Appendix E2
LAX SPECIFIC PLAN AMENDMENT STUDY REPORT

Ground Access Concept Development

July 2012

Prepared for:

Los Angeles World Airports
One World Way
Los Angeles, California 90045

Appendix E2-1
LAX SPECIFIC PLAN AMENDMENT STUDY REPORT

LAX Ground Transportation Study Report

July 2012

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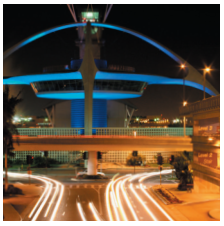

LAX GROUND TRANSPORTATION STUDY REPORT

STV 100 Years

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Abbreviations

APM	Automated People Mover
ConRAC	Consolidated Rental Car
CTA	Central Terminal Area
ITF	Intermodal Transportation Facility
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport
LOS	Level of Service
MAP	Million Annual Passengers
MSC	Midfield Satellite Concourse
POV	Privately Owned Vehicle
SPAS	Specific Plan Amendment Study
TBIT	Tom Bradley International Terminal

Introduction

The Los Angeles International Airport (LAX) Ground Transportation Study was undertaken to identify and evaluate potential surface transportation alternatives and develop design configurations and options that would provide solutions to both current vehicular and pedestrian circulation issues at an activity level of 78.9 million annual passengers (MAP) by 2025. Planning alternatives were considered within and outside of the airport's Central Terminal Area (CTA).

The study team consisted of aviation/transportation planners and roadway/traffic specialists from STV Incorporated (STV) and Ricondo & Associates, Inc. (Ricondo). In 2010, STV Incorporated (STV) prepared a Basis of Design that outlined the general design criteria, performance standards, and guidelines used to assess the CTA roadway network and curbside loading conditions and develop functional and operational planning initiatives to improve traffic flow, pedestrian circulation, and passenger level of service (LOS). In general, the criteria include the following for each of the ground transportation components:

- **Terminal Curbside Loading (Departures & Arrivals):** delays and queuing
- **Pedestrian Circulation:** maximum walking distances; number of level changes; line of sight; vertical circulation
- **On-airport Roadways:** design speed; maximum grades; minimum radii; queuing lengths; delay times; ease of wayfinding; travel times
- **Intersections:** queue length; volume over capacity ratios
- **Connecting Transportation Facilities:** local street network; freeway system; transit system
- **Impacts on Existing Facilities:** identification of existing facilities that would have to be reconstructed or demolished to build ground transportation improvements
- **Property Acquisition Required:** property that would have to be acquired to support ground transportation improvements

STV, in consultation with LAWA staff, developed a number of landside operational and facility improvements for consideration and evaluation. Traffic simulation modeling was performed by Ricondo based on a VISSIM model initiated by LAWA for previous studies. VISSIM modeling was used to identify congestion hot spots that should be addressed, as well as to evaluate how well each planning alternative improved the roadway LOS and reduced congestion at these airport roadway hot spots. Appendix A provides details on the traffic simulation modeling.

In addition to roadway improvements, the study team was tasked with evaluating proposed operational and facility improvements that would have potential for long-term improvements in airport access, including but not limited to the following: an Intermodal Transportation Facility (ITF) outside the CTA; an elevated busway or automated people mover (APM) system; and a Midfield Satellite Concourse (MSC) Passenger Processor and its adjacent roadways and associated curbsides. The options for a dedicated busway or APM considered its integration into the CTA landside access program of roadways, parking structures, passenger pickup zones, and terminal interface.

The study team also examined the disposition of existing CTA real estate, including best-use scenarios for underutilized parcels (e.g., long-term parking areas), current and future use of parking facilities, increase in passenger activity at the TBIT curbside, and the long-term planning of an expansion of Terminal 1 (T1) to the east, referred to as Terminal 0, as part of the LAX Specific Plan Amendment Study (SPAS), and the construction of terminal buildings between T1 and Terminal 2 (T2) and between T2 and Terminal 3 (T3), referred to as Terminal 1.5 and Terminal 2.5, respectively. Terminals 1.5 and 2.5 are LAX Master Plan projects independent of SPAS.

The LAX Ground Transportation Study was initiated in parallel with and in support of the SPAS, which is addressing options for future modernization of LAX, and includes a process for environmental and public review. One intent of the LAX Ground Transportation Study was to support the SPAS process by evaluating and assessing surface transportation improvements that would accommodate 78.9 MAP. While this study considered several operational and physical improvements to the ground transportation system at LAX, only certain proposals were ultimately included in one or more of the SPAS alternatives.

The Ground Transportation Study evaluated the following issues:

- CTA roadway system design currently creates queuing, weaving, and conflict points at various locations that impede traffic flow.
- During peak travel times, inbound airport traffic currently extends out of the CTA roadways onto public streets and may worsen as airport activity returns and grows.
- CTA curbside demand is unevenly distributed, especially during peak periods, creating concentrations of passengers that are not accommodated by the existing curbside system.
- As cumulative regional traffic increases, there will be less time certainty for airport users without easy access to the airport from the regional transit system.
- The roadway system is not designed to efficiently accommodate security screening of vehicles entering the CTA.

The LAX Ground Transportation Study report is organized under the following headings:

- **CTA Roadway Network Improvements** - This section includes consideration of planning initiatives to reconfigure/reprogram approach roadways in the CTA Arrivals (Lower Level) and Departures (Upper Level) roadway network. Three operational concepts are presented for reversing the CTA curbsides, moving commercial traffic to the inner roadway and private vehicles to the outer roadway. A supplement to these concepts, improving curbsides at the TBIT, is also described. These operational concepts could by implemented independently from SPAS.
- **CTA Access Improvements** - Planning options to reconfigure roadways CTA were evaluated. These options include the relocation of Sky Way between 96th Street and World Way North to accommodate Terminal 0.
- **Passenger Processor Facility** - Options for a facility to handle passenger processing for the future MSC were developed. The Processor options included a Departures-only facility and a full-service facility on both the Departures and Arrivals levels. The roadway and curbsides servicing this facility were also explored. This is a Master Plan project independent of SPAS.
- **Intermodal Connectivity** - Several planning alternatives were evaluated that seek to optimize flow within the CTA through the development of intermodal facilities with connectivity to/from the CTA via a dedicated busway or APM. Potential facilities that were considered in support of off-CTA developments include a an Intermodal Transportation Facility (ITF) at 98th Street and a Transit Hub at Manchester Square.
- **SPAS Support** - Various options were developed to support the SPAS process, including location of the following: dedicated busway or APM and its associated stations; ConRAC; employee and public parking; redesigned entry roadways; and support facilities.

CTA Roadway Network Improvements

Problem Definition

The CTA, which is oriented east-west, comprises eight 2-level terminals and seven parking garages served by an elevated Departures and at-grade Arrivals roadway network, World Way, along with north-south intersecting roadways, West Way and East Way, that enable vehicles to recirculate or exit the CTA (**Figure 1**). Seven terminals (T1-T7) primarily provide domestic airline services, while the TBIT, which is undergoing a major expansion and renovation, serves a majority of the airport's international travelers. In addition to the terminals and parking garages.

Key landside features shown on Figure 1 include:

- The Theme Building, a 1961 landmark structure located at the center of the CTA
- A Central Utility Plant (CUP), which is currently being replaced
- Center Way, an east-west exit roadway that will be reconfigured as part of the CUP project
- LAWA Administration Building
- Various employee and visitor surface parking lots and ancillary facilities

The Arrivals roadway system consists of a 2-lane inner roadway and passenger pick-up lane, and an outer roadway of 4-6 lanes, with slip ramps at each terminal to allow private vehicles and taxis to move between the outer curbside roadway and the inner curbside roadway. Table 1 provides information on the number and width of loading and travel lanes, as well as the number of slip ramps, for the Arrivals roadways. The Departures roadway

Figure 1 - Aerial map of LAX CTA

TABLE 1 - ARRIVALS LEVEL ROADWAY GEOMETRIC STATISTICS

Roadway Section	Curb	Number of Lanes		Width of Each Lane (ft.)			Number of Slip Ramps
		Loading	Travel	Loading	Inner Travel Lane(s)	Outer Travel Lane	
World Way North	Inner	1	2	10	10	11	10
	Outer	1	4	20	10	12	
World Way South	Inner	1	2	10	10	11	10
	Outer[1]	1	3/4	20	10	12	

1 - Three 10-foot travel lanes adjacent to T4 and the first half of T5; four 10-foot travel lanes for the remainder of World Way South

system is comprised of a 3-lane roadway and a passenger drop-off area of sufficient width that allows for dual unloading adjacent to the terminal curbsides.

Current operations allow private vehicles, limousines, taxis, and door-to-door shuttles (Prime Time and Super Shuttle) to pick up passengers along the inner curbside of the Arrivals roadway; all other commercial vehicles are required to pick up passengers along the outer curbside; these include multiple buses and vans serving rental car companies, hotels, remote parking, FlyAway® service, and other off-airport shuttles. Pedestrian wayfinding signs direct customers along the inner curb to the appropriate crosswalk connecting with the customer's desired commercial mode; this limits the need for customers to walk along the outer, narrower commercial islands in search of their particular commercial vehicle loading zone. **Figure 2** is a photograph of a typical Arrivals curbside showing private vehicles on the inner roadway and commercial traffic on the outer roadway. **Figure 3** provides an elevation view and a partial plan view of the existing Arrivals level roadway and **Figure 4** illustrates the 2010 Arrivals level curbside allocations.

Traffic bottlenecks occur along the Arrivals roadway at peak travel times, particularly at T1 and on the approach to TBIT. Without improvements to the existing operation, these choke points will further deteriorate as traffic

Figure 2 - Typical arrivals curbside

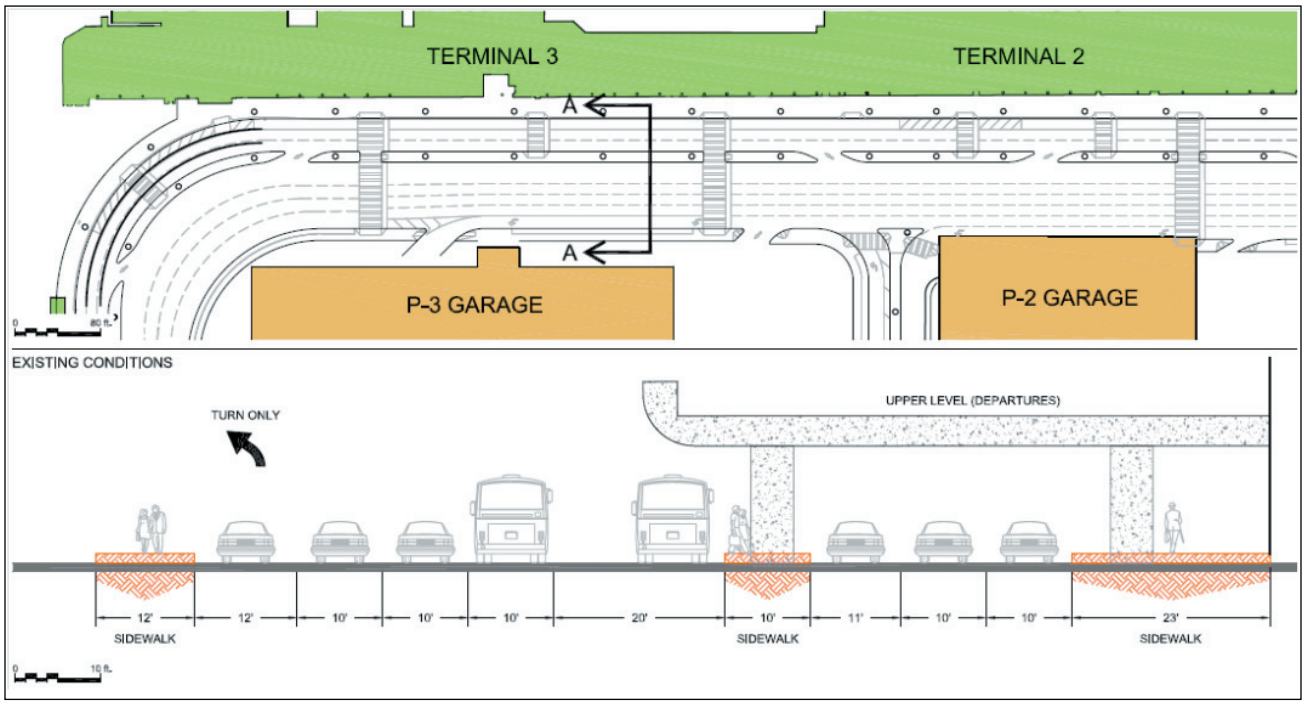

Figure 3 – Existing Arrivals level roadway layout with POVs on the inner roadway and mixed modes on the outer roadway of World Way

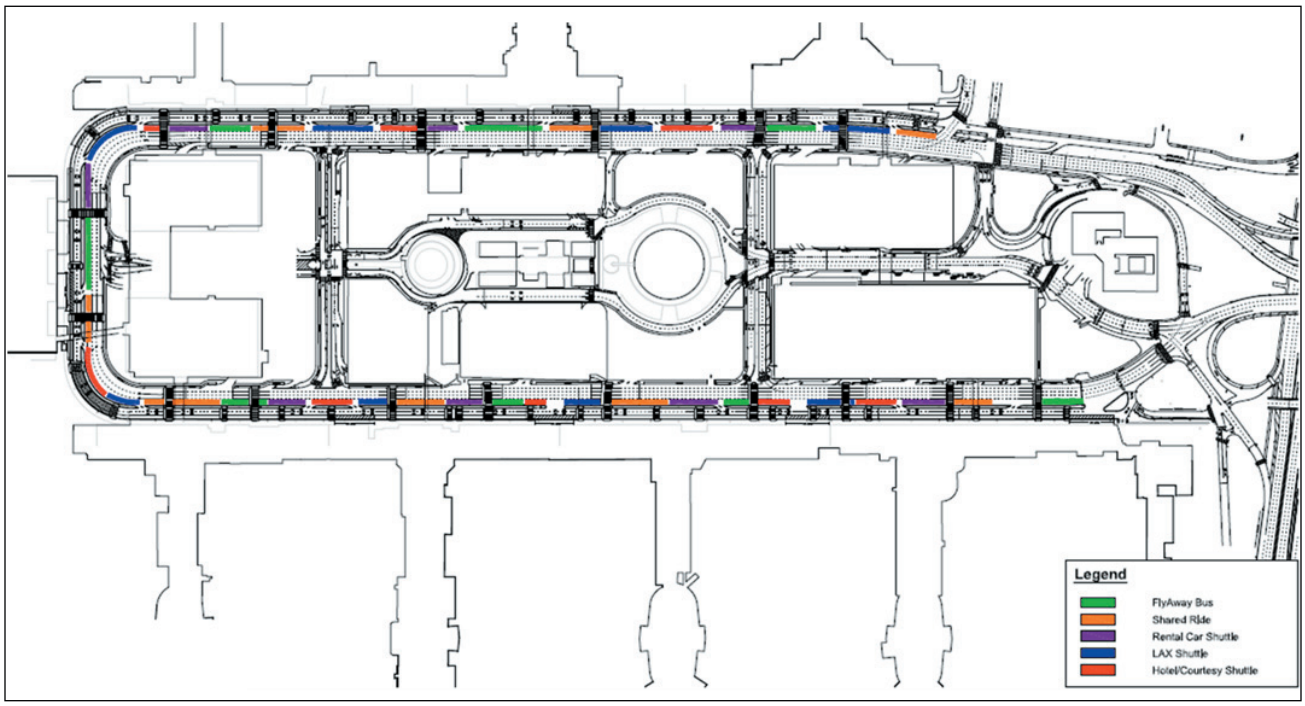

Figure 4 – Arrivals level vehicle curbside allocations, 2010

volumes increase. The VISSIM model was calibrated at 59.8 MAP, the LAX passenger activity level in 2008, which was the last full year of data available when STV began its study in 2009. Passenger activity in the SPAS EIR baseline (i.e., 2010) was 59.1 MAP. The activity level in 2008 (i.e., 59.8 MAP) is sufficiently close (within one percent) to be considered representative of 2010 conditions. The model showed some queuing along West Way and minor to moderate congestion at various locations along the CTA roadways. Based on output from the model, recommendations independent of SPAS were made to address existing roadway capacity issues and improve traffic flow along the affected areas, including adding a traffic signal at West Way and World Way South and widening World Way across from TBIT between the driveway to P3 and Center Way to accommodate an additional lane of traffic. The latter recommendation was subsequently included as a component of the CUP project currently under construction.

The current configuration of the curbsides requires all vehicles destined for TBIT to travel along the entire CTA main line roadways. This, coupled with the slip ramps for ingress and egress into the inner curbsides on the Arrivals level, were observed to cause severe weaving problems. Simulation of the existing roadway configuration at 78.9 MAP shows that LOS on the inner curbside at TBIT deteriorates significantly and leads to backups that extend east along World Way North.

The 78.9 MAP activity level was modeled to include only the programmed facility improvements at the TBIT and construction of the MSC. Without additional operational and facility improvements, the VISSIM modeling showed that the CTA roadways would experience severe congestion, with vehicle queues extending from the TBIT to the airport entrances under the 78.9 MAP condition (**Figure 5**). This congestion is a consequence of the significant increase in the number of passengers who are expected to be processed through the TBIT.

The primary reason for this significant increase was the study's assumption that, at the 78.9 MAP activity level, passengers on flights gated at the MSC and TBIT would be processed through the TBIT Arrivals Hall, and that 41% of all arriving passengers would be processed through the TBIT compared to 19% with the 58.9 MAP level. This growth in passengers arriving on the TBIT curbside during

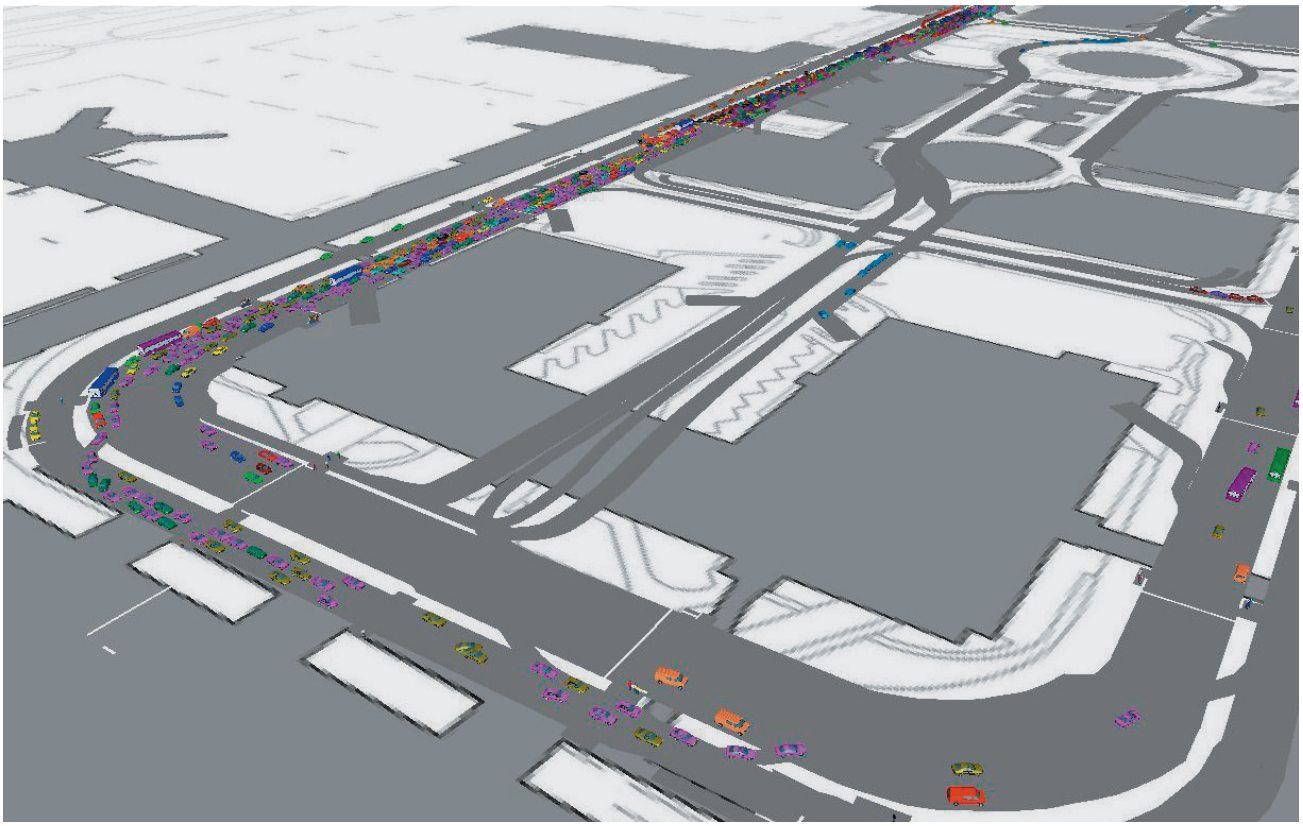

Figure 5 – VISSIM animation of existing CTA roadway operations with the future 78.9 MAP activity level

the peak hour resulted in a 175% increase in vehicles trying to access the TBIT inner roadway curbsides. Commercial vehicle traffic, on the other hand, grew at a more moderate pace due to underlying efficiencies derived from high-occupancy vehicles (HOVs). Note that an increase of 15 privately owned vehicle (POV) passengers would add 10 additional POVs into the network (assuming an occupancy of 1.5 passengers per POV), whereas, 15 rental car customers would warrant only one additional commercial vehicle (at 15 passengers per rental car shuttle).

Based on the 175% (746-vehicle) increase in vehicles attempting to access the TBIT curbside with no accompanying facility improvements, the VISSIM simulation showed that vehicles block both the inner and outer roadway lanes from the TBIT curbsides back to the airport entry ramps from both Century and Sepulveda Boulevards.

Trip generation and distribution modeling showed that approximately 500 additional airport peak-hour vehicle trips would enter and exit the CTA at 78.9 MAP compared to the 59.8 MAP activity level; during the same time period, vehicles traveling along the TBIT frontage were estimated to increase by more than 700 trips. The increase of approximately 200 additional airport peak-hour trips in front of the TBIT, compared to the east end of the CTA, are attributed to recirculating vehicles. Supporting documentation for the 59.8 MAP and 78.9 MAP peak-hour traffic volumes on the eastern and western ends of the CTA is provided in Appendix A (Figures A-1 and A-2). The simulation results also showed that an addition of approximately 500 POVs on World Way during peak periods resulted in increased delays, as many of these vehicles were forced to weave between commercial vehicles along the outer roadway as they attempted to either enter or exit the inner Arrivals roadway at one of the 20 existing slip ramps.

Reprogramming Arrivals Curbside Operations

This section describes one of the planning initiatives, the reconfiguration of the Arrivals curbsides, that would dramatically change vehicular and passenger circulation and improve LOS. The study team developed three options (Options 1, 2, and 3) for reprogramming the inner and outer curbsides of the Arrivals level; bus traffic is relocated to the inner curbsides along with taxis, and private vehicles are relocated to the outer curbside. A fourth option (Option 4) addresses improvements at the TBIT curbside that could be implemented to augment any of the other three alternatives.

Based on the observations made from the 78.9 MAP model, the primary limitations of the existing CTA roadway network were the slip ramps and outer roadway throughput capacity. This was particularly evident in the area of T3 and the TBIT, which were projected to experience a large growth in POV volumes from 58.9 MAP to 78.9 MAP. In an attempt to resolve this problem, the study team proposed reversing the Arrivals Level curbsides so that private vehicle and taxi operations would move to the outer curbside while the remaining commercial vehicles would move their operations to the inner curbside.

The modeling revealed that if the curbsides are reversed, the overall congestion levels dropped significantly. The outer curbsides operated with some congestion but with significant improvement over the existing operation. On the inner curbsides, the commercial vehicles operated with a reasonable LOS, although the change in congestion levels before and after the reversal of the curbside operations have not been quantified.

Causes of reduced congestion include the following:

- Significantly more POVs compared to commercial vehicles
- Outer roadway has more capacity
- Friction caused by the slip ramps results in congestion on both the inner and outer roadways

Potential benefits of reversing vehicle modes on the inner and outer roadway curbsides include the following:

- Balances modal capacity
- Reduced emissions, since alternate fuel vehicles are moved to inner roadway
- Operational control of who uses the curb closest to the terminal
- Outer roadway curbside operates more efficiently by segregating POVs from commercial vehicles
- Improved pedestrian safety with wider median curbside

In addition, the reversal is a relatively low capital-intensive improvement that is reversible, if LAWA decides to return to the current operational configuration.

Key considerations to reversing the Arrivals level curbside operations include the large structural columns located on the 10-foot-wide outer islands. Implementing the reversed curbside operations on the Arrivals level would require various facility improvements. These would include:

- New wayfinding signs for both pedestrians and drivers
- Widening the outer curbside islands and restriping the outer roadway to provide larger pedestrian waiting areas. This will result in the elimination of a moving lane of traffic on the main roadway of World Way
- Installing a new traffic signal at T7 and World Way South to facilitate the movement of commercial traffic from the inner roadway to the outer roadway
- Installing a grade-separated crossing(s) between TBIT and Parking Structures 3 and 4 (P3/P4) to replace pedestrian crossings on the outer roadway
- Inner curbside vehicle access improvements at T1
- Restriping the Arrivals roadway inner curbside roadway

Each of these proposed facility improvements and a number of operational variations on this configuration were considered, although not all variations were evaluated using VISSIM simulation modeling.

One of the improvements common to all of the reverse curbside alternatives is the recommendation to install a traffic signal at T7 and World Way South. Placing a traffic signal at this location will provide the opportunity for commercial vehicles to safely merge onto World Way South and access their desired lane at the downstream intersection (see Appendix A, Figure A-3). With the commercial vehicles moved to the inner roadway of World Way, shuttles and buses would exit after passing T7. Because of the high vehicle volumes along World Way South, and the desire of some commercial vehicles to access Circle Way (requiring vehicles to weave across three lanes of traffic prior to the intersection of World Way South and Center Way), this traffic signal would ease the egress by the commercial vehicles from the inner roadway.

Reprogrammed Arrivals Curbside Alternatives

Table 2 summarizes the features of the four options for reprogrammed curbsides and their advantages and disadvantages. Each is described below.

TABLE 2 - REPROGRAMMED CURBSIDE OPTIONS

Option	Features	Advantages	Disadvantages
1	Relocating POV Arrivals curbside to face of parking garages	• Reduces recirculation within the CTA • Potential to add traffic lane on World Way	• Eliminates spaces in parking structures • May require modification of parking structures to accommodate APM
2	Relocating POV Arrivals curbside to Theme Building	• Optimizes Theme Building real estate • Reduces impact of APM to parking structures	• Impacts space in parking garages • Increases distances for passengers to travel • Closes northbound East Way
3	Relocating POV Arrivals curbside and widening curbside to improve pedestrian flow	• Enhanced LOS for passengers • Accommodates APM near terminals	• Loss of one lane of traffic on outer roadway • Less efficient outer curbside pickup
4	TBIT POV curbside expansion	• Relieves congestion at TBIT • Provides location to integrate future APM	• Requires staging/phasing of parking operation • Requires demolition of vehicular ramp and upper deck bridge at P3/P4

Option 1

This option relocates the commercial shuttle curb zones from the outer roadway of World Way (**Figure 6**) to the inner curb adjacent to the terminals (**Figure 7**). Passenger pick-up zones for POVs are relocated from the inner curb adjacent to the terminals to segments of the first ground floors of the parking structures. This relocation would enable drivers to wait in these designated areas for arriving passengers instead of recirculating on CTA roadways until an arriving passenger is sighted at the curb. A capacity analysis of the parking structures would be required to determine whether a sufficient number of spaces could be reprogrammed for this waiting area.

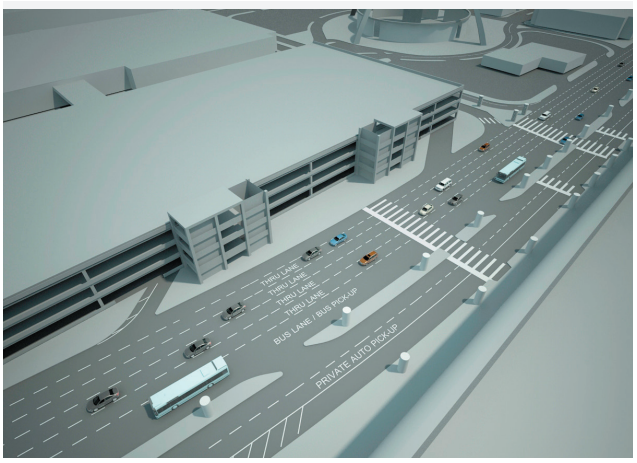

Figure 6 – Existing conditions of World Way Arrivals roadway

Under Option 1, pedestrian crosswalks are consolidated at a limited number of signalized crossing locations to optimize bus and taxi frontage along the terminal curbs and to facilitate safe pedestrian circulation between the terminals and the relocated private vehicle pick-up areas within the parking structures. Architectural barriers would be added to the curbsides for directing passengers through reconfigured, signalized crosswalks. A new wayfinding program would be introduced to guide passengers to relocated pick-up areas. A future APM right-of-way along the frontages of the parking structures is also incorporated to work in tandem with the proposed private vehicle pick-up areas (**Figure 8**).

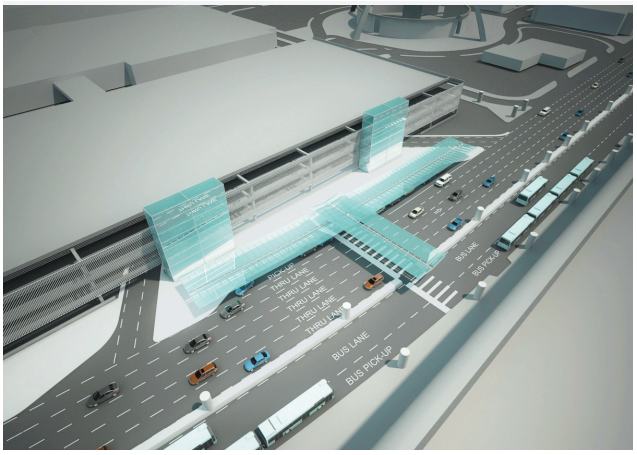

Figure 7 - Option 1: new vehicular curbsides with POV pickup at face of parking garage. Rendering shows weather-protection canopies and crosswalk, and vertical transportation elements at garage

Traffic Simulation Analysis & Findings

Simulation modeling was performed to determine the advantages and disadvantages of Option 1. In summary, relocation of the commercial shuttles to the inner roadway can create an additional lane on World Way; however, the need for additional right-of-way to integrate a future APM alignment along the parking structures may eliminate that advantage.

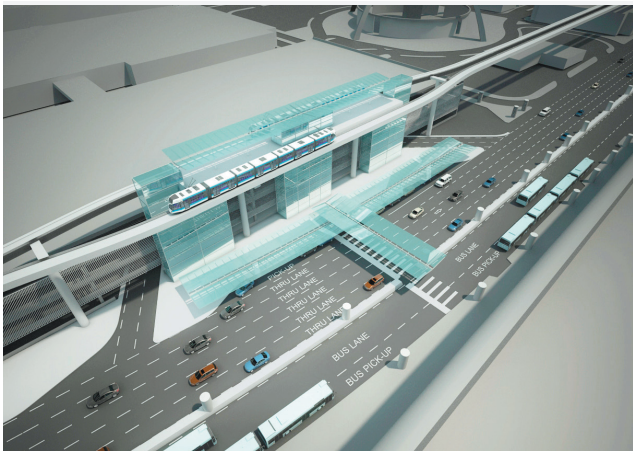

Figure 8 - Option 1: curbsides showing potential for an integrated APM station and guideway at garage

Pros:

- Short-term arrivals pick-up areas within the parking structures reduce recirculation within the CTA
- Potential to add a lane of traffic on World Way, or improve the efficiency of the existing lanes

Cons:

- Eliminates parking spaces on the ground level of the parking structures

- Parking structures may require modifications to accept the APM station and support structure
- Requires new passenger wayfinding and passenger education through pamphlets and other outreach materials

Option 2

As in Option 1, this option includes the relocation of commercial shuttle curb zones from the outer, main roadway of World Way (**Figure 9**) to the inner curb adjacent to the terminals (**Figure 10**). Portions of the first floors of parking structures would be used for private vehicle pick-up areas for arriving passengers; however, the primary private auto waiting areas would be located in the underserved real estate on the north and south sides of the Theme Building.

Figure 9 - Existing conditions at the Theme Building

Pedestrian crosswalks would be consolidated at a limited number of signalized crosswalk locations to optimize bus and taxi frontage along the terminal curbside and to facilitate safe pedestrian circulation between the terminals and the relocated pick-up areas adjacent to the Theme Building and in the parking structures. Railings would be added on the existing raised commercial island to channel pedestrians to these crosswalks. A pedestrian wayfinding and management program would be needed to guide pedestrians to the new pick-up locations.

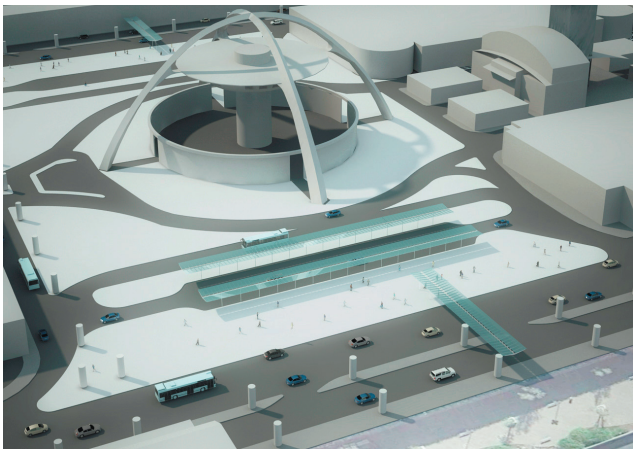

Figure 10 - Option 2 : curbside configuration adjacent to the Theme Building

While the reprogramming of curbsides in Option 2 would increase the walking distance for passengers being picked up by a private vehicle, the additional area created by eliminating the existing commercial loading lane, shifting the travel lanes away from the parking structures, and relocating many of the private vehicle pickup areas off World Way North and World Way South provides right-of-way opportunities for an APM alignment along the parking structures (**Figure 11**).

Northbound East Way would be eliminated to avoid vehicle flow conflicts at the entrance to the proposed private vehicle pickup area north of the Theme Building and at the exit of the proposed private vehicle pick-up area south of the Theme Building. Option 2 also incorporates other CTA improvements associated with the reverse curb operation, such as a new traffic signal at the easterly end of T7, which was described under Option 1.

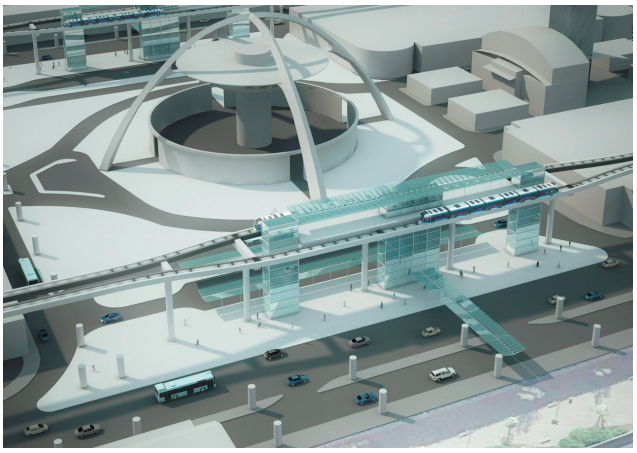

Figure 11 - Option 2: curbsides with integrated APM station and guideway at the Theme Building

Traffic Simulation Analysis & Findings

Option 2 was evaluated through simulation modeling to determine its advantages and disadvantages. Relocation of the commercial shuttles to the inner roadway can create an additional lane on World Way; however, the need for additional right-of-way to integrate a future APM alignment along the parking structures may eliminate that advantage.

Pros:

- Underutilized Theme Building real estate is optimized
- Provides a right-of-way opportunity for an APM alignment along the parking structures that may reduce impacts to the parking structures with stations located at the Theme Building

Cons:

- Provides supplemental private vehicle Arrivals pick-up zones within designated CTA garages, potentially requiring replacement parking to be developed in other airport locations
- Increases walking distance for passengers being picked up by private vehicles
- Closing northbound East Way will force private and commercial vehicles to travel east through the World Way South and Center Way intersection to use Circle Way as their recirculation route
- Requires new wayfinding and passenger education program

Option 3

This option addresses inadequate space for passenger circulation between the inner and outer roadways by widening the raised median island along the outer Arrivals curbside that serves private vehicle pickup. This curbside would be developed to provide modern passenger services and amenities and weather-protection canopies (**Figures 12 and 13**).

The existing structural support columns for the Departures level roadway, which are within the current 10-foot width of the outer curbside islands, provides limited space for passengers, particularly with luggage, to circulate along the curbside without having to step off the curb onto the inner or outer roadway lanes. To eliminate this problem, the outer curbside islands could be either widened towards the terminals, thereby reducing the inner curbside roadway from three lanes (one loading and two travel lanes) to two lanes, or by widening the curbside towards the public parking garages and reducing the number of vehicle travel lanes in the main roadway of World Way.

Figure 14 provides a section of the proposed inner and outer roadway lanes with the outer curbside island widened from 10 feet to 20 feet to accommodate increased pedestrian activity. Widening the outer curbside towards the parking structures would result in the loss of a travel lane on the outer roadway of World Way. However, the reversed curbside operation also eliminates the need for many of the vehicle slip ramps which currently allow private vehicles and taxis to move between the inner and outer roadways. The closure of these slip ramps, except for a minimal number reserved for public safety and airport authorized vehicles, also eliminates the additional friction caused by private vehicles weaving between commercial vehicles; it also results in an increase in vehicle throughput capacity, especially for the lanes adjacent to the outer curbside. However the alternative, narrowing the inner roadway, is not recommended, since it would make commercial vehicle operations more challenging and result in a reduction in the throughput capacity by increasing the likelihood that buses attempting to access the curbside would block vehicles trying to pass.

Consideration was also given to narrowing the inner curb sidewalk (next to the terminals) to create additional inner roadway width. While some sections of the sidewalk adjacent to the terminals have sufficient width to allow the roadway to be widened, other sidewalk segments contain facilities such as elevators, escalators, and support columns which preclude this possibility.

With the widening of the outer curbside providing additional queuing and circulation space for passengers, consideration should be given to constructing a railing along the side of the outer curb sidewalk closest to the terminals for passenger safety and to channel passengers to the crosswalks between the inner and outer curbs.

