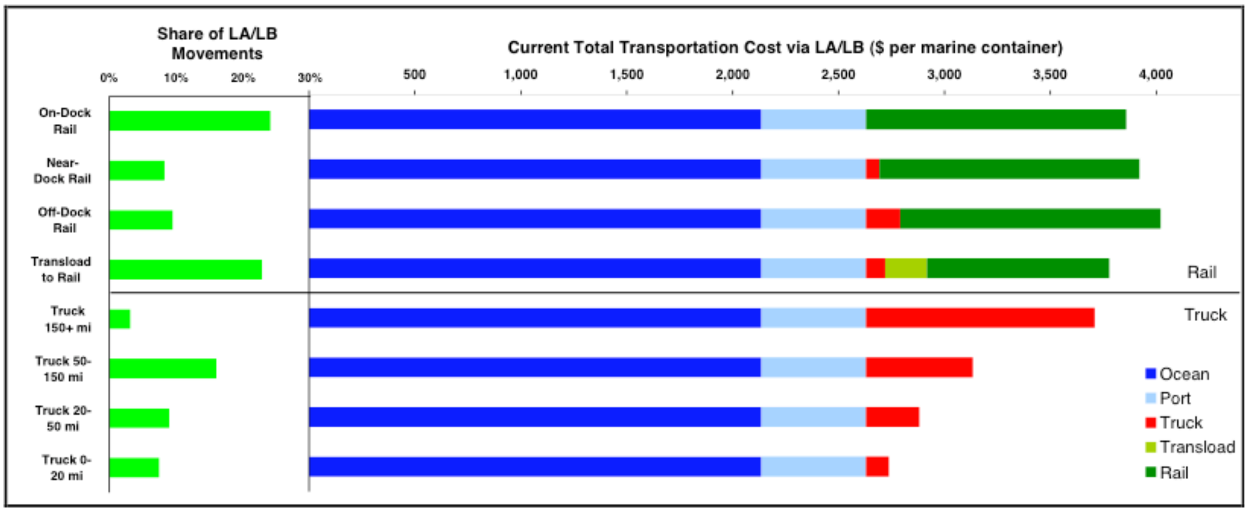
A third cost may also need to be considered. Many shippers will locate distribution centers in close proximity to a port. Thus the decision to move freight from one port to another may entail the decision to move the distribution center. The cost of relocating a distribution hub might be substantial, but it is not necessarily prohibitive. 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 these reasons, intermodal freight is significantly more likely to divert to another port than is local freight. Furthermore, the propensity of an increase in drayage rates to divert freight is

[63] These costs will also be incurred by intermodal shippers.

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. Drayage fees make up a much smaller proportion of the overall cost of shipping an intermodal container than they do for a local container (Figure VI-16). Therefore, a percentage change in drayage rates will result in a smaller percentage change in rates for total intermodal transportation than for total local container transportation.

FIGURE VI-16: TRANSPORTATION COSTS AND SHARE OF POLA-POLB 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: Leachman (2005) and Moffatt and Nichol (2007). The Leachman study is an elasticity study of diversion at the POLA/LB complex, 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% to 7%.

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% increase in trucking costs. Their finding is that the ports would experience less than a 1.2% 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 should be introduced slowly.

2. PORT OF OAKLAND

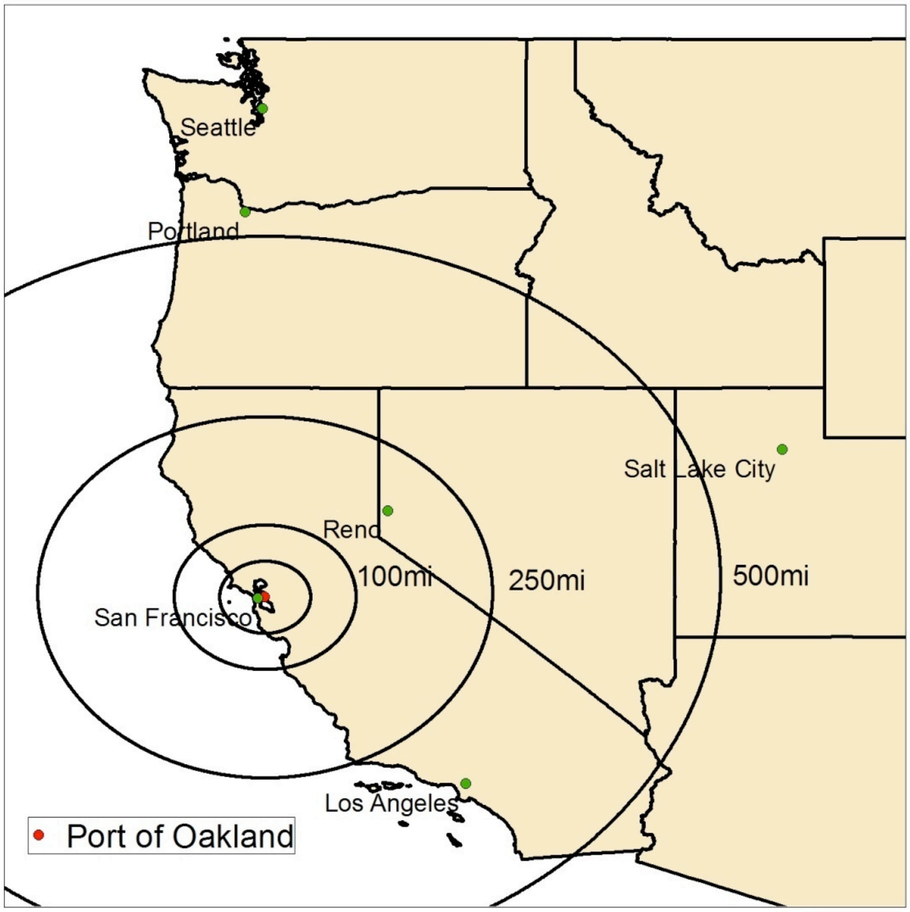
Of significant concern in the CTMP process is the likelihood that overall drayage rates may increase at the Port. The concern is well founded since many of the future changes will cause LMCs and IOOs to incur greater costs; moreover, new regulations may limit entry into the market. The outcome of many of the changes, however, will likely entail increased efficiency in the drayage sector. The extent to which these two forces will offset each other is unknown. It seems plausible, 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% to 30%. For intermodal shipments, the increase amounts to 0.2% to 0.4% in total transportation costs, while for the average local shipment the increase amounts to 1.5% to 2.5% in total transportation costs (See Table VI-34).

Through our surveys, we have found that approximately 20% of shipments through the Port of Oakland are intermodal and the rest are local, meaning served by truck. This business pattern suggests:

- The most price sensitive form of shipment (intermodal) is a relatively small share of total shipments.
- The most price sensitive form of shipment (intermodal) is likely to be subject to the smallest percentage increase in transportation costs.
- 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. With more than 70% of all non-shuttle drays to and from the Port being 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 short haul into a long haul, at a distance of more than 250 miles. According to the rates that we have gleaned from our survey data, drayage rates would increase from $315 on average for a short haul to $875. 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 RESULTS

In general, Beneficial Cargo Owners (BCOs), or shippers, are the primary decision-makers with respect to the port used for importing and exporting their products. In some cases, however, it will be a freight forwarder or even an ocean carrier who makes the decision, particularly with 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.

Our surveying covered 24 BCOs who are primarily local rather than intermodal users of the Port. Of these companies, 11 use the Port for importing, 6 for exporting, and 7 for both importing and exporting. Four of the exporters move intermodal freight through the Port while only one of the importers surveyed reported having intermodal shipments.

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 and 14A are summarized in Table VI-48. The table highlights the primary factor expressed in the interview. The most common response indicates that proximity to either a factory or distribution center is paramount in their selection of a port. Ease of operation, cost, and transit time are also mentioned. Although five BCOs indicated cost as among the primary factors, few indicated that cost was paramount or determinative.

TABLE VI-48: SURVEY QUESTION SUMMARY RESPONSES: MOST IMPORTANT FACTOR INDICATED

	Frequency of Responses	
	14	14A
Proximity/location	20	22
Cost	2	
Port capacity	1	
Port efficiency	1	
Avoid POLA/POLB		2
All Responses	24	24

Their interest in the Port of Oakland stems from an evaluation of these same considerations, but in no case was cost mentioned as the primary factor in selecting the Port of Oakland. Several BCOs indicated that they ship through Oakland to avoid the congestion of the San Pedro

Bay Ports, suggesting that they are unlikely to move their cargo to these ports with a relatively small increase in drayage rates. That cost was seldom mentioned is especially telling because many of these BCOs did report using other U.S. ports for shipping their goods. In particular, 14 of the firms reported using other California or East Coast ports for importing while 5 reported using other ports for exporting.

