April 8, 2013

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Re: World Logistics Center Project Draft Environmental Impact Report (SCH #2012021045)

Dear Mr. Gross:

On behalf of the Sierra Club, Center for Community Action & Environmental Justice, and the Natural Resources Defense Council, we provide comments on the World Logistics Center Project Draft Environmental Impact Report ("EIR"). We appreciate the opportunity to provide comments on the EIR for the World Logistics Center Project ("WLC" or "Project"). Given the inevitable regional and acute local impacts of the proposed Project, it is especially important that the EIR contain the necessary analysis to enable both the decision makers and the public to understand the significant environmental repercussions of this Project. Additionally, it is also critical that the EIR compare the proposed Project to other possible alternatives. Instead, the EIR effectively disguises the true impacts of the Project by omitting crucial information, underestimating many environmental impacts and ignoring others altogether.

Overall, this project, which is planned to be the largest master planned warehousing development in the world, will exact a large toll on the environment and public health even under the favorable assumptions used in the EIR. For example, the EIR concedes the Project will interfere with the Air Quality Management Plan, which is the region's roadmap for clean air. As we fight to meet air quality standards, these types of projects, which emit thousands upon thousands of pounds of pollution a day must not be approved, until and unless they comply with clean air plans and adopt **ALL** feasible mitigation measures. And, as articulated below, the full extent of the impacts is not even articulated in the EIR. By way of example, the EIR dramatically underestimates by 50% to 100% the number of trucks that will serve this Project. Since the number of trucks serves as the lynchpin to several analyses in the EIR (i.e. air quality, traffic, noise, etc), this flaw demands that the analysis be revised. Underestimating the level of truck traffic expected for this Project does a disservice to the public and decision-makers.

It effectively masks the extent and challenges this Project will exact on the region and local communities. .

As a result of the EIR's inadequacies, there can be no meaningful public review of the Project. CEQA accordingly requires the City to prepare and circulate a revised EIR to permit a complete understanding of the environmental issues at stake, if its wishes to pursue this project.

I. The Proposed Project will have an Indelible Impact on Adjacent Communities and the Region in General.

The health impacts and regional air quality impacts from freight activities are well documented. Of all listed Toxic Air Contaminants identified by the California Air Resources Board ("CARB"), diesel particulate matter ("DPM") is known to present the greatest health risks to Californians.[1] Dozens of studies have shown adverse impacts from DPM and Oxides of Nitrogen ("NO_x") including respiratory disease, cardiovascular mortality, cancer, and reproductive effects as well as an increase in regional smog and water contamination. CARB has determined that diesel exhaust is responsible for over 70% of the risk from breathing our air statewide and in the South Coast Air Basin ("SCAB").[2] Further, the South Coast Air Quality Management District ("SCAQMD") in the Multiple Air Toxics Exposure Study III ("MATES III") "indicate[ed] that diesel exhaust is the major contributor to air toxics risk, accounting on average for about 84% of the total" risk from breathing air toxics."[3]

Residents in Inland Empire communities will undoubtedly face additional impacts due to the increased pollution from this Project. For sensitive populations, such as children and the elderly, and for those who live and work in close proximity to these major sources of diesel exhaust, the risk will be even higher.

In recent years, environmental health researchers have firmly established the linkage between air pollution exposure and a range of negative health outcomes, including slowed lung growth rates in children (Gauderman et al Cohort C, Cohort D papers), exacerbation of existing respiratory disease (McConnell et al EHP bronchitis/asthmatic paper), increased absences from school due to respiratory illness (Gilliland et al CHS absences paper), and increased mortality. The following charts display the troubling findings of the impacts of air pollution on

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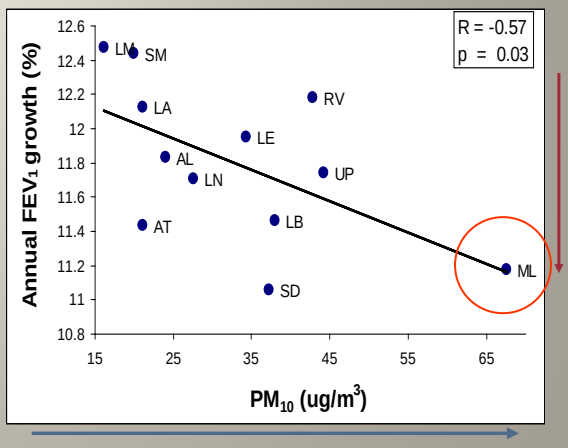
[1] CARB, *Emissions Reduction Plan for Ports and Goods Movement in California*, 7 (2006)(hereinafter "ERP").
[2] ERP, at 7.
[3] SCAQMD, Multiple Air Toxics Exposure Study for the South Coast Air Basin-III, at ES-3 (September, 2008) *available at http://www.aqmd.gov/prdas/matesIII/Final/Document/ab-MATESIIIExecutiveSummary-Final92008.pdf* (hereinafter "MATES III").

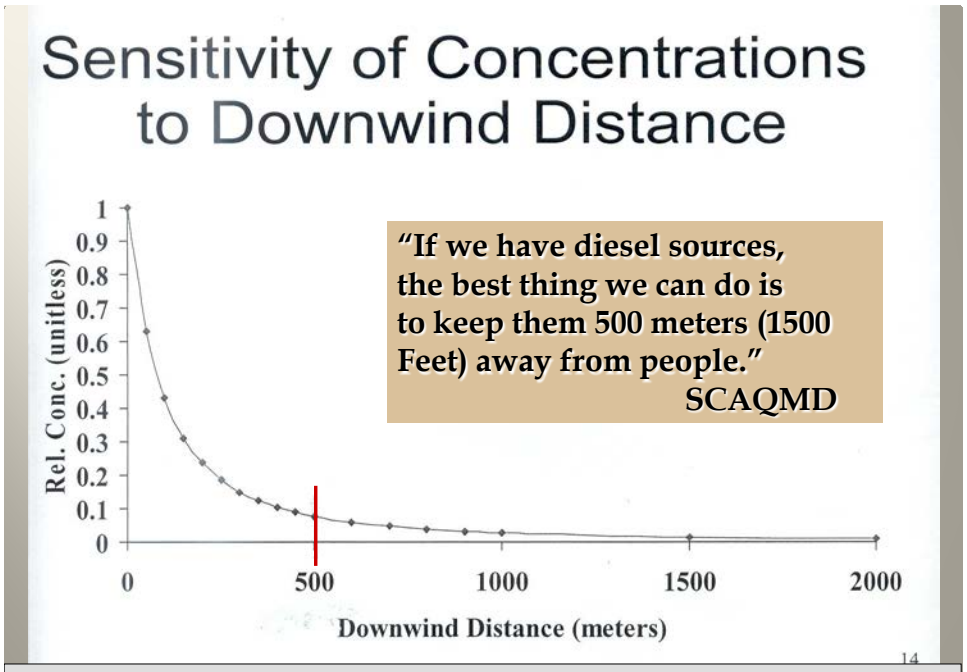
health of residents in the Inland Empire, including our most vulnerable populations, children.

USC Children's Health Study

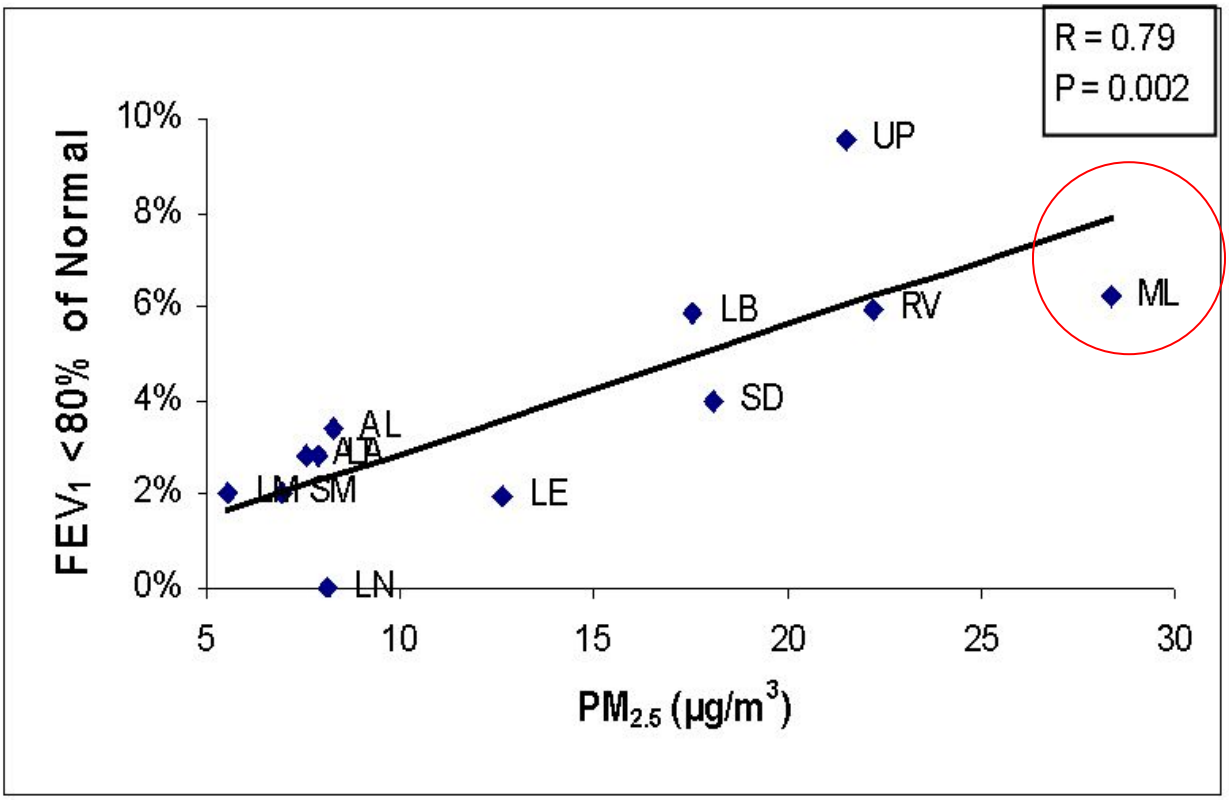
- University of Southern California (USC), Children's Health Study found children in the Mira Loma area to have the **slowest lung growth** and **weakest lung capacity**.[2]



2"Association Between Air Pollution and Lung Function Growth in Southern California Children", American Journal of Respiratory and Critical Care Medicine; Gauderman, W. James; McConnell Rob; et al, Department of Preventive Medicine, University of Southern California School of Medicine, Los Angeles.



SCAQMD "Mira Loma Specific Air Management Project", 2002. Presentation by Mike Nazemi before the Mira Loma Community Committee. August 29, 2002.



South Coast Air Quality Management District, "Multiple Air Toxics Exposure Study in the South Coast Air Basin" (MATES II Study), March 2000.

In addition to the large impacts on residents and workers closest to the sources of emissions, distribution center operations pose a particularly acute threat to regional air quality. The area where the proposed project is located, consistently ranks near the top of the list for the nation's most polluted air.[4] Freight transport, including the operations culminating in the Inland Empire, greatly contributes to the persistent failure of the South Coast Air Basin ("SCAB") to meet federal and state clean air standards established by the Environmental Protection Agency. Without all feasible mitigation, the SCAB could fail to achieve the federal annual PM2.5 standard by 2014, the 8-hour ozone standard by 2024, and other air quality standards. This project proposes to add additional pollution that would not have occurred if the project was not built. Against this backdrop, there are several deficiencies in the EIR that must be addressed.

II. The EIR Provides Inadequate Analysis of and Mitigation For the Project's Traffic Impacts.

There are a number of important flaws in the transportation and traffic section of the EIR. As such, further study must be undertaken to properly identify, analyze, and mitigate the traffic impacts of the proposed Project.

CEQA requires that all adverse and significant traffic impacts be properly disclosed, analyzed and, where feasible, mitigated. Until these various issues and concerns are addressed, there is substantial evidence that the proposed Project may have adverse traffic impacts, and these impacts have not been properly disclosed, analyzed, or mitigated. According, the Draft EIR for the WLC must be revised and recirculated.

Most of these concerns are discussed at length in the Review of the EIR for the World Logistics Center prepared by Mr. Tom Brohard for NRDC ("Brohard Letter"). Mr. Brohard is a Professional Civil Engineer in both California and Hawaii and a Professional Traffic Engineer in California. He has over 40 years of engineering experience. His report is attached to this Letter as Exhibit A and incorporated herein by reference. The EIR and its technical studies should be revised to address the flaws identified by Mr. Brohard. Below are some particularly salient points from the Brohard Letter.

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[4] *See* AMERICAN LUNG ASSOCIATION, STATE OF THE AIR 2012 12-17 (2012), *available at* http://www.stateoftheair.org/2012/assets/state-of-the-air2012.pdf. San Bernardino and Riverside Counties rank first and second, respectively, as the most ozone-polluted counties nationwide. *Id.* at 17. San Bernardino and Riverside are also among the most polluted counties by year-round particle pollution (annual PM2.5), ranking ninth and fourth respectively nationwide. *Id.* at 16.

a. The EIR Uses an Improper Baseline.

As outlined in Exhibit A, the traffic analysis uses a faulty baseline. In particular, the EIR and its TIA analysis contain three critical flaws in this regard. First, the EIR fails to adjust upward for 2011 traffic counts.[5] Second, the EIR and TIA fail to adjust for seasonal fluctuations.[6] Finally, the EIR does not indicate if there were adjustments made to convert trucks to passenger car equivalents.[7]

b. Direct and Cumulative Impacts are Incorrectly Identified.

The Brohard Letter identifies more than three pages of examples where direct traffic impacts are not disclosed in the EIR.[8] With more than 50 additional direct project traffic impacts not revealed in the EIR, this precludes a proper analysis of the major traffic impacts from this Project. Also, by failing to disclose these impacts properly, the EIR forecloses analysis of proper mitigation for these intersections where traffic will be degraded.

c. The EIR Dramatically Underestimates Truck Traffic.

As articulated in the Brohard Letter, truck trips are underestimated for this Project.[9] Of particular importance, even using the favorable assumptions from the NAIOP study, this estimate of daily passenger car equivalents is underestimated by 14,281.[10] Thus, the EIR fails to disclose the true extent to the major traffic impacts imposed by this Project.

d. The EIR Ignores Several Feasible Measures That Would Mitigate the Project's Traffic Impacts.

There are many problems with the mitigation measures for this Project. The Brohard letter has identified several mitigation measures that should be implemented to reduce the impacts of this Project.[11] Also, the EIR proposes no mitigation measures for 2017 or 2022.[12] Since there are significant project impacts in this timeframe, CEQA requires the adoption of all feasible mitigation measures to reduce significant impacts like traffic impacts or if there is substantial evidence

[5] Brohard Letter, at 2-3.
[6] Brohard Letter, at 2-3.
[7] Brohard Letter, at 3.
[8] Brohard Letter, at 6-10.
[9] Brohard Letter, at 5.
[10] Brohard Letter, at 6.
[11] Brohard Letter, at 11-12.
[12] Brohard Letter, at 11.

as to why the mitigation measures are infeasible.[13] And even the mitigation offered is flawed. For example, the Brohard Letter identifies flaws with the mitigation measures on pages 13-14. Most importantly, the Brohard Letter identifies that many of the mitigation measures will not be implemented in a timely fashion.

III. The DEIR Provides Inadequate Analysis of and Mitigation For the Air Quality Impacts.

The air quality analysis suffers many flaws that render it incapable of informing public decisions on the merits of this Project. In particular, the EIR underestimates emissions from this Project. Three assumptions create this underestimation, including a) underestimating trip generation numbers, b) underestimating the percentage of trucks associated with the Project, and c) underestimating trip lengths for both autos and trucks.

a. The EIR Uses Faulty Trip Generation Numbers.

Trip generation assumptions are of paramount importance in accurately disclosing the environmental impacts of a project. The trip generation numbers are artificially deflated for this Project, which underestimates the air quality impacts from this project. In particular, the EIR's Air Quality Analysis uses a trip generation number based not on ITE Trip Generation Manual, but rather discounted based on the NAIOP study.[14] The EIR also relies on guidance from SCAQMD, which is reproduced in Exhibit B to this comment letter.[15] The guidance relied upon in pertinent part, states –

> In order to avoid underestimating the number of trips associated with large warehouse / distribution center operations without rail service, AQMD staff recommends that lead agencies utilize a rate of 2.59 trips per TSF for large warehouse air quality analyses on a project specific basis. The value of 2.59 from the nationwide dataset is preferable instead of the SCAB rate of 3.68 due to the greater reliability of data based on the larger sample size. For warehouses with rail service, a rate of 1.63 trips per TSF may be used. These values provide reasonable worst case default rates for individual new warehouses in the absence of more project-specific data.
>
> In the case that air quality is evaluated for multiple warehouses (>10), such as in an analysis for a general plan, the average rate of 1.44 trips per TSF from the ITE 8th Edition Trip Generation manual is acceptable. This lower value may be more appropriate as on

[13] Pub. Res. Code § 21081(a)(3).
[14] EIR, at 4.15-30.
[15] EIR, Appendix D, at 110.

> average, a small portion of warehouses can be expected to operate at varying levels of service, including some warehouses experiencing temporary partial or complete vacancy.[16]

The basis for using a lower trip generation than the rate of 2.59 recommended in SCAQMD's guidance is laid out in the case where 1) there is rail access or 2) "a small portion of warehouses can be expected to operate at varying levels of service, including some warehouses experiencing temporary partial or complete vacancy." Here, since there is no rail access, the project proponents presumably rely on the latter assumption related to more than 10 warehouses. However, the EIR does not contain sufficient analysis to demonstrate this trip generation number is appropriate. For example, the EIR and its studies fail to articulate the amount of temporary partial or complete vacancy that is expected at this complex. In fact, in Appendix O, which articulates the economic benefits of the operation of this facility, there does not anticipate "temporary partial or complete vacancy." To the extent the EIR anticipates that portions of this warehouse complex are presumed to lay vacant, these assumptions should be articulated in all relevant sections of the EIR (e.g. purpose and need section, economic analysis). Absent this justification, the Project should assume the higher trip generation from the ITE Trip Generation Manual for individual warehouse developments.

b. The EIR uses Faulty Assumptions About Truck Trips as a Percentage of Total Trips.

Even if the trip generation numbers are based in reality, the EIR dramatically underestimates the percentage of trips that are by trucks.[17] As outlined in the Brohard Letter, the assumption that only 20% based on a 2003 Fontana Study of warehouse trips attributed to trucks is not supported by the record. In particular, three sources cut against use of this artificially low threshold.

First, the SCAQMD recommends using a much higher truck assumption. In pertinent part, SCAQMD recommends –

> [i]n order to avoid underestimating the number of trucks visiting warehouse facilities, AQMD staff recommends that lead agencies conservatively assume that an average of 40% of total trips are truck trips [(0.48*10 + 0.2*4)/(10+4)=0.4)]. Without more project-specific data (such as detailed trip rates based on a known tenant schedule), this average rate of 40%

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[16] South Coast Air Quality Management District, CalEEMod, Appendix E, Technical Source Documentation, *available at* https://www.aqmd.gov/caleemod/doc/AppendixE.pdf (Exhibit B), at 15.
[17] EIR, at 4.15-32 (Table 4.15M).

> provides a reasonably conservative value based on currently available data.[18]

The 40% recommendation is 100% higher than the 20% estimate used for this EIR. Despite claims by the EIR that the air quality analysis is conservative, this assumption renders the analysis completely indefensible because it undercuts the extent of emissions from this project.

Second, Appendix S to the TIA includes the December 20, 2011 NAIOP Truck Trip Generation Study of 31 high-cube warehouses larger than 500,000 square feet in size in the Inland Empire prepared by Kunzman Associates ("NAIOP Study").[19] This study indicates that 69.70 percent of the high-cube warehouse trips were made by cars and 30.21 percent of the high cube warehouse trips were made by trucks.[20] Even this study, which was relied upon in the EIR to provide justification for a much lower trip generation number than that in the ITE Trip Generation Manual, demonstrates that 20% of trips are attributed to trucks is an inappropriate estimate for high cube warehouses. If the EIR wishes to deviate from using this analysis, it must explain why it deviates from "[t]he 2011 NAIOP [study, which] provides the more accurate trip generation for the proposed project as the NAIOP study is the most comprehensive trip study performed for high-cube logistics warehouses."[21]

Third, the Peer Review of the NAIOP Study in Appendix T to the TIA Report states that "[b]ased on the study's small overall sample size and the fact that only one warehouse over 500,000 square feet was included in the analysis, the 2003 Fontana Study is not an appropriate source for vehicle/truck trip generation rates for modern high-cube warehouses uses larger than 500,000 square feet."[22] Thus, the record also includes evidence that the study in which the 20% truck share number is established is deeply flawed.

The dramatic underestimation of trucks is important because as the EIR concedes, "heavy-duty trucks have greater NOX, PM10, and PM2.5 emissions compared with automobiles."[23] This means that under a conservative assumption endorsed by the SCAQMD, the trucks are underestimated by 100% in the EIR. Even using the less conservative assumptions of the NAOIP study, trips from trucks in the EIR are underestimated by 50%. A particular flaw is the underrepresentation of heavy-heavy duty trucks, which under the 2003 are presumed to be only 12 percent of total trips, but the NAIOP study indicates heavy-heavy duty truck trips

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[18] Exhibit B, at 16.
[19] Brohard Letter, at 5.
[20] Brohard Letter, at 5; *see also* Appendix L, Appendix S, at 11.
[21] EIR, at 4.15-31.
[22] Brohard Letter, at 5; *see also* Appendix L, Appendix T, at 5-6.
[23] EIR, at 4.3-50.

should be much greater than what this outdated study articulates. This underestimation renders the EIR incapable of informed decision-making because it underestimates the number of trucks by thousands. As a result of this analysis, the total emissions from the project are incorrect, in addition to the health risk assessment, which underreported health risk due to the failure to include

c. The Proposed Trip Lengths are Not Support in the EIR.

Also, of great concern, the EIR underestimates trip length for trucks using the proposed warehousing facilities. NRDC retained Dr. Alex Karner to look at the trip length assumptions in the EIR and associated technical studies. This memo summarizing his findings is located at Exhibit C to the attached comments. We incorporate this analysis by reference and ask that the EIR address the comments contained therein. As noted by Dr. Karner, small changes in assumptions can dramatically impact emissions. For example, a 55 average trip length, would increase the emissions compared to the current 50 mile trip length assumed in the EIR.

Dr. Karner's analysis indicates that the EIR fails include sufficient data to justify the 50 mile assumed trip length.[24] In particular, using the EIR assumptions, only 881 of the 14,683 truck trips associated with this project in 2022 would be from the Ports. This is less than 10% of the total number of port-related trips projected for the San Bernardino Valley in 2022, which is likely to be approximately 9,100.[25] This low level of port-related trips is curious, given the stated goal of this warehousing project to accommodate traffic to and from the Ports of Los Angeles and Long Beach. Given this likely underestimation of trip lengths, the emissions from the project will be understated as well.

d. The Construction Mitigation Measures Must be Improved.

The mitigation measures for construction are vague. We recommend that the construction mitigation comply with the following requirements:

The mitigation measures provided for construction activity are inadequate because they fail to fully address the diesel engines used by construction equipment, which are the largest construction related emission source. Construction related emissions from this project are estimated to exceed several important health and air quality thresholds including SCAQMD regional thresholds of significance for VOC, NOx, CO, PM10 and PM2.5; local thresholds for NO2, PM10 and PM2.5; and cancer risk.

[24] EIR, Appendix D, at 120.
[25] Exhibit C, at 4.

While the plan calls for construction equipment to meet EPA Tier 4 emission standards in 2017 and thereafter, it continues to allow for interim tier 4 equipment that meets a particulate standard ten times less protective,[26] and allows for more polluting tier 3 equipment if the cleaner equipment is not easily available through a rental company.[27] This opens the door to widespread use of more polluting construction equipment despite the fact that tier 4 compliant construction equipment is already available and will be widely available beginning in 2014, the final U.S. EPA deadline for which it is required across the board.[28]

Of most concern is that prior to 2017, construction equipment is only required to meet U.S. EPA Tier 3 standards, which are similar to 1994 vintage truck standards and at least ten times more polluting than modern standards for both NOx and PM.[29] The WLC should adhere to the clean construction policies adopted by the Port of Los Angeles and by the Los Angeles County Metropolitan Transportation Authority ("LA METRO").[30] Both of these policies require construction equipment to meet Tier 4 standards no later than 2015 and require use of diesel particulate filters on all construction equipment that does not meet Tier 4 standards starting in 2011. Further, the policies also require all on-road trucks associated with construction to meet U.S. EPA 2007 emission standards by January 2014, all trucks carrying material such as debris or fill be fully covered; and that in any case where grid power is inaccessible and generators are utilized, they must meet 0.01 gram per brake-horsepower hour standard for PM or be equipped with best available control technology for PM, such as diesel particulate filters. All three of these important elements must be applied to this project.

We recommend a strict no idling policy on the construction site, applied to all vehicles – on- and off-road when they are not actively engaged in work on the

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[26] See diesel standards explained by dieselnet: http://www.dieselnet.com/standards/us/nonroad.php

[27] "Written verification of the Tier IV equipment search of three or more rental companies shall be provided by the project applicant to the City verifying the results of the search."

[28] Again, see dieselnet for more information on the phase in of interim and tier IV standards. Note that tier IV equipment phases in through 2015 only for the very largest engines, exceeding 750 horsepower and more typically used for mining, not construction. See Cummins for another helpful description of tier IV equipment and note a modest fuel savings in addition to major emission reductions associated with final tier IV equipment: http://cumminsengines.com/tier-4-final

[29] Compare standards at dieselnet.com.

[30] Port of Los Angeles Green Construction program, see page 160, http://www.portoflosangeles.org/CAAP/_2010_CAAP_UPDATE_FINAL.pdf
LA Metro Green Construction Policy, http://www.metro.net/projects_studies/sustainability/images/Green_Construction_Policy.pdf

site. Additionally we recommend the use of electric and alternative fueled equipment where feasible. We support the remaining construction mitigation measures and best practices, including most notably that on site electrical hook ups for equipment will be provided, where feasible. We note that establishing access to grid power is an essential priority.

Finally, it is important for all nearby residents and sensitive sites such as schools, daycares and senior centers to be actively notified in advance of and during construction activities.

e. The Operational Mitigation Must Be Strengthened.

Mitigation for diesel trucks in the plan is grossly inadequate, especially considering that these trucks are by far the greatest source of pollution from the project with or without the mitigation package.[31] In fact emissions from diesel trucks in the mitigated scenario appear to be much less that the "worst case scenario" because credit is taken for a "project design feature" calling for 2010 and later model year trucks to serve the facility.[32] However, this specification is not included as mitigation nor is it made clear how it will be enforced or upheld. Diesel truck emission remain high even when the 2010 and later truck design feature is accounted for, comprising almost 3,000 pounds per day of NOx emissions or more than 90 percent of the project total; and over 120 pounds per day of PM2.5 emissions or 80 percent of the project total.[33] Not only should 2010 and newer diesel trucks be required as a minimum specific mitigation measure, the plan must go further to address this major source of pollution by adding the following mitigation measures:

- Require at least half of the trucks serving the facilities to be alternative fuel including, but not limited to electric and hydrogen fuel cell or hybrid vehicles.
- Require at least one quarter of trucks serving the facility to be zero-tailpipe emission vehicles; or that one quarter of goods delivered to the facility be conveyed by zero-tailpipe emission technology; and that the proportion of zero-tailpipe emission conveyance increase to fifty percent by 2020.

Although the plan fails to adequately address pollution from the largest source, diesel trucks, there are many other mitigation measures that we support. Several mitigations are helpful, pertaining to providing ample signage to keep

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[31] See for example, tables 52 and 57 of Air Quality, Greenhouse Gas and Health Risk Assessment Report.
[32] See discussion on page 180, of Air Quality, Greenhouse Gas and Health Risk Assessment Report
[33] According to table 57 of the Air Quality, Greenhouse Gas and Health Risk Assessment Report.

trucks on truck routes and off residential streets and curtailing unnecessary idling (MM AQ-6, a, b, and c). Similarly, MM AQ-6 i providing trucking services is helpful. Other measures in MM AQ-6 seem of little consequence as they encourage compliance with existing laws. For example, it is not clear what MM AQ-6 f and g encouraging SmartWay certified trucks add to the existing California regulations requiring SmartWay type efficiency measures for trucks. We support the commitment in MM AQ-6 h to provide onsite alternative fueling infrastructure in accordance with the Regional Transportation Plan zero/near-zero emissions truck corridor along State Route 60. However, this commitment does not go far enough, as the project itself should require utilization of zero and near-zero emission trucks, discussed above.

Many mitigation measures are focused on reducing passenger vehicle emissions, including bikeways, bike lockers and showers, pedestrian access and others; these are helpful measures, yet they do not provide significant reductions in pollution from the project (MM AQ-7). The last element of MM AQ-7 covering buffer zones addresses near project exposures, however, is of paramount importance. We strongly support the inclusion of buffer zones, but the measure as stated must be strengthened. The South Coast Air Quality Management District noted in its May 1, 2012 letter commenting on the Draft Specific Plan for the Project, that the setbacks described in the plan are inadequate to protect public health. We share the Air District's concern that certain areas with heavy duty diesel trucking activity (e.g. roadways and loading docks) may not have adequate setback distances from residential areas and seem to focus mainly on the buildings instead of the high traffic roadways and loading areas. The Air District also notes California Air Resources Board (CARB) guidance calling for a 1,000 foot setback between sensitive sites including housing and distribution centers receiving more than 100 truck trips per day or 40 trucks with refrigeration units. According to Exhibit 21, showing the project's incremental cancer risk with mitigation accounted for, an additional cancer risk of 10 per million appears to impact the residential area far beyond 1,000 feet of the project perimeter. Thus, a minimum setback of 1,000 feet as CARB recommends is essential.

Mitigation of pollution from transport refrigeration units (TRUs) and yard equipment such as hostlers and forklifts is entirely missing from the Plan. This type of equipment is universally associated with warehousing and therefore must be accounted for here and mitigated. We recommend the following additional mitigations:

- Forklifts, yard tractors, and other equipment at warehouses run steadily and never leave the site, which means their emissions accumulate nearby. All equipment should use electric battery or fuel cell engines. Where this is not possible, any remaining diesel equipment must employ the best available control technology to reduce emissions of PM and NOx, such as diesel particulate filters, cleaner fuels, and more efficient engines.

- Warehouse operators have the ability to minimize truckers' use of transport refrigeration units that rely on secondary diesel engines. WLC must provide electric hookups for refrigeration at each loading dock, minimizing the use of any diesel refrigeration units and ensuring that those that do remain in use meet the cleanest emissions standards (U.S. EPA Tier 4). Further, indoor warehouse space must provide ample storage for refrigerated goods passing through the facility to ensure that no refrigerated goods are stored in trailers or externally, requiring use of TRUs.

The **mitigation for greenhouse gas (GHG) emissions from this project** is also grossly inadequate. It seems that it is entirely focused on solid waste and recycling (MM AQ-8), despite the many other opportunities for GHG reduction measures.

We strongly support the addition of a mitigation measure requiring rooftop solar generation, as the Air District suggests in their above mentioned comment letter (5/1/12). However, this mitigation measure must be enforceable and clearly articulated in the EIR. The high cube warehouses will have ample roof space for photovoltaic panels or any other type of solar power generation, not only to meet the electrical needs of the facility itself but also to provide additional renewable power to California to help mitigate the transportation GHG impacts of the project. The Plan erroneously states that the project is not part of California's power generation grid and thus cannot contribute to the 33 percent Renewable Portfolio Standard. This is false because the project will utilize power from the California grid and could instead become a power generator contributing to the state's efforts to increase renewables and mitigating the project impacts.

All warehousing buildings on the site should be built to meet the standards of the Leadership in Energy and Environmental Design (LEED) Green Building Rating System.™ They should include energy efficient lighting, heating, and cooling measures as well as stormwater management, vegetative cover, and the use of locally sourced materials where possible.[34] Simply stating that the project will comply with California energy codes and other existing requirements does not constitute a mitigation measure. WLC can go far beyond what is required by law, significantly cutting GHG emissions by meeting LEED platinum standards for all the structures that are built.

f. The Project Proponent Should Provide Funding to Provide Clinics and Other Sensitive Site Mitigation to Reduce the Impacts from Warehouse Pollution.

[34] For information on LEED standards, see the U.S. Green Building Council: http://www.usgbc.org/DisplayPage.aspx?CategoryID=19.

To avoid injury to public health, the project must mitigate its impacts through the reduction of emissions to as near zero as possible, and this comment letter offers numerous measures that should be used in pursuing that goal. Given that increases in pollution are likely even after these measures are implemented and given the lasting effects of pollution from the WLC, further mitigation is needed to address the extraordinary impact of this project on the respiratory health of communities near the proposed project and along the goods movement corridors that go to the proposed project. A mitigation fund controlled by the neighboring community should also be made available to help address some of the unmitigated impacts of this project, supporting the implementation of such measures as vegetation and other barriers, filtration devices and window upgrades for nearby buildings, and on-site air quality monitoring. The fund should be of ample size so as to cover indoor air filtration expenses for all nearby residents who request such filtration, buffer vegetation and landscaping, and a community air monitor if so desired, as well as sufficient funds to administer these programs.

Many residents of goods movement communities and workers at the ports have already suffered irreparable long term damage to their lungs – as noted earlier, diminished lung function in children generates lifelong health effects. The project proponent should fund the establishment of one or several medical facilities close to the project and along the route to the project dedicated to the respiratory and general health of the people most affected by these emissions.

Many of the goods movement adjacent neighborhoods in this region are heavily populated with low and moderate income families unable to afford health insurance. Similarly, while some workers in the warehousing industry earn relatively high wages with good benefits, thousands of others earn low wages with few or no benefits.

Thus, funding for clinics should be sufficient not only to construct appropriate facilities, but also include adequate support for operations so that two classes of patients – residents of the identified goods movement adjacent communities and warehouse workers can access the facility without out of pocket cost regardless of insurance status.

Finally, the project proponent needs to explore installation of air filtration system to protect residents from harmful levels of air pollution. The Port of Los Angeles agreed through the TraPac MOU to fund filtration systems in school in the vicinity of that project, and this Project should also include this type of mitigation. In addition, the Port of Long Beach through the Middle Harbor Redevelopment Project agreed to fund air filtration systems for schools and other sensitive sites. This mitigation must be part of the WLC project.

IV. The Analysis of Agricultural Impacts is Deeply Flawed.

The proposed project will have a large impact on loss of agricultural lands. In particular, the EIR provides absolutely no mitigation for the impacts of loss of agricultural land. In examining the potential of a fee to help offset the loss of agricultural land, the EIR summarily dismisses this potential because the fee was rejected during larger general plan discussions. Thus, the EIR does not engage in a project specific analysis of the feasibility of this type of measure. In particular, given the economic promises being made by the Project proponents in Appendix O, it is unclear why such a fee is infeasible.

V. The DEIR/S Does Not Adequately Discuss Alternatives to the Proposed Project.

The analysis of alternatives to the proposed project lies at "[t]he core of an EIR."[35] In this analysis, the EIR must consider a reasonable range of alternatives that would avoid or substantially lessen this impact while feasibly attaining most of the Project's basic objectives.[36] If the EIR refuses to consider a reasonable range of alternatives or fails to support its analysis with substantial evidence, the purposes of CEQA are subverted and the EIR is legally inadequate.[37] If a feasible alternative exists that will meet the project's objectives while reducing or avoiding its significant environmental impacts, the project may not be approved.[38]

The analysis of the alternatives throughout the document fails in this respect. In particular, the EIR has failed to examine an alternative with better access to rail and closer to the Ports.[39] As the SCAQMD has articulated, "[r]ail lines are expected to lower the truck trip rate by diverting the transportation of goods from trucks to trains that directly service the facility."[40] The EIR summarily notes that there are no alternative sites in surrounding areas.[41] By determining that the only feasible alternative site would include "a contiguous 2,635-acre site for 41 million square feet,"[42] the EIR fails to examine existing warehouse space and future land zoned industrial. For example, a recent SCAG report entitled *Industrial Space in Southern California* attached as Exhibit D demonstrates that there are other

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[35] *Citizens of Goleta Valley II*, 52 Cal. 3d at 564; *see also* Pub. Res. Code § 21002.1(a) ("The purpose of an environmental impact report is . . . . to identify alternatives to the project . . . .").
[36] *See* § 21100(b)(4); CEQA Guidelines § 15126.6(a).
[37] *San Joaquin Raptor*, 27 Cal. App. 4th at 735-38; *Kings County Farm Bureau*, 221 Cal. App. 3d at 736-37.
[38] Pub. Res. Code § 21002.
[39] Brohard Letter, at 15.
[40] Exhibit C, at 15.
[41] EIR, at 6-38.
[42] EIR, at 6-38.

potential sites that could have been explored. For example, the report identifies 143 million ft^2 of available warehouse space.[43] In addition, it also identifies 186 million ft^2 of warehouse development potential in the region.[44] Surely, the cursory, unlawful analysis in the EIR would have benefited from a reasonable analysis of locations with better rail service and closer to regional centers to reduce truck trip length. The failure to consider a reasonable range of alternatives renders the EIR invalid.

VI. A Revised Draft EIR Must Be Prepared and Recirculated.

Because of the inadequacies discussed above, the draft EIR cannot form the basis of a final EIR. CEQA requires preparation and recirculation of a supplemental draft "[w]hen significant new information is added to an environmental impact report" after public review and comment on the earlier draft EIR.[45] The opportunity for meaningful public review of significant new information is essential "to test, assess, and evaluate the data and make an informed judgment as to the validity of the conclusions to be drawn therefrom."[46] An agency cannot simply release a draft report "that hedges on important environmental issues while deferring a more detailed analysis to the final [EIR] that is insulated from public review."[47]

In order to cure the panoply of EIR defects identified in this letter, the City must obtain substantial new information to adequately assess the proposed Project's environmental impacts, and to identify effective mitigation and alternatives capable of alleviating the Project's significant impacts. This new information will clearly necessitate recirculation. CEQA requires that the public have a meaningful opportunity to review and comment upon this significant new information in the form of a recirculated draft supplemental EIR.

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[43] Exhibit D, at 2-5.
[44] Exhibit D, at 2-11.
[45] Pub. Resources Code § 21092.1.
[46] *Sutter Sensible Planning, Inc. v. Sutter County Board of Supervisors*, 122 Cal. App. 3d 813, 822 (1981); *City of San Jose v. Great Oaks Water Co*., 192 Cal. App. 3d 1005, 1017 (1987).
[47] *Mountain Lion Coalition v. California Fish and Game Comm'n*, 214 Cal.App.3d 1043, 1052 (1989).

We appreciate your consideration of our comments. While these comments solely focus on air quality, traffic and loss of agricultural space, we remain concerned about many other impacts articulated in comments from other organizations. Please feel free to contact us if you have any questions.

Sincerely,

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EXHIBIT A

Tom Brohard and Associates

March 29, 2013

Mr. Adriano Martinez, Staff Attorney
Natural Resources Defense Council
1314 Second St.
Santa Monica, CA 90401

SUBJECT: World Logistics Center Project Draft Environmental Impact Report – Traffic and Transportation – Findings and Comments

Dear Mr. Martinez:

At the request of the Sierra Club, I have reviewed the traffic and transportation portions of the February 4, 2013 World Logistics Center Project Draft Environmental Impact Report (Draft EIR) prepared by LSA for the City of Moreno Valley. In preparing these findings and comments, the following sections and appendices related to traffic and transportation in the Draft EIR for the World Logistics Center Project have been reviewed:

- Chapter 1.0 – Executive Summary
- Chapter 2.0 – Introduction and Purpose
- Chapter 3.0 – Project Description
- Chapter 4.15 – Traffic and Circulation
- Draft EIR Appendix L – January 2013 Traffic Impact Analysis Report (TIA Report) prepared by Parsons Brinckerhoff
- TIA Report Appendices A through T prepared by Parsons Brinckerhoff (TIA Appendices)

In my review of these documents, I have concluded that the Draft EIR and the TIA Report for the proposed World Logistics Center Project are seriously flawed as an adequate assessment of Project traffic impacts on freeways, roadways and intersections has not been provided. Further study of the findings and comments identified in this letter is required as part of a Recirculated Draft EIR for the World Logistics Center Project.

As explained in detail throughout this letter, the Draft EIR and the TIA Report fail to establish a proper baseline for analysis. Direct Project traffic impacts are repeatedly confused with cumulative Project traffic impacts, leading to defective mitigation measures. Mitigation measures are not developed for Project conditions forecast in either Year 2017 or in Year 2022, and funding is not shown to be available to construct mitigation measures in a timely manner as the significant Project traffic impacts occur in Years 2012, 2017, 2022, and 2035. The documents also omit important information and contain numerous errors, making it difficult at best for the public to review and understand.

