4.13 Utilities

4.13.1 Energy

4.13.1.1 Introduction

The energy supply analysis addresses electricity, natural gas, and transportation-related fuel consumption associated with SPAS-related activities. In addition, this section addresses energy conservation and measures to reduce wasteful, inefficient, and unnecessary consumption of energy, consistent with Public Resources Code Section 21100(b)(3), State CEQA Guidelines Section 15126.4(a)(1)(C), and State CEQA Guidelines Appendix F.

4.13.1.2 Methodology

Electricity and natural gas[719] consumption associated with SPAS-related improvements would result from a number of activities, including space heating and cooling, airfield and terminal lighting, and food preparation. Electricity would also power any future Automated People Mover (APM) system at the airport and would be used indirectly in the delivery, treatment, and distribution of water used by the SPAS alternatives and the treatment of wastewater. Other energy consumption would include aviation fuel for aircraft, as well as diesel, gasoline, and alternative fuels for ground support equipment (GSE) and airport-related motor vehicle trips. This analysis compares energy consumption associated with the SPAS alternatives to LAX-related energy consumption under baseline conditions. For purposes of this analysis, baseline conditions for data relating to aircraft and aircraft-related operations (i.e., aircraft, GSE, and on- and off-airport vehicle trips) are from calendar year 2009, which provides a full years' worth of aircraft-related activity data prior to the publication of the Notice of Preparation (NOP) in October 2010. Baseline conditions relating to passenger-related facilities are from 2010. The existing use of electricity and natural gas, and other transportation-related fuels, including Jet A, gasoline, diesel, and alternatives fuels, as represented by Liquefied Petroleum Gas (LPG), is characterized, and supplies are described. The analysis includes estimates of baseline and SPAS-related on-airport electricity and natural gas consumption, as well as transportation-related fuel consumption both on- and off-airport. Air quality and greenhouse gas emissions associated with the production of electricity and combustion of fuels and are accounted for in the impacts analyses in Sections 4.2, *Air Quality*, and 4.6, *Greenhouse Gases*.

Electricity/Natural Gas

Although the future passenger activity level associated with each of the SPAS alternatives would be the same (i.e., 78.9 million annual passengers [MAP] in 2025), building-related electricity and natural gas consumption were calculated by applying a generation factor to a building area, as described below.[720] For purposes of this analysis, therefore, building-related electricity and natural gas consumption were estimated for passenger-related facilities (i.e., terminals, passenger processing, and passenger-serving ground access facilities) associated with each of the alternatives.

Total electricity and natural gas consumption for existing and proposed passenger-related facilities was calculated for baseline conditions and all nine SPAS alternatives. Electricity and natural gas consumption factors are typically provided in terms of consumption (in kilowatt-hours [kWh] or cubic feet [cf] per year) per unit (e.g., square foot of building space). Electricity and natural gas consumption were projected by multiplying the factor by the appropriate passenger-related facility square footage. All electricity and natural gas consumption values presented in the impacts analysis are estimates, projected based on the factors and methods described below.

---

719 For purposes of this analysis, the discussion of natural gas usage focuses on standard, domestic usage. Use of natural gas as alternative transportation fuels is considered in the analysis of fuel consumption.

720 Electricity and natural gas consumption factors developed for the LAX Master Plan EIS/EIR were used in this analysis. These factors do not account for recent energy efficiency measures implemented at LAX. Therefore, the resulting energy consumption projections are conservative and may overstate energy consumption.

For purposes of this analysis, passenger-related facilities include terminals and/or concourses, and the building components of ground access facilities, such as the Consolidated Rental Car Facility (CONRAC) and Intermodal Transportation Center (ITC) customer service areas, the Intermodal Transportation Facility (ITF) passenger service area, and the Ground Transportation Center (GTC) passenger processing piers. Electricity and natural gas consumption factors for passenger-related facilities uses were derived from *Utilities Consumption and Generation at LAX Technical Addendum*.[721]

Under each of the SPAS alternatives, some existing off-airport uses would be acquired to accommodate the proposed improvements (see Section 2.3.1.11, *Acquisition*, in Chapter 2, *Project Description*). With this acquisition, electricity and natural gas consumption associated with these uses would be eliminated. This reduction in electricity and natural gas consumption was not included in the quantitative calculations below. Therefore, the projected electricity and natural gas consumption associated with each SPAS alternative is a conservative estimate; electricity and natural gas consumption would be lower if the methodology accounted for the reduction associated with acquisition.

A new source of electricity consumption, independent of square footage, would include operation of a new APM under Alternatives 3 and 9. Estimated annual electricity consumption for the APM associated with Alternative 3, which includes two separate APM systems, APM 1 and APM 2, was developed by LEA + Elliot, Inc.[722] APM-related electricity consumption under Alternative 9 was estimated in proportion to electricity consumption under Alternative 3. Specifically, the length of the APM guideway and estimated number of daily operations under Alternative 9 were compared to the total length of the two APM guideways and total daily operations under Alternative 3. The APM guideway length of Alternative 9 is approximately 30 percent of the total guideway length of APM 1 and APM 2 under Alternative 3. The number of daily trips estimated for the APM under Alternative 9 is approximately 20 percent of the total number of daily trips for the two APM systems under Alternative 3. As such, the daily electricity consumption associated with the Alternative 9 APM system is assumed to be approximately 6 percent of that associated with Alternative 3.

The analysis also includes estimates of electricity consumption associated with the delivery, treatment, and distribution of water to LAX, as well as the treatment of wastewater. Electricity consumption associated with these activities was derived from CalEEMod, using the water demand and wastewater generation calculated for the SPAS alternatives (see Section 4.13.3, *Wastewater Generation*, and Section 4.13.4, *Water Supply*).

To determine whether the projected increase in electricity and natural gas consumption associated with the SPAS alternatives would be significant, the total quantity of electricity and natural gas consumption was projected for each of the nine SPAS alternatives. These projections were compared to the anticipated supply available from regional electricity and natural gas suppliers.

Transportation-Related Fuels

Aircraft

Jet A fuel use was estimated for aircraft in the Landing/Take Off (LTO) cycle for baseline conditions and Alternatives 1 through 7 (Alternatives 8 and 9 are focused on ground access improvements only) in the proposed horizon year of 2025. Jet fuel consumption in short tons per year was derived from FAA's Emissions and Dispersion Modeling System (EDMS) and converted to gallons per year using the aircraft fuel density factor from Exxon Mobil's *World Jet Fuel Specifications with Avgas Supplement*.[723]

721 Psomas and Associates, Utilities Consumption and Generation at LAX Technical Addendum, October 31, 1996.

722 Lea + Elliott, Inc., Electrical Power Consumption Estimate for People Mover Concepts, February 1998.

723 Exxon Mobil, World Jet Fuel Specifications with Avgas Supplement, 2005.

Gasoline/Diesel/Alternative Fuels

The analysis of other transportation-related fuels considered gasoline, diesel and alternatives fuels, which are used at LAX by vehicles and GSE. Alternative fuels primary consist of liquefied natural gas (LNG), compressed natural gas (CNG), and LPG (propane and/or butane). These fuels are generally lighter than diesel and gasoline, and have lower total emissions. As the alternative fuels are all petroleum products derived from the same resources, for purposes of this analysis, LPG was used to represent all alternative fuel types. Consumption was estimated by converting carbon dioxide (CO_2) emission estimates developed for the greenhouse gas analysis to fuel consumption using default emission factors from the Climate Registry.[724]

Fuel consumption associated with construction activities includes heavy equipment, haul trucks, water trucks, and other on-site vehicles. Assumptions regarding on-airport traffic volumes and fleet mix (i.e., cars/light-duty trucks, medium-duty trucks, and heavy-duty trucks) were derived from the SPAS on-airport traffic analysis prepared by Ricondo & Associates for this EIR. Assumptions regarding off-airport road traffic volumes and fleet mix (i.e., cars/light-duty trucks and heavy-duty trucks) were derived from the SPAS off-airport transportation analysis prepared by Fehr & Peers for this EIR. Assumptions regarding the fuel split (i.e., gasoline versus diesel) for cars/light-duty trucks and medium-duty trucks were derived from the California Air Resources Board's emission factor model, EMFAC2007, based on defaults for Los Angeles County. Heavy-duty diesel trucks and construction equipment were assumed to be diesel-fueled. Assumptions regarding GSE types were obtained from a 2006 survey of GSE at LAX. GSE fuel consumption was estimated by applying the ratio of GSE to aircraft activity for baseline conditions to future 2025 activity levels; as all the SPAS alternatives would have the same activity level, GSE fuel consumption under all SPAS alternatives would be the same.