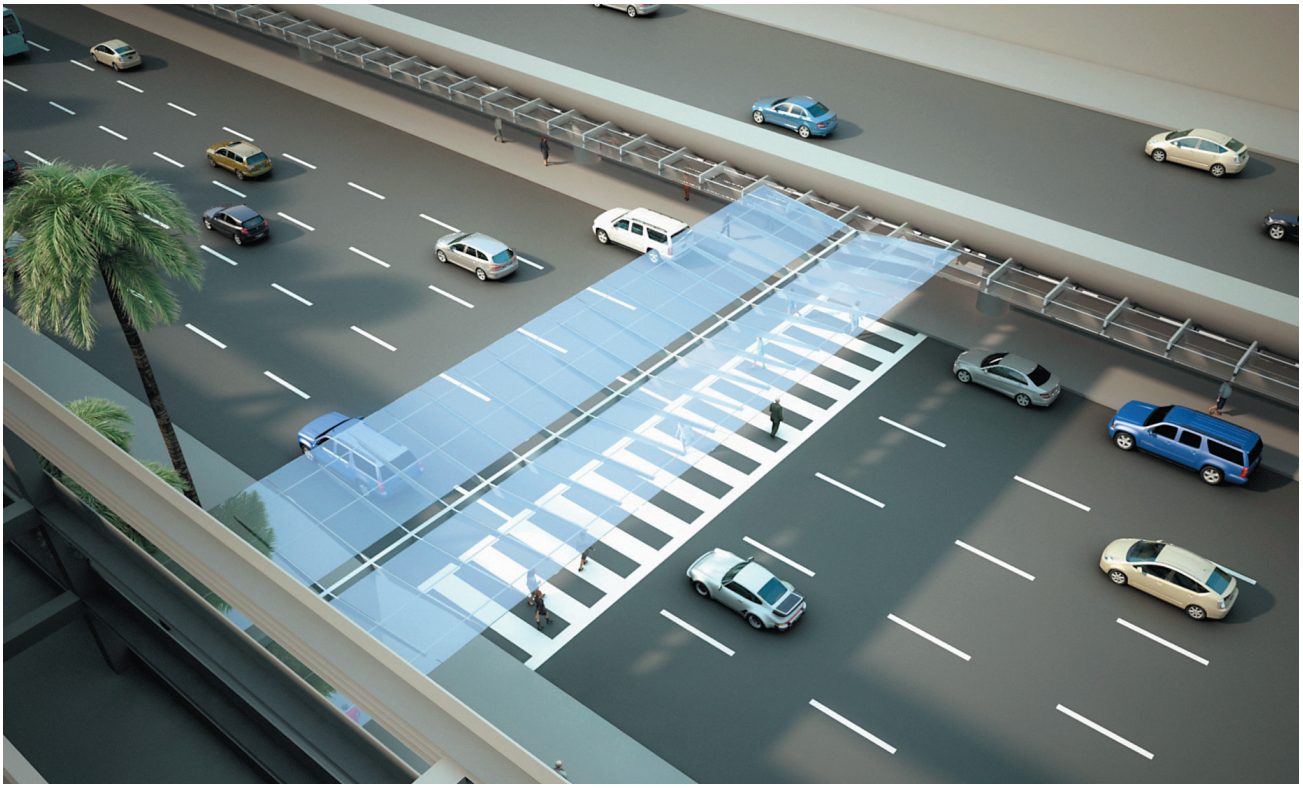

Figure 12 - Option 3: expanded outer Arrivals curbside with signalized, weather-protected crosswalk (bird's-eye view)

Figure 13 - Option 3: expanded outer Arrivals curbside with signalized, weather-protected crosswalk

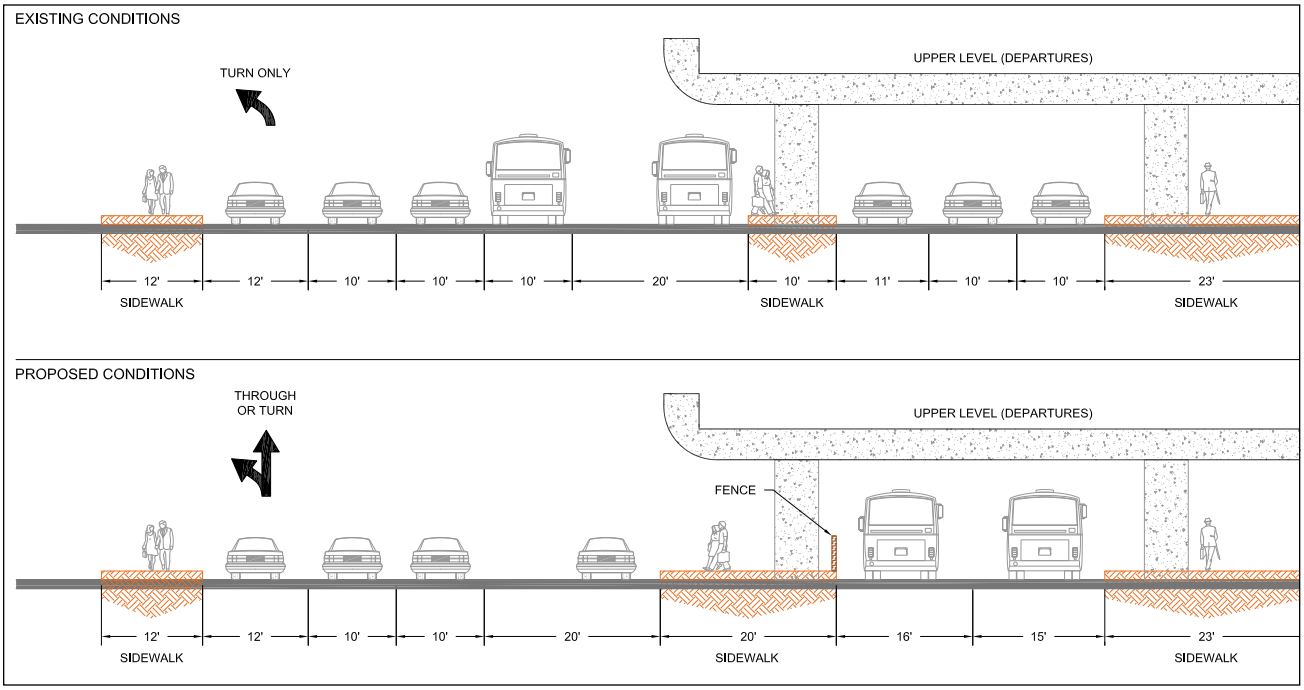

Figure 14 - Comparison of the existing Arrivals Level roadway layout with reprogrammed roads and widened outer curbside

As in Options 1 and 2, pedestrian crosswalks would be consolidated to a limited number of signalized crossing locations to optimize bus and taxi frontage along the terminal-side/inner curbs and to facilitate safe pedestrian circulation between terminals, relocated private vehicle pick-up areas, and parking structures. A specific pedestrian wayfinding and management program would be needed to inform passengers as to the new curb assignments.

Option 3 also provides adequate space for a future APM right-of-way along the widened, redeveloped outer curbside; this is an important feature of this option because it leaves the parking structures untouched (**Figure 15**).

Under Option 3, commercial vehicles would enter the Arrivals level inner roadway at T1 and pick up passengers along the inner curbside at each of the terminals, merging with traffic from the outer lanes east of T7. Private vehicles would pick up passengers along the outer curb,

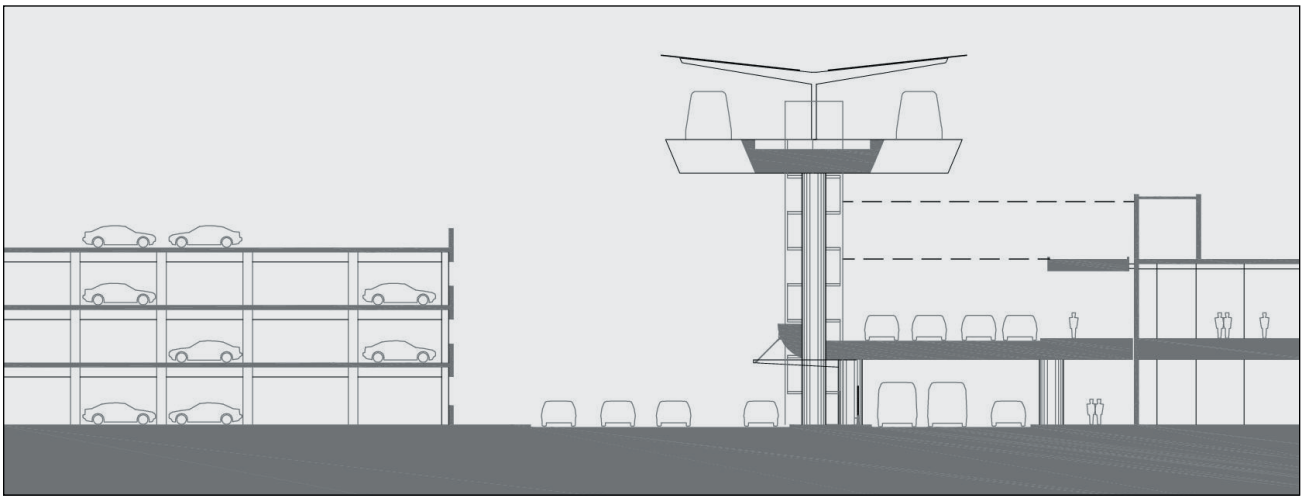

Figure 15 - Terminal-side option for APM guideway/station in which passengers circulate over the Departures roadway

eliminating the additional vehicle congestion caused by vehicles moving between the outer roadway and the inner roadway. Most existing slip ramps would be closed, with a small number of strategic slip ramps remaining open for emergency and authorized vehicles. Further study is recommended to evaluate the need to widen the outer curbside island to accommodate increased pedestrian activity, even if the POV and commercial curb operations are not reversed.

Traffic Simulation Analysis & Findings

The LOS for Option 3 was evaluated through simulation modeling. Expanding the outer curbside to improve pedestrian circulation in the POV pick-up zone results in the loss of a travel lane; however, that loss may be offset by the elimination of weaving and roadway friction between commercial and private vehicle traffic. Results of VISSIM simulation for the 78.9 MAP activity level showed that after flipping the Arrivals level roadway operations and instituting some degree of commercial vehicle consolidation, along with many of the other operational and facility improvements discussed previously, congestion levels and vehicle queue lengths along the outer roadway adjacent to T3 and the TBIT showed significant improvement. However, this roadway segment still had vehicle queues extending to West Way during the peak activity period. While the TBIT curbsides generated a significant amount of traffic, based in large part on the assumption that arriving passengers to both TBIT and MSC would all be processed through the TBIT Arrivals Hall, there was still a significant number of vehicles generated from other terminal activity and bypassing the TBIT curbsides. In addition, P3 and P4 are currently the two busiest public parking facilities in the CTA and are expected to remain so when LAX reaches the 78.9 MAP activity level. This suggests that a large number of passengers, as well as meeters/greeters, will continue to cross the inner and outer roadways at grade.

By providing a grade-separated pedestrian crossing and removing both of the pedestrian crossing signals between P3 and P4 and the TBIT, initial simulation results showed that vehicle flow along the outer roadway at T3 and the TBIT experienced a noticeable improvement. While the concept of grade separating pedestrian traffic between the P3 and P4 structures and the TBIT was modeled to assess the impact on traffic flow, specific grade-separation concepts have not been developed as part of this study. Should a grade-separated pedestrian crossing be constructed at the TBIT, pedestrians currently required to cross the Departures level roadway at grade would likely also use the grade-separated crossing, thereby allowing the Departure level signals to be removed.

Simulation also showed that during peak times, southbound West Way can queue north of Center Way, impeding eastbound traffic on Center Way at West Way. To resolve this queuing, the installation of a new traffic signal at the intersection of West Way and World Way South was recommended.

Pros:

- Enhanced LOS regarding wayfinding, circulation, and curbside amenities for arriving passengers
- Widened, redeveloped outer private auto curbsides provide potential for a future APM right-of-way, enabling the APM stations to be located in proximity to the terminals and the parking structures to remain undisturbed

Cons:

- Loss of one lane on the main roadway of World Way
- Potentially less efficient outer curbside pickup and through traffic operations

Option 4

Option 4 is a supplemental improvement that can be implemented with any of the previous options for curbside reprogramming. This option includes the development of new east-west taxi curbsides to serve the TBIT redevelopment between P3 and P4 and new north-south multimodal curbsides east of the structures to serve T4 and T6. Taxis, buses, and POVs would enter these new roadways from World Way North prior to reaching TBIT, thereby relieving congestion at TBIT. The proposed north-south curbsides also support development of a future APM station at this location.

Establishing a site of sufficient size between P3 and P4 to enhance curbside pickup at TBIT would require the following infrastructure modifications:

- Demolishing the east-west vehicular ramp connecting the upper and lower level roadways
- Demolishing the north-south upper deck bridge that connects the P3 and P4 parking structures
- Reconfiguring the P3 and P4 exit plazas

Figure 16 is a view of existing conditions and Figure 17 the same view with new curbsides. Figure 18 illustrates how the new curbsides would be integrated with a future APM station and guideway.

Figure 16 - Existing conditions at P3 and P4 viewed from TBIT

Traffic Simulation Analysis & Findings

In Option 4, private vehicle pickup for T1 and T2 will take place on proposed curbsides in the ground level of P1, while arriving passengers from T6 and T7 will meet their party on the ground floor of P7. Arriving passengers being picked up by a private vehicle at T3, T4, or T5 are assigned to the proposed north-south curbside between P3/P4 and West Way, while TBIT passengers are directed to the new (east-west) curbside between P3 and P4, as illustrated in Figures 19 and 20.

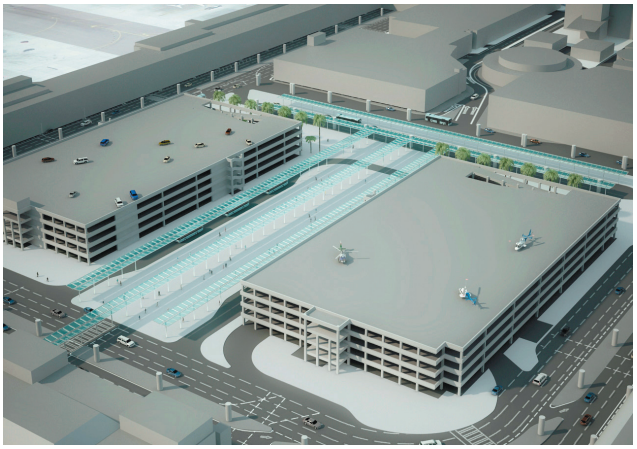

Figure 17 - Option 4: mutlimodal curbsides introduced between P3 and P4 and east of P3/P4

Option 4 eliminates the use of the TBIT outer curbside by adding railings on the raised island to channel pedestrians to crosswalks while restricting passenger loading. Passengers would be forced to cross from the terminal curbs across both the inner and outer roadways to the new passenger loading areas between P3 and P4. While this planning alternative increases the walking distances for passengers being picked up by a private vehicle, the additional area created by eliminating the existing commercial loading lane, shifting the travel lanes away from the parking structures and relocating many of the private vehicle pickup areas off World Way North and World Way South, attempts to maximize opportunities in the CTA by incorporating underutilized space on the ground level of the P1 and P7 structures.

Other key elements of Option 4 include the following:

- Taxi loading at all terminals within the CTA would be along new curbsides on the left side of the outer

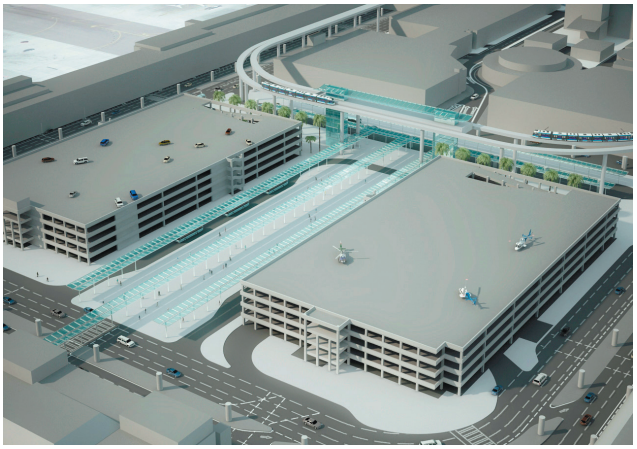

Figure 18 - Option 4: multimodal curbsides with integrated APM station and guideway east of P3/P4

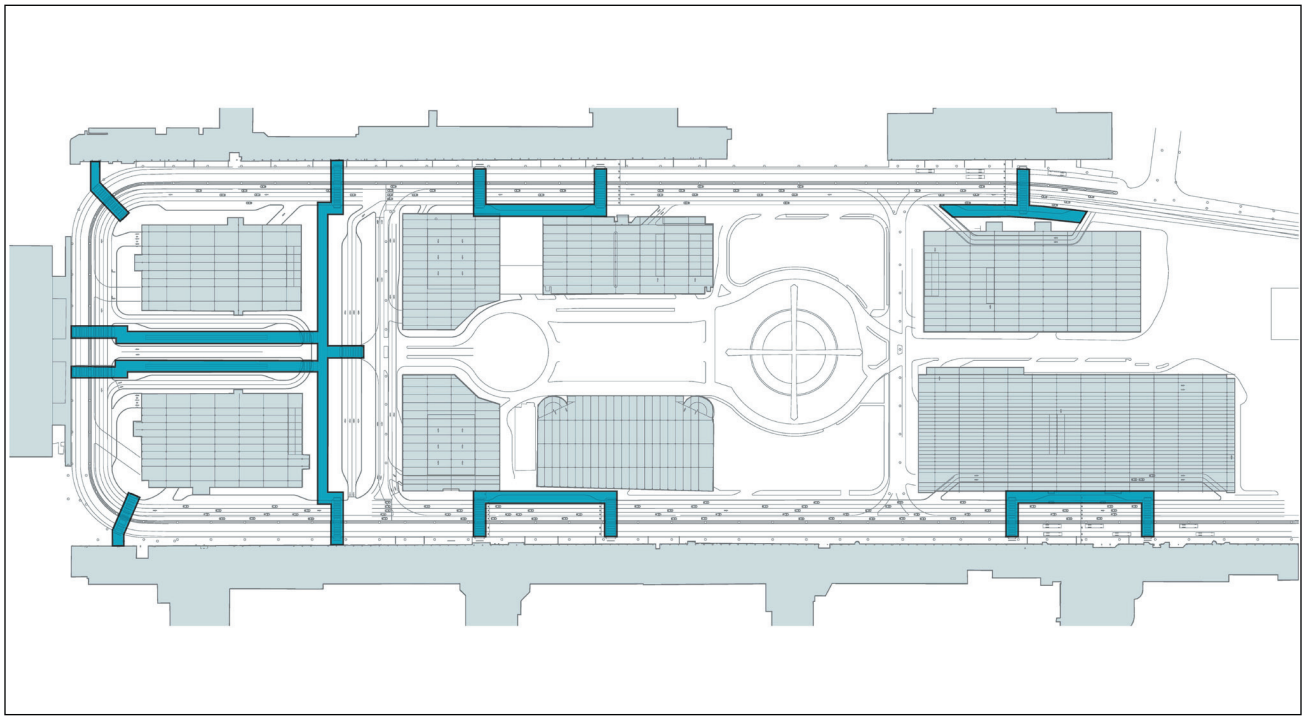

Figure 19 - Private vehicle pickup in CTA garages and between P3 and P4

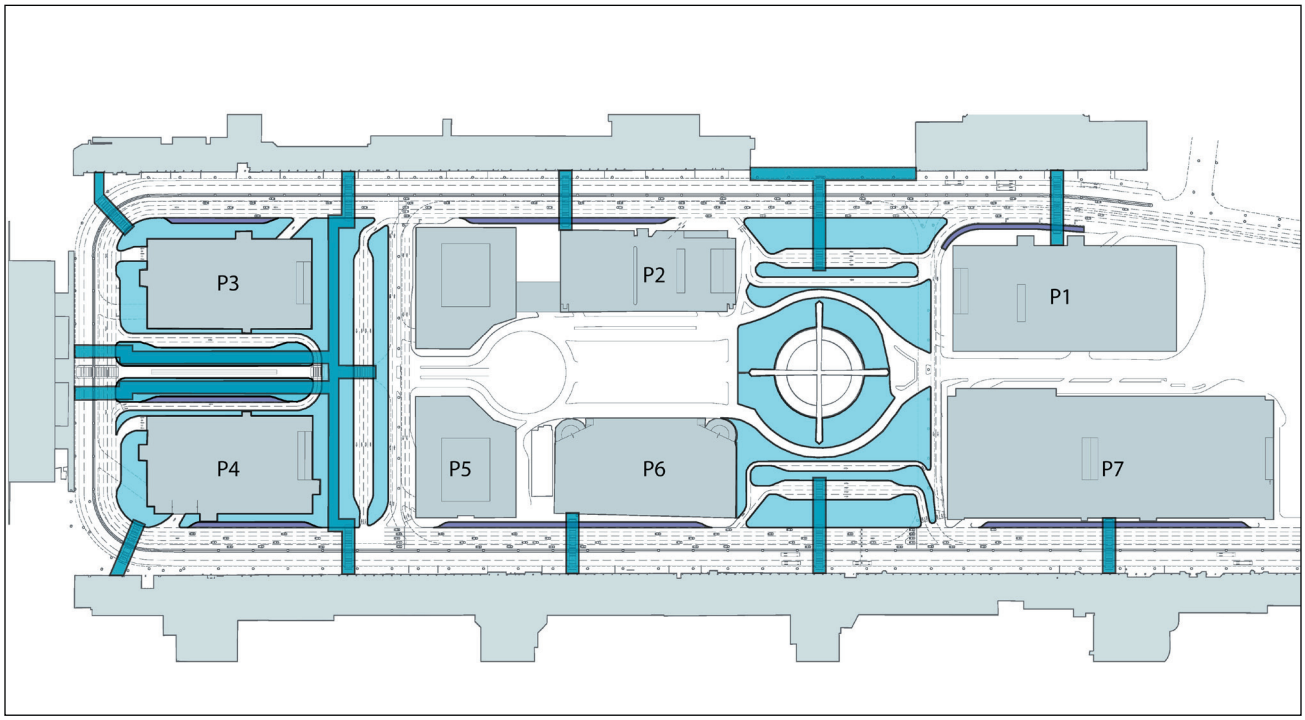

Figure 20 - Private vehicle pickup adjacent to the Theme Building and between P3, P4, and West Way

WEATHER PROTECTED WALKWAY
APM STATION
PASSENGER CURBS

roadway adjacent to each terminal parking structure. Taxis will have left-side loading on these curbsides. The exception to this will be at the TBIT where taxis will continue to load along the inner curbside roadway

- East Way would be closed in both directions to avoid creating vehicle conflicts between private vehicles exiting P1 and a vehicle turning southbound from World Way North, as well as between vehicles turning from southbound East Way onto World Way South and private vehicles entering P7
- P5 and P6 parking customers would exit onto World Way South
- The exit from P3 would be relocated to the new TBIT curbside roadway between P3 and P4
- The exit from P4 would be relocated to World Way in front of the TBIT
- Pedestrians from TBIT would cross the Arrivals level roadway on relocated at-grade crosswalks which will be located to directly connect the terminal curbside with both northern and southern sides of the new TBIT curbside
- This concept also incorporates other CTA improvements associated with the reversed curbside operations concept, such as the new traffic signal at the easterly end of T7

Pros:

- Reconfigured curbsides aid to relieve congestion at TBIT
- Proposed north-south curbsides offer a location to integrate a future APM station

Cons:

- Reconfiguring exit/entry plazas in P3 and P4 requires staging and phasing of parking operation
- Requires demolition of the vehicular ramp and north-south upper deck bridge that connects P3 and P4

Additional Considerations for Reconfigured Curbsides

Taxi Loading Operations

Reversing the Arrivals level curbsides operations results in two potential scenarios for taxi loading operations: (1) maintaining the taxi passenger loading areas along the inner curbside with the other commercial vehicle modes; or (2) relocating the taxi passenger loading areas to the outer curbside along with private vehicles.

LAWA staff indicated that it would be unlikely to relocate the taxi operation to the outer curb. However, initial simulation results indicated that reversing the Arrivals level curbside operations while maintaining taxi operations on the inner curbside generated sufficient congestion to warrant reconsideration of this scenario and instead to relocate taxi operations to the outer curbside. Further, maintaining taxis operations along the inner curbside may require additional slip ramps to the outer curbside to facilitate taxis exiting the airport. This would limit the roadway capacity improvements derived by reversing the curbside operations and impede the efficient flow of the pedestrians along a widened outer curbside.

Appendix A includes two depictions of the commercial vehicle service on the CTA roadway curbsides, one with the taxi loading locations on the inner roadway curbside (Figure A-3) and the other with taxi loading locations along the outer roadway curbside (Figure A-4). In addition, both exhibits provide the corresponding commercial vehicle allocations along the inner curbside roadway.

Arrivals Inner Roadway Access & Commercial Vehicle Maneuverability

For a reversed curbside operation to be considered, commercial vehicles must be able to access and maneuver safely within the Arrivals level inner roadway. This is most challenging for larger vehicles operating on the dual-loop route within the CTA; these vehicles circulate around the Departures level before transitioning to the lower Arrivals level at the northbound approach to the intersection of World Way North and Sky Way immediately east of T1. The current northbound approach to this intersection consists of two dedicated left-turn lanes and a single dedicated through lane, which are fed from three stop-controlled lanes: Circle Way (from the intersection of Center Way and World Way South); the Departures level roadway ramp; and Eastbound Center Way.

Vehicles using eastbound Center Way are mainly comprised of recirculating private vehicles while the majority of the vehicles on Circle Way and the ramp from

the Departures level are commercial vehicles either destined for the Arrivals level curbsides or exiting the CTA via Sky Way. Two northbound left-turn lanes are required to handle the demand of commercial vehicles turning from Sky Way onto World Way North. Since the commercial vehicles turn onto the wide, outer roadway of World Way North, the commercial vehicles can easily negotiate this left turn. However, LAWA staff expressed concern that if the commercial pick-up curbs on the Arrivals Level were relocated to the narrower, inner roadway next to the terminals, the dual left turn from northbound Sky Way could not be retained. This was confirmed by the study team's analysis of the roadway geometry.

Existing support columns prevent two standard 40-foot-long buses with a width of 8.5 feet from being able to turn simultaneously from the left turn lanes into the inner roadway. Based on this finding, two concepts were developed to improve LOS at the intersection of World Way North and Sky Way: (1) realign the left turn lanes (**Figure 21**); and (2) install a 2-phase signal that would prohibit a left turn for northbound vehicles, which would be directed to a jug handle, allowing a return to the CTA (**Figure 22**).

The 30-foot-wide inner roadway is currently striped with two travel lanes and one passenger loading lane. While it may be possible to operate large commercial vehicles such as a 40-foot bus in three lanes of the inner roadway along World Way North from T1 to T3, and along World Way South from T4 to T7, the 40-foot design vehicle would not be able to operate safely in three lanes as the inner roadway turns 90 degrees between T3 and the TBIT and between the TBIT and T4. Therefore, the study team proposed a roadway striping alternative for the curved sections of the Arrivals level inner roadway, shown in **Figure 23**. A second lane configuration option would be to restripe the Arrivals level inner roadway lanes from three to two lanes with, for example, a 12-foot loading lane and an 18-foot travel lane.

Ultimately, LAWA decided not to include any of the reconfigured curbside options into the SPAS alternatives. This was due to various concerns (depending on the option), including the loss of a lane of traffic on the main roadway of World Way, potential and/or perceived customer inconvenience, concerns of maneuverability of large vehicles into and along the inner roadway, and limited roadway

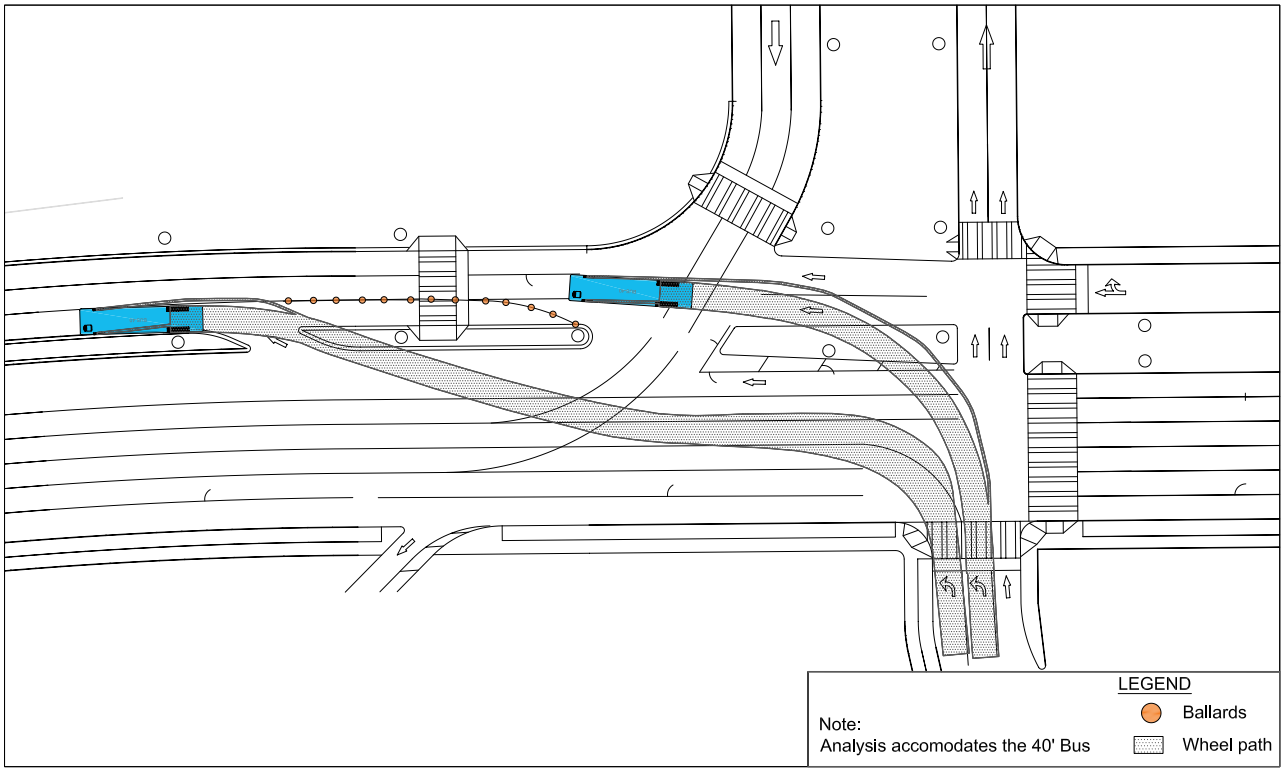

Figure 21 - Arrivals level inner curbside roadway access option

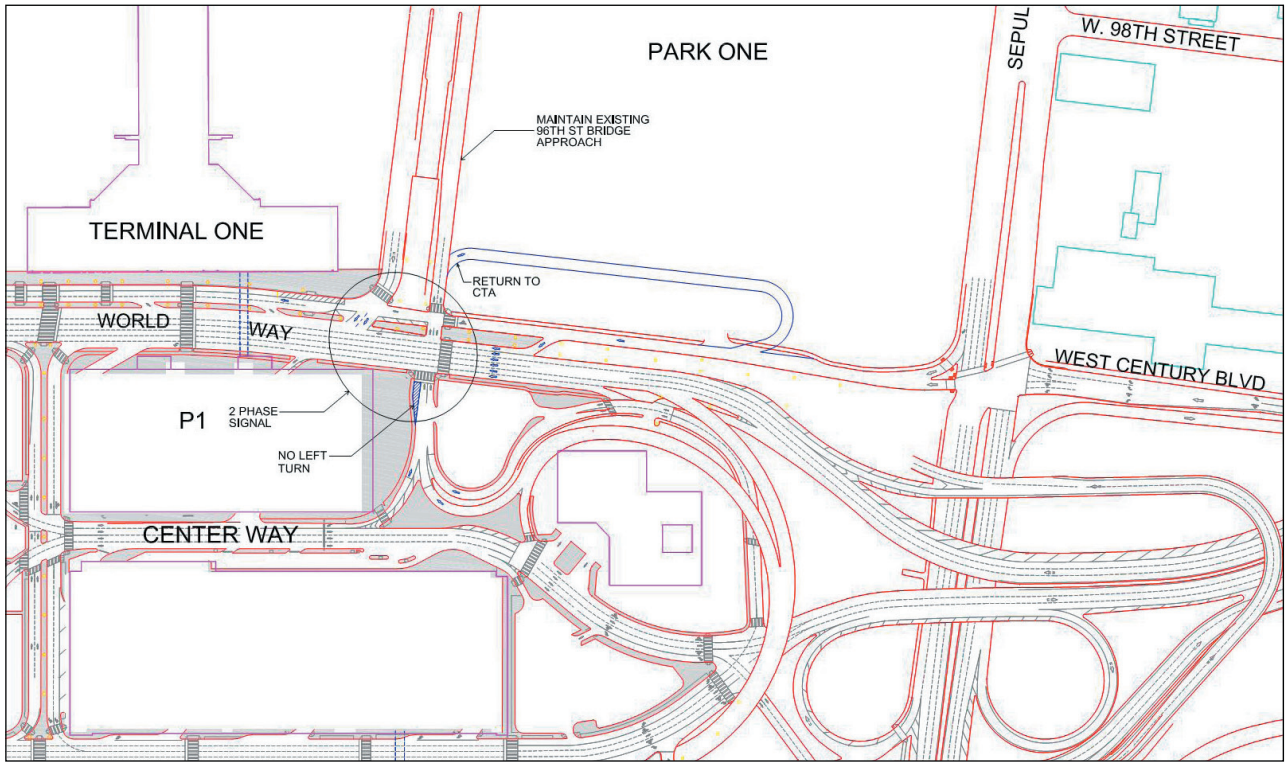

Figure 22 - Plan for installation of 2-phase signal and jug handle at intersection of Sky Way and World Way North

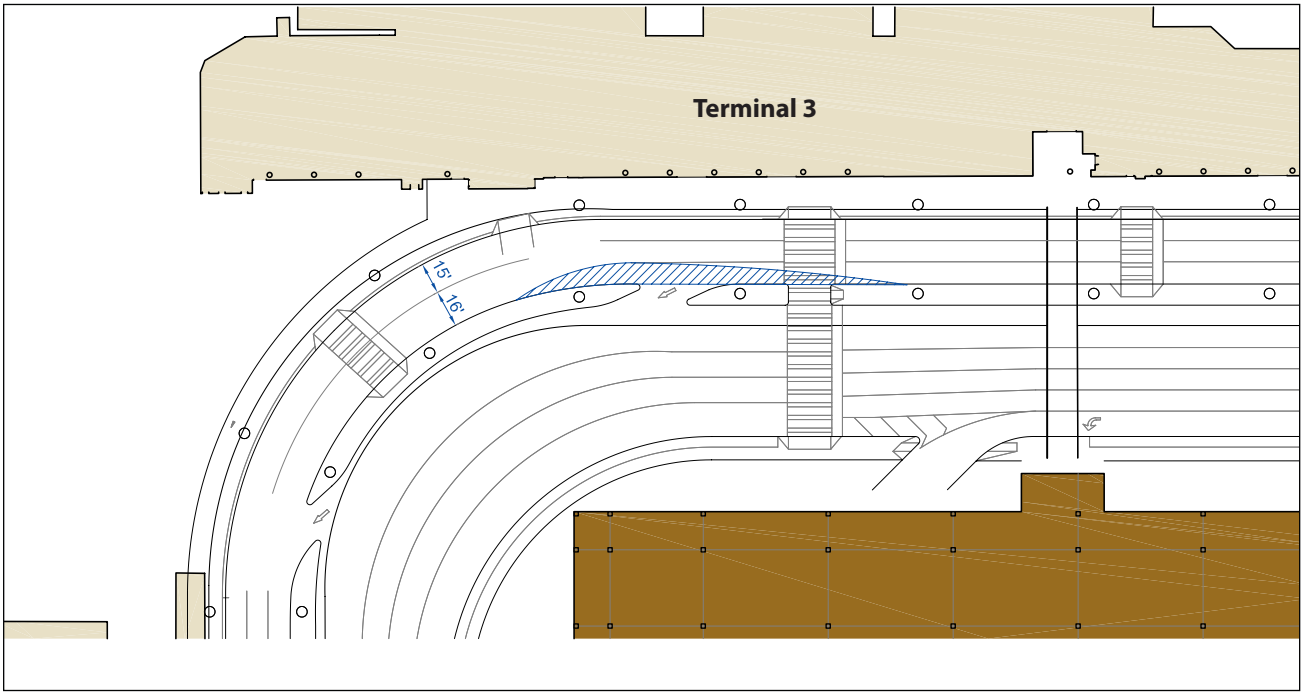

Figure 23 - Proposed striping plan for Arrivals level inner roadway (3-lane configuration) between T3 and TBIT

capacity of the inner roadway due to the 90-degree turns on the approach to and departure from the TBIT. While the reprogrammed curbside options are not included in the SPAS EIR, LAWA could choose to further analyze, refine, and implement these operational changes independent of SPAS.

CTA Access Improvements

The roadways leading into the CTA consist of westbound Century Boulevard, northbound and southbound Sepulveda Boulevard and 96th Street/Sky Way. These roadways, along with the CTA recirculation roadways converge at intersections east of T1 on both the Arrivals and Departures levels. Currently, traffic exiting the CTA on the Arrivals level can access southbound Sepulveda Boulevard, eastbound Century Boulevard (which connects to northbound Sepulveda Boulevard via a circular ramp), or Sky Way to reach the 96th Street Bridge and northbound Sepulveda Boulevard. Drivers exiting from the Departures level can directly access southbound Sepulveda Boulevard and eastbound Century Boulevard; however, vehicles need to transition to the lower (Arrivals) level first in order to reach northbound Sepulveda Boulevard via the ramp from Century Boulevard. Only emergency vehicles on the Departures level are allowed to use Sky Way to exit the CTA.

The Arrivals level intersection of Sky Way and World Way North has been identified as having poor LOS. One solution for improving LOS at this intersection is to eliminate the northbound left-turn movement by installing a right-handed "jug handle" northeast of the intersection, as was described earlier (see Figure 22). The signal would be changed from 3-phase to 2-phase, allowing more green time for eastbound traffic on World Way North. This improvement does impact some parking and the office trailer for Park One.

Realignment of Sky Way

The study team also investigated long-term improvement to the intersection that would have the added benefit of relocating/eliminating a section of Sky Way that would allow for the construction of Terminal 0, east of T1 (**Figure 24**). These options are described and illustrated below.