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Education and Experience

Since receiving a Bachelor of Science in Engineering from Duke University in Durham, North Carolina in 1969, I have gained over 40 years of professional engineering experience. I am licensed as a Professional Civil Engineer both in California and Hawaii, and as a Professional Traffic Engineer in California. I formed Tom Brohard and Associates in 2000 and now serve as the City Traffic Engineer for the City of Indio and as Consulting Transportation Engineer for the Cities of Big Bear Lake, San Fernando, and Tustin. I have extensive experience in traffic engineering and transportation planning. During my career in both the public and private sectors, I have reviewed many environmental documents and traffic studies, with only a few of these shown on the enclosed resume.

Traffic and Transportation Issues/Concerns – Findings and Comments

Based on the information provided in the February 4, 2013 Draft EIR and the January 2013 TIA Report for the World Logistics Center Project, my review disclosed numerous issues and concerns relating to traffic and transportation. Each of the following findings and comments must be addressed through further study and necessary modifications to the Draft EIR, together with recirculation for public review and comment:

1) Traffic Counts Were Not Adjusted to Create a Proper Baseline – Traffic counts at study intersections were made over 20 months between March 2011 and October 2012. All counts were assumed to have been made in 2012 but Appendix A to the TIA Report shows that traffic counts at 78 of the intersections were actually conducted in Year 2011. No adjustments were made to account for annual ambient traffic growth to bring the Year 2011 counts forward to Year 2012 whereas a two percent per year increase was assumed to grow the Year 2012 counts to Year 2017. Furthermore, no adjustments were made to remove potentially significant seasonal traffic volume fluctuations among the months of February, March, October, November, and December when the counts were taken.

   According to Page 46 of the TIA Report, 24-hour traffic counts were collected on the study road segments. Copies of these traffic counts were not provided in Appendix A. Similar deficiencies in establishing a proper baseline for the 24-hour counts including annual ambient growth and seasonal adjustments may also exist. In addition, no evidence is presented to indicate how or if adjustments were made to convert trucks to passenger car equivalents.

   Additionally, traffic volume counts on the freeway mainline and weaving segments may have been taken from annual Caltrans Traffic Volume publications but the TIA Report does not identify the source of this data. The most recent data available from Caltrans reflects freeway traffic volumes

counted in Year 2011 or earlier. Similar deficiencies in establishing a proper baseline for these counts including annual ambient growth may also exist.

Traffic counts made during Year 2011 or before should be brought forward at two percent per year to reflect proper baseline traffic volumes in Year 2012. By failing to do this, the Draft EIR is internally inconsistent as the TIA Report did expand traffic volumes by two percent per year to establish baseline conditions in Year 2017. Furthermore, traffic volume fluctuations during different seasons should have been adjusted to a common seasonal baseline to properly reflect the higher volumes recorded during the peak month. If the counts are not adjusted, then the TIA Report and the Draft EIR must present evidence through validation and comparison of traffic counts that annual and seasonal adjustments are not required.

2) Traffic Volumes for Approved Projects Are Not Supported by Evidence - Figure 3 on Page 6 of the TIA Report followed by Table 1 beginning on Page 7 provide a map and a list of approved development projects that have been assumed to be complete by Year 2017. The TIA Report fails to include the trip generation and trip distribution for each of these projects as well as a summary of peak hour trips from these projects that are forecast to travel through study intersections as well as on roadway and freeway segments. In addition, no evidence is presented to indicate how or if adjustments were made to adjust truck volumes to passenger car equivalents generated by these projects. Without this data and information, the baseline traffic volumes used in the Year 2017 analyses cannot be supported.

   In addition, the Year 2017 traffic volume baseline does not appear to include trips to and from various nearby development projects on the enclosed listing provided by Riverside County. General Plan Amendments are associated with each of these projects and some of these projects have already been entitled. As a result, each of these projects must be considered to be reasonably foreseeable and trips to and from each of them must be added to the Year 2017 baseline for a proper traffic analysis of the World Logistics Center.

3) Year 2035 Baseline Traffic Volumes Are Lower than Earlier Years – Several freeway segment volumes in the Year 2035 scenario are less than the same freeway segment volumes in the scenarios of earlier years. The Draft EIR and TIA Report indicate that the Project will reverse the significant existing jobs to housing imbalance with 25,000 new jobs for City of Moreno Valley residents. It is unreasonable to conclude that the 25,000 new jobs will solely be taken by City residents and that the current directional peak hour congestion will be eliminated, especially with World Logistics Center Project trucks replacing a number of the commuter worker trips in the current peak direction.

In the traffic analysis, associated segment volumes in the current peak directions are forecast to drop. In turn, the Level of Service (LOS) for freeway segments in the current peak direction is then forecast to improve from LOS "F" to LOS "D" with the negative Project trips are added (subtracted). The conclusion that building 41,600,000 square feet of high cube warehouses will lower traffic volumes on the freeway system and then improve peak hour operating conditions is not reasonable or logical.

4) World Logistics Center Project Traffic Volumes Not Adequately Disclosed – Table 24 on Page 78 of the TIA Report as well as Table 4.15M on Page 4.15-32 of the Draft EIR provide peak hour and daily trip forecast volumes for truck and auto traffic forecast for the World Logistics Center Project. It appears that the "Phase 2" subheading in both of these tables represent the total number of trips that will be generated at completion of the entire World Logistics Center Project, not merely by completion of Phase 2 of the Project. This requires clarification.

   Page 80 of the TIA Report provides graphic representations of the forecast changes in freeway "car" traffic volumes in the AM peak hour in Figure 26 and in the PM peak hour in Figure 27 by comparing 2012 without project volumes to with project traffic volumes. Volumes in the current primary travel direction (westbound in the AM peak hour and eastbound in the PM peak hour) show reductions of over 500 car trips and corresponding increases of over 500 car trips in the current secondary travel pattern. As indicated above, the reductions and additions are based upon the faulty assumption that the 25,000 new jobs will be taken by City of Moreno Valley residents.

   Figures 26 and 27 are also misleading if they include only "car" trips. The World Logistics Center will generate a significant number of truck trips in the current secondary travel directions. When these are converted to passenger car equivalents to properly disclose the overall changes, the reductions will likely be lower and the additions will likely be higher than shown in Figures 26 and 27.

   The Draft EIR and the TIA Report do not clearly identify the numbers of auto and truck trips associated with World Logistics Center on freeway segments, roadway segments, and at intersections. Instead, the documents provide figures of baseline and baseline plus project trips. The two different figures require comparison with each other to identify project traffic.

   Traffic study guidelines such as the "Guide for the Preparation of Traffic Impact Studies" published by the California Department of Transportation in December 2002 require that figures be provided to clearly disclose project generated trips. By omitting these figures with actual numbers, the TIA Report and Draft EIR do not properly disclose the negative trip generation that is

forecast to occur. By omitting these figures for project generated trips only, it is not clear if the analyses properly included passenger car equivalents for the trucks or just traffic volumes for the World Logistics Center Project without the necessary passenger car equivalent adjustments.

5) World Logistics Center Project Daily Truck Trips Are Underestimated – Table 4.15.M on Page 4.15-32 of the Draft EIR and Table 24 on Page 78 of the TIA Report provide forecasts for the number of autos, light trucks, medium trucks, and heavy trucks that are forecast to be generated by the World Logistics Center Project. Footnotes to these tables indicate the numbers of auto and truck trips shown are based on the Truck Trip Generation Study (Fontana Study) prepared in August 2003 for the City of Fontana. Using the Fontana Study, the text immediately below each table indicates that 80 percent of the vehicles forecast for the World Logistics Center are autos and the remaining 20 percent of the vehicles are trucks.

   Appendix S to the TIA Report provides the December 20, 2011 NAIOP Truck Trip Generation Study of 31 high-cube warehouses larger than 500,000 square feet in size in the Inland Empire area prepared by Kunzman Associates (NAIOP Study) and Appendix T to the TIA Report provides the February 1, 2012 Peer Review conducted by Urban Crossroads of the NAIOP Study. Data contained in Appendix D to the NAIOP Study indicates that 69.79 percent of the high-cube warehouse trips were made by cars and 30.21 percent of the high-cube warehouse trips were made by trucks, not 80 percent cars and 20 percent trucks from the 2003 Fontana Study. Other entities suggest using an even greater truck trip percentage for this type of warehouse development (i.e., SCAQMD's recommendation to use a 40 percent truck assumption for a conservative analysis). Based on this, the Draft EIR and TIA Report must revise the percentage of trucks up from 20 percent to at least 30 percent.

   Regarding the 2003 Fontana Study, Page 7 of the Peer Review in Appendix T to the TIA Report states "Based on the study's small overall sample size and the fact that only one warehouse over 500,000 square feet was included in the analysis, the 2003 Fontana Study is not an appropriate source for vehicle/truck trip generation rates for modern high-cube warehouse uses larger than 500,000 square feet. In addition, the 2003 Fontana Study surveyed buildings that were likely constructed prior to the shift to larger, highly automated buildings that many global retailers and logistics companies are utilizing in the modern economy."

   Both Appendix S and Appendix T to the TIA Report clearly demonstrate that the 2003 Fontana Study should not be used to forecast truck trip generation for the World Logistics Center Project. By doing this, the Draft EIR and TIA

Report have significantly underestimated the number of truck trips that the World Logistics Center will generate.

For example, application of the data shown in the NAIOP Study to the 71,085 daily trips forecast for the completion of the entire World Logistics Center Project (currently identified as Phase 2 in the tables) changes the number of passenger car equivalents that must be used to properly identify, disclose, analyze, and mitigate the additional number of significant environmental impacts that will be created by the World Logistics Center Project. Using data from the outdated 2003 Fontana Study, the Draft EIR and TIA Report indicate 93,414 daily passenger car equivalent trips will be generated. Using the current data contained in Appendix D to the NAIOP Study including 70 percent autos, three percent 2-axle trucks, four percent 3-axle trucks, and 23 percent 4+-axle trucks indicates 107,695 daily passenger car equivalent trips will be generated. Therefore, the Draft EIR has underestimated 14,281 daily passenger car equivalent trips in its analyses of environmental impacts.

6) Direct and Cumulative Impacts Are Incorrectly Identified – Page 4.15-85 of the Draft EIR properly defines direct and cumulative traffic impacts as follows:

- Direct Traffic Impacts – "A significant project-specific impact would occur if the project would cause a decrease from satisfactory LOS (based on local agency adopted standards) to an unsatisfactory LOS on a study area intersection, roadway segment, freeway mainline lane, freeway weaving segment or freeway ramp."

- Cumulative Traffic Impacts – "A significant cumulative traffic impact would occur if the project contributes toward those facilities operating at unsatisfactory LOS in the pre-project condition."

The Draft EIR and the TIA Report incorrectly identify many cumulative traffic impacts when they are in fact direct traffic impacts from the definitions above. Further, other direct impacts are not disclosed in the text even though the direct impacts are clearly shown in the various tables when the LOS degrades from an acceptable to an unacceptable level with the addition of only Project traffic. Additional direct traffic impacts which have not been identified in the Draft EIR include the following:

Existing (2012) plus Project – Intersections – (PM Peak Table 4.15.AD-2)

- #123 – Gilman Springs/Bridge Street – Degrades from LOS C with 20.8 seconds of delay to LOS D with 26.1 seconds of delay with Project traffic added.
- #132 – San Timoteo/Alessandro - Degrades from LOS C with 23.9 seconds of delay to LOS F with 103.4 seconds of delay with Project traffic.

Existing (2012) plus Project – Mainline – (AM Peak Hour Table 4.15.AF)

- F-6 – EB SR-60 – Euclid/Grove – Degrades from LOS D with density of 34.7 to LOS E with density of 38.5 with Project traffic added.

Existing (2012) plus Project – Weaving – (PM Peak Hour Table 4.15.AG)

- W-25 – EB SR-60 – Central/Fair Isle – Degrades from LOS D with density of 32.4 to LOS E with density of 35.5 with Project traffic added.
- W-25 – WB SR-60 – Central/Fair Isle – Degrades from LOS D with density of 29.3 to LOS E with density of 35.3 with Project traffic added.

Year 2017 plus Project – Intersections – (AM Peak Table 4.15.AI-1)

- #74 – Elsworth/Cactus – Degrades from LOS D with 54.4 seconds of delay to LOS E with 56.1 seconds of delay with Project traffic added.

Year 2017 plus Project – Mainline – (AM Peak Hour Table 4.15.AK-1)

- F-7 – EB SR-60 – Grove/Vineyard – Degrades from LOS D with density of 34.9 to LOS E with density of 37.2 with Project traffic added.
- F-8 – EB SR-60 – Vineyard/Archibald – Degrades from LOS D with density of 34.1 to LOS E with density of 36.1 with Project traffic added.
- F-19 – EB SR-60 – Market/Main – Degrades from LOS D with density of 31.8 to LOS E with density of 35.3 with Project traffic added.
- F-49 – EB SR-91 – Central/14th – Degrades from LOS D with density of 34.6 to LOS E with density of 35.1 with Project traffic added.

Year 2017 plus Project – Mainline – (PM Peak Hour Table 4.15.AK-2)

- F-17 – WB SR-60 – Valley/Rubidoux – Degrades from LOS D with density of 34.1 to LOS E with density of 36.5 with Project traffic added.
- F-24 – WB SR-60 – MLK/Central – Degrades from LOS D with density of 33.9 to LOS E with density of 40.3 with Project traffic added.
- F-29 – WB SR-60 – Pigeon Pass/Heacock – Degrades from LOS D with density of 32.7 to LOS E with density of 39.3 with Project traffic added.

Year 2017 plus Project – Weaving – (PM Peak Hour Table 4.15.AL-2)

- W-28 – WB SR-60 – Day/Pigeon Pass – Degrades from LOS D with density of 32.5 to LOS E with density of 35.6 with Project traffic added.

Year 2017 plus Project – Ramps – (PM Peak Hour Table 4.15.AM)

- R-19 – WB SR-60 – MLK Off/MLK Off – Degrades from LOS C with density of 23.0 to LOS E with density of 36.0 with Project traffic added.

Year 2022 plus Project – Intersections – (AM Peak Table 4.15.AN)

- #27 – Redlands/Cactus – Degrades from LOS B with 13.4 seconds of delay to LOS F with >50 seconds of delay with Project traffic added.
- #38 – Perris/JFK – Degrades from LOS D with 50.8 seconds of delay to LOS E with 58.3 seconds of delay with Project traffic added.

- #39 – Iris/Perris – Degrades from LOS D with 54.0 seconds of delay to LOS E with 57.8 seconds of delay with Project traffic added.
- #46 – Kitching/Krameria – Degrades from LOS C with 29.2 seconds of delay to LOS E with 61.4 seconds of delay with Project traffic added.
- #123 – Gilman Springs/Bridge – Degrades from LOS C with 22.3 seconds of delay to LOS E with 38.3 seconds of delay with Project traffic added.
- #135 – Crescent/Alessandro – Degrades from LOS D with 27.7 seconds of delay to LOS E with 47.8 seconds of delay with Project traffic added.

Year 2022 plus Project – Intersections – (PM Peak Table 4.15.AN)

- #12 – Theodore/Ironwood – Degrades from LOS C with 17.8 seconds of delay to LOS F with 50.5 seconds of delay with Project traffic added.
- #27 – Redlands/Cactus – Degrades from LOS A with 9.5 seconds of delay to LOS F with >50 seconds of delay with Project traffic added.
- #28 – Moreno Beach/JFK – Degrades from LOS B with 18.9 seconds of delay to LOS E with 57.8 seconds of delay with Project traffic added.
- #36 – Moreno Beach/Ironwood – Degrades from LOS D with 51.0 seconds of delay to LOS E with 56.7 seconds of delay with Project traffic added.
- #38 – Perris/JFK – Degrades from LOS D with 53.5 seconds of delay to LOS E with 56.7 seconds of delay with Project traffic added.
- #40 – Kitching/Iris – Degrades from LOS C with 23.9 seconds of delay to LOS E with 71.5 seconds of delay with Project traffic added.
- #46 – Kitching/Krameria – Degrades from LOS D with 40.0 seconds of delay to LOS E with 55.7 seconds of delay with Project traffic added.
- #58 – Heacock/Alessandro – Degrades from LOS D with 48.9 seconds of delay to LOS E with 65.3 seconds of delay with Project traffic added.
- #70 – Day/Alessandro – Degrades from LOS D with 43.0 seconds of delay to LOS F with 98.5 seconds of delay with Project traffic added.

Year 2022 plus Project – Mainline – (AM Peak Hour Table 4.15.AP-1)

- F-4 – EB SR-60 – Central/Mountain – Degrades from LOS D with density of 33.0 to LOS E with density of 35.5 with Project traffic added.
- F-5 – EB SR-60 – Mountain/Euclid – Degrades from LOS D with density of 32.5 to LOS E with density of 35.1 with Project traffic added.
- F-9 – EB SR-60 – Archibald/Haven – Degrades from LOS D with density of 32.8 to LOS E with density of 36.0 with Project traffic added.
- F-29 – EB SR-60 – Pigeon Pass/Heacock – Degrades from LOS D with density of 29.2 to LOS E with density of 39.6 with Project traffic added.
- F-30 – EB SR-60 – Heacock/Perris – Degrades from LOS C with density of 25.0 to LOS E with density of 39.2 with Project traffic added.
- F-49 – EB SR-91 – Central/14th – Degrades from LOS D with density of 34.9 to LOS E with density of 35.5 with Project traffic added.

Year 2022 plus Project – Mainline – (PM Peak Hour Table 4.15.AP-2)

- F-18 – WB SR-60 – Rubidoux/Market – Degrades from LOS D with density of 32.5 to LOS E with density of 37.1 with Project traffic added.
- F-29 – WB SR-60 – Pigeon Pass/Heacock – Degrades from LOS D with density of 34.0 to LOS F with density of 46.9 with Project traffic added.
- F-30 – WB SR-60 – Heacock/Perris – Degrades from LOS D with density of 27.5 to LOS E with density of 39.1 with Project traffic added.

Year 2022 plus Project – Weaving – (AM Peak Hour Table 4.15.AQ)

- W-23 – EB SR-60 – University/MLK – Degrades from LOS D with density of 30.5 to LOS E with density of 35.3 with Project traffic added.
- W-25 – EB SR-60 – Central/Fair Isle – Degrades from LOS C with density of 27.4 to LOS E with density of 35.3 with Project traffic added.

Year 2022 plus Project – Ramps – (AM Peak Hour Table 4.15.AR)

- R-2 – EB SR-60 – On from Central – Degrades from LOS D with density of 28.8 to LOS F with density of 33.2 with Project traffic added.

Year 2035 plus Project – Intersections – (AM Peak Table 4.15.AS-1)

- #11 – Theodore/Ironwood – Degrades from LOS C with 22.9 seconds of delay to LOS E with 44.3 seconds of delay with Project traffic added.
- #86 – Central/Chicago – Degrades from LOS D with 49.5 seconds of delay to LOS E with 61.3 seconds of delay with Project traffic added.
- #98 – Alessandro/Canyon Crest – Degrades from LOS D with 54.4 seconds of delay to LOS E with 55.9 seconds of delay with Project traffic added.
- #131 – Reche Canyon/Reche Vista – Degrades from LOS C with 35.0 seconds of delay to LOS D with 40.4 seconds of delay with Project traffic.

Year 2035 plus Project – Intersections – (PM Peak Table 4.15.AS-2)

- #53 – Lasselle/Cactus – Degrades from LOS C with 34.8 seconds of delay to LOS D with 38.2 seconds of delay with Project traffic added.

Year 2035 plus Project – Mainline – (PM Peak Hour Table 4.15.AU-2)

- F-2 – WB SR-60 – Reservoir/Ramona – Degrades from LOS D with density of 34.6 to LOS E with density of 35.8 with Project traffic added.
- F-34 – WB SR-60 – Redlands/Theodore – Degrades from LOS D with density of 29.7 to LOS E with density of 35.0 with Project traffic added.

Year 2035 plus Project – Weaving – (AM Peak Hour Table 4.15.AV-1)

- W-20 – EB SR-60 – Main/SR91 – Degrades from LOS D with density of 34.2 to LOS E with density of 35.9 with Project traffic added.

Year 2035 plus Project – Weaving – (PM Peak Hour Table 4.15.AV-2)

- W-28 – WB SR-60 – Day/Pigeon Pass – Degrades from LOS D with density of 32.3 to LOS E with density of 36.1 with Project traffic added.

Year 2035 plus Project – Ramps – (AM Peak Hour Table 4.15.AW)

- R-8 – EB SR-60 – On from Theodore – Degrades to LOS F with density of 43.6 with Project traffic added. While this new ramp is to be constructed by the Project, LOS F conditions result when Project traffic is added. The Project must therefore build a ramp with more initial capacity rather than one that immediately fails to carry traffic generated by the Project.

As identified above, there are over 50 additional direct project traffic impacts beyond those identified in the Draft EIR where the World Logistics Center Project traffic causes an intersection or segment to fall below the acceptable LOS. In each of the various sections in the different analysis scenarios, the text in the Draft EIR conflicts with the entries in the various tables throughout the discussion of traffic impacts. Instead, these locations are either incorrectly shown as cumulative impacts or they are omitted altogether from the listings.

The Project must be required to fully mitigate its direct impacts created when the LOS falls from a satisfactory level to an unsatisfactory level when project traffic is added.

7) Other LOS Calculation Errors Must Be Corrected – Several locations are shown with better operations when Project traffic is added to baseline volumes but no physical improvements are installed. As one example, Page 4.15-116 identifies Redlands/Alessandro as being directly impacted although this intersection is shown to improve dramatically with the addition of Project traffic and without any improvements specified. It is not possible for intersection operations to improve unless additional traffic lanes are added or other improvements are made. The following are additional examples of calculations of improved LOS and reduced delay when project traffic is added that are clearly erroneous and must be corrected:

Existing (2012) plus Project – Intersections – (AM Peak Table 4.15.AD-1)

- #11 – Redlands/Ironwood – Improves from LOS D with 40.9 seconds of delay to LOS C with 34.4 seconds of delay with Project traffic added.
- #112 – Placentia/Perris - Improves from LOS C with 30.1 seconds of delay to LOS C with 29.6 seconds of delay with Project traffic added.

Existing (2012) plus Project – Intersections – (PM Peak Table 4.15.AD-2)

- #11 – Redlands/Ironwood – Improves from LOS D with 37.3 seconds of delay to LOS C with 34.8 seconds of delay with Project traffic added.
- #107 – Evans/Rider - Improves from LOS C with 28.3 seconds of delay to LOS C with 27.6 seconds of delay with Project traffic added.

Year 2017 plus Project – Intersections – (AM Peak Table 4.15.AI-1)

- #23 – Redlands/Alessandro – Improves from LOS E with 39.2 seconds of delay to LOS C with 17.1 seconds of delay with Project traffic added.

Year 2017 plus Project – Intersections – (PM Peak Table 4.15.AI-2)

- #23 – Redlands/Alessandro – Improves from LOS C with 20.1 seconds of delay to LOS C with 16.2 seconds of delay with Project traffic added.

Numerous duplications in the listings in the Draft EIR must also be eliminated (i.e., see Page 4.15-106 which repeats the last two intersections of San Timoteo-Live Oak and Redlands-San Timoteo at the end of the list of intersections identified as being cumulatively impacted).

8) No Mitigation Measures Proposed for Year 2017 or Year 2022 Analyses – The Draft EIR and TIA Report provide mitigation measures based on the analyses of Existing as well as Year 2035 Buildout with Project traffic added. While many significant direct and cumulative impacts are identified in the TIA Report in the analysis of Year 2017 conditions with fifty percent of Project traffic added as well as in the analysis of Year 2022 conditions with all Project traffic added, no mitigation measures are proposed for the Year 2017 and for the Year 2022 significant impacts.

   The Draft EIR must also identify the mitigation measures that are shown in the TIA Report and that are concurrently required in Year 2017 and in Year 2022. This is the major flaw in the Draft EIR since significant impacts must be mitigated in a timely manner and mitigation of these significant traffic impacts when they are forecast to occur has been omitted.

9) "Significant and Unavoidable" Impacts Require Further Evaluation – In regard to Alternative Transportation Policies, Plans, and Programs, Page 1-31 of the Draft EIR states "The Proposed Project will create a complete roadway circulation network, install a loop trail system, have Class II bikeways and sidewalks on all internal streets, and streets can accommodate bus turnouts when needed by the local transit agency." As mitigation, Page 1-31 of the Draft EIR states "Carpooling is required under Air Quality Mitigation Measure 4.3.6.4A. No additional mitigation is required."

   Mitigation Measure 4.3.6.4A on Page 1-12 of the Draft EIR states "Future development in the WLCSP will implement a number of activities to help reduce long-term air pollutant emissions, including participation in the County's Rideshare Program, on-site bicycle lanes, sidewalks and pedestrian paths, etc." The traffic analysis then proceeds to identify numerous significant traffic impacts and classifies many of them including all those on the freeway system as "significant and unavoidable."

While the Draft EIR identifies a number of "significant and unavoidable" traffic impacts, it does not evaluate or propose all feasible Transportation Demand Management (TDM) measures that would address these impacts. TDM measures reduce traffic impacts by lowering the number of vehicle trips by encouraging, requiring, and/or subsidizing alternative transportation. Impacts are also reduced by measures that avoid travel during congested peak hours.

From their website, the Riverside County Transportation Commission's Core Rideshare Program offers ride matching for carpools and vanpools, free incentives for employees to try ridesharing, and a guaranteed ride home program for employers with more than 250 employees. In addition to participation in the County's Rideshare Program, the all reasonable TDM measures must be considered including:

Shuttles to Connect to Existing Transit Service – At this time, transit service is not provided in the World Logistics Center Project area. Until this occurs, shuttle service connecting with existing transit would encourage use of alternative transportation by many employees.

Construction of Bus Turnouts - Construction of bus turnouts throughout the Project, initially to be used by shuttles, must be required as street improvements are constructed rather than being deferred until needed by the local transit agency.

Flex Time, Staggered Work Hours, and Compressed Work Hours - A number of the Project's peak hour trips would likely be generated by employee commuting. Use of flex time, staggered work hours, and/or compressed work hours to avoid peak commute hours is an effective method to reduce travel at these congested periods.

Differential Parking Treatments - Preferential parking for those employees that commute together is a simple measure that can encourage alternative transportation.

On-Site Child Care - Provision of child care facilities on-site can encourage use of alternative transportation because employees will not need the flexibility of passenger vehicles to arrange drop-offs and pick-ups and because they will be able to respond to emergencies without leaving the site.

Other TDM Measures – The following TDM measures would further reduce the number of employee commute trips to and from the Project:

- Designated Contact – Administers all aspects of TDM Program; provides employee orientation packets identifying transportation options; periodic special promotions as well as trip planning with routes and maps.

- Secured Bicycle Parking; Motorcycle Parking; Showers/Clothes Lockers

To achieve and maintain employee trip reduction goals, the individual TDM plans for employers in the World Logistics Center must be developed and then monitored on a regular basis. Further, these plans must also contain penalties for non-compliance. The Draft EIR must include the preparation and monitoring of TDM plans as an enforceable condition of approval for each project in the World Logistics Center.

10) Proposed Mitigation Measures Are Defective – Several of the Mitigation Measures that are identified in the Draft EIR and in the TIA Report are defective as follows:

a) Trans 1 requires that each development within the World Logistics Center must conduct a traffic study. The depth and scope of these required traffic studies must be defined in the Draft EIR in addition to including this requirement as an enforceable condition of approval for each and every project within the World Logistics Center.

b) Trans 5 requires a study with Caltrans and the other cities to determine how the many required improvements will be funded and implemented. Such an effort has not begun and it will take many years to complete. By then, a number of developments in the World Logistics Center will likely have paid their DIF and TUMF fees. Payment of the additional fee determined by the multi-jurisdictional study must be included as an enforceable condition of approval for each and every project within the World Logistics Center. Additionally, since the measure only identifies Caltrans and the cities, it appears the County has been omitted from this study effort and they must be added.

c) Trans 6 suggests aligning the TUMF Program so that improvements needed to mitigate traffic impacts created by the World Logistics Center are funded earlier. Many improvements are needed throughout the County and there is no guarantee that the realignment of project priorities to benefit the World Logistics Center will occur in a timely manner.

d) In the mitigation of impacts, the use of TUMF or DIF fees are proposed to implement the necessary improvements, even though the World Logistics Center Project creates a direct impact. The World Logistics Center Project must be required to mitigate all of the direct traffic impacts that it creates.

e) The Draft EIR and the TIA Report do not identify which, if any, of the improvements required by the Mitigation Measures are covered by fees now being collected under the TUMF and DIF Programs. The Draft EIR

must provide supporting evidence as to which TUMF and DIF improvements are currently programmed, and which are not.

f) In several cases, particularly in the 2035 analysis, potential mitigation measures are quickly dismissed because of cost (such as adding a mixed flow lane to a freeway segment). It is my understanding that high cost cannot be used to conclude that the particular mitigation is not feasible. For other freeway sections such as SR-91 south of SR-60, Caltrans is currently widening the mainline whereas the Draft EIR indicates adding lanes to this portion of the freeway is not feasible because of the need for retaining walls which are currently being built.

g) There are a number of errors that were cut and pasted from the TIA Report directly into the Draft EIR. Many of these appear in the 2035 analysis for the freeway segments (see Page 379 of the TIA Report and following) where the words in the second line "period this intersection" appear again and again. This gets worse (see Page 386 of the TIA Report and following) where the freeway segments involve I-10 but the references are to SR91. These errors must be eliminated to properly define the mitigation measures and the responsibility for their implementation.

11) Proposed Mitigation Measures Are Not Shown To Be Timely – Payments of either traffic impact fees or fair shares toward improvements do not ensure that the improvements will be constructed in a timely manner. CEQA requires that mitigation measures be effective, enforceable, and timely. Merely requiring the applicant to make fair share payments does not ensure the significant improvements will be constructed in a timely manner. Therefore, the mitigation measures included in the Draft EIR are not feasible as they cannot be constructed without adequate funding. As discussed further below, the Draft EIR must be modified to require that significant additional mitigation measures be funded and constructed by the World Logistics Center Project.

To provide timely implementation of improvements required for cumulative impact mitigation, execution of a reimbursement agreement with the City must be considered. Under this agreement, the Project constructs all improvements necessary to mitigate cumulative impacts, and is subsequently reimbursed by the City for costs in excess of the Project's fair share as other development occurs. To avoid gridlock LOS F conditions in the Project area, the City of Moreno Valley should utilize this tool to accelerate the required improvements so they are available in a timely manner, and should make this mitigation arrangement an enforceable condition prior to approving this Project.

12) Traffic Queuing Has Not Been Studied, Evaluated, or Mitigated - Traffic study guidelines such as the "Guide for the Preparation of Traffic Impact Studies" published by the California Department of Transportation in December 2002

require that facility geometry including the storage lengths be evaluated for baseline and for baseline with Project traffic added. The TIA Report did not evaluate queuing or determine if adequate storage capacity exists before turning lanes overflow or if through traffic backs up through adjacent closely spaced intersections. Facility geometry together with queuing must be analyzed, evaluated, disclosed, and mitigated.

13) Draft EIR Fails to Analyze Rail Service for the World Logistics Center – The traffic analysis discloses that the World Logistics Center Project will create numerous significant environmental impacts, many of which are the direct result of the high volumes of truck traffic required to serve the site. The Draft EIR must review transportation access to the site using rail service as a mitigation measure rather than just rely on trucks to provide access.

14) Mitigation Monitoring Program Is Required – The Draft EIR does not indicate that a Mitigation Monitoring and Reporting Program will be prepared as a part of the Final Draft EIR. The Mitigation Monitoring and Reporting Program should have been made a part of the Draft EIR so it would be available for public review and comment at this time, along with the rest of the documents.

In sum, the Draft EIR must address the significant issues and concerns outlined in this letter. The evidence in the Draft EIR makes clear that the significant traffic impacts created by the World Logistics Center Project cannot or will not be addressed in a timely manner, especially in light of the fact that critical mitigation measures are not funded. After correction of the faulty methodology in the Draft EIR, the World Logistics Center Project will also be found to create additional significant traffic impacts in Years 2012, 2017, 2022, and 2035 that must be properly evaluated and mitigated in a Recirculated Draft EIR.

Respectfully submitted,

Tom Brohard and Associates

Tom Brohard

Tom Brohard, PE
Principal

Enclosures

Tom Brohard, PE

Licenses: 1975 / Professional Engineer / California – Civil, No. 24577
1977 / Professional Engineer / California – Traffic, No. 724
2006 / Professional Engineer / Hawaii – Civil, No. 12321

Education: 1969 / BSE / Civil Engineering / Duke University

Experience: 40+ Years

Memberships: 1977 / Institute of Transportation Engineers – Fellow, Life
1978 / Orange County Traffic Engineers Council - Chair 1982-1983
1981 / American Public Works Association – Life Member

Tom is a recognized expert in the field of traffic engineering and transportation planning. His background also includes responsibility for leading and managing the delivery of various contract services to numerous cities in Southern California.

Tom has extensive experience in providing transportation planning and traffic engineering services to public agencies. Since May 2005, he has served as Consulting City Traffic Engineer for the City of Indio. He also currently provides "on call" Traffic and Transportation Engineer services to the Cities of Big Bear Lake, Mission Viejo, and San Fernando. In addition to conducting traffic engineering investigations for Los Angeles County from 1972 to 1978, he has previously served as City Traffic Engineer in the following communities:

- Bellflower ..... 1997 - 1998
- Bell Gardens ..... 1982 - 1995
- Huntington Beach ..... 1998 - 2004
- Lawndale ..... 1973 - 1978
- Los Alamitos ..... 1981 - 1982
- Oceanside ..... 1981 - 1982
- Paramount ..... 1982 - 1988
- Rancho Palos Verdes ..... 1973 - 1978
- Rolling Hills ..... 1973 - 1978, 1985 - 1993
- Rolling Hills Estates ..... 1973 - 1978, 1984 - 1991
- San Marcos 1981
- Santa Ana ..... 1978 - 1981
- Westlake Village ..... 1983 - 1994

During these assignments, Tom has supervised City staff and directed other consultants including traffic engineers and transportation planners, traffic signal and street lighting personnel, and signing, striping, and marking crews. He has secured over $5 million in grant funding for various improvements. He has managed and directed many traffic and transportation studies and projects. While serving these communities, he has personally conducted investigations of hundreds of citizen requests for various traffic control devices. Tom has also successfully presented numerous engineering reports at City Council, Planning Commission, and Traffic Commission meetings in these and other municipalities.

In his service to the City of Indio since May 2005, Tom has accomplished the following:

- Oversaw preparation and adoption of the Circulation Element Update of the General Plan including development of Year 2035 buildout traffic volumes, revised and simplified arterial roadway cross sections, and reduction in acceptable Level of Service criteria under certain constraints. Reviewed Riverside County's updated traffic model for consistency with the adopted City of Indio Circulation Plan.

- Oversaw preparation of fact sheets/design exceptions to reduce shoulder widths on Jackson Street over I-10 as well as justifications for protected-permissive left turn phasing at I-10 on-ramps, the first such installation in Caltrans District 8 in Riverside County; reviewed plans and provided assistance during construction of a $1.5 million project to install traffic signals and widen three of four ramps at the I-10/Jackson Street Interchange under a Caltrans encroachment permit.

- Oversaw preparation of fact sheets/design exceptions to reduce shoulder widths on Monroe Street over I-10 as well as striping plans to install left turn lanes on Monroe Street at the I-10 Interchange under a Caltrans encroachment permit; reviewed plans to install traffic signals and widen three of four ramps at the I-10/Monroe Street Interchange.

- Reviewed traffic impact analyses for Project Study Reports evaluating different alternatives for buildout improvement of the I-10 Interchanges at Jefferson Street, Monroe Street, Jackson Street and Golf Center Parkway.

- Oversaw preparation of plans, specifications, and contract documents and provided construction assistance for over 40 traffic signal installations and modifications.

- Reviewed and approved over 600 work area traffic control plans as well as signing and striping plans for all City and developer funded roadway improvement projects.

- Oversaw preparation of a City wide traffic safety study of conditions at all schools.

- Prepared over 500 work orders directing City forces to install, modify, and/or remove traffic signs, pavement and curb markings, and roadway striping.

- Oversaw preparation of engineering and traffic surveys to establish enforceable speed limits on over 200 street segments.

- Reviewed and approved traffic impact studies for more than 25 major developments.

- Developed the Golf Cart Transportation Program and administrative procedures; implemented routes forming the initial baseline system.

Since forming Tom Brohard and Associates in 2000, Tom has reviewed many traffic impact reports and environmental documents for various development projects. He has provided expert witness services and also prepared traffic studies for public agencies and private sector clients.

General Plan Amendments Summary
October 2003 – February 2012

2003 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2003-544	MVAP: 680	12/23/03 BOS Proceedings Item 16.1 Land Use Designation Amendment: GPA 680 Text Amendments: GPA680 – MVAP Page 2, 9, 15-16, 36-37, 43, 48

2004 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2004-290	HVAP: 617 ELAP: 671	09/28/04 BOS Proceedings Item 3.47 Land Use Designation Amendment: 671 Specific Plan Associated: GPA 617 (SP 293 Amendment No. 2)
2004-530	ELAP: 585 SWAP: 676 ECVAP: 687 SCMAP: 696 LMWAP: 572	12/21/04 BOS Proceedings Item 3.41a Land Use Designation Amendments: GPA 585, 676, 687, 696 Text Amendments: GPA 572 – LMWAP page 29 Specific Plan Associated: GPA 572 (SP 325)

2005 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2005-156	ELAP: 658 WCVAP: 683 SCMAP/TCAP: 717 Various Area Plans: 716	05/03/05 BOS Proceedings Item 3.44a Land Use Designation Amendments: GPA 716, 716(Rescinded), GPA 717 Text Amendments: GPA 716 – Land Use Element: pages LU-66, LU-70, GPA 683 – WCVAP: page 31, GPA 717 – SCMAP: pages 28-29, 36-38, 51 Specific Plan Associated: GPA 658 (SP 152 Amendment No. 3), 683 (SP 225 Amendment No. 2)
2005-393	WCVAP: 677 ELAP: 698	08/23/05 BOS Proceedings Item 3.92 Land Use Designation Amendments: GPA 677, 698
2005-430	HOUSING: 733	10/04/05 BOS Proceedings Item 3.21 Housing Element: GPA 733
2005-445	JURAP: 679	10/04/05 BOS Proceedings Item 3.22a Text Amendments: GPA 679 – JUAP page 30 Specific Plan Associated: GPA 679 (SP337)
2005-501	ELAP: 672 SCMAP: 693 WCVAP:746	12/20/05 BOS Proceedings Item 3.36 Land Use Designation Amendments: GPA 672, 693, 746

2006 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2006-075	SCMAP: 744	02/28/06 BOS Proceedings Item 3.58 Circulation Element Amendment: SCMVAP
2006-141	WCVAP: 707 ECVAP: 714, 719 SCMAP: 749 JURAP: 750 SWAP: 760	05/16/06 BOS Proceedings Item 3.27 Land Use Designation Amendment: 714, 719, 749, 750 Text Amendments: GPA 707 – WCVAP page 30, GPA760 – SWAP page 24-25 Specific Plan Associated: GPA 707 (SP343)
2006-432	SWAP: 503 HVAP: 689	12/19/06 BOS Proceedings Item 3.59 Land Use Designation Amendments:

	SCMAP: 701, 702, 740 ECVAP: 712, 767 ELAP: 728 SJVAP: 730 HAP: 742 EAP: 761 JURAP: 768, 794 WCVAP: 782	GPA 503, 689, 701, 702, 712, 728, 730, 740, 742, 761, 767, 768, 782, 794
2006-462	TCAP/ELAP: 825	12/19/06 BOS Proceedings Item 3.44 Text Amendments: GPA 825 – TCAP page 31, ELAP page 28 Specific Plan Associated: GPA 825 (SP 327)

2007 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2007-306	SCMAP: 729	07/31/07 BOS Proceedings Item 3.102 Area Plan Level Circulation Element Amendment: SCMVAP
2007-400	WCVAP: 811	09/04/07 BOS Proceedings Item 3.52a Land Use Designation Amendment: GPA 811
2007-080	SCMAP: 655, 726, 797, 800 ELAP: 722 HAP: 741 ECVAP: 772, 786 WCVAP: 776, 809 SWAP: 758 SJVAP: 792, 812 EAP: 817 PAP: 820 JURAP: 836, 842, 688	10/02/07 BOS Proceedings Item 3.65a Land Use Designation Amendments: 655(GPA 729 for Circulation Element Amendment), 722, 726, 741, 772, 776, 786, 758, 792, 797, 800, 809, 817, 820, 836, 842, 688 Text Amendments: GPA 776 – WCVAP page 31 Specific Plan Associated: GPA 776 (SP338) Area Plan Level Circulation Element Amendment: GPA 812
2007-446	WCVAP: 864	10/16/07 BOS Proceedings Item 15.2 Land Use Designation Amendments: GPA 864 Text Amendments: GPA 864 – WCVAP: Page 43-44 Signage
2007-494	ELAP: 704, 738, 754 ECVAP: 787 PVAP: 838 JURAP: 850 ECVAP: 863 LNAP: 775	12/18/07 BOS Proceedings Item 3.74 Land Use Designation Amendments: GPA 738, 754, 787, 838, 850, 863, 704, 775 Text Amendments: GPA 754 – ELAP page 28 Specific Plan Associated: GPA 754 (SP340)

2008 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2008-094	ELAP: 884	01/29/08 BOS Proceedings Item 3.49 Land Use Designation Amendments: GPA 884 Text Amendments: ELAP page 33-35 Area Plan Level Circulation Element Amendments: 884-3a, 884-3b, 884-3c and Trails Amendments: 884-4a, 884-4b, 884-4c
2008-173	JURAP: 844 EAP: 834 SWAP: 821	04/29/08 BOS Proceedings Item 3.27b Land Use Designation Amendments: GPA 821, 834, 844

2008-410	SCMAP: 890	09/16/08 BOS Proceedings Item 3.49 Land Use Designation Amendment: GPA 890 (Affordable Housing Development)
2008-412	SJVAP: 747 ECVAP: 764, 795, 880 WCVAP: 831, 853	10/21/08 BOS Proceedings Item 3.55 Land Use Designation Amendments: GPA 747, 764, 795, 880, 831, 853
2008-500	ECVAP: 860 WCVAP: 885	12/23/08 BOS Proceedings Item 3.33 Land Use Designation Amendment: GPA 860 Text Amendments: GPA 885 – WCVAP Page 29 (Establishes the Cahuilla Hills Policy Area), Area Plan Policy Boundary Exhibit 9

2009 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2009-118	JURAP: 912 EAP: 971 SWAP: 1047 ECVAP: 826 WCVAP: 876, 881 COUNTY WIDE: 883, 1073	06/09/09 BOS Proceedings Item 3.48a Land Use Designation Amendment: GPA 876, 912, 971, 1047 Text Amendments: GPA 883 (Child Care, Chapter 2-Vision & Chapter Land Use Element), 1073(Public Facilities, Chapter 3 Land Use Element) Specific Plan Associated: GPA 826(SP362), 881 (SP360)
2009-162	EAP:807 JURAP:882 SWAP:1048, 1056, 1055 SJVAP:1053, ECVAP:905 PVAP:1051	10/20/2009 BOS Proceedings Item 3.61 Land Use Designation Amendment: GPA 807, 882, 1048, 1053, 1055, 905, 1051 Text Amendments: GPA 1056-SWAP Specific Plan Associated:
2009-358	TCAP:774 EAP: 887, 827 (Removed) REMAP: 878 HVWAP: 1061 ECVAP: 784 WCVAP: 1072	12/22/09 BOS Proceedings Item 3.57f Land Use Designation Amendment: GPA 774, 887, 878, 1061 ,1072, 784 Text Amendments: Specific Plan Associated: GPA1061 (SP293 Amendment No.5)

2010 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2010-89	LNAP: 720, (Land Use) & 721(Circulation)	03/23/2010 BOS Proceedings Item 3.37 Land Use Designation Amendment: GPA 720 Text Amendment: GPA 720- LNAP (add SP342 to SP table) Specific Plan Associated: GPA720&721(SP342)
2010-138	LMWAP: 662 HVWAP: 727 EAP: 827 JURAP: 859	05/25/2010 BOS Proceedings Item 3.53 Land Use Designation Amendment: GPA 662, 727, 827, 859 Text Amendments: GPA 827- EAP (add SP 358 "The Ranch at Eastvale") Specific Plan Associated: GPA827 (SP358)
2010-253	TCAP: 815 EAP: 918 JURAP:1095	09/28/10 BOS Proceedings Item 3.74 Land Use Designation Amendment: GPA815, GPA918, GPA1095 Text Amendments: GPA 815-TCAP (add SP353 "Serrano Commerce Center").

