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**Appendix C**  
**GROUND TRANSPORTATION**

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# **Appendix C1**

## **Travel Demand Model Methodology**

# 1 Introduction

This appendix summarizes the methodologies and sources used to estimate traffic-related activity during the Baseline and from the proposed Project and Alternatives. Those estimates, are used as inputs into the following analyses:

- Trip generation and vehicle miles traveled used for purposes of emissions estimation in Air Quality and Greenhouse Gas analyses, and Noise sections in this EIR.
- Traffic intersection analysis by level of service (LOS) from Project vehicles, including employee autos and drayage trucks; that analysis is included for information purposes in Appendix E2.
- A summary of the methodology used for the vehicle miles traveled (VMT) analysis that informs the CEQA evaluation in Section 3.10 Ground Transportation.

## 2 Travel Demand Model Methodology

### Port Transportation Analysis Model (PortTAM)

The PortTAM Model was originally developed for the Ports of Long Beach and Los Angeles Transportation Study (POLB and POLA 2001). It was subsequently revised and updated for several efforts including the Port of Los Angeles Baseline Transportation Study (POLA 2004). Further, this model was recently updated using SCAG's latest Regional Travel Demand Forecasting Model (SCAG 2020). Elements of the SCAG Heavy Duty Truck (HDT) model were also used. The use of the SCAG model to account for sub-regional and regional traffic growth beyond the general proximity of the Project site is an accepted practice by agencies/ jurisdictions. The SCAG model is used for the regions federally required Regional Transportation Plan (RTP) (SCAG 2012). Also used are the State Implementation Plan and the South Coast Air Quality Management Plan (SCAQMD 2016). TransCAD is the software platform used for modeling.

The PortTAM Model data is owned by Los Angeles Harbor Department (LAHD) and is housed and operated at consultant offices. Port-area traffic analyses and the Port's model use the average weekday of the peak month of port operations in a given year for the basis of existing and forecasted traffic volumes and for the forecasting of project trips. Therefore, this methodology ensured that a representative, conservative level of background traffic would be used for the traffic analysis of potential significant impacts of the proposed project and alternatives. Daily classification counts conducted at the entry/exit gates that serve the Project site were utilized in the calibration of the Project site trip generation in the PortTAM Model.

### SCAG Regional Travel Demand Model

The SCAG Regional Travel Demand Model is the basis and "parent" of most subregional models in the Southern California six-county region, comprising Ventura, Los Angeles, Orange, San Bernardino, Riverside, and Imperial Counties. At the regional level, this model has the most comprehensive and current data—for both existing and future conditions—on housing, population, employment, and other socioeconomic input variables used to develop regional travel demand forecasts. The model has more than 4,200 zones and a complete network of regional transportation infrastructure, including more than 3,500 miles of freeways and over 18,600 miles of major, primary, and secondary arterials.

1 For purposes of sub-regional transportation analysis (such as at the Port), the SCAG Regional  
2 Travel Demand Model provides the most comprehensive and dynamic tool to forecast the  
3 magnitude of trips and distribution of travel patterns anywhere in the region. However, by virtue  
4 of its design and function, the SCAG Regional Travel Demand Model is not (and cannot be) very  
5 detailed and precise in any specific area of the region, and this is the case in the Ports of Long  
6 Beach and Los Angeles focus area. Therefore, the PortTAM Model has been comprehensively  
7 updated with more details in the Port focus areas. In addition, typical “post-processing” of model  
8 data is used to reflect local conditions.

9 The SCAG Regional HDT (heavy duty truck) model was developed as an adjunct component to  
10 the SCAG Regional Travel Demand Model. The HDT model develops explicit forecasts for heavy-  
11 duty vehicles with a gross vehicle weight (GVW) of 8,500 pounds and greater. The HDT model  
12 includes trip generation, trip distribution, and network traffic assignment modules for heavy-  
13 duty trucks stratified by three heavy-duty truck gross vehicle weight classifications, as follows:

- 14 ● Light-Heavy—8,500 to 14,000 GVW
- 15 ● Medium-Heavy—14,000 to 30,000 GVW
- 16 ● Heavy-Heavy—over 30,000 GVW

17 The HDT Model utilizes the SCAG Regional Travel Demand Model network for its traffic  
18 assignment process without major refinements and additions to the network. However, several  
19 network modifications have been implemented, including link capacity enhancements, truck  
20 prohibitions, and incorporation of truck PCE factors. All of these were carried forward into the  
21 PortTAM Model focus area.