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?*
>
> *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 vary significantly, with some indicating that because the market is very competitive, they would divert cargo after a small change in rates. The majority, however, claim that it would take a significant increase in drayage fees to get them to change their shipping patterns. In general, proximity appears to carry more weight than the cost of drayage.

Overall, there was very little willingness on the part of BCOs interviewed to speculate on the effect of a small rate increase. Many do not negotiate trucking rates, so have no basis for responding. At the same time, some BCOs indicated that any increase at all in drayage rates would cause them to stop using the Port of Oakland. The issue was not so much one of diversion, but rather of reducing their overall trade, resulting from the closure of a distribution center or factory. Though this effect is certainly possible for some range of rate increase, it seems unlikely that the increases possibly resulting from the CTMP would induce such a change.

Reliability is another issue that was indicated. Consistent with the experience of the ports of Los Angeles and Long Beach, it was suggested that congestion or other disruptions to service could lead to a reduced reliance on the Port of Oakland. Following the port closure in 2003 and the service disruptions of 2004, many BCOs recognized the need to diversify their shipments and to use other ports. It is reasonably clear that these two events have lead to a reduction in the share of goods moving through Southern California's major ports. It is quite possible that short term disruptions of service at a port could be a bigger motivator for diversion than a small increase in shipping costs.

4. SUMMARY

Shipments through the Port of Oakland are primarily from local sources (80%), at distances ranging within 500 miles. Our evidence suggests that it would take a significant increase in drayage rates to result in diversion of local shipments to other ports. Intermodal shipments (accounting for 20% of all shipments) are at higher risk for diversion, as intermodal shippers are more likely to experiment with alternative routes. However, depending on the cause of the cost increase, whether a container fee or through increased costs to the LMCs, there might be little diversion resulting from the CTMP. A fee that imposes a disproportionate burden on intermodal freight would have a larger diverting effect than would a simple increase in costs to LMCs.

Although the responses from BCOs are relatively homogeneous, readers are encouraged to interpret these results as suggestive. Only 24 of the many BCOs shipping goods through the Port were interviewed, most declined to be interviewed. It is unknown what fraction of the total number of BCOs this represents, nor is it possible to ascertain the extent to which this sample is representative of the BCOs serving the Port. As it stands, the sample is clearly biased towards local companies, with little insight into the possible responses of companies out of the state.

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
- The 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
- TWIC, CARB truck regulations, and diesel prices combined
- An employee driver requirement
- All scenarios combined

1. Driver Supply and Demand

The Port of Oakland forecasts that TEUs will increase from 2.4 million in 2007 to 3.5 million in 2017.[64] With 1,989 full-time drayage drivers serving the Port of Oakland in 2008, the increase in volumes would require approximately 3,153 full-time drivers by 2017 (an increase of 1,170

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[64] This forecast was provided by the Port.

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 whom are IOOs (independent owner-operators), the increased demand for drivers would represent an increase of less than 1% 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% of the current labor supply of IOO 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%.

Given the relatively small numbers this increase represents, the increase in labor demand would not, in itself, be likely to raise 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, it would likely occur toward the latter end of the period when the increase in driver demand is especially acute (Table VI-49). However, the likelihood that these growth rates can be achieved is relatively low, reinforcing our belief that status quo growth will not lead to an appreciable increase in wages or rates.

TABLE VI-49: FORECASTS OF TEU GROWTH AND THE ACCOMPANYING NEED FOR DRIVERS

Year	Forecast Growth				
	Containers (TEU)		Drivers		
	Percent	Total Volume	Change Percentage	Change Number	Total Number
2008		2.2			
2009	-2.5	2.1	-2.2	-44	1,939
2010	1.0	2.2	1.0	20	1,959
2011	2.5	2.2	2.5	49	2,008
2012	4.0	2.3	4.0	80	2,088
2013	6.0	2.4	6.0	125	2,213
2014	8.0	2.6	8.0	177	2,390
2015	9.0	2.9	9.0	215	2,605
2016	10.0	3.2	10.0	261	2,866
2017	10.0	3.5	10.0	287	3,153
Total		1.3		1,170	

Source: Calculations by Beacon Economics.

a) TWIC

Impact on Labor Supply

The Transportation Worker Identification Credential, mandatory for all truckers accessing the Port as of March 1, 2009, was expected to have a significant impact on the current population of drivers. According to the driver survey, conducted in October of 2008, 7.6% of drivers surveyed stated that they did not intend to apply for a TWIC, and another 10.8% indicate that they are not sure whether they will apply. Over three-quarters (81.5%) claim that they will apply. LMC owners, also surveyed in October of 2008, were more optimistic about the probability of their drivers applying for the TWIC. Managers estimated that 84.8% of IOOs and 89.5% of employee drivers to apply. Thus, the estimated percentage of drivers unlikely to apply for the TWIC ranges from 8% to 18%. Using this range, LMCs would require an additional 159 to 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, was expected to be a short-term shortage of drivers. However, no such shortage materialized. We have been told that some 5% of truckers were turned away during the first week of implementation, with no disruptions in the time since. As volumes at the Port of Oakland are down roughly 7% from the end of 2007 to the end of 2008, with further decreases expected in 2009, much of the initial shortage due to reduction in labor supply may have been mitigated by the lack of volume.

The additional contribution of TWIC to congestion and structural change was dependent upon the TSA's capacity to provide readers to the terminals and the ability of the terminals to keep these readers operational. The implementation of readers at terminals should not significantly affect the productivity of drivers or cause specific congestion concerns with respect to the drayage portion of container moves. We do 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 might 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 have average annual salaries of $40,248, 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 IOOs.[65]

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 indicate that the bulk of their recruiting is 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 September 11 attacks demonstrated that the terrorist threat on domestic soil is quite real. Further, the attacks indicated 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 only occasionally serve the Port won't be restricted, it is quite likely that there will be fewer of these drivers. As the Port is a complex and often dangerous place, regularity breeds familiarity, and familiarity breeds safety.

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

b) CARB

The California Air Resources Board's Final Regulation Order regarding drayage trucks was filed with the secretary of state on November 24, 2008. There are two phases of the order:

- Phase I: By 12/31/2009 all drayage trucks must be equipped with 1994-2003 model year engines 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 II: 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 toward the VDEC retrofit, $20,000 to repower a truck, and $50,000 to replace a truck). Thus the assumed cost of retrofitting is $10,000 to $20,000, the repowering cost is $20,000 to $40,000, and the replacement cost is $60,000 to $120,000 (where the lower bound represents the cost after the CARB grant and the upper bound represents no subsidy). It should be noted that 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-50. Overall, these follow roughly similar distributions. It is notable that both surveys show that employee drivers tend to drive newer trucks than do owner-operators. The median vintage of employee drivers (2001) is three years later than for IOO operated trucks (1998).

TABLE VI-50: TRUCK AGE DISTRIBUTIONS BY DRIVER TYPE

	LMC Survey		Driver Survey	
Years	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
Median truck	1994-2003	1994-2003	2001	1998

Source: Calculations by Beacon Economics.

A survey of license plates generated a different distribution of truck ages (Table VI-51). Since it is impossible to delineate trucks driven by IOOs from those driven by employees in the license plate data, we aggregate the driver survey distribution across all drivers and compare it with the license plate survey distribution.

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

TABLE VI-51: 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	77.0
2004-2006	11.6	4.0
2007 or newer	7.4	2.0

Source: Calculations by Beacon Economics.

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 December 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 to 1,939 full-time drivers through 2009 and growing to 1,959 in 2010. We further assume that trucks that only occasionally call at the Port of Oakland 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 1,959 trucks and drivers in 2010.

There are two phases of costs to estimate:

A. Phase I

For Phase I implementation we make the following assumptions:

- All pre-1994 trucks (215) must be replaced with new trucks that meet 2007 standards.
- Half of the 1994-2003 truck fleet (1,315 trucks fall into this category) will be replaced with new trucks that meet 2007 standards (657) and half will be retrofitted (658).[66] 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 model year 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.

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[66] The age distribution is from the Marstel-Day study in Appendix 5.

Under these assumptions, 873 trucks will be replaced and 657 retrofitted. The total **replacement** cost, with no subsidy, will be $151.5 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 (CARB) plan, the total cost would be roughly halved, resulting in a cost of $24 per dray for the five-year period.