		Specific Plan Associated: GPA 815 (SP353)

2011 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2011-176	HAP: 1105	07/12/11 BOS Proceedings Item 16.6 Land Use Designation Amendment: GPA 1105
2011-156	COUNTY WIDE: 1075, 1088, 1083, 1096	10/18/11 BOS Proceedings Item 3.34 Text Amendments: GPA 1075- Entitlement/amendment DCAP, ECVAP, ELAP, PAP, MVAP, REMAP, SJVAP, SWAP, WCAP, Chapter: Introduction, Chapter 3: Land Use Element, Chapter 10: Administration Element; Appendix B: General Planning Principles. GPA 1083, 1088: Chapter 3: Land Use Element; (Cultural and Indian Fee) GPA 1096: Chapter 1: Introduction, Chapter 2: Vision, *NEW* Chapter 10 Healthy Communities Element, Appendix M: Health Indicators
2011-273	COUNTY WIDE: 1080	11/08/11 BOS Proceedings Item 16.2 GPA 1080: Chapter 3: Land Use Element (Solar)

2012 General Plan Amendments

GPA Resolution No.	Associated GPA Cases	Summary of Changes
2012-018	ECVAP: 846, 889 LMWAP: 897 SWAP: 1107	01/10/12 BOS Proceedings Item 3.55 Land Use Designation Amendment: GPA 846, 897, 1107 Circulation: GPA 889 Specific Plan Associated: GPA846 (SP369)
2012-036	ECVAP: 910	02/07/12 BOS Proceedings Item 3.27 Land Use Designation Amendment: GPA 910 Specific Plan Associated: GPA 910 (SP 375-Travertine Point)
2012-038	WCVAP: 1101	02/28/12 BOS Proceedings Item 16.01 Land Use Designation Amendment: GPA 1101

Acronyms:

BOS	Board of Supervisors
EAP	Eastvale Area Plan
ECVAP	Eastern Coachella Valley Area Plan
ELAP	Elsinore Area Plan
GPA	General Plan Amendment
HVWAP	Harvest Valley/Winchester Area Plan
HAP	Highgrove Area Plan
JURAP	Jurupa Area Plan
LMWAP	Lake Mathews/Woodcrest Area Plan
LNAP	Lakeview/Nuevo Area Plan

MVAP	Mead Valley Area Plan
PVAP	Palo Verde Valley Area Plan
PAP	The Pass Area Plan
RCBAP	Reche Canyon/Badlands Area Plan
REMAP	Riverside Extended Mountain Area Plan
SCMAP	Sun City/Menifee Area Plan
SJVAP	San Jacinto Valley Area Plan
SWAP	Southwest Area Plan
TCAP	Temescal Canyon Area Plan
WCVAP	Western Coachella Valley Area Plan

EXHIBIT B

Appendix E
Technical Source Documentation

Prepared for:
South Coast Air Quality Management District
Diamond Bar, California

Prepared by:
ENVIRON International Corporation
San Francisco, California

Date:
February 2011

Contents

1 Construction Survey by SCAQMD

South Coast Air Quality Management District performed some construction surveys in order to develop default equipment usage and construction phase lengths. The initial survey was for projects less than five acres in size and is decribed in the following reference: The Sample Construction Scenarios for Projects Less than Five Acres in Size (http://www.aqmd.gov/ceqa/handbook/LST/FinalReport.pdf)

An additional 16 sites between five and thirty acres were surveyed for mid-sized projects. The amount and types of equipment was developed by attempting to find trends in data (i.e., comparing projects within the same project size, length of construction phases, number of pieces of equipment with areas disturbed, etc.).

The results of these surveys are included in the following tables.

Demolition
One Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	1
Concrete/Industrial Saws	1	8
Excavators		
Bore/Drill Rigs		
Tractors/Loaders/Backhoes	2	6
	4	

Demolition
Two Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Concrete Saw	1	8
Excavators		
Bore/Drill Rigs		
Tractors/Loaders/Backhoes	3	8
	5	

Demolition
Three Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Concrete Saw	1	8
Excavators		
Bore/Drill Rigs		
Tractors/Loaders/Backhoes	3	8
	5	

Demolition
Five Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Grading
One Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	6
Excavators		
Graders	1	6
Scrapers		
Tractors/Loaders/Backhoes	1	7
	3	

Grading
Two Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators		
Graders	1	8
Scrapers		
Tractors/Loaders/Backhoes	2	7
	4	

Grading
Three Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators		
Graders	1	8
Scraper		
Tractors/Loaders/Backhoes	2	7
	4	

Grading
Five Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	1	8
Graders	1	8
Scrapers		
Tractors/Loaders/Backhoes	3	8
	6	

Construction
One Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	4
Welders		
Excavators		
Forklifts	2	6
Generator Sets		
Tractors/Loaders/Backhoes	2	8
	5	

Construction
Two Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	6
Welders	3	8
Excavators		
Forklifts	1	6
Generator Sets	1	8
Tractors/Loaders/Backhoes	1	6
	7	

Construction
Three Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	8
Welders	3	8
Excavators		
Forklifts	2	7
Generator Sets	1	8
Tractors/Loaders/Backhoes	1	6
	8	

Construction
Five Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Coating/Paving
One Acre

Equipment Type	No. of Equip	hr/day
Pavers	1	7
Paving Equipment		
Cement and Mortar Mixers	4	6
Plate Compactors		
Rollers	1	7
Tractors/Loaders/Backhoes	1	7
	7	

Coating/Paving
Two Acre

Equipment Type	No. of Equip	hr/day
Pavers	1	6
Paving Equipment	1	8
Cement and Mortar Mixers	1	6
Plate Compactors		
Rollers	1	7
Tractors/Loaders/Backhoes	1	8
	5	

Coating/Paving
Three Acre

Equipment Type	No. of Equip	hr/day
Pavers	1	8
Paving Equipment	1	8
Cement and Mortar Mixers	1	8
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes	1	8
	6	

Coating/Paving
Five Acre

Equipment Type	No. of Equip	hr/day
Pavers	1	8
Paving Equipment	2	6
Cement and Mortar Mixers	2	6
Plate Compactors		
Rollers	2	6
Tractors/Loaders/Backhoes	1	8
	8	

Site Preparation
One Acre

Equipment Type	No. of Equip	hr/day
Grader	1	8
Bulldozer		
Excavator		
Scraper		
Tractor/Loader/Backhoe	1	8
	2	

Site Preparation
Two Acre

Equipment Type	No. of Equip	hr/day
Grader	1	8
Bulldozer	1	7
Excavator		
Scraper		
Tractor/Loader/Backhoe	1	8
	3	

Site Preparation
Three Acre

Equipment Type	No. of Equip	hr/day
Grader	1	8
Bulldozer		
Excavator		
Scraper	1	8
Tractor/Loader/Backhoe	1	7
	3	

Site Preparation
Five Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

Equipment

Demolition
Ten Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Demolition
Fifteen Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Demolition
Twenty Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Demolition
Twenty-five Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Grading
Ten Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	1	8
Graders	1	8
Scrapers		
Tractors/Loaders/Backhoes	3	8
	6	

Grading
Fifteen Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	2	
Graders	1	8
Scrapers	2	8
Tractors/Loaders/Backhoes	2	8
	8	

Grading
Twenty Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	2	8
Graders	1	8
Scrapers	2	8
Tractors/Loaders/Backhoes	2	8
	8	

Grading
Twenty-five Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	2	8
Graders	1	8
Scrapers	2	8
Tractors/Loaders/Backhoes	2	8
	8	

Construction
Ten Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Construction
Fifteen Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Construction
Twenty Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Construction
Twenty-five Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Coating/Paving
Ten Acre

Equipment Type	No. of Equip	hr/day
Pavers	2	8
Paving Equipment	2	8
Cement and Mortar Mixers		
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes		
	6	

Coating/Paving
Fifteen Acre

Equipment Type	No. of Equip	hr/day
Pavers	2	8
Paving Equipment	2	8
Cement and Mortar Mixers		
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes		
	6	

Coating/Paving
Twenty Acre

Equipment Type	No. of Equip	hr/day
Pavers	2	8
Paving Equipment	2	8
Cement and Mortar Mixers		
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes		
	6	

Coating/Paving
Twenty-five Acre

Equipment Type	No. of Equip	hr/day
Pavers	2	8
Paving Equipment	2	8
Cement and Mortar Mixers		
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes		
	6	

Site Preparation
Ten Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

Site Preparation
Fifteen Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

Site Preparation
Twenty Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

Site Preparation
Twenty-five Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

Demolition
Thirty Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Demolition
Thirty-four Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Excavators	3	8
Bore/Drill Rigs		
Tractors/Loaders/Backhoes		
	6	

Grading
Thirty Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	2	8
Graders	1	8
Scrapers	2	8
Tractors/Loaders/Backhoes	2	8
	8	

Grading
Thirty-four Acre

Equipment Type	No. of Equip	hr/day
Rubber Tired Dozers	1	8
Excavators	2	8
Graders	1	8
Scrapers	2	8
Tractors/Loaders/Backhoes	2	8
	8	

Construction
Thirty Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Construction
Thirty-four Acre

Equipment Type	No. of Equip	hr/day
Cranes	1	7
Welders	1	8
Excavators		
Forklifts	3	8
Generator Sets	1	8
Tractors/Loaders/Backhoes	3	7
	9	

Coating/Paving
Thirty Acre

Equipment Type	No. of Equip	hr/day
Pavers	2	8
Paving Equipment	2	8
Cement and Mortar Mixers		
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes		
	6	

Coating/Paving
Thirty-four Acre

Equipment Type	No. of Equip	hr/day
Pavers	2	8
Paving Equipment	2	8
Cement and Mortar Mixers		
Plate Compactors		
Rollers	2	8
Tractors/Loaders/Backhoes		
	6	

Site Preparation
Thirty Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

Site Preparation
Thirty-four Acre

Equipment Type	No. of Equip	hr/day
Grader		
Bulldozer	3	8
Excavator		
Scraper		
Tractor/Loader/Backhoe	4	8
	7	

2 Building Construction Worker and Vendor Trip Rates

Construction Vendor Trips - Defaults for CalEEMod

Based on 2008 SMAQMD Field Survey - SCAQMD 2010 Update

				Square Footage			*Raw Data Collection in Field*				
Site	**Location**	**Type**	**# Units**	**Residential Area, sq ft**	**Commerical Area, sq ft**	**Office Area, sq ft**	**Light Duty**	**Medium Duty**	**Heavy Duty**	**Observation Time (minutes)**	**Multiplier to Equate Mins to 8 hrs/day**
Heritage Park	Woodland	Single Family Residential	2,037				13	3	6	37	12.97
Heritage Park (2nd visit)	Woodland	Single Family Residential	2,037				13	3	2	30	16
Yolo Co. Emergency Service	Woodland	Commercial			43,560		2	2	0	30	16
Woodshire	Woodland	Single Family Residential	2,000				5	3	5	35	13.71
Woodshire (2nd visit)	Woodland	Single Family Residential	2,000				10	0	3	30	16
815 H St.	Davis	Multi-Family Residential	8				1	0	0	30	16
Eleanor Roosevelt Cr.	Davis	Multi-Family Residential	60				2	0	0	30	16
Parlin Ranch	West Sac	Single Family Residential	306				2	1	3	30	16
Bridgeway Lakes 2	West Sac	Single Family Residential	487				7	2	0	30	16
The Rivers	West Sac	Single Family Residential	1,139				7	2	0	30	16
The River's Side	West Sac	Single Fam/ Multi Fam/ Comm	29	43,560	3,850		2	2	0	30	16
Carriage Lane	Sacramento	Multi-Family Residential	156				0	2	1	30	16
Promenade	Sacramento	Office/ Comm & Retail			751,000	504,000	10	1	6	40	12
Serenade	Sacramento	Single Family Residential					5	7	2	30	16
1801 L St. Building	Sacramento	Multi-Fam Res/ Comm & Retail	176	48,226	9,600		2	0	0	30	16
800 J Lofts	Sacramento	Multi-Fam Res/ Retail		144,035	50,965		2	1	0	30	16
Marriott Hotel	Sacramento	Multi-Family Res/ Comm	30	80,143	187,000		1	0	1	30	16
Anatolia I	Rancho Cordova	Single Fam Res/ Comm	1,038	7,122,060	631,620		19	15	10	30	16
Pappas Gateway Ctr	Elk Grove	Comm/ Retail			11,200		1	0	2	30	16
Sheldon Place	Elk Grove	Single Family Residential	164				6	2	0	30	16
Laguna Ridge (east pt)	Elk Grove	SF Res/ MF Res/ Office/ Comm & Retail	7,826	1,132,560	2,853,180	307,969	4	5	51	30	16
Laguna Ridge (west pt)	Elk Grove	SF Res/ MF Res/ Office/ Comm & Retail	7,826	1,132,560	2,853,180	307,969	7	8	8	30	16
		Total Units/SqFt	27,319	9,703,144	7,395,155	1,119,938					

Construction Vendor Trips - Defaults for CalEEMod

Based on 2008 SMAQMD Field Survey - SCAQMD 2010 Update

	Daily Count			Residential			Commercial			Office			
Site	**Light Duty**	**Medium Duty**	**Heavy Duty**	**Light Duty**	**Medium Duty**	**Heavy Duty**	**Light Duty**	**Medium Duty**	**Heavy Duty**	**Light Duty**	**Medium Duty**	**Heavy Duty**	**References for the Residential SqFt**
Heritage Park	169	39	78	169	39	78	0	0	0	0	0	0	
Heritage Park (2nd visit)	208	48	32	208	48	32	0	0	0	0	0	0	
Yolo Co. Emergency Service	32	32	0	0	0	0	32	32	0	0	0	0	
Woodshire	69	41	69	69	41	69	0	0	0	0	0	0	
Woodshire (2nd visit)	160	0	48	160	0	48	0	0	0	0	0	0	
815 H St.	16	0	0	16	0	0	0	0	0	0	0	0	
Eleanor Roosevelt Cr.	32	0	0	32	0	0	0	0	0	0	0	0	
Parlin Ranch	32	16	48	32	16	48	0	0	0	0	0	0	
Bridgeway Lakes 2	112	32	0	112	32	0	0	0	0	0	0	0	
The Rivers	112	32	0	112	32	0	0	0	0	0	0	0	
The River's Side	32	32	0	29	29	0	3	3	0	0	0	0	http://www.mintierharnish.com/projects/westsac/pdf/2008-2013HousingElementUpdate.pdf
Carriage Lane	0	32	16	0	32	16	0	0	0	0	0	0	
Promenade	120	12	72	0	0	0	72	7	43	48	5	29	
Serenade	80	112	32	80	112	32	0	0	0	0	0	0	Serenade at Regency Park Homeowners Association (916) 925-9000
1801 L St. Building	32	0	0	27	0	0	5	0	0	0	0	0	http://www.kuchman.com/architecture-portfolio/urban/1801L.html
800 J Lofts	32	16	0	24	12	0	8	4	0	0	0	0	http://www.cityofsacramento.org/econdev/development-projects/documents/700-800_K_Street_Final_Proposal_web.pdf
Marriott Hotel	16	0	16	5	0	5	11	0	11	0	0	0	http://sacramento.bizjournals.com/sacramento/business_travel/guide/hotels.html
Anatolia I	304	240	160	279	220	147	25	20	13	0	0	0	http://www.cityofranchocordova.org/Modules/ShowDocument.aspx?documentid=758
Pappas Gateway Ctr	16	0	32	0	0	0	16	0	32	0	0	0	
Sheldon Place	96	32	0	96	32	0	0	0	0	0	0	0	
Laguna Ridge (east pt)	64	80	816	17	21	215	43	53	542	4	6	59	http://sacramento.bizjournals.com/sacramento/stories/2008/05/12/story7.html
Laguna Ridge (west pt)	112	128	128	30	34	34	74	85	85	8	9	9	http://sacramento.bizjournals.com/sacramento/stories/2008/05/12/story7.html
Total Daily Vehicle Trips	1,846	925	1,547										
			Total Daily Vehicle Trips	1,496	701	724	289	204	727	60	20	97	
			Vehicle Trips per Unit or 1k Sq Ft	0.0548	0.0256	0.0265	0.0391	0.0275	0.0983	0.0538	0.0176	0.0863	
			TOTAL Vehicle Trips per Unit or 1k SqFt		**0.1069**			**0.1649**			**0.1577**		

Construction Vendor Trips - Defaults for CalEEMod

Based on 2008 SMAQMD Field Survey - SCAQMD 2010 Update

		Commercial and Office Daily Count		
Site	**Commerical and Office Area, sq ft**	**Light Duty**	**Medium Duty**	**Heavy Duty**
Heritage Park	0	0	0	0
Heritage Park (2nd visit)	0	0	0	0
Yolo Co. Emergency Service	43,560	32	32	0
Woodshire	0	0	0	0
Woodshire (2nd visit)	0	0	0	0
815 H St.	0	0	0	0
Eleanor Roosevelt Cr.	0	0	0	0
Parlin Ranch	0	0	0	0
Bridgeway Lakes 2	0	0	0	0
The Rivers	0	0	0	0
The River's Side	3,850	3	3	0
Carriage Lane	0	0	0	0
Promenade	1,255,000	120	12	72
Serenade	0	0	0	0
1801 L St. Building	9,600	5	0	0
800 J Lofts	50,965	8	4	0
Marriott Hotel	187,000	11	0	11
Anatolia I	631,620	25	20	13
Pappas Gateway Ctr	11,200	16	0	32
Sheldon Place	0	0	0	0
Laguna Ridge (east pt)	3,161,149	47	59	601
Laguna Ridge (west pt)	3,161,149	82	94	94
TOTALs	**8,515,093**	**349**	**223**	**823**
		0.0410	0.0262	0.0967
			0.1639	

3 Analysis of Warehouse Trip Generations Rates by SCAQMD

Large Warehouse and Distribution Center Trip Rates

Introduction

New large warehouse projects and distribution centers (>100,000 square feet) have become a more common project type in the past several years, especially in the western Riverside County and San Bernardino County area. As an example, at least 8 new EIRs for warehouse projects totaling 17.75 million square feet have been reviewed by SCAQMD staff since late 2008 just in the vicinity of the city of Perris in Riverside County. These warehouse projects are commonly associated with substantial diesel emissions due to the high volume of heavy duty trucks that serve them. Diesel Particulate Matter (DPM) from internal combustion engines has been classified as a carcinogen by the California Air Resources Board (CARB). This white paper has been prepared because the number of truck trips associated with warehousing projects is a key component in determining the potential impact of DPM emissions on surrounding communities. Due to concern about these emissions, the CARB in its *Air Quality and Land Use Handbook* recommended providing a 1,000 foot setback from any distribution center serving more than 100 trucks per day.

For CEQA purposes, the volume of truck traffic predicted to serve a new large warehouse project is typically derived using the Institute of Transportation Engineers Trip Generation manual. This is the same source of traffic data used in the URBEMIS air quality model. The trip rate value used in URBEMIS is 4.96 trips per 1,000 square feet (TSF) for warehouse projects (land use type 150). This value is from the 7th Edition of the Trip Generation manual, published in 2003. Several developers of high-cube warehouses in recent years have questioned the validity of this value for modern warehousing operations and have commissioned local studies to investigate these trip rates. As a result, in the most recent version of the Trip Generation manual (8th Edition, 2008), additional data has been included to provide a new high-cube warehouse (land use 152) trip rate of 1.44 trips/TSF.

SCAQMD staff and other interested parties have questioned lead agencies about this lower rate because of concern that industrial warehouse project analyses may be underestimating the number of trucks serving them. If this were true, air quality impacts may be underreported in the corresponding CEQA analyses. This memo and attached spreadsheet presents a meta-analysis of available traffic studies that have targeted high-cube warehouses.

Studies

The seven studies included in this meta-analysis are listed below. Studies marked with an (*) are included in the 8th Edition of the ITE Trip Generation manual.

1. **Westside Industrial Park, Warehouse Trip Generation Study – Twenty Five Buildings, Duval County Florida*, December 5, 2008. King Engineering Associates, Inc.
2. **Westside Industrial Park, Warehouse Trip Generation Study –Eight Buildings, Duval County Florida*, December 5, 2008. King Engineering Associates, Inc.
3. **Trip Generation Study. High-Cube Warehouse Buildings, Fresno California*, January 19, 2007. Peters Engineering Group
4. **Trip Generation Study. Existing High-Cube Warehouse Buildings, Visalia California*, October 1, 2008. Peters Engineering Group
5. **Western Riverside County Warehouse/Distribution Center Trip Generation Study*, May 2008. Crain and Associates
6. **San Bernardino/Riverside County Warehouse/Distribution Center Vehicle Trip Generation Study (Inland Empire Study)*, January 2005. Crain and Associates
7. *Truck Trip Generation Study, City of Fontana*, August 2003. Transportation Engineering and Planning, Inc.

Together these seven studies include traffic counts for 68 different warehouse buildings. 35 of those warehouses are in California, and 25 are in the South Coast Basin. As a comparison, a total of 35 individual buildings were included in the ITE Trip Generation 8th Edition.

Data Analysis

In the ITE 8th Edition manual the trip rates range from 0.20-2.88 trips/TSF with an average of 1.44 and a standard deviation of 1.39. In order to investigate the high standard deviation and range of rates, all 68 warehouses from the above mentioned studies were investigated using overhead and oblique aerial photography to determine site-specific characteristics. Table 1 and Chart 1 present a statistical summary of trip rates determined from all seven studies. Based on this aerial reconnaissance, two factors were identified that may lower the reported trip rate for individual warehouses including the presence of a rail line serving the facility, and the potential partial vacancy of a facility.

Statistical Measure	Rail Service?	Potential Vacancy?	Number of Buildings	Trips/TSF
Minimum trip rate	No	Yes	68	0.17
Maximum trip rate	No	No	68	5.25
Average of all trip rates	Some	Some	68	1.57
Standard Deviation of all trip rates	Some	Some	68	0.81
95th Percentile of all trip rates	Some	Some	68	2.57
Average for CA warehouses	Some	Some	35	1.44
Average for SCAB warehouses	Some	Some	25	1.57
Average for all warehouses	Yes	Yes	14	0.73
Average for all warehouses	Yes	No	8	0.81
Average for all warehouses	No	Some	58	1.79
Average for all warehouses	No	No	54	1.91
95th Percentile for SCAB warehouses	No	No	13	3.68
95th Percentile for all warehouses	**No**	**No**	**54**	**2.59**
95th Percentile for all warehouses	**Yes**	**No**	**8**	**1.63**
ITE High-Cube warehouses	**Some**	**Some**	**35**	**1.44**

Table 1 Statistical summary of trip rates *CA= California, SCAB=South Coast Air Basin*

Rail lines are expected to lower the truck trip rate by diverting the transportation of goods from trucks to trains that directly service the facility. Rail service must include spurs that are adjacent to loading docks at the facility (Figure 1). Vacancies or partial vacancies in the trip rate studies are difficult to verify, however analysis of aerial photographs provides circumstantial evidence that anomalously low trip rates are associated with facilities with virtually no trucks parked at the loading docks at the time that the photograph was taken (Figure 2). While this accounts for the majority of the anomalously low trip rates, the lack of adequate business histories or historical photographic coverage make this correlation difficult to validate. Trip rates were also investigated in comparison to building size; however no correlation was identified (Chart 2).

In order to avoid underestimating the number of trips associated with large warehouse / distribution center operations without rail service, AQMD staff recommends that lead agencies utilize a rate of 2.59 trips per TSF for large warehouse air quality analyses on a project specific basis. The value of 2.59 from the nationwide dataset is preferable instead of the SCAB rate of 3.68 due to the greater reliability of data based on the larger sample size. For warehouses with rail service, a rate of 1.63 trips per TSF may be used. These values provide reasonable worst case default rates for individual new warehouses in the absence of more project-specific data.

In the case that air quality is evaluated for multiple warehouses (>10), such as in an analysis for a general plan, the average rate of 1.44 trips per TSF from the ITE 8th Edition Trip Generation manual is acceptable. This lower value may be more appropriate as on average, a small portion

of warehouses can be expected to operate at varying levels of service, including some warehouses experiencing temporary partial or complete vacancy.

Fleet Mix

The fleet mix used in the URBEMIS model is derived from the regional average distribution of trips obtained from the EMFAC model. While this fleet mix may be appropriate for the majority of land uses, it may not be appropriate for specialized uses such as warehouses. For example, as reported in the ITE 8th Edition Trip Generation manual, truck trips may account for 9 to 29 percent of total trips. Five of the seven studies analyzed here did not report specific truck traffic data, though some generally reported similar rates. The Inland Empire study (#6) found that trucks accounted for 28 to 65 percent of total trips for the ten warehouses in the study, with an average of 48%. The Fontana study (#7) found that trucks make up approximately 20% of total trips for the four warehouses evaluated. This study also broke down the trip distribution among 2, 3, and 4+ axle trucks (3.46%, 4.64%, 12.33%, respectively). In order to avoid underestimating the number of trucks visiting warehouse facilities, AQMD staff recommends that lead agencies conservatively assume that an average of 40% of total trips are truck trips [(0.48*10 + 0.2*4)/(10+4)=0.4)]. Without more project-specific data (such as detailed trip rates based on a known tenant schedule), this average rate of 40% provides a reasonably conservative value based on currently available data.

The fleet mix from the Fontana study as quoted above may be used to determine the distribution of truck type. In order to convert the axle based fleet mix to the vehicle classes utilized by EMFAC, one of two methods may be used.

1. 4+ axles=HHDT, 3 axles=MHDT, 2 axles=LHDT1, all others=LDA
2. Caltrans *Transportation Project-Level Carbon Monoxide Protocol* Appendix B (illustrated below).
   %HDGT = 0.50(%2-axle) + 0.25(%3-axle) + 0.10(%4 axle)
   %HDDT = 0.50(%2-axle) + 0.75(%3-axle) + 0.90(%4-axle) + 1.0(%5-axle)
   All others=LDA

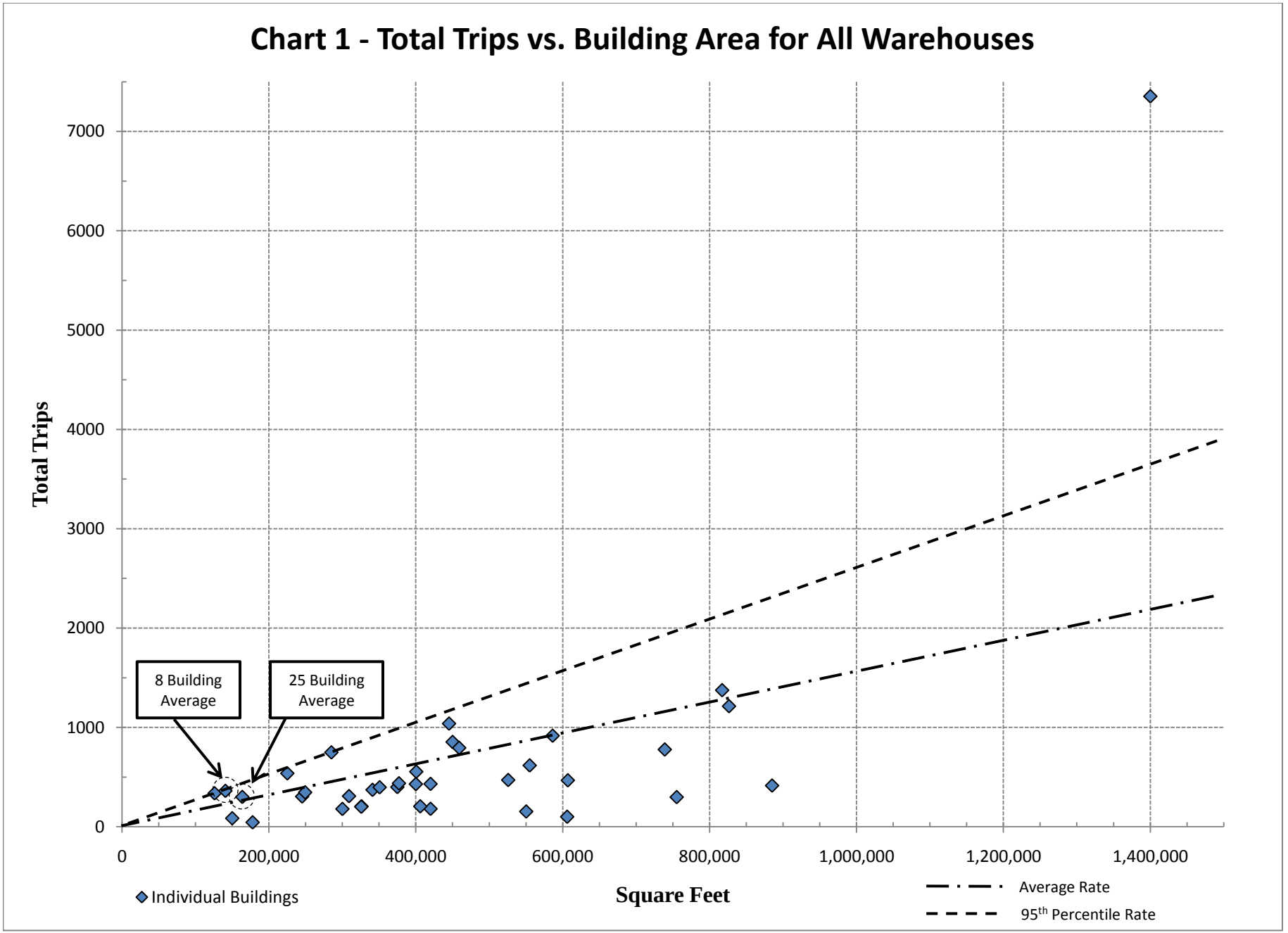
Chart 1 - Total Trips vs. Building Area for All Warehouses
Total Trips
7000
6000
5000
4000
3000
2000
1000
0
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
1,400,000
Square Feet
8 Building Average
25 Building Average
Individual Buildings
Average Rate
95th Percentile Rate

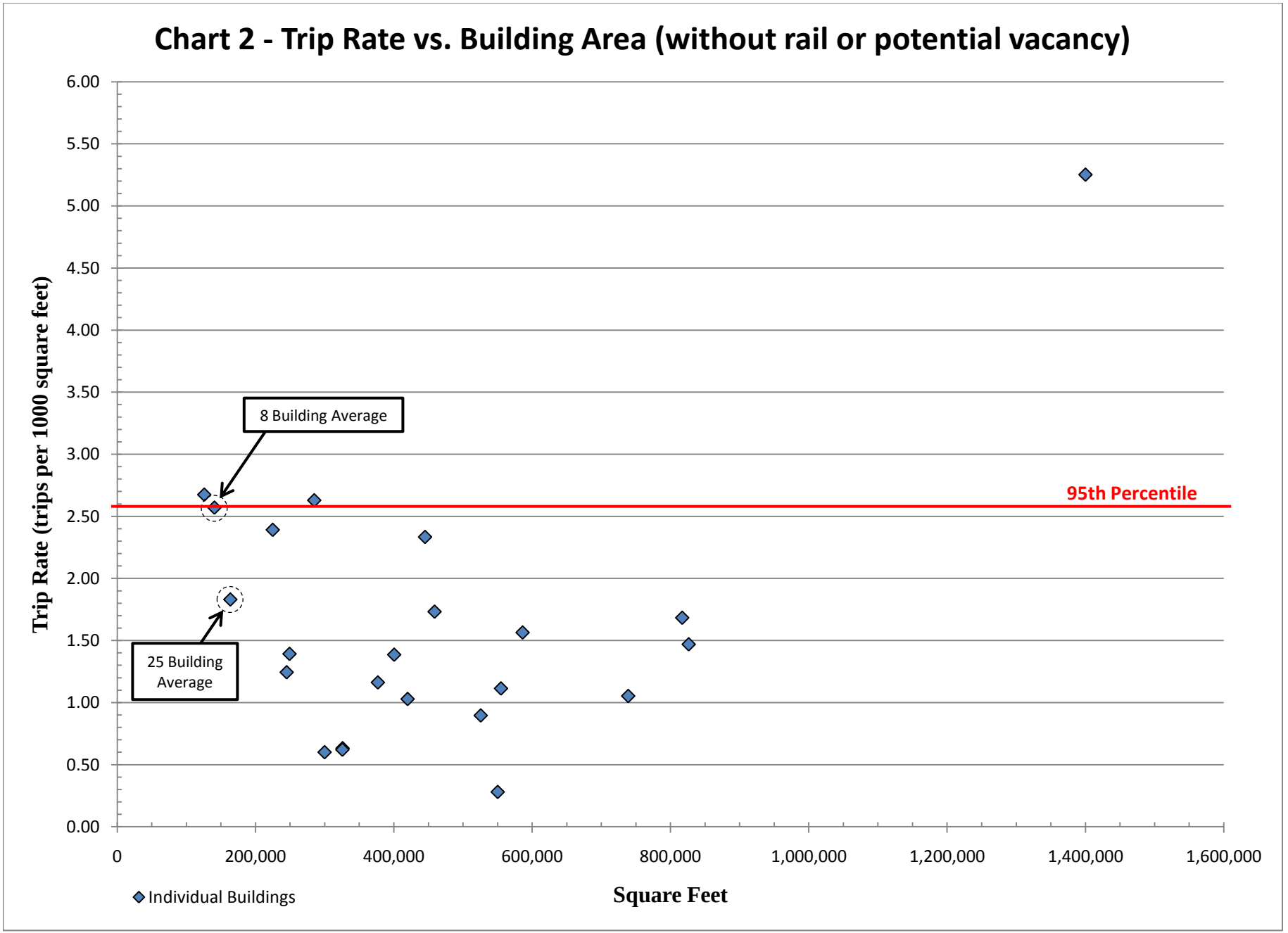
Chart 2 - Trip Rate vs. Building Area (without rail or potential vacancy)
Trip Rate (trips per 1000 square feet)
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
8 Building Average
25 Building Average
95th Percentile
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
1,400,000
1,600,000
Square Feet
Individual Buildings

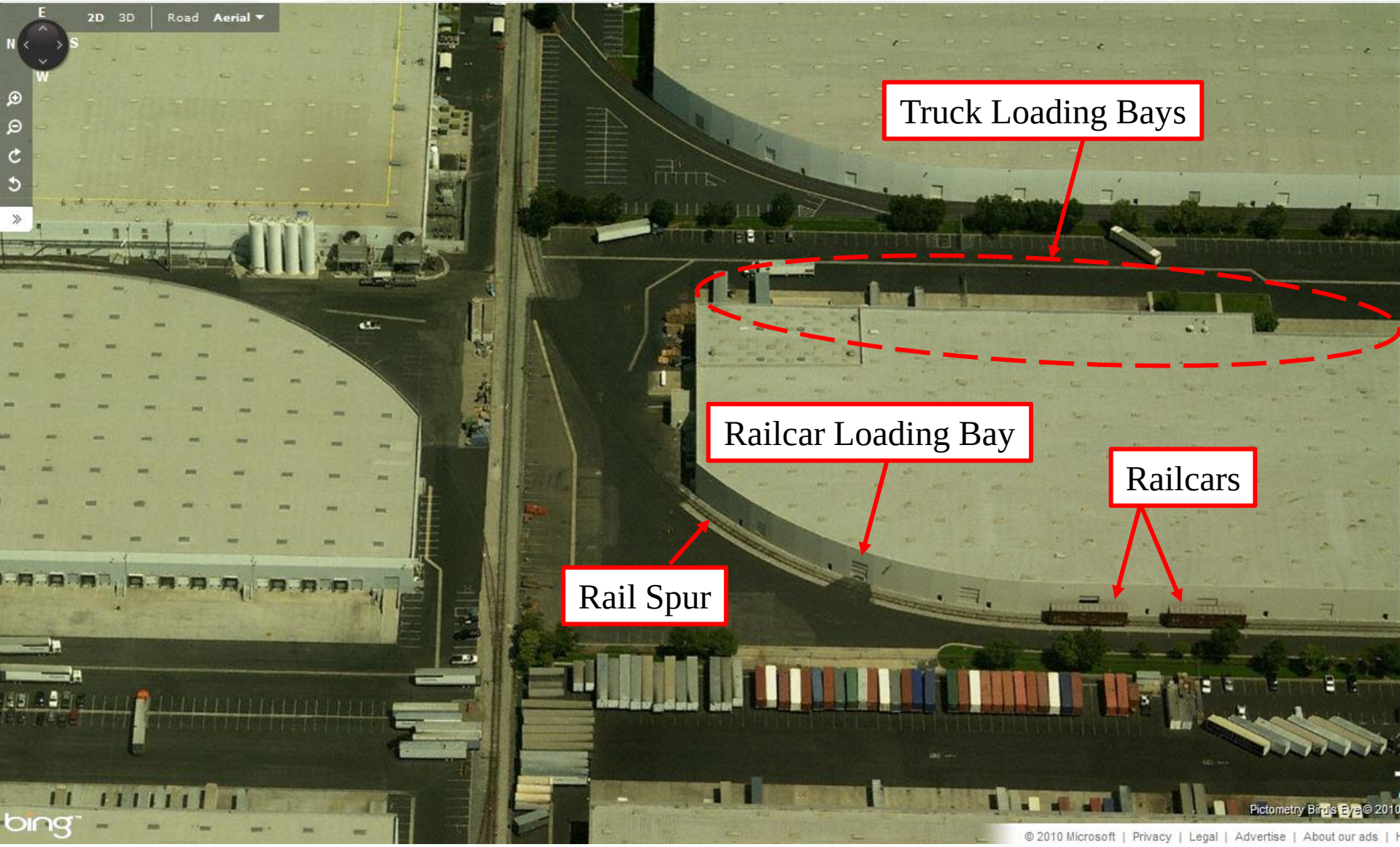

Figure 1 Oblique aerial photograph showing an example of a facility evaluated in the NAIOP San Bernardino County Truck Study. The truck trip rate for this facility was 1.13/TSF

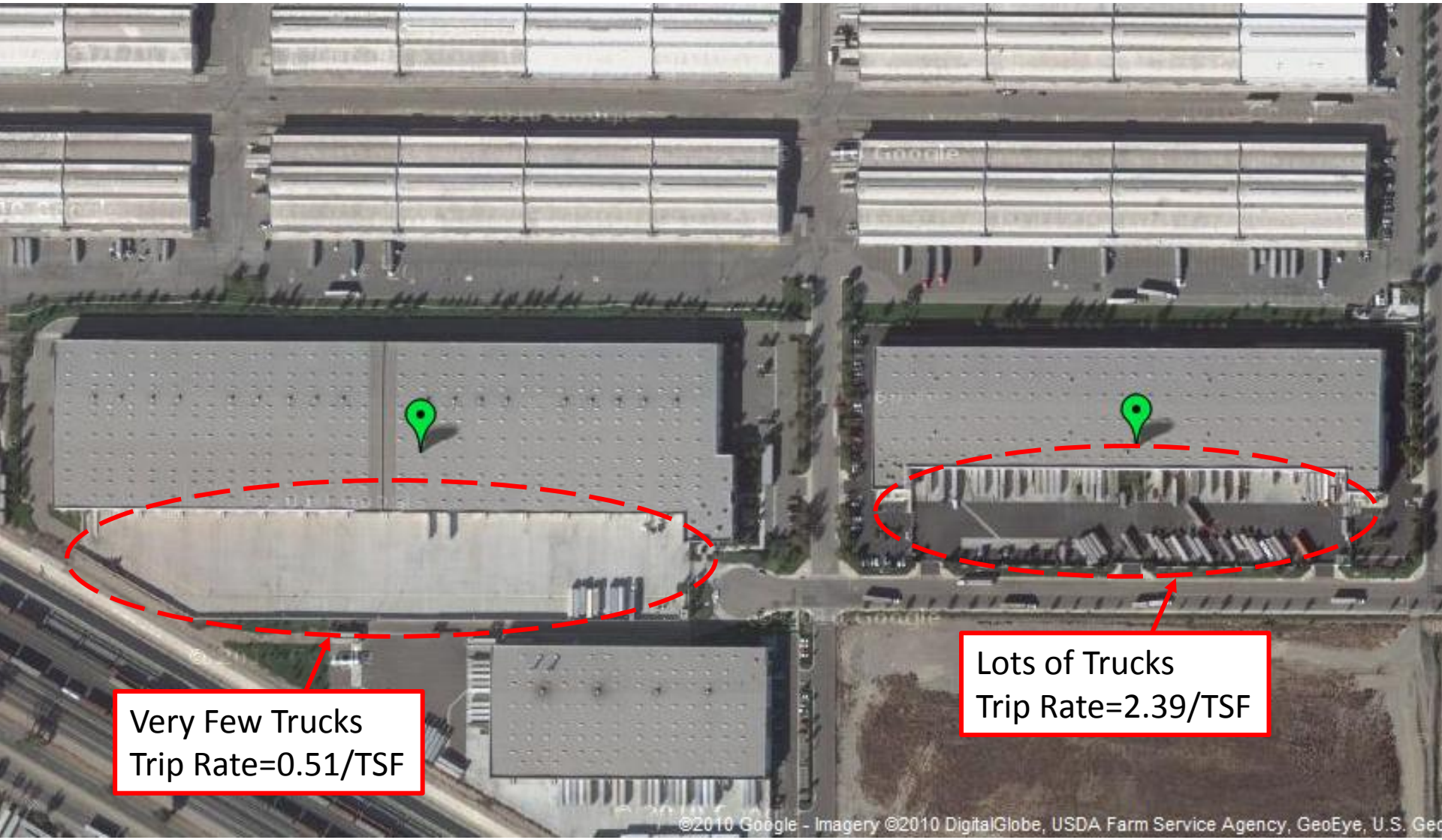

Figure 2 Aerial photograph showing an example of two facilities evaluated in the NAIOP Riverside County Truck Study. The facility on the left is suspected to be at least partially vacant.