4.13.1.3 Existing Conditions

Energy Efficiency at LAX

LAWA has an ongoing commitment to increasing energy efficiency and implementing energy conservation measures to reduce wasteful, inefficient, and unnecessary consumption of energy at its airports. In 2008, LAWA adopted the Los Angeles World Airports *Sustainability Plan*,[725] which outlines LAWA's plans to integrate environmental stewardship, economic growth, and social responsibility in airport operations. One of LAWA's initial sustainability objectives is the reduction of energy usage and the increased usage of green power at all airport facilities and in all operations. Other objectives, while aimed at other sustainability categories, also reduce energy consumption. For example, to meet its objective of reducing single-occupancy trips to, from, and within LAWA airports, LAWA has expanded its FlyAway Program at LAX, initiated an LAX Hotel Shuttle and Rental Car Consolidation Program, and promotes its Employee Rideshare Program. All of these initiatives reduce transportation-related fuel consumption. Use of an on-site rock crusher at LAX reuses concrete and asphalt from construction projects while eliminating truck trips and diesel-fuel consumption that would otherwise be required to transport these materials to off-site disposal facilities.

Through implementation of its *Sustainability Plan*, LAWA has made progress towards its sustainability objectives. Leadership in Energy and Environmental Design (LEED®) standards have been and are being applied to new construction projects at LAX, including the Tom Bradley International Terminal (TBIT) renovation and Aircraft Rescue and Fire Fighting Facility (ARFF). The ARFF includes efficient lighting fixtures and controls with occupancy sensors throughout the facility to reduce lighting and save energy during off-peak hours. The TBIT renovation project, which was certified as LEED® Silver in March 2010, was designed and built to use 20 percent less energy than a non-LEED® building. LAWA achieved these savings by installing an automated building light control system as well as an energy-efficient heating,

724 Climate Registry, 2012 Climate Registry Default Emissions Factors, January 6, 2012, Available: http://www.theclimateregistry.org/downloads/2012/01/2012-Climate-Registry-Default-Emissions-Factors.pdf.

725 City of Los Angeles, Los Angeles World Airports, Los Angeles World Airports Sustainability Plan, April 2008.

ventilation, and air-conditioning (HVAC) system. The ARFF achieved LEED® Gold certification in November 2011. The building's design will result in annual energy savings of 35 percent compared to a non-LEED® building. Other LAX projects being designed to meet LEED® Silver standards are the Bradley West Project, the Interim West Bus Terminal, and the Central Utility Plant (CUP) Replacement Project. The Bradley West Project includes increased building wall and roof insulation, high performance window glazing, a "cool roof" (i.e., a roof that delivers high solar reflectance, which reduces heat transfer to the building, and high thermal emittance, which radiates non-reflected solar energy), and daylighting controls so that lights will be automatically dimmed during daylight hours. All of the projects listed above include variable frequency fans for HVAC systems and LED lights, where applicable. In addition to these achievements, other energy conservation initiatives have resulted in a 7 percent decrease in per passenger energy consumption at LAX between 2007 and 2009.

LAWA has also undertaken improvements to the airfield and gates to better accommodate fuel efficient Aircraft Design Group (ADG) VI aircraft, such as the Airbus A380, Boeing 787, and Boeing 747-8. These improvements include construction of Taxilane R, which was designed to accommodate ADG VI aircraft; taxiway intersection improvements along the A380 operational route; additional loading bridges at remote boarding gates to better facilitate the loading and unloading of A380 aircraft; the modification of two gates at TBIT, which are currently operational, to accommodate ADG VI aircraft; and the construction of seven additional ADG VI gates currently underway at TBIT as part of the Bradley West Project. According to the International Air Transport Association, "New aircraft are 70% more fuel efficient than 40 years ago and 20% better than 10 years ago. Airlines are aiming for a further 25% fuel efficiency improvement by 2020. Modern aircraft achieve fuel efficiencies of 3.5 liters per 100 passenger kilometers. The [Airbus] A380 and [Boeing] B787 are aiming for 3 liters per 100 passenger kilometer [approximately 78 miles per gallon]."[726] According to Boeing, the 747-8 represents "a new benchmark in fuel efficiency…, allowing airlines to lower fuel costs… The 747-8 Intercontinental provides double-digit fuel improvements over the 747-400."[727] Relative to the Boeing 787, Boeing indicates "The airplane will use 20 percent less fuel for comparable missions than today's similarly sized airplane."[728]

LAWA has also implemented measures throughout LAX to reduce water consumption (see Section 4.13.4, *Water Supply*). With these reductions, energy consumption associated with the transport, treatment, and delivery of water to the site, and the treatment of wastewater generated on-site, have also been reduced.

LAWA operates a CUP at LAX, which provides heating and cooling to the Central Terminal Area (CTA). The CUP houses a co-generation system that generates electrical power, which is sold to the City of Los Angeles Department of Water and Power (LADWP). In addition to producing electricity, the CUP's cogeneration[729] facility reduces fuel usage by 10 to 30 percent compared to separate electricity and heat processes.[730] Additional information regarding the CUP is provided below.

---

726 International Air Transport Association, "Fuel Efficiency," Available: http://www.iata.org/whatwedo/environment/pages/fuel_efficiency.aspx.

727 Boeing, "The Boeing 747-8 Family: A Proud Tradition of Value Continues", Available: http://www.boeing.com/commercial/747family/747-8_background.html.

728 Boeing, "Boeing 787 Dreamliner Will Provide New Solutions for Airlines, Passengers," Available: http://www.boeing.com/commercial/787family/background.html.

729 Cogeneration is a process in which the boiler system and a turbine system are integrated to generate heat for both hot water and electricity and in which waste energy may be utilized to produce heat and electricity.

730 City of Los Angeles, Los Angeles World Airports, Los Angeles World Airports Sustainability Plan, April 2008.

Electricity

Electricity Supply

Electrical power within the City of Los Angeles, including LAX, is supplied by LADWP, which serves approximately 4.1 million people.[731] Electricity provided by LADWP is generated by LADWP and other utilities with power generating facilities located both within the Los Angeles region and in other areas. These sources include natural gas-fired, coal-fired, large hydroelectric, and nuclear plants. Existing renewable energy resources include small hydroelectric, wind, solar, biogas, and geothermal facilities. The current resource mix assures reliability and flexibility in providing electrical energy to the citizens of Los Angeles. In December 2011, LADWP adopted its 2011 *Power Integrated Resource Plan* (Power IRP). The Power IRP is a 20-year energy resource planning document that provides a framework to ensure that the future energy needs of the City are reliably met in a cost-effective manner, while reflecting LADWP's commitment to environmental stewardship. Within the Power IRP, LADWP outlines adequate electricity supply and transmission capability to meet the needs of its customers within the Los Angeles area, including LAX, through 2030. The Power IRP recommends divestiture of the Navajo coal power plant by 2015, 4 years ahead of the current 2019 end date. In addition, the Power IRP includes updated renewable energy requirements, electrical load forecasts, revenue and rate impacts, and the integration of public input.[732]

The LADWP service area used over 23,000,000 megawatt-hours (MWh) of electricity in 2010. Projections prepared by LADWP in 2011 indicate that the power demand for Los Angeles will be approximately 24,239,000 MWh in 2020 and 26,665,000 MWh in 2030. Projected future electricity consumption growth for LADWP is approximately 1.1 percent per year through 2030. Diversification of LADWP's energy portfolio, increasing electricity from renewable energy, and new customer energy efficiency measures will help meet all of the City's needs through the year 2030.[733] While the LADWP Power IRP does not provide a projected service area power demand specific to 2025, the buildout year for the SPAS alternatives, a mid-point approximation between the 2020 and 2030 estimates indicates the service area power demand in 2025 would be 25,452,000 MWh.