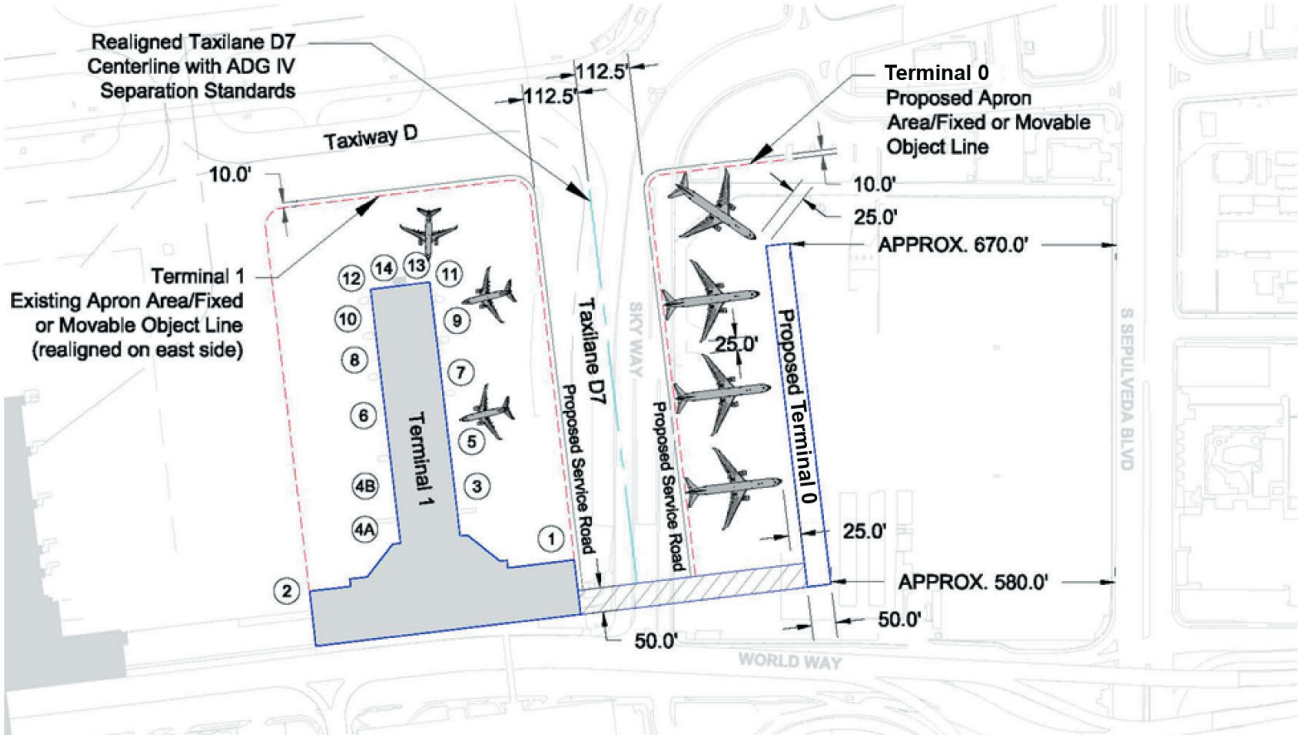

Figure 24 - Proposed location of Concourse 0 with realigned Taxiline D7 and ADG IV separation standards

Option 1 - Consolidated Approaches to LAX

This option merges Sky Way, Century Boulevard/World Way North, northbound and southbound Sepulveda Boulevard, and CTA recirculation traffic within Park One to create a consolidated approach to the CTA. This configuration provides for more controlled and defined approaches to T1 and adds frontage space for T1. The existing northbound approach on Sky Way would be eliminated. The columns supporting the existing departure level make the proposed alignment constrained and any future consideration of such a scheme should consider modifying the columns accordingly (**Figure 25**).

Option 2 - Relocation of Sky Way Exit

This option looks only at relocating the Sky Way approach and exit to the eastern half of Park One. This alternative has a common feature to provide a separate and enlarged frontage at T1 (**Figure 26**).

Option 3 - Tunnel under CTA Loop Roadway

This option looks to provide grade separation, i.e,. a tunnel, for the exiting Sky Way traffic movement under World Way North. This allows the Sky Way approach to shift to the eastern part of Park One which provides a separate and enlarged T1 Arrivals curbside, common to the other options (**Figure 27**).

Option 4 – Modified Sky Way Overpass

This option shortens the west side of the 96th Street overpass to create a horizontal curve just west of Sepulveda Boulevard. The new roadway to the Arrivals level would provide one lane from southbound Sepulveda Boulevard and one lane from the westbound 96th Street Bridge. The new Sky Way roadway widens to four lanes as it approaches World Way North. A new signalized intersection will be created approximately 600 feet east of the current signal near T1, which would continue to operate. However, since the north leg of the roadway would no longer exist, the signal would operate with two phases (westbound through and northbound left movements) rather than three phases. The right two lanes will be designated for traffic turning into the inner roadway (near the terminals) while the left two lanes will be designated for traffic turning into the main roadway of World Way (**Figure 28**).

The new roadway to the upper Departure roadway will be designed to provide one lane from southbound Sepulveda Boulevard and one lane from westbound 96th Street Bridge. The new Sky Way roadway will widen to three lanes as it approaches World Way. A new signalized intersection is located approximately 700 feet east of the current signal near T1. The current traffic signal near T1 on the Departures roadway would be removed.

If required, the relocated Sky Way roadways (upper and lower) can be designed with security checkpoints prior to traffic reaching World Way. The traffic movement from southbound Sepulveda Boulevard to eastbound 96th Street Bridge will continue to be accommodated, primarily for those drivers heading to rental car facilities, long-term parking lots and the proposed 98th Street Transportation Center.

Alverstone Avenue and Davidson Avenue, which currently provide access to construction employee parking and the taxi holdings lot, would be eliminated. Finally, the service road north of and parallel to World Way North, aka Little Century, would be widened to provide two moving lanes of westbound traffic between Sepulveda Boulevard and T1. Additional width for vehicle staging or passenger pickup may also be provided.

Summary of Options

All options provide for additional T1 frontage and expansion of the airside. They also improve traffic flow along this segment of the Arrivals level roadway The following matrix (**Table 3**) summarizes additional advantages as well as the disadvantages of the four options. Option 4 was selected to be used in the SPAS alternatives because it provided the necessary access to the CTA in a design that was safe and intuitive to drivers, maintained sufficient acreage for the Terminal 0 and commercial vehicle holding lot facilities on the east side of Park One, and provided room for security checkpoints, as needed.

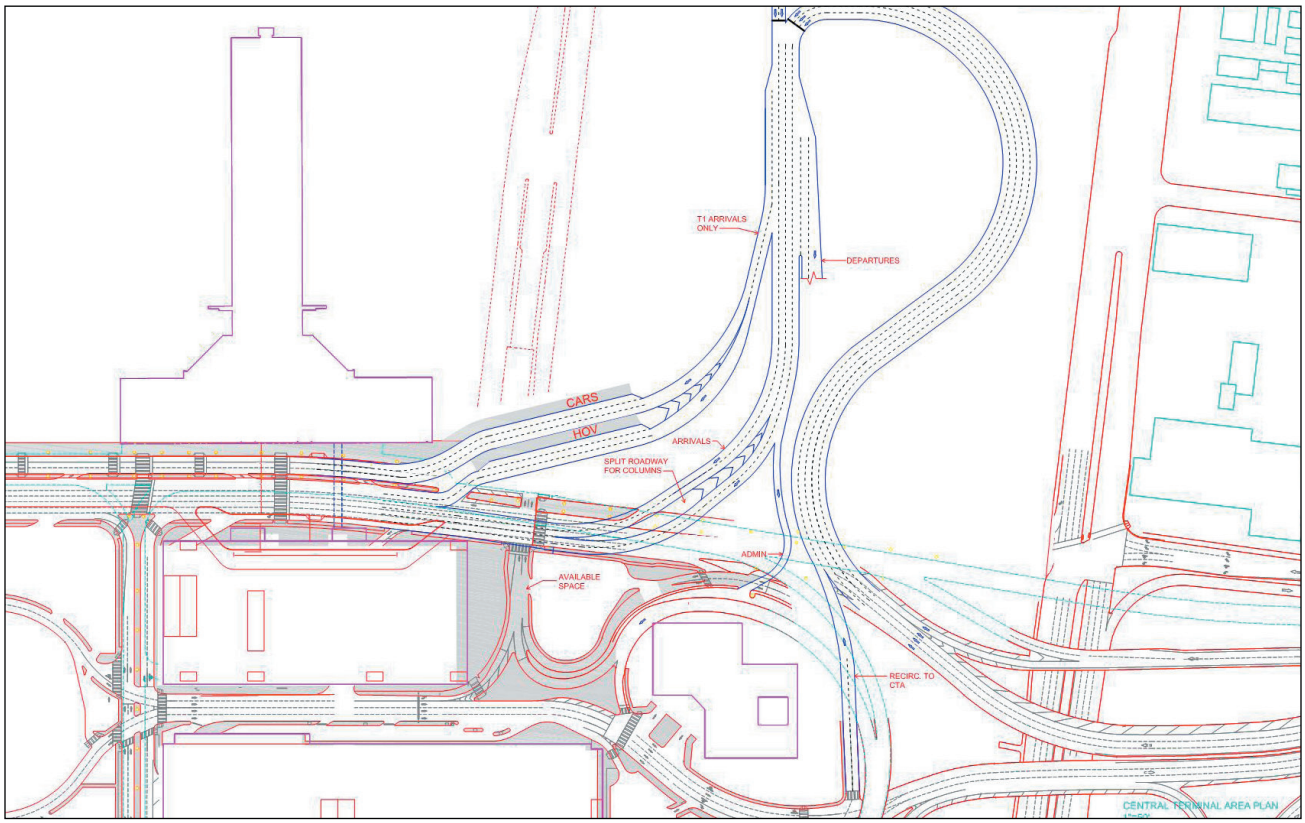

Figure 25 - Option 1: consolidated approaches to LAX

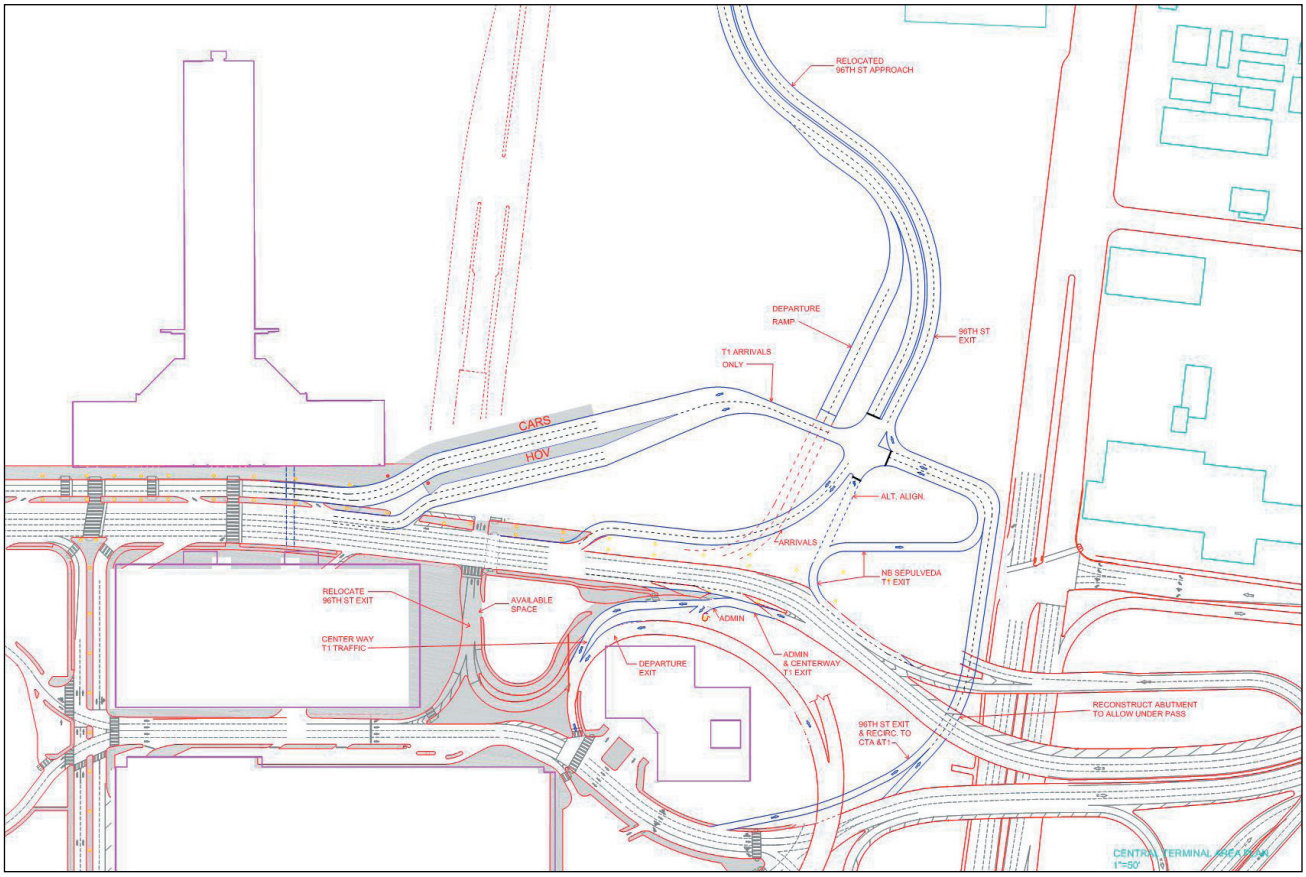

Figure 26 - Option 2: relocation of Sky Way exit

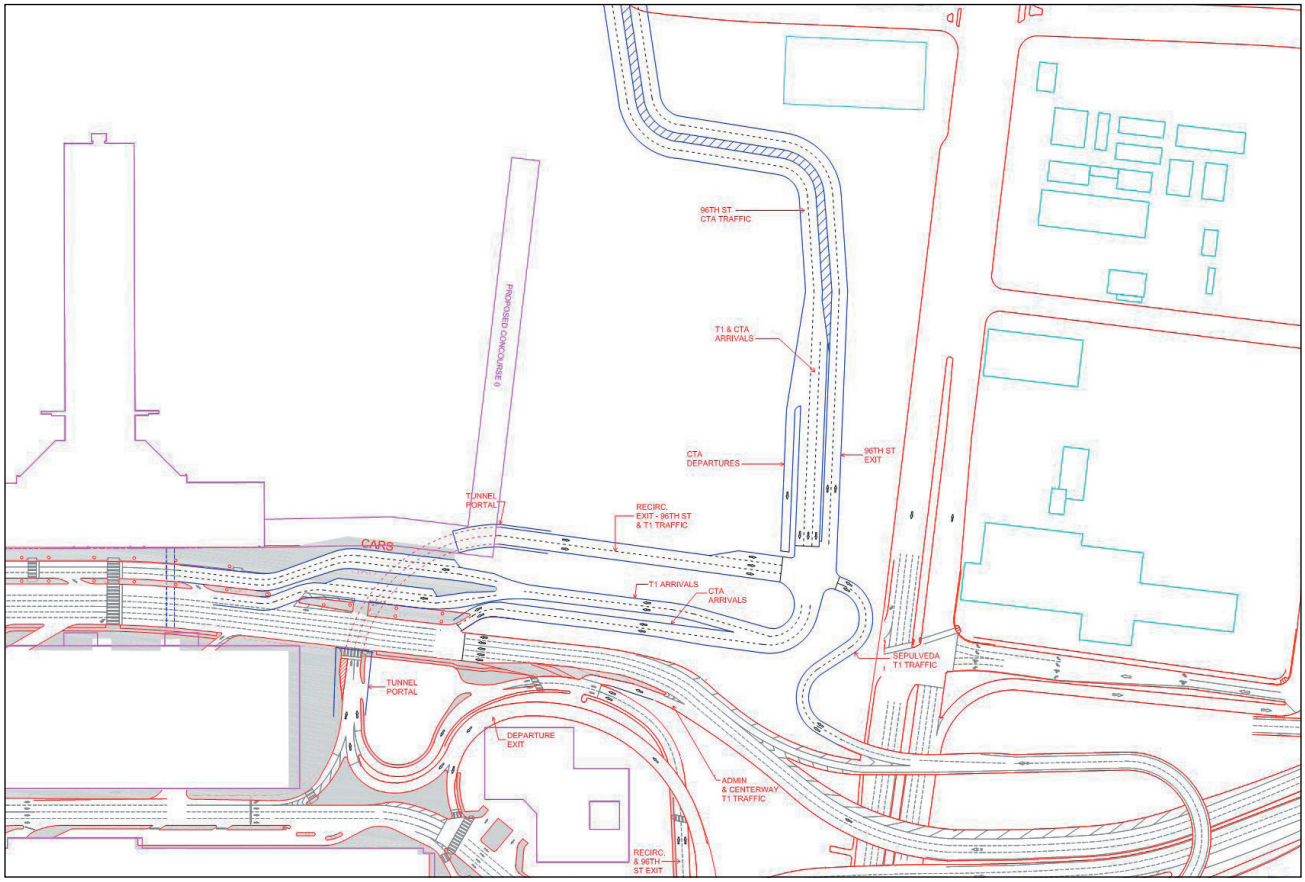

Figure 27 - Option 3: tunnel under CTA Loop roadway

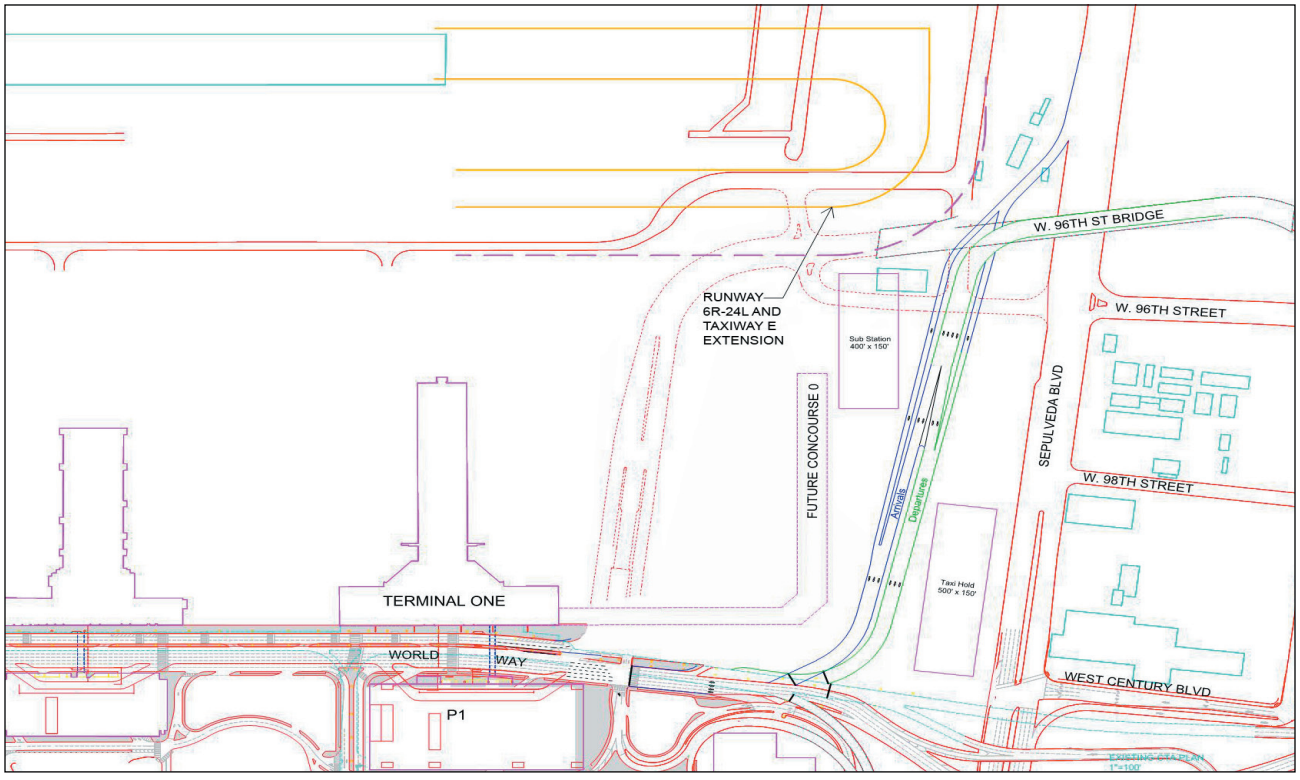

Figure 28 - Option 4: modified Sky Way overpass

TABLE 3 – SUMMARY OF OPTIONS FOR REALIGNMENT OF SKY WAY

Alternative	Features	Advantages	Disadvantages
1	Consolidated Approach Road to CTA	N/A	• Potential impact to Departures level substructure and columns. • Resulting space between the "S" curve alignment may be difficult to reuse effectively for a taxi holding lot
2	Relocation of Sky Way Exit	N/A	• Potential impacts to the current landscape areas for the relocated 96th Street movement
3	Tunnel under CTA Loop Roadways	N/A	• Utility impacts that will add to the cost of a tunnel construction. • The tunnel structure potentially will be within the desired footprint of Terminal 0 • Eliminates direct access from the CTA to 96th Street Bridge
4	Modified Sky Way Overpass	• Provides maximum space for terminal and airside expansion	• Eliminates direct access from the CTA to the 96th Street Bridge

Passenger Processor Facility

The study team developed plans for a new facility—the Processor—that would facilitate passenger departures and arrivals from the TBIT and future MSC. Two alternatives were developed: (1) a Processor that handled departures only, and (2) a full-service Processor. This facility would be implemented independent of SPAS; however, it was assumed to be in place in the future background (i.e., 2025) condition in the SPAS EIR.

Alternative 1 – MSC Departures Processor

Alternative 1 is a Departures-level MSC Passenger Processor building located directly across from TBIT between World Way and West Way and between the P3 and P4 parking structures. This facility builds on the Reprogrammed Curbsides Alternative 4 concept that proposed new Arrivals roadways and curbsides between P3 and P4, made possible by the removal of existing infrastructure, adjacent to and below the proposed Processor footprint (**Figure 29**).

Processor construction would be triggered by TBIT requiring additional passenger processing capacity or by the phased development of the MSC to the west of TBIT. The Processor would be developed as an environmentally controlled public space above the new open-air Arrival curbsides. Passengers on the Departures roadway network seeking the Processor would be directed to new multimodal north-south curbsides east of the Processor, which would accommodate commercial vehicles, charter operations, as well as taxis and private vehicles (**Figures 30 and 31**).

Upon entering the Processor, passengers would be presented with ticketing and check-in counters with properly sized queuing space, back-of-house airline space and passenger amenities such as restrooms and pre-security retail, food, and concessions. Check-in kiosks would be located as close to the curb as possible. Additional passenger services and amenities, as well as airline tenant operations space could be programmed within the Processor envelope.

Once they are checked in, passengers would be directed to vertical circulation that would transport them up to an elevated connecting concourse which would interface with the TBIT Departures Hall. From the Hall, passengers would be directed out to the MSC.

Various types of vertical circulation would link the Processor to the new open-air Arrival curbsides below. An APM station for TBIT as well as adjacent terminals could be included on the east side of the Processor (**Figures 32, 33 and 34**). The APM station and vertical circulation would be incorporated within Processor curbside activities. The Reprogrammed Curbsides Alternative 4 formed a basis for evaluating the Processor footprint and superstructure impacts to the new Arrival curbsides below, and

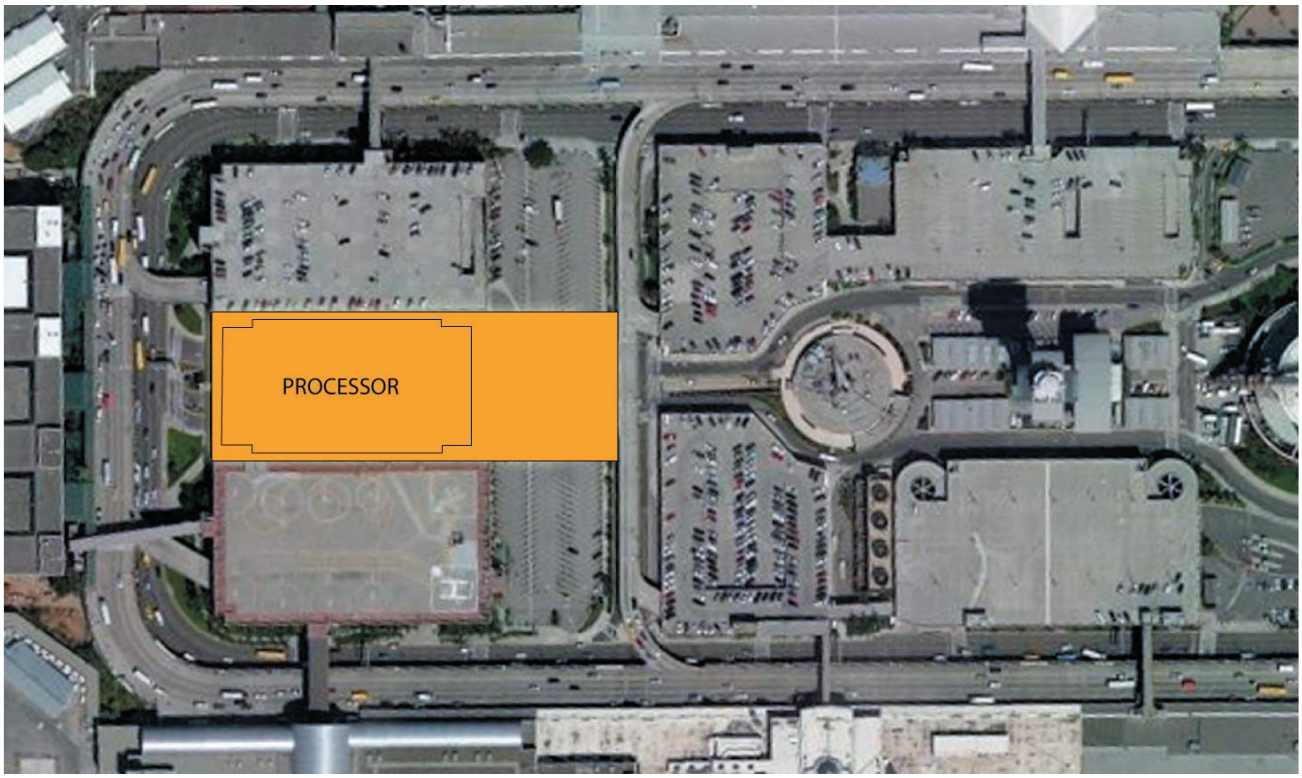

Figure 29 - Processor zone between P3 and P4

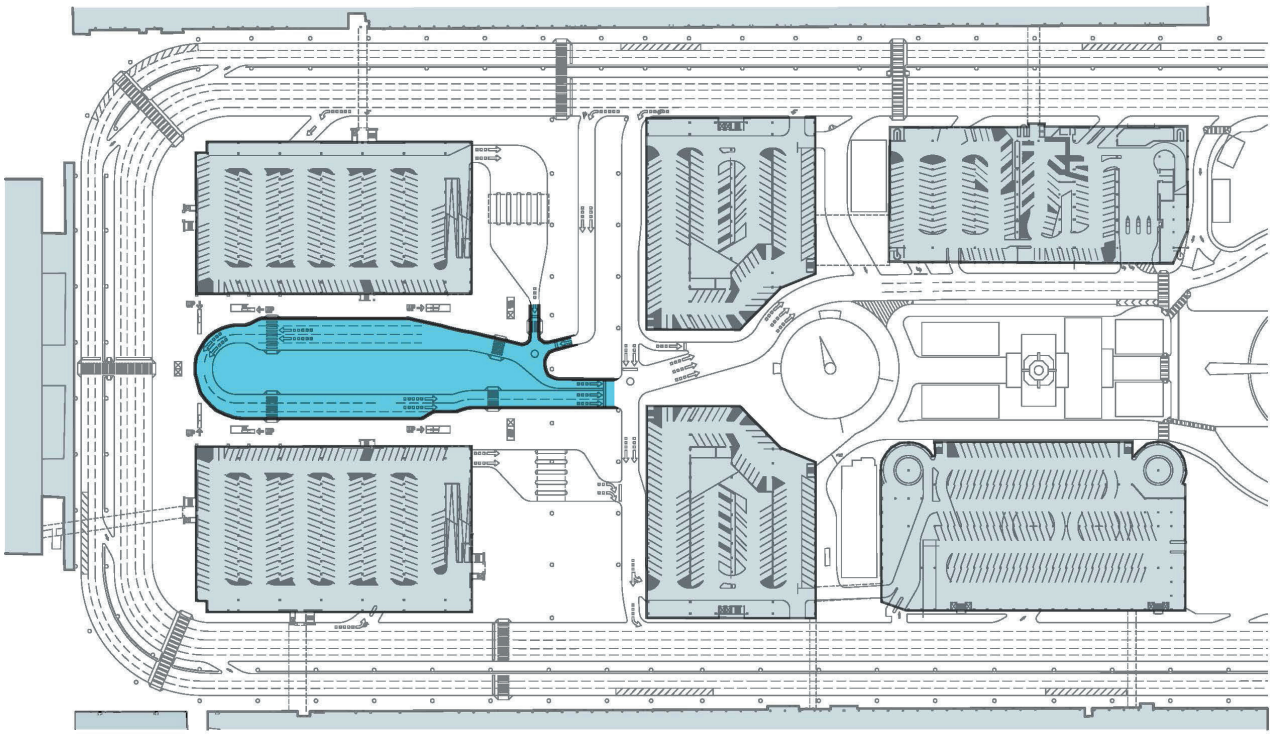

Figure 30 - Grade-level multimodal curbsides and modified exit plazas below the Processor

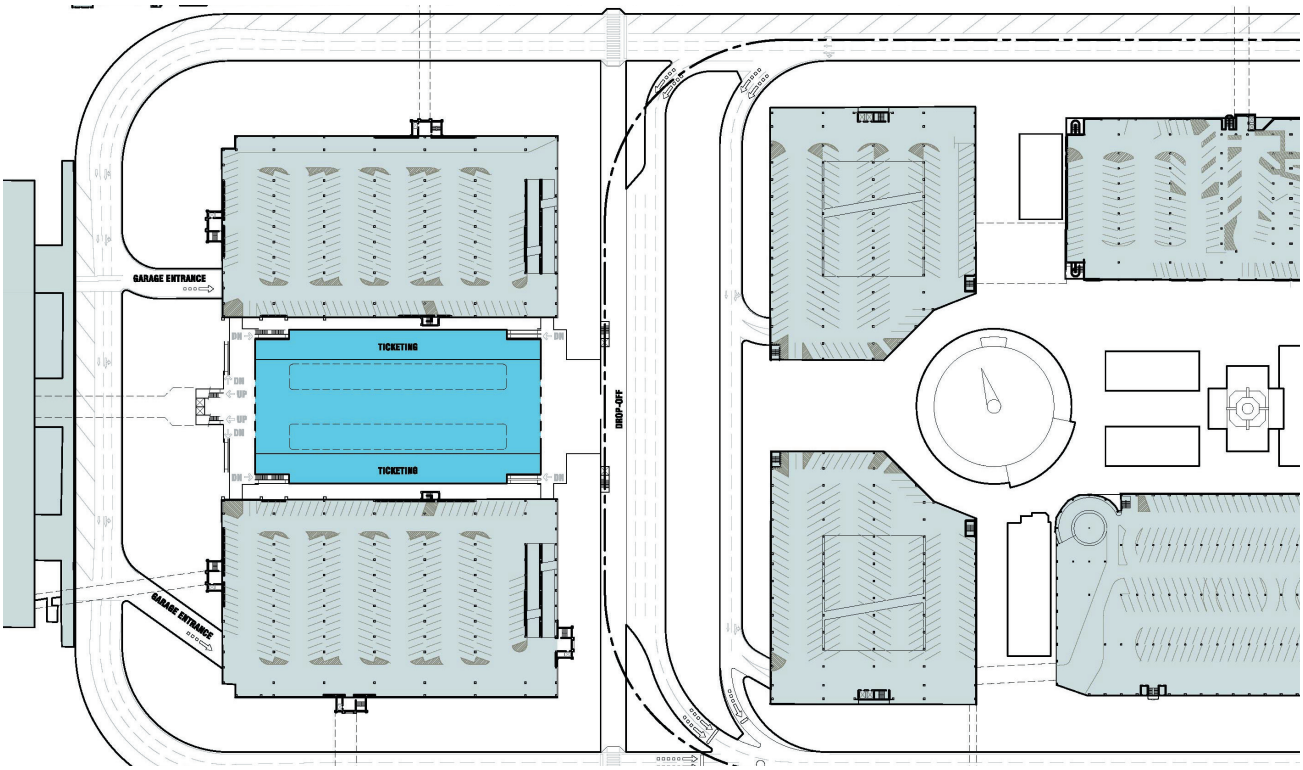

Figure 31 - Processor Departures-level footprint

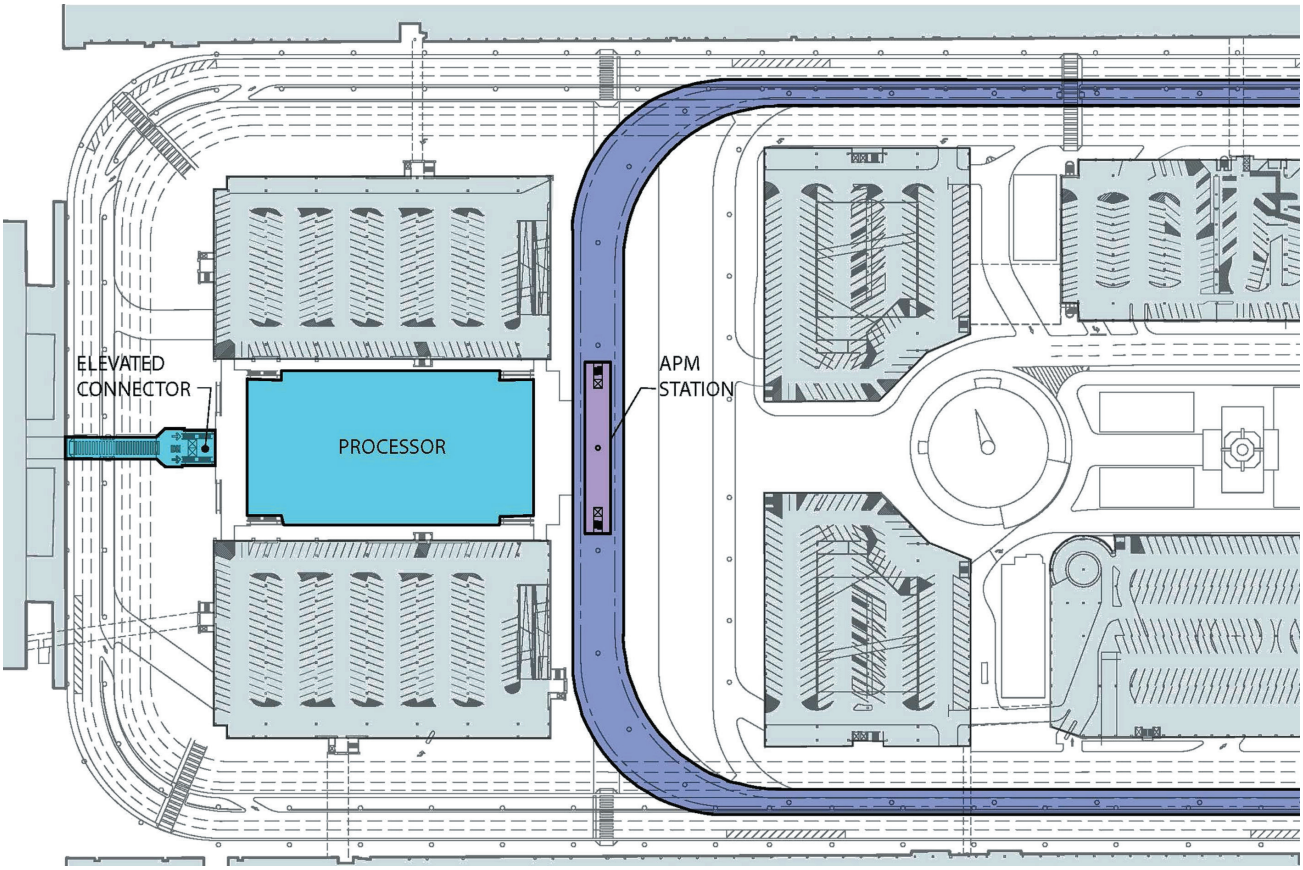

Figure 32 - Processor Departures-level footprint with integrated APM station and guideway

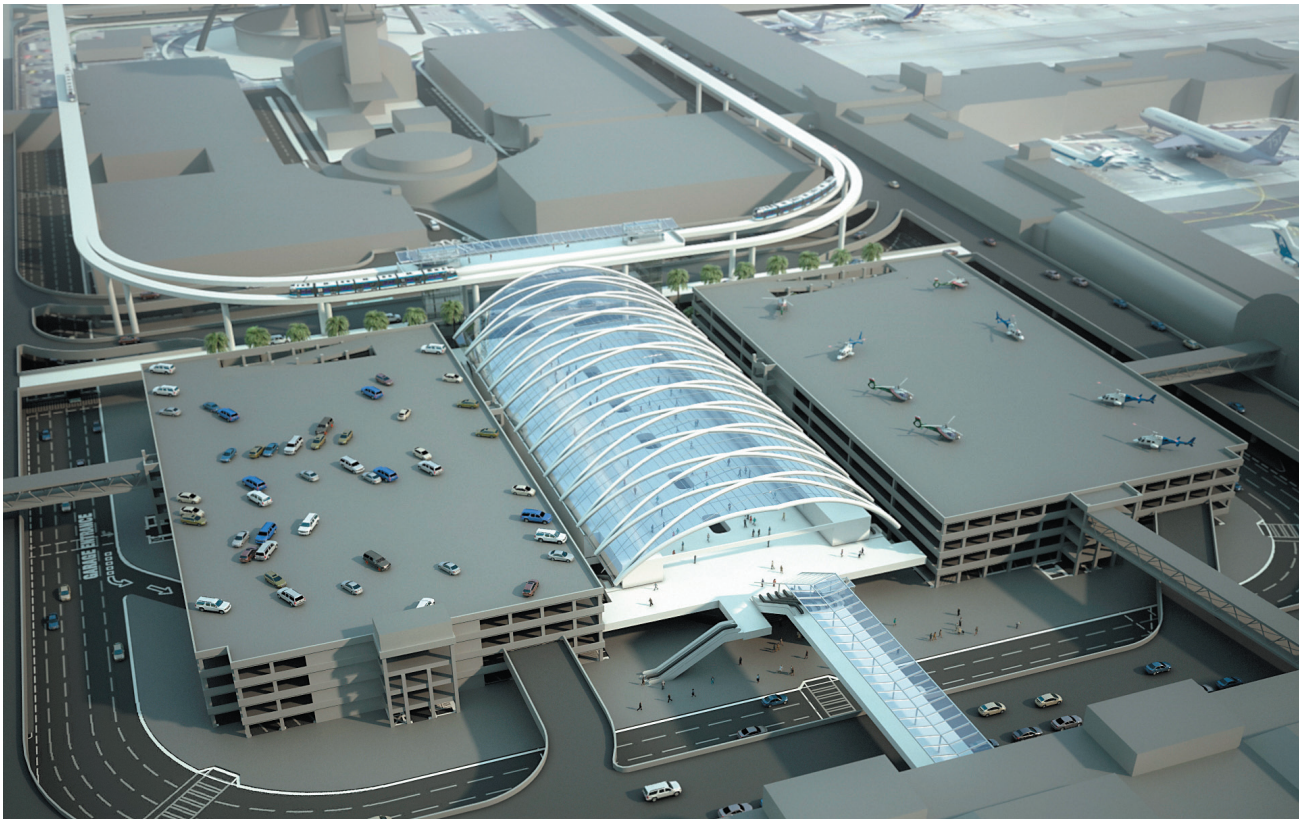

Figure 33 - Bird's-eye view of the Processor and APM looking east, with elevated pedestrian connection to TBIT in foreground

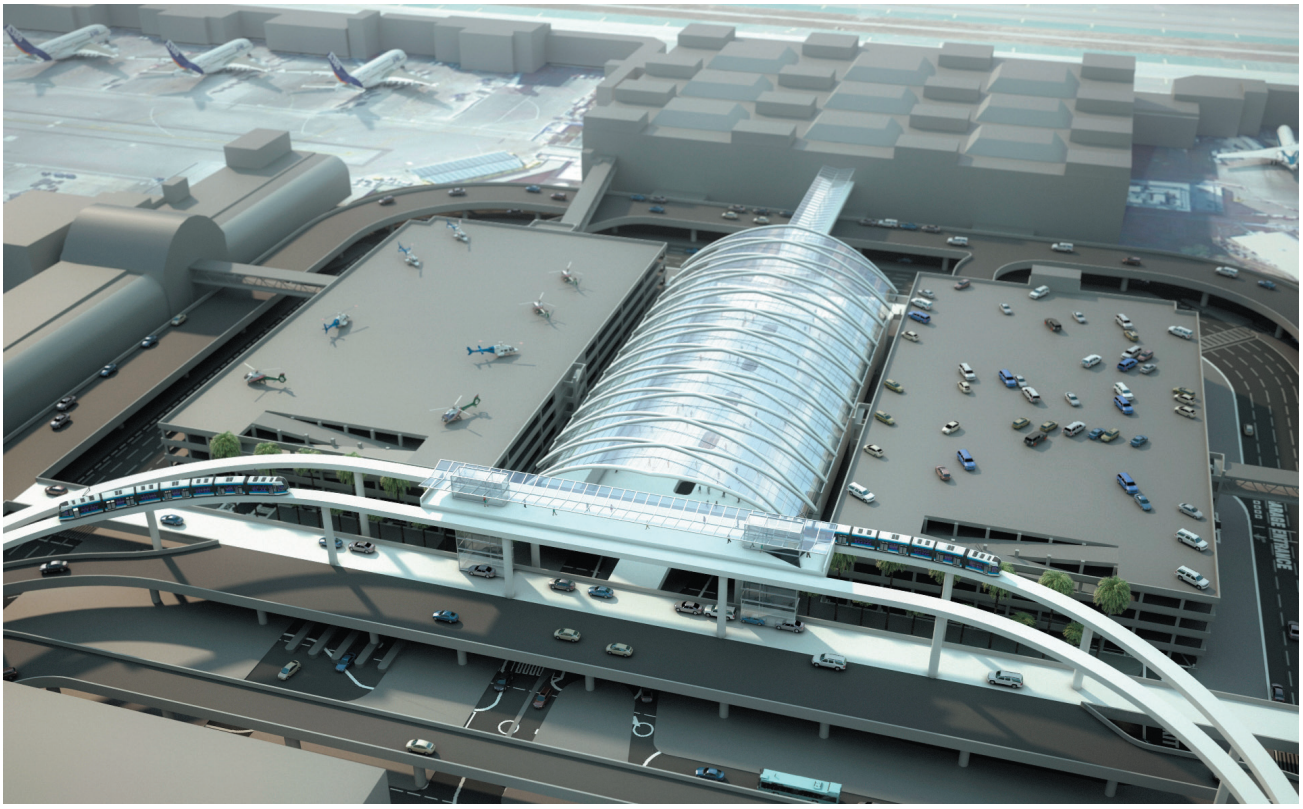

Figure 34 - Bird's-eye view of the Processor and APM looking west towards TBIT

vice versa, as well as Processor connections to the TBIT. Its interface with the TBIT requires further analysis and coordination to establish a clearer representation of the Processor regarding size and ability to accommodate projected gate capacity at TBIT and/or the MSC.