22 Apart from the aforementioned three truck classes, the PortTAM model splits the Heavy-Heavy  
23 category and adds three more truck categories: Port Bobtail Truck, Port Chassis Truck, and Port  
24 Container Trucks.

25 The presence of vehicles other than passenger cars in the traffic stream affects traffic flow in two  
26 ways: (1) these vehicles, which are much larger than passenger cars, occupy more roadway space  
27 (and capacity) than individual passenger cars, and (2) the operational capabilities of these  
28 vehicles, including acceleration, deceleration, and maintenance of speed, are generally inferior to  
29 passenger cars and result in formation of large gaps in the traffic stream that reduce the highway  
30 capacity. On long, sustained grades and segments with impaired capacities, where trucks operate  
31 considerably slower, formation of these large gaps can have a profound impact on the traffic  
32 stream. The PortTAM Model takes all of these factors into account.

33 The TransCAD model uses four periods to forecast traffic over a full 24-hour period: the A.M.  
34 period (6:00 A.M. to 9:00 A.M.), the M.D. period (9:00A.M. to 3:00 P.M.), the P.M. period (3:00  
35 P.M. to 7:00 P.M.), and the night period (7:00 P.M. to 6:00 A.M.). The outputs of the model include  
36 daily and peak-period roadway link volumes and speeds and peak-period intersection turning  
37 movement volumes.

38 The following steps describe the development of refined intersection turning movement volumes  
39 from model-produced raw forecasts used in the traffic analysis of the proposed Project and  
40 alternatives:

- 41 ● The base year model scenario and future year model scenarios forecast peak-period  
42 intersection turning movement volumes were converted to peak-hour approach and departure

- 1 volumes by summing the turning movements and applying peak-hour factors. Appropriate  
2 peak period to peak hour factors were used based on the vehicle classification and the time  
3 periods.
- 4 ● PortTAM base-year, scenario-derived intersection volumes were subtracted from the  
5 corresponding future-year volumes.
  - 6 ● This calculation yielded a representative of the growth volume between the base year and  
7 future years. This estimated growth between the base year and future years was added to  
8 groundcount data, yielding adjusted future-year forecasts of auto and truck volumes at each  
9 of the study intersections that were used to determine the future-year turning movement  
10 volumes.

11 These post-processing methodologies are generally described in the National Cooperative  
12 Highway Research Program Report (NCHRP). The computations involve alternatively balancing  
13 the rows (approaches) and the columns (departures) of a turning movement matrix until an  
14 acceptable convergence is obtained. The results must be checked for reasonableness, and manual  
15 adjustments are sometimes necessary, such as when a change in the model network in a future  
16 scenario that would change travel patterns would not be comparable to the base-year model  
17 network volumes or existing traffic counts, in which case future raw model volumes would be  
18 used.

### 19 **Ports of Los Angeles and Long Beach Trip Generation**

20 Trip generation by the Ports of Los Angeles and Long Beach for each analysis year was estimated  
21 by adding traffic resulting from the terminal expansion and associated throughput growth based  
22 on the San Pedro Bay Cargo Forecast. Port-related trip generation was developed using the  
23 LAHD's 'QuickTrip/TrainBuilder' Model (hereafter referred to as just 'QuickTrip'). Port-related  
24 trip generation is separated into four classes of vehicles:

- 25 ● Bobtails: tractor-only;
- 26 ● Chassis: tractor plus chassis;
- 27 ● Container: tractor and chassis with loaded or empty container; and
- 28 ● Auto: Employee automobiles and other auto visitor trips.