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** 657 trucks is estimated to be $16.6 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 a 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 I** would be $168.1 million.

B. Phase II

For Phase II implementation we make the following assumptions:

- Traffic will grow at the Port of Oakland, resulting in a demand for 2,390 truck drivers.
- All remaining 1994-2003 (586) 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 (241) 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 I.
- The interest rates, loan horizons, days per month, and trips per day are the same as assumed in Phase I.

Under these assumptions, 586 trucks would be replaced at a total cost of $101.8 million, or $48 per dray. In addition, 241 trucks would be retrofitted at a total cost of $6.1 million, or $14 per dray. The total combined cost would be $107.9 million.

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

The **total cost of both phases** is $276.0 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 does not take into account CARB subsidies; taking subsidies into consideration could potentially halve the amount.[67]

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

[67] 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.

able to see a return on their investment for approximately 8 to 10 years after the loan is completely paid off.

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

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. Because Phase I requires only that trucks are retrofitted to meet 2004 standards, the impact will likely be small in Phase I but potentially larger in Phase II, particularly if subsidies are not made available.

In the LMC survey, 47.9% of firms report that they are Class III Carriers (those with less than $1 million revenue per year). Of those, none use 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 some structural change may occur with the

[68] 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.

implementation of CARB requirements: very small carriers might shift to the use of IOOs who own compliant trucks.

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 a 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, should help to mitigate the disruption. The major obstacle may be for the 873 trucks that need to be replaced; however, 873 is an upper bound, since most of these trucks could be retrofitted instead of replaced. In 2010, 215 trucks will be older than model year 1994 and must be replaced. It is possible that there will be a shortage of anywhere from 200 to 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 on 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 $276.0 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 (six years). Firms replacing trucks rather than retrofitting would have to assess fees of at least $48 per dray. These figures represent 3% to 24% of the cost of an average container move at the Port of Oakland (a lower percentage for more expensive, longer hauls and a higher percentage for cheaper, shorter 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 second CARB criteria). This currently consists of 93% to 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 $276.0 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 is 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. Safety will be enhanced at the Port if for no other reason than newer trucks, when leaving the assembly line, tend to have stronger safety measures than older trucks. 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-52: 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 changes in diesel prices are not expected to have significant impact on the port drayage sector, the concurrent implementation of Phase I of the CARB regulations with TWIC has the potential to substantially affect the labor supply of drivers. We anticipate that from 8% to 18% of drivers will not apply for the TWIC. In addition, the implementation of CARB's first phase of regulations will require replacement of at least 215 trucks and likely the replacement or retrofitting of over 1530 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 regulations.

Because volumes are down 10% (and this decline in volume is expected to continue), and because many current port drayage workers drive less than the legal maximum, we anticipate that the combined impact on the labor supply is likely to require an increase of only 15% of drivers (an additional 300) to address shortages resulting from Phase I 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 (and in many cases less than) port drayage drivers, which means the likely costs of attracting these workers will not be in wages, but in 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 large-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 $40.70 per dray in Phase I and $44.74 per dray in Phase II (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, or from 3.8% to 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 I and late-model used trucks purchased in Phase II. Also note that these percentage 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 of the haul.

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. About 60% of IOO drivers report 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 provide examples of what jobs they would do instead of port drayage (most responding that they would drive their trucks elsewhere).

However, in supplemental surveying, we found that this low proportion of drivers willing to become employees had more to do with their objection to the notion of selling their truck, a part of the question involved, than becoming an employee. Therefore, this 60% figure likely overstates the exodus of drivers in the event of an employee driver requirement.

Nonetheless, it is possible that up to 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 could cause substantial recruitment costs for firms, though it is 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 has the potential 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 business 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 the regulation over five 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 initial 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 employee drivers 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 to 32% for those LMCs only utilizing IOOs, and under 10% for those employing a mix of IOO and employee driver labor. We estimate an increase in drayage rates on the order of 21%. As mentioned above, a portion of the increase in costs may be offset by productivity increases, thus mitigating the impact on drayage rates; though there is significant slack in the system, 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, the level of accountability will increase, which will 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 the degree of responsibility rises when a known LMC answers for 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 I and TWIC. There is also the potential for a substantial reduction in the number of drivers, on the order of 40%, due to the employee driver requirement. 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 approximately one year), as there are large numbers of workers in the area who could transition into port drayage with a minimum of training (and who also currently earn less in their jobs than the average salary of an employee driver in port drayage).

Looking forward to Phase II 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 five 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 II 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 effect.

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

TABLE VI-53: COMBINED EFFECT OF TWIC, CARB, AND AN EMPLOYEE REQUIREMENT ON NEED FOR NEW DRIVERS

Year	Status Quo Growth of Drivers		Additional Drivers Needed			
	Absolute Growth	Level	CARB	Employee Requirement	Total	Percentage Increase
2009	-44	1,939	300	175	425	21.9
2010	20	1,959	150	175	344	17.6
2011	49	2,008		175	224	11.2
2012	80	2,088		175	255	12.2
2013	125	2,213		175	300	13.6
2014	177	2,390	200		376	15.7
2015	215	2,605			214	8.2
2016	261	2,866			260	9.1
2017	287	3,153			286	9.1
Total	1,170		650	875	2,685	12.7

Source: Calculations by Beacon Economics.

Impact on the Structure of Port Drayage

The CARB regulations 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 regulations, 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% to 35%, which may lead to a short-term congestion problem, on the order of one 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 $40 per dray ($50 per dray including the overhead costs of administering the program), or 3.8% to 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% to 50%, with the lower bound more likely if more retrofitting of trucks is employed and if late-model used trucks are purchased rather than new trucks. These increases 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 Task 8 reports.

Impact on Safety and Security of the Port

In the field of security, a layered approach is often utilized to provide the greatest returns. It is in this sense that the TWIC and employee driver 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.

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 1,989.

Our estimate of 1,989 trucks is the same number of trucks as estimated in Task 2. We arrive at this figure 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% own their trucks and 10% lease their trucks. 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 eight drivers to the Port and eight trucks.

The anecdotal evidence from LMCs that drivers generally drive the same truck dovetails with our 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, representing 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 (Table VI-53). Please see Appendix 5 for the details of this study.

TABLE VI-54: 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	17.0
1994-2003	1,571	79.0
2004-2006	60	3.0
2007+	20	1.0
Totals	1,989	100.0

Source: Calculations by Beacon Economics.

The table reflects our estimate that there are 1,989 trucks serving the Port. Of these, the vast majority are between the model years of 1994 and 2003. Just 4% 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-55: NUMBER OF DRAYS BY TRUCK AGE IN A WEEK

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

Source: Calculations by Beacon Economics.

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

Truck Vintage	Shuttle	Short	Regional	Long	Total
Pre-1994	5.57	5.88	0.31	0.62	12.38
1994-2003	13.00	49.23	2.17	2.48	66.87
2004-2006	1.24	6.19	0.62	1.55	9.60
2007+	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-57: DISTRIBUTION OF DRAYS ACROSS HAUL TYPES OF TRUCK AGE (%)

Truck Vintage	Shuttle	Short	Regional	Long	Total
Pre-1994	45.00	47.50	2.50	5.00	100.00
1994-2003	19.45	73.61	3.24	3.70	100.00
2004-2006	12.90	64.52	6.45	16.13	100.00
2007+	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, as well as the economic impact of these scenarios (costs of retrofits and replacements of trucks and subsequent potential effect on drayage truck supply and 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 online 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 in terms of the cost of purchasing new trucks and retrofitting old trucks.

Results

Table VI-58 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 1,530, with 873 being replaced and 657 retrofitted. The associated costs are $168.1 million in total, with $151.5 million going to truck replacement and $16.6 million for retrofit.

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

	Number			*Cost ($Millions)*		
Year	Affected	Replaced	Retrofitted	Total	Replaced	Retrofitted
2010	1,530	873	657	168.1	151.5	16.6
2014	827	586	241	107.9	101.8	6.1
Total	2,357	1,459	898	276.0	253.3	22.7

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 from 1994 to 2003 will either have to be retrofitted or replaced. As a result of the CARB regulations, trucks older than model year 1994 are to be replaced with a 2007 model year truck. It is assumed that one-half of the trucks serving the port with model years from 1994 to 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 by the CARB regulations, and will need to be replaced. Those with model years between 2004 and 2006 will either be replaced or retrofitted. 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 827 trucks at an additional cost of $107.9 million. The total cost of the CARB requirements is estimated to be $276.0 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-59 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 374 trucks, aged between 1999 and 2004, are replaced at a cost of $64.9 million. This reduces the cost in 2014 from $107.9 million to just $58.8 million.