At this level of planning, all programming has been evaluated based upon an optimized Processor footprint resulting from available real estate and appropriate separation between the structures. Columns supporting the deck would be located within an east/west open air arcade adjacent to the taxi/HOV curbsides.

Pros:

- Processor would increase the LOS for passengers by creating additional processing capacity
- Processor location optimizes APM alignment and station location relative to TBIT and adjacent terminals

Cons:

- Investment in removal of existing infrastructure adjacent to and below the proposed Processor footprint
- Reconfiguration of P3/P4 exit plazas

Alternative 2 - MSC Dual-Level Processor

Alternative 2 expands the MSC Processor to incorporate an Arrivals function in addition to Departures. Adding an Arrivals level component in the Processor would increase the size of the facility and potentially preclude the reversal of the Arrivals roadway curbs, described in Reprogrammed Curbsides Alternatives 3 and 4, by limiting or removing curbside locations which are proposed to be in the same footprint as the Processor. The expanded Processor may also require removing P2B and P5, in addition to impacting both levels of West Way as well as Center Way between World Way and West Way.

To mitigate these concerns, Alternative 2 expands the Processor east in a north/south direction creating a T-shaped footprint that serves as the Arrivals component (**Figures 35 through 43**). The Departures component remains between P3 and P4. The P2B and P5 parking structures are removed, enabling multimodal curbsides to be developed on the east and west sides of the Arrivals

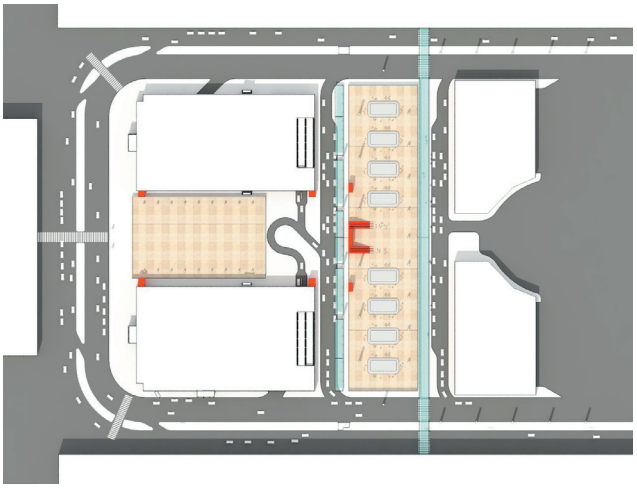

Figure 35 - Processor Arrivals bag claim and operations space

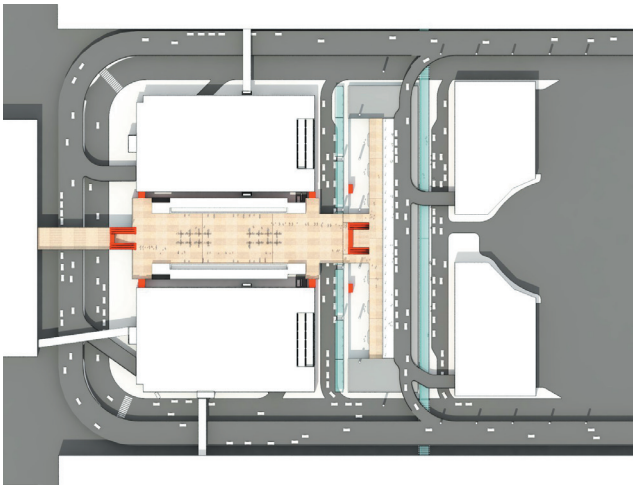

Figure 36-Processor Departures check-in operations

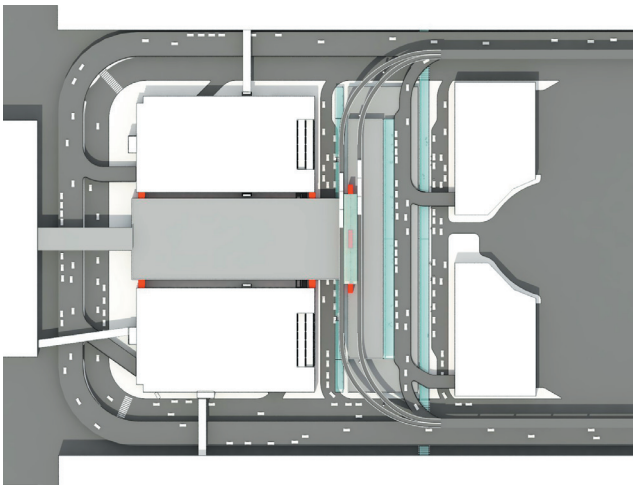

Figure 37 - Processor APM station level

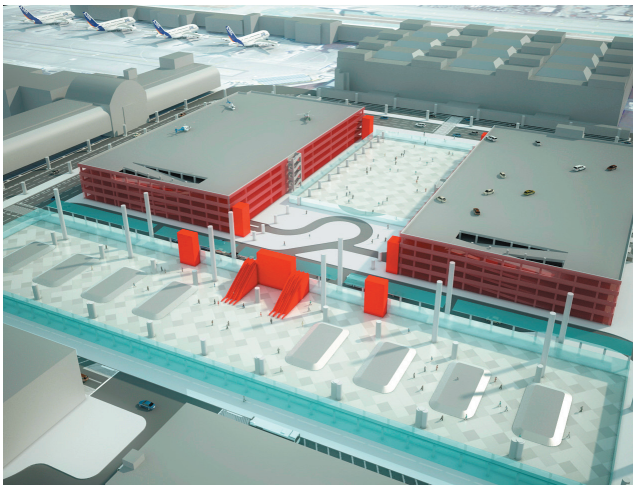

Figure 38 - Processor Arrivals baggage claim and operations space, looking west.

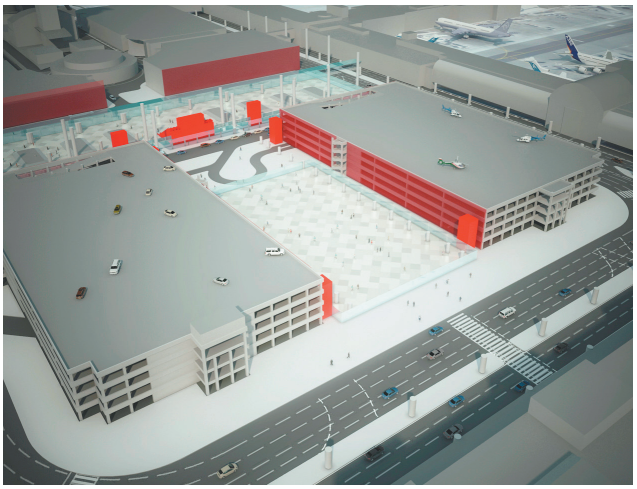

Figure 39 - Processor Arrivals baggage claim and operations space between P3/ P4, looking east

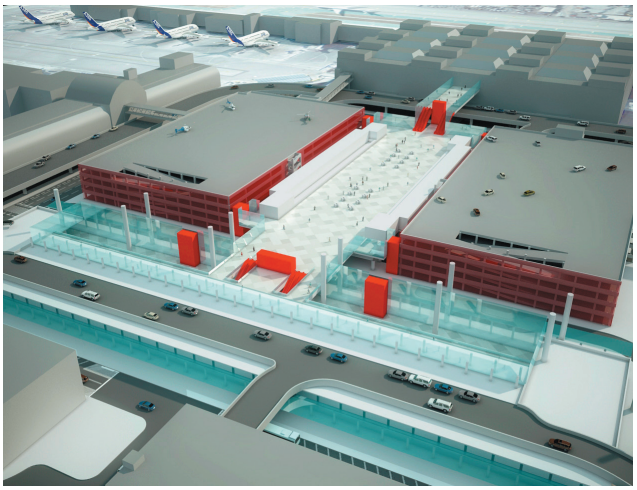

Figure 40 - Processor Arrivals baggage claim and operations space between P3/ P4, looking west

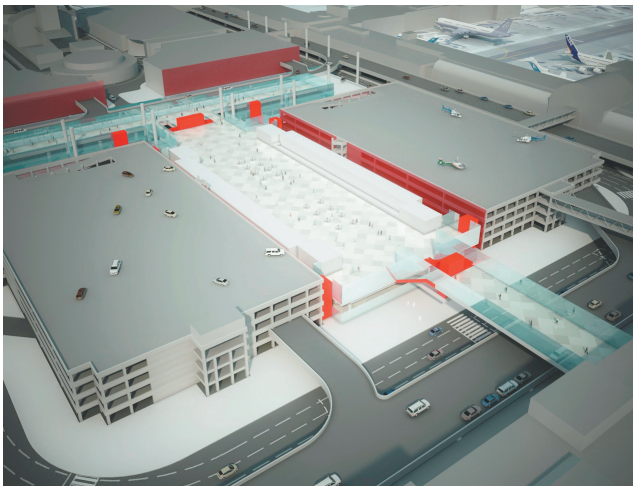

Figure 41 -Processor Departures check-in between P3/ P4, looking east

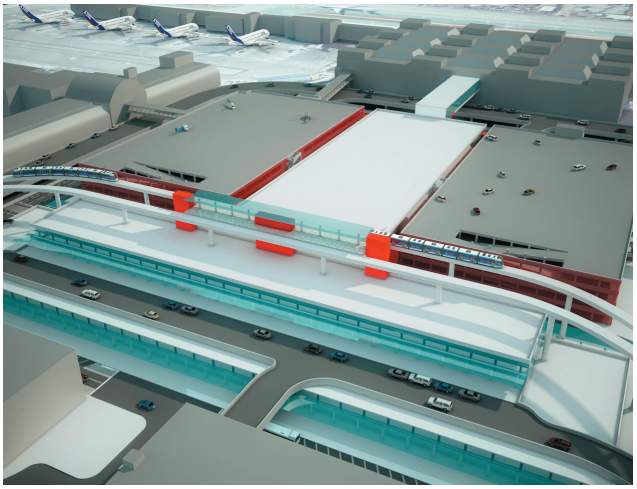

Figure 42 - Processor Arrivals baggage claim and operations space between P3/ P4, looking west

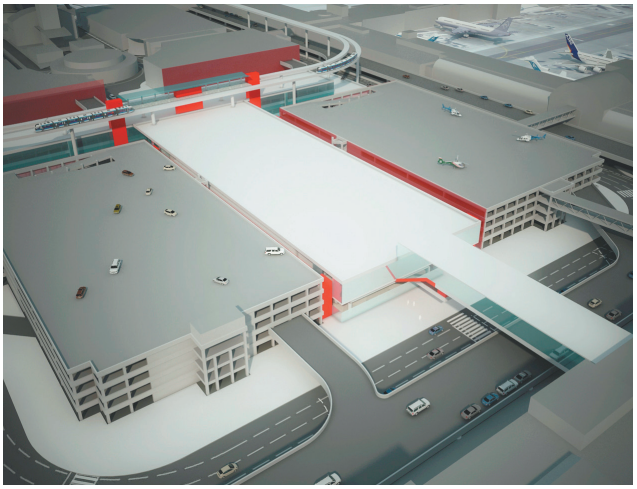

Figure 43 -Processor APM level, looking east

component, namely taxis on the west curb and private autos and buses on the east curb.

Preliminary analysis indicates that this arrangement may enable the proposal to reverse the Arrivals curbsides. Drivers exiting the P3 and P4 garages would travel via a new eastbound roadway underneath the Processor to exit the airport.

Pro:

- Processor would increase the LOS for passengers by creating additional processing capacity
- Creation of additional roadway and curbside capacity in the CTA

Con:

- Would require partial demolition of P2B and P5 for a total of 1,536 spaces
- Requires investigation of operation, location and technology of baggage delivery to and from the Processor
- Relocation of the egress for P3 and P4 parking structures

Alternative 3 - MSC Dual-Level Processor Variant

Following this study, a variation of the dual-level MSC Passenger Processor was evaluated. Alternative 3 includes constructing the Processor on a smaller footprint east of P3/P4 and west of P2A and P6. As in Alternative 2, P2B and P5 would be demolished to accommodate this new facility. Some replacement parking may be constructed as part of the project.

The existing two-directional arrival roadway of West Way would be replaced with two southbound streets, one immediately east of the MSC Passenger Processor building and one immediately west of the building. The roadway east of the Passenger Processor would be for private vehicles only. There would be a pickup area of sufficient width for double loading, along with two adjacent through lanes. A new traffic signal would be constructed at the intersection of this new roadway and World Way South to facilitate two lanes of left-turning traffic from this roadway onto eastbound World Way South. An existing pedestrian traffic signal on World Way South would be relocated to the west and incorporated as part of this new signal.

The roadway west of the Passenger Processor would have one pickup lane for limousines and taxis (adjacent to the building) and one pickup lane for shuttles on the far side of the roadway. Loading of the taxis and limousines would take place on the left side of these vehicles. There would be two moving lanes of traffic between the two loading areas.

The existing northbound traffic on West Way, which is traffic recirculating back to World Way North, would be displaced to East Way.

On the upper level, there would be a relocated West Way roadway east of the Passenger Processor. The roadway would be one-way southbound. There would be an unloading area of sufficient width for dual stacking, and two moving lanes of traffic. As today, there would be a traffic signal at the intersection of this roadway with World Way South; the intersection would facilitate the movement of three lanes of southbound traffic to eastbound World Way South.

The existing ramps located between P3 and P4, which connect the lower and upper level roadways, would be eliminated. As the only means for vehicles to access the upper level from the lower level within the CTA, in the future vehicles needing to move from the lower level to the upper level would need to exit the CTA and re-enter.

Pro:

- Processor would increase the LOS for passengers by creating additional processing capacity
- Creation of additional roadway and curbside capacity in the CTA

Con:

- Would require demolition of P2B and P5 for a total of 1,536 spaces
- Requires investigation of operation, location and technology of baggage delivery to and from the Processor
- Relocation of the egress for P3 and P4 parking structures

Summary

The improved passenger LOS and the ability to create substantial roadway capacity and curbside frontage in

the CTA that is provided in Alternative 3 led to the assumption that a dual-level Processor, with accompanying access roadways and curbsides, would be constructed as a non-SPAS improvement and be operational by 2025.

Intermodal Connectivity

Shuttle/Bus Service Strategies

Shuttle and bus service strategies to reduce vehicular volumes in the CTA were studied. Under these strategies, certain shuttles would no longer be allowed to operate in the CTA as they do currently; rather, these vehicles would drop off and pick up passengers at a facility constructed outside of the CTA. Consolidated buses would transport passengers between this facility and the CTA. For LAWA to accommodate any consolidated bus operation, a convenient facility beyond the CTA would need to be provided to allow for passengers to transfer between individual commercial vehicle modes/services and a consolidated busing operation. The facility should be located in proximity to the CTA to provide convenient shuttle access to and egress from the site, reducing travel time for passengers and limiting the number of shuttles which would be required to travel in a direction away from the airport when transiting from their business's point of origin (e.g., hotel, private parking lot) to the consolidated shuttle transfer site. This facility could include passenger services and amenities such as ticketing, meeter/greeter areas, restrooms, and concessions.

Branding and wayfinding are critical components of a consolidated bus operation. Passengers heading to the airport would need to understand that the service provider's bus would drop them off at a facility outside the CTA and that they would be required to transfer to a consolidated bus to reach their terminal. Passengers exiting the terminals would need to be instructed to take an airport bus to the ITF and then transfer to the individual service provider bus (**Figures 44, 45, and 46**).

Depending on which commercial mode and degree of consolidation, multiple bus routes between a consolidated shuttle transfer site and various CTA terminals may be necessary. Finally, consolidation of commercial vehicle operations will require that the Airport educate their passengers of this change in service and modify pedestrian wayfinding signage to reflect this operational change.

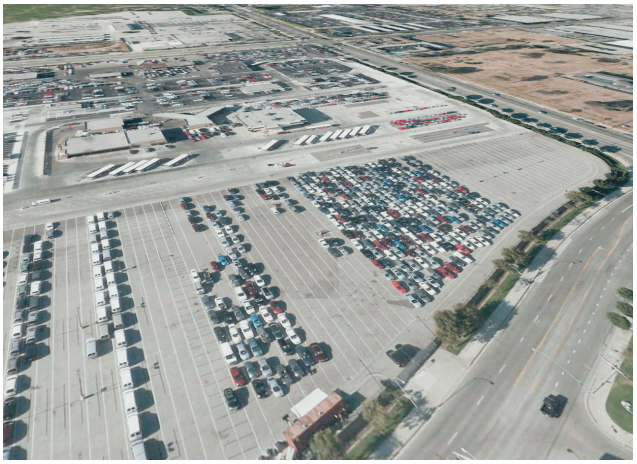

Figure 44 - Existing remote parking

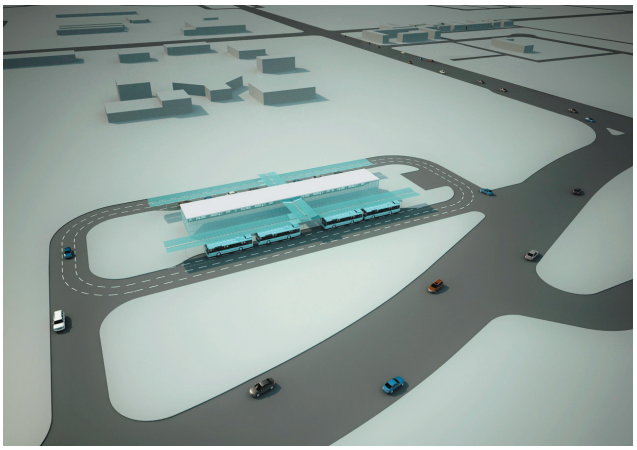

Figure 45 - Consolidated bus operations facility

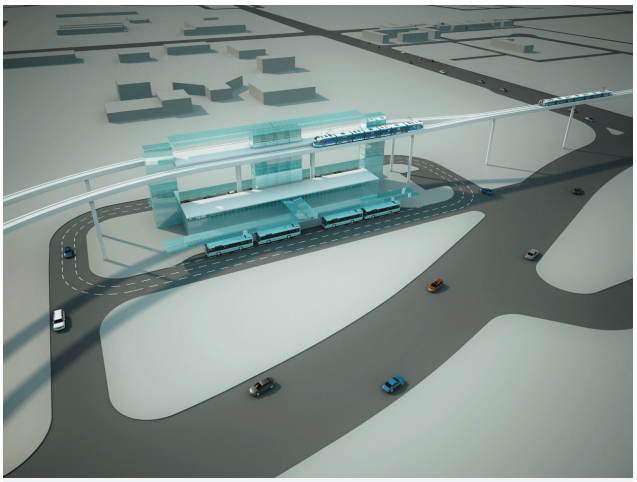

Figure 46 - Consolidated bus operations facility with integrated busway or APM station and guideway

While consolidation of the commercial modes should have a positive impact on CTA traffic conditions, the reduction in the number of commercial vehicle trips would be modest relative to the total vehicle trips in the CTA. While reducing the number of commercial vehicle trips will likely be part of the ultimate solution to improving the CTA's overall traffic conditions, the degree to which commercial vehicle consolidation improves CTA traffic conditions will differ depending on which commercial vehicles are consolidated and where they stop curbside.

For example, if the Arrivals level curbsides continue to operate as they do today, reducing the number of commercial vehicle trips in the CTA will reduce the number of conflicts between commercial vehicles and private vehicles weaving in the area of slip ramps along the outer curbside, but given the higher number of private vehicles expected to be operating within the CTA, these improvements may be limited. If the Arrival Level curbside operations are reversed, the need for the existing slip ramps would be limited and reducing the number of commercial vehicle trips along the inner roadway may be sufficient to permit taxis to continue to operate on the inner curbside. However, it is also important to remember that under this scenario, the outer curbside sidewalk would need to be widened resulting in the loss of a vehicle travel lane on the outer roadway.

Traffic Simulation Analysis & Findings

Simulation modeling indicated that consolidated bus service at a 78.9 MAP activity level would result in a modest reduction in CTA roadway congestion. Consolidation of commercial vehicle operations will require that LAWA educate passengers of this change in service and modify signage to reflect this operational change.

Pros:

- Airport-branded service creates ease of wayfinding - one bus for all services
- Less fuel, vehicle maintenance and air emissions
- Reduced commercial vehicle trips within the CTA

Cons:

- Investment in a convenient facility near the CTA to serve as a transfer point for passengers from multiple commercial vehicle services to a consolidated bus service

LAWA decided that, for the SPAS, it would be assumed that FlyAway buses and shared-ride vans would continue to be allowed to enter the CTA to drop off their passengers at the terminal curbs. However, passengers arriving at LAX would travel via a consolidated vehicle to an off-airport facility to wait for their individual FlyAway bus or shared-ride van. This would reduce vehicular demand on airport roadways and eliminate the need for specific passenger pick-up curbs which are currently designated to these operators. Independently of the SPAS, LAWA may choose to limit the access of other commercial operators into the CTA and require them to pickup and/or drop off their passengers outside of the CTA.

Intermodal Facilities

Two locations were evaluated for locations of intermodal facilities: (1) property that the airport has the opportunity to acquire along 98th Street; and (2) property adjacent to LAX's eastern border at Manchester Square, where a confluence of intermodal connections coming from the extension of the Metro Crenshaw/LAX and Green lines can be integrated with a dedicated airport busway or APM to transport passengers into the CTA. Manchester Square also offers potential for developing airport long-term parking and/or a consolidated car rental facility (ConRAC).

98th Street Intermodal Transportation Facility (ITF)

This 14-acre site between 96th Street and 98th Street, west of Airport Boulevard and south of Parking Lot C, could be developed to provide surface parking and a variety of transportation activities associated with an ITF (**Figure 47**). One option is to develop the ITF as part of a parking structure that would provide parking revenue to LAWA and could replace or enhance parking provided in the CTA. A similar strategy was implemented at Newark Liberty International Airport (EWR) with the construction of the P4 Garage, a 6-level structure that accommodates 3,400 cars, and provides an intermodal connection to AirTrain Newark, an APM system (see Appendix B for more information on the EWR P4 Garage).

By providing close, weather-protected parking space with intermodal connection to the CTA, parking at the ITF can be programmed as a daily rather than long-term parking, i.e., charged at daily rates, and surface Lot C can remain as long-term parking and/or as employee parking with

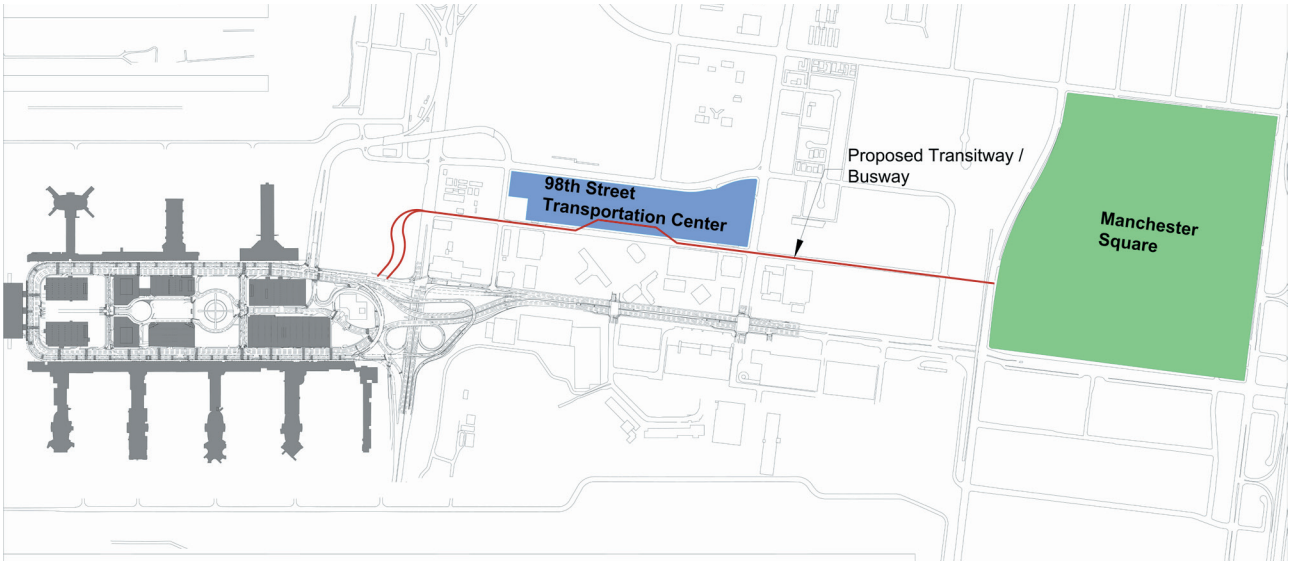

Figure 47 - Location of proposed 98th Street ITF

shuttle bus service to the CTA. Departing passengers would also be encouraged to use the ITF as a "Kiss-n-Ride" facility, rather than be dropped off in the CTA.

The ITF can be developed in phases to accommodate optimal flexibility. The initial phase can be programmed and designed for grade level parking and a consolidated bus service. Passenger amenities such as retail, food service, ticketing and restrooms would be developed in this first phase. Meeter/greeter waiting areas can be programmed within the facility to encourage friends and family to gather at the facility and wait for arriving passengers rather than circulate around the CTA. Facility curbsides would be programmed to promote passenger wayfinding and vehicular ingress and egress from Airport Boulevard, 96th Street, and 98th Street.

Future phases can be programmed to expand the ITF to include a dedicated busway or APM emanating from Manchester Square and stopping at the ITF (**Figure 48**).

The advantages and disadvantages of an ITF are summarized below.

Pros:

- Enhanced LOS for passengers coming to the airport in private vehicles by providing remote weather-protected parking with seamless transfer to ITF consolidated service
- Reduces the number of vehicles in the CTA, thereby improving traffic flow and reducing congestion on airport roadways

Cons:

- Potentially requires significant capital investment
- Passengers using consolidated busing between the CTA and the ITF are required to transfer to another bus to travel between the ITF and their destination.

Traffic Simulation Analysis & Findings

The study team determined that the site located along 98th Street and described previously in the document, offered the best alternative for a consolidated ITF that would provide a number of future multimodal transportation services for airport customers connecting to the CTA. The connection between the ITF and the CTA could initially be through an at-grade transit bus route and, in the long term, via a dedicated elevated busway or APM.

For the purpose of the simulation modeling, the study team assumed that the ITF would provide an opportunity to consolidate various commercial vehicle modes serving the CTA. It also offers a convenient "Kiss-n-Ride" location near the CTA to allow customers arriving or departing via private vehicle to be dropped off or picked up without entering the CTA. A Kiss-n-Ride curb at the ITF is expected to be used primarily by experienced travelers,

and demand for this service is likely to be dependent on four key factors: (1) travel time reliability between the Kiss-n-Ride curbside and the terminal; (2) actual or perceived delays within the CTA and, to some extent, local surface street delays; (3) customer awareness of the service; and (4) convenient vehicle access and egress to the Kiss-n-Ride curb from the local roadway network. If each of these factors is successfully addressed, a Kiss-n-Ride service should be part of an overall solution to addressing future traffic in the CTA.

Because of the traffic advantages that such a facility provides, its geographic location relative to the CTA and airport-related businesses and facilities and its ease of access to and egress from major arterial roadways, an ITF was included in SPAS Alternatives 1, 2, 8 and 9. It was assumed under these alternatives that the ITF would be located between 96th Street and 98th Street and between Vicksburg Avenue and Airport Boulevard. The ITF would include space for public parking and a remote passenger pick up/drop off or Kiss-n-Ride area to allow drivers to avoid entering the CTA. As discussed earlier, it would be assumed that FlyAway buses and shared ride vans would continue to be allowed to enter the CTA to drop off their passengers at the terminal curbs. However, passengers arriving to LAX would travel via a consolidated vehicle to an off-airport facility to wait for their individual FlyAway bus or shared-ride van.

Manchester Square Transit Hub

A multimodal transit hub at Manchester Square could be built which would connect mass transit to LAX. Over the past several decades, mass transit airport access has evolved as a common practice across the country as well as on an international level. The concepts of time certainty and level-of-service on airport approach roadways combined with an energy conscious, sustainability driven mind-set has become the impetus for massive transit infrastructure projects to be developed for the country's largest airports including Chicago, Dallas, San Francisco, and JFK and Newark Liberty International Airports in the New York area.

Several factors have influenced the selection of Manchester Square as the preferred location, including its proximity to the airport CTA and its land use potential for developing significant airport-specific support facilities.

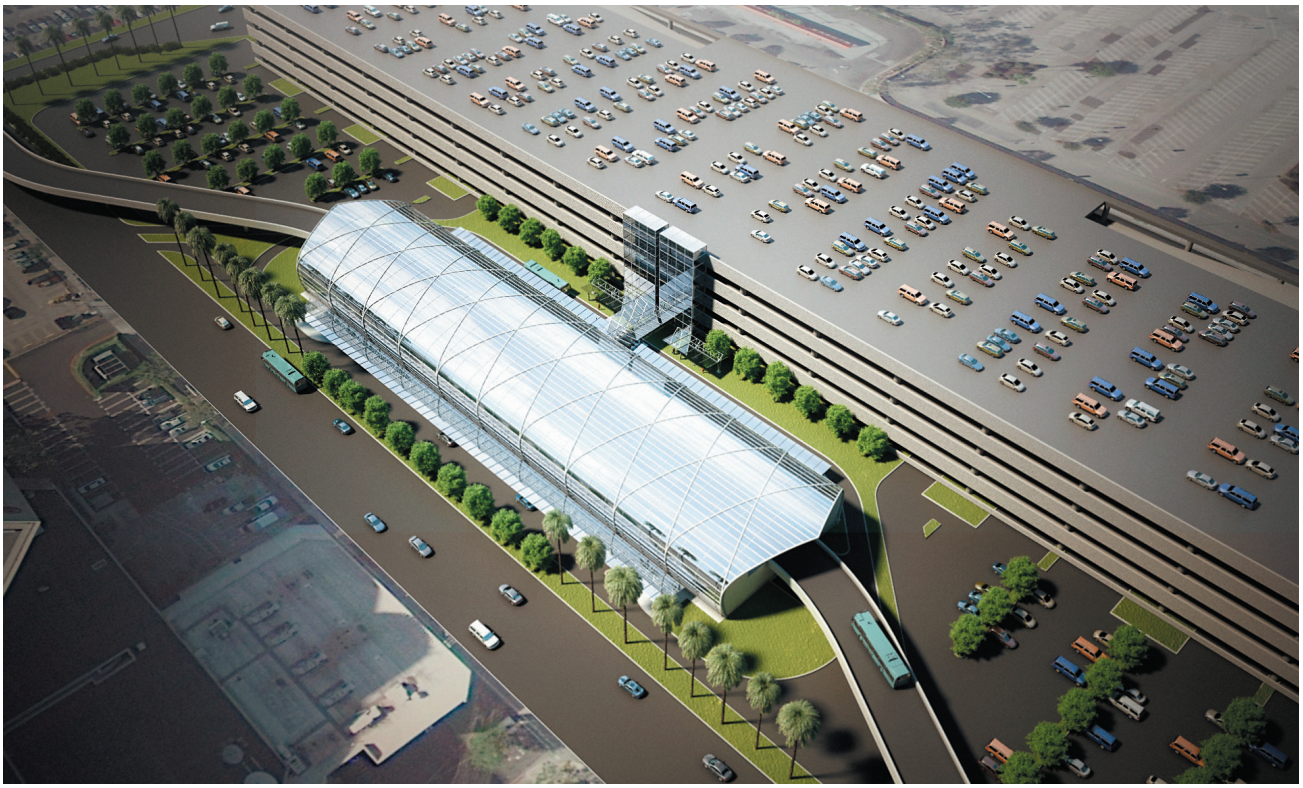

Figure 48 - Bird's-eye view of ITF

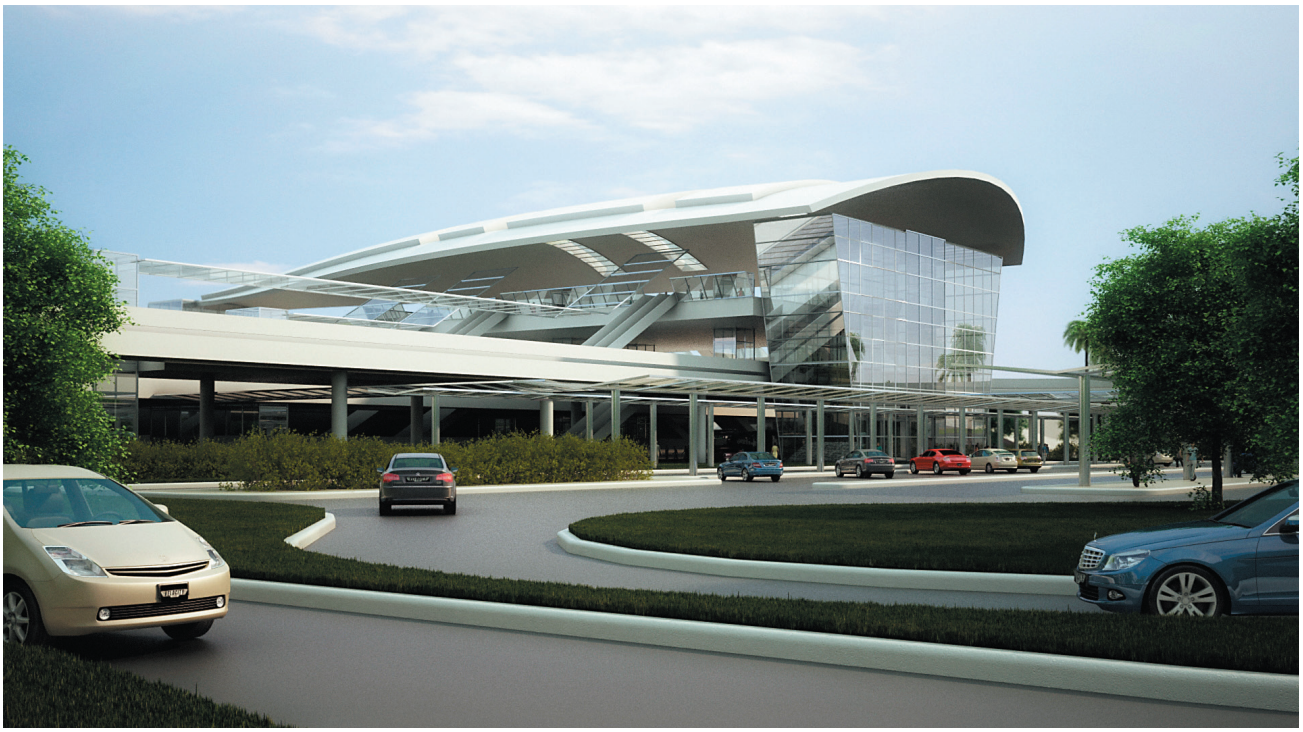

Figure 49 - Manchester Square Transit Hub connecting airport service with regional transit

However, the motivating factor in developing a transit connection from this site is a new light rail service line with a station near the southwest corner of Manchester Square. The new Metro Crenshaw/LAX transit corridor between the Exposition Line and the Green Line will be operational by 2019. This line will include a station at Aviation and Century Boulevards, across the street from Manchester Square. This station will also service passengers from the Green Line. The connectivity into the airport CTA will be via a dedicated busway—an airport branded bus circulating on an elevated right-of-way—or a future driverless APM. If the APM is built between Manchester Square and the CTA, Manchester Square has available land for the required maintenance facility.