LADWP has adopted a number of initiatives to increase its use of renewable energy resources to support the goal of reducing greenhouse gas emissions, reducing reliance on fossil fuels, and meeting state mandates requiring all utilities to provide 33 percent of their energy from renewable resources by 2020, with interim goals of at least an average of 20 percent renewable resources between 2011 and 2013, and 25 percent renewable resources by 2016. In 2010, LADWP secured 20 percent of its power from renewable resources, and is planning for the 33 percent requirement by 2020.[734]

LADWP provides electricity to LAX. LAWA adopted Resolution No. 20821 on October 19, 1999, establishing LAWA's participation in LADWP's "Green Power for LA" program to purchase electricity from renewable resources. In 2008, LAWA purchased 42 million kWh of green power, equivalent to 25 percent of LAWA's total electricity use in that year.[735]

As noted above, in addition to obtaining electricity from LADWP, LAWA operates a CUP, which provides heating and air conditioning to the CTA. The existing CUP is currently operating at capacity. The existing CUP consists of old facilities that no longer meet energy needs. A new CUP is currently being constructed adjacent to the existing CUP, which will provide increased heating and cooling capacity to the

---

731 City of Los Angeles, Department of Water and Power, Power Integrated Resource Plan, December 11, 2011, Available: http://www.lapowerplan.org/.

732 City of Los Angeles, Department of Water and Power, Power Integrated Resource Plan, December 11, 2011, Available: http://www.lapowerplan.org/.

733 City of Los Angeles, Department of Water and Power, Power Integrated Resource Plan, December 11, 2011, Available: http://www.lapowerplan.org/.

734 City of Los Angeles, Department of Water and Power, Power Integrated Resource Plan, December 11, 2011, Available: http://www.lapowerplan.org/.

735 City of Los Angeles, Los Angeles World Airports, Los Angeles World Airports Sustainability Report for 2009, June 2010.

CTA, while generating a greater amount of electrical power from cogeneration.[736] The new CUP is being designed for LEED® Silver certification, and will be a more energy-efficient facility that will use state-of-the-art equipment. The new CUP has already undergone environmental review[737] and was approved in November 2009. The CUP currently under construction includes a Thermal Energy Storage (TES) tank. The purpose of the TES tank is to make chilled water during the daily period when electric demands and charges are low. Subsequently, during the peak energy and rate and usage demand, the stored energy within the chilled water will be released from the tank and pumped into the chilled water system, thereby, reducing the number of water chillers that would have been required to meet cooling demands during the peak demand of the day. The CUP currently under construction will result in an approximately 6 percent decrease in operational GHG emissions in comparison to the existing CUP.[738]

Baseline Electricity Consumption

Electricity is primarily used at LAX for lighting, cooling, and equipment operation. Site-specific electricity consumption data are not collected at LAX. To calculate baseline electricity consumption, usage-based factors were used, as described in Section 4.13.1.2. Based on these factors, annual baseline electricity consumption at LAX is approximately 13,773 MWh for passenger-related facilities, and 275 MWh associated with water supply and wastewater treatment (see **Tables 4.13.1-1** and **4.13.1-3**). LAX's electricity use currently represents approximately 0.06 percent of LADWP's demand.

Natural Gas

Natural Gas Supply

The Southern California Gas Company (SoCalGas) supplies natural gas to nearly all of Southern and Central California, including the City of Los Angeles. In 2009, approximately 2,621 million cubic feet (MMcf) of natural gas per day (956,665 MMcf annually) was consumed in Southern California.[739] SoCalGas projects overall natural gas demand within its service area will contract at an average annual rate of approximately 0.2 percent from 2010 to 2030. Demand is expected to be virtually flat for the next 21 years due to modest economic growth, California Public Utilities Commission (CPUC)-mandated demand side management and renewable electricity goals, decline in commercial and industrial demand, continued increased use of non-utility pipeline systems by enhanced oil recovery customers, and savings linked to advanced metering modules. Projected demand for natural gas for the 2025 planning horizon is anticipated to be 2,458 MMcf/day (897,170 MMcf annually) in Southern California. SoCalGas obtains the majority of its natural gas from out-of-state sources. Future supplies of natural gas are anticipated to be adequate to meet projected demand through 2025.[740]

Baseline Natural Gas Consumption

Natural gas is primarily used at LAX for electricity generation, space heating, food preparation, and maintenance activities. Site-specific natural gas consumption data are not collected at LAX. To calculate baseline natural gas consumption, usage-based factors were used, as described in Section 4.13.1.2. Based on these factors, baseline natural gas consumption at LAX is approximately 11 MMcf per year (see **Table 4.13.1-2**). LAX's natural gas consumption is approximately 0.0011 percent of the total Southern California regional demand.

---

736 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Los Angeles International Airport (LAX) Central Utility Plant Replacement Project, October 2009.

737 The Central Utility Plant Replacement Project Environmental Impact Report was certified in November 2009 (State Clearinghouse No. 2009041043).

738 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Los Angeles International Airport (LAX) Central Utility Plant Replacement Project, October 2009, page 1-14.

739 The California Gas and Electric Utilities, 2010 California Gas Report, 2010, Available: http://www.socalgas.com/regulatory/cgr.shtml.

740 The California Gas and Electric Utilities, 2010 California Gas Report, 2010, Available: http://www.socalgas.com/regulatory/cgr.shtml.

Table 4.13.1-1

Baseline and Projected Building-Related Electricity Consumption

Building Components	Baseline Conditions	Alt. 1			Alt. 2			Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
		Airfield/ Terminals	Ground Access	Total Alt. 1	Airfield/ Terminals	Ground Access	Total Alt. 2							
Terminals														
Terminal 0	NA	330,000	NA	330,000	330,000	NA	330,000	NA	NA	330,000	330,000	325,000	NA	NA
Terminal 1 Concourse	138,000	114,000	NA	114,000	114,000	NA	114,000	See Linear Concourse	138,000	114,000	114,000	114,000	NA	NA
Terminal 2 Concourse	306,000	306,000	NA	306,000	306,000	NA	306,000	See Linear Concourse	306,000	306,000	306,000	306,000	NA	NA
Terminal 3 Concourse	279,000	223,000	NA	223,000	223,000	NA	223,000	See Linear Concourse	279,000	223,000	223,000	205,000	NA	NA
New Linear Concourse	NA	NA	NA	NA	NA	NA	NA	1,400,000	NA	NA	NA	NA	NA	NA
New Passenger Processing Terminals	NA	NA	NA	NA	NA	NA	NA	2,151,000	NA	NA	NA	NA	NA	NA
Bradley West North Concourse Extension	NA	113,800	NA	113,800	113,800	NA	113,800	NA	NA	73,300	113,800	64,400	NA	NA
MSC North Concourse Extension	NA	249,400	NA	249,400	249,400	NA	249,400	NA	NA	204,800	249,400	190,700	NA	NA
Subtotal Terminal Components	**723,000**	**1,336,200**	**0**	**1,336,200**	**1,336,200**	**0**	**1,336,200**	**3,551,000**	**723,000**	**1,251,100**	**1,336,200**	**1,205,100**	**0**	**0**
Ground Access Components														
Ground Transportation Center	NA	NA	NA	NA	NA	NA	NA	1,400,000	NA	NA	NA	NA	NA	NA
Intermodal Transportation Center	NA	NA	NA	NA	NA	NA	NA	85,000	NA	NA	NA	NA	NA	NA
Intermodal Transportation Facility	NA	NA	75,000	75,000	NA	75,000	75,000	NA	NA	NA	NA	NA	75,000	75,000
CONRAC	NA	NA	NA	NA	NA	NA	NA	89,000	89,000	NA	NA	NA	85,000	85,000
Subtotal Ground Access Components	**0**	**0**	**75,000**	**75,000**	**0**	**75,000**	**75,000**	**1,574,000**	**89,000**	**0**	**0**	**0**	**160,000**	**160,000**
Total Building Area (sf)	**723,000**	**1,336,200**	**75,000**	**1,411,200**	**1,336,200**	**75,000**	**1,411,200**	**5,125,000**	**812,000**	**1,251,100**	**1,336,200**	**1,205,100**	**160,000**	**160,000**
Total Electricity (MWh/yr[1])	**13,773**	**25,455**	**1,429**	**26,883**	**25,455**	**1,429**	**26,883**	**97,631**	**15,469**	**23,833**	**25,455**	**22,957**	**3,048**	**3,048**

Note:

Alternatives 1 through 4 consist of airfield, terminal, and ground access improvements. Alternatives 5 through 7 focus on airfield and terminal improvements only. Alternatives 8 and 9 focus on ground access improvements only. The airfield/terminal improvements associated with Alternatives 1, 2, 5, 6, and 7 could be paired with the ground access improvements associated with Alternatives 1, 2, 8, or 9. Similarly, the ground access improvements associated with Alternatives 1, 2, 8, and 9 could be paired with the airfield improvements associated with Alternatives 1, 2, 5, 6, or 7. The full impacts of any alternative must consider airfield, terminal, and ground access contributions. The airfield, terminal, and ground access improvements associated with Alternatives 3 and 4 are specific to each of those alternatives and cannot be paired with other alternatives.