FEHR & PEERS
TRANSPORTATION CONSULTANTS

MEMORANDUM

Date: August 23, 2010

To: Jennifer Schulte, ENVIRON

From: David Robinson, Meghan Mitman, Fehr & Peers

Subject: ***Large Warehouse and Distribution Center Trip Rates***

SF10-0495

Fehr & Peers completed its review of the Large Warehouse and Distribution Center Trip Rates white paper prepared by the Southern California Air Quality Management District (SCAQMD). The white paper presents the results of a meta-analysis of seven trip generation studies of warehouse and distribution centers located in California and Florida.

Our review of the white paper focused on the recommended trip generation rates presented in Table 1 (Statistical Summary of Trip Rates) and the statistical analysis provided in file SCAQMD Trip Rate Study_7-21-10.xlsx). We have the following observations based on our review:

- Use of 95 Percentile – The recommended trip generation rates are based on the 95 percentile of trip generation rate observations. The 95 percentile trip generation rate can be defined as the lowest trip generation rate that is greater than 95 percent of the observed trip generation rates. The use of the 95 percentile may be overly conservative. Another approach would be to base the recommended trip generation rate on the 95 percentile confidence interval, which would result in a trip generation rate between the average and 95 percentile rates for all warehouses.

- Observations – Both studies from Florida (i.e., reference 1 and 2 on Page 2) were treated as single observations to calculate the average trip generation rate for all warehouses, but were treated as multiple observations for the standard deviation calculation, which would affect the calculation of the confidence interval (discussed above). These studies and corresponding trip generation rates are based on the combined trip generation and building area of multiple buildings/uses in the same industrial park. One study included 31 buildings and the other included 9 buildings. The building size ranged from about 64,000 to about 440,000 square-feet.

- Outliers – One observation from the Fontana study (i.e., reference 7 on Page 2) is considerably higher than the other observations. Eliminating this observation results in a 20% decrease in the average trip generation rate for all warehouses.

Clarification Responses by SCAQMD regarding Fehr and Peers August 23, 2010 Memorandum
Large Warehouse and Distribution Center Trip Rates

Use of 95 Percentile

- AQMD STAFF RESPONSE – A CONFIDENCE INTERVAL APPROACH IS INAPPROPRIATE FOR A CEQA AIR QUALITY ANALYSIS AS THIS GIVES THE ODDS THAT A NEW POPULATION WILL RETURN AN AVERAGE WITHIN THE CONFIDENCE INTERVAL. IN THE CONTEXT OF CEQA, AIR QUALITY ANALYSES SHOULD EVALUATE A REASONABLE WORST CASE SCENARIO SO AS NOT TO UNDERESTIMATE IMPACTS. THIS CONERVATIVE APPROACH IS SUPPORTED BY CEQA CASE LAW AND IS CONSISTENT WITH AQMD GUIDANCE ON PREPARING AIR QUALITY ANALYSES. ALSO, IT IS WORTH NOTING THAT 11 OUT OF 54 BUILDINGS ARE ALREADY AT OR ABOVE THE 95TH PERCENTILE.

Observations

- AQMD STAFF RESPONSE – THE STATISTACAL APPROACH DESCRIBED IN THIS COMMENT DOES NOT MAKE AFFECT THE TRIP RATE. SPLITTING OUT INDIVIDUAL BUILDINGS FOR THE AVERAGE DOESN'T ALTER THE TRIP RATE SINCE THE AVERAGE IS TRIPS/SQ. FT. HOWEVER, THE NUMBER OF INDIVIDUAL BUILDINGS ARE NEEDED FOR THE STANDARD DEVIATION, SO THE FLORIDA STUDIES WERE SPLIT UP TO OBTAIN A CORRECT 'N' (EVERY BUILDING WAS ASSIGNED THE SAME RATE).

Outliers

- AQMD STAFF RESPONSE - THIS IS EXACTLY THE POINT, IF WE KNOW THAT SOME BUILDINGS HAVE A RATE CONSIDERABLY HIGHER THAN OTHER BUILDINGS, THEN THE USE OF AVERAGES MAY CONSIDERABLY UNDERESTIMATE POTENTIAL AIR QUALITY IMPACTS. THIS IS ESPECIALLY IMPORTANT FOR ANY SENSITIVE RECEPTORS THAT MAY BE LOCATED IN CLOSE PROXIMITY TO EITHER THE FACILITIES OR THE TRUCK ROUTES SERVING THEM. UNLIKE SOME OTHER STATISTICAL STUDIES, THIS SINGULAR HIGH RATE (FROM A SMALL DATASET) IS NOT A MEASUREMENT ERROR, HENCE IT SHOULD NOT BE DISCARDED AS IT IS A REAL FACILITY WITH REAL IMPACTS IN THE COMMUNITY.

4 Consumer Product Use Analysis by SCAQMD

Consumer Products Summary

Statewide Volatile Organic Compound (VOC) emissions data was obtained from the 2008 California Air Resources Board (CARB) Consumer Product Emission Inventory.[1] Statewide total VOC emissions were 239.6 tons/day.

The statewide total building area is 22,435,267,518 square feet. The general building stock inventory was obtained from the HAZUS-MH software and backup databases prepared by the Federal Emergency Management Agency.[2] This inventory was found to be the most comprehensive statewide data available that included building area for all land use types. The inventory was developed from the following information:

- Census of Population and Housing, 2000: Summary Tape File 1B Extract on CDROM prepared by the Bureau of Census.
- Census of Population and Housing, 2000: Summary Tape File 3 on CD-ROM prepared by the Bureau of Census.
- Dun & Bradstreet, Business Population Report aggregated by Standard Industrial Classification (SIC) and Census Block, May 2002.
- Department of Energy, Housing Characteristics 1993. Office of Energy Markets and End Use, DOE/EIA-0314 (93), June 1995.
- Department of Energy, A Look at Residential Energy Consumption in 1997, DOE/EIA-0632(97), November 1999.
- Department of Energy, A Look at Commercial Buildings in 1995: Characteristics, Energy Consumption, and Energy Expenditures, DOE/EIA-0625(95), October 1998.

Statewide VOC's per building square feet are therefore:
(239.6 tons/day x 2000 lbs/ton) / 22,435,267,518 sq. ft. = ***2.14e-5 lbs/(sq.ft.-day)***

[1] http://www.arb.ca.gov/app/emsinv/emssumcat_query.php?F_YR=2008&F_DIV=-4&F_SEASON=A&SP=2009&F_AREA=CA#5

[2] Detailed information is contained in the HAZUS-MH Earthquake Technical Manual, Chapter 3.2.1.3 available here: http://www.fema.gov/plan/prevent/hazus/

Data Grouping	Total VOC (tons/day)	Population*	Total VOC (lbs/person-day)	Total Building Area (Square Feet)	
2003 Survey Commercial *(45.3% of 2003 Land Use Total)*	47.4				
2003 Survey Residential *(48.0% of 2003 Land Use Total)*	50.3				
2003 Survey Industrial *(6.7% of 2003 Land Use Total)*	7.0				
2003 Survey Land Use Total *(42.3% of Grand Total)*	*104.7*			8,600,000,000	from AQMD draft staff report for consumer products rule
2003 Survey ARB Data Total	186.3	34,650,690	1.08E-02		
2006 Survey ARB Data Total	61.1	36,457,549	3.35E-03		
Grand Total	***247.3***		***1.41E-02***	***22,435,267,518***	from HAZUS-MH, data from late 1990's - early 2000's

*Data from American Communities Survey from the US Census

		Total VOC (lbs/building sq. ft.)	
2008 ARB Emission Inventory (Consumer Products)	***239.6***	*2.14E-05*	Statewide Factor
SCAQMD R1143 reduction to 300 g/l (as of 1/1/11)	11.3	*2.04E-05*	
If 25 g/L gets upheld by the courts	17.5	1.98E-05	SCAQMD

5 Analysis of Building Energy Use Data by ENVIRON

Analysis of Building Energy Use Data by ENVIRON

This summarizes the steps and assumptions used in preparing building energy use estimates used in CalEEMod.

Background

GHGs are emitted as a result of activities in residential and commercial buildings when electricity and natural gas are used as energy sources. New California buildings must be designed to meet the building energy efficiency standards of Title 24, also known as the California Building Standards Code. Title 24 Part 6 regulates energy uses including space heating and cooling, hot water heating, ventilation, and hard-wired lighting. By committing to a percent improvement over Title 24, a development reduces its energy use and resulting GHG emissions.

The Title 24 standards have been updated twice (in 2005 and 2008)[1] since some of these data used to estimate energy use were compiled. California Energy Commission (CEC) has published reports estimating the percentage deductions in energy use resulting from these new standards. Based on CEC's discussion on average savings for Title 24 improvements, these CEC savings percentages by end use can be used to account for reductions in electricity and natural gas use due to the two most recent updates to Title 24. Since energy use for each different system type (ie, heating, cooling, water heating, and ventilation) as well as appliances is defined in this survey, the use of survey data with updates for Title 24 will easily allow for application of mitigation measures aimed at reducing the energy use of these devices in a prescriptive manner.

Another mitigation measure to reduce a building's energy consumption as well as the associated GHG emissions from natural gas combustion and electricity production is to use energy-efficient appliances. For residential dwellings, typical builder-supplied appliances include refrigerators and dishwashers. Clothes washers and ceiling fans would be applicable if the builder supplied them. For commercial land uses, only energy-efficient refrigerators have been evaluated for grocery stores.

1 California Energy Commission. 2003. Impact Analysis: 2005 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/2005standards/archive/rulemaking/documents/2003-07-11_400-03-014.PDF
California Energy Commission. 2006. California Commercial End-Use Survey. Prepared by Itron Inc. Available at: http://www.energy.ca.gov/ceus/

Methodology

Datasets

The Residential Appliance Saturation Survey (RASS)[2] and California Commercial Energy Use Survey (CEUS)[3] datasets were used to estimate the energy intensities of residential and non-residential buildings, respectively, since the data is available for several land use categories in different climate zones in California. The RASS dataset further differentiates the energy use intensities between single-family, multi-family and townhome residences.

The Energy Star and Other Climate Protection Partnerships 2008 Annual Report[4] and subsequent Annual Reports were reviewed for typical reductions for energy-efficient appliances. ENERGY STAR residential refrigerators, clothes washers, dishwashers, and ceiling fans use 15%, 25%, 40%, and 50% less electricity than standard appliances, respectively. ENERGY STAR commercial refrigerators use 35% less electricity than standard appliances.

Calculations

RASS and CEUS datasets were used to obtain the energy intensities of different end use categories for different building types in different climate zones. Energy intensities from CEUS are given per square foot per year and used as presented. RASS presents Unit Energy Consumption (UEC) per dwelling unit per year and saturation values; the energy intensities used in this analysis are products of the UEC and saturation values.

Data for some climate zones is not presented in the CEUS and RASS studies. However, data from adjacent climate zones is assumed to be representative and substituted as follows:

For non-residential building types:
Climate Zone 11 used Climate Zone 9 data.
Climate Zone 12 used Climate Zone 9 data.
Climate Zone 14 used Climate Zone 1 data.
Climate Zone 15 used Climate Zone 10 data.

For residential building types:
Climate Zone 6 used Climate Zone 2 data.
Climate Zone 14 used Climate Zone 1 data.
Climate Zone 15 used Climate Zone 10 data.

RASS and CEUS data are based on 2002 consumption data. Because older buildings tend to be less energy efficient, and the majority of the buildings in the survey were likely constructed before 2001, the RASS and CEUS data likely overestimate energy use for a 2001 Title 24-compliant building.

2 California Statewide Residential Appliance Saturation Study Reporting Center. Available at: http://websafe.kemainc.com/RASSWEB/DesktopDefault.aspx

3 California Energy Commission. 2006. California Commercial End-Use Survey. Prepared by Itron Inc. Available at: http://www.energy.ca.gov/ceus/

4 United States Environmental Protection Agency 2009. ENERGY STAR and Other Climate Protection Partnerships: 2008 Annual Report. Available at: http://www.epa.gov/cpd/pdf/2008AnnualReportFinal.pdf

To account for updates since the 2001 Title 24 standards, percentage reductions for each end use category taken directly from the CEC's "Impact Analysis for 2005 Energy Efficiency Standards" and "Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings" reports were applied to the CEUS and RASS datasets for improvements from 2001 to 2005, and 2005 to 2008, respectively (see Table 1 and 2). For the CEUS data, exterior lighting was assumed to be covered by Title 24 lighting and therefore has the full percentage reductions taken. Interior lighting was assumed to be 50% Title 24 and 50% non-Title 24 uses. Therefore only half of the reduction for lighting was applied. The resulting 2008 numbers were then used as baseline energy intensities. In CalEEMod, if the user selects use historical, the reductions only include up to the 2005 standards. The total baseline energy intensities are calculated as follows:

$$\text{Baseline} = \sum\left[T24_{2001} \times \left(1 - R_{2001\text{-}2005}\right) \times \left(1 - R_{2005\text{-}2008}\right)\right] + \sum NT24$$

Where:

Baseline = Total baseline energy intensities of building category

$T24_{2001}$ = Energy intensities of Title 24 regulated end use from RASS or CEUS

$R_{2001\text{-}2005}$ = Reduction from 2001 to 2005

$R_{2005\text{-}2008}$ = Reduction from 2005 to 2008

NT24 = Non-Title 24 regulated end use energy intensities

Table 1

Reduction in Title 24 Regulated End Use for Non-Residential Buildings

Energy Source	End Use	Reduction from 2001 to 2005	Reduction from 2005 to 2008
Electricity	Heating	4.9%	37.2%
	Ventilation	5.0%	1.5%
	Refrigeration	0.0%	0.0%
	Process	0.0%	0.0%
	Office Equipment	0.0%	0.0%
	Motors	0.0%	0.0%
	Miscellaneous	0.0%	0.0%
	Interior Lighting	4.9%	5.9%
	Water Heating	0.0%	0.0%
	Cooking	0.0%	0.0%
	Air Compressors	0.0%	0.0%
	Cooling	6.7%	8.3%
	Exterior Lighting	9.8%	11.7%
Natural Gas	Cooking	0.0%	0.0%
	Cooling	10.4%	9.3%
	Heating	3.1%	15.9%
	Water Heating	0.0%	0.0%
	Process	0.0%	0.0%
	Miscellaneous	0.0%	0.0%

Table 2
Reduction in Title 24 Regulated End Use for Residential Buildings

Energy Source	End Use (As presented in RASS Dataset)	Reduction from 2001 to 2005			Reduction from 2005 to 2008		
		Multi-family	Single family	Town home	Multi-family	Single family	Town home
Electricity	Conv. Electric heat	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	HP Eheat	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	Aux Eheat	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	Furnace Fan	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	Central A/C	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	Room A/C	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	Evap Cooling	24.3%	19.8%	24.3%	19.7%	22.7%	19.7%
	Water Heat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Solar Water Heater	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dryer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Clothes Washer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dish Washer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	First Refrigerator	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Second Refrigerator	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Freezer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pool Pump	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Spa	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Outdoor Lighting	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Range/Oven	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	TV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Spa Electric Heat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Microwave	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Home Office	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	PC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Water Bed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Well Pump	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Miscellaneous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Natural Gas	Primary Heat	15.7%	6.7%	15.7%	7.0%	10.0%	7.0%
	Auxiliary Heat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Conv. Gas Water Heat	15.7%	6.7%	15.7%	7.0%	10.0%	7.0%
	Solar Water Heat w/Gas Backup	15.7%	6.7%	15.7%	7.0%	10.0%	7.0%
	Dryer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Range/Oven	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pool Heat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Spa Heat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Miscellaneous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

6 Additional References

Midwest Research Institute (MRI). 1988. Gap Filling PM_{10} Emission Factors for Selected Open Area Dust Sources Final Report. EPA Contract No. 68-02-4395. March 1. EPA 450/4-88-003.

United States Environmental Protection Agency (US EPA). 1992. Fugitive Dust Background Document and technical Information Document for Best Available Control Measures. Research Triangle Park, NC. Office of Air Quality Planning and Standards. EPA 450/2-92-004. September.

US EPA. AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources. Available online at http://www.epa.gov/ttnchie1/ap42/

EXHIBIT C

Sustainable Systems Research, LLC
27276 Meadowbrook Dr.
Davis, CA 95618
April 8, 2013

To: Adriano Martinez
From: Alex Karner, PhD
Subject: World Logistics Center Truck Distance Estimates

I was retained by the Natural Resources Defense Council to assess the truck trip distance estimates contained in the Draft Environmental Impact Report for the proposed World Logistics Center (WLC). My curriculum vitae is attached to this memorandum.

The WLC is a proposed warehouse distribution and logistics center that would create a maximum of 41.4 million square feet of warehousing space over an area of approximately 4,000 acres in the San Bernardino Valley in the city of Moreno Valley, California [1, p. 3-19]. This memo assesses the derivation of an important variable used in the Draft Environmental Impact Report for the WLC (DEIR) – the average distance that trucks travel to access the site. This distance is used throughout the DEIR to determine the air quality, greenhouse gas, and traffic impacts of the project (see, e.g., DEIR Appendix D, pp. 119-121). Small variations in this value are likely to affect the magnitude of calculated environmental impacts because they will affect all truck trips. Problematically, the DEIR's estimated distance for all future years is based on 2008 *regional* truck movements with an arbitrary adjustment upward to account for the types of trips expected to be generated by the WLC. However, the expected distribution of truck trips coming to/from the WLC is not specified and is not likely to reflect future increases in truck traffic associated with the San Pedro Bay Ports, as illustrated further below.

In reviewing the derivation of this value, I consult the air quality, greenhouse gas, and health risk assessment appendix to the DEIR (Appendix D) and the traffic impact report appendix to the DEIR (Appendix L).[1]

DEIR Approach to estimating truck trip distance

Assumptions about truck trip distance – the average length trucks travel to and from the WLC – critically affect the magnitude of the WLC's estimated environmental impacts. Deriving an appropriate trip length is complicated by the variation in truck origins and destinations. To address this challenge, Appendix D follows an approach based in part on a recommendation made by the South Coast Air Quality Management District (SCAQMD) in their comments on the Bandini Industrial Center Project.[2]

In brief, the method used in Appendix D proceeds as follows. Consider truck traffic originating from or destined for six mutually exclusive geographies: internal to the SCAG region, external to the SCAG region in four possible directions, and the San Pedro Bay Ports. This disaggregation follows from the approach taken in the Southern California Association of Governments (SCAG) 2012 regional transportation plan goods movement appendix [2, pp. 13-14]. That appendix classifies all regional truck trips for 2008 into five categories (percentages of total regional truck trips are shown in parentheses): internal to SCAG (87.3%), external to SCAG (7%), and three San Pedro Bay Port-related categories (5.7%). The total number of truck vehicle

[1] Note that this is a partial review of all documents associated with the project. Review of additional documents may reveal factors that were not considered as part of this review that would change the conclusions it contains.
[2] MacMillan, I. April 27, 2012. Email to Nancy Fong Re: Draft Mitigated Negative Declaration (Draft MND) for the Proposed Bandini Industrial Center. http://www.aqmd.gov/CEQA/igr/2012/April/MNDbandini.pdf

miles traveled (VMT) is then taken from elsewhere in the RTP and associated with each category of travel [3, p. 52]. Dividing truck VMT by the total number of truck trips results in an average per trip length for each trip category. Using the RTP values, the DEIR takes the share of trips in each category multiplied by its average distance and sums over all categories to arrive at a representative trip length. Results are shown for both the SCAG region as a whole and Riverside County alone because they have somewhat different distributions of trip categories. Both result in the same average trip distance of 36 miles.

This figure is subsequently adjusted upwards:

> [B]ased on various comments from the SCAQMD regarding trip lengths for trucks going to warehouse and distribution center projects as contained in their published CEQA review correspondence, the trip length used for this analysis is increased to 50 miles to provide a worst case scenario. (Appendix D, p. 120).

The "published CEQA review correspondence" cited in the quotation above was not available, so the extent to which the trip distribution was adjusted to achieve that result is unclear. We return to the issue of the disparity between the 36 and 50 mile average trip distance estimates below.

Flawed DEIR approach

The categorization of truck trips used in the RTP is justified in Appendix L which states "truck traffic associated with the WLC and other logistics centers is expected to follow this general pattern" (Appendix L, p. 61). However, the transfer of the regional and county-specific distribution of truck trips is not likely to reflect the distribution of actual truck trips at the WLC for several reasons. Most importantly the WLC is being constructed precisely to accommodate expected growth in port-related truck traffic. An article from the Press-Enterprise on the WLC describes SCAG Executive Director Hasan Ikhrata as stating that the "growing volume of cargo from the ports creates a demand for warehouse space on the scale sought by Benzeevi [the WLC's developer]."[3] Additionally, SCAG's 2012 RTP states that while current port-related truck traffic stays largely in the vicinity of the San Pedro Bay Ports, that pattern is expected to change "in the future with an increase in the number of daily trucks traveling to warehouses in the San Gabriel Valley and the Inland Empire" [2, p. 14]. Specifically, the RTP states that by 2035, 8.8% and 7% of all port-related truck trips will be associated with eastern and western San Bernardino Valley, respectively (ibid.).[4] In other words, 15.8% of all truck traffic related to the San Pedro Bay Ports will have an origin or destination within the San Bernardino Valley, where the WLC is located. This amounts to a total of 120,000 * 0.158 = 18,960 port-related truck trips per day entering or exiting the Valley in 2035.[5] As a result, SR-60, the main facility serving the WLC, is projected to see the highest growth among all east-west corridors in the region (ibid.). Future distributions of truck traffic expected in the vicinity of the WLC are therefore likely to shift to port-related trip purposes.

[3] Danelski, D. March 12, 2012. "Moreno Valley: Huge Warehouse Development Sought." *The Press-Enterprise.* http://www.pe.com/local-news/riverside-county/moreno-valley/moreno-valley-headlines-index/20120310-moreno-valley-huge-warehouse-development-sought.ece

[4] These percentages represent an increase from 0.5% and 2.3% for the eastern and western San Bernardino Valley in 2008, respectively.

[5] According to SCAG's 2012 RTP, port-related truck trips numbered 1,400 in 2008.

Sensitivity of the estimated distance to input assumptions

The DEIR analysis for the WLC errs because it assumes that the distribution of truck traffic that serves the facility will remain unchanged in the future and will reflect the 2008 *regional* or county-wide distribution of all truck trips as stated in the 2012 SCAG RTP. In other words, the truck trip distribution is not adjusted to reflect the types of trips expected to enter or exit the WLC site; instead the truck distribution entering and leaving the WLC for all analysis years is assumed to mimic the region's truck trip distribution in 2008.

The 2008 distribution of trips based on the 2012 SCAG RTP is asserted in the DEIR even though the trip distance is adjusted upwards from 36 to 50 miles. However, this increase actually depends upon a shift to longer trip types, based on a recognition that the warehouse facility will generate trips differently than the region-wide 2008 average would suggest. External-north, external-south, and port-related trips are all 50 miles in length or greater, so in order to increase from 36 to 50 miles, greater shares of these trips would have to be realized. Table 1 illustrates one possible truck trip distribution that would generate an average trip distance of 50 miles and compares that to the distribution for Riverside County cited in the DEIR (Appendix D, p. 120; Appendix L, p. 61). The adjusted distribution was generated by growing the percentage of all trips 50 miles or greater at an equivalent rate, and shrinking the percentage of all trips less than 50 miles at an equivalent rate. Each of the percentage values for trips 50 miles or greater was multiplied by 3.35 and each of the percentage values for trips less than 50 miles was multiplied by 0.773. These values were determined by trial-and-error.

Table 1. Truck trip distributions for the DEIR and a hypothetical adjusted example. Trip lengths represent average one-way travel between an origin or a destination and the WLC. The DEIR Riverside County share of truck trips is based on 2008 values in the region and is used in the DEIR to estimate the distribution of WLC trips for all analysis years. The adjusted Riverside County share of truck trips is a hypothetical example showing one possibility for realizing the adjusted 50 mile average trip length used in the DEIR.

Trip type	Direction	Trip length (mi)	DEIR Riverside County share of truck trips (%)	Adjusted Riverside County Share of truck trips
Internal		30	87.9	67.9
External	North	140	4.0	13.4
	Northeast/ Southeast	47	2.2	1.7
	East	23	1.1	0.85
	South	50	3.0	10.1
Port-related		79	1.8	6.0
Weighted average trip length (mi)			36	49.9

The hypothetical adjusted distribution shown in Table 1 illustrates that the internal proportion of truck trips must drop substantially to result in an average distance of 50 miles.[6] Proportions of long external and port-related trips increase accordingly. These percentages can be converted into numbers of total truck trips per day using values presented in the DEIR. Appendix D shows

[6] This will be the case in any scenario with an average trip length of 50 miles. Even if all trip types with distances less than 50 miles had a 0% share and external-north (the longest trip type) increased accordingly, average trip distance would only be 40 miles.

total daily trips at full project buildout in 2022 (Appendix D, Table 17, p. 112). The total number of estimated truck trips per day accessing the WLC in 2022 is 14,683. This total, and the share shown in Table 1 of 6%, implies that the total number of port-related truck trips entering and leaving the WLC under the hypothetical adjusted distribution would be 0.06 * 14,683 = 881 at project buildout in 2022. The total number of port-related trips associated with the San Bernardino Valley in 2022 is likely to be approximately 9,100.[7] In 2035, at the end of the project's planning horizon, port-related truck trips entering and leaving the San Bernardino Valley will number 18,960 trips per day. According to a SCAG-sponsored study, the total regional share of warehousing space devoted to port-related uses will grow from 19% in 2022 to 25% in 2035 [4, Table 3.2]. Other data from that study show the proportion of warehousing space in Western Riverside County (where the WLC will be located) devoted to port-related uses increasing from 7.1% in 2008 to 14.4% in 2022 and 2035 [4, Table 5.9]. In light of these figures, the proportion of port-related truck trips attributed to the WLC in the DEIR appears unreasonably low.

Values for the total number of port-related trips drawn to the San Bernardino Valley in 2022 and 2035 shown above are both much higher than the number of port-related trips expected to be drawn to the WLC according to the DEIR analysis, yet the facility will be the largest warehouse constructed in the United States when it begins operation.[8] Additionally, the WLC's proposed 41.2 million square feet of warehousing space exceeds total available in Riverside County as of 2009 [4, Table 2.3]. The size of the WLC, combined with the stated logic of its construction – to serve growth in port-related cargo volumes – indicate that the proportion of port-related trips expected to be traveling to and from the WLC deserves closer scrutiny. The DEIR should explicitly state the new distribution of truck trips it uses to get from 36 to 50 miles and compare the project's expected share of port-related trips to the total expected in the San Bernardino Valley in 2022 and 2035 to ensure that the calculated values are within reason. If the DEIR finds that the projected share of port-related traffic is too low in future years, it is likely that the average trip distance will need to be increased to reflect the true environmental impacts of the WLC.

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[7] Using the previously cited RTP estimates (1,400 truck trips in 2008, 18,960 truck trips in 2035) and assuming a linear increase in truck volumes from 2008 to 2035, approximate truck volume in 2022 = (18960 – 1400)*0.519 = 9,114. Note that 0.519 represents the year 2022 as a proportion of time between 2008 and 2035.

[8] Danelski, D. March 12, 2012. "Moreno Valley: Huge Warehouse Development Sought." *The Press-Enterprise.*

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EXHIBIT D

SOUTHERN CALIFORNIA
ASSOCIATION of GOVERNMENTS

Comprehensive Regional Goods Movement Plan and Implementation Strategy

Industrial Space in Southern California:

Future Supply and Demand for Warehousing and Intermodal Facilities (Task 5 Report)

June, 2010

FREIGHTWORKS

This report was prepared for Southern California Association of Government by Cambridge Systematics, Inc. in association with Economics & Politics.

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Executive Summary

The *Industrial Space in Southern California: Future Supply and Demand for Warehousing and Intermodal Facilities* is intended to forecast industrial land needs in the region. Its purpose is to understand both the existing supply and demand for industrial/warehouse and intermodal facility space and to forecast growth to determine whether land use in the general plan allocated to warehousing needs will be sufficient in the Los Angeles basin.

Based on research conducted through interviews, data analysis of assessor data from 2009 in all six counties in the Los Angeles area, the application of a methodology to forecast future demand for space, and a survey of warehousing facilities, the study established the following summary results.

- **Existing and Future Supply of Total Warehousing Space**.
    - The analysis show that there are 4,700 existing warehousing facilities in the SCAG region, amounting to 838 million square feet of occupied and available warehousing space.
    - In addition, there is 185 million square feet of undeveloped land currently zoned industrial that could accommodate warehousing and distribution buildings.
- **Existing and Future Demand for Warehousing Space.**
    - Port-related warehouse square footage in 2008 was estimated at 102 million square feet. Based on projections of port cargo, it was estimated that 307 million square feet of port-related warehousing space would be needed in the year 2035.
    - Non port-related warehouse square footage in 2008 was estimated at 591 million square feet. By 2035, the demand for non port-related warehousing is projected to reach 943 million square feet based on domestic cargo shipments in the SCAG region.
    - This amounts to 1,250 million square feet of port and non port-related warehouse square footage demanded in 2035.
- **Distribution of Warehousing Space Over Time.**
    - According to assumed growth rates, the region will run out of suitably zoned vacant land in about the year 2028. At that time, forecasts show that the demand for warehousing space will be approximately 1,023 million square feet.

- During the year 2035, there will be a projected shortfall of space of about 228 million square feet, unless other land not currently zoned for warehousing becomes available.

1.0 Introduction

The objective of Task 5 is to conduct a needs assessment of industrial/warehouse and intermodal facilities in the Southern California Association of Governments (SCAG) region. The goal is to understand the demand for facility space and to determine if the supply will be sufficient. The study also attempts to project where and when warehousing will develop over time. The analysis includes warehousing demand for port related cargo, as well as non-port related cargo.

Section 2.0 describes the current supply of warehouse facilities in the SCAG region and provides an inventory of existing supply through cataloguing the undeveloped land in the SCAG region. This analysis also maps the location of undeveloped property that is zoned in a way that would permit development of future goods movement facilities.

Section 3.0 determines the current demand for industrial/warehousing facilities and then estimates future aggregate demand for warehouse space to support port related cargo storage and processing needs.

Section 4.0 provides a theory for future growth and how the supply of land will evolve over time based on economic forces in the Southern California region. Since World War II, Southern California's history has been dominated by the impact of its rapid population growth on its land use pattern. With no policies in place or under consideration to stop population growth, the region will continue to develop outward. Various policy scenarios are tested to determine what could change this trajectory.

Section 5.0 takes the aggregate forecasts of warehousing demand described in Section 3.0 and allocates growth to subregions. It is assumed that growth will occur in a logical sequence (i.e., as subregions closer to the urban core become saturated, future development will jump to the next logical subregions until the supply of vacant industrial-zoned land runs out).

Section 6.0 documents the existing and planned intermodal (IM) rail facilities in the region. Fortunately, a similar analysis was completed by Cambridge Systematics in February 2009 for the I-710 Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)[1], and the following information is taken largely from that study.

[1] Cambridge Systematics, Inc., *Final technical Memorandum, I-710 Railroad Goods Movement Study*, prepared for Los Angeles Metropolitan Transportation Authority, February 3, 2009.

2.0 Existing Supply of Warehousing Space

This section describes the current supply of warehouse facilities in the SCAG region and has been covered by the previous two-part technical memorandum provided to SCAG on September 22, 2009 and presented in Appendices A and B.

A database has been created showing the locations of the warehouses, their square footage, the land area covered, and whether the facilities are occupied or available (*vacant or occupied but tenants are leaving*). The data in this report are from the six county assessor's offices in the SCAG region and Lee & Associates, a major commercial real estate firm. The data include facilities that are 50,000 square feet and above that have been classified as "warehousing" plus facilities more generally classified as "industrial", however, their size and location would indicate that they are most likely warehouses.

2.1 FINDINGS FOR OCCUPIED AND AVAILABLE SPACE

Summary of Existing Space

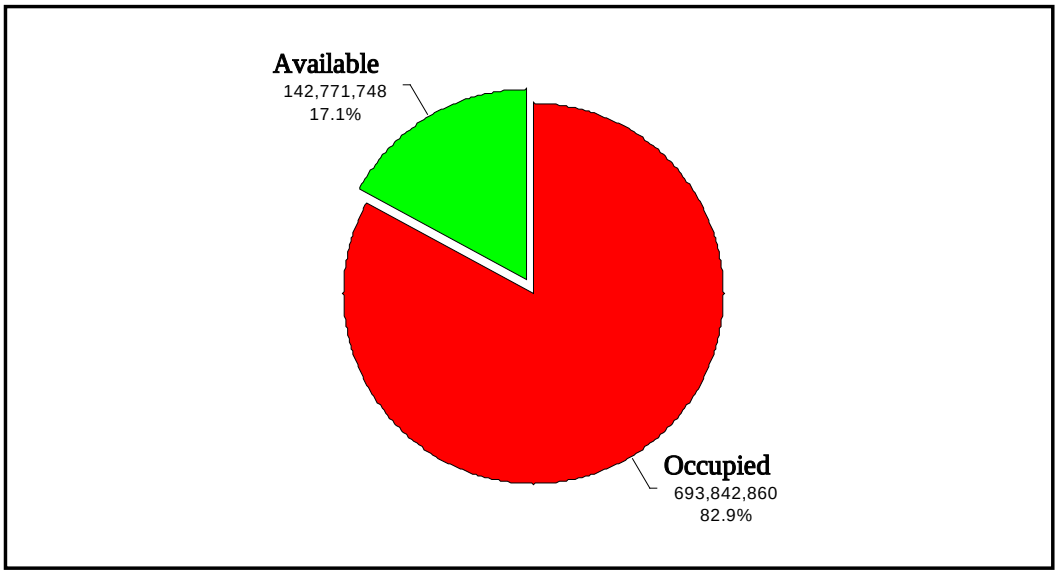
There are currently a total of 4,695 warehousing facilities in the SCAG region (*Table 2.1 and Figure 2.1*). Of these, 84.8 percent (*3,983*) are occupied and 15.2 percent (*712*) are available (*vacant or occupied and becoming vacant*). The 4,695 facilities represent 837,689,768 square feet (square feet) of warehouse space. They cover 1,463,925,978 square feet of land representing an average 57.1 percent floor area ratio (FAR). A total of 693,842,860 square feet, or 82.8 percent, are occupied and 143,846,908 square feet., or 17.1 percent, are available (*Table 2.1 and Figure 2.1*).

Table 2.1 Profile of Warehousing Facilities in the SCAG Region

Status	Facilities (Number)	Percentage Share	Facilities (Square Feet)	Percentage Share	Land (Square Feet)	Percentage Share
Occupied	3,983	84.8%	693,842,860	82.8%	1,164,574,572	79.6%
Available	712	15.2%	143,846,908	17.2%	299,351,406	20.4%
Total Existing	**4,695**	**100.0%**	**837,689,768**	**100.0%**	**1,463,925,978**	**100.0%**

Source: Cambridge Systematics Technical Memorandum, *Existing Supply of Warehouse Facilities*, Task 5, Deliverable #1, Part 1, September 22, 2009. Slight correction made to account for additional space in Imperial County.

Figure 2.1 Occupancy of Warehousing Facilities in the SCAG Region
In Square Feet



Occupied Space

Of the 3,983 occupied warehouse facilities, the largest shares are in Los Angeles (*51.8 percent*) and San Bernardino (*16.5 percent*) counties, followed by Riverside (*12.8 percent*) and Orange counties (*9.3 percent*) (*Table 2.2 and Figure 2.2*). As a share of the regional total of warehousing square footage,

San Bernardino County and Riverside County represent 23.7 percent and 19.7 percent, respectively, while Los Angeles County accounts for 44.8 percent (*Table 2.2 and Figure 2.3*). The facilities in San Bernardino and Riverside Counties tend to be larger, newer, and built with more recent technology.