Airport facilities that are being considered for Manchester Square are a Consolidated Rental Car Facility (ConRAC) and airport parking. One objective of the SPAS would be to extend airport services out to Manchester Square. As with the 98th Street ITF, passenger amenities such as retail, food service, ticketing and restrooms would be developed in this first phase. Meeter/greeter waiting areas can also be programmed within the facility to encourage friends and family to gather at the facility rather than circulate around the CTA. Facility curbsides would be programmed to promote passenger wayfinding and vehicular ingress and egress.

Again, as with the ITF, departing passengers would be encouraged to use Manchester Square Transit Hub as a Kiss-n-Ride facility, rather than be dropped off in the CTA. When arriving back to LAX, passengers could choose to travel to the Manchester Square Transit Hub rather than wait curbside in the CTA.

The economic development of Manchester Square would be augmented with the presence of a transit hub, including the potential for public-private partnership programs (**Figures 49, 50 and 51**).

One success story for an airport access transit hub is the AirTrain JFK Vertical Circulation Building in Jamaica, New York, which serves as one of the termini for the APM to JFK International Airport. Viewed as a catalyst for economic development by the City of New York, the Jamaica community that surrounds the terminal has been rezoned to attract development, including provisions for an air-rights overbuild and a street presence that has generated

Figure 50 - Bird's-eye view of Manchester Square Transit Hub illustrating multimodal integration with airport program

Figure 51 - Bird's-eye view of Manchester Square Transit Hub

interest in adjacent sites from the local development community. Further information and illustrations of this project are provided in Appendix B (Figures B-5 through B-10).

The following summarize the advantages and disadvantages of a Transit Hub at Manchester Square.

Pros:

- Direct connectivity with the Metro Crenshaw/LAX and Green Line light rail transit corridors
- Enhanced levels of service for passengers coming to the airport in private vehicles seeking remote weather-protected parking with seamless transfer to airport consolidated service
- Potential for economic development, if Manchester Square is developed as an airport hub

Cons:

- Potentially requires significant capital investment in terms of property acquisition and infrastructure.

Findings

A transit hub in Manchester Square was not included in the SPAS alternatives that show various options for parking or combined parking and ConRAC facility in this location. While the SPAS alternatives do not preclude development of a transit hub in this location, available property for elements of a transit hub near the Metro light rail lines may be more limited in those alternatives that include a ConRAC facility and would largely depend on the design and location of the ConRAC.

Transit Linkages

Two transit system options are being considered to serve as long-term connections between an off-CTA ITF at Manchester Square and the CTA: a dedicated busway and an APM. Both the busway and APM would be on a dedicated, grade-separated structure and follow a similar corridor within the 98th Street right-of-way.

Dedicated Busway

While an exact alignment has yet to be determined, an elevated busway between Manchester Square and the CTA approximately follow the 98th Street corridor. The busway needs to be 36 feet wide to accommodate one lane of traffic in each direction, plus shoulders to accommodate vehicle breakdowns, and would occupy a raised median supported on columns within the 98th Street right-of-way.

From at-grade in Manchester Square, the busway would ascend a ramp to a bridge over Aviation Boulevard and the Metro Crenshaw/LAX light rail line, and then continue along the 98th Street corridor to a terminus at the 98th Street ITF, likely on the second or third level of that facility. The busway would continue along the 98th Street corridor, crossing over Sepulveda Boulevard into the current Park One property, cross over the relocated Sky Way, and run parallel to that roadway as it intersects with World Way North. By crossing Sky Way, the buses will be on the terminal side of the World Way North Departures roadway, thereby allowing buses to drop off and pick up passengers at terminal curbsides without crossing other lanes of traffic.

In the CTA, buses will be required to use mixed flow lanes on the Departures roadway. Bus service will be provided in various routes, each serving specific groups of terminals. Buses will circle the Departures roadway to both drop off and pick up passengers at the terminals. At the route's final terminal, buses will transition to the Arrivals level roadway using the existing ramp that encircles the LAWA Administration East Building. Buses will continue on eastbound Center Way, through the intersection of Center Way and World Way South, and then turn right onto the ramp that leads to northbound Sepulveda Boulevard. Buses would then travel on Sepulveda Boulevard, turn right onto 96th Street. East of Vicksburg Avenue, buses would use a bus-only roadway and ascend a ramp to an upper floor of the ITF. Buses would continue east on this elevated roadway along the 98th Street corridor, cross over the Metro Crenshaw/LAX light rail line and Aviation Boulevard, and then descend to an at-grade parking facility at Manchester Square.

Pros:

- Perceived better LOS as opposed to surface transit
- Passengers would be dropped off and picked up at their respective terminal front door, thereby providing a shorter walking distance than other forms of transit

Cons:

- Subject to congestion and traffic signal timing on CTA roadways and on northbound Sepulveda Boulevard
- Perception of train as higher LOS than bus at airport intermodal hub must be overcome

Busway Interface with the CTA Roadway Network

One of the primary challenges in designing a dedicated busway between Manchester Square and the CTA is the convergence of several roadways at the main CTA entrance east of T1. The study team focused on various roadway options between 98th Street and the CTA/Park One area. The new elevated structure would consist of three lanes: one inbound; one outbound; and a median lane to accommodate bypass, emergency, or maintenance vehicles. The study team developed two inbound and three outbound roadway options, described below. In developing these options, the following conditions were assumed: (1) the entrance ramp from southbound Sepulveda Boulevard into the CTA must be maintained; (2) property for a future Terminal 0 must be preserved; and (3) property for a commercial vehicle holding lot within the existing Park One property should be preserved.

Inbound

Departure Roadway Option 1 - The bus viaduct and the southbound Sepulveda Boulevard Departure level roadway would be structurally combined but remain in separate lanes as it approaches the CTA. This combined viaduct would intersect with the Departure level roadway about 250 feet west of Sepulveda Boulevard. It is recommended that a two-phase signal be constructed at this new intersection (**Figure 52**).

Departure Roadway Option 2 - Buses are provided with a direct approach to the Terminal 1 curbsides, shifting the bus traffic merger downstream. This option adds 500 linear feet of additional structure, as well as requiring Southbound Sepulveda Boulevard Departure Traffic to be on its own structure to connect to the Departure roadway at a new signalized intersection. This option can also facilitate movement of buses assigned to different zones, i.e. a bus can stop for Terminal 1 and another bus can bypass to head to other terminals (**Figure 53**).

A variation of Roadway Option 2 was assumed in SPAS Alternatives 1 and 8. At this level of planning the roadway design is in a conceptual stage only.

Outbound

The bus operation for this study assumes that the inbound bus would circle around the Departure roadway. After Terminal 7 the bus would exit down to the Arrivals roadway starting at T1. Upon completing the arrivals loop the following exit options are possible.

Arrival Roadway Option - The proposed Arrival level roadways complete the picture for the southbound Sepulveda Boulevard movements into the CTA. The proposal utilizes the existing Sky Way exit just east of T1. If the passenger pick-up operation on the level of the CTA is reversed so that commercial vehicles are picking up passengers on the inner roadway closest to the terminals, one of the slip ramp openings from the inner roadway to the outer roadway of World Way South in front of T7 would require a separate phase to facilitate the movement of buses from the inner roadway to the far left lane of the outer roadway before making a left turn at the World Way South/Center Way intersection (**Figure 54**).

Exit Options 1 and 2 - These options investigated using the ramp from eastbound Century Boulevard to northbound Sepulveda Boulevard as the consolidated bus route to return to the ITF. This would allow buses on the inner Arrivals roadway to remain on the right-hand lane instead of having to cross to the left lane, as in the other outbound options described above. The ramp from Century Boulevard to northbound Sepulveda Boulevard would be widened to allow for two lanes of traffic (**Figure 55**).

There are two variations on the outbound exit options: Option 1 would use the existing westbound connector road between Sepulveda Boulevard and Vicksburg Avenue and then continue north on Vicksburg Avenue to the ITF on 98th Street; Option 2 provides an elevated structure to cross over Sepulveda Boulevard and Century Boulevard and then continue north on the west side of Sepulveda Boulevard over the LAX roadways, and finally merge with the bus viaduct structure at 98th Street.

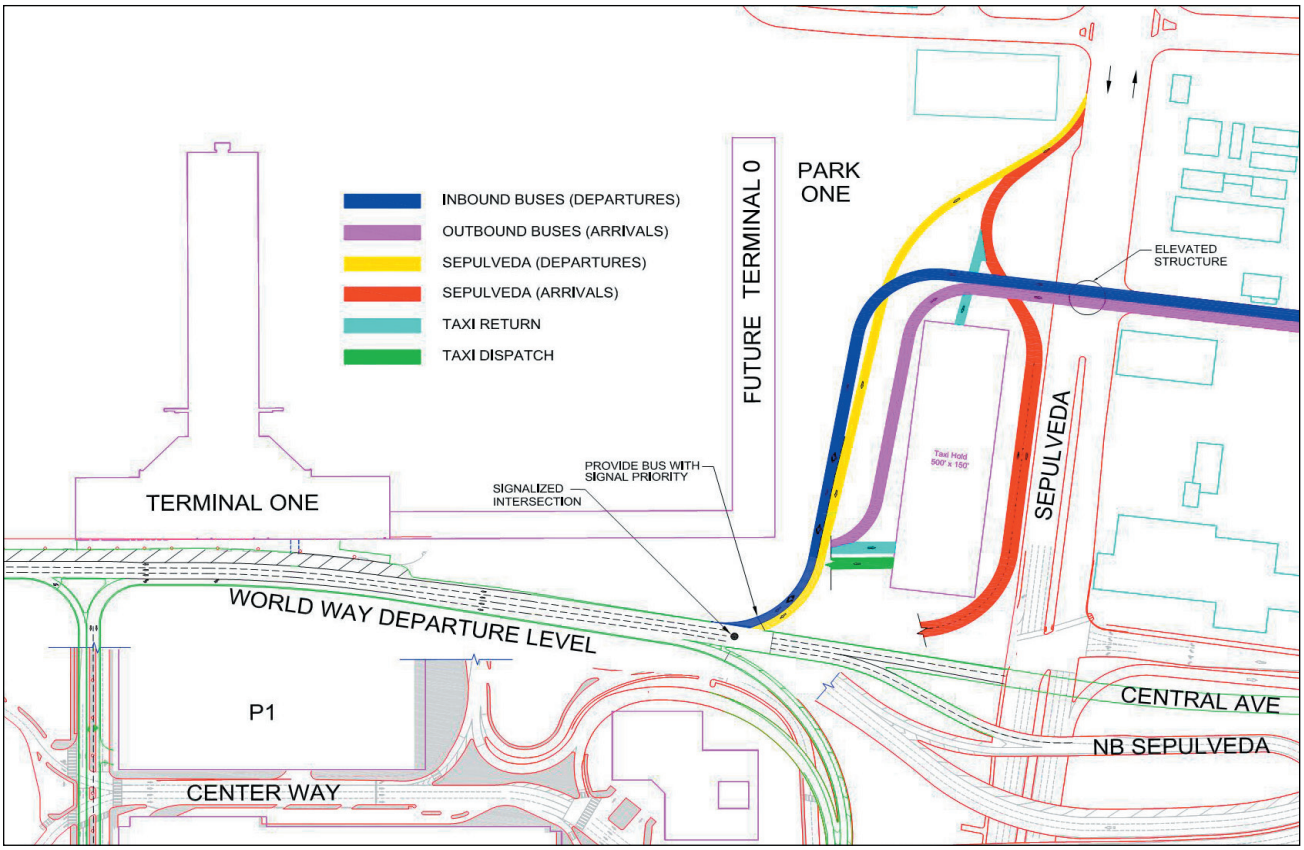

Figure 52 - Inbound Departures roadway to accommodate busway, Option 1

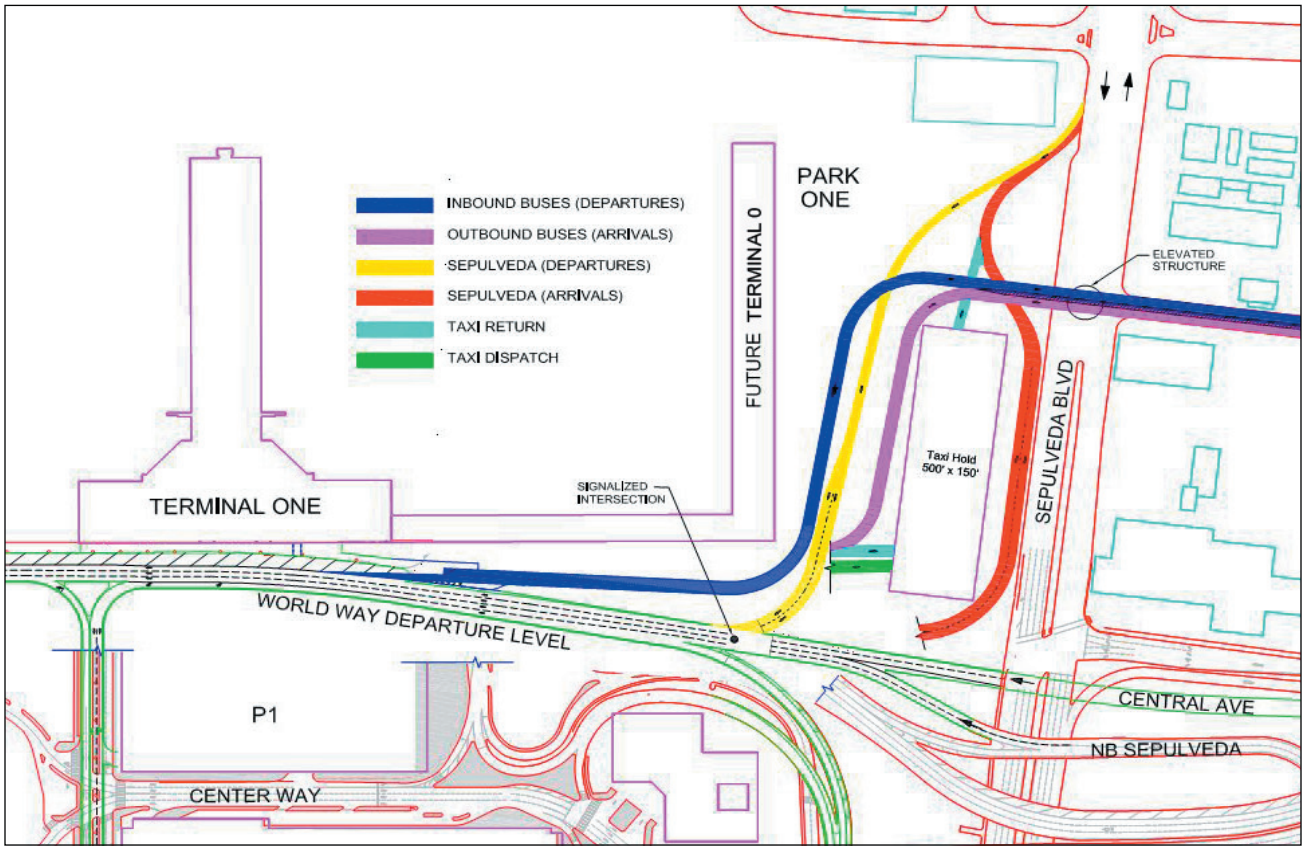

Figure 53 - Inbound Departures roadway to accommodate busway, Option 2

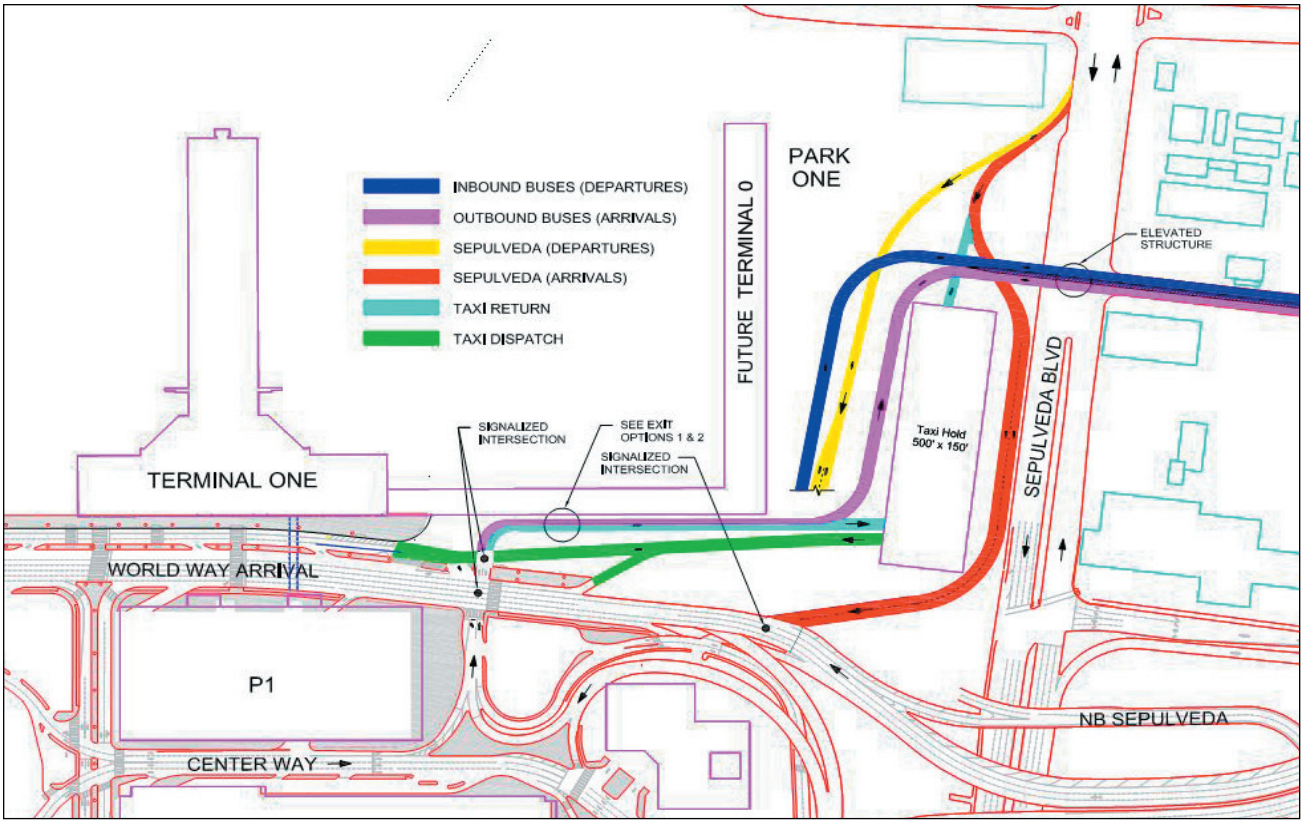

Figure 54 - Outbound Arrivals roadway to accommodate busway

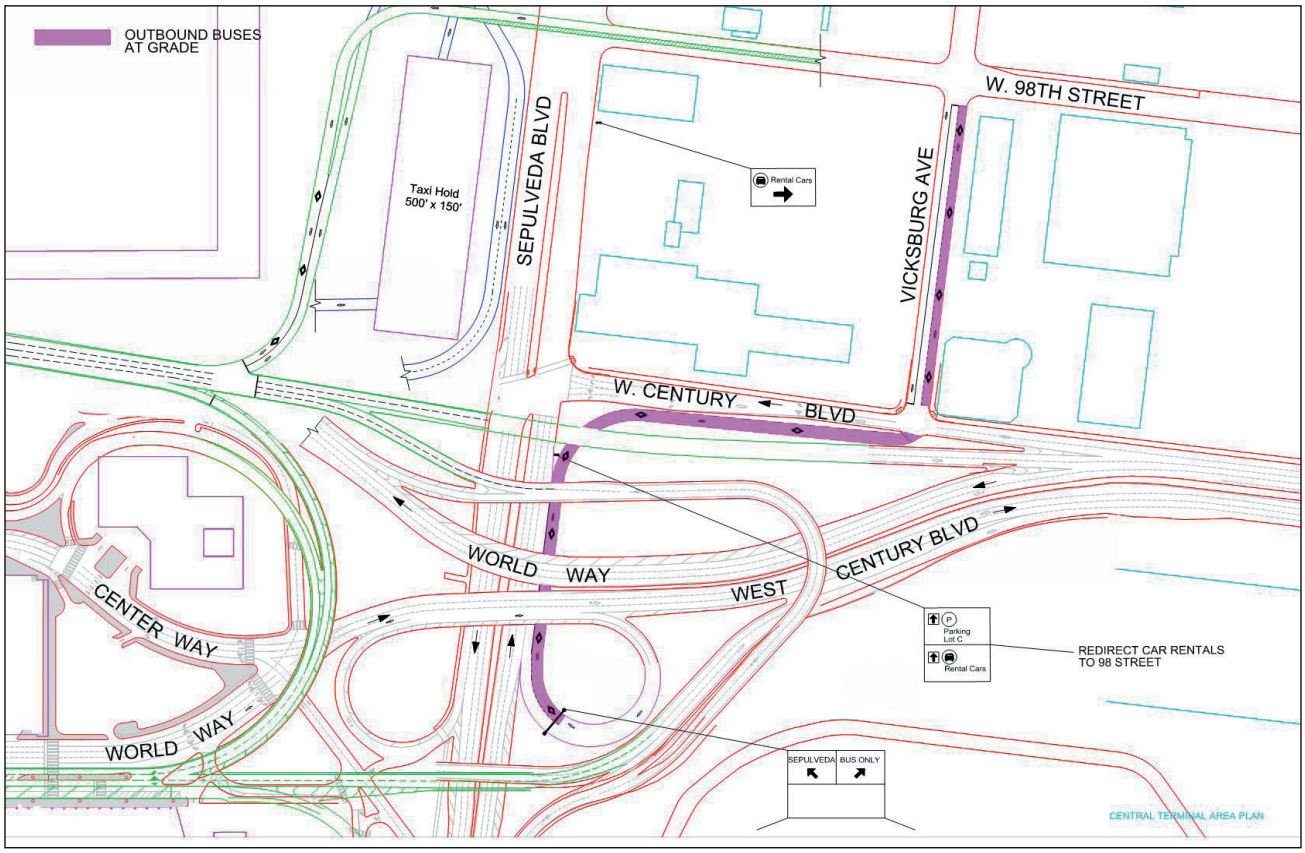

Figure 55 - Outbound busway exit options

While this grade-separated option allows the consolidated buses to avoid mixed flow traffic congestion on Sepulveda Boulevard, it is significantly more challenging to construct and finance (**Figure 56**).

Ultimately, neither of these outbound options was chosen for inclusion in SPAS. Rather, it was decided to assume that in SPAS Alternatives 1 and 8, the bus would exit the CTA in mixed-flow traffic via eastbound Century Boulevard to northbound Sepulveda Boulevard. The buses would turn right on 96th Street and then turn right east of Vicksburg Avenue to enter the elevated busway.

Automated People Mover

An automated (i.e., driverless) APM between the CTA and Manchester Square is one option to connect LAX with regional transit and off-CTA passenger services, including long-term parking and a potential ConRAC facility. Although an exact alignment has yet to be determined, the proposed APM follows a similar route to the busway, using the 98th Street right-of-way to support the elevated guideway between the CTA and Manchester Square, the location for the future Metro Crenshaw/LAX light rail station and proposed Transit Hub.

The proposed APM would be a pinched loop system, meaning that cars would travel in one direction to an end station and then travel back in the other direction. The APM guideway would be located above the upper level roadway, following the alignment of World Way. It could be constructed either adjacent to the parking structures or within widened median islands between the inner and outer roadways. **Figure 57** provides a section view of the APM concept on the garage side of the outer Arrivals roadway; a similar section with the APM on the terminal side was provided as Figure 15, under the discussion of reprogrammed Arrivals curbside operations. To transition from the north side of the CTA to the south side, it is possible that the APM alignment could use a realigned West Way corridor, which was proposed to be constructed as an element of the passenger Processor. New vertical circulation and pedestrian bridges over the Departures roadway would provide passengers with connections between APM stations and the terminals. The APM station east of the proposed Processor would be constructed one level above the West Way curbsides, with vertical circulation and a pedestrian bridge connecting it to the Processor.

The fixed length of an APM guideway is estimated at between 25,000 and 26,000 feet. The required guideway width is 30 feet; a width of 36 feet for the APM would be required if the busway option is constructed as a first phase.

It is estimated that with the pinched-loop system, a round trip on the APM would take approximately 19 minutes. The automated system would operate 24 hours a day. During peak periods (12 hours per day), the APM would operate with nine 4-car trains at headways of 2.1 minutes; this configuration provides a capacity of 2,383 passengers per hour per direction (pphpd), assuming 21 passengers per car. The 6-hour daytime off-peak operation assumes six 4-car trains with 3.2-minute headways, providing a capacity 1,589 pphpd. During the remaining 6-hour night period operation, four 4-car trains at 4.8-minute headways would provide a capacity of 1,059 pphpd. The APM would require a maintenance and storage facility with an access guideway of approximately 6,000 feet. The maintenance facility itself would be approximately 92,000 square feet (2.1 acres) and would likely be located near the terminus in Manchester Square.

APM Stations

Two scenarios were studied for the APM operation within the CTA, a 3-station concept and a 5-station concept. In the 3-station concept, one station would be located on the north side of the CTA between T1 and T2, a second station would serve the proposed passenger Processor with passenger circulation to T3, T4, and TBIT, and a third station would serve the terminals on the south side of the CTA (**Figures 58 and 59**). In the 5-station concept, an additional station would be constructed on the north and south sides of the CTA (**Figures 60 and 61**). Stations would be approximately 160 feet in length.

Since Metro is in the early stages of designing its future Metro Crenshaw/LAX transit corridor station at or near the northwest corner of Aviation and Century Boulevards, the specific means of connecting the APM with this light rail station cannot be determined at this time. If the light rail station is near 98th Street, an APM station could be located one level directly above Metro's station. If the light rail station is constructed closer to or straddling Century Boulevard, a pedestrian bridge may provide the connection between the two stations. This APM station

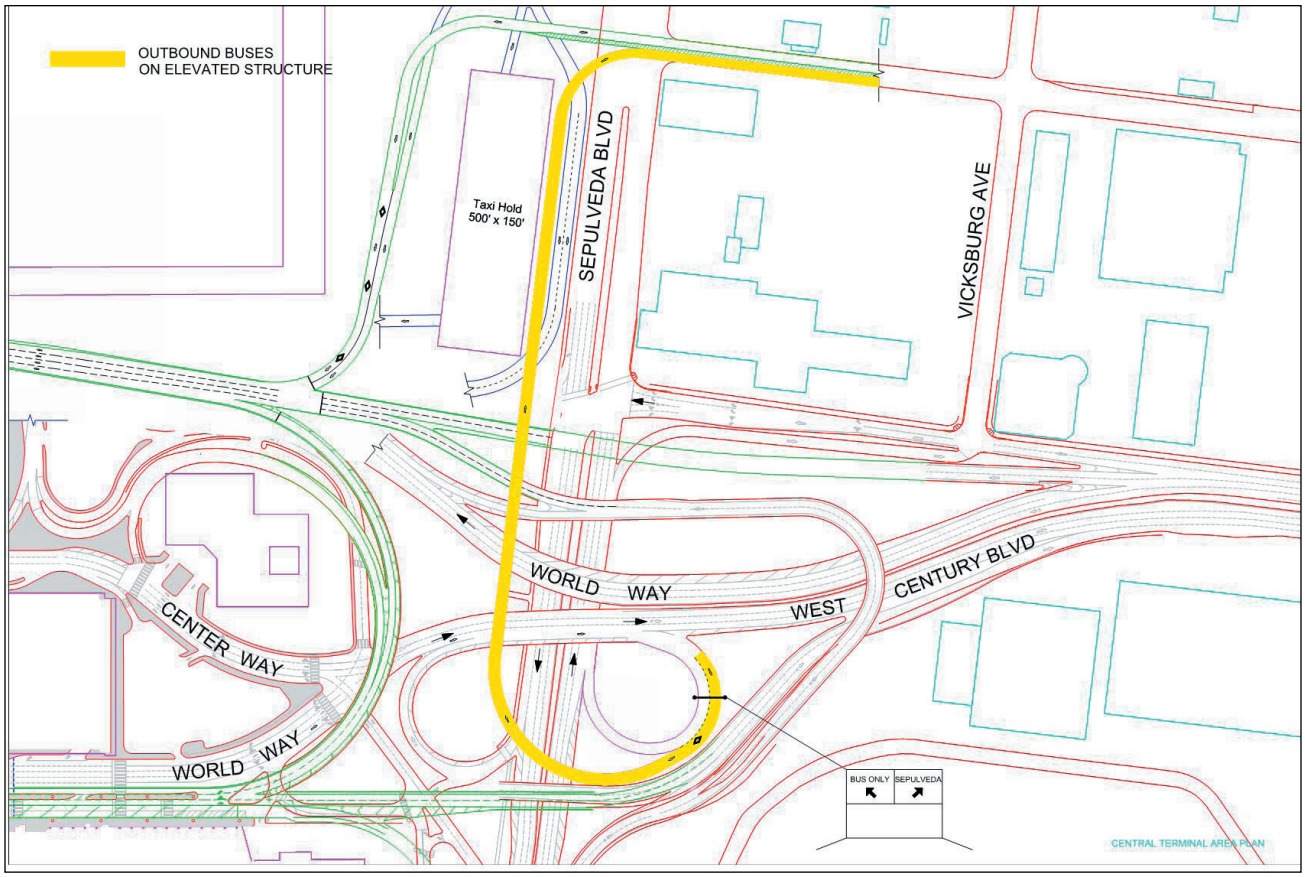

Figure 56 - Grade-separated roadway to accommodate outbound busway operations

Figure 57 - APM garage-side option, in which passengers circulate down and across Arrivals roadway

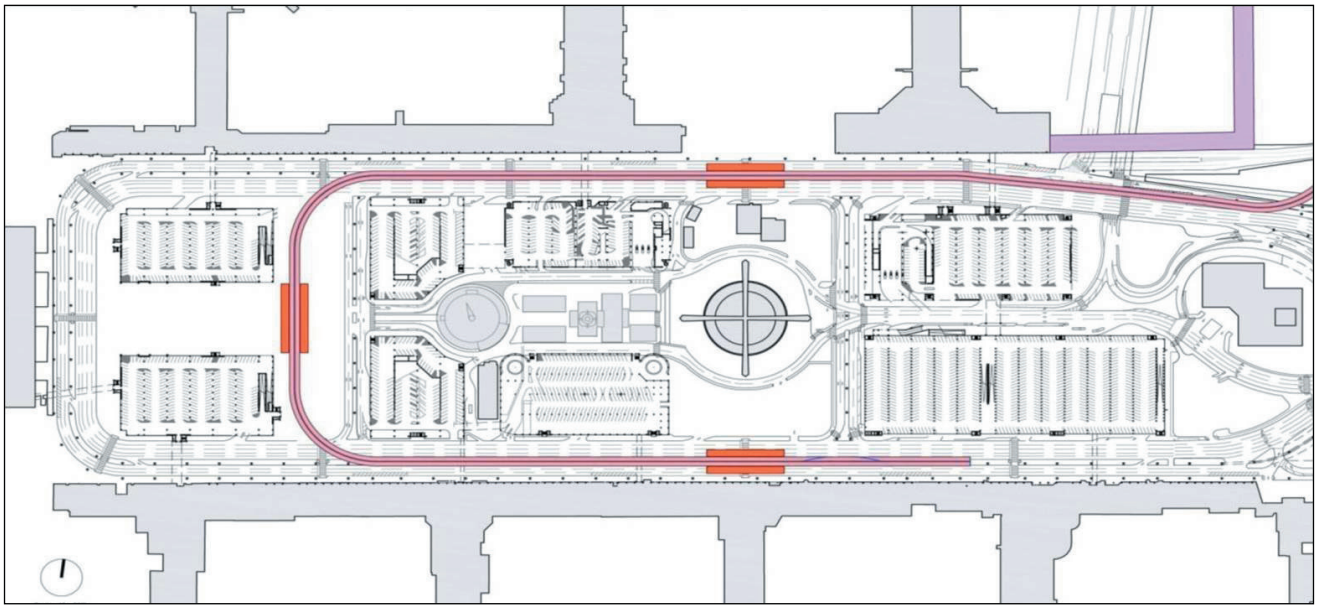

Figure 58 - APM 3-station option, plan view

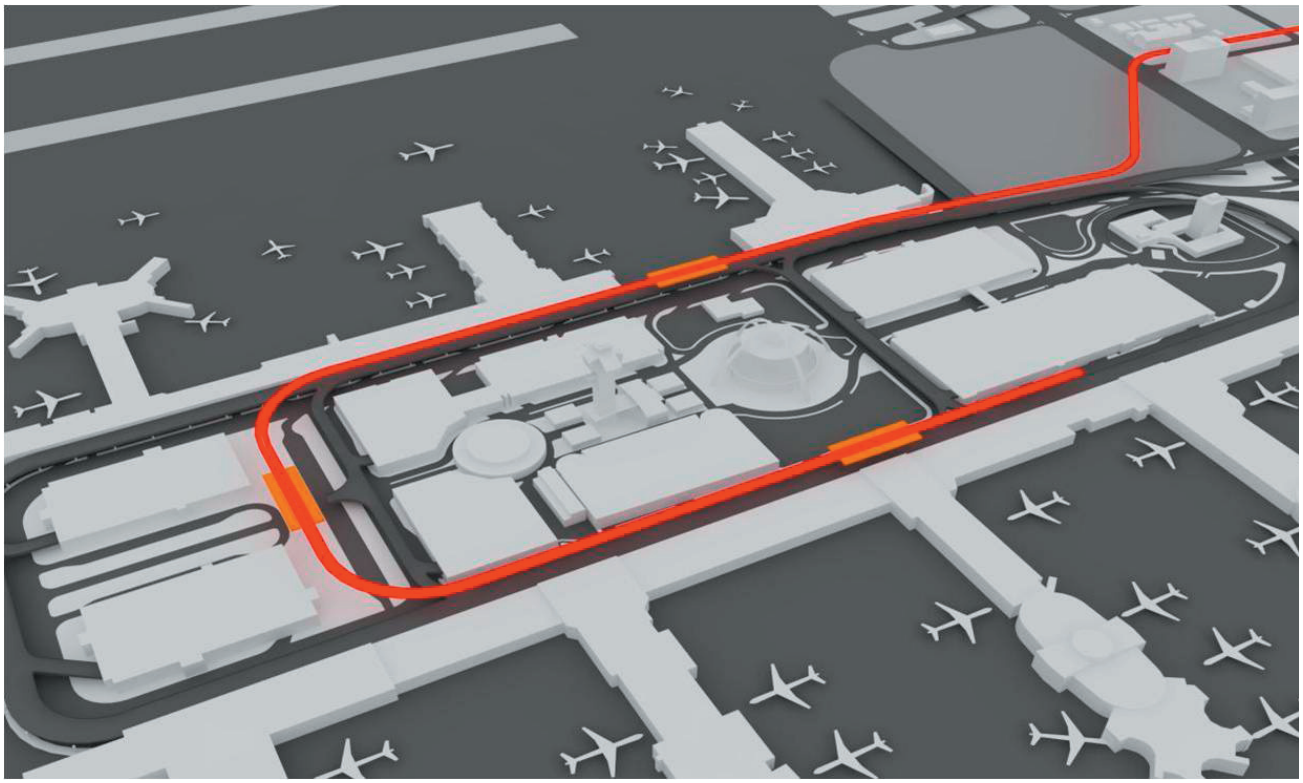

Figure 59 - APM 3-station option, bird's-eye view

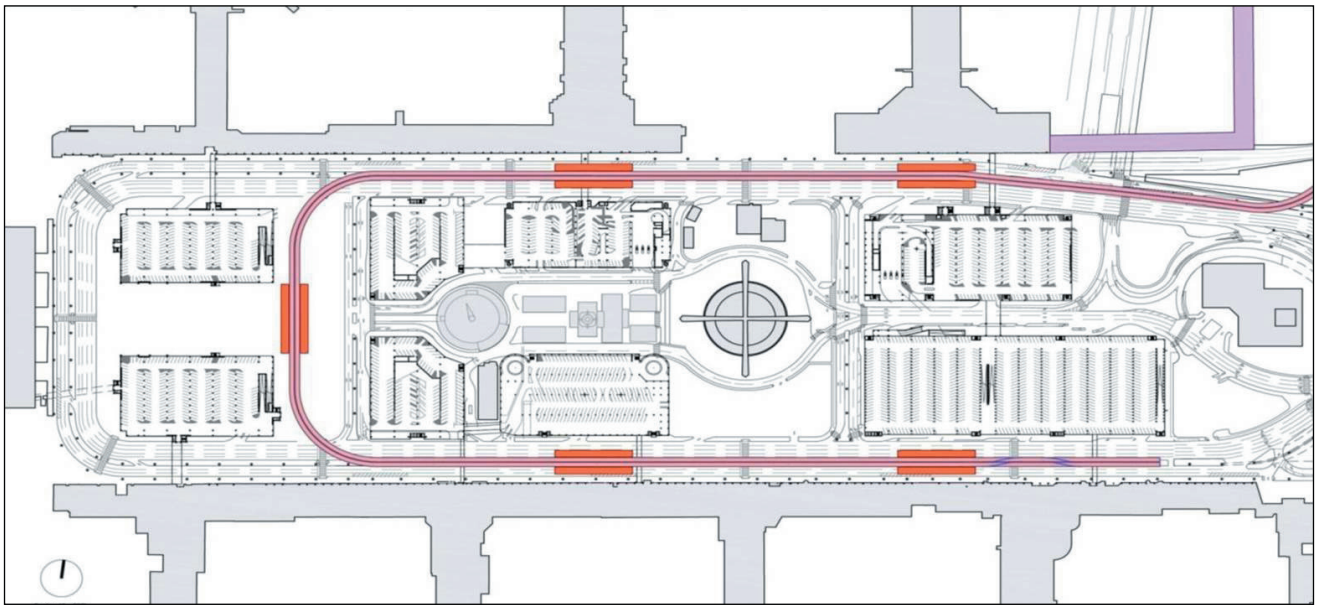

Figure 60 - APM 5-station option, plan view

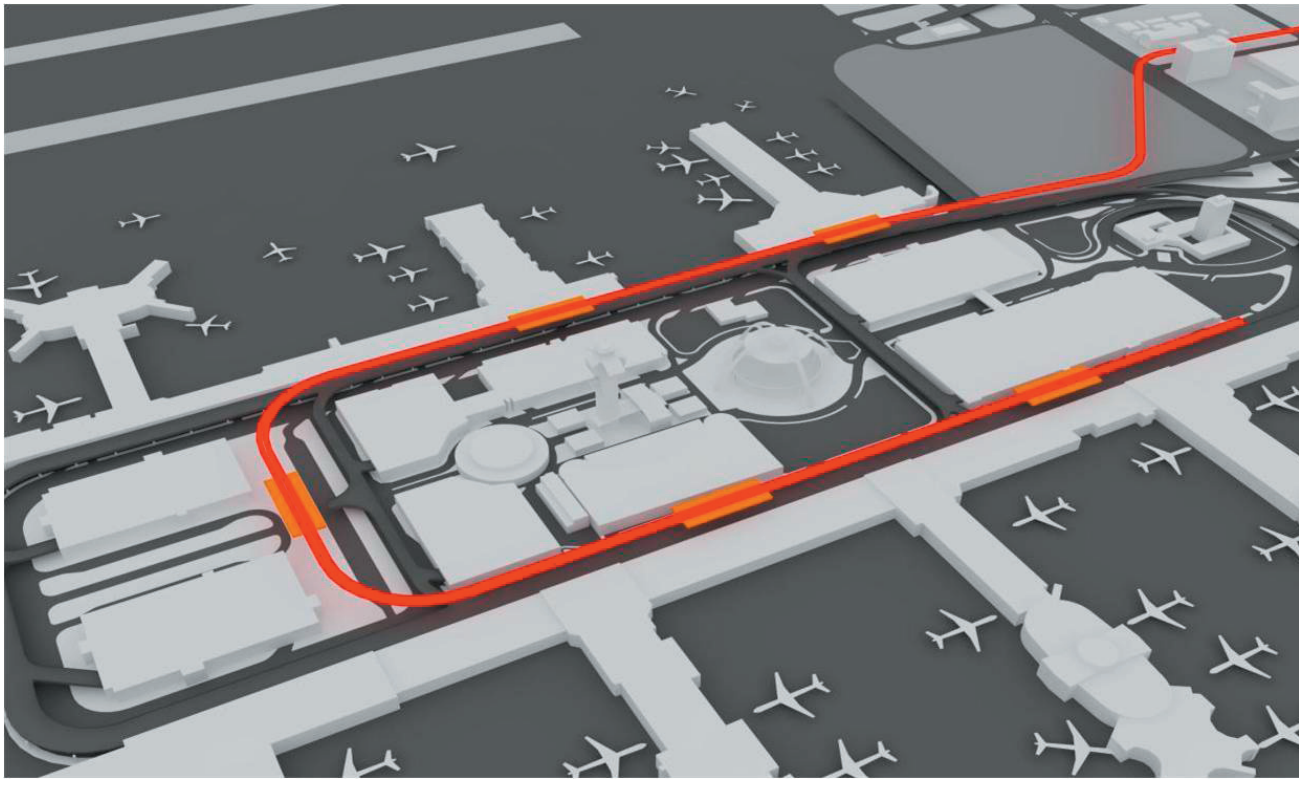

Figure 61 - APM 5-station option, bird's-eye view

may also serve a ConRAC in Manchester Square via a pedestrian bridge between the station and the ConRAC, or a separate APM station may be provided specifically for the ConRAC. A station would also be developed at the 98th Street ITF as an intermediate stop between the Manchester Square Transit Hub and the CTA.