TABLE VI-59: IMPACT OF ACCELERATED CARB REGULATIONS ON THE OAKLAND DRAYAGE MARKET

	Number			*Cost ($Millions)*		
Year	Affected	Replaced	Retrofitted	Total	Replaced	Retrofitted
2010	1,530	873	657	168.1	151.5	16.6
2012	456	374	82	66.9	64.9	2.1
2014	544	303	241	58.8	52.7	6.1
Total	2,530	1,550	980	293.8	269.1	24.7

Although the incremental cost of the 2014 regulation is reduced, the overall costs associated with the regulations are increased, from $276.9 million to $293.8 million. This increased cost arises because under this scenario 2,530 trucks are affected overall, while under the written CARB requirement, only 2,357 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 in 2014 causes replacement of some older trucks that might well have left the market at their owner's discretion. 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 cost-benefit 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%, and that the driver or LMC acquires the truck with a loan at an interest rate of 10%, with duration of six years. Similarly, a retrofit costs $20,000 and is acquired with a loan at a 10% interest rate, with duration of three years.

Further, it is assumed that trade grows at the rates illustrated in column 1 of Table VI-48 of Tasks 4 and 5. It is also assumed that there is 20% turnover in the fleet each year. This may be high, but it is consistent with turnover in the trucking industry generally. The losses the fleet experiences each year are made up for 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 215 trucks will have to be replaced and as many as 1,459 trucks may be replaced by 2014.[69] As discussed in Tasks 4 and 5, this will likely result in an increase in drayage rates as the potential price tag of $276.0 million is spread out across 2.2 to 3.4 million containers between 2010 and 2018.

As discussed in Task 6, this burden disproportionately falls on independent drivers, as they currently drive 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

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[69] There are currently 215 pre-1994 trucks serving the Port and all will have to be replaced by January 1, 2010.

list of IOOs used by the LMC. The supplemental survey was carried out by telephone and some 73 drivers were contacted 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 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 answer "don't know." This suggests that a subsidy could be a powerful tool for encouraging drivers to replace their older trucks with new models. 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 nonspecific 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

The task of assessing the ability of a Port trucking network to meet spikes in demand was performed under two separate conditions:

a. With an employee driver requirement
b. Without an employee driver requirement

Additionally, this task includes an analysis of the economic impact of a potential shortage of truck drivers on various employment sectors.

1. FINDINGS

Spikes in demand for trucking services are quite infrequent at the Port of Oakland.[70] Nevertheless, a diversion from a port closure, or 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 driver requirement, it is worth considering the impact that such a policy might have on the drayage sector's ability to service any increased need.

The status quo of the drayage sector serves as our baseline, against which an employee driver requirement is judged. It is currently the case that roughly two-thirds of the drivers providing drayage to the Port are independent owner-operators. The other one-third are employees of licensed motor carriers (LMCs). Together, these drivers moved some 2.2 million TEUs through

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[70] This is the general consensus of terminal operators at the Port of Oakland.

the Port of Oakland in 2008. Of these, 1.7 million TEUs, or 76%, were loaded containers. 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 can 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 of 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 indicate that the average dray takes 6.4 hours (Table VI-60). Breaking this down into time spent waiting and time spent driving provides a rough indication of the inefficiency in the current system.

TABLE VI-60: TIME DURATION OF AN AVERAGE DRAY

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

Source: Calculations by Beacon Economics.
Note: Means are based off of separate survey responses for each the three columns.
*Significantly different at the 10 percent level.

From Table VI-61, we find that drivers spend on average 1.5 hours waiting for dispatch between drays. Despite some unavoidable delay inside the terminal (at 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.

TABLE VI-61: DRIVER TIME SPENT WAITING FOR DISPATCH BETWEEN DRAYS

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

Source: Calculations by Beacon Economics.
*Significantly different at the 10 percent level.

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, with drivers waiting 2 hours, on average, outside the gate and 1.6 hours once inside the gate to get out. As discussed in Section VI.C, Task 3, these estimates likely overstate wait times significantly, though we have no way of knowing just how much. Nonetheless, 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. Conversations with MTOs and LMCs indicate 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 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, it 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. 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, the temporary shortage may be partially offset by an increase in driver hours. Taken together, these elements suggest that the current drayage sector would be fully capable of handling a surge in demand between 25% and 40%.

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 noted that during the spike of traffic in 2003, when the West Coast ports had reopened following the closure related to the labor dispute, 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, 1.3 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 4.9 of the 6.9 hours for a dray are spent waiting. Of this, the 1.3 hours spent waiting for dispatch and 2.6 hours of the terminal wait could be eliminated. This 3.9 hours represents fully 56% 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% 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 legal 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 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, drivers will need to consider Transportation Worker Identification Credential regulations. These issues will have to be resolved during any rapid expansion of port activity.

An employee requirement may restrict the trucking sector's ability to quickly respond to rapid changes in the flow of containers. The additional non-port capacity of many LMCs to respond to a short-term spike may provide the buffer that the drayage sector needs between being caught shorthanded and handling a surge. As reported elsewhere, the LMCs currently participating in drayage have half again as many drivers with whom they contract as 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 responsive to cargo surges, the possible shortcomings of an employee driver requirement are unlikely to be tested.

c) Local economic impact of a driver shortage[71]

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% 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% increase in container flows.

Tables VI-62 and VI-64 present the results from an IMPLAN simulation of a 25% reduction in flows through the Port of Oakland.[72] The first table indicates the employment consequences 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 job impacts are jobs 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 because the sector is not that reliant on

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[71] For a clear exposition of the methodology used in producing these results, please see the memo from Bay Area Economics in Appendix 3.

[72] This analysis was provided by Bay Area Economics as a subcontractor to Beacon Economics.

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-62: 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: Bay Area Economics.

The first category includes Port operations (NAICS 488) and reflects a decline in employment of about 25% 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% 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% of Port maritime activity resulting in a loss of just 800 jobs, one-fifth of the scenario depicted in the table.

TABLE VI-63: PORT OF OAKLAND MARITIME-RELATED EMPLOYMENT, 2005[73]

	Employment
Rail	153
Truck	3,636
Terminal employees	276
ILWU (longshore)	1,329
Towing	92
Pilots	95
Steamship line agents	168
Maritime SVCS	378
Freight forwarders/customs house 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: Bay Area Economics.

Note: Truck Employment is not specific to drayage.

The output effects of a reduction in Port activity are perhaps more striking in Table VI-64. 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

[73] Minnesota IMPLAN Group, Inc., 2007 California data.

of the effects on the Port sector, output losses total roughly $200 million. This is a very small fraction of the local economy.

TABLE VI-64: THE OUTPUT CONSEQUENCES OF A 25 PERCENT REDUCTION IN PORT ACTIVITY (MILLIONS)

Industry Output	Direct	Indirect	Induced	Total
Scenic & sightseeing trans. & support	-357.4	-4.9	-0.4	-362.7
Imputed rental act. for owner-occ. dwellings	0.0	0.0	-17.0	-17.0
Real estate establishments	0.0	-4.2	-7.2	-11.4
Wholesale trade businesses	0.0	-1.5	-9.4	-10.9
US Postal Service	0.0	-9.5	-0.6	-10.2
Couriers and messengers	0.0	-8.0	-0.3	-8.3
Private hospitals	0.0	0.0	-7.9	-7.9
Food services and drinking places	0.0	-0.7	-7.0	-7.7
Insurance carriers	0.0	-2.6	-4.8	-7.4
Offices of physicians, dentists, & other health	0.0	0.0	-6.8	-6.8
Monetary authorities and depository credit	0.0	-1.5	-3.9	-5.3
Management of companies and enterprises	0.0	-3.0	-1.6	-4.6
Employment services	0.0	-3.7	-0.7	-4.4
Telecommunications	0.0	-1.2	-2.7	-3.9
Services to buildings and dwellings	0.0	-2.4	-0.8	-3.2
Transport by truck	0.0	-1.7	-1.3	-3.0
Securities, commodity contracts, investments	0.0	-0.9	-2.1	-3.0
Retail Stores, Motor vehicle and parts	0.0	-0.1	-2.9	-3.0
Retail Stores, Food and beverage	0.0	-0.1	-2.7	-2.8
Other state and local government enterprises	0.0	-1.0	-1.7	-2.7
Legal services	0.0	-0.9	-1.7	-2.7
Maint & repair construct of nonresident struct.	0.0	-2.0	-0.6	-2.6
Natural gas distribution	0.0	-1.5	-1.1	-2.6
Warehousing and storage	0.0	-2.3	-0.3	-2.6
Medical & labs and outpatient care services	0.0	0.0	-2.5	-2.5
Management, scientific, & technical consulting	0.0	-1.8	-0.7	-2.5
Office administrative services	0.0	-2.0	-0.4	-2.4
Waste management & remediation services	0.0	-1.9	-0.4	-2.3
Retail Stores - General merchandise	0.0	-0.1	-2.1	-2.1
Other	0.0	-17.5	-51.0	-68.5
Total	-357.4	-77.1	-142.5	-577.0

Source: Bay Area Economics.