Table 2.2 Occupied Warehousing Facilities by County

County	Number of Facilities		Facilities (by Square Feet)		Land Area (by Square Feet)	
Imperial	47	1.2%	7,273,270	1.0%	11,364,491	1.0%
Los Angeles	2,063	51.8%	310,696,717	44.8%	471,368,956	40.5%
Orange	369	9.3%	34,488,034	5.0%	77,493,686	6.7%
Riverside	508	12.8%	136,421,050	19.7%	213,157,898	18.3%
San Bernardino	657	16.5%	164,716,871	23.7%	328,323,740	28.2%
Ventura	339	8.5%	40,246,918	5.8%	62,885,801	5.4%
Total	**3,983**	**100.0%**	**693,842,860**	**100.0%**	**1,164,574,572**	**100.0%**

Source: Cambridge Systematics Technical Memorandum, *Existing Supply of Warehouse Facilities*, Task 5, Deliverable #1, Part 1, September 22, 2009.

Figure 2.2 Occupied Warehousing Facilities by County, Number

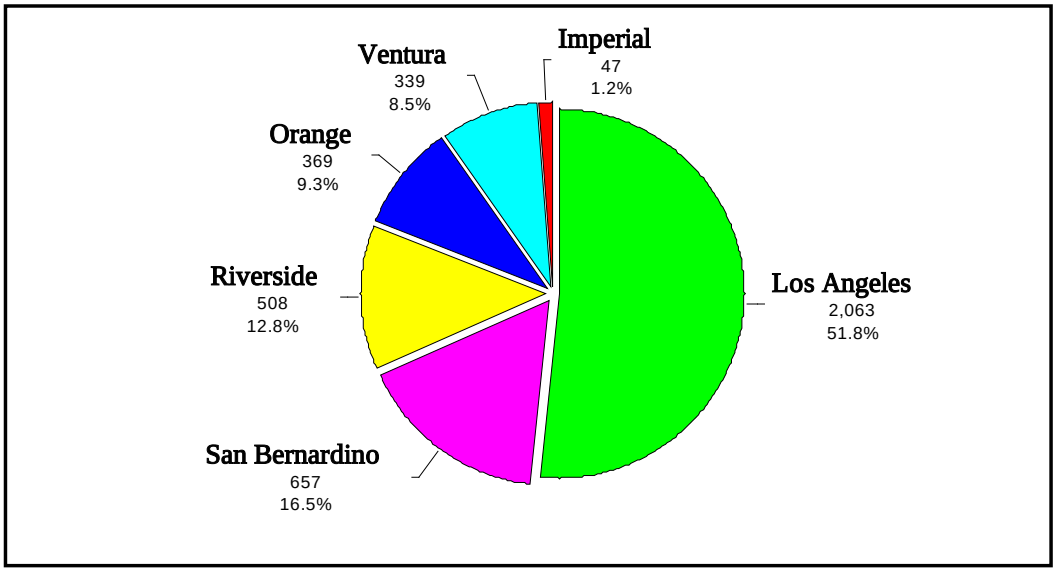
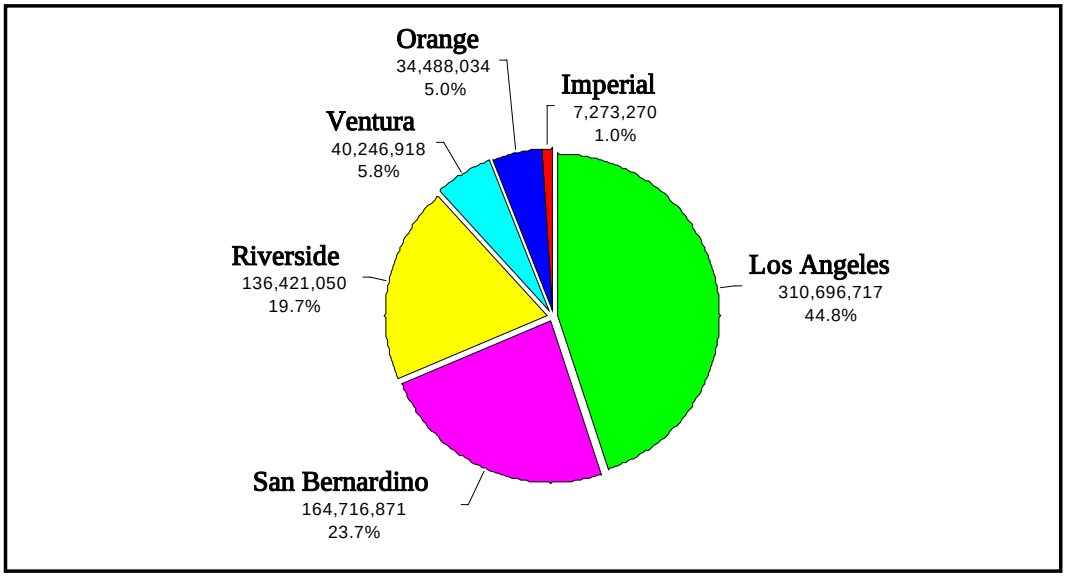


Figure 2.3 Occupied Warehousing Facilities by County
In Square Feet



Currently Available Space

Of the 712 warehouse facilities, either available or occupied but now on the market, the largest shares are in Los Angeles (*40.3 percent*) and San Bernardino (*29.2 percent*) Counties, followed by Riverside (*14.7 percent*) and Orange (*12.6 percent*) (*Table 2.3 and Figure 2.4*). In terms of square footage, the inland counties again had higher shares with San Bernardino at

37.1 percent and Riverside at 22.9 percent, while Los Angeles had 28.0 percent and Orange had 9.1 percent (*Table 2.3*).

Table 2.3 Available Space for Warehousing by County

County	Number of Facilities		Facilities (by Square Feet)		Land Area (by Square Feet)	
Imperial	N/A	0.0%	1,075,160	0.7%	N/A	0.0%
Los Angeles	287	40.3%	40,289,109	28.0%	75,446,297	25.2%
Orange	90	12.6%	13,116,570	9.1%	25,718,467	8.6%
Riverside	105	14.7%	32,958,011	22.9%	63,032,998	21.1%
San Bernardino	208	29.2%	53,316,426	37.1%	126,910,023	42.4%
Ventura	22	3.1%	3,091,632	2.1%	8,243,620	2.8%
Total	**712**	**100.0%**	**143,846,908**	**100.0%**	**299,351,406**	**100.0%**

Source: Cambridge Systematics Technical Memorandum. Existing Supply of Warehouse Facilities (Task 5, Deliverable #1, Part 1). September 22, 2009. Slight correction made to account for additional space in Imperial County.

Note: Assessor data from Imperial County did not include "vacant" parcels. See Data Manipulation and Assumptions.

Figure 2.4 Available Warehousing Facilities by County, Number

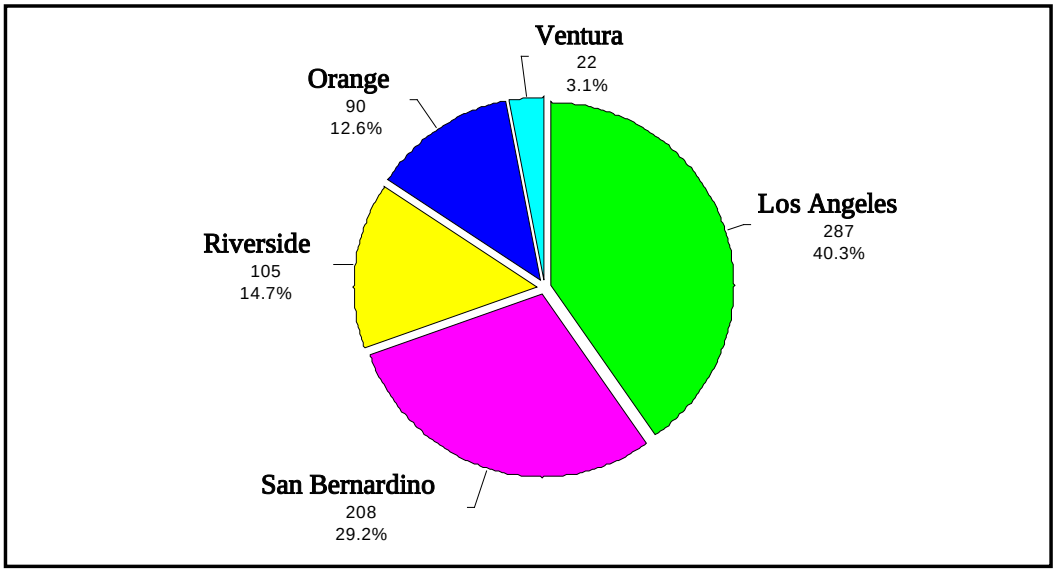


Table 2.4 Summary of Occupied, Available, Total Space by County, 2009
Includes Facilities of 50,000 Square Feet and Larger

	Occupied Space		Available Space		Total Space	
County	**Square Feet**	**% of County**	**Square Feet**	**% of County**	**Square Feet**	**% Available**
Imperial	7,273,270	1.0%	1,075,160	0.7%	8,348,430	12.9%
Los Angeles	310,696,717	44.8%	40,289,109	28.0%	350,985,826	11.5%
Orange	34,488,034	5.0%	13,116,570	9.1%	47,604,604	27.6%
Riverside	136,421,050	19.7%	32,958,011	22.9%	169,379,061	19.5%
San Bernardino	164,716,871	23.7%	53,316,426	37.1%	218,033,297	24.5%
Ventura	40,246,918	5.8%	3,091,632	2.1%	43,338,550	17.1%
Total	**693,842,860**	**100.0%**	**143,846,908**	**100.0%**	**837,689,768**	**17.2%**

Source: Cambridge Systematics Technical Memorandum. Existing Supply of Warehouse Facilities (Task 5, Deliverable #1, Part 1). September 22, 2009. Slight correction made to account for additional space in Imperial County. [2]

Table 2.4 summarizes, for each county, the facilities that the Assessor's Offices found were occupied and the facilities that Lee & Associates lists as available (*vacant or occupied and becoming vacant*). The total is the sum of these two. Table 2.4 is not comparable to commercial brokerage data for several reasons. It only looks at facilities of 50,000 square feet and above; brokerage data starts at 5,000 square feet. It also includes build-to-suits,

[2] There is a slight deviation in total vacant space from earlier work in that 1,075,160 square feet of vacant space was found in Imperial County (*149,915 square feet in north end of the County nearer the Salton Sea; 925,245 square feet in south end near the Mexican border*). That number had been assumed at zero due to lack of information. The total of vacant space was thus 143,846,908; not 142,771,748, as previously reported. Data in this final report reflect corrected values.

which are often excluded from commercial brokerage data. It provides data on "available" square footage, and thus an availability rate, not a "vacancy rate". It mixes sources with the occupied from the assessor's offices and the available from Lee & Associates. Table 2.4 seeks to measure warehousing facilities; brokerage data is for all industrial facilities.

In 2009, brokerage data found that all industrial facilities in the Inland Empire, regardless of size down to 5,000 square feet, had a 12.3-percent vacancy rate. Availability rates run higher. A study of that area in second quarter 2008 found the availability rate was 4-percent higher. Also, the data in Table 2.4 are for facilities of 50,000 square feet and above. The slowdown in international trade worldwide has affected large warehouses very hard, with a growing number of firms abandoning operations.

Figure 2.6 and Figure 2.7 are maps of the SCAG region showing the location of occupied and available warehouses in Southern California.

Figure 2.5 Map of Occupied Warehousing Space in the SCAG Region

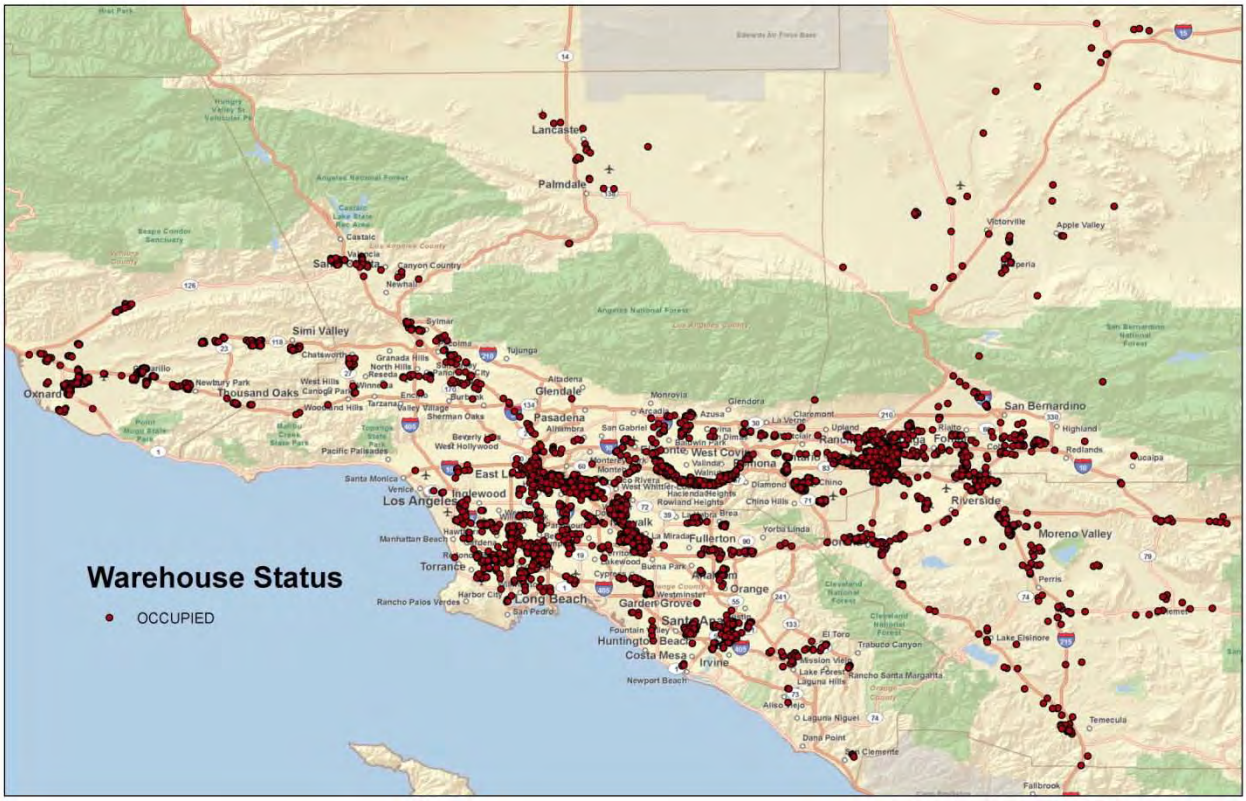
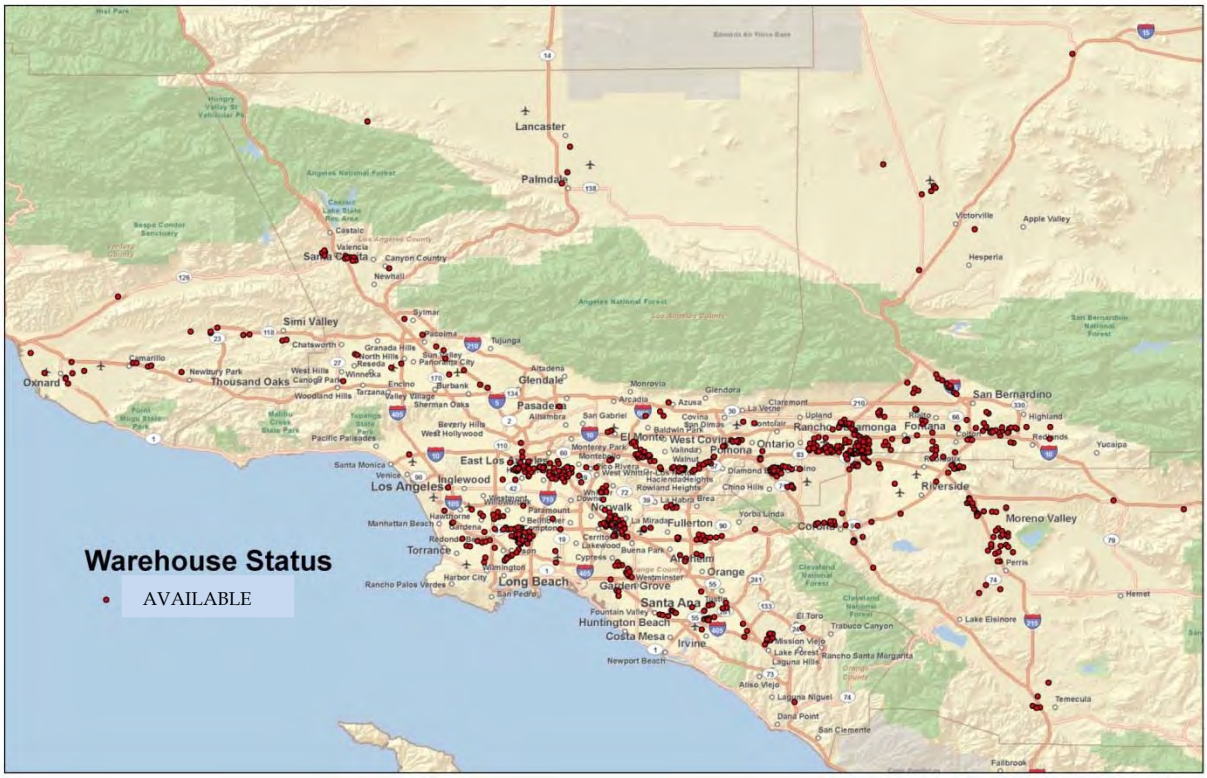


Figure 2.6 Map of Available Warehousing Space in the SCAG Region



2.2 FINDINGS FOR UNDEVELOPED LAND

Based on a review of available land that is zoned industrial, the analysis indicated that the SCAG region (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties) could hold another 186.2 million square feet of warehousing and distribution buildings (*Table 2.5 and Figure 2.8*).

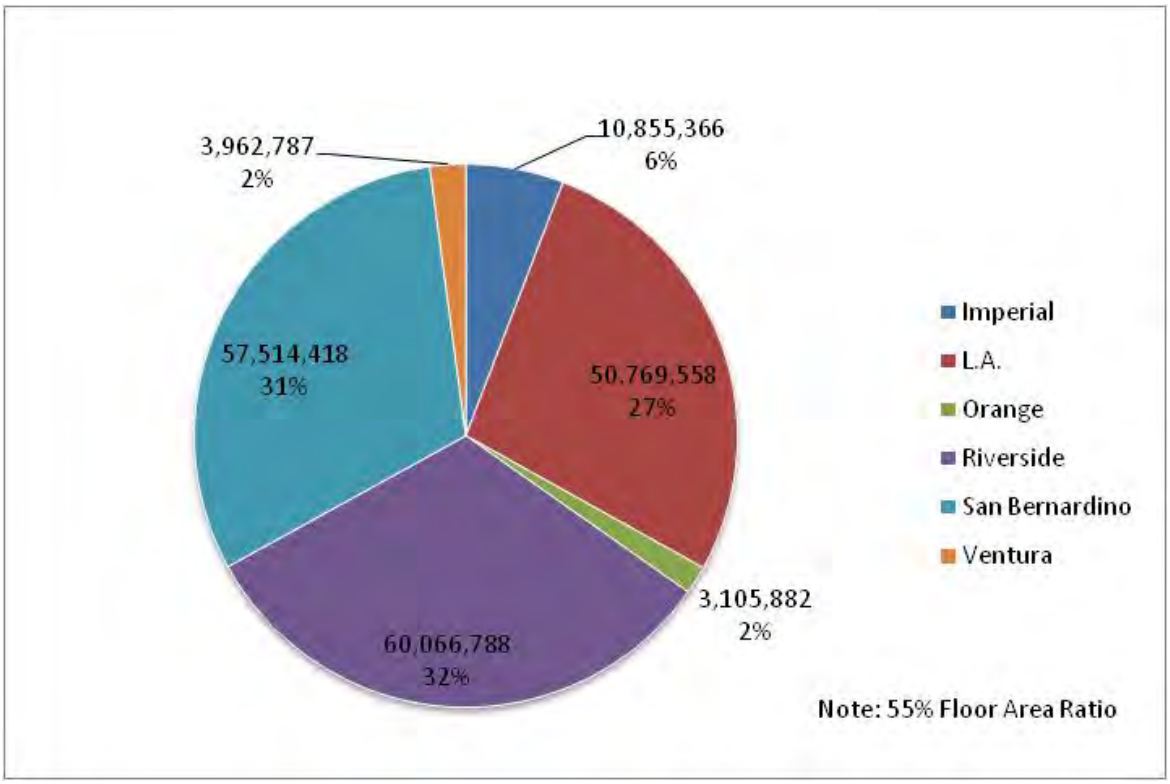
This assumes no other land, such as agricultural sites, is converted to industrial. The largest share of these potential facilities would be in Riverside County (60.0 million square feet, 32.2 percent) and San Bernardino County (57.5 million square feet, 30.9 percent). Next would be Los Angeles County (50.8 million square feet, 27.3 percent). Imperial County ranked fourth (10.9 million square feet, 5.8 percent), followed by Ventura County (4.0 million square feet, 2.1 percent) and Orange County (3.1 million square feet, 1.7 percent). Importantly, within each county, the vast majority of the potential space is in outlying desert areas: San Bernardino (74.9 percent), Los Angeles (71.5 percent), Riverside (67.5 percent), and Imperial (100.0 percent). Here, there is also some bias for large tracts that could be potential mining or solar fields.

Table 2.5 Summary of Undeveloped and Total Space by County, 2009
Includes Facilities of 50,000 Square Feet and Larger

	Undeveloped Suitable Space		Total Existing Space	
County	**Square Foot**	**% by County**	**Square Foot**	**% Available**
Imperial	10,855,366	5.8%	8,348,430	12.9%
Los Angeles	50,769,558	27.3%	350,985,826	11.5%
Orange	3,105,882	1.7%	47,604,604	27.6%
Riverside	60,066,788	32.2%	169,379,061	19.5%
San Bernardino	57,514,418	30.9%	218,033,297	24.5%
Ventura	3,962,787	2.1%	43,338,550	17.1%
Total	**186,274,798**	**100%**	**837,689,768**	**17.2%**

Source: Cambridge Systematics Technical Memorandum. Existing Supply of Warehouse Facilities (Task 5, Deliverable #1, Part 2). September 22, 2009. Slight adjustment for Imperial County data.

Figure 2.7 Warehouse Development Potential (Square Feet) on Vacant But Suitable Industrial Land in SCAG Region (186.2 Million)



If **Riverside County's** available industrial land were to be developed with logistics facilities, it would have the potential to add 60.0 million square feet, the SCAG region's largest share. Most of this potential space (29.6 million square feet) would be on unincorporated land outside of a census-designated place (CDP), with most of that likely in outlying deserts. Of the cities in Riverside County, Perris (3.7 million square feet) and Riverside (3.4 million square feet) have the most potential, followed by Coachella (3.3 million square feet), Corona (3.3 million square feet), and Palm Springs (3.1 million square feet.). Including unincorporated property, 67.5 percent of Riverside County's available sites are in its deserts.

San Bernardino County has the potential to add 57.5 million square feet of warehousing and distribution facilities, the second largest share in the SCAG region. Adelanto has the greatest potential (20.3 million square feet), followed by unincorporated non-CDP locations (12.9 million square feet) and Victorville (7.0 million square feet). Two urban valley cities are next: San Bernardino (4.4 million square feet) and Redlands (2.3 million square feet). Including unincorporated property, 74.9 percent of San Bernardino County's available sites are in its deserts.

Maintaining the theme of outlying areas having the bulk of the SCAG area's potential future warehousing and distribution space, Lancaster (23.0 million square feet) and Palmdale (12.9 million square feet) have 71.5 percent of **Los Angeles County's** 50.8 million square feet of potential space. The only substantial potential sites clearly in urbanized areas were in Santa Clarita (3.7 million square feet), Los Angeles (2.4 million square feet), and Industry (2.1 million square feet).

Imperial County is generally not on the list of major sources of urban development potential. That is not true with regards to potential future logistics space. Land identified as industrial that could hold warehousing and distribution facilities has the ability to handle 10.9 million square feet of space. The number would, of course, be much higher if agricultural sites were ultimately converted to industrial use. This is more than either Orange or Ventura Counties.

Ventura County still has some potential to handle warehousing and distribution facilities. It could see 4.0 million square feet with 44.5 percent of that in Oxnard (1.7 million square feet), not too far from the Port of Hueneme.

In the SCAG region, **Orange County** is nearly out of undeveloped industrially-zoned land. It has the potential for just 3.1 million square feet Of this, Irvine (1.4 million square feet) is where 49 percent of this space could locate.

Figure 2.8 Map of Undeveloped Warehousing Space in the SCAG Region

2.3 DATA SOURCES

The location and facility characteristics of warehouses were obtained from the six county assessor's offices in the SCAG region. A listing of the types of data received is shown in Table 2.5. Each office was asked to provide a list of facilities that could be classified as warehousing and distribution, including the following use classification or facility type:

- **Industrial/Warehouse.** General category where we had insufficient information to differentiate between a warehouse or a manufacturing operation. Based on the size of facilities, and elimination of facilities that were clearly manufacturing operations by looking at the names of the owners, the overwhelming majority would be warehouses.
- **Distribution Facility.** A warehousing operation or a trucking operation.
- **Cross Dock Trucking Terminal.** A facility where trucks of one size or from one geographic location are unloaded on one side of the facility and move across to the other side, where they are loaded into other trucks of different sizes or going to different places.

- **Bulk Warehouse.** Large warehousing facilities.

Table 2.6 Assessor Data Received, Properties of All Sizes

Data Type	Los Angeles	Ventura	San Bernardino	Riverside	Orange*	Imperial
Assessor Parcel Code	✓	✓	✓	✓	✓	✓
Use Code	✓	✓	✓	✓	✓	✓
Street Address	✓	✓	✓	✓	✓	✓
City, Zip	✓	✓	✓	✓	✓	✓
Lot and Tract No.	✓	✓	✓	✓	✓	✓
Site square feet (% of facilities where data were provided)	98.6 %	93.5 %	90.0%	80.2%	100%	91.8 %
Building sq ft (% of facilities where data were provided	99.3 %	0%	99.4%	0%	100%	0%
Owner	✓	✓	✓	✓	✓	✓
Owner's Address	✓	✓	✓	✓	✓	✓
Valuation	✓	✓	✓	✓	✓	✓
Longitude/Latitude	✓	✓	✓	✓	✓	✓

*Orange County provided all industrial buildings of 50,000 or more square feet, but did not specify whether they were manufacturing or warehousing facilities. It was assumed they were warehousing.

Lee & Associates, a major commercial brokerage firm, obtained data on available space, which the assessors' data did not include. This data was provided in exchange for sponsorship acknowledgment on the reports. They included:

- Address, city, zip;
- Building total square footage;
- Available square footage;
- Height;
- Lot size;
- Number of land parcels comprising the lots; and
- Longitude and latitude.

Data Manipulation and Assumptions

This raw data set was manipulated using the following rules and assumptions:

- Assessor data and Lee & Associates vacancy data were matched by determining the longitude and latitude of the assessor's data. If a Lee & Associates facility, using its Geographic Information System (GIS) location, was within 500 feet of an assessor's facility, it was counted as the same facility.
- If there was conflicting information for a given facility, the Lee & Associates data were assumed to be accurate. The assumption is that brokerage data is of higher quality and more up to date, because clients count on the brokers to use accurate information to market the facilities.
- If a Lee & Associates vacant building was not on the assessor's files or was more than 500 feet from an assessor's building, it was added to the database with the Lee & Associates information.
- Buildings with less than 50,000 square feet were removed from the database, as they were assumed unlikely to be involved in goods movement activities.
- An equation was developed relating lot size to building square footage, where that was available under the rules outlined above and described in greater detail in Section 2.4. This was then applied to the blank land square footage to estimate the square footage of buildings, where data was not available. Extreme cases and outliers for illogical data were removed from the database.
- An external check was run on the result. The SCAG region showed roughly 694,000,000 square feet of occupied warehousing space and roughly 143,000,000 square feet of available (vacant or soon to be vacant) space. This is within reason for the commercial data published about the warehousing sector. The commercial data includes buildings of 5,000 square feet and above, and is therefore not strictly comparable.
- Except for Orange County, the available data included vacant parcels regarded as future industrial sites. Of these, the most accurate appears to be San Bernardino County. The least accurate appears to be Riverside County. More analysis, outlined below, is needed on vacant parcels.
- After the database was completed, a line-by-line review was undertaken of occupied sites to judge whether the data appeared to be accurate in cases where the assessors' codes did not allow specificity to goods movement facilities, as opposed to other industrial uses. In particular, an effort was made to remove:

- Named self-storage facilities;
- Named very large manufacturing facilities (*e.g., Amgen, Ventura County*);
- Named manufacturing facilities less than 200,000 square feet.;
- Industrial-coded sites under 200,000 square feet in areas known to contain few, if any, warehousing facilities (*e.g., Hunter Park, Riverside County*); and
- Named agricultural facilities of any size in outlying areas (*e.g., Coachella Valley*).

Data Dictionary

The warehousing information is provided in the following two ArcGIS file (.shp) titled "Occupied" and "Vacant (Available)." These files include the following fields and description of contents:

- **ALLCOUNTY.** County where the warehouse is located. This is derived from one of the six county assessor files.
- **OWNER1.** Name of the facility, as provided by the county assessor.
- **SITUSADDRE.** Address of the facility, as provided by the county assessor.
- **PLACE_NAME.** City where the warehouse is located.
- **PARCELNO.** Parcel number, as provided by the county assessor. These correspond to various use codes. Each county has a separate series of use codes, which can be provided if needed.
- **FIELD7.** Same as PARCELNO.
- **X and Y.** Latitude and Longitude location of facilities, as coded by GIS.
- **TOTALVALUE.** Total assessed value (land and structures) per the county assessor.
- **WAREVAC.** Status of warehouse, per county assessor (intermediary calculation).
- **OCCUPIED.** Status of warehouse, per county assessor (intermediary calculation).
- **GIS_SQFT.** Square footage details calculated with parcel information (intermediary calculation).
- **ASSESSORSF.** Square footage details provided by county assessor (intermediary calculation).
- **BROKERSF.** Square footage details provided by Lee & Associates (intermediary calculation).

- **COUNT.** Number of records per parcel (intermediary calculation).
- **STATUS.** Vacant (Available), Occupied, or Undeveloped.
- **BUILDING.** Actual Building Square Footage per above methodology developed by John Husing. This field provided the actual building square footage in subsequent analyses and calculations.
- **CODE.** Assessors' codes.
- **DEFINITION OF CODE.** The Assessor's explanation of the meaning of the code.

3.0 Determining Current and Future Demand for Warehousing Space

This part of the task determines the current demand for industrial/warehouse facilities, and then estimates future demand for warehouse space to support port related and non-port related cargo storage and processing.

3.1 FINDINGS ON WAREHOUSING SPACE DEMAND

Port related warehouse square footage in 2008 was estimated to be 102 million square feet. The existing 2008 warehouse space in the region (836.6 million square feet, occupied and available) will meet the growth demand until 2021 (see Table 3.2 on Page 3-5). Based on projections of port cargo, it was estimated that 307 million square feet of port related warehousing would be needed in 2035.

It has been estimated that 591 million square of warehousing in 2008 is occupied by non-port related cargo. By 2035, the need for non-port related warehousing is projected to reach 943 million square feet, based on projections of domestic cargo shipments in the SCAG region.

In Section 5.0, we present forecasts of future demand for warehousing by year and by subregional zone for both port related and non-port related uses.

3.2 DATA SOURCES

The first step was to develop a list of variables required to estimate warehouse demand, including the economic drivers behind this demand, such as growth in cargo through the ports and growth in the domestic economy. These variables were compiled through literature review, interviews, and a warehousing survey that was conducted for this task. To gain an understanding of current demand for warehousing space, interviews were conducted with warehouse distribution specialists in the SCAG region.

Interviews with Industry Professionals

For this task, Cambridge Systematics interviewed industry professionals from ProLogis, Watson Land Company, Majestic Realty Company, California

Cartage, as well as the Distribution Management Association of Southern California and International Warehouse Logistics Association.

Warehousing Survey

To gain a better understanding of the variety of warehousing functions and characteristics in the SCAG region, we conducted a survey of warehouse tenants from November 2009 to January 2010. Results of this survey were used as one of the data sources for the findings in this section. A full summary of the warehousing survey can be found in Appendix C, including background on survey methodology, pre-test, questionnaire, and results.

3.3 METHODOLOGY

Avison Young Methodology

To forecast demand for warehouse space to support port growth, we adapted an approach developed by Avison Young for a study of industrial space needs associated with container cargo growth at the Port of Vancouver, British Columbia.[3] The Vancouver report is provided as Appendix D. The methodology converts estimates of port container volumes in local distribution into cubic footage and square footage of warehousing.

Using the Avison Young approach, Cambridge Systematics developed a spreadsheet model to predict the amount of warehouse space that would be required to accommodate future growth of containerized cargo through the Ports of Los Angeles and Long Beach. The methodology starts with assumptions about the percentage of port Twenty-Foot Equivalent Units (TEU) requiring warehouse space. It is assumed that loaded containers in the "local distribution" and "transload" market segments need warehouse space in the SCAG region, but that containers in the "direct long-haul intermodal" segment do not, since they are loaded onto trains for shipment out of the region. In 2008, the Ports handled a total of 14,337,801 TEUs, 75 percent of which were loaded. In 2009, they handled 11,816,592 TEUs, 77 percent of which were loaded.

Based on the Ports' container truck trip generation model, known as "QuickTrip", 26.4 percent of total TEUS (including empties) are loaded local import containers, including transload containers. A total of 8.5 percent TEUs are loaded local export containers. It is assumed that 100 percent of the loaded local imports need warehousing space, but that only 30 percent of the loaded local exports are warehoused, as they often move direct from

[3] Avison Young, Container Shipping Growth and Industrial Real Estate Demand in Greater Vancouver: 2005-2020, June 2005.

their origin to the ports. Multiplying these factors would indicate that in 2008, 4,150,793 loaded TEUs needed warehousing space. This number of TEUs, shown as *L* in Equation 1, represents 29 percent of all TEUs through the Ports that needed warehousing space.

The analysis used these additional simplifying assumptions:

- Ten percent of the cargo needing warehouse space are moved twice in the region (i.e., a container that is sent from the port to a warehouse, and then is later sent to another warehouse in the region);
- Ninety percent of a TEU is actually filled with cargo; and
- The dimensions of a TEU are 8 feet by 8.5 feet by 20 feet.

This implies that the cargo needing warehousing in 2008 would require more than 5.6 billion cubic feet of space for storage. However, not all of the cubic space in a warehouse is devoted to cargo storage, since there are hallways, offices, etc. Based on a schematic for a typical warehouse, only about 23 percent of the actual cubic footage inside a warehouse are used for cargo storage. It is also assumed that, on the average, warehouses operate at 75 percent of capacity. Based on the recent warehouse survey conducted as part of this study, the average ceiling height used for cargo storage inside a warehouse is 27 feet. Also, the higher the cargo turnover rate per year, the more cargo can be processed through the facility. Based on the survey, the average turnover rate is 12 times per year.

To calculate the warehouse space needed to accommodate 2008 port container volumes from the loaded TEUs needing warehousing space, the following equation was used.

Equation 1

$$W = L * (1+m) * d * e * (1/u_1*u_2) * (1/t) * (1/h)$$

Where:

W = Warehouse space needed to accommodate port container volumes;

L = Loaded TEUs needing warehousing space;

m = Percentage of cargo moved twice within the region;

d = Dimension of container (i.e., length x width x height);

e = Efficiency of container (i.e., percent of TEU filled with cargo);

u_1 = Warehouse cubic space utilization ratio and used for cargo at full capacity;

u_2 = Average percentage capacity utilization annually;

t = Turnover of cargo in warehouse per year; and

h = Ceiling height used for cargo storage.

Combining these factors yields an estimate of 102 million square feet of warehouse space needed to accommodate 2008 port container volume. The resulting square feet of warehouse space per loaded TEU per year needing space is 22.4.

As shown in Table 3.1, the Ports expect to be at capacity of 43,158,000 TEUs per year by 2035. Using the same analytical procedures, it was estimated that 12.5 million loaded TEUs would need regional warehouse space in 2035. This cargo would require about 307 million square feet of warehouse space, or 205 million square feet more than what was needed in 2008.

Table 3.1 Estimated Container Volumes for San Pedro Bay Ports
2008 to 2035

Year	Inbound Loads	Outbound Loads	Total Loads	Empties	Total TEUs
2008 actual	7,327,953	3,469,553	10,797,507	3,540,295	14,337,801
2009 actual	6,059,283	3,020,964	9,080,247	2,736,345	11,816,592
2010	6,620,000	3,071,000	9,691,000	3,123,000	12,814,000
2015	8,780,000	3,768,000	12,548,000	4,410,000	16,958,000
2020	11,333,000	4,343,000	15,676,000	6,151,000	21,827,000
2025	14,417,000	4,897,000	19,314,000	8,377,000	27,691,000
2030	18,039,000	5,415,000	23,454,000	11,109,000	34,563,000
2035	22,571,000	5,988,000	28,559,000	14,599,000	43,158,000

Source: Ports of Los Angeles and Long Beach, 2009. Total inbound loads, total outbound loads, empties, and total TEU forecasts for 2015, 2020, 2025, and 2030 from The Tioga Group and IHS Global Insight, *San Pedro Bay Container Forecast Update*, July 2009. Ports assumed to be operating at capacity by 2035.

Subtracting the 102 million square feet of port related space from the estimated total occupied warehouse space in the region in 2008 of 694 million square feet implies that about 591 million square feet is used for non-port related cargo.

Table 3.2 shows projections of aggregate warehouse demand for port related and non-port related warehousing. In forecasting required port related warehouse space to 2035, it was assumed that port related needs would

grow according to the recent IHS Global Insight/Tioga forecasts for containerized cargo through the San Pedro Bay Ports. Total TEUs are projected to grow at the following compound annual rates:

- **2010 to 2015.** 5.8 percent;
- **2015 to 2020.** 5.2 percent;
- **2020 to 2025.** 4.9 percent;
- **2025 to 2030.** 4.5 percent; and
- **2030 to 2035.** 4.5 percent.

Another IHS Global Insight product is the cargo tonnage database known as TRANSEARCH. This database shows projections of cargo tonnage for domestic and international goods movement through 2040. Non-port related warehouse needs in the SCAG region were assumed to grow according to the TRANSEARCH forecasts for domestic cargo in the SCAG region. This sector is projected to grow at the following compound annual growth rates, including negative growth through 2012:

- 2007 **to 2012.** -2.2 percent;
- **2012 to 2017.** 3.0 percent;
- **2017 to 2023.** 2.6 percent;
- **2023 to 2030.** 2.1 percent; and
- **2030 to 2035.** 2.2 percent.

Over time, both the port related and non-port related demand would absorb the "available" 143 million square feet, but at different annual rates, as listed above.

Table 3.2 Estimates of Warehouse Supply and Demand, 2008 to 2035
In Square Feet

Year	TEUs/Year	TEUs/Yr Using Warehouse Space in Region*	Total Port-Related Warehouse Square Feet Required	Percentage Port Related	Non-Port Occupied Square Feet	Total Occupied Port and Non-Port Square Feet
2008 actual	14,337,801	4,565,873	102,082,701	15%	591,760,159	693,842,860
2009 actual	11,816,592	3,762,994	84,132,118	13%	578,615,852	662,747,971
2010	12,814,000	4,080,618	91,233,496	14%	565,763,510	656,997,007
2011	13,550,015	4,315,002	96,473,797	15%	553,196,647	649,670,444
2012	14,329,677	4,563,286	102,024,858	16%	540,908,922	642,933,780
2013	15,155,647	4,826,316	107,905,626	16%	557,214,315	665,119,941
2014	16,030,754	5,104,993	114,136,234	17%	574,011,224	688,147,458
2015	16,958,000	5,400,275	120,738,070	17%	591,314,468	712,052,538
2016	17,829,867	5,677,921	126,945,612	17%	609,139,307	736,084,919
2017	18,749,827	5,970,882	133,495,571	18%	627,501,466	760,997,037
2018	19,720,669	6,280,047	140,407,800	18%	643,520,270	783,928,070
2019	20,745,348	6,606,356	147,703,346	18%	659,948,000	807,651,346
2020	21,827,000	6,950,808	155,404,521	19%	676,795,096	832,199,616
2021	22,883,394	7,287,217	162,925,869	19%	694,072,263	856,998,132
2022	23,994,893	7,641,174	170,839,546	19%	711,790,479	882,630,026
2023	25,164,507	8,013,637	179,167,005	20%	729,961,006	909,128,011

Year	TEUs/Year	TEUs/Yr Using Warehouse Space in Region*	Total Port-Related Warehouse Square Feet Required	Percentage Port Related	Non-Port Occupied Square Feet	Total Occupied Port and Non-Port Square Feet
2024	26,395,422	8,405,622	187,930,909	20%	745,471,649	933,402,558
2025	27,691,000	8,818,199	197,155,201	21%	761,311,872	958,467,073
2026	28,937,941	9,215,287	206,033,208	21%	777,488,677	983,521,885
2027	30,245,459	9,631,667	215,342,517	21%	794,009,216	1,009,351,733
2028	31,616,627	10,068,315	225,104,994	22%	810,880,794	1,035,985,788
2029	33,054,674	10,526,261	235,343,644	22%	828,110,869	1,063,454,513
2030	34,563,000	11,006,587	246,082,670	23%	845,707,058	1,091,789,729
2031	36,145,182	11,510,433	257,347,537	23%	864,320,511	1,121,668,047
2032	37,804,983	12,038,997	269,165,037	23%	883,343,633	1,152,508,669
2033	39,546,363	12,593,539	281,563,363	24%	902,785,441	1,184,348,804
2034	41,373,488	13,175,387	294,572,183	24%	922,655,150	1,217,227,333
2035	43,158,000	13,743,665	307,277,606	25%	942,962,179	1,250,239,785
Growth 2008-2035	**28,820,199**	**9,177,792**	**205,194,904**		**351,202,020**	**556,396,925**
Ratio: 2035/2008	**3.0**	**3.0**	**3.0**		**1.6**	**1.8**
Growth 2020-2035	**21,331,000**	**6,792,857**	**151,873,085**		**266,167,083**	**418,040,169**

*Including TEUs moving twice (i.e., a container that is sent from the ports to a warehouse, and then is later sent to another warehouse in the region).