Pros:

- Improved connectivity for transit passengers
- Provides time certainty compared to surface transportation options
- Stations outside the CTA provide Kiss-n-Ride option, thereby reducing vehicles entering the CTA

Cons:

- Requires significant investment for a system that may only serve a small percentage of annual passenger volume
- The number of level changes and the walking distances required between proposed APM stations and the terminals may not be passenger friendly
- Construction within existing airport infrastructure would be challenging

Findings

SPAS Alternatives 3 and 9 include APM lines. SPAS Alternative 3, the existing LAX Master Plan, has two APM lines; one line connects the CTA, ConRAC (located in the property currently used as Parking Lot C), and the ITF at the northeast corner of Aviation Boulevard and Imperial Highway, and the other line connects the CTA and the GTC in Manchester Square.

The proposed APM line in SPAS Alternative 9 connects the CTA, ITF, and the ConRAC in Manchester Square. Access to the future Metro Crenshaw/LAX light rail station at Aviation and Century Boulevards would also be provided. Under Alternative 9, it is assumed that the APM would operate on a pinched loop system in the CTA, with two or three stations to serve the terminals.

Specific Plan Amendment Study (SPAS) Support

The SPAS process is being undertaken to identify and develop potential alternative designs, technologies, and configurations for the LAX Master Plan Program that would provide solutions to the problems that the Yellow Light Projects were designed to address consistent with a practical capacity of 78.9 MAP.

The main ground transportation features of the approved LAX Master Plan Alternative D include the following:

- **The CTA** would be closed to private vehicles.
- **A Ground Transportation Center (GTC)** would be built in Manchester Square to effectively replace the roadways, curbsides, and parking facilities in the CTA.
- **A ConRAC facility** would be constructed in the property currently used for long-term public parking Lot C.
- **An Intermodal Transportation Center (ITC)** would be built at the northeast corner of Aviation Boulevard and Imperial Highway to primarily replace the parking eliminated from Lot C and to provide connectivity with the Green Line light rail system and local bus transit.
- **Two APM routes** would be built, one connecting the CTA to the GTC via Century Boulevard (APM 1) and a second connecting the CTA to the ITC and ConRAC (APM 2), the latter using the Aviation Boulevard and 98th Street corridors.
- **A West Employee Parking Lot** would be built on the west side of the airport (World Way West) to consolidate various employee parking facilities and provide a common security access point for employees.

The STV/Ricondo study team performed various transportation planning tasks to support the SPAS process. This included the preparation of numerous options:

First Iteration Options

Option 1

The features of Option 1, shown in **Figure 62**, include:

- A public parking facility with shuttle drop-off/pick-up accommodations between 96th and 98th streets
- A ConRAC located east of Lot C, with the main building along Airport Boulevard
- A public parking facility in Manchester Square
- Employee parking in Lot E, where it is presently located
- Three APM stations outside the CTA to serve the two proposed public parking facilities, the ConRAC, and the Metro Crenshaw/LAX transit corridor station at Aviation and Century boulevards, respectively

Option 2

The features of Option 2, shown in **Figure 63**, include:

- APM with only two stations outside the CTA, one on the existing parking lot bounded by 96th and 98th streets, Vicksburg Avenue, and Avion Drive. The second station would be located in Manchester Square.
- No ConRAC
- A public parking facility with shuttle drop-off/pick-up accommodations between 96th and 98th streets
- Continued use of Lot C as long-term public parking
- Employee parking relocated to Manchester Square
- Parking Lot E replaced by airport facilities.

Option 3

The features of Option 3, shown in **Figure 64**, include:

- A ConRAC between 96th and 98th streets
- ConRAC parking in Lot C
- Public parking moved from Lot C to Manchester Square.
- Employee parking remaining in Lot E.
- Two APM stations outside the CTA, one to serve the proposed ConRAC on 98th Street and the other in proximity to the Metro Crenshaw/LAX light rail station at Aviation and Century Boulevards and public parking in Manchester Square.

Option 4

The features of Option 4, shown in **Figure 65**, include:

- A ConRAC between 96th and 98th streets
- Parking Lot C area shared between public parking and ConRAC parking
- Employee parking relocated to Manchester Square
- Parking Lot E replaced with airport facilities
- Two APM stations outside the CTA, one to serve the proposed ConRAC on 98th Street and the other to serve the Metro Crenshaw/LAX light rail station at Aviation and Century Boulevards and employee parking in Manchester Square

Option 5/5A

The features of Option 5 and 5A, which are shown in **Figure 66**, include:

- A ConRAC located south of Westchester Parkway and east of Jenny Avenue, part of which is currently an Avis Rent-a-Car leasehold
- A consolidated bus facility along the west side of Airport Boulevard between Westchester Parkway and 96th Street, part of which is also currently leased by Avis Rent-a-Car
- Public parking facilities in Manchester Square and north of 98th Street, immediately south of the ConRAC.
- Employee parking kept in Lot E
- Two APM stations would be built outside the CTA to service the proposed ConRAC and consolidated bus facilities west of Airport Boulevard and the Metro Crenshaw/LAX light rail station at Aviation and Century Boulevards as well as the public parking in Manchester Square.

In addition of the components described above, Option 5A includes a parking structure occupying an existing surface parking lot bounded by 96th and 98th streets, Vicksburg Avenue, and Avion Drive, which LAWA would need to acquire

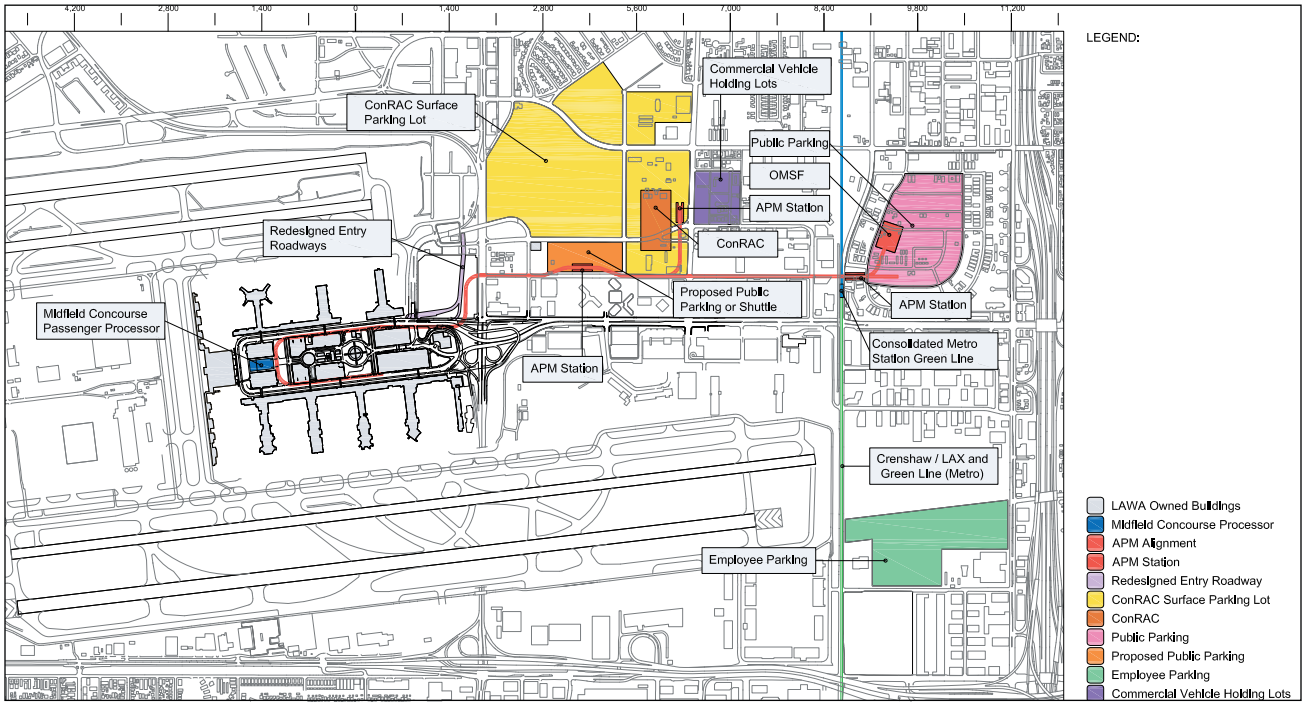

Figure 62 - June 2010 Option 1

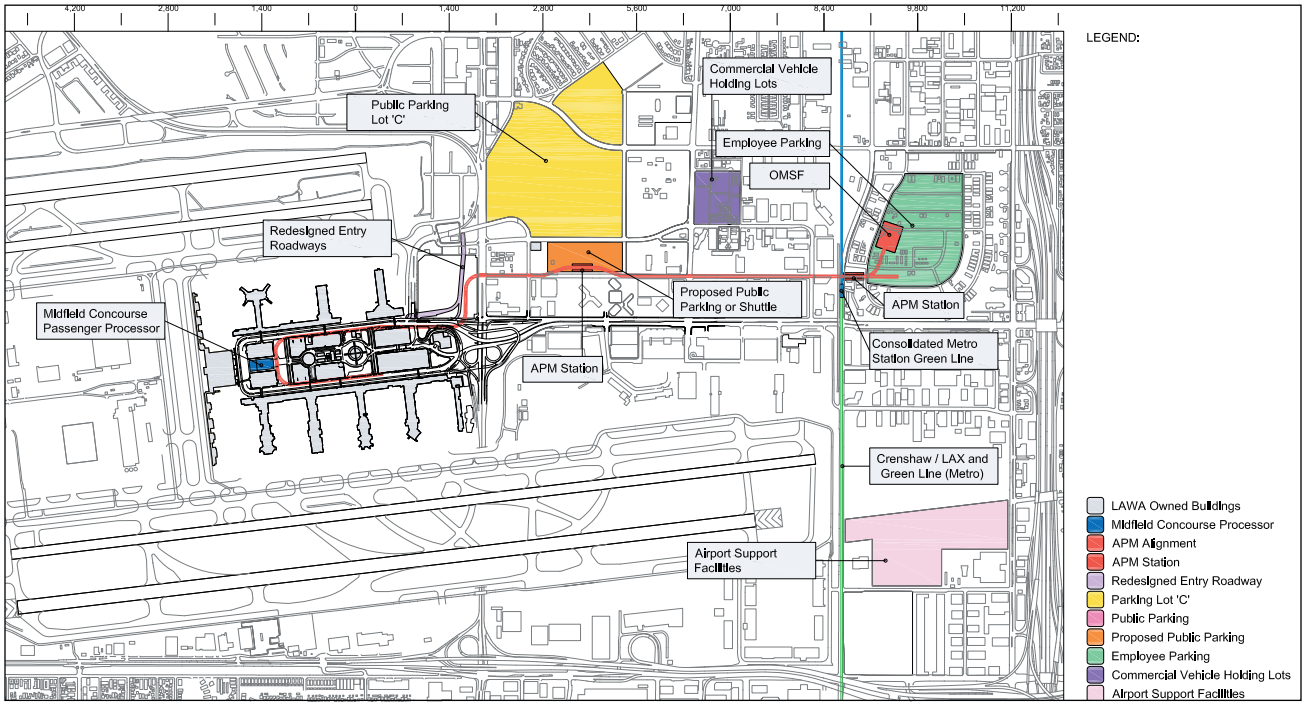

Figure 63 - June 2010 Option 2

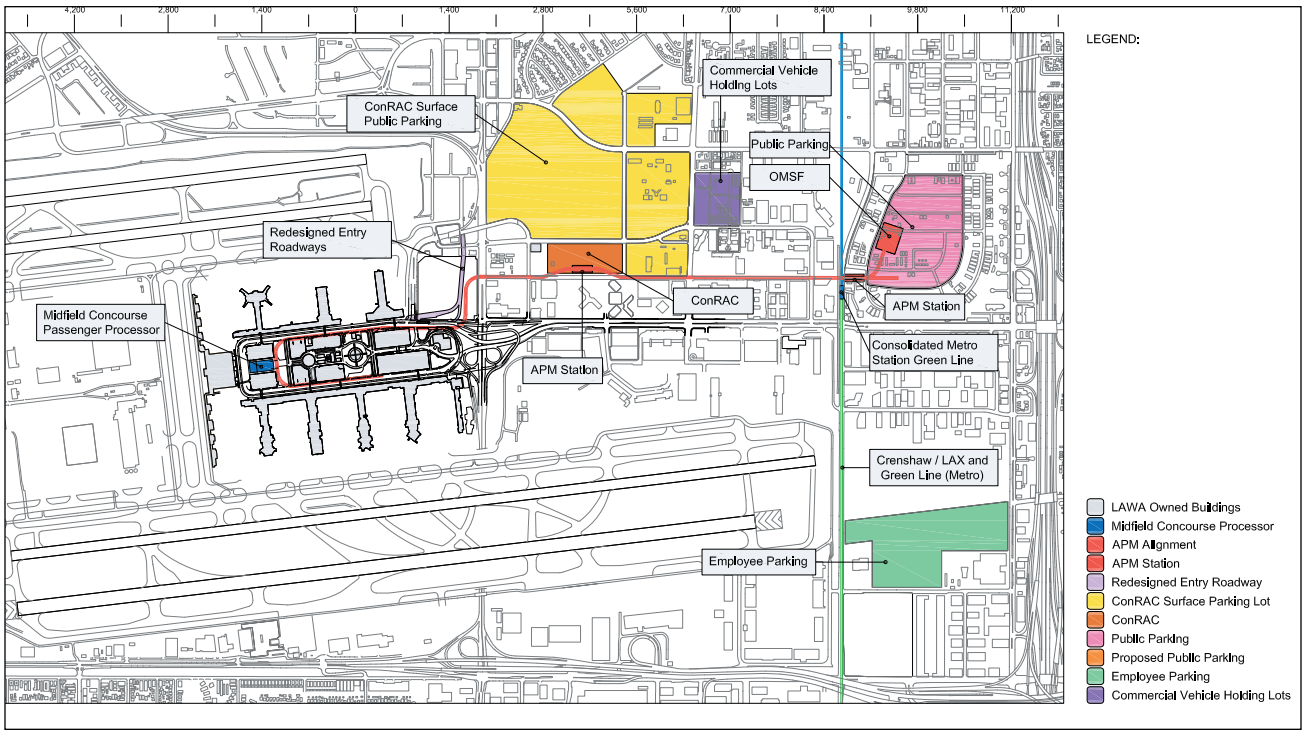

Figure 64 - June 2010 Option 3

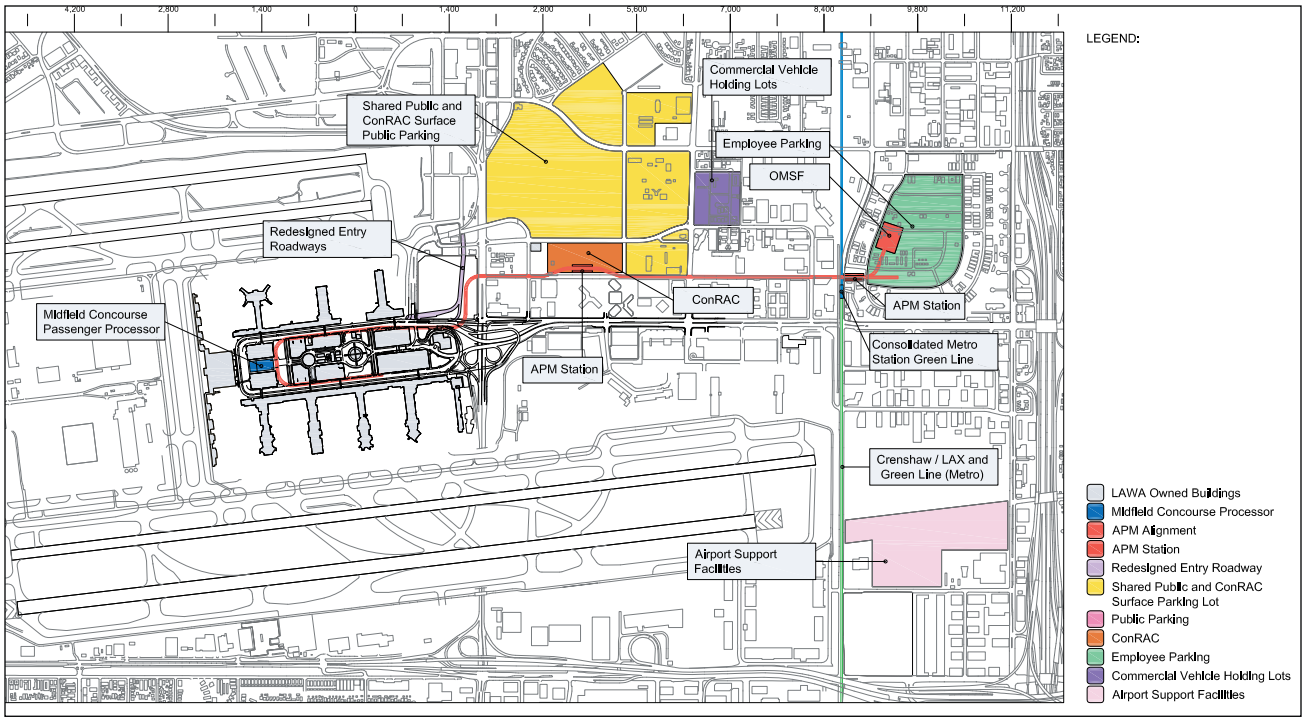

Figure 65 - June 2010 Option 4

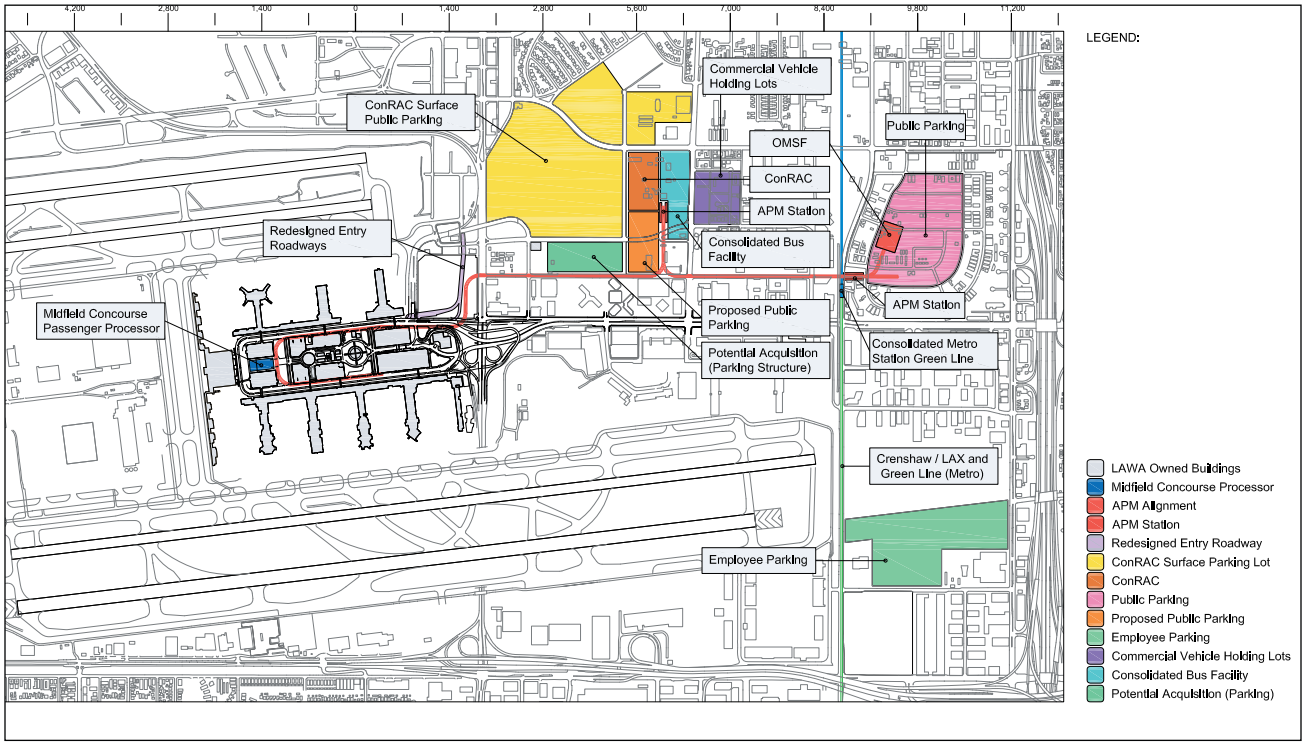

Figure 66 - June 2010 - Option 5 and 5A

Option 6

Option 6 (**Figure 67**) includes the following features:

- A parking structure for public parking constructed between 96th and 98th streets
- A ConRAC in Manchester Square
- Parking Lot C continued to be used as long-term public parking
- Lot E continued to be used for employee parking
- Two APM stations outside the CTA, one to serve the proposed public parking facilities on 98th Street and the other in proximity to the Metro Crenshaw/LAX light rail station at Aviation and Century Boulevards and the ConRAC in Manchester Square

Option 7

Option 7 was developed after it was decided that an employee parking structure and the ITC at Aviation and Imperial boulevards, which were proposed in LAX Master Plan, would not be built.

The features of Option 7, include the following:

- Two APM stations, one between 96th and 98th streets and the second one on Manchester Square
- ConRAC surface parking in what is now Lot C and Belford Square.
- Public parking on Lot C as well, north of Westchester Parkway
- Shared public and employee parking in Manchester Square
- APM operations and maintenance facility in Manchester Square
- Airport support facilities developed on Lot E and an area south of 111th Street between Aviation Boulevard, Hindy Avenue, and Imperial Highway
- Taxi holding lot on a portion of what is now Park One parking facility

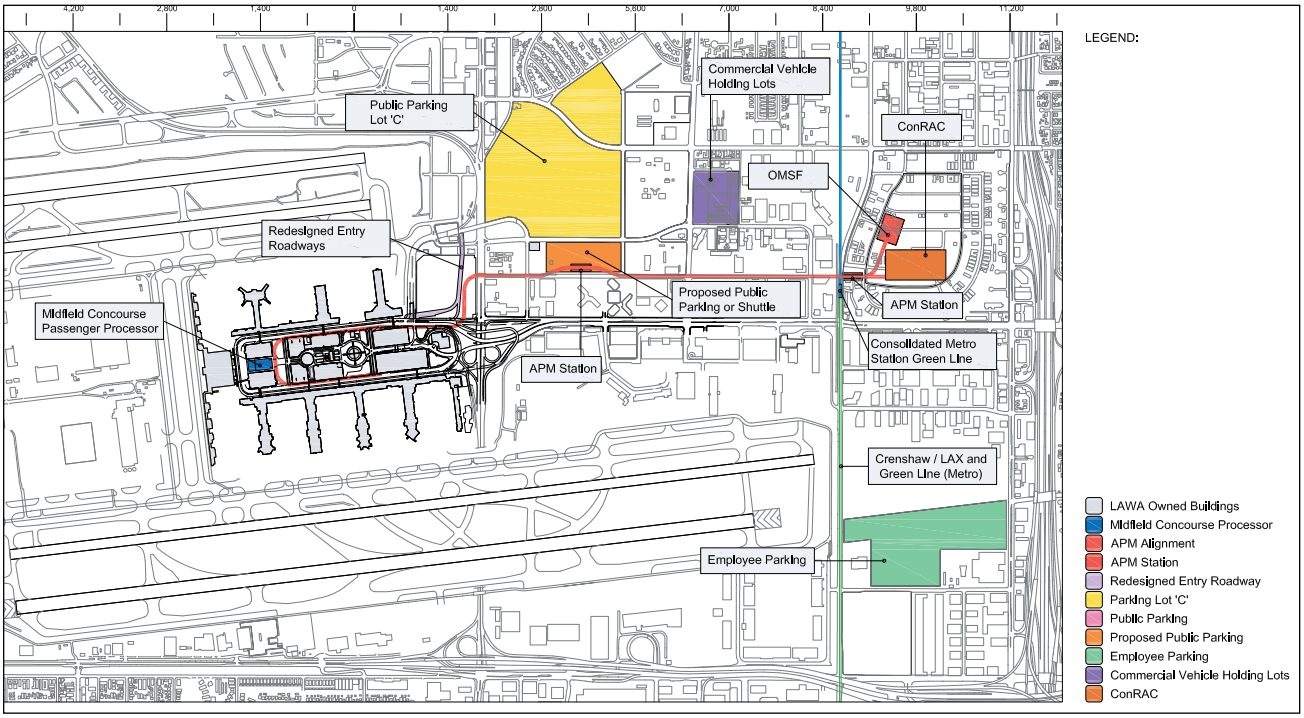

Figure 67 - June 2010 - Option 6

Second Iteration Options

Of the seven options prepared by STV, LAWA selected three options in July 2010 for further consideration and development. These options—2, 6, and 7—were renamed Options A, B, and C, respectively.

All options had only two APM stations beyond the CTA, one located in the existing parking lot between 96th and 98th streets east of Vicksburg Avenue, and the second one in Manchester Square. The first station would be south of Lot C and in direct connection to future use of that lot. In addition, it would be strategically positioned to serve hotels located between Century Boulevard and 98th Street. The second station, in Manchester Square, was locked in its position relative to potential connections to the future Metro Crenshaw/LAX and Green Lines.

It is to be noted that the boundaries of property to be acquired by LAWA were not definitive at the time of this study and subject to change, especially the extent and shape of the Manchester Square development.

Other common elements of these three options include:

- Airport support facilities in Lot E and the area south of 111th Street
- Redesigned entry roadways and a commercial vehicle holding lot on the Park One property

Option A

Unique features of Option A, shown in **Figure 68,** include the following:

- The eastern portion of Lot C would be used for public parking, while the western part of it would be used for the rental car leasehold and airport support facilities.
- Additional airport support facilities in Belford Square
- The lot between 96th and 98th streets developed as a public parking or bus shuttle facility
- Employee parking in the core of Manchester Square
- The APM operations and maintenance facility west of the APM station in Manchester Square

No ConRAC is provided in this option

Option B

Unique features of Option B, shown in **Figure 69**, include the following:

- The eastern portion of Lot C would be used for public parking and the western and northern parts would be used as Employee Parking.
- Belford Square would host airport support facilities
- The lot between 96th and 98th streets used for either public parking or a bus shuttle facility
- A ConRAC and ConRAC surface parking in Manchester Square
- The APM operations and maintenance facility in an intermediate location, north of 98th Street and east of Airport Boulevard

Option C

Unique features of Option C, shown in **Figure 70**, include the following:

- ConRAC in the lot between 96th and 98th streets
- ConRAC surface parking in a portion of Lot C and in Belford Square
- Public parking in the northern section of Lot C
- Shared employee and public parking in the core of Manchester Square
- The APM operations and maintenance facility west of the APM station in Manchester Square

Third Iteration Options

In August 2010, two options were selected for further consideration: Option C, renamed Concept A; and Option B, which was renamed Concept B (**Figures 71 and 72**).

One major change to Option C/Concept A was the substitution of the APM with a Dedicated Transit Connection. Buses would run on this elevated transit connection between the CTA and Manchester Square with an intermediate stop at the former public parking lot between 96th and 98th Streets. In order to allow the buses to operate on the elevated transit connection, the southern ending on World Way South had to be reconnected to 96th Street, creating a loop.