[1] MWh/yr = megawatt-hours per year

Source: CDM Smith, 2012.

Table 4.13.1-2

Baseline and Projected Building-Related Natural Gas Consumption

Building Components	Baseline Conditions	Alt. 1 Airfield/ Terminals	Alt. 1 Ground Access	Alt. 1 Total Alt. 1	Alt. 2 Airfield/ Terminals	Alt. 2 Ground Access	Alt. 2 Total Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
Terminals														
Terminal 0	NA	330,000	NA	330,000	330,000	NA	330,000	NA	NA	330,000	330,000	325,000	NA	NA
Terminal 1 Concourse	138,000	114,000	NA	114,000	114,000	NA	114,000	See Linear Concourse	138,000	114,000	114,000	114,000	NA	NA
Terminal 2 Concourse	306,000	306,000	NA	306,000	306,000	NA	306,000	See Linear Concourse	306,000	306,000	306,000	306,000	NA	NA
Terminal 3 Concourse	279,000	223,000	NA	223,000	223,000	NA	223,000	See Linear Concourse	279,000	223,000	223,000	205,000	NA	NA
New Linear Concourse	NA	NA	NA	NA	NA	NA	NA	1,400,000	NA	NA	NA	NA	NA	NA
New Passenger Processing Terminals	NA	NA	NA	NA	NA	NA	NA	2,151,000	NA	NA	NA	NA	NA	NA
Bradley West North Concourse Extension	NA	113,800	NA	113,800	113,800	NA	113,800	NA	NA	73,300	113,800	64,400	NA	NA
MSC North Concourse Extension	NA	249,400	NA	249,400	249,400	NA	249,400	NA	NA	204,800	249,400	190,700	NA	NA
Subtotal Terminal Components	**723,000**	**1,336,200**	**0**	**1,336,200**	**1,336,200**	**0**	**1,336,200**	**3,551,000**	**723,000**	**1,251,100**	**1,336,200**	**1,205,100**	**0**	**0**
Ground Access Components														
Ground Transportation Center	NA	NA	NA	NA	NA	NA	NA	1,400,000	NA	NA	NA	NA	NA	NA
Intermodal Transportation Center	NA	NA	NA	NA	NA	NA	NA	85,000	NA	NA	NA	NA	NA	NA
Intermodal Transportation Facility	NA	NA	75,000	75,000	NA	75,000	75,000	NA	NA	NA	NA	NA	75,000	75,000
CONRAC	NA	NA	NA	NA	NA	NA	NA	89,000	89,000	NA	NA	NA	85,000	85,000
Subtotal Ground Access Components	**0**	**0**	**75,000**	**75,000**	**0**	**75,000**	**75,000**	**1,574,000**	**89,000**	**0**	**0**	**0**	**160,000**	**160,000**
Total Building Area (sf)	**723,000**	**1,336,200**	**75,000**	**1,411,200**	**1,336,200**	**75,000**	**1,411,200**	**5,125,000**	**812,000**	**1,251,100**	**1,336,200**	**1,205,100**	**160,000**	**160,000**
Total Natural Gasoline (Mcf/yr[1])	**10,975**	**20,284**	**1,139**	**21,422**	**20,284**	**1,139**	**21,422**	**77,798**	**12,326**	**18,992**	**20,284**	**18,293**	**2,429**	**2,429**

Note:

Alternatives 1 through 4 consist of airfield, terminal, and ground access improvements. Alternatives 5 through 7 focus on airfield and terminal improvements only. Alternatives 8 and 9 focus on ground access improvements only. The airfield/terminal improvements associated with Alternatives 1, 2, 5, 6, and 7 could be paired with the ground access improvements associated with Alternatives 1, 2, 8, or 9. Similarly, the ground access improvements associated with Alternatives 1, 2, 8, and 9 could be paired with the airfield improvements associated with Alternatives 1, 2, 5, 6, or 7. The full impacts of any alternative must consider airfield, terminal, and ground access contributions. The airfield, terminal, and ground access improvements associated with Alternatives 3 and 4 are specific to each of those alternatives and cannot be paired with other alternatives.

[1] Mcf/yr = thousand cubic feet per year

Source: CDM Smith, 2012.

Table 4.13.1-3

Baseline and Projected Total Energy Consumption

Energy Form	Baseline Conditions	Alt. 1 Airfield/ Terminals	Alt. 1 Ground Access	Alt. 1 Total Alt. 1	Alt. 2 Airfield/ Terminals	Alt. 2 Ground Access	Alt. 2 Total Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
Electricity (MWh/yr[1])														
Building	13,773	25,455	1,429	26,883	25,455	1,429	26,883	97,631	15,469	23,833	25,455	21,681	3,048	3,048
Water Supply	235	433	24	458	433	24	458	1,663	263	406	433	369	52	52
Wastewater Generation	40	75	4	79	75	4	79	286	45	70	74	64	9	9
APM Electricity	NA	NA	NA	NA	NA	NA	NA	208,240	NA	NA	NA	NA	NA	12,494
Subtotal	**14,048**	25,963	1,457	**27,420**	25,963	1,457	**27,420**	**307,820**	**15,777**	**24,309**	**25,963**	**22,114**	**3,109**	**15,603**
Natural Gas (Mcf/yr[2])	**10,975**	20,284	1,139	**21,422**	20,284	1,139	**21,422**	**77,798**	**12,326**	**18,992**	**20,284**	**17,276**	**2,429**	**2,429**
Transportation-Related Fuels														
Jet A (Million Gallons/yr)	**63.0**	93.9	NA	**93.9**	92.5	NA	**92.5**	**98.7**	**96.4**	**94.2**	**93.5**	**95.8**	**NA**	**NA**
Gasoline (Million Gallons/yr)														
On-Airport Vehicles	4.0	NA	3.4	3.4	NA	3.4	3.4	2.9	3.4	NA	NA	NA	3.4	3.3
Off-Airport Vehicles	118.3	NA	122.9	122.9	NA	122.9	122.9	116.1	120.6	NA	NA	NA	119.8	119.8
GSE	2.5	3.2	NA	3.2	3.2	NA	3.2	3.2	3.2	3.2	3.2	3.2	NA	NA
Subtotal	**124.8**	3.2	126.3	**129.5**	3.2	129.5	**129.5**	**122.3**	**127.3**	**3.2**	**3.2**	**3.2**	**123.2**	**123.2**
Diesel (Million Gallons/yr)														
On-Airport Vehicles	1.2	NA	1.4	1.4	NA	1.4	1.4	1.0	1.3	NA	NA	NA	1.3	1.3
Off-Airport Vehicles	27.1	NA	34.9	34.9	NA	34.9	34.9	32.3	34.3	NA	NA	NA	33.0	33.0
GSE	2.6	3.4	NA	3.4	3.4	NA	3.4	3.4	3.4	3.4	3.4	3.4	NA	NA
Construction	NA			31.5			13.5	44.0	4.4	30.2	23.9	22.4	5.5	6.4
Subtotal	**30.8**	3.4	36.3	**71.2**	3.4	36.3	**53.2**	**80.6**	**43.4**	**33.6**	**27.3**	**25.8**	**39.8**	**40.7**
LPG (Million Gallons/yr)														
GSE	**2.0**	2.6	NA	**2.6**	2.6	NA	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**NA**	**NA**

Notes:

Numbers may not add due to rounding.