I. Task 8: Understanding 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 is a summary of the findings.

a) Carrier survey

Seven major carriers who call at the Port of Oakland were surveyed. As large carriers, all call at major ports along the West Coast, East Coast, and Gulf of Mexico. 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 also 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, with four of seven carriers reporting less than 25% IPI traffic and the remaining three reporting over 50% IPI traffic. 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.

When asked about the most important factors in choosing a West Coast port, carriers respond that freight volumes and customer preferences are the two most important, followed by the availability of rail and terminal productivity, and throughput. The carriers indicate that the primary obstacles in using the Port of Oakland are lack of rail infrastructure and lack of volumes, both of which make Southern California ports more attractive.

Carriers indicate 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 state that they are 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

The marine terminal operators survey was administered to eight MTOs and one rail terminal. 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 report that they have 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 indicate 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.

While MTOs indicate that implementation of TWIC would address most security concerns, traffic in the area surrounding the port was a recurring safety issue.

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 nondrayage 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.[74] Most LMCs state 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 the 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% 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 in the driver survey and is 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 percentage 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 acknowledge this type of relationship. LMCs report that there are few premiums paid in port drayage, primarily only for hazardous materials, specialized equipment, and overweight hauls.

LMCs indicate that the major factor decreasing productivity at the Port of Oakland terminals are the long lines and perceived hold-ups due to terminal inefficiency. Some add that extended hours might ameliorate this problem, though most did not provide suggestions for how the productivity may be improved.

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[74] 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 say IOOs are more productive and five indicate that drivers have similar productivity.

LMCs overwhelmingly indicate that they do not have and are not be able to provide IOO drivers with truck financing. Two state that they are concerned as to whether a truck retrofit and replacement grant program would benefit their drivers, or whether preference would be given to larger firms.

LMCs largely agree 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 report having difficulty meeting peak demand. They also indicate that unanticipated spikes are rare. Most LMCs indicate they typically need only a few days to get extra drivers to address 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 are found for routing, where only seven firms indicate using a computer or GPS technology.

The LMC concerns with the CTMP center on the potential for a more adverse impact on smaller firms and the likelihood that it will not address inefficiencies in the marine terminals.

d) BCO SURVEY

Twenty-four BCOs were interviewed: ten importers, seven exporters, and seven firms who both import and export. There is considerable variance across the sample in the amount of TEUs imported (8 to 1,200 in a typical month) and exported (15 to 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 distribution centers, manufacturing facilities, or other players in the supply chain. Only one importer reported moving freight via long haul truck from the Port of Oakland, and no exporters reported long haul drays. Roughly 40% 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 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 share of port traffic moving through the Port of Oakland varies considerably by BCO. Eleven of 18 importers and six of eleven exporters move over half their freight through the Port of Oakland. Other ports used by 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 owing 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 three of the BCOs expect to ship more freight through Oakland next year; eleven expect the same amount; and ten expect less. Survey respondents indicate 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 that 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

Although the surveys of BCOs and carriers are fewer in number than might be desired, 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 conditions, stop lights, etc.).

Although 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

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.

Below is a contact list of LMCs providing drayage services to the Port of Oakland with over five drivers. The list also provides additional information as to whether these firms use IOOs, employ drivers, or do both.

This list is derived from the sample of LMCs that participated in the survey.

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:

MARSTEL DAY
CONSERVATION & CONSULTING
FROM SEA TO STARS

Marstel-Day, LLC
Oakland, CA 94612

February 2009

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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.

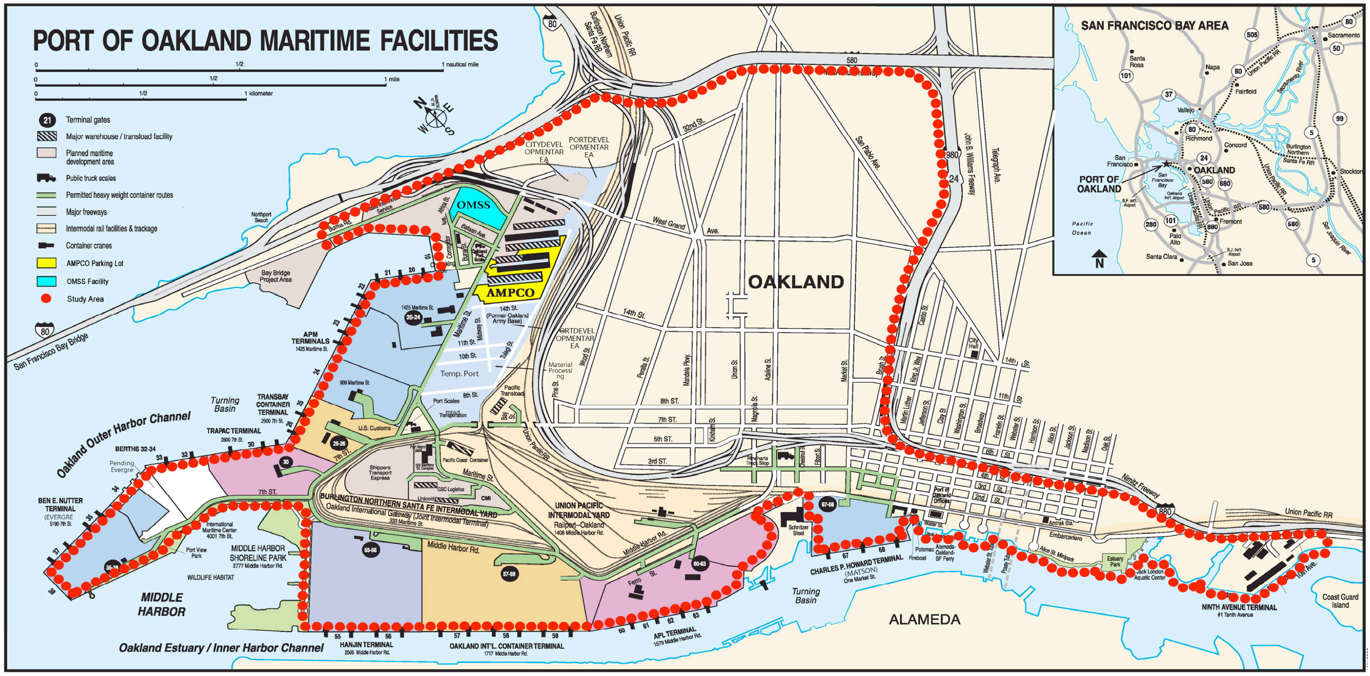

Figure 1: Study Area (SOURCE: Port of Oakland, April 2008)

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		

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.

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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.

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.

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 limitation of the ACS); however, although we can geographically constrain our sample, we cannot 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

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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.

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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]

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[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

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[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

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[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.

APPENDIX 4: TASK 7: METHODS FOR THE LOCAL ECONOMIC IMPACT ANALYSIS, PRODUCED BY BAY AREA ECONOMICS AS A SUBCONTRACTOR TO BEACON ECONOMICS

bae

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 in increase in Port operations.

The analysis further assumes that Port maritime operations demand grows by 25 percent, but that the LMCs cannot not 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

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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.

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[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 Support[8] 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

APPENDIX 5: ADDENDUM TO TASK 6

Port of Oakland
Comprehensive Truck Management Program
Economic Impact Analysis:

Drayage Truck Fleet Age Distributions
(Task 6)

Prepared by:

MARSTEL DAY
CONSERVATION & CONSULTING
FROM SEA TO STARS

Marstel-Day, LLC
Oakland, CA 94612

April 2009

Table of Contents

Tables

Figures

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. 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.