4.0 "Dirt Theory" and Scenarios for How Warehouses Locate

In 2009, Southern California's urban core spreads from Los Angeles County in the center through Orange and San Diego Counties to the south and Ventura County in the north, as shown in Figure 4.1. To the east, it includes the valley portions of San Bernardino and Riverside Counties. In this vicinity, development has recently moved north into the Victor Valley area of the Mojave Desert, east to San Gorgonio Pass on the way towards the Coachella Valley. It has also entered the Antelope Valley of Los Angeles County, and most recently, it has begun to migrate from San Diego County into Imperial County.

Figure 4.1 SCAG Region

While covering this immense seven–county area, Southern California's economy has expanded by turning a succession of submarkets into "hot zones," characterized by rapid housing and population growth, dramatic

increases in commuting, and much hand-wringing about "sprawl." Over time, the same forces have eventually turned these "hot zones" into job generators, ultimately creating a balance between local workers and jobs. Since World War II, several high-profile areas have completed this process. These have included the San Fernando Valley (*1950 to 1960s*), San Gabriel Valley (*1960 to 1970s*), Simi Valley (*1970 to 1980s*), and Orange County (*1980 to 1990s*). The next area on track to complete this cycle is the western Inland Empire.

This long-term pattern has occurred despite repeated attempts to stop it. Thus, in 1980, San Bernardino County found Adriana Gianturco, Secretary of Transportation under Governor Jerry Brown, trying to sell the right-of-way for the I-210 freeway from San Dimas to Redlands. The theory was to make movement so difficult that the outflow of growth would be forced to stop. After numerous bureaucratic decisions, lawsuits, and funding delays, that extension was finally completed in 2007. Meanwhile, without the freeway, the County's population grew by 2.24 times from 1980 (*895,016*) to 2007 (*2,008,800*), up 1,113,784 people.[4] Clearly, the policy of making life difficult for the movement of people and goods failed to stop the outward migration.

That lesson is important, because today lawmakers are considering policies, fees, and taxes aimed at altering Southern California's horizontal growth. This could impact distribution facilities if penalties, fees, or taxes applied to them, as "trip generators" slow down the tendency for industrial facilities to migrate to outlying areas. Framed as air quality measures, the unintended consequence would be to lessen the speed that blue collar jobs migrate to where people who need them have chosen to live. This would force workers to commute long distances for longer time periods, clogging freeways, punishing families, and contributing to air quality difficulties.

That impact can be found in the unintended consequence of Ventura County's 1998 Save Open space and Agricultural Resources (*SOAR*) initiative, which essentially halted the conversion of agricultural land and open space. The unintended result has been to make Ventura County a source of long-distance commuting with 22.3 percent of its workers leaving the County for jobs[5] and 17.5 percent commuting 90 minutes a day *round trip*.[6] Among Southern California's suburban markets, only the Inland Empire had higher levels (*29.1% percent; 23.4 percent*). Rates were much lower in Orange

[4] *E-2 Report*, California Department of Finance, Demographic Research Unit, 2009.

[5] *Table B08007 Sex and Place of Work*, American Community Survey, Census Bureau, 2008.

[6] *Table B08012 Sex of Worker by Time Travel to Work*, American Community Survey, Census Bureau, 2008.

County (*15.3 percent; 11.7 percent*) and San Diego County (*2.5 percent; 11.4 percent*).

In 2008, the Census Bureau showed that 71,714 Ventura County workers indicated they worked in the warehousing, distribution and manufacturing sectors. However, the county had just 50,400 jobs in those sector. The other 21,300 had to be commuters (*29.7 percent*).

Given the conflict between the desire to have Southern California stay more compact, the potential impact of that impulse on jobs-housing balance and the fact that only banning development has stopped the region's outward migration, it is important to understand the underlying market forces that drive the Southland's development pattern. For the full "Dirt Theory" report, please see Appendix E.

4.1 FINDINGS ON "DIRT THEORY"

Since World War II, Southern California's history has been dominated by the impact of its rapid population growth on its land use pattern. With no policies in place or under consideration to stop population growth, the region will continue to development outward with a three-stage process affecting each new area caught up in its expansion. Stage #1, residential developers seeking affordable land move outward; they bring families wanting affordable homes and population-serving firms. A huge jobs-housing deficit is created in these areas, as well as massive commuting. Stage #2, industrial developers needing available land for their large facilities are ultimately forced outward. Their tenants follow due to lower lease rates and the lower labor costs brought on by workers who want to stop commuting. Stage #3, younger, better educated workers migrate outward when they too are priced out of core markets. Their skills allow a higher end to be added to the economy.

Stage #2 of this scenario will apply to the migration of warehousing facilities to outlying industrial markets in the High Desert, North Los Angeles County, the Pass Area/Coachella Valley, and Imperial County. This will occur as lack of space and rising lease rates in today's "hot zones" ultimately force developers and their clientele to migrate to the next available land. The rates required to bring about this result are simply an extension of the pattern of the past six decades. Four of the objections to this pattern continuing (*developer skepticism, distance to outlying facilities, competition from current Stage #2 markets, policies to stop "sprawl"*) have existed throughout the outward migration of the region. In recent years, it has continued despite difficulties with funding or approvals for infrastructure projects. Fuel prices have gone through several surges without preventing it. The one difficulty that might not be overcome is that the lease rates of facilities throughout the region will reach a level that diverts trade from Southern California.

In this section, we estimate the likelihood that the excess demand for each intermodal channel will be accommodated by each of these alternatives. We will aggregate these channel-specific scenarios into a future county scenario, which will include estimates of the amount of land redeveloped for industrial use, and the amount of freight diverted to other counties presented in Section 6.0.

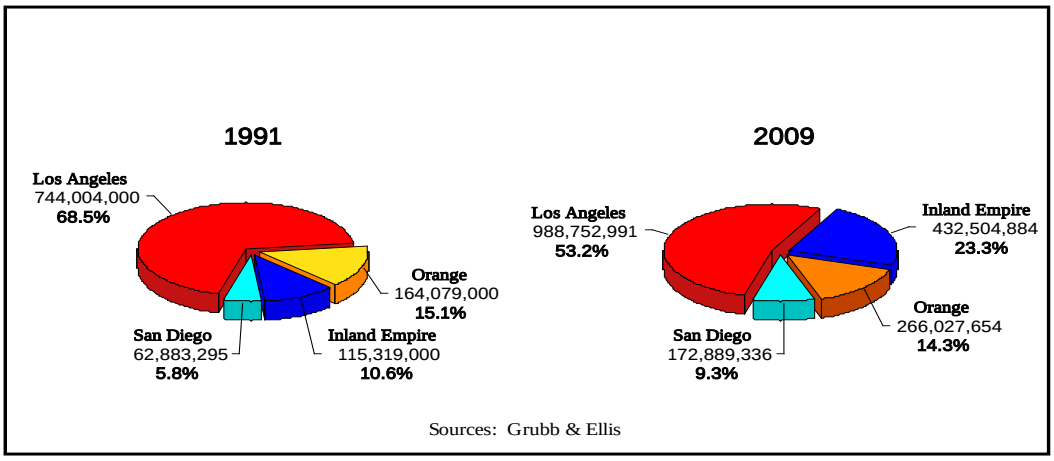
4.2 THE LOCATIONAL EVOLUTION OF WAREHOUSES

The manner in which Southern California has developed over the past 70 years holds important messages for the current and future location of distribution facilities within the region. Based on the information presented in Section 2.0, it is estimated that there are 693.8 million square feet of warehousing and distribution facilities in Southern California.

A Short History

In 1991, Los Angeles County dominated the industrial market with 744.0 million square feet of space, a 68.5-percent share. This occurred as there had been land available in that County, and firms chose to locate in the midst of what was then center of the region's population and labor pool. This also put them close to the Ports of Los Angeles and Long Beach, as well as Los Angeles International Airport (LAX) and the region's major railroad yards. Next was Orange County with 164.0 million square feet or 15.1 percent, and the Inland Empire with 115.3 million square feet or 10.6 percent. San Diego County trailed with 62.9 million square feet or a 5.8-percent share, as shown in Figure 4.2.

Figure 4.2 Industrial Space in Southern California, 1991 and 2009



By 2009, Los Angeles County still had the largest share of industrial facilities with 988.7 million square feet, but its share fell from 68.5 percent to a 53.2 percent. This occurred as development had previously saturated South Bay and the San Gabriel Valley and activity moved out as far as Santa Clarita, up the I-5 freeway. Orange County's rank fell to fourth (*14.3 percent*) from second (*15.1 percent*) with 266.0 million square feet as it had become essentially built-out. The major change was in the Inland Empire as its share soared to a second placed 23.3 percent from 10.6 percent with 432.5 million square feet. This occurred because Los Angeles and Orange Counties were running short of space. The importance of San Diego County also increased, going from 5.8 percent to 9.3 percent as its inventory reached 172.9 million square feet.

Here, the price in Los Angeles County was 80.0 percent higher than in the inland area. Orange County was 117.5 percent more expensive and San Diego County 147.5 percent more costly. The timing, geographic pattern, and relative pricing exhibited in these changes correspond exactly to Stage #2 of the process by which outlying "hot zones" have historically matured.

Meanwhile, from 1991 to 2009, while the Stage #2 growth was affecting the Inland Empire, an important change was occurring in Southern California's industrial economy. Manufacturing activity has been shrinking, while logistics activity related to international trade and goods movement has been strengthening. Thus, in Southern California, from 1990 to 2008:[7]

[7] Wage and Salary Employment, Metropolitan Areas, California Employment Development Department, 1990 to 2008.

- Manufacturing employment dropped from 1,280,000 to 855,100, down 424,900 (*-33.2 percent*); and
- Logistics employment increased from 561,700 to 691,500, up 129,800 (*+23.1 percent*).

With industrial space migrating into the Inland Empire, its industrial performance was stronger:

- Manufacturing employment rose from 78,300 to 107,000, up 28,700 (*+36.7%*), though this was down from a peak of 123,400 in 2006 (*1990 to 2006: up 45,100 or 57.6 percent*); and
- Logistics employment increased from 44,400 to 119,600, up 75,200 (*+164.9 percent*), though this was down from a peak of 120,600 in 2007 (*1990 to 2007: up 76,200 or +171.6 percent*).

These data underscore three facts about the warehousing market. Southern California's industrial economy has moved from being based on manufacturing to being dependent on international trade. The Stage #2 development has put the bulk of the new growth in "hot zone" areas like the Inland Empire. As a result, industrial growth in the outlying area has been much more about warehousing than manufacturing facilities. This is why the inland area now has 23.3 percent of Southern California's industrial space, but 43.4 percent of its warehousing space.

- Los Angeles County:
  - There is a mass of facilities in central Los Angeles County. This is where warehousing first grew up as it is near the Ports of Los Angeles and Long Beach and LAX, as well as next to the intermodal rail yards at the I-710 and SR 60 junction.
  - Later, warehousing activity intensively traced a path along the SR 60 through the San Gabriel Valley towards the Inland Empire. To a lesser extent, this is also seen along the I-10.
  - Moving north, warehouses traced a lighter path along the I-5 going through the San Fernando Valley. More recently, a cluster has emerged in Santa Clarita.
- Inland Empire:
  - Starting in 1985, the movement of warehouses eastward along the I-10 and SR 60 led to development of a large concentration of facilities at their junction with I-15.
  - Since 2000, a mass of warehouses has developed farther inland at the junction of the I-10 and SR 60 with the I-215, and most recently south along that corridor.

  - A smaller group of facilities has shown up in Corona as growth came to it from Orange County along the SR 91 freeway.

- Orange County:
  - The southward migration of facilities is seen with a mass of warehouses in and near Irvine close to John Wayne Airport.
- Ventura County:
  - There is a light tracing of warehouses along SR 101 with a small aggregation in Oxnard near Port Hueneme.

Available Land for Future Warehouses

Given the logic of a Stage #2 outward migration of Southern California's economy, the starting point for understanding where future warehouses will locate is to identify the vacant land that is currently industrial. Note that nearly all of this space is in outlying areas.

- Los Angeles County:
  - The overwhelming bulk of the County's remaining sites are in the High Desert near Palmdale and Lancaster.
  - There is a cluster of sites north of the junction of the I-5 and SR 14 freeways near Santa Clarita.
- Inland Empire:
  - The overwhelming bulk of the Inland Empire remaining sites are in the High Desert near Adelanto and Victorville near Southern California Logistics Airport.
  - Along the I-10 corridor, east of the I-15, several sites remain, mostly in San Bernardino and Redlands near San Bernardino International Airport and Burlington Northern Santa Fe Railway's (BNSF) intermodal rail yard.
  - On the SR 60, near the I-215 and along that freeway as it moves south, there is a significant amount of available industrial land, particularly in Moreno Valley, Perris, and near March Air Reserve Base.
  - Space still is available on I-215 near its junction with the I-15 in north San Bernardino.
  - There are a few sites remaining along the I-15 freeway, mainly in Chino and south of Corona.
- Elsewhere. There is smattering of small sites near John Wayne Airport in Orange County and Port Hueneme in Ventura County.

Given Southern California's historic Stage #2 development pattern, it is not surprising to find that its remaining industrial land is distributed in this fashion. As indicated, preferences for coastal locations, land availability, and relative prices have meant that areas near to major port, airport, rail, or production activities have naturally developed first. Later, growth begrudgingly migrated outward as sites in this area disappeared. That put development in a sequence of "hot zones," where lower land and lease costs lured developers and companies. These same areas also had lower labor costs because in Stage #1 people moved to them and have been willing to work for less to quit commuting.

Today, this process left most of Southern California's remaining developable industrial land in the desert areas of the Inland Empire and Los Angeles County. To the south, a similar condition exists in Imperial County. Altogether, the potential new facilities that could be built in Southern California, if all the remaining industrially zoned land was used for warehousing with a 55-percent FAR, is 185.1 million square feet, as described in Section 2.0.

Table 4.1 Developable Industrial Land

Area	Available Land (Square Feet)	Percentage of Available Land
High Desert Inland Empire	43.0 million	23.2%
North Los Angeles County	42.7 million	23.1%
Riverside Unincorporated/Coachella	40.4 million	21.8%
Imperial County	10.9 million	5.9%
Scattered Urban Locations	48.1 million	26.0%
Total	**185.1 million**	**100.0%**

The Development of Vacant Sites

Given the logic of "dirt theory," Southern California's warehouse market should eventually migrate to those areas currently being impacted by Stage #1 of the development cycle. This should occur aggressively once the valley portions of San Bernardino and Riverside Counties are built-out. At that time, the current outlying areas will be the places with the available land, lower-priced facilities, and a labor force willing to work for less to avoid

commuting. Importantly, the data indicates that 74.0 percent (*137.0 of 185.1 million square feet*) of this potential additional warehousing space are located in four outlying areas of the Southern California.

- **High Desert** (*Adelanto, Apple Valley, and Hesperia, Victorville*) has 74.9 percent of San Bernardino County's available industrially zoned land. The 43.0 million square feet of facilities that could be built in this area represent 23.2 percent of Southern California's potential capacity.
  - ***Stage #1.*** Of the four areas, the High Desert is currently feeling the greatest pressure from the Stage #1 migration of population. It was shown to have had a 4.24-percent compounded population growth rate from 2000 to 2009, reaching 420,516 people. The area's 2006 jobs-housing ratio was just 0.67, indicating a heavy dependence on commuter employment. In surveys conducted in 2006 and 2007, 27 percent of commuters indicated a willingness to take 10 percent less pay for a local job; 39 percent would take at least 5 percent less. These are not surprising results, given that commutes average 70.5 minutes a day round trip, with workers driving an average of 49 miles each way.[8]
  - ***Advantages.*** Besides the local labor force and vast amounts of land, the High Desert's key asset is Southern California Logistics Airport (SCLA), named this because the area's development strategy is based around goods movement. SCLA is the 2,300-acre former George Air Force Base that is owned by the Victor Valley Economic Development Agency made up of leaders from San Bernardino County and the four local cities.

    Of almost equal importance to SCLA is the fact that BNSF's mainline, which moves up Cajon Pass, traverses the High Desert and moves north to Barstow. There it joins BNSF's line that runs from the Bay Area to Arizona and points east. The High Desert also is the route for Union Pacific (UP) Railroad, which moves up Cajon Pass, and then goes on to Barstow along BNSF's right-of-way. From there, the line joins UP's route that goes to Las Vegas and points north and east. Meanwhile, warehousing operations in the High Desert have access to the I-15 freeway along which goods entering and leaving Southern California are connected to states to the east and the north.
  - ***Local Attitude About Warehousing.*** Today, the High Desert's political leadership is acutely aware of the adverse impact that commuting is having on the people who have moved to their

[8] Inland Empire Annual Survey, Institute of Applied Research and Policy Analysis, California State San Bernardino, 2006 to 2007.

communities. They recognize the importance that the Stage #2 migration of industrial facilities to their area could have on their jobs-housing balance. Already, they have been successful in using SCLA to develop a major aircraft servicing and repair center that has attracted firms, including Boeing, General Electric, Pratt & Whitney, and Leading Edge Aviation Services. Though SCLA has no scheduled air service, it does have its own U.S. Customs operation and handles flights for troops involved in war games at Fort Irwin.

Another prong in the High Desert strategy to jump start the migration of Stage #2 industrial activity has been the attempt to convince BNSF to build its second inland intermodal facility on SCLA's property. To date, Victorville has gained an exclusive right to negotiate for that operation from BNSF. It has acquired the right-of-way and is willing to fund a rail spur from BNSF's main line to this proposed site. Looking longer term, there is the hope that such a facility would serve as an "inland port" to which cargo could be moved from the sea ports by rail, reducing truck trips.

Recognizing that the desert can serve a major logistics function, San Bernardino and Los Angeles Counties, plus the Cities of Adelanto, Victorville, Apple Valley, Lancaster, and Palmdale, have formed a Joint Power Authority to develop a new freeway/expressway from SR 14 to I-15. Victorville has received Federal funds for starting this work, and the corridor has been officially designated in Section 1305 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) as a High Priority Corridor on the National Highway System. Meanwhile, the High Desert's leaders have gotten SANBAG to make the expansion of the SR 58 to four lanes to Kern County a priority project. This route allows cargo to reach Northern California from the High Desert without passing through urbanized Southern California.

- ***Difficulties.*** For the High Desert, the greatest barrier to Stage #2 development is the existence of undeveloped industrial land in inland valley places like San Bernardino and Moreno Valley. That is a natural difficulty for an outlying market that time can heal. A second difficulty is the fact that Victorville is 186 miles round trip from the Ports, much farther than Moreno Valley (*150 miles*), San Bernardino (*112 miles*), or Ontario (*60 miles*). Typically, this has been an issue only as long as closer areas have had available developable land. Perhaps more difficult for the High Desert is the fact that it is up the 3,000 grade of Cajon Pass. This has help create the perception among logistics facility developers that the market will never move that far away. More recently, the fluctuations in fuel prices have added to the

question of whether warehousing operations can locate at such great distance from the Ports or the bulk of Southern California's market.

- **North Los Angeles County** (*Lancaster, Palmdale, and Santa Clarita*) has 78.9 percent of the industrially-zoned land available in Los Angeles County. The 42.7 million square feet of facilities that could be built in this area represent 23.1 percent of the region's potential capacity.
  - ***Stage #1.*** For Los Angeles County, the northern zone has seen very rapid population growth. From 2000 to 2009, its three cities (*Lancaster, Palmdale, and Santa Clarita*) went from 386,519 to 473,570 people, up 22.5 percent, a compound rate of 2.3 percent. That compared to just 1-percent compounded for the County.[9] According to SCAG's 2008 adopted Regional Transportation Program, Northern Los Angeles County had a 0.92 job to housing ratio, indicating the need for high levels of commuting down the SR 14. The average 2008 two-way commute from the area's three cities was 69.6 minutes.[10]
  - ***Advantages.*** Besides abundant land and a rising labor force, Northern Los Angeles County's competitive advantages include the I-5 freeway. This is Southern California's principal connection to Northern California. Santa Clarita sits at the junction of the I-5 and the Antelope Valley freeway (*SR 14*). Warehouses located in that City can serve both Southern California and the State's Central Valley. The SR 14 connects Palmdale and Lancaster to I-15 and the balance of Southern California. Trucks moving from those Cities can also access the SR 58 to Northern California by going up the SR 14 to Mojave.

    There are three rail connections in Northern Los Angeles County. Some of UP Railroad's trains leave its Colton yard and move up Cajon Pass before bending west along the "Palmdale Cutoff" to that City. Eventually, in Lancaster, these trains can connect with the UP's main north-south line traveling the length of California. UP also has rights to move freight along the Metrolink line that travels through Santa Clarita and Soledad Canyon to Palmdale and Lancaster.

    Northern Los Angeles County has a potential for an air cargo connection via Palmdale Regional Airport. The facility is owned by the U.S. Air Force (USAF) and has been leased to Los Angeles World Airports (LAWA), the agency that runs LAX. The airport is closely

[9] E-5 Reports, 2000 and 2009, Demographic Research Unit, California Department of Finance.

[10] American Community Survey, 2008, U.S. Census Bureau.

associated with USAF Plant 42, where planes like the SR-71, B-1 and F-119 have been secretly developed. As a result, Palmdale is home to major operations by Lockheed Martin, Northrop Grumman, Boeing, and Delta Scientific. Several attempts to keep air service at Palmdale Regional Airport have been unsuccessful, and LAWA has plans to surrendered certification to operate the facility. Palmdale is considering taking over the lease.

- ***Local Attitude About Warehousing.*** In 2008, the Multi-County Goods Movement Study indicated, "there is currently very limited development of warehousing in the North Los Angeles County Subregion. This area has potential to serve as a warehousing hub, primarily due to its large tracts of available land at costs less than the more urbanized portions of the County."[11] The area has begun to take advantage of this possibility. In Santa Clarita, 6.8 million square feet of facilities have been built and 5.0 million square feet are occupied. In Lancaster, three large distribution centers have opened, and Palmdale has acquired a 115-acre Fairway Business Park to encourage firms to migrate to it. Among others, FedEx, Michael's, Rite Aid, and Sygma have opened in these communities.
- ***Difficulties.*** For the Northern Los Angeles County, the current barrier for Stage #2 development is the existence of undeveloped industrial land in inland valley cities like San Bernardino. This is not true of Santa Clarita, where a round trip from the Ports (*116 miles*) is roughly equal to one to San Bernardino (*112 miles*). It is true for the more distant Cities of Palmdale (*160 miles*) and Lancaster (*178 miles*). Again, this has only been an issue until land in the closer areas has been exhausted. A second issue is the 1,800-foot grade up Soledad Canyon that must be traversed along the SR 14. Though less a difficulty than Cajon Pass, it is still a time and cost barrier for truckers. As with other outlying areas, Northern Los Angeles County cities now face the open question of how fuel prices might affect the willingness of warehousing operations to locate at great distance from the Ports. This has added to the perception by some developers that Palmdale and Lancaster are too remote for them to successfully market facilities.

- **Pass Area** (*Beaumont, Banning, and Calimesa*), **Coachella Valley** (*Cathedral City, Coachella, Desert Hot Springs, Indio, and Palm Springs*), and unincorporated areas have 67.5 percent of Riverside County's available

[11] Multi-County Goods Movement Action Plan, Los Angeles County Action Plan, April 30, 2008.

industrially-zoned land. The 40.4 million square feet of facilities that could be built on it represent 21.8 percent of the region's potential capacity.

- ***Stage #1.*** In Riverside County, Stage #1 population growth reached the Pass Area connecting the urban Inland Empire to the Coachella Valley in the last housing cycle. From 2000 to 2009, it went from 42,085 to 68,358 people, up 26,273 or 62.4 percent, a compound rate of 5.5 percent. This is typical of what happens when a place is first hit by housing developers needing affordable land. Thus, Beaumont's 2000 to 2009 population growth ranked second in the State, up 184.6 percent. In 2008, the Pass Area had an estimated 29,749 occupied homes and 16,202 jobs, giving it a 0.54 job to housing ratio. It, therefore, has very high levels of commuting down the I-10,[12] with its average two-way commute taking 60.8 minutes.[13]

  Meanwhile, the Coachella Valley is a special case. Largely, it is a self-contained economy based mainly on retirees, conventioneers, and tourism. However, just as Stage #1 growth hit the Pass Area, it recently entered the Valley's western edge. There, Desert Hot Springs emulated the Pass Area. From 2000 to 2009, it went from 16,582 to 26,552 people, up 9,910 or 60.1 percent, a compound rate of 5.2 percent.[14] The City's two-way average commute of 56.2 minutes was far higher than the Valley's 43.2 minutes.[15] The full Coachella Valley has a 0.86 job to housing ratio. That would normally indicate an area with a commuting problem. However, 19.4 percent of its residents are 65 or older, compared to Southern California's average of 10.8 percent. As a result, the area's jobs to housing balance overstates any commuter problem.

- ***Advantages.*** In addition to abundant low-cost land and a labor force willing to work for less to not commute, the Pass Area/Coachella Valley competitive advantages include the I-10 freeway. This route bisects this combined area and is Southern California's truck route to Arizona and points east. In addition, the route is joined by the SR 86

[12] Adopted 2008 Regional Transportation Program housing data averaged for 2005 and 2010, SCAG; job base from ES 202 data, California Employment Development Department, 2008.

[13] American Community Survey, 2008, U.S. Census Bureau.

[14] E-5 Reports, 2000 and 2009, Demographic Research Unit, California Department of Finance.

[15] American Community Survey, 2008, U.S. Census Bureau.

in Indio/Coachella. That is the principal route for goods moving between northern Mexico and Southern California. Warehouses located along the I-10, whether in the Pass Area, Desert Hot Springs, North Palm Springs, Cathedral City, Indio or Coachella, can serve both Southern California, Arizona, and Mexican trade.

There is one rail route through the Pass Area/Coachella Valley. That is UP Railroad's mainline, which passes through them before going south into Imperial County. From there, it turns east into Arizona and points to the east. In Imperial County, the UP Railroad route divides with a major spur going south to Calexico at the Mexican border. There have been off and on discussions by UP of locating an intermodal facilities, either in the Pass Area or in Indio, but to date, no concrete action has occurred.

Another potential advantage for the Coachella Valley is Palm Springs International Airport, which is owned and operated by that City. The facility is served by 10 airlines and served 1,542,925 passengers in 2008. It also handled 26 tons of cargo. The southeastern end of the Coachella Valley is served by Desert Resorts Regional Airport. It is owned by Riverside County, which has recently invested heavily in upgrading the facility.

- ***Local Attitude About Warehousing.*** While industrial land in the Pass Area is constrained by its narrow width, the Cities of Beaumont and Banning, as well as the Morongo Band of Mission Indians in Cabazon, have developed plans to host industrial facilities. To date, 2.8 million square feet of space have been developed.[16] This does not include the 383,000 square feet water bottling plant operated by Arrowhead Mountain Springs Water on Indian land. There is also room for another 1.4 million square feet of facilities.

  Farther inland, the Coachella Valley Economic Partnership has formally made development of warehousing one of that Valley's economic priorities. Their recently completed economic strategy cites one of their key targets is "to link the Valley in the minds of external companies and site-selection professionals with the dynamic logistics economies of the Inland Empire," and "to integrate messages related to positioning the Valley as a destination for warehousing,

[16] Industrial Snap Shot, Inland Empire, Grubb & Ellis, Third Quarter 2009.

distribution, wholesale trade, and supply-chain management companies."[17]

One possibility being entertained for the Pass Area or the Coachella Valley is the development of a combined intermodal rail and truck transfer station. The intermodal rail site could serve an "inland port" for goods moving along the I-10 corridor. Should California eventually ban dirty trucks from its air basin, the truck transfer depot could serve as a place where older trucks from Mexico or the rest of the U.S. could transfer goods to clean burning local vehicles.

- ***Difficulties.*** For the Pass Area/Coachella Valley, the main barrier to the migration of Stage #2 development is again the existence of undeveloped industrial land in inland valleys. Distance is a real factor as a round trip from the Ports to San Bernardino (*112 miles*) or Moreno Valley (*150 miles*) is less than Beaumont (*170 miles*), and much less than Desert Hot Springs/North Palm Springs (*226 miles*) or Indio/Coachella (*290 miles*). Again, this issue may disappear as the inland valley areas closer run out of developable land. Though less of a difficulty than Cajon Pass or Soledad Canyon, trucks moving up through the Pass Area on the I-10 must traverse a 1,250-foot grade from Redlands to the summit of San Gorgonio Pass. This takes time and fuel. Finally, as with other outlying areas, the impact of fuel prices on warehousing development in the Pass Area/Coachella Valley area is an open question. As of today, developers have built projects in the Pass Area, but the Coachella Valley has not, as yet, figured in their calculations.

- **Imperial County** has 10.9 million square feet of possible industrial facilities. This would represent 5.9 percent of Southern California's potential warehousing capacity.

  - ***Stage #1.*** After a long period of dormancy, Imperial County began to be affected by Stage #1 growth late in the current decade. From 2000 to 2009, its population went from 142,361 to 179,254 people, up 36,893 or 25.9 percent, a 2.6-percent compound rate. This occurred as residentially-zone land in San Diego County became scarce and expensive, pushing affordable development east into Imperial County. In early 2009, Imperial County's median priced home was $131,000. That was $200,000 less than for San Diego County (*$331,000*). That said, by 2006, the County had not yet had a commuter problem as its jobs to housing balance was a strong 1.26. However, the ratio will

[17] Coachella Valley Economic Blue Print, Market Street, J. Mac. Holladay for Coachella Valley Economic Partnership, October 2009.

likely decrease in the next housing cycle, as Stage #1 growth causes population to accelerate.

- ***Advantages.*** Imperial County has vast quantities of land. As its population grows, it will acquire a labor force which likely will want blue collar jobs. In addition to these advantages, the County has two major highway routes. The I-8 connects its main population centers around El Centro to San Diego County and the Port of San Diego. The SR 86 and SR 111 routes are links that connect the County to Mexico to the south and the Coachella Valley to the north. It is along these highways that the North American Free Trade Agreement (NAFTA) trade moves between Southern California and Mexico. Importantly, the Calexico-Mexicali border area is where many of Mexico's maquiladoras production facilities are located.
- Like Southern California's other high-growth areas, Imperial County has rail service. UP Railroad's main line from Southern California travels south through the County from the Coachella Valley, running adjacent to SR 111. At Nyland, it splits. The main line curves east and exits the County into Yuma, Arizona. The other route continues south through the center of Imperial County's population centers ending at Calexico. There, it interfaces with Mexico's Ferromex railroad.
- ***Local Attitude About Warehousing.*** One of the priorities for the Imperial Valley Economic Development Corporation (IVEDC) is the development of a warehousing and logistics node to take advantage of Imperial County's highway and rail connections plus its location adjacent to Mexico's maquiladoras facilities. In particular, IVEDC cites the recent formation of an international committee and two specific planned areas for international logistics: Mesquite Lake in Imperial (*5,100 acres*) and Gateway to the Americas in Calexico (*1,700 acres*).
- ***Difficulties.*** For Imperial County, distance will be a serious difficulty for the development of a warehousing industry related to the Port of San Diego. It is 226 miles round trip from the Port to El Centro and 264 miles to Brawley. Another problem is the 4,000-foot grade to traverse the In Ko Pah mountain area on the I-8. For this reason, the greater long-term opportunity would appear to be warehousing related to north-south international trade from Mexico. Still, a round trip from Calexico to Indio is 180 miles. Finally, as with other outlying areas, the issue of fuel prices will most definitely be a issue for this remote location.

4.3 LIKELIHOOD OF FOLLOWING "DIRT THEORY" TRAJECTORY

Given these situations in the four areas with the space to accommodate significant increases in warehousing square footage, what is the likelihood that Stage #2 of Southern California's growth process will cause development and firms to migrate into them? Certainly, the conditions that have caused this to happen in the past still exist:

- Southern California's future population increase of 5.9 million people, largely driven by births over deaths, will force residential development to migrate horizontally, with the pricing system causing people to migrate outward. That is why each of the four areas is already experiencing some level of Stage #1 surges in growth.
- Eventually, this population growth will create a mass of outlying workers willing to work for less to stop commuting. The High Desert, North Los Angeles County, and the Pass Area already have the jobs to housing balance and commuting issues that underlie this condition. The Coachella Valley and Imperial County will see it emerge as their populations surge further.
- If the Ports reach the level of trade that is the basis for this study, recent history has shown that warehousing facilities will be developed where there is industrially-zoned land to accommodate them. This has been seen most recently with the development of major nodes of space significantly east of the I-15 freeway in the Inland Empire and out the I-5 freeway in Santa Clarita.
- The lower costs of operations from outlying facilities will ultimately cause firms to move into this new space. There are three major expenses for warehousing operations: lease rates, labor cost, and transportation costs. To date, the lower costs of the first two have overwhelmed the cost of moving goods to and from distant facilities. Firms have been willing to migrate as a result.

Difficulties and Challenges

An issue is whether there are location characteristics relative to these newest "hot zones" that will cause this pattern to severely changed. There are many ways this might happen, with several of these possibilities mentioned above under the category of difficulties.

Competition from Existing Stage #2 Markets

As indicated repeatedly, an outlying market cannot compete with a market closer to the Ports if that competitor still has significant amount of

industrially-zoned land available for new facilities. Until that land is used, developers will not have a financial incentive to look farther out for lower priced land. In addition, firms will not be forced to absorb higher transportation costs for hauling longer distances to an outlying market.

These tendencies were seen in the development of the western Inland Empire market. As long as firms could locate in a series of markets from the I-710 through the San Gabriel Valley, there was no incentive for developers to move over Kellogg Hill into the inland area. However by 1985, land to the west had largely disappeared. As a result, the continuing demand for more space forced developers into the inland area. At the same time, lower lease and labor costs caused customers to accept the higher transportation costs and move to the new market. Today, Ontario alone has just under 100 million square feet of facilities, most of which are occupied.

Conclusion. Once the competitive Stage #2 areas run out of space, the availability of land will cause developers to move farther out. Lower lease and labor costs will make it in the interest of their customers to follow.

Developer Skepticism

In interviews with major developers, all but one expressed great skepticism that the warehousing market would ever move into the four areas where most of Southern California's vacant industrially-zone land are currently located.

Here, the most that can be currently said is that historically developers likely were saying the same thing about building in the series of markets that they have heretofore been forced to enter. Put simply, if demand exists, and there is no room in the current markets, builders will go farther away once they have no choice. The key is whether their customers will find that the lower lease and labor costs of the new market are low enough to overwhelm the added transportation costs. If they are, companies needing space will follow. The fact that since 2000, developers began building east of the I-215 freeway is the latest iteration of this situation. True, vacancy rates in the new facilities in this area are currently high (*roughly 20 percent*). However, that has been a short-term function of the current recession, not a long run difficulty.

Conclusion. Developers never want to go farther away, but will if they have no choice. If lease and labor costs are below their added transportation costs, their customers will ultimately follow.

Distance and Passes

While the economic logic of Stage #2 industrial development has held up long enough to push the warehousing market out as far as Redlands and Perris in the Inland Empire and Santa Clarita on the I-15, there is a significant

difference between migration to these markets and moving over mountain passes into desert areas. The distances to those sites are greater by an order of magnitude, and in every case, trucks must move up and down steep grades to reach them. Thus, transportation costs to these markets will be significantly higher. As a result, though clients will save on labor costs, their lease costs savings will have to be very large to justify moving their operations to these places. As a result, unless developers can get land at extraordinarily low prices, they will be unable to offer facilities at lease rates that will justify the increased transportation costs of their potential tenants. Firms locating in these markets will also find that their inventories are far from Southern California's core markets.

This argument points to the critical importance of costs in determining where and when Southern California's new outlying markets will become viable. Stage #1 residential development did not reach these areas until lack of land and the cost of housing in closer markets reached levels that forced developers to move out to land on which they could build homes that families could still afford. In buying these houses, families had to weigh the time and cost of long commutes against their desire for homeownership. The fact that 420,516 people now live in the High Desert and 473,570 people live in Northern Los Angeles County indicates that the relative price of housing achieved this result.

For this same calculation to occur for the outward movement of Stage #2 industrial development, a similar situation has to be created. It will require increased demand and very low vacancy rates for existing facilities to push their lease costs to much higher levels. Only when the lack of facilities becomes sufficiently acute and lease rates become high enough will the market dictate that development can afford to move into the deserts. Unlike past moves, the severe distances and passes that must be crossed to reach the desert markets will perhaps mean that existing markets must become much more expensive to force this solution. However, unless demand is cut off, the housing market shows that such a solution will ultimately occur. In this light, it is important to note that even with today's severe recession, the industrial vacancy rate for Los Angeles County was only 3.6 percent in third quarter 2009, up from an almost nonexistent 1.5 percent in third quarter 2007.[18]

Conclusion. Throughout Southern California's history, warehousing facilities have sought to remain as close to the Ports and LAX as possible. When demand has increased beyond the carrying capacity of nearby land, the pricing system has ultimately forced the wider dispersion of facilities and

[18] Industrial Market Snapshot Los Angeles Third Quarter 2007 and 2009, Grubb & Ellis.

firms. The migration to the deserts would simply be an extension of that market logic. The difference will be in how low existing vacancy rates must become, and how high existing lease rates must go, to create the price differentials necessary to make the desert markets a viable option.

Changes in Aging Facility Usage

Warehouses began being built in the South Bay area near the Ports and LAX in the 1950s. Development in places like Vernon, Commerce, Industry, and Santa Fe Springs followed. In today's terms, these facilities are often small, with low ceilings, limited gates, insufficient parking, and inadequate fire suppression systems. They may lack fiber optic capability or 440 watt electrical systems. While it is expensive to replace these aging facilities with modern buildings, there is a price point at which that might prove to be feasible. To the extent this happens, warehouses closer to the ports would have expanded capacity and obviate the need for developers to migrate to far way locations. Even without new facilities, the use of better, more efficient systems inside of the existing buildings can increase their effective capacity.

Discussions with major developers have indicated that in occasional situations, they have found it in their interest to raze existing facilities and replace them with larger, more modern buildings.[19] However, with vacancy rates at just 2.8 percent in South Bay and 2.5 percent in Central Los Angeles,[20] despite today's economic difficulties, the incentive for owners to undertake a mass change in their inventory of buildings is lacking.

One nuance of the existing market is that facilities closer and farther from the Ports have evolved to being used for different functions. The smaller facilities near the Ports tend to be used for more labor-intensive functions, such as pick and pack, knitting, or product repairs. The larger outlying facilities undertake more bulk activities, such as transloading and sorting of containers and packages. The more efficient technologies have tended to be those that can be used in the larger outlying facilities.[21]

Conclusion. Even with unemployment at 12.2 percent in Los Angeles County,[22] and port import volume down 29.2 percent from its 2006 peak,[23]

[19]Discussions with Watson Land Company and Majestic Realty.

[20]See note #38.

[21]See note #39.

[22]Monthly Employment Reports by County, November 2009, California Employment Development Department.

there remains very high demand for older facilities in Los Angeles County, and no incentive to massively renew the facilities. Meanwhile, the facilities most capable of adapting to new technology are those in today's outlying markets.

Antagonistic Policies

There is powerful sentiment in regulatory agencies, the environmental movement, and among NIMBYs to stop "sprawl." One way is to outlaw new distribution facilities or zone them out of existence. Another is to put severe fees and taxes on them to the point that lease costs are not competitive with facilities closer to the Ports.