Alternatives 1 through 4 consist of airfield, terminal, and ground access improvements. Alternatives 5 through 7 focus on airfield and terminal improvements only. Alternatives 8 and 9 focus on ground access improvements only. The airfield/terminal improvements associated with Alternatives 1, 2, 5, 6, and 7 could be paired with the ground access improvements associated with Alternatives 1, 2, 8, or 9. Similarly, the ground access improvements associated with Alternatives 1, 2, 8, and 9 could be paired with the airfield improvements associated with Alternatives 1, 2, 5, 6, or 7. The full impacts of any alternative must consider airfield, terminal, and ground access contributions. The airfield, terminal, and ground access improvements associated with Alternatives 3 and 4 are specific to each of those alternatives and cannot be paired with other alternatives.

[1] MWh/yr = megawatt-hours per year
[2] Mcf/yr = thousand cubic feet per year

Source: CDM Smith, 2012; Lea + Elliot, Inc. (Alternative 3 APM electricity).

This page intentionally left blank.

Transportation-Related Fuels

A variety of transportation-related fuels are used at LAX. These include Jet A fuel for aircraft, and gasoline, diesel, and alternative fuels (LPG [propane and/or butane], LNG, and CNG) for automobiles, trucks, shuttle buses, support vehicles, and GSE. In addition, passenger vehicle trips associated with the airport require fuel, mainly gasoline and diesel.

Supplies of Jet A, gasoline, diesel, and alternative fuels are dependent on energy reserves, both domestic and international. Increased use of renewable fuels that will result from federal and state mandates, along with increased vehicle average fuel efficiency, is forecast to reduce the growth of traditional petroleum-based transportation fuels over the next 20 years.[741]

Gasoline and Diesel Supply

Oil is a finite and non-renewable resource. Our dependency on imported oil has significantly declined in the United Sates since it peaked in 2005.[742] A combination of declining consumption and shifts in supply patterns as a result of the economic downturn after the financial crisis in 2008 has contributed to this trend. In addition, increased use of ethanol and biodiesel, and gains in production of crude oil and natural gas, have expanded domestic supplies and reduced the need for imports. A study done by the U.S. Energy Information Administration (EIA) indicates that oil will continue to have adequate supply far beyond the SPAS buildout year of 2025 but eventually the price of oil will be more expensive than other fuel alternatives.[743] This study looked at a variety of oil production scenarios, projecting peak world conventional crude oil production could plausibly occur between 2021 and 2112, depending on actual crude oil resources and worldwide demand.

Jet A Supply

The Jet A fuel used at LAX is obtained from the world commodity market for Jet A fuel. The local sources of supply are mainly refineries within the Los Angeles region. Jet fuel obtained from other sources arrives by either interstate pipelines or domestic or international tankers.

The majority of Jet A fuel used at LAX is transported to the airport through four pipelines dedicated to deliver Jet A fuel to LAX. These pipelines deliver Jet A fuel from the local refineries and terminals, and are owned and operated by the oil companies. Tanker deliveries of Jet A fuel to either the Port of Los Angeles or the Port of Long Beach are made through pipeline connections at the GATX Terminal, Wilmington Liquid Bulk Terminal facilities (WLBT), and the Shell Carson Terminal. Interstate transport of jet fuel via the Southern Pacific (SP) Pipeline can also be pumped to LAX via the WLBT.

LAXFUEL Corporation operates an on-airport Jet A fuel storage facility (fuel farm) consisting of 14 storage tanks that can hold between 18,000 and 60,000 bbl each for a total storage capacity of approximately 624,000 bbl. LAXFUEL dispenses an average of more than four million gallons, or 95,200 barrels, of fuel a day.[744] Mercury Air Group also supplies Jet A fuel at LAX. Mercury supplies approximately six percent of the LAX Jet A fuel demand via storage tanks that are re-filled by truckload shipments of Jet A fuel.[745]

---

741 California Energy Commission, Transportation Energy Forecasts and Analysis for the 2009 Integrated Energy Policy Report, May 2010.

742 Southern California Association of Governments, 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy, April 2012.

743 U.S. Energy Information Administration (EIA), Long-Term World Oil Supply Scenarios, August 2004.

744 Haddican, Lisa, AviationPros.com, "LAXFUEL Operates on Precision," March 29, 2011, Available: http://www.aviationpros.com/article/10246019/laxfuel-operates-on-precision.

745 PLH Aviation Services Corporation, Garrett Aviation Services, and Hudson Aviation Services also deliver fuel to various airlines. However, they obtain Jet A fuel from the above-mentioned sources. None of these companies stores Jet A fuel at LAX.

Baseline Energy Consumption

Baseline passenger-related electricity and natural gas consumption at LAX are provided in **Tables 4.13.1-1** and **4.13.1-2**, respectively, and total baseline energy consumption is provided in **Table 4.13.1-3**. As indicated in these tables, baseline electricity consumption at LAX was 14,283 MWh/year and baseline natural gas use was 10,975 thousand cubic feet per year (Mcf)/year. **Table 4.13.1-3** shows that, under baseline conditions, an estimated 63 million gallons of Jet A fuel, 124.8 million gallons of gasoline, 30.8 million gallons of diesel, and 2 million gallons of LPG were used at, or in association with, LAX. On-airport vehicles (vehicles primarily used on-airport, such as shuttles, vans, and other vehicles that do not travel off-airport during normal trips) other than GSE are estimated to have consumed approximately 4 million gallons of gasoline, and 1.2 million gallons of diesel fuel. Off-airport vehicles (vehicles that bring passengers, employees, or cargo to and from the airport) are estimated to have consumed approximately 118 million gallons of gasoline and 27 million gallons of diesel fuel. GSE is estimated to have consumed 2.5 million gallons of gasoline, 2.6 million gallons of diesel fuel, and 2 million gallons of LPG under baseline conditions.

4.13.1.4 Thresholds of Significance

A significant energy impact would occur if the direct and indirect changes in the environment that may be caused by the particular SPAS alternative would result in one or more of the following future conditions:

- An exceedance in regional electricity or natural gas supplies due to project-related electricity and natural gas demand.
- A substantial increase in project-related fuel consumption relative to available supply.

These thresholds are based upon guidance provided in the L.A. CEQA Thresholds Guide. This analysis also considers the ability of the SPAS alternatives to avoid or reduce inefficient, wasteful, and unnecessary consumption of energy.

4.13.1.5 Applicable LAX Master Plan Commitments and Mitigation Measures

As part of the LAX Master Plan, LAWA adopted two commitments pertaining to energy (denoted with "E") and one commitment pertaining to public utilities in general (denoted with "PU") in the Alternative D Mitigation Monitoring and Reporting Program (MMRP). Of the three commitments, one is applicable to the analysis of the SPAS alternatives in this EIR and was considered in the energy analysis herein.

- **E-1. Energy Conservation and Efficiency Program.**

  LAWA will seek to continually improve the energy efficiency of building design and layouts during the implementation of the LAX Master Plan. Title 24, Part 6, Article 2 of the California Administrative Code establishes maximum energy consumption levels for heating and cooling of new buildings to assure that energy conservation is incorporated into the design of new buildings. LAWA will design new facilities to meet or exceed the prescriptive standards required under Title 24. Some of the energy conservation measures that LAWA may incorporate into the design of new buildings and airports facilities may include the use of energy-efficient building materials, energy-saving lighting systems, energy-efficient air-conditioning systems, energy-efficient water-heating systems, and designed-in access for alternative means of surface transportation, including the Green Line and the APM. These energy conservation measures may be further improved upon as energy-saving design approaches and technologies develop.

4.13.1.6 Impacts Analysis

This section describes the impacts related to energy consumption for the SPAS alternatives. For each alternative, the effects are discussed as they relate to projected energy consumption. **Tables 4.13.1-1** and **4.13.1-2** identify building-related electricity and natural gas consumption, respectively, associated

with the SPAS alternatives as well as under 2010 baseline conditions. **Table 4.13.1-3** shows total energy consumption.

4.13.1.6.1 Alternative 1

Under Alternative 1, aircraft operations, GSE, and vehicle miles traveled (VMT) by on-and off-airport vehicles would increase compared to baseline conditions. In addition, square footage associated with terminals and other passenger-related facilities would increase.