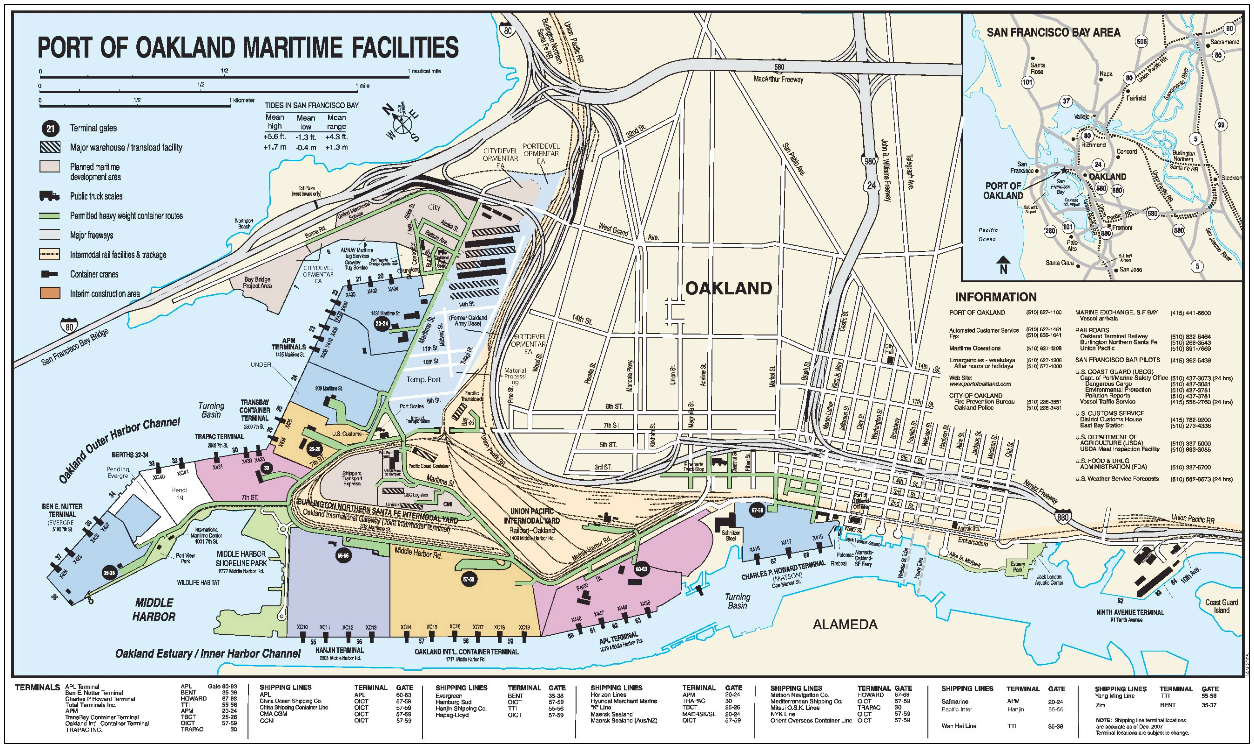

Figure 1: Port of Oakland Maritime Facilities (SOURCE: Port of Oakland, April 2008)

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; almost 30 percent (1,255 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 1,668 (about 83 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.

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 1,668 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 83 percent of the total license plates collected during the survey). As shown in Table 2 and Figure 2, most (94 percent) of the trucks surveyed were model year 2003 or older. Trucks with model year 2007 or newer represented only two 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	286	17
1994-2003	1,286	77
2004-2006	60	4
2007+	36	2
Totals:	**1,668**	**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 83 percent of the total license plates collected during the survey.		

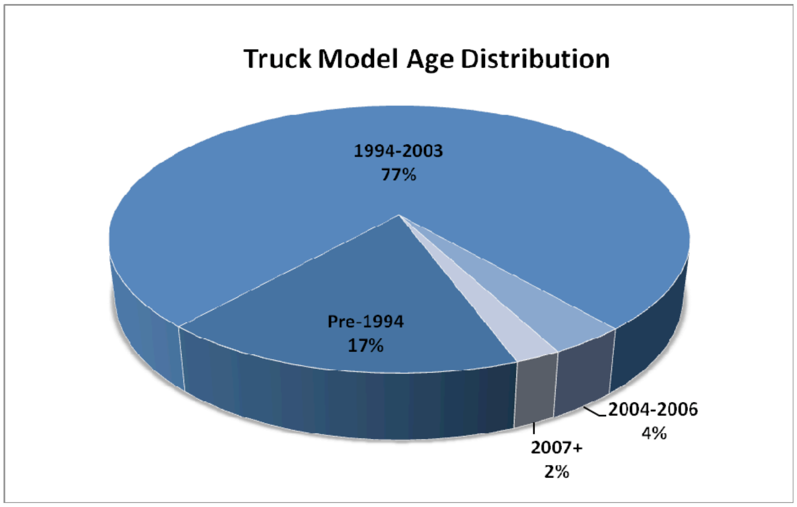

Figure 2: Truck Model Age Distribution, 2008 License Plate Survey Data

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 90^{th} percentile of these data is represented by the year 1991, and the 50^{th} percentile is represented by the year 1997.

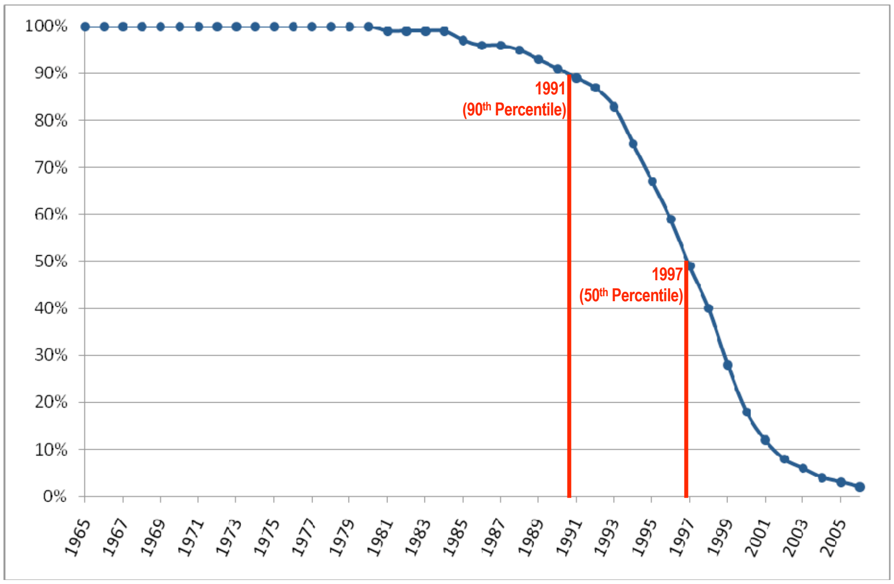

Figure 3: Cumulative Age Distribution at the Port of Oakland, Truck Model Age, 2008 Surveys

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.

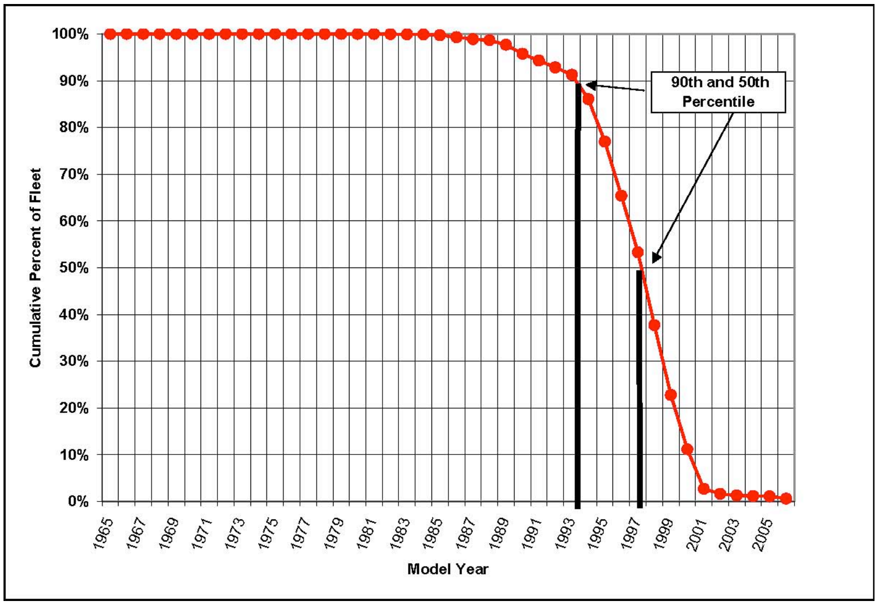

Figure 4: Cumulative Age Distribution at the Port of Oakland (SOURCE: ENVIRON 2006)

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.