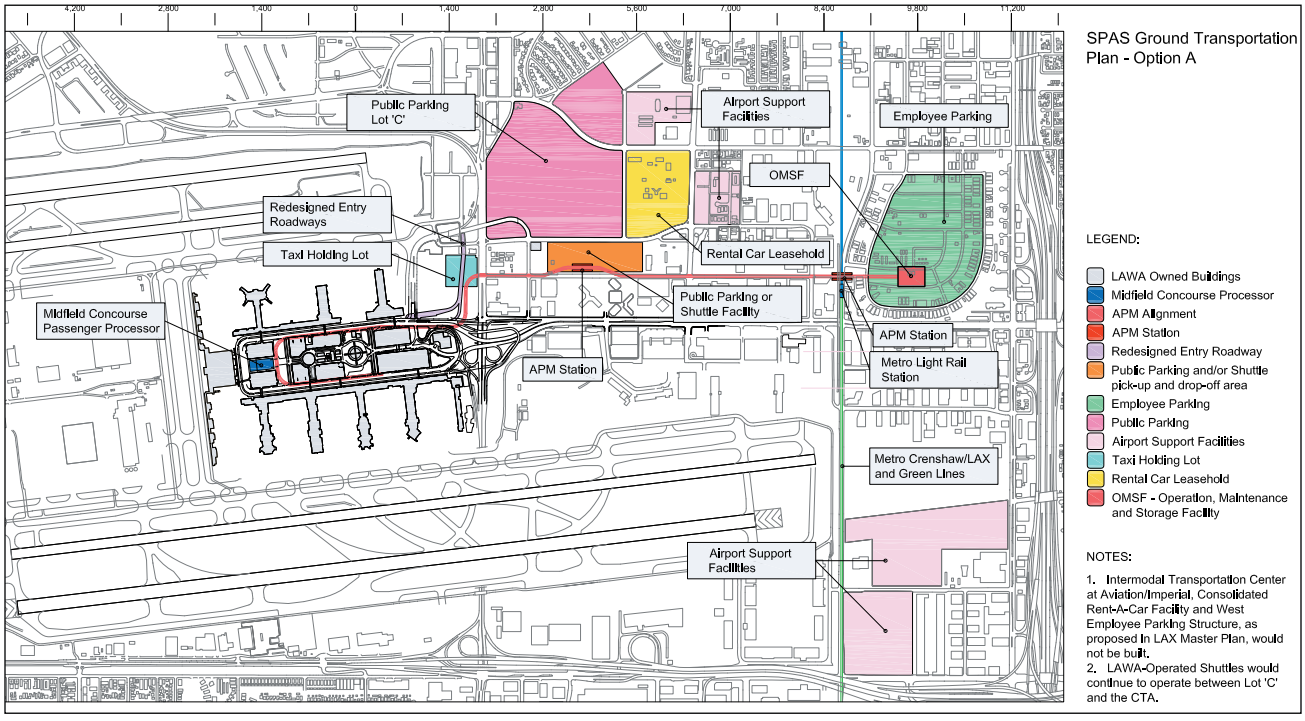

Figure 68 - Option A

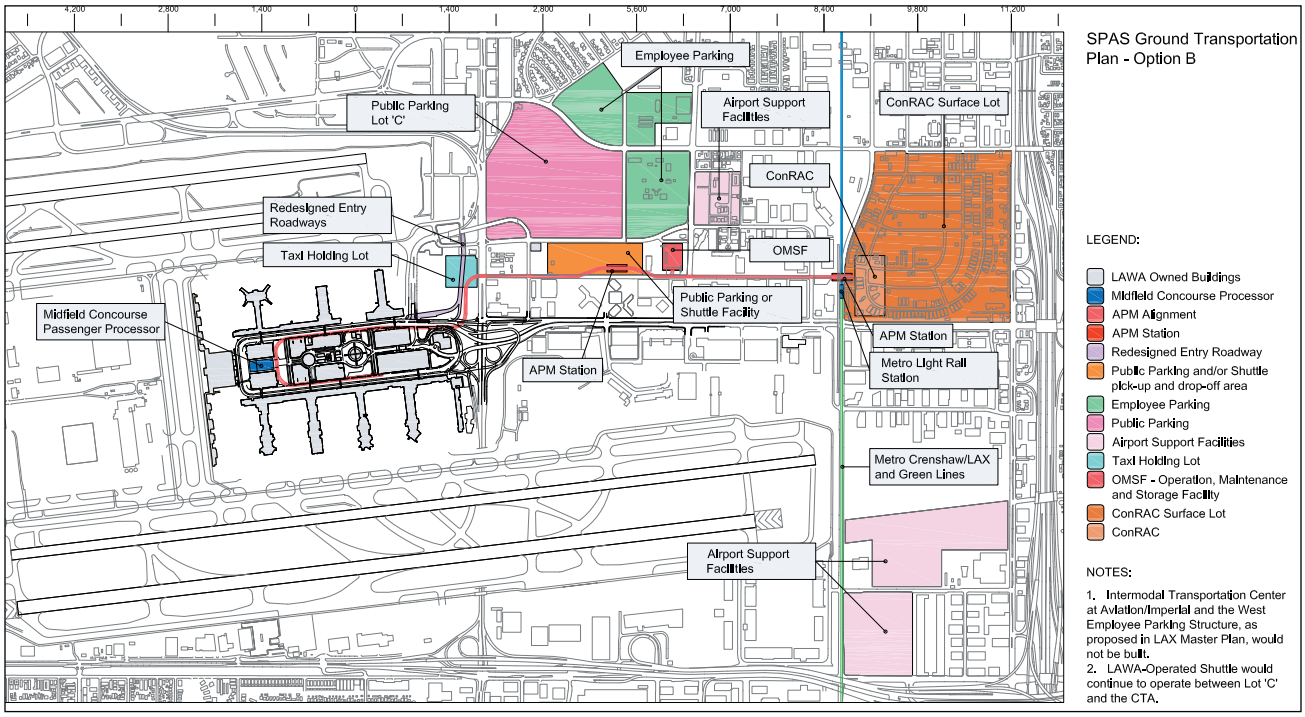

Figure 69 - Option B

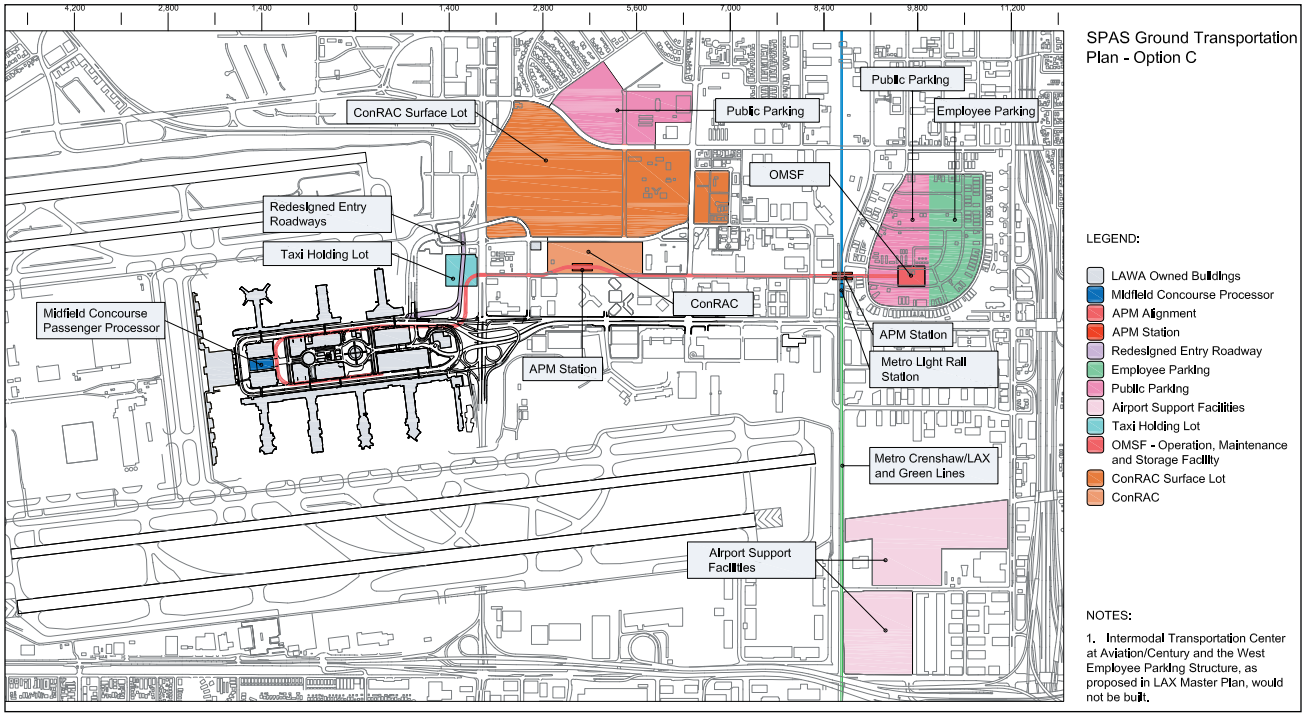

Figure 70 - Option C

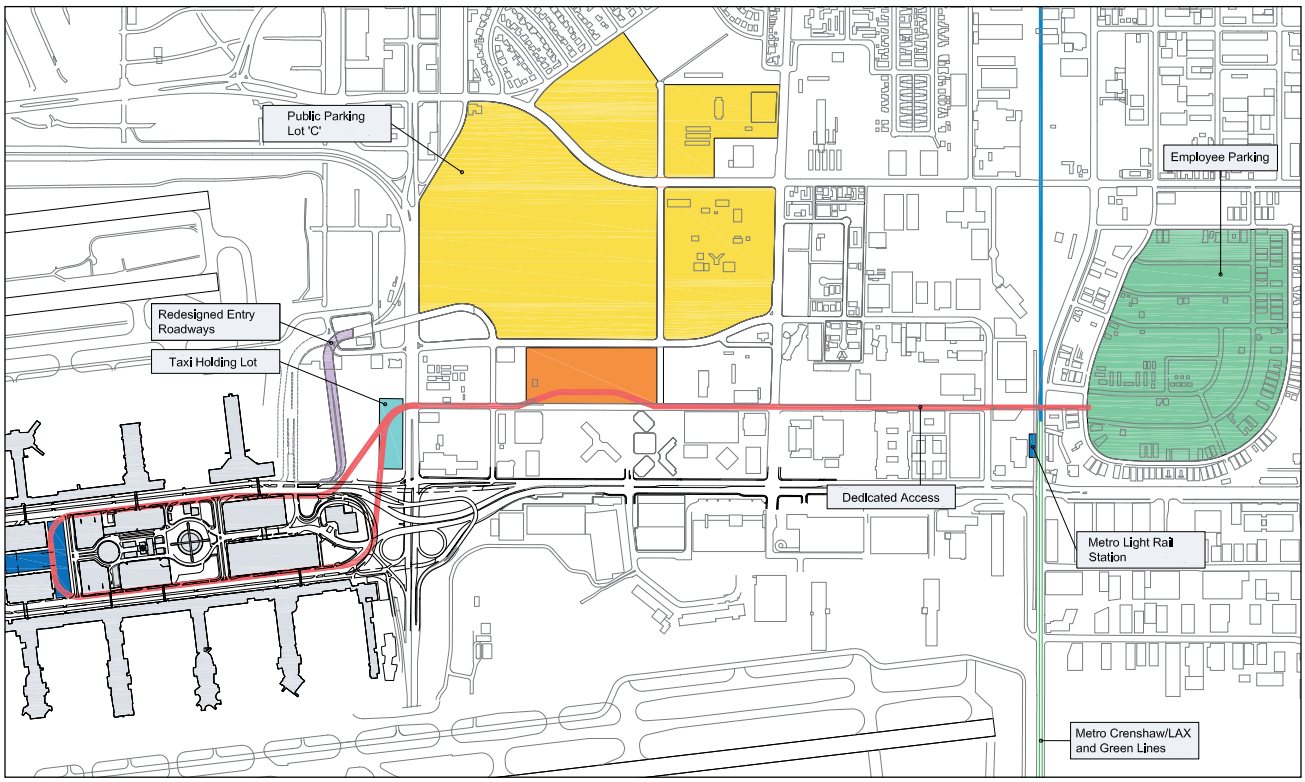

Figure 71 - Concept A

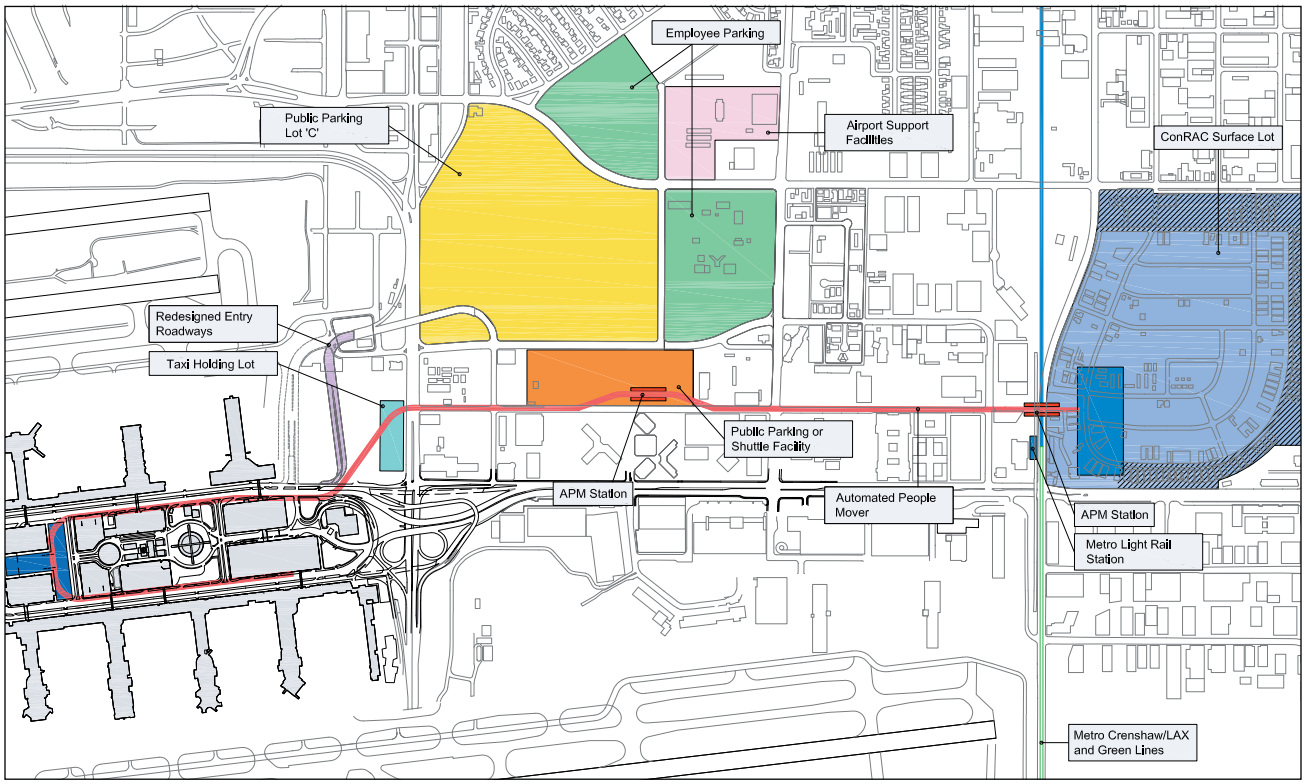

Figure 72 - Concept B

The alignment of the Dedicated Transit Connection/APM was improved by increasing the radius of the elevated structure coming out from the CTA, then diagonally over the Park One property, before turning into 96th Street. In addition, the APM operations and maintenance facility was moved to the north on Manchester Square and the APM alignment was extended east on World Way South to reach Terminal 7.

The Roadway entrance to the CTA was also modified in these schemes. The underlying reason for this modification was that the LAWA-operated shuttles from Lot C into the CTA would continue to operate. The solution to make possible this connection was to re-use the 96th Street Bridge over Sepulveda Boulevard. The proposed solution would simplify the connection with South Sepulveda Boulevard running from south to north.

Some main differences between these two concepts are summarized below.

Concept A

- Lot C used for Public Parking.
- The destination for Belford Square was not considered in this option.
- The lot between 96th and 98th streets would host the ITC
- The inner core of Manchester Square would include the Employee Parking lot.

Concept B

- The eastern portion of Lot C would be used for public parking, while the western and north parts would be used as employee parking.
- Belford Square was not considered in this option.
- The lot between 96th and 98th streets could be either a public parking or shuttle facility.
- The inner core of Manchester Square would be used as the ConRAC surface parking lot, with the potential expansion to occupy the entire square, reaching South La Cienega Boulevard to the east and West Arbor Vitae to the north.

Final Alternatives

The final ground transportation alternatives described below were included in the SPAS Environmental Impact Report (EIR) for evaluation.

Alternatives 1 and 2

Alternatives 1 and are illustrated in **Figure 73** and **Figure 74**, respectively. Both of these alternatives maintain access within the CTA by private vehicles.

Key Features

- Relocation of Sky Way, the primary access roadway connecting southbound Sepulveda Boulevard and the 96th Street Bridge to the CTA
- Addition of new curbside at Terminal 0
- Relocation of the commercial vehicle holding lot to the south, between Sepulveda Boulevard and the relocated Sky Way
- New ITF between 96th and 98th streets and between Vicksburg Avenue and Airport Boulevard. The ITF will include space for public parking and a remote passenger pick up/drop off, or Kiss-n-Ride area, to provide drivers the option of not entering the CTA. Arriving passengers would travel to the ITF to board door-to-door shuttles or scheduled buses.
- Dedicated busway between Manchester Square and the CTA, primarily along the 98th Street corridor bridging over Sepulveda Boulevard. Stops along the busway would include the future Metro Crenshaw/LAX light rail station at or near Century and Aviation boulevards and the new ITF. The busway would be grade-separated into the CTA, where it would merge with mixed-flow traffic on the upper level roadway. Exiting the CTA, buses would be in mixed flow, re-entering the elevated busway east of Vicksburg Avenue. Passengers using the ITF would be transported to and from the CTA via an airport-operated shuttle using the elevated busway to access the CTA and then use northbound Sepulveda Boulevard to 98th Street when returning to the ITF.
- Connection to public transit via the LAX dedicated busway, with a stop/connection at the new Metro transit station at Aviation/Century. The LAX shuttle bus serving the Metro Green Line station at Aviation Boulevard and Imperial Highway would be discontinued.

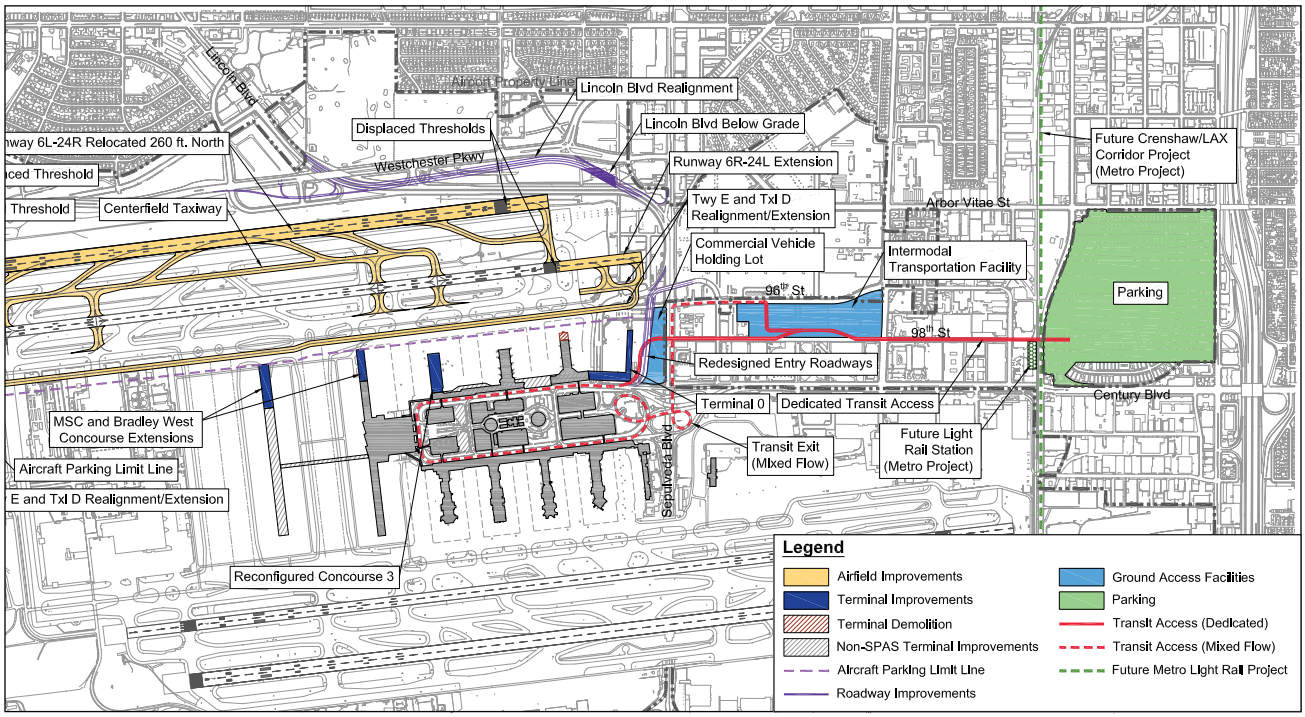

Figure 73 - SPAS Alternative 1

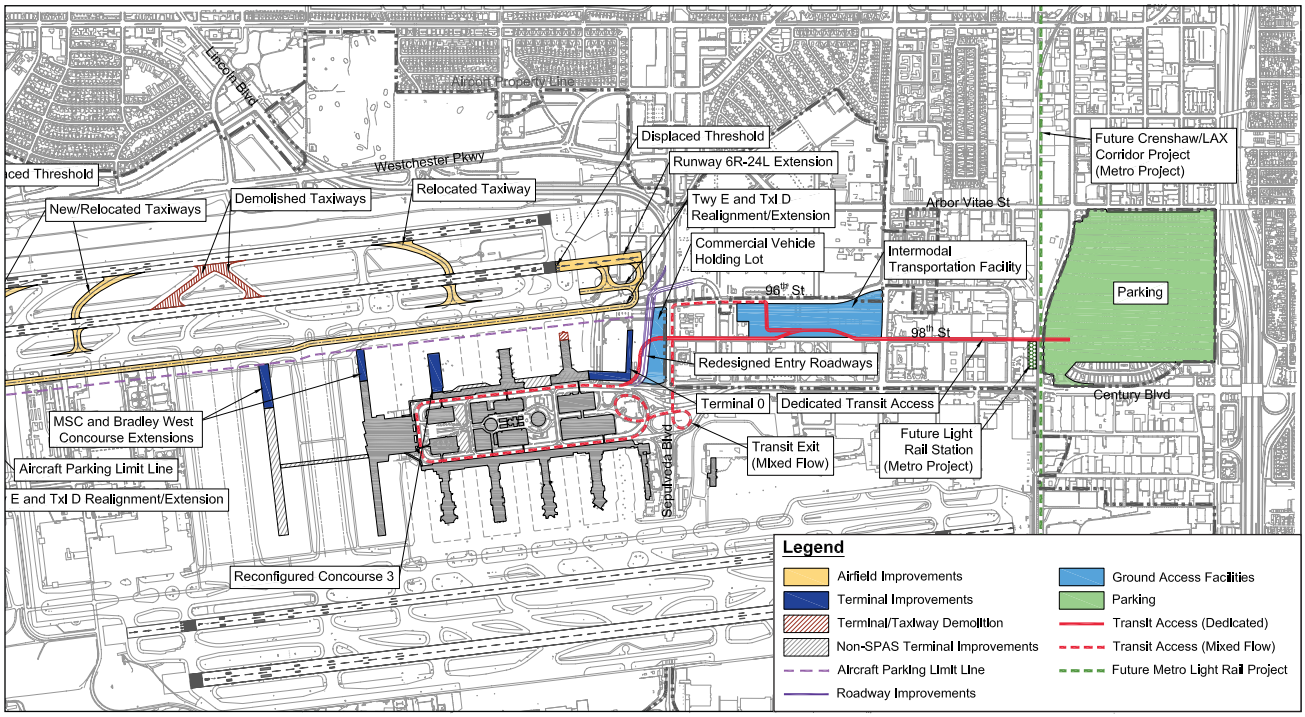

Figure 74 - SPAS Alternative 2

Parking

- No changes to CTA parking conditions would occur as a result of these SPAS alternatives; however, the non-SPAS MSC Passenger Processor project, described previously, is expected to result in the demolition of P2B and P5.
- Elimination of the Park One facility to accommodate new Terminal 0.
- No specific changes would occur in regards to employee parking Lot E, although the property could be used for other airport purposes in the future.
- No changes are proposed to Parking Lot C.
- Parking Lot D would provide 1,944 employee parking spaces and the nearby "Jenny Lot" would provide 1,940 employee parking spaces. These parking areas were not in use in the 2009 baseline year; however, their use for parking is occurring independently from SPAS.
- Development of the ITF would include approximately 4,900 spaces of short-term public parking.
- Approximately 4,200 long-term parking spaces and 3,500 employee parking spaces within Manchester Square.
- The West Employee Parking facility would not be constructed.

Alternative 4

Under this alternative, illustrated in **Figure 75**, only ongoing or reasonably foreseeable non-yellow light ground transportation projects would be developed, including a ConRAC at Lot C, and a parking structure at the Continental City site to accommodate public parking displaced by the ConRAC.

Ground Transportation

- Private vehicle access within the CTA maintained.
- ConRAC located in Lot C.

Parking

- Public parking within Parking Lot C displaced by the ConRAC.
- Employee parking within Parking Lot D and the proposed Jenny Lot displaced by the ConRAC.
- New public parking structure in Continental City.
- Employee parking maintained in Lot E.

Alternative 8

Alternative 8, illustrated in **Figure 76**, is characterized by the following features.

Ground Transportation

- ConRAC, located in a portion of Manchester Square, would include a customer service area and approximately 8,271 spaces for ready/return vehicles.
- All other ground transportation improvements identified in Alternatives 1 and 2 apply to this alternative

Operational Improvements

- Consolidated rental car shuttles from the ConRAC would arrive to the CTA via the elevated busway. The shuttles would exit the CTA in mixed-flow traffic, entering the busway on 96th Street east of Vicksburg Avenue..

Parking

- Approximately 2,750 employee parking spaces in the existing Avis rental car lot.
- Approximately 4,200 long-term parking spaces within Manchester Square.
- All other parking improvements identified in Alternatives 1 and 2 also apply to Alternative 8.

Alternative 9

Alternative 9, illustrated in **Figure 77**, is comparable to Alternative 8, except that an APM system is proposed between Manchester Square and the CTA, with an intermediate stop at the ITF.

Ground Transportation

- The ConRAC, in a portion of Manchester Square, includes a customer service area and approximately 8,271 spaces for ready/return vehicles.
- The APM system guideway follows the same alignment as the elevated busway until it enters the CTA, where it would be located on a new elevated guideway.
- APM maintenance facility likely located in Manchester Square.

Operational Improvements

- Rental car passengers would travel between the CTA and the ConRAC at Manchester Square via the APM..

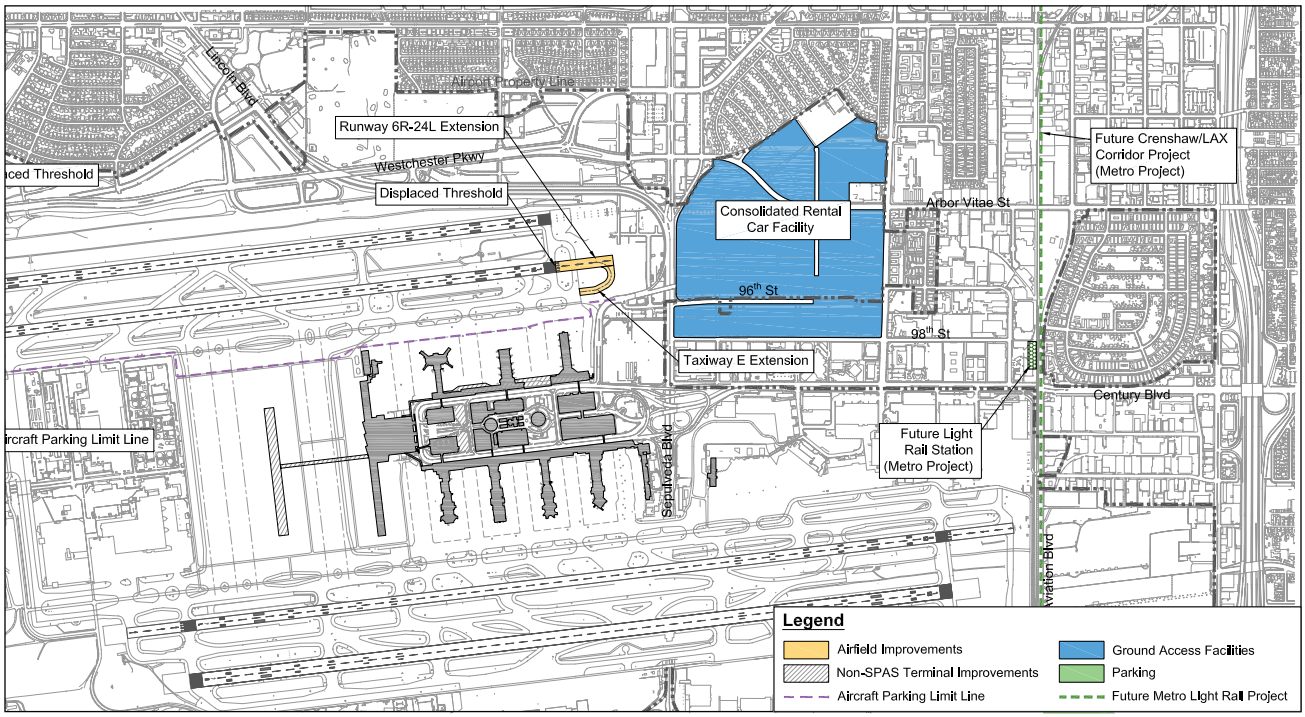

Figure 75 - SPAS Alternative 4

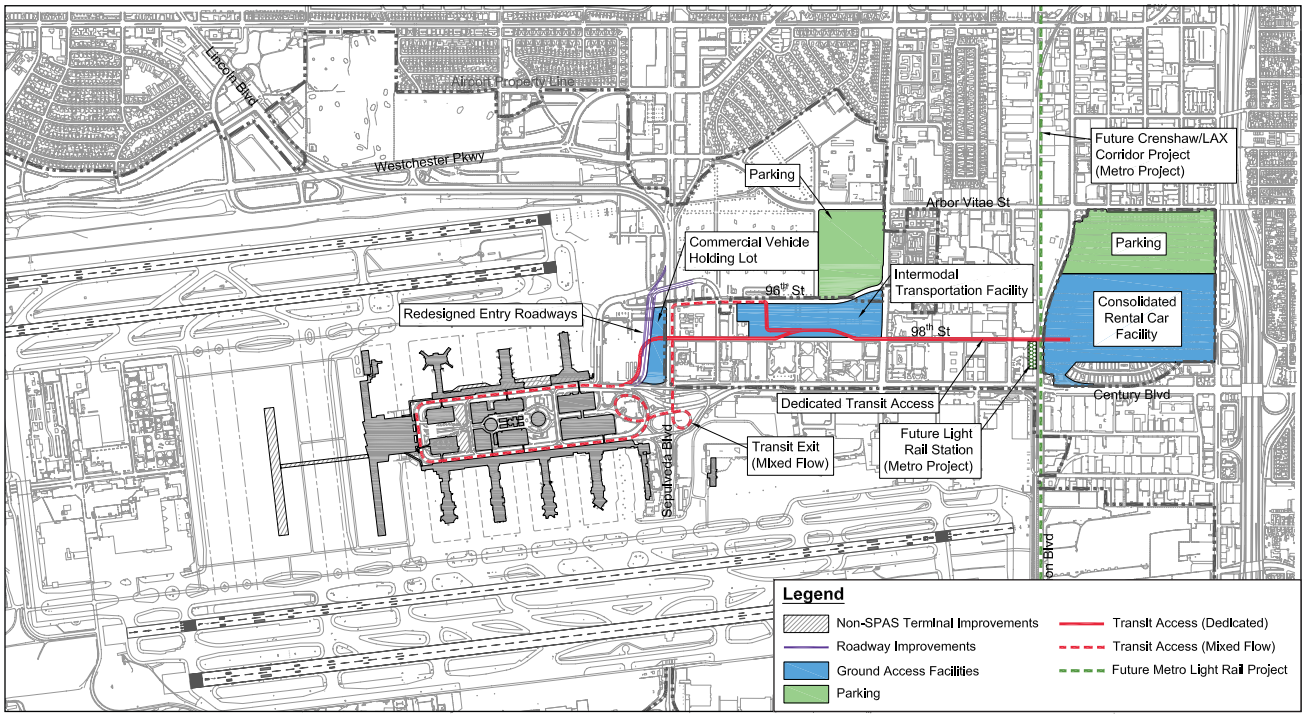

Figure 76 - SPAS Alternative 8

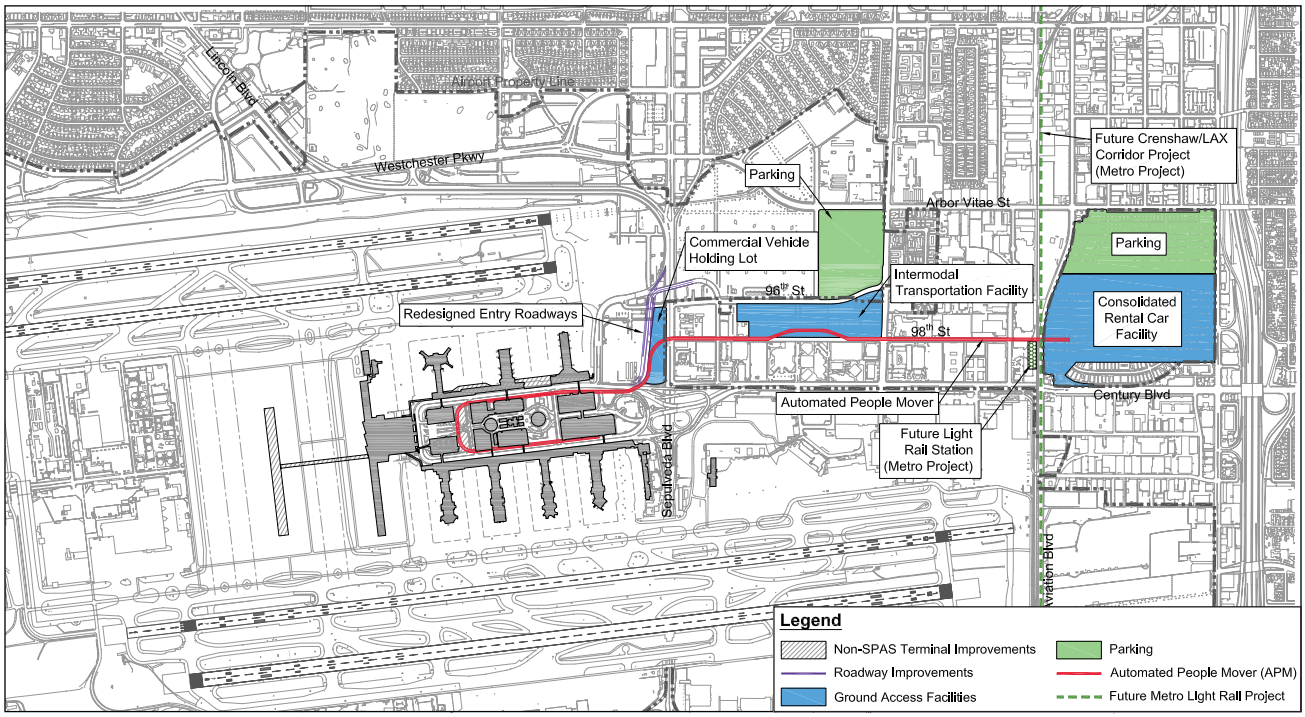

Figure 77 - SPAS Alternative 9

APPENDIX A

Traffic Data & Analysis

Introduction

This appendix contains details on the traffic data collection and simulation modeling performed for this study and summarized in the report. In addtion, several plan drawings, analysis outputs, and tables and provided as supporting data for the findings in the report.

Figures A-1 and A-2 provide results of trip generation and distribution modeling. This analysis showed that approximately 500 additional airport peak-hour vehicle trips would enter and exit the CTA at 78.9 MAP compared to the 59.8 MAP activity level; during the same time period, vehicles traveling along the TBIT frontage were estimated to increase by more than 700 trips.

Figures A-3 and A-4 depict two scenarios for commercial vehicle location on the Arrivals level of West Way with reprogrammed inner and outer roadways, one with taxi operations on the inner roadway with other commercial traffic, and the other with taxi operations on the outer roadway with POVs.

Traffic Simulation Modeling

The traffic simulation model was developed using VISSIM micro-simulation software to provide a detailed assessment of the curbside and roadway operations associated with Baseline (2008) conditions and 78.9 MAP conditions. The VISSIM model used as the base or starting point in this analysis was initiated by LAWA as a part of other airport-related studies and analyses such as the Bradley West Project EIR. This base model included much of the existing physical geometry of the CTA roadway system (roadway configurations, lanes, and intersections); however, the model was refined for use in the Bradley West Project analysis in 2008 and further refined with new data as a part of STV/Ricondo's Ground Transportation Study. As part of this process, the model was evaluated and expanded to provide a complete physical representation of the CTA roadway system through additional data collection, field verification, as well as a detailed review of video and photographs. All programmed improvements to the physical geometry were included as discussed below in the assumptions section.

The roadway modeling efforts were suspended on or about June 2010 while a new future 78.9 MAP gated (non-airline specific) flight schedule was reviewed and approved by LAWA. Due to delays experienced by the team responsible for completing this non-airline specific flight schedule, and the subsequent kickoff of the SPAS process which has redefined many of the key assumptions related to how the CTA terminals and roadways will function in the future, the refinement of landside modeling was discontinued, with the exception of some specific analyses provided in this study report.

Data Collection

As a part of the update to the LAX VISSIM model developed in 2008 for the LAX Bradley West EIR, the collection of new data was required to reflect a more recent representation of the traffic conditions within the CTA. This effort included:

- Acquiring new data from LAWA staff
- Field investigations
- Updated passenger projections, as shown below

LAWA staff provided updated loop detector counts and the Automated Vehicle Identification (AVI) counts required for the calibration of the trip generation model. LAWA also provided turning movement counts along both West Way and East Way.

The following field surveys were conducted to support the further development and refinement of the traffic models:

- Turning movement counts for intersections along Center Way
- Vehicle classification survey on the lower level at the entrance to the airport
- Vehicle dwell time survey at T1, T4, and T7
- Vehicle license plate survey at T1 and T7 Arrivals curbside

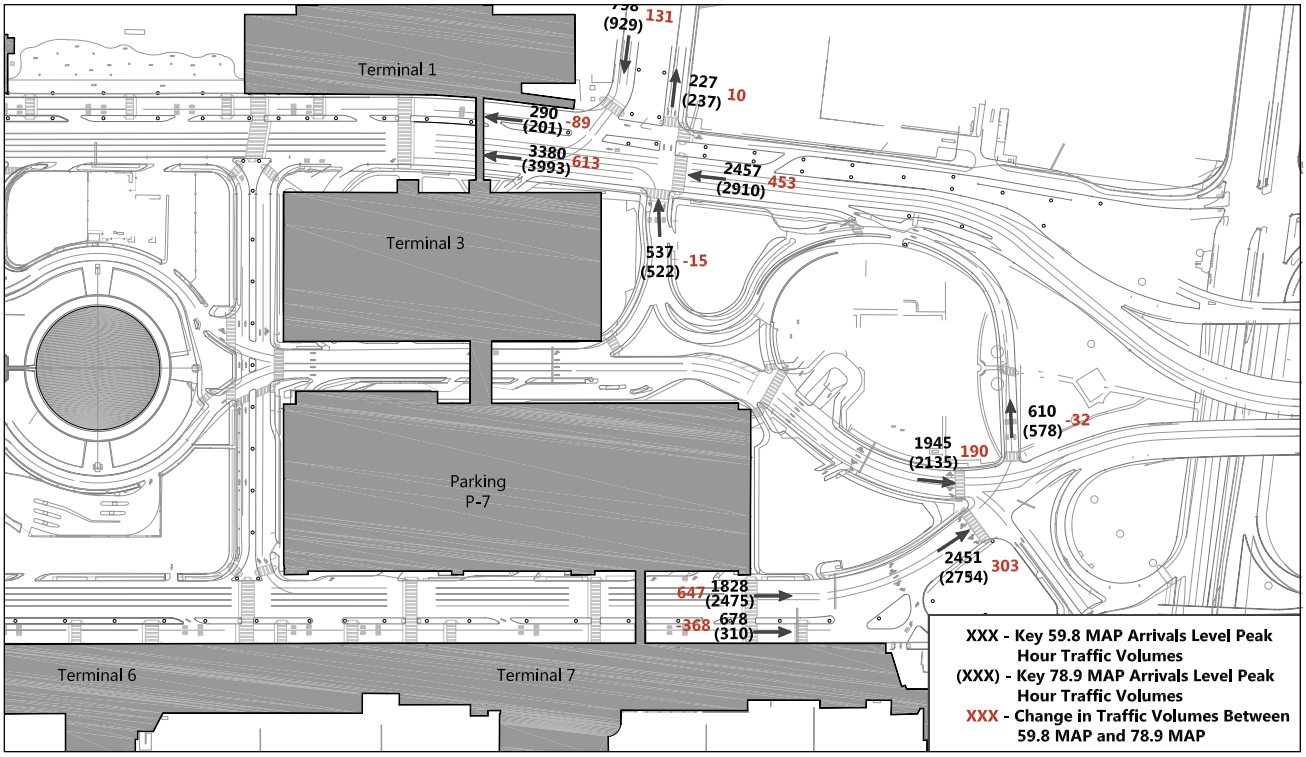

Figure A-1 - 59.8 MAP and 78.9 MAP peak hour traffic volumes on the eastern end of the CTA

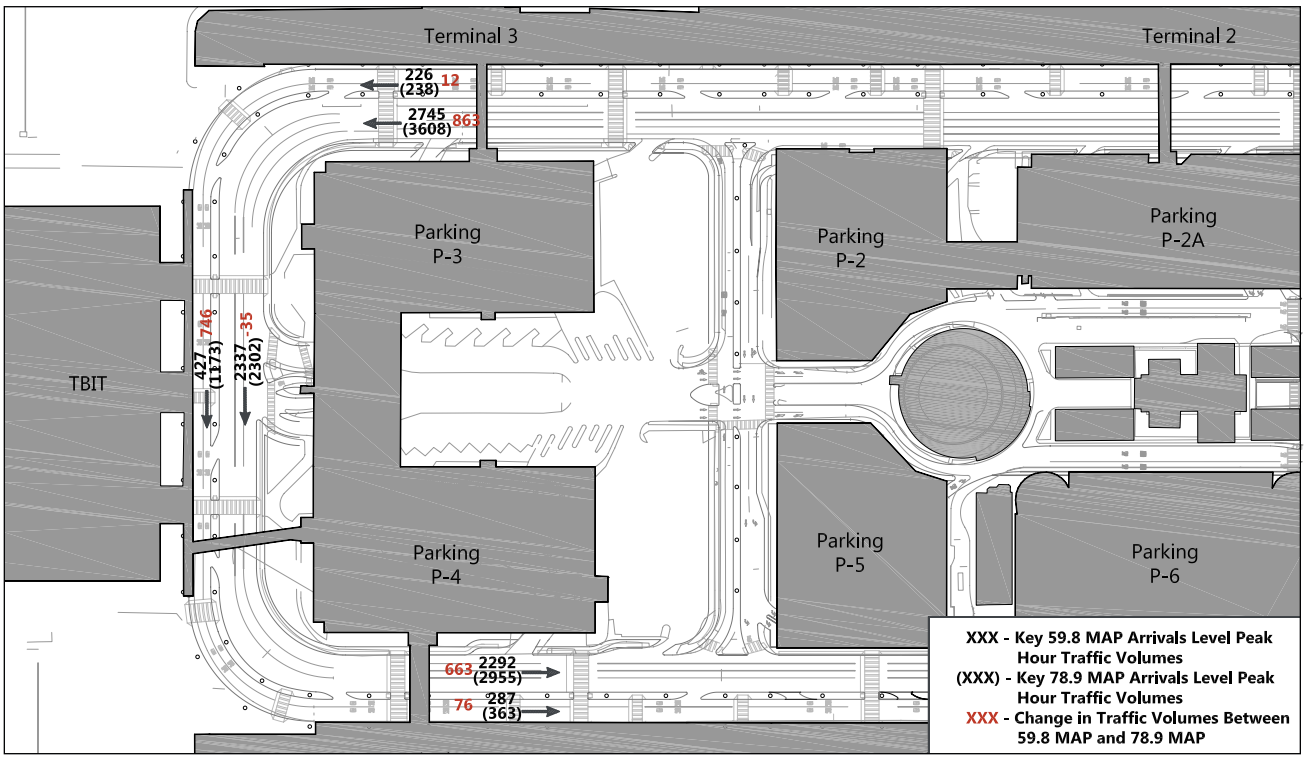

Figure A-2 - 59.8 MAP and 78.9 MAP peak hour traffic volumes on the western end of the CTA

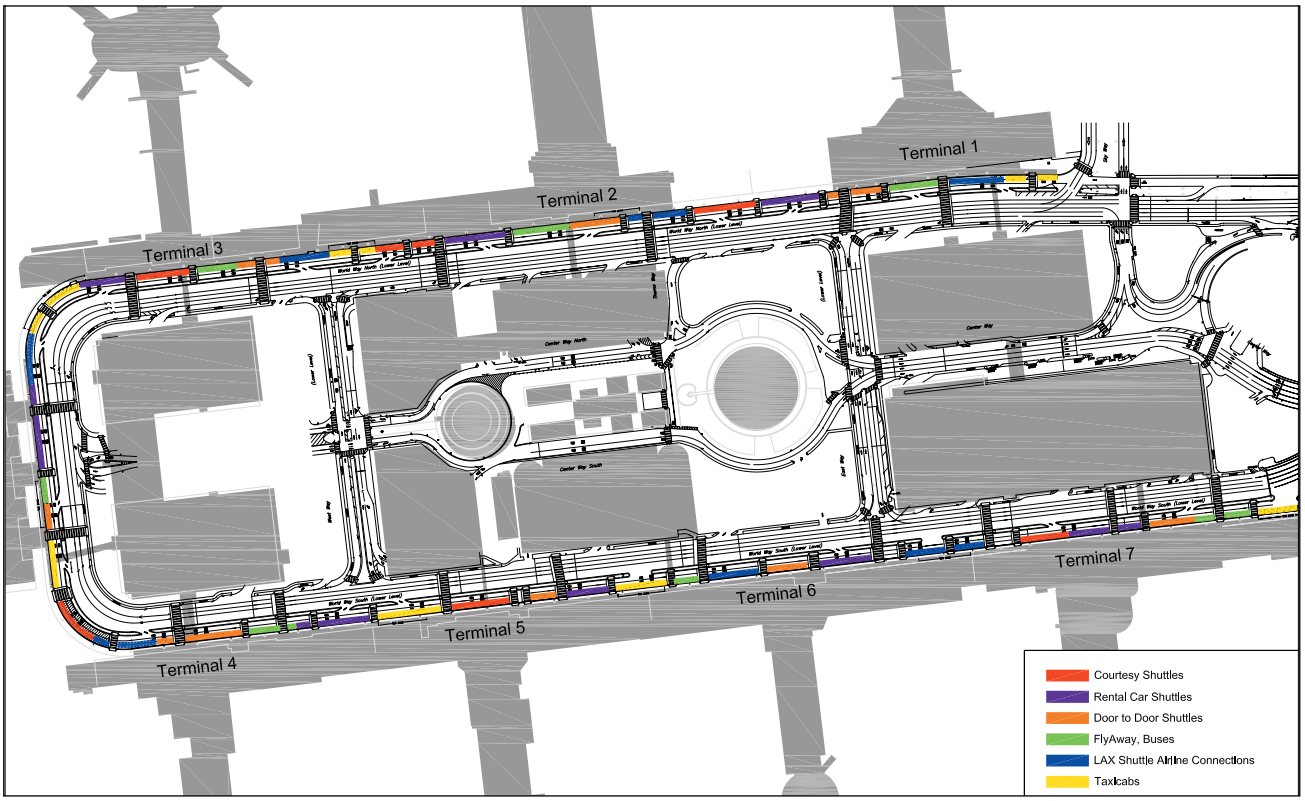

Figure A-3 - Proposed reversed Arrivals level commercial vehicle allocation with taxi operations on the inner roadway

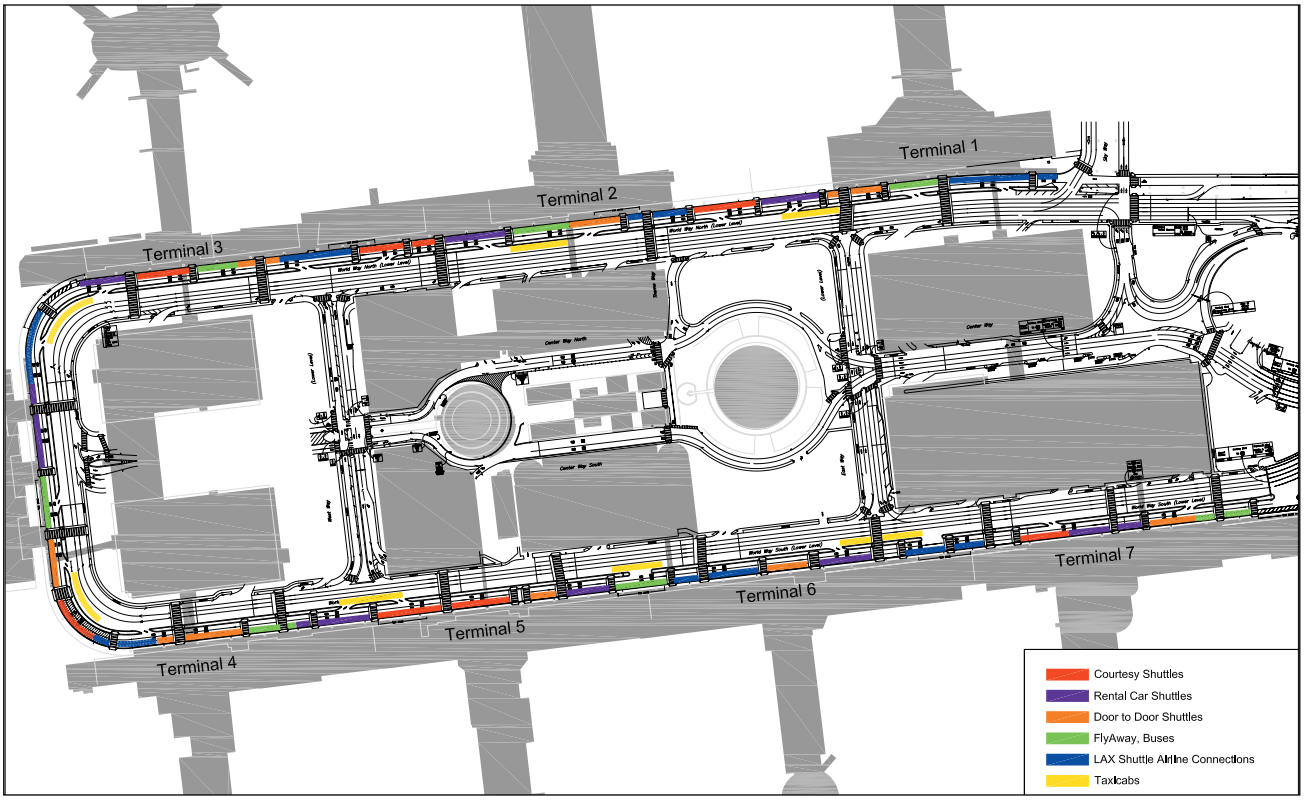

Figure A-4 - Proposed reversed Arrivals level commercial vehicle allocation with taxi operations on the outer roadway

- Public parking garage entry counts for the P1, P3, and P7

Field data were collected on Friday, October 2, 2009, and Friday, October 9, 2009; these dates were selected to represent a typical busy day on the CTA roadways and curbsides. The surveys were conducted in the mornings between 10:30 A.M. and 12:30 P.M. for all data collected on the Departures roadway, and between 8:30 P.M. and 10:30 P.M. in the evening for all data collected in the Arrivals roadway. Survey hours were established based on the peak passenger activity in the CTA, which was determined from the 2008 (design day) gated passenger schedule.