Electricity and Natural Gas

Under Alternative 1, the passenger-related building area would increase compared to baseline conditions. Although concourse areas associated with Terminals 1 and 3 would decrease, there would be new concourse areas associated with Terminal 0 and the northerly extensions of Bradley West and the Midfield Satellite Concourse (MSC). In addition, this alternative would include a passenger service area at the ITF. As shown in **Table 4.13.1-1**, under Alternative 1, total electricity use for passenger-related facilities in 2025 would be 26,883 MWh/yr in 2025. As shown in **Table 4.13.1-3**, under Alternative 1, total electricity consumption associated with water supply and wastewater generation would be 537 MWh/yr in 2025. **Table 4.13.1-2** shows that, under Alternative 1, total natural gas use associated with passenger-related facilities would be 21,422 Mcf/yr, or 21.4 MMcf/yr, in 2025. The projected consumption of electricity and natural gas under Alternative 1 would represent 0.11 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0024 percent of the projected Southern California regional natural gas demand.

In order to reduce electricity and natural gas consumption under Alternative 1, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 1, a sufficient supply of electricity and natural gas is expected to be available based on the LADWP *Power IRP* and the *California Gas Report*.[746,747] Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 1 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

As indicated in Section 4.13.1.3, transportation-related fuels used at LAX include Jet A fuel for aircraft, and gasoline, diesel, and alternative fuels (LPG, LNG, and CNG, all of which are represented by LPG in this analysis) for vehicles and/or GSE. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 1.

Jet A

Under Alternative 1, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 93.9 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions (63 million gallons). For the most part, this increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 1, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

---

746 City of Los Angeles, Department of Water and Power, Power Integrated Resource Plan, December 11, 2011, Available: http://www.lapowerplan.org/.

747 The California Gas and Electric Utilities, 2010 California Gas Report, 2010, Available: http://www.socalgas.com/regulatory/cgr.shtml.

The number of ADG VI aircraft would increase in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft. Airfield improvements associated with Alternative 1 would also increase the efficiency of ADG VI operations on the airfield. These improvements include the northerly relocation of Runway 6L/24R, addition of a centerfield taxiway, the easterly extension of Runway 6R/24L and Taxiway E, increased separation between Taxiway E and Taxilane D, and the westerly extension of Taxilane D.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 1 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 1 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

Under Alternative 1, total gasoline and diesel fuel consumption would be approximately 129.5 million gallons and 71.2 million gallons, respectively, in 2025. Gasoline and diesel consumption would both increase compared to baseline conditions. A substantial portion of these increases would result from greater flight operations and passenger activity in 2025, which would occur in the future with or without Alternative 1.

Several design features associated with Alternative 1 would partially offset increases in fuel consumption due to increased vehicle trips. Development of the ITF and parking within Manchester Square would encourage passengers to park or be dropped off outside the CTA, and enter the CTA on the proposed dedicated busway. The dedicated busway would include a stop at the future Metro Crenshaw/LAX Transit Station, which would facilitate increased transit ridership to the airport. These features would reduce total VMT to and from the airport, and would reduce transportation-related fuel consumption compared to conditions in 2025 without implementation of Alternative 1.

As discussed previously, petroleum products, including gasoline and diesel, are market-driven commodities for which the EIA indicates adequate supplies are anticipated well beyond 2025. Since sufficient supplies of gasoline and diesel are expected to be available, the impact associated with an increase in gasoline and diesel consumption under Alternative 1 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 1 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 1, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 1. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 1 would be less than significant.

4.13.1.6.2 Alternative 2

Under Alternative 2, aircraft operations, GSE, and VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, square footage associated with terminals and other passenger-related facilities would increase.

Electricity and Natural Gas

Under Alternative 2, impacts associated with energy demand for passenger-related facilities, as well as that associated with water supply and wastewater treatment, would be the same as described above for Alternative 1. As with Alternative 1, the project-related electricity and natural gas demand would be able to be accommodated by regional supplies. In addition, LAWA would implement LAX Master Plan

Commitment E-1, Energy Conservation and Efficiency Program, and would apply sustainable design concepts, including pursuing LEED® certification, to new facilities to maximize energy efficiency associated with this alternative. For these reasons, impacts related to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 2 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

As with Alternative 1, consumption of transportation-related fuels would increase by 2025, due to increases in passenger activity and the number of flight operations, as well as construction activities. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 2.

Jet A

Under Alternative 2, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 92.5 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions. For the most part, this increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 2, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

The number of ADG VI aircraft would increase in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft. Airfield improvements associated with Alternative 2 would also increase the efficiency of ADG VI operations on the airfield. These improvements include the easterly extension of Runway 6R/24L and Taxiway E, increased separation between Taxiway E and Taxilane D, and the westerly extension of Taxilane D.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 2 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 2 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

Under Alternative 2, gasoline consumption would be approximately 129.5 million gallons in 2025, the same as under Alternative 1. Diesel consumption is estimated to be approximately 53.2 million gallons in 2025, which would be lower than Alternative 1 due to the reduced amount of construction required. Gasoline and diesel consumption would both increase compared to baseline conditions. A substantial portion of these increases would result from greater flight operations and passenger activity in 2025, which would occur in the future with or without Alternative 2.

Alternative 2 would include the same design features associated with Alternative 1 that would partially offset increases in fuel consumption due to increased vehicle trips, including development of the ITF, parking within Manchester Square, and the proposed dedicated busway, which would include a stop at the future Metro Crenshaw/LAX Transit Station. These features would reduce total VMT to and from the airport, and would reduce transportation-related fuel consumption compared to conditions in 2025 without implementation of Alternative 2.

Similar to Alternative 1, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with an increase in gasoline and diesel consumption under Alternative 2 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 2 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 2, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased

GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 2. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 2 would be less than significant.

4.13.1.6.3 Alternative 3

Under Alternative 3, aircraft operations, GSE, and VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, square footage associated with terminals and other passenger-related facilities would increase. Alternative 3 would also include two APM systems, which would be powered by electricity.

Electricity and Natural Gas

Under Alternative 3, passenger-related facilities would increase compared to baseline conditions. Terminals 1, 2, and 3 would be replaced with a linear concourse and four new terminals would be built in the central portion of the CTA. In addition, this alternative would include passenger-related facilities at the GTC, ITC, and CONRAC. As noted above, Alternative 3 would also include two APM systems, which would likely be electric powered.

As shown in **Tables 4.13.1-1**, **4.13.1-2**, and **4.13.1-3**, under Alternative 3, total electricity and natural gas use would be 307,820 MWh/yr and 77.8 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 3 would represent 1.2 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0087 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 3, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 3, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 3 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Table 4.13.1-3 shows all projected transportation-related fuel consumption resulting from Alternative 3.

Jet A

Under Alternative 3, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 98.7 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions. For the most part, this increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 3, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

The number of ADG VI aircraft would increase in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft. Airfield improvements associated with Alternative 3 would also increase the efficiency of ADG VI operations on the airfield. These improvements include the southerly relocation and easterly extension of Runway 6R/24L, addition of a centerfield taxiway, increased separation between Taxiway E and Taxilane D, and the westerly extension of Taxilane D.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 3 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 3 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

Under Alternative 3, total gasoline and diesel fuel consumption would be approximately 122.3 million gallons and 80.6 million gallons in 2025, respectively. Gasoline consumption would be slightly lower than baseline conditions. This would be due to increased fuel efficiency in motor vehicles, which would offset increases in VMT. Diesel consumption would increase compared to baseline conditions, due to increases in truck trips and GSE as well as construction activities.

Several design features associated with Alternative 3 would partially offset increases in fuel consumption due to increased vehicle trips. Closure of the CTA to private vehicle traffic, and construction of the GTC, ITC, and CONRAC, would reduce total VMT. The construction of two APMs, and the linkage of these APMs to the Metro transit system, would facilitate increased transit ridership to the airport. These features would reduce total VMT to and from the airport, and would reduce transportation-related fuel consumption compared to conditions in 2025 without implementation of Alternative 3.

Under Alternative 3, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with gasoline and diesel consumption under Alternative 3 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 3 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 3, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 3. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 3 would be less than significant.

4.13.1.6.4 Alternative 4

Under Alternative 4, aircraft operations, GSE, and VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, square footage associated passenger-related facilities would increase.

Electricity and Natural Gas

Under Alternative 4, the only facility that would result in an increased electricity and natural gas demand would be the CONRAC customer service area. As shown in **Tables 4.13.1-1**, **4.13.1-2**, and **4.13.1-3**, under Alternative 4, total electricity and natural gas use would be 15,777 MWh/yr and 12.3 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 4 would represent 0.06 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0014 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 4, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 4, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 4 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Under Alternative 4, consumption of transportation-related fuels would increase by 2025, due to increases in passenger activity and the number of flight operations, as well as construction activities. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 4.