To the extent that jurisdictions elect to ban warehousing facilities, the effect is to decrease the potential supply that can be built in closer-in markets. The pricing system is then forced to push up prices in existing markets to the point where it makes economic sense for them to be built in outlying markets. In effect, this solution has been a contributing factor to the horizontal development of Southern California.

Higher fees charged on the construction of new facilities in outlying markets can slow down the pace at which new facilities migrate to them. This will occur as the market will tend to require lower vacancy rates and higher lease rates in existing markets before facilities migrate. It does not, however, prevent the eventual outward migration of those buildings. For example, Riverside County has imposed a $1.73 per gross floor area fee on industrial buildings in that County under its Transportation Uniform Mitigation Fee program. That amounts to $692,000 on a 400,000-square foot building. Despite that fact, from 2006 to 2009, the County saw the square footage of facilities in its most outlying markets (*Perris-Moreno Valley, Pass Area, and Temecula*) increase by 12.6 million square feet or 53.2 percent to 36.3 million square feet from third quarter 2006 to 2009.[24]

Strategies such as this raise another question. To the extent they are imposed to slow down the horizontal development of Southern California for worthy purpose, such as decreasing congestion and increasing air quality, leaders must be aware of unintended consequences. In this case, that consequence is to lengthen the time when jobs will migrate to where people have been forced to live. That means increased pressure on those families and longer commuting pressure on the transportation system.

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[23] Loaded In-Bound Containers, TEUs, 2006 and 2009e based on 11 months, Ports of Los Angeles and Long Beach.

[24] Industrial Market Snapshot Inland Empire Third Quarter 2006 and 2009, Grubb & Ellis.

Conclusion. As long as there is a demand for facilities, the market will make price adjustments and distribute them to where they can be built. The unintended consequence of policies meant to prevent the market from moving to new areas is to cause jobs to housing imbalances and their attendant difficulties to persist for longer periods of time.

Inadequate Transportation Infrastructure

Southern California already faces severe congestion on its transportation routes with truck traffic as one of the major culprits. Funding for a major expansion of transportation facilities is currently not available. Even if it was, communities along potential right-of-ways may furiously oppose expansions because trucks and trains cause diesel pollution, which is a proven cause of cancer and asthma. This is certainly the case in the San Gabriel Valley, where virtually every community has opposed creating truck lanes or a train corridor to move cargo from the I-710 to the Inland Empire.[25]

There is no question that the lack of a Federal government policy to help fund infrastructure related to goods movement has caused truck traffic to contribute to transportation congestion in Southern California. To the extent this issue is not solved, congestion will ultimately make the area uncompetitive for handling increased trade through the Ports of Los Angeles and Long Beach. This will result in inhibiting the creation of jobs for blue collar workers in the logistics field. Yet, until the current worldwide recession, that has been the one stable source of blue collar job growth for marginally-educated workers in Southern California, where 42.6 percent of adults have not had a single college class.[26] Thus, from 1990 to 2008, the region's manufacturing sector lost 424,900 jobs (*-33.2 percent*), while construction added 69,550 (*19.7 percent*) and logistics added 129,800 (*23.1 percent*). Those unworried by these figures need to remember that blue collar jobs are the best paying work for the region's marginally-educated workers. To the extent such jobs are not available, it puts income and health pressures on their families.

Meanwhile, to the extent funding is available, but the communities between the I-710 and outlying markets do not wish to see added infrastructure to facilitate either truck or train movement through their areas, there will be a cost in terms of severe congestion. In the case of the San Gabriel Valley, there is currently 117.3 million square feet of undeveloped-industrially zone land to the east. If it is developed, it would raise the region's supply of warehousing space from 387.4 million square feet to 504.7 million square

[25] Testimony at California Public Infrastructure Advisory Commission.

[26] American Community Survey, 2008 U.S. Census Bureau.

feet, a 30.3-percent increase. It is not unreasonable to suggest that this would not occur without a commensurate increase in cargo movement from the I-710 freeway eastward to these facilities. The level of truck traffic on the existing freeways, without either dedicated truck lanes or a connecting rail solution, would likely cause those corridors to resemble the I-710 of recent years.

Conclusion. Without a dedicate truck lane or rail solution to moving goods between the I-710 and outlying markets, the cost of moving goods through Southern California may severely inhibit job growth in the logistics field. This would have severe impact on the region's large base of workers without college training and the financial and personal health of their families. Meanwhile, if development of outlying facilities does occur, but community opposition stops dedicated truck lanes or a rail solution from being built even if funding is available, the congestion on truck connecting freeways will likely become intolerable.

Fuel Costs

Today, diesel prices average $3.032 per gallon. A year ago, the price was $2.334 per gallon. The one-year increase was $0.698 or 29.9 percent.[27] Given the shifts in worldwide supply and demand, there is speculation that prices could double, triple, or more by 2035. In addition, the move toward green trucks may ultimately force the goods movement industry to move to natural gas or hybrid engines. In any case, transportation costs are expected to be much higher than they are today. At some point, the contention is that the cost of transportation may be such that it overwhelms any realistic lease and labor costs savings in outlying markets.

However, market logic dictates that if there is an unmet demand for facilities, the pricing system will lower vacancy rates and raise lease costs in existing markets until it becomes economically feasible for developers to build and lease buildings in outlying areas. This is what happened in the middle 1980s, when development moved from cities like Industry to places like Ontario. This occurred despite the fact that petroleum prices in 1985 (*$29.00 per barrel*) were 2.8 times as high as they were during the Arab oil embargo in 1975 (*$10.46 per barrel*). It happened again when development left the western Inland Empire and moved inland starting in 2000, despite the fact that oil prices from 2000 to 2005 averaged $31.99 per barrel, which was nearly double the average from 1995 to 1999 (*$16.67*).

[27] Weekly Retail On-Highway Diesel Prices, U.S. Energy Information Administration, January 12, 2010.

If soaring oil prices are an issue, it would appear to be because they could be a serious obstacle to the long-term growth of international trade through Southern California. That would be the case if increased transportation costs push the lease payments necessary to allow development to migrate to outlying areas, so high that trade must find other ways to enter or leave the U.S. Then, the 42.5 million TEUs assumption underlying this study would be called into question. To understand that dynamic, it would be necessary to compare the internal dynamics of the Southern California region to other U.S. regions.

5.0 Distribution of Warehouse Space Over Time

This section takes the estimates on demand developed from Section 3.0, and makes an estimate of the number of TEUs of containers of various types that are anticipated to be flowing into and out of Southern California in 2035. Given that demand, and the existing inventory and available space in such facilities collected in Section 2.0, as well as the acreage of industrial vacant land, an estimate will be made of the extent to which various types of facilities will need to be built and where they can be built. The challenge is to figure out whether obsolete space closer to the Ports will be converted to more viable uses due to future demand.

According to assumed growth rates, the region would run out of suitably zoned vacant land in about the year 2028. For the year 2035, there would be a shortfall of space of about 228 million square feet, unless other land not currently zoned for warehousing becomes available.

This section places future supply and future demand side by side to identify any gaps in industrial/warehousing/intermodal space needs in Southern California. See Appendix F for the full report.

5.1 FINDINGS ON THE DISTRIBUTION OF SPACE

Over time, warehousing space directly or indirectly impacted by activities at the Ports of Los Angeles and Long Beach will affect 25 Southern California submarkets as shown in Table 5.1. These are shown in priority order, together with the amount of occupied space, vacant existing space, and developable space from previous iterations of this project. Priority order refers to the rough sequence in which increases or decreases in port and off-port activity will impact each of these submarkets. Thus, South Bay will likely be impacted before the I-710 corridor, and certainly Imperial County would be the last place to feel any activity. The term "rough" is used because the market does not always work in a smooth geographic fashion with the excess demand for space in one area overflowing exactly into the next priority subregion.

There was 693,842,860 million square feet of occupied space; 143,846,908 square feet of available space; and 186,274,798 square feet of developable space on land zoned for industrial activity, but currently without buildings.

Table 5.1 Submarkets in Priority Order of Occupied, Vacant, and Developable Space

Priority	County	Submarket	Occupied	Vacant	Developable	Total Available
1	Los Angeles	South Bay	55,222,927	5,730,730	1,723,183	62,676,840
2	Los Angeles	Mid-I–710	21,339,348	3,145,870	500,273	24,985,491
3	Los Angeles	Central Los Angeles	78,121,132	10,064,154	503,966	88,689,252
4	Los Angeles	605	55,174,480	8,571,933	100,298	63,846,711
5	Los Angeles	San Gabriel	74,710,961	9,570,002	3,641,972	87,922,935
6	San Bernardino	Westend SB	83,553,302	21,204,109	3,480,113	108,237,524
7	Orange	West Orange	6,844,239	2,664,637	414,432	9,923,308
8	Los Angeles	I-5	20,674,648	2,231,773	5,783,759	28,690,180
9	Ventura	Port Hueneme	18,362,615	976,845	2,169,614	21,509,074
10	Riverside	West Riverside	77,666,478	10,408,022	9,528,375	97,602,875
11	San Bernardino	East SB Valley	66,182,417	28,816,656	13,879,760	108,878,833
12	Riverside	March JPA	27,412,126	20,007,359	21,649,981	69,069,466
13	Orange	Orange Airport	13,976,430	4,846,335	1,516,831	20,339,596
14	Orange	North Orange	12,018,265	5,349,334	373,668	17,741,267
15	Ventura	118	8,934,654	1,027,942	932,849	10,895,445
16	Ventura	101	10,540,5	1,004,70	702,738	12,248,02

			81	4		3
17	Orange	South Orange	1,649,100	256,264	800,951	2,706,315
18	Riverside	SW Riv. County	15,457,595	446,294	6,270,262	22,174,151
19	Riverside	Pass	3,543,654	2,025,336	2,870,080	8,439,070
20	San Bernardino	High Desert	14,981,152	3,295,661	40,154,546	58,431,359
21	Los Angeles	North Los Angeles	5,453,221	974,647	38,516,107	44,943,975
22	Ventura	126	2,409,068	82,141	157,585	2,648,794
23	Riverside	Coachella	12,341,197	71,000	19,748,090	32,160,287
24	Imperial	South Imperial	6,789,246	925,245	10,303,800	18,018,291
25	Imperial	North Imperial	484,024	149,915	551,565	1,185,504
Total			**693,842,860**	**143,846,908**	**186,274,798**	**1,023,964,566**

The analysis conducted on the demand for warehousing space was used to push the total year by year demand for port and non-port demand space through this geographic spread of warehousing locations, as shown in Table 5.2. The basis for this annual growth is found Section 3.0.

Table 5.2 Aggregate Port and Non-Port Demand for Warehousing Space

Year	Port Demand	Change	Non-Port Demand	Change	Total Demand	Change
2008 actual	102,082,701		591,760,159		693,842,860	
2009 actual	84,132,118	(17,950,583)	578,615,853	(13,144,306)	662,747,971	(31,094,889)
2010	91,233,496	7,101,378	565,763,510	(12,852,342)	656,997,006	(5,750,964)
2011	96,473,797	5,240,301	553,196,647	(12,566,863)	649,670,444	(7,326,562)
2012	102,024,858	5,551,061	540,908,922	(12,287,725)	642,933,780	(6,736,664)
2013	107,905,626	5,880,768	557,214,315	16,305,393	665,119,941	22,186,161
2014	114,136,234	6,230,608	574,011,225	16,796,910	688,147,459	23,027,518
2015	120,738,070	6,601,836	591,314,468	17,303,243	712,052,538	23,905,079
2016	126,945,612	6,207,542	609,139,307	17,824,840	736,084,919	24,032,382
2017	133,495,571	6,549,959	627,501,467	18,362,159	760,997,038	24,912,118
2018	140,407,800	6,912,229	643,520,270	16,018,803	783,928,070	22,931,032
2019	147,703,346	7,295,546	659,948,000	16,427,730	807,651,346	23,723,276
2020	155,404,521	7,701,175	676,795,096	16,847,096	832,199,617	24,548,271
2021	162,925,869	7,521,348	694,072,263	17,277,167	856,998,132	24,798,515
2022	170,839,546	7,913,677	711,790,480	17,718,217	882,630,026	25,631,894
2023	179,167,005	8,327,459	729,961,006	18,170,526	909,128,011	26,497,985

2024	187,930,909	8,763,904	745,471,649	15,510,643	933,402,558	24,274,547
2025	197,155,201	9,224,292	761,311,872	15,840,223	958,467,073	25,064,515
2026	206,033,208	8,878,007	777,488,677	16,176,805	983,521,885	25,054,812
2027	215,342,517	9,309,309	794,009,217	16,520,539	1,009,351,734	25,829,848
2028	225,104,994	9,762,477	810,880,794	16,871,578	1,035,985,788	26,634,055
2029	235,343,644	10,238,650	828,110,869	17,230,075	1,063,454,513	27,468,725
2030	246,082,670	10,739,026	845,707,059	17,596,190	1,091,789,729	28,335,216
2031	257,347,537	11,264,867	864,320,511	18,613,452	1,121,668,048	29,878,319
2032	269,165,037	11,817,500	883,343,633	19,023,122	1,152,508,670	30,840,622
2033	281,563,363	12,398,326	902,785,441	19,441,808	1,184,348,804	31,840,134
2034	294,572,183	13,008,820	922,655,151	19,869,710	1,217,227,334	32,878,530
2035	307,277,606	12,705,423	942,962,180	20,307,029	1,250,239,786	33,012,452

The year 2027 is highlighted in yellow as the last year in which there is sufficient space available to fully allow the distribution of the demand for space in the various submarkets. In 2028, there is space to distribute the demand, but it requires unrealistically low vacancy rates and heavy dependence on Imperial County locations. As will be discussed later, the accommodation of demand includes adding developable square footage in the High Desert (*10,000,000 square feet*) and North Los Angeles County (*10,000,000 square feet*) during 2024, and in the Coachella Valley (*5,000,000 square feet*) during 2025.

The resulting modeling of the distribution of all warehousing demand to vacant and developable space concludes that a there is a total shortfall of 228,358,907 square feet of space in the region by year 2035 unless other land currently not zoned for warehousing is converted to industrial uses.

Table 5.3 shows the distribution of all warehousing demand to vacant and developable space by until 2035.

Table 5.3 Distribution of All Warehousing Demand to Vacant and Developable Space
(in Square Feet)

Year	Total Demand (Square Feet)	Change	Amount Allocated for Year Demanded
2008 actual	330,121,706		
2009 actual	361,216,596	31,094,889	0
2010	366,967,560	5,750,964	0
2011	374,294,122	7,326,562	0
2012	381,030,786	6,736,664	0
2013	358,844,625	(22,186,161)	0
2014	335,817,107	(23,027,518)	0
2015	311,912,028	(23,905,079)	0
2016	287,879,647	(24,032,382)	0
2017	262,967,529	(24,912,118)	0
2018	240,036,496	(22,931,032)	0
2019	216,313,220	(23,723,276)	0
2020	191,764,949	(24,548,271)	0
2021	166,966,434	(24,798,515)	0
2022	141,334,540	(25,631,894)	0
2023	114,836,555	(26,497,985)	0
2024	110,562,008	(4,274,547)	20,000,000
2025	90,497,493	(20,064,515)	5,000,000
2026	65,442,681	(25,054,812)	0
2027	39,612,833	(25,829,848)	0
2028	29,570,387	(10,042,446)	16,591,609
2029	28,347,052	(1,223,335)	26,245,390
2030	28,153,494	(193,558)	28,141,658
2031	27,948,746	(204,748)	29,673,571

Year	Total Demand (Square Feet)	Change	Amount Allocated for Year Demanded
2032	27,739,491	(209,254)	30,631,368
2033	27,525,631	(213,860)	31,626,274
2034	27,307,065	(218,567)	32,657,963
2035	27,083,687	(223,377)	32,789,074
		Unallocated	**228,358,907**

Note: "Yellow" is the last year of sufficient vacant space to handle all of the demand for that period (2027).

5.2 METHODOLOGY

The demand for port related space was distributed as follows:

1. Demand was initially allocated according to shares of space shown in Table 5.4. This allocation was based on submarket location in relationship to the ports, as well as the amount of vacant space it initially had available.
2. As each market, in turn, reached a vacancy rate of 2.5 percent in the space that was available at the beginning of a year, any demand for square footage that would take that initial space below that 2.5-percent vacancy level was passed on to the next priority market able to accommodate it.
3. From the next year on, that next market's share included the share that had been assigned to its now saturated neighbor.
4. As each priority submarket, in turn, became saturated, the share of the total market passed on to the next priority area represented by the cumulative share of all previously saturated submarkets.
5. Note that the outlying Ventura County SR 126, Coachella Valley, and two Imperial County markets were not allocated any port related demand.
6. This process continued until 2027, when there was insufficient available space above a 2.5-percent vacancy rate to accommodate demand (*917,913 square feet was left unallocated*). This is shown in Table 5.5.

Table 5.4 Initial Shares of Port Demand by Submarket

Priority	County	Submarket	Beginning Share
1	L.A. County	South Bay	20.0%
2	L.A. County	Mid-I 710	6.0%
3	L.A. County	Central L.A.	15.0%
4	L.A. County	I-605	10.0%
5	L.A. County	San Gabriel	7.5%
6	San Bernardino County	Westend SB	12.5%
7	Orange County	West Orange	3.5%
8	L.A. County	I-5	1.5%
9	Ventura County	Port Hueneme	0.4%
10	Riverside County	West Riverside	6.3%
11	San Bernardino County	East SB Valley	5.6%
12	Riverside County	March JPA	5.3%
13	Orange County	Orange Airport	2.0%
14	Orange County	North Orange	1.6%
15	Ventura County	SR 118	0.5%
16	Ventura County	SR 101	0.2%
17	Orange County	South Orange	0.1%
18	Riverside County	SW Riverside County	0.1%
19	Riverside County	Pass	0.3%
20	San Bernardino County	High Desert	1.2%
21	L.A. County	North L.A.	0.5%
22	Ventura County	SR 126	0.0%
23	Riverside County	Coachella	0.0%
24	Imperial County	South Imperial	0.0%
25	Imperial County	North Imperial	0.0%
Total			**100.0%**

Table 5.5 Distribution of Port Related Space to Vacant Warehousing Facilities (square feet)

Year	Total Available (Square Feet)	Change	Amount Allocated for Year Demanded
2008 actual	143,846,908		0
2009 actual	161,797,491	(17,950,583)	0
2010	154,696,113	7,101,378	0
2011	149,455,812	5,240,301	0
2012	416,904,751	5,551,061	0
2013	138,023,983	5,880,768	0
2014	131,793,375	6,230,608	0
2015	125,191,539	6,601,836	0
2016	118,983,997	6,207,542	0
2017	112,434,038	6,549,959	0
2018	105,521,809	6,912,229	0
2019	98,226,263	7,295,546	0
2020	90,525,088	7,701,175	0
2021	83,003,740	7,521,348	0
2022	75,090,063	7,913,677	0
2023	66,762,604	8,327,459	0
2024	57,998,700	8,763,904	0
2025	48,774,408	9,224,292	0
2026	39,896,401	8,878,007	0
2027	30,587,092	9,309,309	0
2028	21,742,528	8,844,564	917,913
2029	21,742,528		10,238,650
2030	21,742,528		10,739,026
2031	21,742,528		11,264,867
2032	21,742,528		11,817,500
2033	21,742,528		12,398,326
2034	21,742,528		13,008,820

2035	21,742,528		12,705,423
		Unallocated	**83,090,025**

Note: In Appendix F, Exhibit 4, "Green" designates at 2.5-percent vacancy rate. "Blue" designates a transfer of demand occurred from a prior submarket.

By allocating port demand for warehousing space to the existing vacant space, the model begins filling up existing space geographically, submarket by submarket. Areas nearer the harbors feel the effects before those farther out. The farthest markets do not receive this impulse. The effect of this modeling is to ultimately reduce vacancy rates to a low of 2.5 percent in nearly every submarket.

Meanwhile, there is also demand for space coming from non-port related increases in goods movement activity. These are much larger than port related activity in terms of the warehousing required. According to estimates in Section 3.0, 14.7 percent of the demand for space were from port related demand in 2008. Over time, that share increases because port trade is expected to grow faster than the general economy. By 2027, when space of all types has begun to disappear, the port related share is up to 21.3 percent. That said, non-port related demand required an estimated 85.3 percent of warehousing space in 2008, and would still represent 78.7 percent of demand in 2027.

The demand for non-port related space was distributed as follows:

7. Non-port related demand was treated as the key driver for the development of new warehousing space since vacant space was sufficient to accommodate all of the port demand. That ceased to be true in 2027, just when non-port demand was also exhausting the supply of developable sites.
8. Demand for non-port related space was initially spread across priority zones using the shares in Table 5.6. It is based on each submarket's location in relationship to the Los Angeles County's population center. A second consideration was the amount of developable land available for warehouse construction in each submarket.
9. As the non-port related demand for warehousing space in each submarket exceeded the supply of developable space in that market, the excess demand was moved to the nearest submarket able to accommodate it. This was not always the adjacent market, and sometimes required the demand to be split between several markets.
10. As the markets became tighter, excess warehouse space demand for a submarket was transferred to whatever market could absorb the

additional square footage. In later years, this process began to bring accelerated development into outlying markets, such as the High Desert, Northern Los Angeles County, the Coachella Valley, and finally even Imperial County.

11. No lower limit was set on vacancy rates for developable property (*unlike the vacant property*) since the key for a market is the combination of vacancy rates for both groups. However, the combined totals were held to the 2.5 percent rule.

Table 5.6 Initial Shares of Non-Port-Related Demand by Submarket

Priority	County	Submarket	Beginning Share
1	Los Angeles County	South Bay	0.00%
2	Los Angeles County	Mid-I-710	1.00%
3	Los Angeles County	Central L.A.	2.00%
4	Los Angeles County	I-605	0.60%
5	Los Angeles County	San Gabriel	3.20%
6	San Bernardino County	Westend SB	7.00%
7	Orange County	West Orange	3.90%
8	Los Angeles County	I-5	4.00%
9	Ventura County	Port Hueneme	1.00%
10	Riverside County	West Riverside	8.00%
11	San Bernardino County	East SB Valley	15.00%
12	Riverside County	March JPA	15.00%
13	Orange County	Orange Airport	2.00%
14	Orange County	North Orange	0.30%
15	Ventura County	SR 118	0.90%
16	Ventura County	SR 101	1.00%
17	Orange County	South Orange	1.00%
18	Riverside County	SW Riv. County	2.50%
19	Riverside County	Pass	2.00%
20	San Bernardino County	High Desert	12.00%
21	Los Angeles County	North Los Angeles	10.00%
22	Ventura County	SR 126	0.50%
23	Riverside County	Coachella	6.00%
24	Imperial County	South Imperial	1.00%
25	Imperial County	North Imperial	0.10%
Total			**100.0%**

12. Non-port related warehousing demand was not used in South Bay due to that submarket's proximity to the harbors.
13. A total of 25,000,000 square feet of developable warehousing square footage were added in the High Desert (*10,000,000 square feet*) and North Los Angeles County (*10,000,000 square feet*) during 2024, and in the Coachella Valley (*5,000,000 square feet*) during 2025. This was done since these are the areas most able to handle such growth. In a sense, doing this replaces the more complex task of adding bits of extra space (*e.g., brownfields*) in highly saturated markets that would be unlikely to satisfy much of the demand for space.

By allocating the space in this manner, the market again begins filling up space submarket by submarket. When a market cannot handle the extra demand, it is transferred to areas that can accommodate it. Once the markets began to saturate, the allocations process was undertaken by hand so that judgment could be exercised as to where it would logically go and where it would best fit. By 2027, even with 25,000,000 extra square feet of new developable land added in the outlying markets, the ability for the market to continue handling added demand was exhausted.

In 2028, the non-port demand represented 15,673,696 square feet of space, when taking all markets to zero would only handle 7,827,259 square feet. No allocation was made.

Finally, bringing together the demand for vacant and developable space for port and non-port uses makes it possible to see the pace at which facilities start to be aggressively used in each submarket and when the market will essentially be exhausted.

The resulting modeling of the distribution of all warehousing demand to vacant and developable space concludes that there is a total shortfall of 228,358,907 square feet of space in the region by year 2035, unless other land currently not zoned for warehousing is converted to industrial uses. Table 5.8 shows the distribution of all warehousing demand to vacant and developable space by each subregion modeled.

Given the location of the vacant and developable space, and the fact that port demand is anticipated to come from the Ports of Los Angeles and Long Beach, and non-port demand will be centered in central Los Angeles County, it is not a surprise to find the market is performing in the following way:

- Approaching saturation in the harbor areas of Los Angeles County first (*South Bay, mid-I-710, Central Los Angeles, and I-605 south of SR 60*).
- This is followed by the second tier of areas, including the San Gabriel Valley, the I-5 through the San Fernando Valley, western Orange County

near the Ports, the western edges of San Bernardino County and Riverside County, and around Port Hueneme in Ventura County.

- This is followed by build-out starting to occur in the third tier of areas, including the eastern San Bernardino Valley, the March Air Reserve Base area of Riverside County, the airport and northern Orange County areas, and the SR 101 and SR 118 portions of Ventura County.
- The last areas to start receiving demand and the last to start reaching saturation are the desert areas, including San Bernardino County's High Desert, Riverside County's Coachella Valley, Los Angeles County's Northern areas, and Imperial County.

Table 5.7 Distribution of Non-Port-Related Demand to Developable Space
(in Square Feet)

Year	Total Demand (Square Feet)	Change	Amount Allocated for Year Demanded
2008 actual	186,274,798		0
2009 actual	199,419,105	13,144,306	0
2010	212,271,447	12,852,342	0
2011	224,838,310	12,566,863	0
2012	237,126,035	12,287,725	0
2013	220,820,642	(16,305,393)	0
2014	204,023,732	(16,796,910)	0
2015	186,720,489	(17,303,243)	0
2016	168,895,650	(17,824,840)	0
2017	150,533,491	(18,362,159)	0
2018	134,514,687	(16,018,803)	0
2019	118,086,957	(16,427,730)	0
2020	101,239,861	(16,847,096)	0
2021	83,962,694	(17,277,167)	0
2022	66,244,477	(17,718,217)	0
2023	48,073,951	(18,170,526)	0
2024	52,563,308	4,489,357	20,000,000
2025	41,723,085	(10,840,223)	5,000,000

Year	Total Demand (Square Feet)	Change	Amount Allocated for Year Demanded
2026	25,546,280	(16,176,805)	0
2027	9,025,741	(16,520,539)	0
2028	7,827,859	(1,197,882)	15,673,696
2029	6,604,523	(1,223,335)	16,006,740
2030	6,410,965	(193,558)	17,402,632
2031	6,206,217	(204,748)	18,408,704
2032	5,996,963	(209,254)	18,813,868
2033	5,783,103	(213,860)	19,227,948
2034	5,564,536	(218,567)	19,651,143
2035	5,341,159	(223,377)	20,083,651
Total		**Unallocated**	**145,268,381**

Table 5.8 Distribution of All Warehousing Demand to Vacant and Developable Space
(in Square Feet)

	1	2	3	4	5	6	74	8	9	10	11	12	13	14
	Los Angeles					San Bernardino	Orange	Los Angeles	Ventura	Riverside	San Bernardino	Riverside	Orange	
Vacant	South Bay	Mid-I 710	Central Los Angeles	I-605	San Gabriel	Westend	W Orange	I-5	P Hueneme	W Riverside	E SB Valley	March JPA	Airport	N Orange
2008 actual	7,453,913	3,646,143	10,568,120	8,672,231	13,211,974	24,684,222	3,079,069	8,015,532	3,146,459	19,936,397	42,696,416	41,657,340	6,363,166	5,723,002
2009 actual	8,169,048	4,170,157	12,086,907	9,820,784	14,826,828	28,250,373	3,924,215	8,819,806	3,399,802	22,286,753	48,264,078	46,125,694	7,230,824	6,429,976
2010	6,748,772	3,872,598	11,278,747	9,187,760	14,705,499	28,262,365	4,176,908	9,227,379	3,499,920	22,867,554	49,794,252	47,677,172	7,345,843	6,354,911
2011	5,700,712	3,683,848	10,744,039	8,739,131	14,714,616	28,487,008	4,483,606	9,651,450	3,604,627	23,542,764	51,385,824	49,284,466	7,492,374	6,308,767
2012	4,590,500	3,473,662	10,157,134	8,257,752	14,691,494	28,653,266	4,768,540	10,059,693	3,705,300	24,176,065	52,918,124	50,833,418	7,627,108	6,256,813
2013	3,414,346	2,957,762	8,948,911	7,571,843	13,728,664	26,776,792	3,926,802	9,319,265	3,518,723	22,501,145	50,142,992	48,075,929	7,183,384	6,113,804
2014	3,247,024	1,337,157	7,678,382	6,848,000	12,723,867	24,822,183	3,053,652	8,553,930	3,325,832	20,764,864	47,274,541	45,226,170	6,722,834	5,963,724
2015	3,247,024	1,116,860	4,672,829	6,083,997	11,675,026	22,785,726	2,147,761	7,762,773	3,126,392	18,964,689	44,309,352	42,280,786	6,244,732	5,806,185
2016	2,444,906	938,611	2,361,015	4,873,468	10,639,065	20,762,045	1,930,497	6,956,666	2,923,313	17,147,627	41,288,004	39,278,060	5,764,085	5,653,390

2017	1,967,490	663,179	2,361,015	1,696,633	8,680,461	18,657,949	1,701,248	6,123,930	2,713,492	15,266,007	38,166,882	36,176,589	5,265,842	5,493,504
2018	1,967,490	663,179	2,361,015	1,600,520	3,643,641	17,793,920	1,459,320	3,553,351	2,525,655	13,549,032	35,376,977	33,407,420	4,807,222	5,334,852
2019	1,967,490	663,179	2,361,015	1,600,520	2,206,020	12,852,479	1,203,976	1,636,867	1,691,514	11,775,194	32,504,267	30,556,597	4,332,756	5,168,840
2020	1,630,548	663,179	2,361,015	1,600,520	2,206,020	7,030,856	934,435	1,521,350	953,131	7,432,035	28,872,053	27,621,370	4,178,733	4,995,080
2021	1,630,548	663,179	2,361,015	1,600,520	2,206,020	2,734,108	393,101	652,822	636,998	6,958,190	28,105,314	18,739,650	4,028,306	4,822,907
2022	1,630,548	663,179	2,361,015	1,600,520	2,206,020	2,734,108	393,101	652,822	622,962	2,240,043	25,672,537	17,965,860	3,763,723	4,643,133
2023	1,630,548	663,179	2,361,015	1,600,520	2,206,020	2,734,108	393,101	652,822	622,962	2,240,043	18,319,391	17,524,505	3,597,174	4,509,894
2024	1,584,016	663,179	2,267,951	1,600,520	2,128,467	2,734,108	253,505	652,822	622,962	2,240,043	10,580,864	17,060,018	3,421,896	4,369,671
2025	1,552,336	663,179	2,267,951	1,600,520	2,128,467	2,639,067	253,505	605,301	543,761	2,240,043	2,400,868	16,495,195	3,237,410	4,222,083
2026	1,552,336	663,179	2,219,421	1,600,520	2,128,467	2,639,067	253,505	605,301	495,231	2,240,043	2,400,868	8,185,381	3,059,850	4,080,035
2027	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	1,099,744	3,931,086
2028	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
2029	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
2030	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
2031	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767

2032	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
2033	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
2034	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
2035	1,542,424	638,398	2,219,421	1,600,520	2,128,467	2,639,067	253,505	595,389	495,231	2,220,219	2,381,043	1,191,269	482,641	447,767
Vacancy Rate	2.5%	2.6%	2.5%	2.5%	2.4%	2.4%	2.6%	2.1%	2.3%	2.3%	2.2%	1.7%	2.4%	2.5%

Table 5.8 Distribution of All Warehousing Demand to Vacant and Developable Space (continued)
(in Square Feet)

	15	16	17	18	19	20	21	22	23	24	25			
	Ventura		Orange	Riverside		San Bernardino	Los Angeles	Ventura	Riverside	Imperial				Was Demand for Year Allocated
Vacant	SR 118	SR 101	S Orange	SW Riverside Co.	Pass	High Desert	North Los Angeles	SR 126	Coachella	South Imperial	North Imperial	Total Demand	Change	
2008 actual	1,960,791	1,707,442	1,057,215	6,716,556	4,895,416	43,450,207	39,490,754	239,726	19,819,090	11,229,045	701,480	330,121,706		
2009 actual	2,207,366	1,964,262	1,220,637	7,100,856	5,411,043	45,438,787	40,926,810	315,698	20,616,608	11,475,949	733,332	361,216,596	31,094,889	0
2010	2,287,531	2,078,583	1,342,059	7,418,614	5,646,786	46,895,852	42,180,088	379,960	21,387,749	11,604,473	746,185	366,967,560	5,750,964	0
2011	2,374,431	2,193,771	1,462,488	7,730,166	5,882,402	48,340,992	43,413,193	442,794	22,141,760	11,730,141	758,752	374,294,122	7,326,562	0
2012	2,457,265	2,305,546	1,579,814	8,034,583	6,111,504	49,748,906	44,616,986	504,233	22,879,024	11,853,019	771,039	381,030,786	6,736,664	0
2013	2,281,113	2,130,730	1,410,879	7,624,008	5,767,753	47,721,690	42,959,983	422,706	21,900,700	11,689,965	754,734	358,844,625	(22,186,161)	(0)
2014	2,098,787	1,950,300	1,236,679	7,200,970	5,413,123	45,631,293	41,252,255	338,721	20,892,886	11,521,995	737,937	335,817,107	(23,027,518)	0
2015	1,910,049	1,764,064	1,057,045	6,765,088	5,047,253	43,475,682	39,492,222	252,205	19,854,691	11,348,963	720,634	311,912,028	(23,905,079)	0
2016	1,718,588	1,573,400	872,589	6,316,363	4,672,134	41,262,211	37,681,804	163,081	18,785,201	11,170,715	702,809	287,879,647	(24,032,382)	0
2017	1,520,579	1,376,679	682,418	5,854,034	4,285,240	38,980,152	35,816,113	163,081	17,683,471	10,987,093	684,447	262,967,529	(24,912,118)	(0)

2018	1,341,848	1,202,666	515,317	5,450,108	3,944,128	36,974,949	34,183,128	163,081	16,722,343	10,826,905	668,428	240,036,496	(22,931,032)	(0)
2019	1,157,521	1,023,798	343,745	5,035,767	3,593,686	34,916,075	32,507,525	163,081	15,736,679	10,662,628	652,000	216,313,220	(23,723,276)	0
2020	967,391	1,008,396	336,043	4,610,739	3,233,641	32,802,009	30,788,160	163,081	14,725,853	10,494,157	635,153	191,764,949	(24,548,271)	0
2021	774,290	993,353	328,522	2,015,403	2,865,534	30,638,493	29,026,598	163,081	13,689,223	10,321,385	617,876	166,966,434	(24,798,515)	(0)
2022	734,722	977,526	320,608	523,116	2,150,782	18,725,478	27,219,164	163,081	12,626,130	10,144,203	600,158	141,334,540	(25,631,894)	0
2023	693,084	960,871	312,281	518,953	2,071,288	13,283,414	15,697,918	163,081	11,535,899	9,962,498	581,987	114,836,555	(26,497,985)	0
2024	649,265	943,343	303,517	514,571	2,044,996	18,881,799	15,902,286	163,081	10,605,260	9,807,391	566,477	110,562,008	(4,274,547)	20,000,000
2025	603,143	924,894	215,092	462,438	2,017,324	14,716,011	12,866,975	115,560	7,526,747	9,648,989	550,636	90,497,493	(20,064,515)	5,000,000
2026	558,753	907,138	206,214	457,999	1,942,159	9,254,952	6,356,301	115,560	4,388,447	8,597,497	534,460	65,442,681	(25,054,812)	0
2027	512,207	888,520	186,992	453,344	1,914,231	2,353,299	1,440,850	115,560	2,364,680	5,929,430	517,939	39,612,833	(25,829,848)	0
2028	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	1,352,386	5,760,714	501,067	29,570,387	(10,042,446)	16,591,609
2029	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	5,588,413	483,837	28,347,052	(1,223,335)	26,245,390
2030	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	5,412,451	466,241	28,153,494	(193,558)	28,141,658
2031	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	5,226,317	447,628	27,948,746	(204,748)	29,673,571
2032	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	5,036,085	428,605	27,739,491	(209,254)	30,631,368

2033	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	4,841,667	409,163	27,525,631	(213,860)	31,626,274
2034	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	4,642,970	389,293	27,307,065	(218,567)	32,659,963
2035	261,105	309,492	77,593	414,560	169,011	677,819	1,095,721	115,560	318,581	4,439,900	368,986	27,083,687	(223,377)	32,789,074
Vacancy Rate	**2.4%**	**2.5%**	**2.9%**	**1.9%**	**2.0%**	**1.2%**	**2.4%**	**4.4%**	**4.2%**	**32.0%**	**42.3%**	**2.9%**	**Unallocated**	**228,358,907**

Note the desert areas will be unlikely to directly handle much port traffic, even as the region builds out. However, they will see strong levels of demand as space disappears in the Valley. This will occur because it will be economical for cargo that must be near the ports and airports take valley space to be near those facilities. This means that domestic cargo headed into Southern California will be increasingly handled by warehouses in the deserts and brought in as needed. Later, the deserts will see a second competitive advantage appear as operations that handle non-port related cargo find that they are being outbid for valley space and must move farther out to find facilities.

The current tendency of the market to move outward to build space where land is available and port and non-port users following as their need for space grows. To date, there has been no tendency for non-port users to give up space near the Ports and move out, or for port users to outbid them for it. This could be due to the cubic footage advantage of the newer outlying facilities, their technological superior for throughput, or simply the reluctance of non-port users to give up existing space to move to the hinterland.

Calculations were made of the share of each submarket's internal space usage that went to port and non-port activities (Table 5.9). This shows the degree of specialization in each area:

Overall, the shares begin at 14.7 percent port cargo handled in warehouses and 85.3 percent non-port. This shifts to 21.9 percent port and 78.1 percent non-port by 2027 when space begins to disappear. This is the case as port cargo was shown to grow faster than non-port cargo.

Extreme specialization is shown in South Bay. There, the shares begin at 100 percent port and 0 percent non-port. The warehousing uses drift away from this specialization only very slightly by 2027 (97.2 percent vs. 2.8 percent). The reverse is true in the outlying deserts, which largely remain at 0 percent port and 100 percent non-port.

In areas nearest to the Ports, their share of port cargo increases between 2008 and 2027. Examples include: Mid-I-710 (22.1 percent to 29.7 percent); Central Los Angeles (11.1 percent to 19.1 percent).

Further from the Ports, but not in the desert areas, the increases in the share of port cargo tends to be even faster as more land is available to accommodate cargo of all kinds and port cargo is growing more quickly (e.g., San Bernardino County's Westend (7.1 percent to 23.2 percent); East San Bernardino Valley (7.1 percent to 29.2 percent); March JPA (6.0 percent to 28.6 percent).

The current tendency of the market is to move outward to build space where land is available, and port and non-port users following as their need for

space grows. To date, there has been no tendency for non-port users to give up space near the ports and move out, or for port users to outbid them for it. This could be due to the cubic footage advantage of the newer outlying facilities, their technological superior for throughput, or simply the reluctance of non-port users to give up existing space to move to the hinterland.