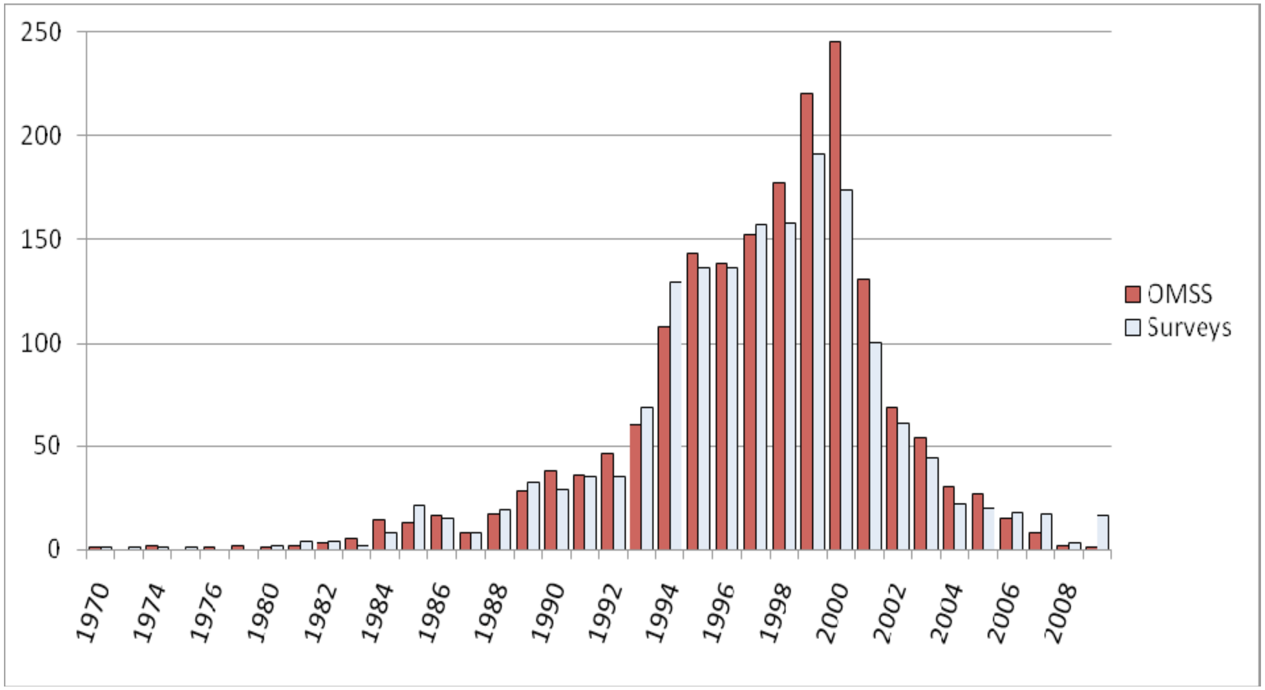

Figure 5: Truck Model Age Distribution, 2008 License Plate Survey and OMSS Data

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 94 percent) of the trucks surveyed were model age 2003 or older, and about 17 percent were model age 1994 or older; and
- Trucks with model age 2007 or newer represented only about two 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	1,526	77
2004-2006	79	4
2007+	40	2
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

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.

ATTACHMENT A
Port of Oakland CTMP Economic Impact Analysis:
Drayage Truck Fleet Age Distributions

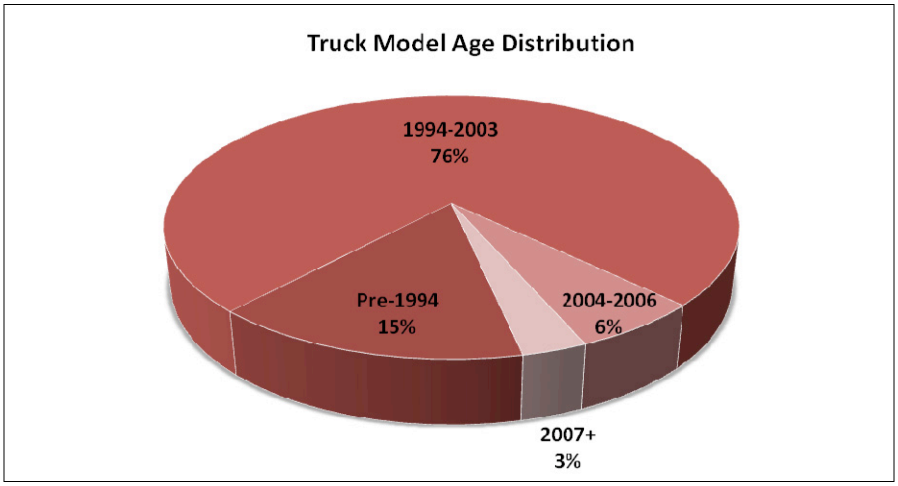


Figure A-1: Truck Model Age Distribution, Terminal Data

APPENDIX 6: SURVEY METHODS

1. *MOTOR CARRIER SURVEY*

Goals and Objectives

The goal of the Motor Carrier survey was to gather information for the following RFP component: analysis of the operational characteristics of truckers in the Port of Oakland area, including rates, number and length of drays, and expenses. According to the RFP, this analysis was to be stratified by type of driver labor used by the LMC; IOO only, ED only, or a mix of driver types.

The objectives were both to describe the status quo of the firms in the industry and gather detailed data on operations and costs to generate a cost model for LMCs and estimate the impacts of different components of the CTMP upon these costs.

Methods

Between October 20, 2008 and January 7, 2009, 54 Licensed Motor Carriers (LMCs) were surveyed regarding their activities at 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 Safety Administration 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 search 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 services, with at least 5 drivers, which implies that 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 model years
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:

a. Carriers from out of state are under-represented.
b. 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.
c. 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 drayage trucking services.

d. 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*

The goal of the driver survey was to gather data for the following RFP components:

- Compare the average number of daily trips for IOOs and EDs, broken down by length of haul and location of the LMC.
- Estimate driver income, driver expenses, truck expenses, and hours of work for IOOs and EDs.
- Detail wages and driver benefits received by IOOs and employee drivers serving the ports.
- Determine the average length of tenure for IOOs and EDs.
- Determine where truck drivers park.

The objectives were to answer the above questions and collect additional data to supplement other analysis. This includes:

- Obtaining a list of LMCs the driver has contracted with, in order to supplement the contact list of LMC's operating in drayage.
- Examining prior labor market experience to supplement the driver supply and demand analysis and identify non-trucking occupations from which new drivers might be recruited.
- Supplement the truck age information collected in the license plate analysis.

Methods

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 rail yard. 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 from 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.

3. *Supply Chain Surveys*

Goals and Objectives

The goal of the supply chain surveys was to gather data for the RFP task: evaluate the influence of shipping company procurement practices on drayage rates. In addition, though outside the specification of the RFP, the supply chain surveys were intended to examine business practices of firms in the supply chain who would be affected by the provisions of the CTMP. These include marine terminal operators (MTOs), ocean carriers, and beneficial cargo owners (BCOS). The surveys asked stakeholders from all three categories to identify practices of contracting for both the ocean carriage and dray segments of goods movement, how these rates were affected by fluctuations in fuel prices, alternatives to using the Port of Oakland, and their opinions about the CTMP.

Methods

It is important to note that, unlike the driver and LMC surveys, due to the small samples anticipated in the supply chain surveys and the qualitative nature of the surveys, formal sampling frames were not constructed for these surveys. Most of the contact information for the participants was provided by the staff at the Port of Oakland.

Carrier Survey

Twelve carriers were contacted to participate in the survey and seven completed the survey. These carriers included large international firms as well as a domestic carrier. Carriers were asked about:

- Ports of call
- Terminal(s) used at the Port of Oakland
- Contracting with LMCs and BCOs
- Factors affecting the use of the Port of Oakland for discretionary freight
- Anticipated changes in freight levels over the next year

MTO Survey

All MTOs operating at the Port of Oakland were contacted to participate in the survey and eight MTOs and one railyard responded to the survey. MTOs were asked about:

- Fluctuations in terminal activity by day of the week and month of the year
- Relationships with ocean carriers
- Efficiency issues at the Port of Oakland affecting truck moves
- Safety and security issues at the Port of Oakland

BCO Survey

Contact information for BCOs was obtained from the staff at the Port of Oakland who identified major importers and exporters. Twenty-four BCOs were surveyed (a 20% response rate) and asked about:

- Volumes moving through the Port of Oakland
- The share of freight through the Port of Oakland that is trucked locally, regionally, and nationally
- The process of contracting with for ocean shipping and drayage rates
- The factors affecting the use of Port of Oakland and the share of freight moving through other ports.
- Concerns with delays at the Port of Oakland
- Anticipated changes in traffic over the next year

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 all together, how much does everybody that you live with make in a year?