Jet A

Under Alternative 4, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 96.4 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions. For the most part, this increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 4, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

The number of ADG VI aircraft would increase in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 4 would be less than significant. Moreover, Alternative 4 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

Under Alternative 4, total gasoline and diesel fuel consumption would be approximately 127.3 million gallons and 43.4 million gallons in 2025, respectively. Gasoline and diesel consumption would both increase compared to baseline conditions. A substantial portion of these increases would result from greater flight operations and passenger activity in 2025, which would occur in the future with or without Alternative 4.

Construction of the CONRAC would partially offset increases in fuel consumption due to increased vehicle trips. This feature would reduce total VMT to and from the airport, and would reduce transportation-related fuel consumption compared to conditions in 2025 without implementation of Alternative 4.

Under Alternative 4, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with an increase in gasoline and diesel consumption under Alternative 4 would be less than significant. Moreover, with implementation of the design feature noted above, Alternative 4 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 4, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 4. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 4 would be less than significant.

4.13.1.6.5 Alternative 5

Under Alternative 5, aircraft operations and GSE would increase compared to baseline conditions. In addition, square footage associated with terminals would increase.

Electricity and Natural Gas

Alternative 5 focuses on airfield and terminal improvements. Under Alternative 5, impacts to electricity and natural gas associated with terminal uses would be similar to those described above for Alternative 1. New concourse areas associated with Alternative 5 would be similar to those under Alternative 1, although approximately 7 percent less square footage would be developed under Alternative 5 due to the more southerly aircraft parking limit line. As shown in **Tables 4.13.1-1**, **4.14.1-2**, and **Table 4.13.1-3** under Alternative 5, total electricity and natural gas use would be 24,309 MWh/yr and 19 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 5 would represent 0.10 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0021 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 5, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 5, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 5 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Under Alternative 5, consumption of transportation-related fuels by GSE would increase by 2025, due to an increase in the number of flight operations. Construction activities would also increase transportation-related fuel consumption. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 5.

Jet A

Under Alternative 5, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 94.2 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions. For the most part, this increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 5, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

The number of ADG VI aircraft would increase in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft. Airfield improvements associated with Alternative 5 would also increase the efficiency of ADG VI operations on the airfield. These improvements include the northerly relocation of Runway 6L/24R, addition of a centerfield taxiway, the easterly extension of Runway 6R/24L and Taxiway E, increased separation between Taxiway E and Taxilane D, and the westerly extension of Taxilane D.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 5 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 5 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

As described above, Alternative 5 focuses on airfield and terminal improvements; therefore, gasoline and diesel fuel consumption associated with on- and off-airport vehicles trips is not addressed for this alternative. However, as shown in **Table 4.13.1-3**, under Alternative 5, GSE-related gasoline fuel consumption would be approximately 3.2 million gallons in 2025. GSE- and construction-related diesel consumption is estimated to be approximately 33.6 million gallons in 2025. Gasoline and diesel consumption associated with GSE and construction would both increase compared to baseline conditions. The GSE-related increases would result from greater flight operations in 2025, which would occur in the future with or without Alternative 5.

Under Alternative 5, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with an increase in GSE- and construction-related gasoline and diesel consumption under Alternative 5 would be less than significant. Moreover, Alternative 5 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 5, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 5. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 5 would be less than significant.

4.13.1.6.6 Alternative 6

Under Alternative 6, aircraft operations, GSE, and VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, square footage associated with terminals would increase.

Electricity and Natural Gas

Alternative 6 focuses on airfield and terminal improvements. Under Alternative 6, impacts to electricity and natural gas associated with terminal uses would be similar to those described above for Alternative 1. As shown in **Tables 4.13.1-1**, **4.13.1-2**, and **4.13.1-3**, under Alternative 6, total electricity and natural gas use would be 25,963 MWh/yr and 20.3 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 6 would represent 0.10 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0023 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 6, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 6, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 6 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Under Alternative 6, consumption of transportation-related fuels by GSE would increase by 2025, due to an increase in the number of flight operations. Construction activities would also increase transportation-

related fuel consumption. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 6.

Jet A

Under Alternative 6, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 93.5 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions. For the most part, this increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 6, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

The number of ADG VI aircraft would increase in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft. Airfield improvements associated with Alternative 6 would also increase the efficiency of ADG VI operations on the airfield. These improvements include the northerly relocation of Runway 6L/24R, addition of a centerfield taxiway, the easterly extension of Runway 6R/24L and Taxiway E, increased separation between Taxiway E and Taxilane D, and the westerly extension of Taxilane D.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 6 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 6 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

As described above, Alternative 6 focuses on airfield and terminal improvements; therefore, gasoline and diesel fuel consumption associated with on- and off-airport vehicles trips is not addressed for this alternative. However, as shown in **Table 4.13.1-3**, under Alternative 6, GSE-related gasoline fuel consumption would be approximately 3.2 million gallons in 2025. GSE- and construction-related diesel consumption is estimated to be approximately 27.3 million gallons in 2025. Gasoline and diesel consumption associated with GSE and construction would both increase compared to baseline conditions. The GSE-related increases would result from greater flight operations in 2025, which would occur in the future with or without Alternative 6.

Under Alternative 6, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with an increase in GSE- and construction-related gasoline and diesel consumption under Alternative 6 would be less than significant. Moreover, Alternative 6 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 6, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 6. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 6 would be less than significant.

4.13.1.6.7 Alternative 7

Under Alternative 7, aircraft operations, GSE, and VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, square footage associated with terminals would increase.

Electricity and Natural Gas

Alternative 7 focuses on airfield and terminal improvements. Under Alternative 7, the impacts to electricity and natural associated with terminal uses would be similar to those described above for Alternative 1, although almost 17 percent less square footage would be developed under Alternative 7 due to the more southerly aircraft parking limit line. As shown in **Tables 4.13.1-1**, **4.13.1-2**, and **4.13.1-3**, under Alternative 7, total electricity and natural gas use would be 22,957 MWh/yr and 18.3 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 7 would represent 0.09 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0019 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 7, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 7, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 7 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Under Alternative 7, consumption of transportation-related fuels by GSE would increase by 2025, due to increases in passenger activity and the number of flight operations. Construction activities would also increase transportation-related fuel consumption. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 7.

Jet A

Under Alternative 7, Jet A fuel consumption by aircraft in the LTO cycle is estimated to be 95.8 million gallons in 2025. This represents an increase in Jet A fuel consumption over baseline conditions. This increase would result from increased flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 7, although changes in airfield design and taxi-idle times would also affect Jet A fuel consumption.

The number of ADG VI aircraft in 2025 compared to baseline conditions. As noted in Section 4.13.1.3, ADG VI aircraft are more fuel efficient than other aircraft. Airfield improvements associated with Alternative 7 would also increase the efficiency of ADG VI operations on the airfield. These improvements include the southerly relocation and easterly extension of Runway 6R/24L, addition of a centerfield taxiway, increased separation between Taxiway E and Taxilane D, and the westerly extension of Taxilane D.

As indicated in Section 4.13.1.3, petroleum product supplies, including Jet A fuel, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of Jet A fuel is expected to be available, the impact associated with an increase in Jet A fuel consumption under Alternative 7 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 7 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel.

Gasoline and Diesel

As described above, Alternative 7 focuses on airfield and terminal improvements; therefore, gasoline and diesel fuel consumption associated with on- and off-airport vehicles trips is not addressed for this alternative. However, as shown in **Table 4.13.1-3**, under Alternative 7, GSE-related gasoline fuel consumption would be approximately 3.2 million gallons in 2025. GSE- and construction-related diesel consumption is estimated to be approximately 25.8 million gallons in 2025. Gasoline and diesel

consumption associated with GSE and construction would both increase compared to baseline conditions. The GSE-related increases would result from greater flight operations in 2025, which would occur in the future with or without Alternative 7.