Table 5.9 How Each of the 25 Submarkets' Space is Used in the Future
Port vs. Non-Port (in Percentage)

	1		2		3		4		5		6		7		8		9		10		11		12		13	
	Los Angeles										San Bernardino		Orange		Los Angeles		Ventura		Riverside		San Bernardino		Riverside		Orange	
Vacant	South Bay		Mid-I–710		Central Los Angeles		I-605		San Gabriel		Westend		W Orange		I-5		P Hueneme		W Riverside		E SB Valley		March JPA		Airport	
2008	100	-0.0	22.1	77.9	11.1	88.9	7.1	92.9	7.1	92.9	7.1	92.9	10.6	89.4	7.1	92.9	7.1	92.9	7.1	92.9	7.1	92.9	6.0	94.0	7.1	92.9
2009	100	-0.0	20.7	79.3	9.7	90.3	5.3	94.7	5.6	94.4	4.1	95.9	6.6	93.4	6.0	94.0	6.5	93.5	5.6	94.4	1.8	98.2	-2.0	10 2	3.0	97.0
2010	100	-0.0	22.5	77.5	10.9	89.1	6.5	93.5	6.3	93.7	5.2	94.8	11.2	88.8	6.7	93.3	6.7	93.3	6.2	93.8	2.5	97.5	-0.7	101	4.1	95.9
2011	100	-0.0	23.7	76.3	11.9	88.1	7.4	92.6	6.9	93.1	6.0	94.0	15.2	84.8	7.2	92.8	6.9	93.1	6.7	93.3	3.1	96.9	0.4	99.6	4.9	95.1
2012	100	-0.0	25.1	74.9	12.8	87.2	8.3	91.7	7.4	92.6	6.9	93.1	19.8	80.2	7.8	92.2	7.0	93.0	7.3	92.7	3.8	96.2	1.7	98.3	5.9	94.1
2013	100	-0.0	26.1	73.9	13.8	86.2	9.3	90.7	7.9	92.1	7.7	92.3	20.5	79.5	8.0	92.0	7.1	92.9	7.6	92.4	4.1	95.9	2.7	97.3	6.6	93.4

2014	100	-0.0	30.4	69.6	14.7	85.3	10.3	89.7	8.5	91.5	8.4	91.6	21.0	79.0	8.1	91.9	7.2	92.8	7.9	92.1	4.5	95.5	3.6	96.4	7.2	92.8
2015	100	-0.0	30.3	69.7	17.3	82.7	11.3	88.7	9.0	91.0	9.2	90.8	21.6	78.4	8.3	91.7	7.2	92.8	8.3	91.7	4.9	95.1	4.4	95.6	7.9	92.1
2016	98.7	1.3	30.1	69.9	19.1	80.9	13.1	86.9	9.5	90.5	9.9	90.1	23.7	76.3	8.4	91.6	7.3	92.7	8.6	91.4	5.2	94.8	5.0	95.0	8.5	91.5
2017	97.9	2.1	29.8	70.2	19.1	80.9	17.5	82.5	10.1	89.9	10.6	89.4	25.8	74.2	8.5	91.5	7.3	92.7	8.9	91.1	5.5	94.5	5.5	94.5	9.1	90.9
2018	97.9	2.1	29.8	70.2	19.1	80.9	17.5	82.5	14.3	85.7	11.4	88.6	27.9	72.1	8.1	91.9	7.4	92.6	9.2	90.8	5.8	94.2	6.0	94.0	9.7	90.3
2019	97.9	2.1	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	15.5	84.5	30.1	69.9	7.9	92.1	7.2	92.8	9.6	90.4	6.1	93.9	6.5	93.5	10.4	89.6
2020	97.4	2.6	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	20.0	80.0	32.2	67.8	8.3	91.7	7.1	92.9	9.6	90.4	6.4	93.6	7.0	93.0	11.2	88.8
2021	97.4	2.6	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	33.1	66.9	11.1	88.9	8.5	91.5	10.1	89.9	6.8	93.2	6.6	93.4	12.0	88.0
2022	97.4	2.6	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	33.1	66.9	11.1	88.9	8.6	91.4	14.4	85.6	9.5	90.5	7.2	92.8	12.8	87.2
2023	97.4	2.6	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	33.1	66.9	11.1	88.9	8.6	91.4	14.4	85.6	16.9	83.1	8.0	92.0	13.7	86.3
2024	97.3	2.7	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.6	91.4	14.4	85.6	23.4	76.6	8.7	91.3	14.6	85.4
2025	97.2	2.8	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.6	91.4	14.4	85.6	29.2	70.8	9.6	90.4	15.5	84.5
2026	97.2	2.8	29.8	70.2	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	21.0	79.0	16.3	83.7
2027	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	24.7	75.3

2028	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2029	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2030	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2031	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2032	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2033	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2034	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0
2035	97.2	2.8	29.7	70.3	19.1	80.9	17.5	82.5	14.9	85.1	23.2	76.8	32.6	67.4	11.1	88.9	8.5	91.5	14.4	85.6	29.2	70.8	28.6	71.4	27.0	73.0

Table 5.9 How Each of the 25 Submarkets' Space is Used in the Future (continued)
Port vs. Non-Port (in Percentage)

	14		15		16		17		18		19		20		21		22		23		24		25		
	Orange		Ventura				Orange		Riverside				San Bernardino		Los Angeles		Ventura		Riverside		Imperial				Total
Vacant	North Orange		SR 118		SR 101		S. Orange		SW Riverside Co.		Pass		High Desert		North Los Angeles		SR 126		Coachella		S. Imperial		N. Imperial		Total
2008	3.5	96.5	1.4	98.6	1.2	98.8	1.9	98.1	0.5	99.5	7.1	92.9	2.7	97.3	2.2	97.8	0.4	99.6	0.1	99.9	1.6	98.4	34.0	66.0	**14.7**	**85.3**
2009	-2.1	102	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	**12.7**	**87.3**
2010	-1.1	101	0.4	99.6	0.1	99.9	0.5	99.5	0.0	100	0.8	99.2	0.7	99.3	1.2	98.8	0.0	100	0.0	100	0.0	100	0.0	100	**13.9**	**86.1**
2011	-0.4	100	0.7	99.3	0.2	99.8	1.0	99.0	0.1	99.9	1.4	98.6	1.5	98.5	3.6	96.4	0.0	100	0.0	100	0.0	100	-0.0	100	**14.8**	**85.2**
2012	0.4	99.6	1.1	98.9	0.4	99.6	1.6	98.4	0.1	99.9	2.3	97.7	2.5	97.5	24.6	75.4	0.0	100	0.0	100	0.0	100	-0.0	100	**15.9**	**84.1**
2013	1.2	98.8	1.4	98.6	0.5	99.5	1.8	98.2	0.1	99.9	2.7	97.3	2.7	97.3	5.4	94.6	0.0	100	0.0	100	0.0	100	0.0	100	**16.2**	**83.8**
2014	2.0	98.0	1.7	98.3	0.6	99.4	2.0	98.0	0.1	99.9	3.0	97.0	2.8	97.2	3.7	96.3	0.0	100	0.0	100	0.0	100	0.0	100	**16.6**	**83.4**
2015	2.9	97.1	2.0	98.0	0.7	99.3	2.2	97.8	0.2	99.8	3.2	96.8	2.9	97.1	3.0	97.0	0.0	100	0.0	100	0.0	100	0.0	100	**17.0**	**83.0**

2016	3.7	96.3	2.3	97.7	0.8	99.2	2.3	97.7	0.2	99.8	3.4	96.6	3.0	97.0	2.7	97.3	0.0	100	0.0	100	0.0	100	0.0	100	**17.2**	**82.8**
2017	4.5	95.5	2.6	97.4	0.9	99.1	2.4	97.6	0.2	99.8	3.6	96.4	3.0	97.0	2.4	97.6	0.0	100	0.0	100	0.0	100	0.0	100	**17.5**	**82.5**
2018	5.3	94.7	2.9	97.1	1.0	99.0	2.6	97.4	0.2	99.8	3.8	96.2	3.1	96.9	2.4	97.6	0.0	100	0.0	100	0.0	100	0.0	100	**17.9**	**82.1**
2019	6.2	93.8	3.3	96.7	1.1	98.9	2.7	97.3	0.3	99.7	3.9	96.1	3.2	96.8	2.3	97.7	0.0	100	0.0	100	0.0	100	0.0	100	**18.3**	**81.7**
2020	7.1	92.9	3.6	96.4	1.3	98.7	3.0	97.0	0.3	99.7	4.1	95.9	3.3	96.7	2.3	97.7	0.0	100	0.0	100	0.0	100	0.0	100	**18.7**	**81.3**
2021	7.9	92.1	3.9	96.1	1.4	98.6	3.3	96.7	0.3	99.7	4.2	95.8	3.4	96.6	2.2	97.8	0.0	100	0.0	100	0.0	100	0.0	100	**19.0**	**81.0**
2022	8.8	91.2	4.3	95.7	1.5	98.5	3.6	96.4	0.3	99.7	4.1	95.9	2.6	97.4	2.2	97.8	0.0	100	0.0	100	0.0	100	0.0	100	**19.4**	**80.6**
2023	9.7	90.3	4.7	95.3	1.7	98.3	4.0	96.0	0.3	99.7	4.5	95.5	2.5	97.5	1.5	98.5	0.0	100	0.0	100	0.0	100	0.0	100	**19.7**	**80.3**
2024	10.6	89.4	5.1	94.9	1.8	98.2	4.3	95.7	0.3	99.7	4.9	95.1	3.1	96.9	1.6	98.4	0.0	100	0.0	100	0.0	100	0.0	100	**20.6**	**79.4**
2025	11.6	88.4	5.5	94.5	2.0	98.0	4.5	95.5	0.3	99.7	5.3	94.7	3.1	96.9	1.6	98.4	0.0	100	0.0	100	0.0	100	0.0	100	**21.1**	**78.9**
2026	12.5	87.5	5.9	94.1	2.1	97.9	4.9	95.1	0.4	99.6	5.6	94.4	3.0	97.0	1.4	98.6	0.0	100	0.0	100	0.0	100	0.0	100	**21.5**	**78.5**
2027	13.5	86.5	6.3	93.7	2.3	97.7	5.2	94.8	0.4	99.6	6.0	94.0	2.8	97.2	1.4	98.6	0.0	100	0.0	100	0.0	100	0.0	100	**21.9**	**78.1**
2028	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**
2029	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**
2030	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**

2031	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**
2032	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**
2033	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**
2034	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**
2035	30.9	69.1	8.5	91.5	7.0	93.0	9.2	90.8	0.6	99.4	25.9	74.1	5.6	94.4	2.1	97.9	0.0	100	0.0	100	0.0	100	0.0	100	**22.5**	**77.5**

6.0 Intermodal Facilities

Part of Task 5 of the SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy is to document the existing and planned intermodal (IM) rail facilities in the region. Fortunately, a similar analysis was completed by Cambridge Systematics in February 2009 for the I-710 EIR/EIS[28], and the following information is taken largely from that study. Mainline track capacity was also evaluated in the I-710 study, but for Task 5 of the present study, only the rail yard information is presented.

A critical part of the analysis is to quantify intermodal lift capacity and compare the capacity to estimated demand. There are three types of IM facilities: on-dock, near-dock, and off-dock. The following three main designations are described as follows, taken from definitions from the Ports of Los Angeles and Long Beach:

1. **On-dock IM Terminal.** IM facility situated inside a marine terminal;
2. **Near-dock IM Terminal.** IM facility situated within five miles off the Ports; and
3. **Off-dock IM Terminal.** IM facility situated more than five miles from the Ports.

All the containers that are handled by any of the three types of IM facilities are known as "direct intermodal" containers, because they are sent by rail "intact" using marine containers without any transloading of cargo into larger domestic containers.

Through 2030, there will be a major construction program of on-dock and near-dock IM terminals. Two new on-dock terminals will be added to existing marine terminals, where there is no on-dock loading facility at this time. Those terminals are TRAPAC in the Port of Los Angeles and the Middle Harbor project in the Port of Long Beach. In addition, Pier S in the Port of Long Beach is under construction. The Pier S project includes an on-dock loading facility. All existing on-dock terminals will be enlarged. Two near-dock projects are in the process of going through an EIR. The development and use of on-dock IM facilities and their estimated capacity include the infrastructure (yard and lead tracks) to support projected volumes.

[28] Cambridge Systematics, Inc., *Final Technical Memorandum, I-710 Railroad Goods Movement Study*, prepared for the Los Angeles Metropolitan Transportation Authority, February 3, 2009.

In combination, the success of IM facility development and the mainline track investment will determine the potential impact on the Basin freeway system. If the IM lift demand is met by constructing all planned facilities in a timely way, or even ultimately, the direct intermodal component of port container traffic will be loaded at on-dock and near-dock IM facilities. In this scenario, all present and future freeway impact on the I-710 involving direct intermodal container moves will be neutralized, such that the overflow container traffic, that which is not loaded on-dock, will be drayed outside the Port to near-dock facilities situated along SR 47 and SR 103, the Terminal Island Freeway. The San Pedro Bay Ports Rail Study Update (Plan), dated December 2006, concludes that if all proposed on-dock and near-dock rail facilities are constructed, there will be no need for off-dock railroad IM facilities to load direct intermodal container traffic. Assuming all IM facilities are constructed, the analysis then shifts to the sufficiency of mainline capacity to haul what has been loaded, over the railroad corridors in the Basin.

This study also examined the volume of rail traffic associated with transloaded and warehoused container traffic. This segment of rail traffic will not be loaded at either on-dock or near-dock IM rail facilities. The pattern for this segment of container traffic will be to move directly by truck from the Port to a warehouse or transload facility situated somewhere in the Basin. If this cargo ultimately moves by rail it will be loaded on a rail car at an off-dock rail facility. To the extent that transloaded and warehoused marine cargo moves out of the Basin, by rail or truck, the freeway system will be impacted.

The railroad IM facilities are shown in Figure 6.1.

Figure 6.1 Intermodal Rail Facilities in the SCAG Region

Source: Multi-County Goods Movement Action Plan.

6.1 FINDINGS ON THE DEMAND FOR INTERMODAL OPERATIONS

The following summarizes the variables associated with direct intermodal operations at or near the Ports:

- It is likely that new port terminals will be constructed. A better perspective on that will be available as the TRAPAC project moves forward. If the negotiated mitigation package is not challenged, the pact will become a template for future port development.
- The rail infrastructure projects will probably be constructed, as they promote the efficient use of existing "in-port" facilities.
- The construction or modernization of near-dock IM facilities is uncertain. Due to perceived community impact, the construction of these facilities is not assured.
- The fragmented nature of port rail operations will degrade the efficiency of on-dock terminals, thus making the likelihood of loading 33 percent of all marine containers on-dock after 2020 improbable.

The fragmentation of on-dock facilities spread over 10 marine terminals will undermine the optimization of port operations. An anecdotal but real situation regarding this observation is the Maersk terminal (Pier 400) in the Port of Los Angeles. The Pier 400 on-dock capacity is estimated at 650,000 containers annually. In 2007, 232,000 containers were loaded at Pier 400. In 2006, 450,000 were loaded. Obviously, there is real capacity at Pier 400. Yet, those terminals without on-dock facilities drayed their containers over the region.

6.2 ON-DOCK IM FACILITIES

The Ports have 10 on-dock IM facilities. Five of these are situated in the Port of Los Angeles. They are the West Basin ICTF (operated by China Shipping and Yang Ming); the Terminal Island Container Intermodal Facility, operated by NYK and Evergreen (considered to be two terminals as each operator has a designated lease of tracks for its exclusive use and operation); Pier 400, operated by Maersk; and Pier 300, operated by American President Lines.

The Port of Long Beach has five IM facilities. They are Pier T, operated by Hanjin; Pier A, operated by Mediterranean Shipping Company; Pier F, operated by Long Beach Container Terminal on behalf of OOCL; Pier G, operated for K-Line; and Pier J, operated for COSCO. Pier J has two separate IM terminals. For the purposes of this report, it is assumed that they operate in tandem as one facility to serve the needs of COSCO.

Three major port tenants do not have on-dock IM facilities. They are TRAPAC in Port of Los Angeles, which is operated for Mitsui. Cal United Terminal, Piers D and E in the Port of Long Beach, operated for Hyundai; and Pier C in the Port of Long Beach, which is operated for Matson.

The EIR for the expansion of TRAPAC, which includes an on-dock IM facility, has been approved by the Port of Los Angeles Board of Harbor Commissioners. The process awaits approval by the City Council of Los Angeles. If approved, it will be the first port expansion project cleared for construction in the past seven years, and according to the plan, it will be operational by the end of 2009.

The Port of Long Beach has plans to develop a Middle Harbor Terminal Rail Yard. This project would combine Piers D, E (Hyundai), and F (OOCL) into a mega-terminal; and provide an on-dock IM facility for Hyundai. According to the plan, this project has a completion date of late 2015. It is worth noting that the Pier F (OOCL) has an on-dock facility in Port of Long Beach that is inadequate to meet the volume demand of OOCL for on-dock loading. The Middle Harbor project will satisfy this demand too, in addition to meeting the needs of Hyundai.

According to BNSF, the largest customer at the BNSF's off-dock Hobart Yard is Hyundai. The second largest is OOCL. Mitsui is the largest customer at the near-dock IM facility of UP.

The construction of the facilities described herein will greatly lessen the need for off-dock rail IM facilities, provided new and modernized near-dock terminals are constructed.

In addition to the projects shown above, the Port of Long Beach is in the process of constructing a new facility at Pier S on Terminal Island. The plan shows this project being completed in 2009. Pier S will have an on-dock IM facility.

The plan estimates the aggregate construction cost of new and enlarged terminals at $482.8 million.

Table 6.1 shows the trend in on-dock rail loadings for the past five years.

Table 6.1 On-Dock Rail Volume by Year

Year	Container Volume	Percentage of Total Port Throughput
2003	1,049,781	15.9 %
2004	1,290,716	18.1 %
2005	1,599,658	20.7 %
2006	2,116,429	24.2 %
2007	2,044,753	23.5 %

Source: BNSF and UP Railroads.

Note: The plan forecasts that the volume of direct intermodal containers will be 40 percent in 2030. The plan projects that 30 percent of all port containers will be loaded on-dock in 2030. The balance or 10 percent will be loaded at near-dock facilities. To convert TEUs (20-foot equivalent unit) to containers requires a factor of 1.80 TEUs to account for the composite average marine container length. TEU is a marine metric and not used by the railroads in describing volume. The metric used by the railroads to describe volume and capacity is based on container units. Thus, the conversion of TEUs to containers is needed to understand capacity and volume as seen through the eyes of railroad managers.

Shown below is a partial list of reasons containers are not all loaded by the marine terminals at on-dock IM facilities. The list is representative and not complete.

1. There are five wells on a typical double-stack rail car. Each well can be loaded with two 40-foot containers (stacked one on the other), or with two 20-foot containers on the bottom and one 40-foot containers on top. All wells must be loaded with containers to the same destination. Often, the marine terminal does not have enough containers destined to the same destination. In that case containers will be drayed to a railroad IM facility, which has the critical mass from all marine terminals to fill the rail car with common destination containers. The utilization of well capacity is a metric of efficiency. BNSF has a goal of filling 96 percent of all slots on a train, and will not pull a car (or train) from a marine terminal that does not meet its loading criteria.
2. Containers may miss the train schedule because of a custom hold. Rather than being delayed at the marine terminal for the next scheduled train (schedules are often weekly), the container will be drayed to a railroad facility from which a train to a given destination may be operated daily.
3. Overflow containers are drayed to railroad facilities. An example would be the situation where a train is scheduled for operation once each week. If the marine terminal has 350 containers and the train size is limited to 300 containers, the balance are drayed to a railroad facility rather than be delayed for a week at the marine terminal. Once more, the railroad facility has the mass of containers from all terminals. In addition, the railroad may operate a train mixed with domestic and international containers. This creates even more mass to operate trains more frequently to a single destination.
4. Many small markets never generate enough containers to operate a train. The necessary volume to operate a train comes from combining small market containers from all marine terminals with domestic boxes at off-dock facilities.
5. Marine terminals rarely operate daily schedules to any destination, even those as large as Chicago. They may operate a single schedule weekly to some destinations (Memphis, Dallas, Houston are examples); and the train to some markets may be operated several days after the arrival of a ship. The marine terminal sequences train loading consistent with shipper directions. Some containers are urgently needed by the consignee business and cannot be held at the marine terminal for several days before being transported. In such an instance, the container will be drayed to a rail terminal which has daily service to the destination.

Railroad facilities generate the mass needed to operate frequent trains to a given destination. They combine the containers from all marine terminals

and can mix this traffic with domestic containers or trucks. The port on-dock facilities are proprietarily operated for a single steamship company or vessel sharing alliance. Thus, the port container volume is distributed between 10 marine terminals. The port facilities do not load domestic containers, so this element is missing with respect to the creation of mass.

6.3 NEAR–DOCK IM FACILITIES

The Intermodal Container Transfer Facility (ICTF) is operated by UP for its exclusive use. The facility is situated about 5 miles north of the Ports. Access is from the Terminal Island Freeway, SR 47/103. The original facility footprint of 148 acres was constructed on Port of Los Angeles property. The property lease is for 50 years and expires in 2034. The terminal opened in November 1986. Since the opening of ICTF, UP has expanded the operation to 233 acres by purchasing and leasing adjacent property. In its first full year of operation (1987), ICTF loaded 303,056 containers. In 2007, the lift volume was 710,460 containers. A moderating influence on growth has been the construction of on-dock facilities. When ICTF opened, there were no on-dock IM facilities. As noted above, there are 10 such facilities situated in the Port Complex now. Each time an on-dock terminal has begun operation, volume at ICTF declines for a short time, then begins to grow again. There are no other near-dock IM facilities at this time.

ICTF Modernization Plan

UP submitted an application for project development to the Governing Board of the Intermodal Container Transfer Facility, Joint Powers Board, on December 26, 2007. The project is titled, "Intermodal Container Transfer Facility (ICTF), Modernization Project". UP stated in an earlier application dated January 30, 2007, that the capacity of ICTF is 760,000 containers annually, and the current throughput is about 725,000 units. The proposed modernization plan is expected to increase the capacity of ICTF to 1.5 million containers annually. The project is designed to convert the overhead straddle cranes from diesel to electric, eliminate hostler activity, reduce congestion on the Terminal Island Freeway, and actually shrink the operational size from 233 to 177 acres. The key to the UP plan is to employ overhead, rail-mounted, wide-span lift cranes. ICTF is a wheeled operation at this time. By this, it is meant that all containers are loaded onto a chassis and are stored on chassis. None of the containers is grounded or stacked vertically. The modernization plan will convert the facility from a wheeled operation to one where the containers are stacked vertically. This operational change greatly reduces the land required for the operation. Additionally, the need to have chassis stored on site is eliminated. More than 50 acres of property are used in the current operation to store chassis. The wide-span cranes described in the modernization plan can span six tracks,

and they will stack containers to the side of working tracks vertically as trains are unloaded. Inbound containers from the Ports will be live loaded. In rare cases, the inbound containers will be grounded for later loading. UP describes this project as a "green overhaul" of an existing facility. Nevertheless, community opposition will be fierce, and the likelihood of the plan becoming a construction reality is uncertain. The Port of Los Angeles has contracted with the South Coast Air Quality Management District (SCAQMD) to prepare the EIR. The SCAQMD has never prepared an EIR, and there is a lot of speculation as to why the Port of Los Angeles contracted with them for the document preparation. Over the past several years, the SCAQMD has made several attempts to regulate railroad emissions. These attempts have failed, as the railroads have prevailed in court with the argument that the Federal government is the only level of government with jurisdiction to regulate railroad locomotive emissions. Given their previous and continuing adversarial positions on emission regulations, the EIR for ICTF will be worthwhile monitoring. Community opposition to this project will be brisk, and the likelihood of construction is problematical.

Table 6.2 shows the IM volume at ICTF for the past 5 years.

Table 6.2 Near-Dock (ICTF) IM Volume for the Past Five Years

Year	Volume
2003	558,993
2004	569,349
2005	640,746
2006	726,622
2007*	710,460

Source: UP Railroad.

*Represents eight percent of port volume.

Southern California International Gateway (SCIG)

The Southern California International Gateway (SCIG) is a proposed near-dock IM facility. It is planned to be developed on Port of Los Angeles property, situated approximately 4 miles north of the Ports, and immediately south of ICTF. Access to the facility will be from the Terminal Island Freeway at Pacific Coast Highway. The Port of Los Angeles has designated BNSF as the exclusive operator and user of the facility. It is thought that this designation will bring competitive parity among the railroads and choice for port tenants. The current plan is to have a draft EIR completed by September 2008, with an approval date of December 2008. BNSF estimates SCIG capacity at 1.5 million containers annually. The design plan is to construct two clusters

of six working tracks, with each track being about 4,000 feet in length. The working tracks will be connected to a lead track, which in turn will connect to the Alameda Corridor. The facility will be "green," and as with ICTF, use wide-span electric lift cranes, and eliminate hostler activity. BNSF has pledged to purchase a clean fleet of diesel trucks for the dray between the Ports and SCIG. BNSF has stated that the SCIG operation will eliminate the need to use Hobart Yard, situated in Commerce, as a container loading facility, thus eliminating immediately 1.2 million truck trips annually on the I-710. When at full capacity, SCIG will eliminate more than 2 million truck trips annually. Community opposition to the SCIG project will be intense, and there is considerable risk that the facility will not be constructed.

6.4 OFF-DOCK IM FACILITIES

There are five off-dock IM facilities in the Basin. The off-dock facilities process a mix of international and domestic containers and trucks. Most of the international containers loaded off-dock are concentrated at the Hobart Yard of BNSF and UP's East Los Angeles Yard. Both are situated in the City of Commerce and sit astride from each other along Washington Boulevard.

Hobart Yard

Hobart is the largest IM facility in the U.S., dwarfing all other such facilities in terms of throughput. The main terminal site constitutes 285 acres of property. BNSF supports the operation from several remote yards, which are situated near the main facility. The plan estimates the capacity of Hobart to be 1.7 million lifts annually. BNSF estimates the capacity at 2.5 million containers, if the facility is converted to a wide span crane operation.

Table 6.3 Off-Dock International Lifts
2006

Facility	Total Lifts
BNSF Hobart	808,096
BNSF San Bernardino	0
UP East Los Angeles	80,108
UP LATC	32,912
UP City of Industry	2,254
Total Off-Dock	**923,370***

Source: BNSF and UP Railroads.

*10.55 percent of all international containers.

As BNSF does not operate a near-dock IM facility, Hobart is used to serve its marine customers as support for the on-dock operation. By volume, about 60 percent of all containers passing through Hobart are international containers, with the balance being domestic boxes. The number of international containers processed at Hobart in 2007 was 789,656 units. This makes the throughput of international containers at Hobart greater than ICTF, with more international volume than any IM facility in the U.S. The balance of throughput at Hobart was about 584,824 units of domestic containers and trucks.

Very few trailers move by rail compared to a few years ago when it was a common practice to ship trailers. The economics of double-stack transport, where containers are stacked two-high, has made the haulage of trailers cost prohibitive (they cannot be stacked two-high).

East Los Angeles (ELA)

ELA is a UP-operated IM facility. The facility is situated on approximately 120 acres. The plan estimates the capacity of East Los Angeles to be 510,000 lifts annually. Of the 358,769 containers and trucks processed at ELA in 2007, 80,253 were international and the balance, domestic. Obviously, ICTF is the primary UP facility utilized for loading international containers. International containers loaded at ELA are combined with domestic containers to make a solid train, which is likely destined for small IM markets, such as Salt Lake City and Denver. The UP's operating scheme is to operate a daily train to Denver with domestic (including UPS service) and international containers. This train sets out traffic destined for Salt Lake City on its route to Denver.

Los Angeles Transportation Center (LATC)

LATC is situated on the east side of the Los Angeles River across from the Los Angeles Union Passenger Terminal. This facility is the only Basin IM terminal from which Pacific Northwest service is operated. LATC is located on about 110 acres of property. The plan estimates the capacity of LATC to be 340,000 lifts annually.

City of Industry (CofI)

CofI is another UP-operated IM facility. It is situated on a 90-acre parcel of property. The plan estimates the capacity to be 220,000. UP has long-term plans to expand the terminal to 160 acres by combining two contiguous pieces of property. UP forecasts that the build out will increase the facility's capacity to 600,000 domestic trailers and containers annually.

San Bernardino (SB)

SB is operated by BNSF. The IM facility is the only IM facility in the Inland Empire. The plan estimates that the capacity of SB is 660,000 annually. SB is situated on 150 acres of land. Expansion of this facility is unlikely as it would require the taking of residential property. San Bernardino does not process any international containers.

Victorville

BNSF has announced plans and signed an Memorandum of Understanding with the City of Victorville to construct an IM facility there.[29] For now, construction has been placed on hold as the demand for lift capacity has not materialized due to a weak IM market. BNSF plans describe Victorville as a domestic facility.

Table 6.4 shows IM volume for all Basin facilities since 2001.

[29] BNSF web site. http://www.bnsf.com/employees/communications/bnsf_today/2007.

Table 6.4 Railroad Intermodal Volume
LA Basin

Year	LATC	City of Industry	East LA	ICTF	On-Dock	Total
Union Pacific						
2000	226,424	163,400	407,636	630,636	N/A	**1,428,096**
2001	193,526	193,584	386,209	679,879	366,250	**1,819,488**
2002	188,752	240,592	438,209	689,432	394,240	**1,951,225**
2003	206,532	252,320	470,927	558,993	458,483	**1,947,255**
2004	228,361	242,428	466,540	569,349	507,127	**2,013,805**
2005	207,056	222,245	357,738	640,746	621,704	**2,049,489**
2006	202,384	191,018	340,003	726,622	831,314	**2,291,341**
2007	186,393	191,892	358,769	710,460	873,106	**2,320,620**

Year	Hobart Yard*	San Bernardino	On-Dock	Total
BNSF				
2001	1,040,601	410,922	421,084	**1,872,607**
2002	1,069,602	449,906	423,404	**1,942,912**
2003	1,216,652	494,777	591,298	**2,302,727**
2004	1,318,583	557,151	783,589	**2,659,323**
2005	1,338,374	554,904	977,954	**2,871,232**
2006	1,366,535	569,047	1,285,115	**3,220,697**
2007	1,374,480	499,974	1,171,647	**3,046,101**

Year	Union Pacific	BNSF	Total	Year	Volume
Total Intermodal Volume by Railroad – LA Basin				**On-Dock Volume**	
2001	1,819,448	1,872,607	**3,692,055**	2001	786,334
2002	1,951,225	1,942,912	**3,894,137**	2002	817,644
2003	1,947,255	2,302,727	**4,249,982**	2003	1,049,781
2004	2,013,805	2,659,323	**4,673,128**	2004	1,290,716
2005	2,049,489	2,871,232	**4,920,721**	2005	1,599,658
2006	2,291,341	3,220,697	**5,512,038**	2006	2,116,429
2007	2,320,620	3,046,101	**5,366,721**	2007	2,044,753

Source: BNSF and UP Railroads

*2003 to 2007 includes Commerce.

Note: These numbers are based on operating data. Other reports are based on billing information. For operating convenience, containers may be unloaded at a facility other than the billing address. In this case, the railroad will dray the container to its billed point. There may be a small volume variance in reports because of these disparate data sources.

Table 6.5 Overview of IM Rail Terminal Capacity (TEUs)

	Current (2005)	Projected (2030)
On-Dock IM Terminals		
Pier J – PCT @ 2IYs (POLB)	377,023	1,879,404
Pier G – ITS (POLB)	119,415	605,265
Pier F – LBCT (POLB)	187,157	–
Pier DE – CUT (POLB)	–	–
MHT	–	1,508,401
Pier A – MSL (POLB)	258,086	1,641,446
Pier S (POLB) – not operational	–	524,613
Pier T – Hanjin (POLB)	571,526	1,264,786
Pier C – Matson (POLB)	–	–
Pier W	–	–
Pier 300 – APL (POLA)	614,022	1,259,786
TICTF – YTI/Evergreen (POLA)	613,645	1,346,440
Pier 400 – APM	747,602	2,642,847
WB West – YML/CSL (POLA)	262,207	893,079
WB East – Trapac (POLA)	–	700,546
Total On-Dock	**3,750,683**	**14,266,613**
Near-dock IM Terminals		
ICTF (UP)	1,600,000	3,500,000
SCIG (BNSF)	0	1,800,000
Total Near-Dock	**1,600,000**	**5,300,000**
Off-dock IM Terminals*		
Hobart (BNSF)	1,805,400	2,655,000
San Bernardino (BNSF)	–	–
East Los Angeles (UP)	144,455	144,455
LATC (UP)	612,000	612,000
City of Industry (UP)	4,000	10,800

Victorville	–	–
Total Off-Dock	**2,565,856**	**3,422,255**

Source: San Pedro Bay Ports Rail Study Update and BNSF and UP Railroads.

* Off-dock terminals handle both domestic and international containers. Only international container capacity is considered in this table. The conversion factor used to convert international containers to TEUs is 1.8.

6.5 TRANSLOADED IM

The plan states that an Alameda Corridor Transportation Authority (ACTA) study 2004 calculated that the railroads hauled the cargo from 12 percent of the port-generated TEUs in domestic boxes. This is traffic which had been transloaded out of the marine container or warehoused in the Basin before being transported to the hinterlands in a 53-foot domestic container. Though looking like a container with domestic product, many of the nonmarine containers are actually loaded with international cargo.

Container Lengths

International containers are 20 feet, 40 feet, and 45 feet in length, with 40-foot containers being most prevalent. Domestic containers are 28 feet, 48 feet, and 53 feet in length. The domestic industry is rapidly transitioning to all 53-foot containers. Rather than return empty marine containers from the hinterlands, the steamship companies try to fill the box with westbound domestic product. This strategy resulted in about 125,000 international containers moving back to the West Coast loaded with domestic goods in 2006. Likewise, even though a container is sized at 53 feet, and thence a domestic box, the cargo may be international. Transloaded and warehoused cargo is restuffed into 53-foot containers. All domestic containers are loaded at off-dock IM facilities.

The transloaded cargo will be transported from any of the five off-dock IM facilities. Most will migrate to the Inland Empire as that is where most new warehouse construction is occurring. One 53-foot container will convert to three TEUs by volume. If the railroad market share is 12 percent of the port TEUs, 5.1 million TEUs will be transloaded and shipped by rail. This equates to 1.7 million domestic containers (53 feet), and will generate 21 trains each day (assumes an average of 220 containers per train). Assuming a 50/50 market split between BNSF and UP, not more than five of these trains will operate out of Hobart Yard. BNSF'S facility at San Bernardino will load and operate the other five to six trains.

The plan estimates that 40 percent of all marine containers will be transported direct intermodal in 2030. At this time, the percent moving ship to rail is about 42 percent. The plan estimates that the on-dock IM facilities are theoretically capable of loading 30 percent of the containers passing through the Ports. This percentage is based on a "perfect world" scenario deemed to be unrealistic by most observers, including the railroads. But assuming the estimate is reality and 40 percent is the direct intermodal number, this leaves 10 percent of the containers to be loaded elsewhere. This represents 4.25 million TEUs, or 2.361 million containers. As previously noted, according to UP, the capacity of ICTF is 760,000 containers annually. This leaves a lift demand of 1.691 million, which will be loaded at modernized or new near-dock IM facility, or to an off-dock terminal.

For each percent, the demand for direct intermodal is greater than 40 percent, and/or the on-dock facilities do not aggregately load 30 percent of the marine containers, a lift demand outside the Port Complex of 420,500 TEUs (233,600 containers) is created. Recall that about 42 percent of all containers are now moving direct intermodal, and the highest percent of total port throughput ever loaded on-dock has been 24.2 percent (2006). The percentage loaded on-dock in 2007 actually fell to 23.5 percent. If today's reality becomes reality in 2030, the Regional freeway system will be seriously and negatively impacted.

A rule of thumb is that for every container loaded at off-dock and near-dock IM facilities, 1.5 truck trips are generated. The ratio is accounted for by bobtail (tractor only) and chassis without container movements.

6.6 PORT INFRASTRUCTURE PROJECTS (NONTERMINAL)

To support the forecasted growth in volume of planned on-dock IM facilities, the plan describes numerous track construction projects. The plan estimates the cost of these projects at $643.6 million. Construction of all projects is forecasted for completion by 2020. The EIR process has recently begun for three projects, including the Pier B rail yard in the Port of Long Beach. The plan states that this yard will be used to support all on-dock terminal operations in the Port of Long Beach.

In addition to new projects, the plan describes the need to lock the Badger Avenue Bridge in the down position. The normal position at present is up. The Bridge is situated on the access route to Terminal Island. More than 50 percent of all containers loaded at on-dock facilities will be on Terminal Island in 2030. According to the plan, a seamless train operation to and from Terminal Island is essential. Since the Bridge spans a navigable waterway (Cerritos Channel), the U.S. Coast Guard has jurisdiction over the Bridge's

normal or at rest position. The importance to the change of the Bridge's normal position is underscored by what is written in the plan, "In 2010, lifting the Bridge increases the delay ratio on Terminal Island by 35 percent". Greater delays will occur as on-dock capacity increases and volume grows on Terminal Island. The Ports have petitioned the Coast Guard to change the normal Bridge position to down. The Coast Guard proposes that the change be implemented as a pilot program for eight weeks. Port of Los Angeles is the lead agency.

The train movement simulation shown in the plan makes several operational assumptions which are not practical. The objective of the rail modeling was to develop a template for success. Success in this instance means that trains can move at an acceptable speed without serious delay. These comments were provided at the request of consultant after a presentation of the simulation findings, including the operating assumptions attendant thereto, in May 2006.

All the infrastructure projects described in the plan require Board approval, funding, and an EIR. None of the projects directly generate port revenue.

6.7 2030 CAPACITY ISSUES

As described earlier, there are major variables that will determine whether there is sufficient rail capacity to meet the plan's objective of:

- Loading all direct intermodal container traffic at on-dock or near-dock facilities;
- The sufficiency of rail support yards and tracks to operate all trains efficiently in the Port Complex; and
- The capacity of the Basin main tracks, including the Alameda Corridor, to haul what has been loaded at the on-dock and near-dock IM facilities. (This issue is evaluated in the I-710 Rail Goods Movement report, but omitted here.)

6.8 NEAR-DOCK IM FACILITIES

The modernization of ICTF and the construction of SCIG face a great deal of community opposition. The railroads are likely to have conditions imposed on them that they will reject. The Ports will no doubt force adherence to the Clean Air Action Plan (CAAP) on the railroads in return for supporting these projects. The Ports will use the permitting process of these projects to enforce port-wide adherence to CAAP. The railroads will not accept this proposition.

Standing alone, the ICTF modernization project seems to be good for the Region. ICTF is a reality. It cannot be stopped from operating. The modernization plan will "green" the operation. Nevertheless, many local residents are aggressively opposed to the modernization plan, as it will bring additional container volume to ICTF.

SCIG is a new project, so therefore it is not an existing polluter like ICTF. The project has significant regional benefits, including the removal of more than 2 million truck trips annually from the I-710 when at full capacity. The project faces formidable community opposition.

The development of both of these projects is outside railroad control. That is a major barrier to the likelihood of project success. Moving forward to construction will require public approval.

On-Dock

The Port's plan to construct new terminals and enlarge others is likely to occur. The Port of Los Angeles recently negotiated a mitigation arrangement with the Los Angeles City Council to move the TRAPAC project forward for approval by the Council. This settlement could serve as a template for future projects.

A major barrier to on-dock productivity is the terminal/international longshore and warehouse union (ILWU) work rule, which restricts terminal switching to times when the IWLU employees are not working. This rule alone will undermine the notion that trains will be able to go directly to spot (a major assumption in the rail simulation) for loading/unloading on arrival at the port terminals. Track turnover (switching) is critical to the efficient use of terminal tracks. Simply, this means that when a track(s) is loaded or unloaded, it must be made accessible to the railroad for replacement. Marine Terminal work rules and productivity are not controlled by the railroads.

6.9 PORT INFRASTRUCTURE DEVELOPMENT (NONTERMINAL)

The port development of new terminal lead and storage tracks is likely to move forward without much difficulty. Few of these projects are specific to port growth. They mostly support what has been built. They are complementary to the efficient use of the on-dock facilities. There is little to be gained by the environmental community in opposing these projects. Stopping the infrastructure projects would merely degrade the efficiency of the marine terminals. This would force the loading of ship to rail containers outside the Ports and onto the regional freeway system for movement to a near-dock or off-dock IM facility.

As with the discussion regarding on-dock terminal throughput, the use of port infrastructure is somewhat independent of railroad control. In a typical railroad IM operation, all aspects of the operation are railroad controlled. The railroad operates the terminal, spots and pulls rail cars randomly, internally coordinates the use of complementary yard tracks, and randomly operates trains into and out of the facility without restriction.

The difference between a railroad and port IM operation is striking. The Ports have 10 on-dock terminals and no operational coordination between them. They are served by two railroads that, through a joint coordination effort, try to optimize their collective efficiency. In large part, however, the operating domain is outside the direction of one party.

Although plans to construct new tracks including storage yard are important, their efficient use is not assured.

Table 6.6 Project Control of Direct Intermodal Capacity

Project	Control
ICTF Modernization	**POLA Board**
	Political Process (LA City Council)
	Public (Community Groups)
	Environmental Groups (NRDC)
SCIG	**POLA Board**
	Political Process (LA City Council)
	City of Long Beach
	Public (Community Groups)
	Environmental Groups (NRDC)
On-Dock Rail	**POLA/POLB Board Depending on port**
	Political Process (City Council)
	Public (Community Groups)
	Environmental Groups (NRDC)
Port Infrastructure	**POLA/POLB Board Depending on port**
	Political Process (LA City Council)
	Public (Community Groups)
	Environmental Groups (NRDC)
Main Trunk Capacity	**Railroads**
	Ports
	Political Process (City Council)
	Public (Community Groups)
	Environmental Groups (NRDC)
Impact on Project Shown By Color	
Approval Required	
Leverage Over Project High	
Leverage Over Project Moderate	
No Leverage Over Project	

Source: George R Fetty & Associates.