- Less than $35,000
- $35,000 - $49,999
- $50,000 - $59,999
- $60,000 - $74,999
- $75,000 - $94,999
- $35,000 - $114,999
- $115,000 - $149,999
- $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.)

- Less than High School
- High School Degree
- Associate Degree
- Some High School
- Some College
- 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 <u>not</u> 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

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 part of an economic analysis that will inform the Port of Oakland's Comprehensive Truck Management Program. 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 Beacon Economics 415-457-6006	or	Comprehensive Truck Management Program Port of Oakland 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 we, 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.

____

____

____

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?

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?

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?

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_________________

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
- Some High School
- High School Degree
- Some College
- Associate Degree
- 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

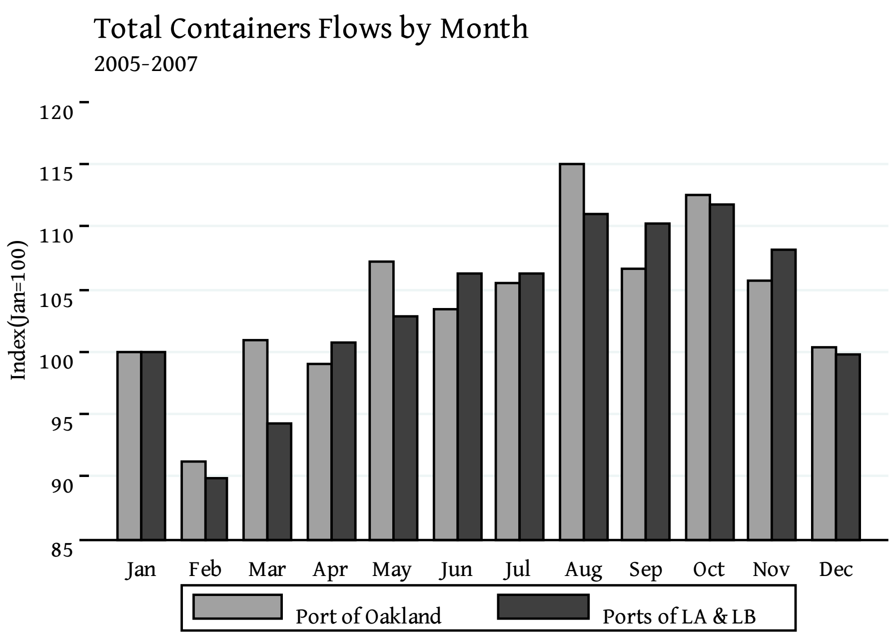
17A. If yes, which option would you choose?

 Install DPF
 Replace the truck
 I will no longer drive at the port after 2009
 I don’t know

APPENDIX 14: WEST COAST CONTAINER FLOWS

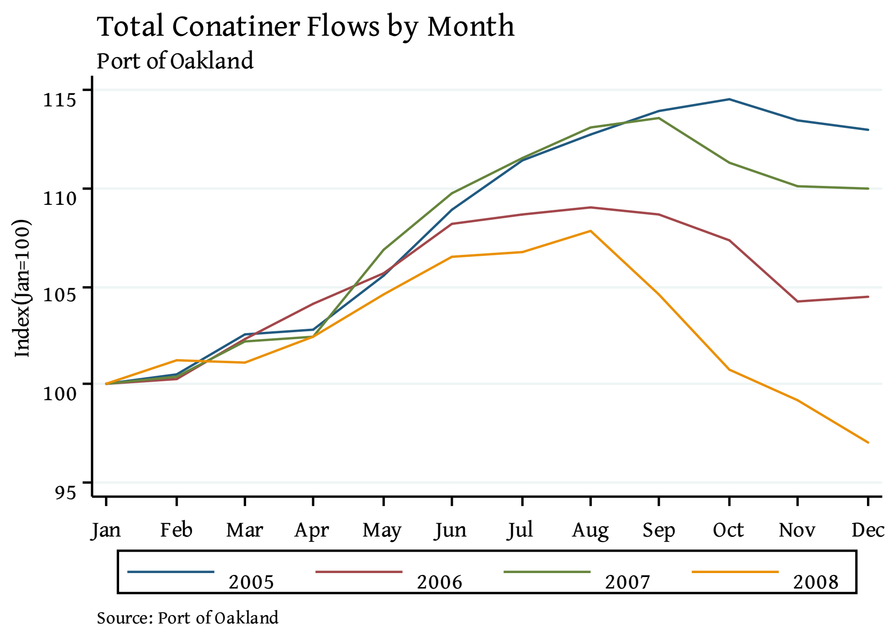
The graphs below provide a reference for total (empty and full) container flows through the Port of Oakland, relative to other regional ports and previous periods.

FIGURE VII-1: PRE-RECESSION MONTHLY CONTAINER FLOWS IN OAKLAND VERSUS THE PORTS OF LOS ANGELES AND LONG BEACH COMBINED, 2005-2007



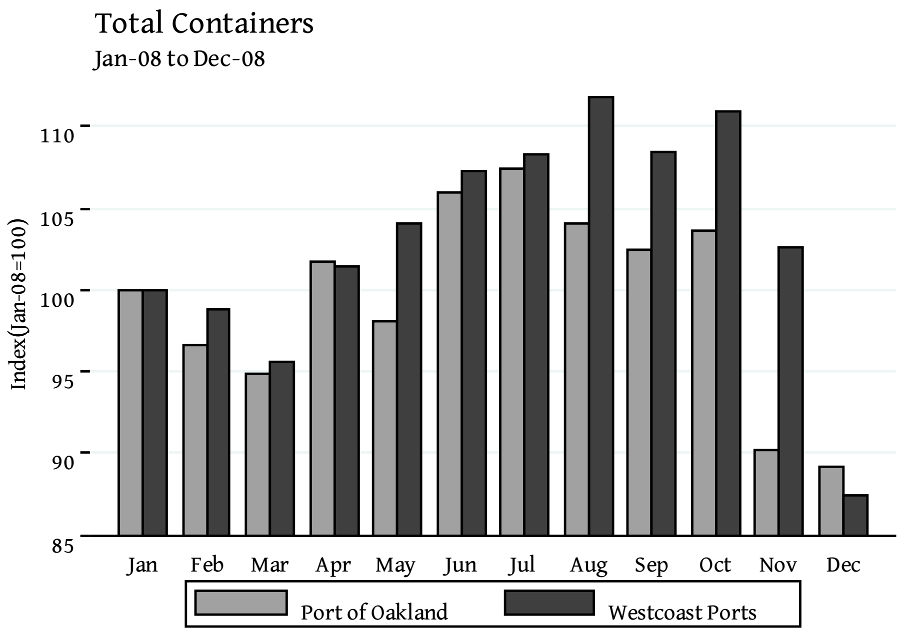
The first figure (above) compares total monthly container flows in Oakland with those through the ports of Los Angeles and Long Beach combined. The data in each of the months for 2005, 2006, and 2007 are added together and then indexed to the January value, providing a perspective of the pre-recession annual trends. They were generally very similar, with a mild drop in February, followed by a climb through the summer months, tailing-off through the fall, and ending the year close to January levels.

FIGURE VII-2: COMPARISON OF MONTHLY CONTAINER FLOWS IN OAKLAND BY YEAR, 2005-2008



The second figure compares Oakland's monthly container flows for each of the years from 2005 to 2008. Here the onset of recession is apparent, as 2005 shows the strongest growth and 2008 the weakest. The second half of 2008 in particular is significantly different from that of 2007. Additionally, each year's crest has shifted further back from December: October in 2005, Aug-Sep in 2006, Sep in 2007, and Aug in 2008.

FIGURE VII-3: COMPARISON OF MONTHLY CONTAINER FLOWS IN OAKLAND VERSUS OTHER WEST COAST PORTS, 2008



The third figure highlights Oakland's 2008 performance relative to the other three largest west coast ports: Los Angeles, Long Beach, and Tacoma. The data are again indexed to January, and here we see the severity of the recession for Oakland. While all four ended 2008 at similar levels, Oakland's drop-off occurred much earlier.

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