Under Alternative 7, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with an increase in GSE- and construction-related gasoline and diesel consumption under Alternative 7 would be less than significant. Moreover, Alternative 7 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Under Alternative 7, the total consumption of alternative fuels, as represented by LPG, would be 2.6 million gallons in 2025, an increase over baseline conditions. The increase would result from increased GSE associated with greater flight operations at the horizon year (i.e., 2025) activity level of 78.9 MAP, which would occur in the future with or without Alternative 7. As indicated in Section 4.13.1.3, petroleum product supplies, including LPG, are anticipated to be adequate well beyond 2025. Therefore, since a sufficient supply of LPG is expected to be available, the impact associated with an increase in LPG consumption under Alternative 7 would be less than significant.

4.13.1.6.8 Alternative 8

Under Alternative 8, VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, new passenger-related facilities would be constructed.

Electricity and Natural Gas

Alternative 8 focuses on ground access improvements. Ground access improvements that would increase electricity and natural gas demand include the ITF passenger service area and the CONRAC customer service area.

As shown in **Tables 4.13.1-1**, **4.13.1-2**, and **4.13.1-3**, under Alternative 8, total electricity and natural gas use would be 3,109 MWh/yr and 2.4 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 8 would represent 0.01 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0003 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 8, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 8, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 8 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Under Alternative 8, consumption of transportation-related fuels would increase by 2025, due to increases in passenger activity and the number of flight operations, as well as construction activities. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 8.

Jet A

Alternative 8 focuses on ground access improvements; therefore, Jet A fuel consumption was not addressed for this alternative.

Gasoline and Diesel

Under Alternative 8, total gasoline and diesel fuel consumption would be approximately 123.2 million gallons and 39.8 million gallons in 2025, respectively. Gasoline and diesel consumption would both increase compared to baseline conditions. A substantial portion of these increases would result from greater flight operations and passenger activity in 2025, which would occur in the future with or without Alternative 8.

Several design features associated with Alternative 8 would partially offset increases in fuel consumption due to increased vehicle trips. Development of the ITF and a CONRAC within Manchester Square would encourage passengers to park or be dropped off outside the CTA, and enter the CTA on the proposed dedicated busway. The dedicated busway would include a stop at the future Metro Crenshaw/LAX Transit Station, which would facilitate increased transit ridership to the airport. These features would reduce total VMT to and from the airport, and would reduce transportation-related fuel consumption compared to conditions in 2025 without implementation of Alternative 8.

Under Alternative 8, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with gasoline and diesel consumption under Alternative 8 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 8 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Alternative 8 focuses on ground access improvements; therefore, LPG consumption from GSE was not addressed for this alternative.

4.13.1.6.9 Alternative 9

Under Alternative 9, VMT by on-and off-airport vehicles would increase compared to baseline conditions. In addition, new passenger-related facilities would be constructed. Alternative 9 would also include a APM system, which would likely be electric powered.

Electricity and Natural Gas

Alternative 9 focuses on ground access improvements. Ground access improvements that would increase electricity and natural gas demand include the ITF passenger service area and the CONRAC customer service area. As noted above, Alternative 9 would also include an APM system, which would likely be electric powered. As shown in **Tables 4.13.1-1**, **4.13.1-2**, and **4.13.1-3**, under Alternative 9, total electricity and natural gas use would be 15,603 MWh/yr and 2.4 MMcf/yr, respectively. The projected consumption of electricity and natural gas under Alternative 9 would represent 0.061 percent of the projected electrical energy demand within LADWP's service area in 2025 and 0.0003 percent of the Southern California regional natural gas demand in 2025.

In order to reduce electricity and natural gas consumption under Alternative 9, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, to maximize the energy efficiency of new facilities. This program would be consistent with federal policies and state requirements pertaining to energy efficiency and resource conservation. In addition, LAWA would apply sustainable design concepts to new facilities in accordance with its *Sustainability Plan*, and would pursue LEED® certification, both of which would increase energy efficiency in the new facilities and building areas.

Under Alternative 9, a sufficient supply of electricity and natural gas is expected to be available. Therefore, impacts with respect to electricity and natural gas consumption would be less than significant. Moreover, with implementation of the measures noted above, Alternative 9 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Under Alternative 9, consumption of transportation-related fuels would increase by 2025, due to increases in passenger activity and the number of flight operations, as well as construction activities. **Table 4.13.1-3** shows all projected transportation-related fuel consumption resulting from Alternative 9.

Jet A

Similar to Alternative 8, Alternative 9, focuses on ground access improvements; therefore, Jet A fuel consumption was not addressed for this alternative.

Gasoline and Diesel

Under Alternative 9, total gasoline and diesel fuel consumption would be approximately 123.2 million gallons and 40.7 million gallons in 2025, respectively. Gasoline and diesel consumption would both increase compared to baseline conditions. A substantial portion of these increases would result from greater flight operations and passenger activity in 2025, which would occur in the future with or without Alternative 9.

Several design features associated with Alternative 9 would partially offset increases in fuel consumption due to increased vehicle trips. Development of the ITF and a CONRAC within Manchester Square would encourage passengers to park or be dropped off outside the CTA, and enter the CTA on the proposed APM system. The APM would include a stop at the future Metro Crenshaw/LAX Transit Station, which would facilitate increased transit ridership to the airport. These features would reduce total VMT to and from the airport, and would reduce transportation-related fuel consumption compared to conditions in 2025 without implementation of Alternative 9.

Under Alternative 9, sufficient supplies of gasoline and diesel are expected to be available. Therefore, the impact associated with gasoline and diesel consumption under Alternative 9 would be less than significant. Moreover, with implementation of the design features noted above, Alternative 9 would not result in a wasteful, inefficient, or unnecessary consumption of gasoline or diesel.

Liquefied Petroleum Gas

Alternative 9 focuses on ground access improvements; therefore, LPG consumption from GSE was not addressed for this alternative.

4.13.1.6.10 Summary of Impacts

Electricity and Natural Gas

Under all of the SPAS alternatives, the passenger-related building area would increase, as would water use and wastewater generation, compared to baseline conditions, resulting in an increase in electricity and natural gas consumption. In addition, the APM systems associated with Alternatives 3 and 9 would also result in increased electricity demand. The highest electricity and natural gas demand would be associated with Alternative 3, as this alternative includes the greatest amount of new building area as well as a dual APM system, whereas the lowest demand would occur under Alternative 4. LADWP and SoCalGas project sufficient supplies of electricity and natural gas to serve future demand. Moreover, under all of the alternatives, LAWA would implement LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, and would comply with its *Sustainability Plan*, which would maximize the energy efficiency of new facilities. For these reasons, under all of the alternatives, impacts associated with electricity and natural gas consumption from the increase in passenger-related building area would be less than significant. As discussed above, LAWA is implementing energy conservation measures in all of its new development. With implementation of LAX Master Plan Commitment E-1, and implementation of energy conservation measures in compliance with the *Sustainability Plan*, Alternatives 1 through 9 would not result in a wasteful, inefficient, or unnecessary consumption of electricity or natural gas.

Transportation-Related Fuel

Total demand for gasoline, diesel, and alternative fuels (LNG, CNG, and LPG) would increase under all of the SPAS alternatives compared to baseline conditions. A substantial portion of this increase is associated with greater flight operations and passenger activity in 2025, which would result from natural growth and would occur with or without implementation of the SPAS alternatives. Increased fuel demand would also be associated with construction activities. The highest total fuel demand would be associated with Alternative 3, due to the higher level of construction activity associated with this alternative and greater fuel consumption by aircraft, and the lowest demand would occur under Alternative 4. Petroleum products are market-driven commodities for which adequate supplies are anticipated well beyond 2025. Therefore, impacts associated with increased transportation-related fuel demand under all of the alternatives would be less than significant. As discussed above, the SPAS alternatives with ground access components (i.e., Alternatives 1, 2, 3, 4, 8, and 9) include a variety of design features to shift individuals away from personal vehicle use to other more efficient modes of transportation, which would reduce transportation-related fuel consumption. With these design features, Alternatives 1, 2, 3, 4, 8, and 9 would not result in a wasteful, inefficient, or unnecessary consumption of Jet A fuel, gasoline, or diesel.

4.13.1.7 Mitigation Measures

Implementation of LAX Master Plan Commitment E-1, Energy Conservation and Efficiency Program, would reduce energy consumption associated with the SPAS improvements and ensure that impacts related to energy use associated with Alternatives 1 through 9 would be less than significant. Therefore, no mitigation measures specific to SPAS are required.