29 Operating conditions under each of the analysis years was defined by changing operating  
30 parameters as follows: modified weekend activity; expanded terminal operating hours; increased  
31 on-dock rail use; and, increased dual transactions within the terminal. These operating  
32 parameters affect the amount of truck traffic generated by the terminals to their estimated  
33 maximum capacity. Cargo volume (throughput) would increase over the years, and terminals  
34 would also change their operations to accommodate the increase in containers. Accordingly, these  
35 operational changes are already being put into place. It should be noted that increased  
36 throughput does not directly translate into a proportional increase in truck trips due to the  
37 different terminal operating parameters over the years. For example, truck trips could actually  
38 decrease at certain terminals in the future due to the implementation and expansion of on-dock  
39 rail, even with greater throughput. This is because the increase in on-dock capacity is even greater  
40 than the increase in throughput, thus resulting in fewer truck trips but more containers processed  
41 through the terminal. The following section summarizes some of the key operating parameters  
42 used in the trip generation estimate. These operating parameters are derived from and consistent

1 with the parameters developed and applied in the previous Port of Los Angeles Transportation  
2 Study.

3 **Work shifts:** To achieve the forecasted TEU throughput volumes, the Port's terminals must  
4 handle more cargo during the non-peak hours (time periods outside of the A.M., MD. and P.M.  
5 peak hours) than they do currently. The QuickTrip model can generate trips for one, two, or three  
6 shifts. For the proposed Project, the terminal operator has indicated they can handle the projected  
7 daily container movements via truck (imports, exports, empties, and bare chassis) with the Day  
8 Shift (8:00 A.M. to 5:00 P.M.) and Second/Night Shift (5:00 P.M. to 3:00 A.M.). The Hoot Shift  
9 (3:00A.M. to 7:00 A.M.) is only needed for vessel unloading/loading. The railyard is also operated  
10 with the day and night shifts only for loading/unloading, with switching done by PHL and the  
11 railroads through the entire day.

12 **Non-Cargo Trip Generation:** Non-cargo trips (employee, visitor, delivery/vendor trips) were  
13 determined based upon data from LAHD.

14 **TEU Throughput Growth:** Port TEU throughput is from the 2009 San Pedro Bay Cargo Forecast  
15 of overall port-wide growth based on estimates of terminal capacity and demand as discussed in  
16 Chapters 1 and 2 (The Tioga Group, Inc. and IHD Global Insight 2009).

17 **On-Dock Rail Usage:** On-dock rail refers to a rail terminal within or adjacent to the cargo terminal  
18 used to build trains to take containers to and from the terminal via rail. Those containers therefore  
19 do not travel by truck; rather, they enter or leave the terminal on rail cars. As the percentage of  
20 containers moved via on-dock rail is increased, the percentage of containers moved by truck  
21 decreases. Building and operating on-dock rail facilities are key methods for reducing truck trips  
22 to and from the container terminal. It is expected that the use of on-dock rail will increase  
23 throughout the Port over time for many reasons, including the construction of expanded on-dock  
24 rail facilities, improvements and enhancements to new and existing on-dock rail facilities,  
25 improvements in rail operation technologies, increased demand for rail movements as opposed  
26 to truck movements, improved container management procedures, and other factors.

27 The amount of cargo throughput that can be handled by on-dock rail is based on the capacity of  
28 the ondock rail facility, which includes the overall size of the on-dock railyard, the number of  
29 linear feet of rail track in the facility, the number and type of equipment servicing the railyard,  
30 the physical layout of the railyard, how it interacts with the rest of the terminal, and other design  
31 and operational factors. These factors determine the number of trains that can be built within  
32 given time periods, the size of the trains, and the overall level of terminal throughput that can be  
33 carried in and out of the terminal on rail cars.

34 **Weekend Terminal Operations:** Based upon detailed terminal capacity analyses that evaluate  
35 terminal and gate congestion, historical weekend gate move data, and a reasonably conservative  
36 analysis, weekend throughput is assumed to be 15 percent of the total weekly throughput. Peak  
37 hour Port-related truck trips do not increase proportionately with TEU growth. This is because,  
38 in future years, on-dock rail usage would increase, and work shift splits would change as  
39 described above. Both actions would shift more activity to the second shift and away from the  
40 day shift. Therefore, although total trips would increase between the baseline and Port build-out,  
41 some of the increase would occur during off-peak time periods due to the operating parameters  
42 described above.

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