All field surveys conducted at terminals were sampling surveys and not direct field counts; this allowed for the application of the survey data to those terminals that were not surveyed and assumed to have similar characteristics to those surveyed. For example, data obtained from T4 could be applied to T2, T3, and T5.

After reviewing and compiling the field data, results were factored from October 2009 conditions to August 2008 conditions using multiple control data sources including passenger schedules, AVI counts, and loop detector data as well as turning movement volumes.

Passenger Data

Passenger data for baseline (2008) and future 78.9 MAP were obtained from gated passenger schedules previously developed for LAWA. This data was further processed to estimate when passengers would reach the curbside based on the time their flight was scheduled to arrive or depart by applying passenger earliness arrival and lateness distribution curves.

Data from previous studies completed for LAWA, in particular the Bradley West Project, were compared to the new data set for consistency and reasonableness prior to using it in the development of the model. In addition, results from the most recently available (at the time) LAX Air Passenger Survey (2006) were used to estimate the mode share based on the assumption that passenger behavior had not changed considerably between 2006 and baseline year.

Traffic Model Assumptions

Estimation of future conditions using any model involves forming strategic and operational assumptions based on available information. The following sections describe the assumptions which were used to develop the future conditions (78.9 MAP) roadway models.

Programmed CTA Roadway Improvements

Following the calibration of the updated baseline VISSIM simulation model to 2008 conditions, based on the roadway network as it existed in August of 2008, the process of developing a future conditions baseline model began. To develop the future conditions baseline model, the existing conditions (59.8 MAP) baseline model was updated to include expected landside facility improvements which are anticipated to be in place when the Airport's passenger activity level reaches 78.9 MAP.

The landside facility improvements included were any roadway projects that were either part of a current ongoing project, a recommended project impact mitigation based on previously approved studies and any minor or spot facility improvements required to improve the overall flow of traffic in the CTA. **Figure A-78** provides an illustration of the assumed improvements included in the future condition baseline model.

Central Utility Plant (CUP) Improvements

The new LAX CUP is currently being constructed immediately east of the existing plant, resulting in a reconfiguration and realignment of Center Way. The portion of Center Way between East Way and West Way will be realigned from two parallel roads on either side of the existing CUP to a single, three-lane roadway along the north side of the new CUP. Traffic from P3 and P4 will use this realigned Center Way to exit the airport. Center Way South will be closed to public traffic between West Way and the new CUP building; therefore all P5 customers will be directed through P6 to the cashier booths for that structure, and exit onto the existing segment of Center Way west of East Way. These roadway changes, necessary to accommodate the new CUP, were added to the future conditions baseline model.

Bradley West Project Mitigations

As a part of the Bradley West EIR, mitigation measures were developed to offset potential CTA traffic impacts generated by the project. The mitigation measures in the CTA included the modification of a left-turn only lane on World Way at Center Way (across from TBIT) to a through/left lane. This will be accomplished by widening World Way beginning at Center Way and continuing along the frontage of P4 to the first pedestrian signal on World Way South. In addition, the Bradley West EIR included a second mitigation which will construct a second dedicated right-turn lane from World Way South to the southbound on-ramp to Sepulveda Boulevard. The locations of these projects are illustrated in **Figure A-5**.

Other Improvements

Based on observation of the existing conditions and baseline model performance, further roadway improvements were recommended and coded in the future conditions baseline model. These included constructing an additional lane on World Way by extending the existing lane drop at the entrance to P3 on World Way and ending at Center Way. The second improvement is the addition of a new traffic signal at the intersection of World Way South and West Way (Figure A-6).

Future Conditions Gated Passenger Schedule

Figure A-7 provides a graphic representation of the assumed aircraft gating for the future (78.9 MAP) condition which includes a MSC (see below) but no Yellow Light Projects. The gated passenger schedule representing the aircraft gating scenario illustrated in the Figure A-7 used as the future condition for this study was created from the passenger schedule for the 78.9 MAP activity level, developed with the assistance of the National Aeronautics and Space Administration (NASA) to support various north airfield simulation efforts.

The No Yellow Light Projects scenario assumes the following conditions:

- The North Airfield's existing layout is maintained
- The existing terminals remain in their current configurations
- The ground transportation access to the CTA remains unchanged
- The APM system is not built

MSC & Passenger Processor Building

At the time this study was initiated, and while the majority of the VISSIM simulation modeling was conducted, all arriving and departing passengers on flights expected to be gated at a future MSC were assumed to be processed

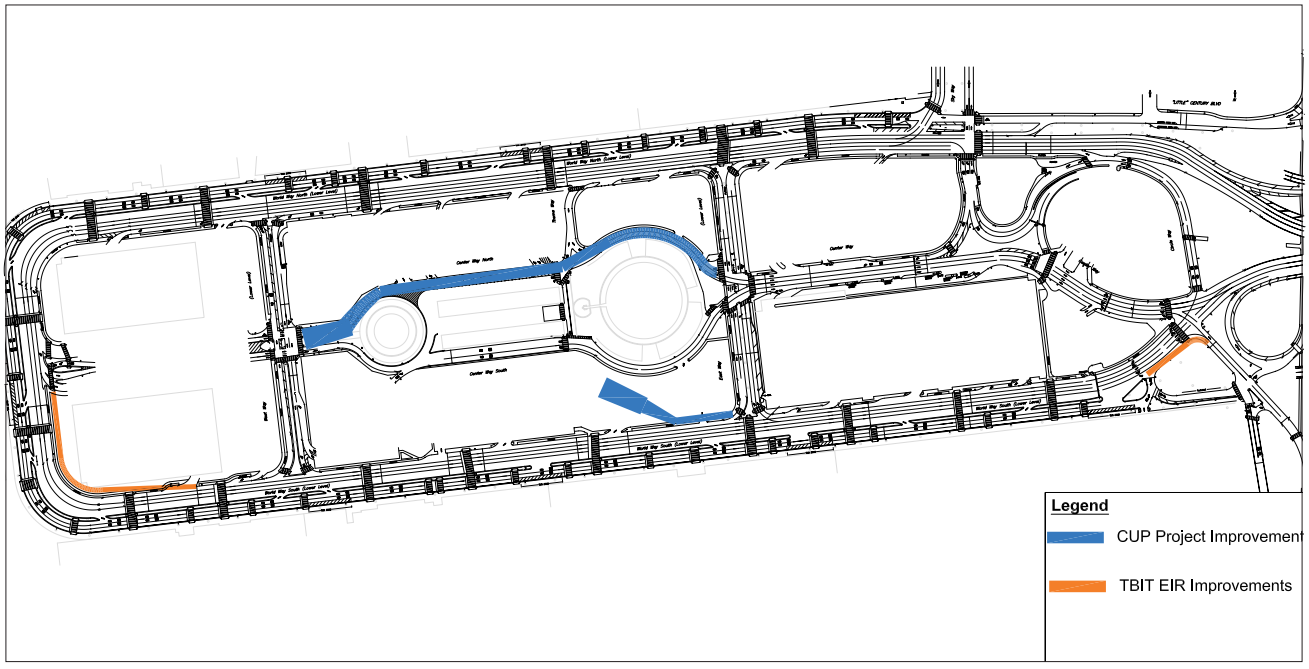

Figure A-5 - Programmed CTA Roadway Improvement Projects

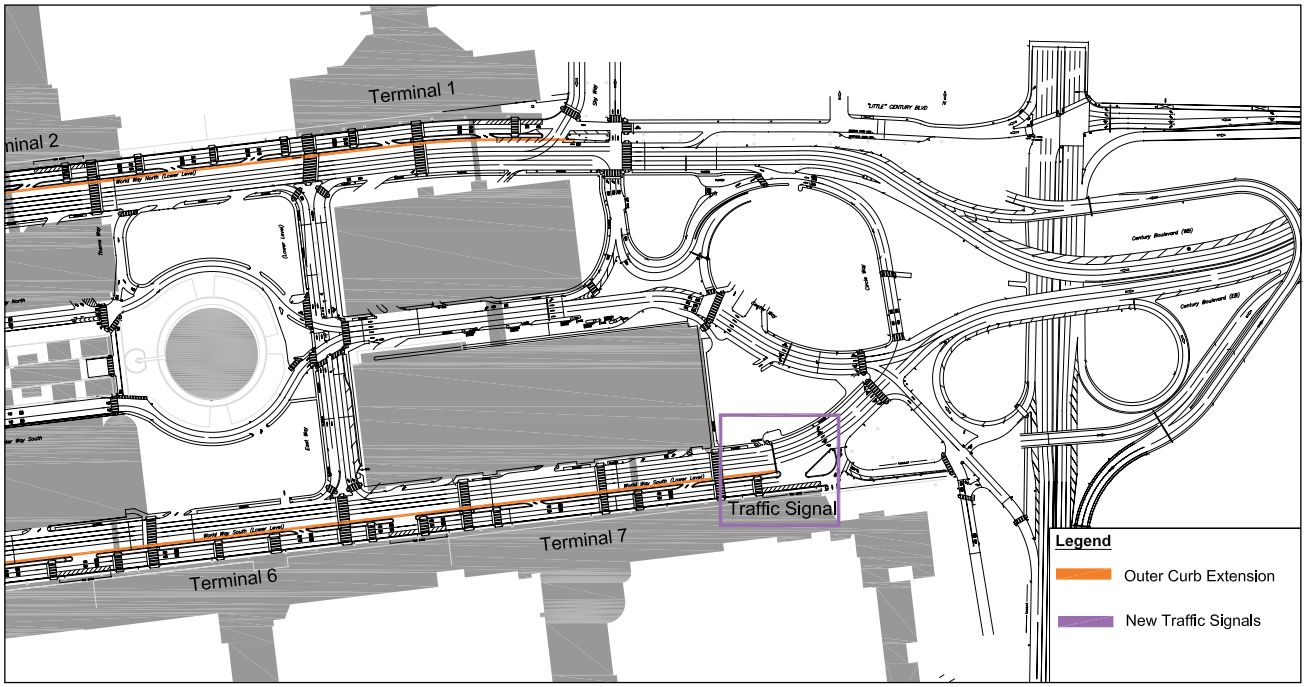

Figure A-6 - Proposed traffic signal on World Way South east of T7

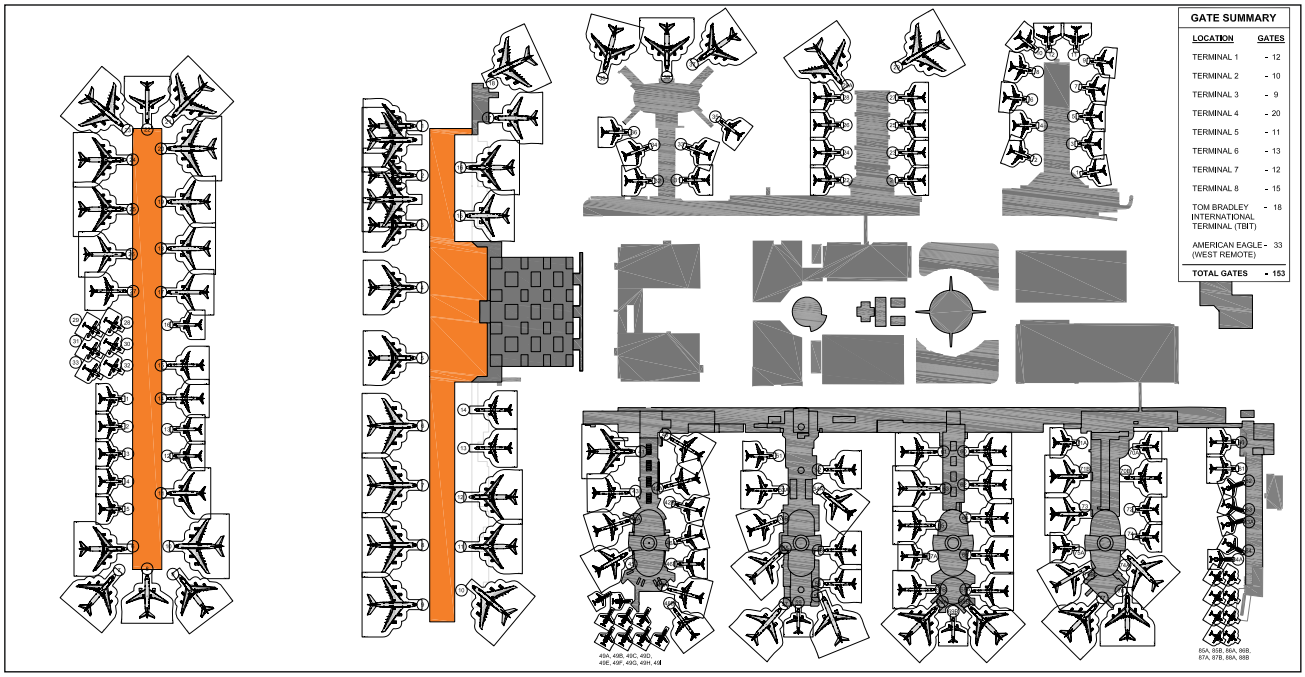

Figure A-7 - Assumed aircraft gated scenario for the future 78.9 MAP activity level with No Yellow Light Projects

through the TBIT based on consultations with LAWA staff. Details on a possible Passenger Processor facility in the CTA for all or some portion of the MSC's passengers were not available when the project began. As the study progressed, LAWA began developing a preliminary concept for a MSC Passenger Processor building. This preliminary concept assumed the Passenger Processor would be a departures only facility with all arriving MSC passengers continuing to be processed through the TBIT.

Trip Generation Model

This section outlines the data processing and methodology used in the modeling of CTA roadways for developing the Baseline (2008) simulation model and for determining the traffic conditions in the future 78.9 MAP activity level.

Using the future passenger schedule, a spreadsheet-based vehicle trip generation and distribution model was developed to calculate future traffic volumes on the airport's roadway system. The model was calibrated to the balanced Baseline (2008) CTA roadway vehicle volumes to ensure the model was accurately replicating the baseline conditions. The trip generation model's outputs were compared to various loop detector and AVI volumes for the peak hour to determine if the model-generated values were within an acceptable range. The trip generation model uses the future passenger schedule and factors such as passenger arrival characteristics, vehicle volumes, mode split (i.e., the proportion of traffic volume comprised of various modes including private vehicles, taxicabs, and limousines), and vehicle occupancy characteristics to calculate vehicle volumes and passenger volumes at the curbside. The following subsections describe the data used in the trip generation model.

Passenger Activity

Table A-1 provides the peak hour passenger activity for the Baseline (2008) and for 78.9 MAP future year conditions. The August 2008 gated airline schedule and the future conditions gated schedule with no Yellow Light Projects were used to estimate a rolling hour of originating (i.e., outbound flight) and terminating (i.e., inbound flight with LAX as the final destination) passenger volumes for each terminal. Originating passenger volumes throughout each hour of the day were adjusted to account for the time passengers arrived at the curbside prior to the departure time of their flight. These adjustments were made based on "early arrivals curves" developed using data from the 2006 LAX Airport Passenger Survey. These curves account for the differences in domestic and international passenger early arrival characteristics as well as other factors that include time of day, regional traffic conditions and anticipated travel times to the airport. Similarly, terminating passenger volumes developed from the airline schedule were adjusted to represent the time passengers arrived at the curbside following the arrival of their flight. **Figures A-8 and A-9** provide the rolling hour profile of the originating and terminating passenger volumes at the curbsides for the 78.9 MAP activity levels.

Passenger Mode Splits & Occupancy

Passenger mode splits were developed from the 2006 LAX Air Passenger Survey. The survey data included mode share choices of passengers by the time of the day. The passenger mode splits were determined by processing the raw survey data for the peak hours into a passenger mode split which included reviewing the survey questions to determine the exact nature of a passenger's choices. For example, some rental car customers answered that some of the passengers were dropped off at the curbside before returning their rental car. In this scenario, these passengers were factored in the POV mode choice as well as Rental Car shuttle choice. These mode splits as well as other factors were adjusted slightly during the calibration process for the trip generation and distribution model to yield the number of vehicles (by mode) closely matching the existing conditions. In addition, group sizes were also determined from the same survey data and served as starting point in determining a vehicle mode's occupancy. **Table A-2** shows the mode share and occupancy assumptions utilized in the trip generation model.

VISSIM Simulation Model

The 2008 passenger volumes associated with each peak-hour condition considered in this analysis were used as inputs to the trip generation and distribution model, from which hourly vehicle volumes for each roadway link were generated. These hourly vehicle volumes, along with dwell time data by vehicle mode, were then used as input for the VISSIM simulation model to calibrate to existing (2008) conditions. This calibration was neces-

TABLE A-1 - PASSENGER ACTIVITY DURING THE ARRIVALS AND DEPARTURES LEVELS PEAK HOURS

	Arrivals Level Peak			
	Baseline (2008)		78.9 MAP	
	8:50 PM to 9:50 PM		1:00 PM to 2:00 PM	
Terminal	PAX	Distribution	PAX	Distribution
T1	998	15.45%	696	7.40%
T2	734	11.36%	980	10.50%
T3	516	7.99%	761	7.00%
T4	624	9.66%	438	10.20%
T5	351	5.43%	227	6.30%
T6	746	11.54%	899	9.20%
T7	1278	19.78%	772	8.20%
TBIT	1213	18.78%	4353	41.29%
	6461		9,126	

	Departures Level Peak			
	Baseline (2008)		78.9 MAP	
	11:00 PM to 12:00 PM		10:40 AM to 11:40 AM	
Terminal	PAX	Distribution	PAX	Distribution
T1	987	16.52%	938	11.00%
T2	631	10.56%	699	8.20%
T3	526	8.80%	423	5.00%
T4	700	11.72%	1142	13.40%
T5	452	7.57%	845	9.90%
T6	294	4.92%	852	10.00%
T7	1075	17.99%	1195	14.00%
TBIT	1311	21.93%	2432	28.50%
	5976		8,525	

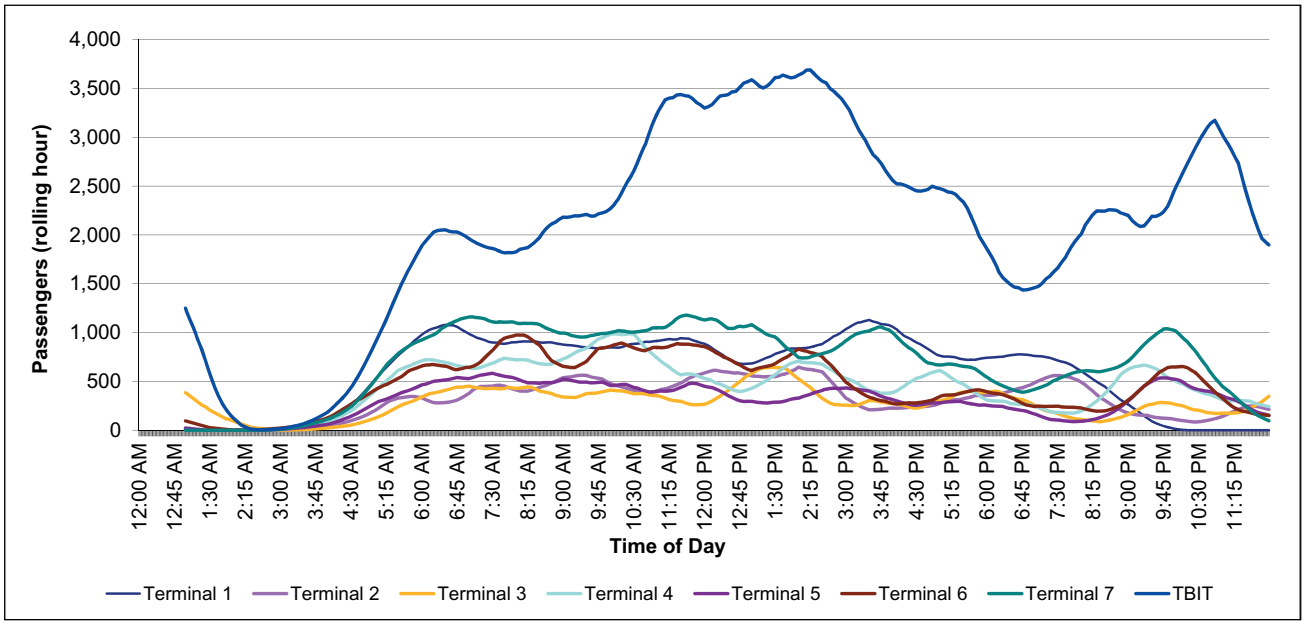

Figure A-8 - Rolling Hour Originating Passenger Volumes at the Departures Curbside (78.9 MAP)

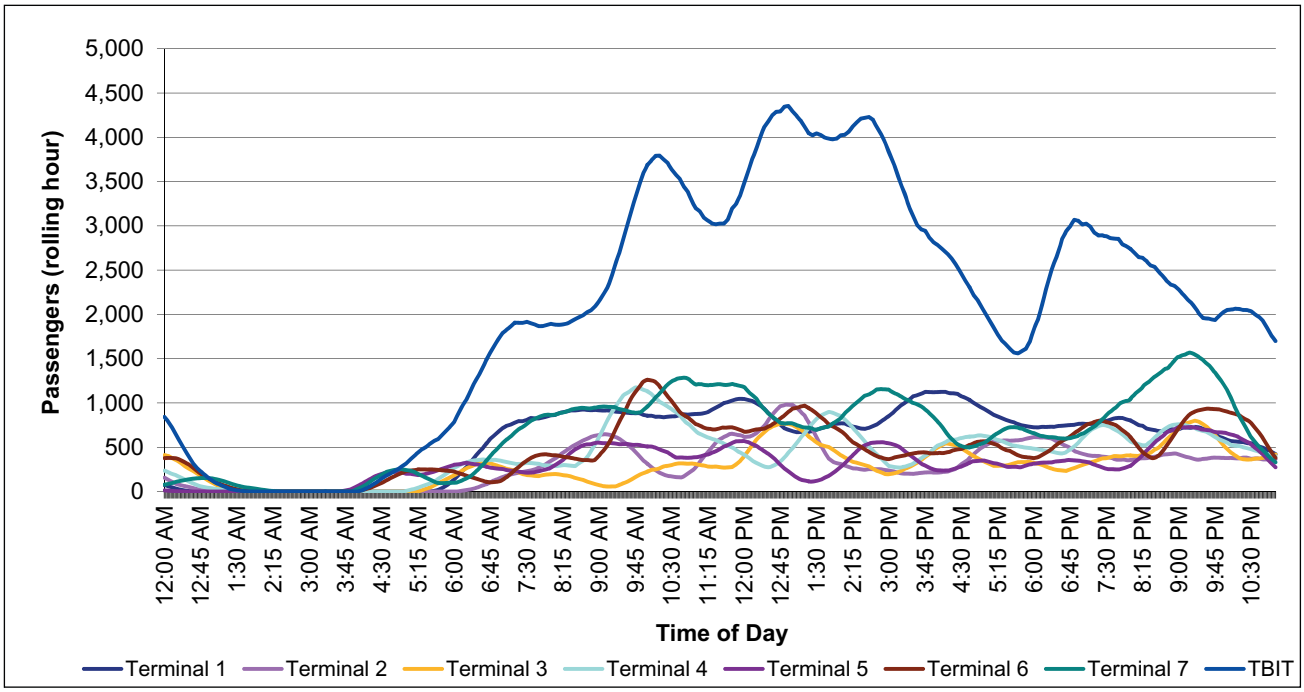

Figure A-9 - Rolling Hour Terminating Passenger Volumes at the Arrivals Curbside (78.9 MAP)

TABLE A-2 - MODE SHARE AND OCCUPANCY

Mode	Lower Level		Upper Level	
	Mode Share	Occupancy	Mode Share	Occupancy
Charter Bus	1.83%	29.6	5.70%	28.4
FlyAway	1.90%	15.3	1.50%	17.9
Hotel/Motel Shuttles	6.00%	9.5	5.00%	9.6
LAX Shuttles	2.73%	4.4	5.10%	6.8
Limousines	2.50%	1.3	3.84%	1.3
POV (including Parking)	57.83%	1.5	49.83%	1.7
Private Parking Shuttles	8.60%	4.2	9.00%	4.7
Rental Car Shuttles	8.32%	6.0	11.00%	6.6
Shared Ride Vans	4.95%	4.5	3.40%	5.0
Taxi	4.76%	1.1	4.50%	1.6
Transit Bus	0.59%	3.8	1.13%	16.9

TABLE A-3 - AVERAGE DWELL TIMES

Dwell Times in seconds	Lower Level		Upper Level	
	Average	Standard Deviation	Average	Standard Deviation
Charter Bus	50 to 242		50 to 242	
FlyAway	148	30	71	56
Hotel/Motel Shuttles	50	30	69	56
LAX Shuttles	30	15	38	28
Limousines	79	30	60	36
POV (including Parking)	79	30	64	47
Private Parking Shuttles	25	15	25	15
Rental Car Shuttles	30	15	30	15
Shared Ride Vans	45	10	45	10
Taxi	Managed Mode		60	36
Transit Bus	10 to 60		10 to 60	

Note: Shows the Average Dwell Times. May vary from Terminal to Terminal.

sary to ensure that the VISSIM model was generating the proper number and type of vehicle trips throughout the CTA roadway network. This calibration is critical since this model serves as the basis for developing the future conditions VISSIM models. In addition to the data used in developing the trip generation model, dwell time data was also input to determine the curbside utilization at various terminal curbsides within the CTA.

Vehicle Dwell Time

Vehicle dwell times provide an estimate of the amount of time a vehicle will spend at the curbside loading and unloading passengers. **Table A-3** provides the average vehicle dwell times and associated standard deviations by mode used in the VISSIM model for T1 through T7. The standard deviation represents the variation in dwell time from the average dwell time that a vehicle type will spend at a curbside. The standard deviation in vehicle dwell times were applied in the VISSIM simulation using a normal distribution. The data used to develop this table was collected at T1, T4, and T7.

Future 78.9 MAP Simulation Model

Using the calibrated trip generation model, the 78.9 MAP volumes were used to generate the future conditions vehicle volumes by mode. These vehicle volumes were then entered into the future conditions baseline VISSIM model which included the programmed CTA roadway improvements discussed previously to derive a simulated representation of the baseline 78.9 MAP CTA roadway conditions.

Results

As discussed previously, the study's simulation modeling efforts were suspended pending the development and approval of a future non-airline specific gated schedule. Due to delays in receiving the new non-airline specific flight schedule, and the subsequent kickoff of the SPAS process which has redefined many of the key assumptions related to how the CTA terminals and roadways will function in the future, the continued refinement of landside modeling has not resumed. As a result, a number of the facility and operational improvements discussed above either have only been modeled and evaluated from a qualitative perspective or have not been modeled. Most results discussed in this study are based on observation of the model runs. The qualitative measures of changes between existing and future conditions, as well as the performance of various alternatives have not been undertaken. Because the study team was developing and evaluating a wide range of operational and facility improvements within the CTA, detailed qualitative comparisons of alternatives were not completed. The process of assessing various combinations of proposed improvements included observing and assessing the modeling outputs in a qualitative matter in order to focus in on a limited number of potential improvements which could provide an acceptable LOS for LAX's landside facilities at the 78.9 MAP activity level.

It should be noted that many of the facility and operational improvements developed late in this study (e.g., MSC Passenger Processor building, Concourse 0 and its associated curbfronts, commercial vehicle holding lot relocations, and the realignment of Sky Way) were not fully modeled.

Single-Level Busing

Rent-a-Car and Private Parking Shuttles)

Single-level busing allows a commercial vehicle mode to both unload and load passengers at a single curbside stop. This can be done on either the Arrivals or Departures Level curbsides. Important issues to consider when evaluating single-level busing operation include the following:

- Single-level operations on a Departures level roadway require specifically defined sections of curbside which, from a driver's perspective, must be clearly identified as being reserved for a specific commercial vehicle mode or modes. The same is true from a customer (pedestrian) perspective; wayfinding must be clearly displayed within the terminal in both the Arrivals and Departures halls, as well as on the Departures curbside, so as to define the customer queuing area.
- Sufficient, convenient and suitable vertical circulation capacity between the Arrivals and Departures Levels is a critical component for a successful single-level busing operation. Passengers needing to transition from one

level to the other may be able to use one of the methods for vertical circulation—stairs, escalators, elevators—depending on factors such as the quantity and size of their baggage, whether they are accompanied by small children/strollers, physical limitations, and other factors. In an airport environment, passengers transitioning vertically will often prefer or require elevators.

- Vehicle dwell times will increase at the curbside as time must be provided for passengers to first alight the bus, then for new passengers to board the bus.
- Since single-level busing operations require longer dwell times, additional curbside length compared to their existing allocation (based on dual-level operations) may be necessary Additional sidewalk space may be required to account for the queuing area occupied by passengers who will be waiting for a bus to arrive at the curbside. In addition, an allowance of space must also be provided for those passengers alighting the bus, retrieving baggage and circulating along the curb.

In July 2011, LAWA requested the study team to evaluate the impacts of allowing rental car shuttles to both pick up and drop off passengers on the Arrivals level curbsides, while relocating some combination of the private parking, hotel, and LAX parking shuttle operations to the Departures level where they would both pick up and drop off passengers.

The evaluation was conducted using the study's gated passenger schedules as well as the calibrated VISSIM simulation models, which for future condition analyses were updated to include the proposed CTA roadway improvements from the Bradley West EIR and the CUP project. The evaluations of the proposed changes for the private parking, hotel, and LAX parking shuttle operations were conducted for the Departures Level peak-hour conditions. To accommodate single-level Rental Car operations on the Arrivals Level, shuttles were assumed to gain the additional curbside frontage required for single level operations from the curbsides formerly used by one of the modes relocated to the Departures Level. The analyses were conducted for existing (59.8 MAP) and future (78.9 MAP) activity levels.

The dwell times required for the private parking, hotel, and LAX parking shuttles to pick up and drop off passengers on the upper level were calculated based on passenger volumes. The passenger mode shares for rental car, private parking, hotel, and LAX shuttle operations were assumed to be 11%, 8.75%, 6.0%, and 5.1%, respectively. The mode share information was calculated as a part of the calibration process for the STMP trip generation model. For all commercial modes analyzed for single-level busing, shuttle dwell times at each terminal's curbside were estimated following an assumption that each loading or alighting passenger would require an average of 10 seconds to complete this activity; the assumption of a 10 second/passenger activity time was based on data collected at other airports in the United States and is also meant to account for bus maneuvering time into and away from the curbside.

The overall dwell time per bus was calculated on the basis of the 10 second/passenger activity time and the passenger demand during the peak 10 minutes of the analysis peak hour. As noted above, for these analyses the peak-hour simulation models correspond to the passenger peaks for the overall airport peak. At the 59.8 MAP activity level, the arrivals level peak traffic volume (adjusted for passenger lead/lag times) peaked between 9:00 P.M. and 10:00 P.M. The arrivals level peak coincided with the overall airport peak for 59.8 MAP activity level. At the 78.9 MAP activity level, the Departures Level peak is expected to occur between 11:20 A.M. to 12:20 P.M. The Departures level peak hour corresponded with LAX's overall or combined peak hour for 78.9 MAP activity level.

Single-Level Busing (Rent-a-Car and Private Parking Shuttles)

At the request of LAWA staff, the analysis focused on the Departures level curbside. On the Arrivals level, commercial curb zones relinquished by the shuttles relocated to the upper level were redistributed among the remaining commercial operators. Since intuitively providing more space per operator would result in a better LOS, the lower level was not further evaluated.

Allowing private parking and LAX parking shuttles to operate single level busing operations on the Departures Level curbsides is expected to result in minimal impacts to curbside operations with the current passenger activity level (59.8 MAP) compared to the existing conditions.

However, the analysis showed that adding hotel shuttles operations to a single level parking shuttle operation is expected to result in greater impacts to the Departures Level curbside operations at the current 59.8 MAP activity level. Future 78.9 MAP conditions (modeled using the NASA schedule without the midfield processor) showed that at TBIT the LOS significantly worsens. Other terminals were not significantly affected because the future schedule showed that passenger levels at these terminals do not increase appreciably.

Table A-4 shows the LOS on the Departures level at T1 and the TBIT.

TABLE A-4 - RESULTS OF ANAYSIS OF LOS AT T1 AND TBIT DEPARTURES CURBSIDE

			Terminal 1			TBIT		
Scenario	MAP	Parking Zone[3]	Average Utilization (%)	LOS	Percent of Time LOS D or Higher	Average Utilization (%)	LOS	Percent of Time LOS D or Higher
Existing	59.8	All	205	F	100	222	F	100
1	59.8	Single Level	112	D	50	104	D	47
		All Other	172	E	90	177	E	97
2		*Single Level*	*115*	*D*	*52*	*104*	*B*	*56*
		All Other	171	E	93	127	C	61
3		Single Level	149	F	50	144	F	56
		All Other	130	C	68	118	C	41
1	78.9[1,2]	Single Level	87	C	31	240	F	94
		All Other	153	D	86	246	F	100
2		Single Level	93	C	34	247	F	91
		All Other	165	D	79	229	F	99
3		Single Level	118	E	38	263	F	98
		All Other	144	D	61	233	F	100

Note:
1/ A decrease in the number of passengers at Terminal 1 at 78.9 MAP activity compared to 59.8 MAP activity results in lower overall dwell times.
2/ Upstream congestion resulted in lower curbside utilization rates as fewer shuttles were able to reach their assigned curbsides.
3/ Analysis assumed 120 feet of curbside parking zone for Private Parking shuttle zone at all Terminals. The length was increased to 160 feet with the addition of LAX and Hotel shuttles.

APPENDIX B

Comparative Projects

Newark Liberty International Airport P4 Intermodal Garage

The P4 Intermodal Garage at Newark Liberty International Airport (EWR) was presented to LAWA as a model of how the proposed 98th Street ITF at LAX could be developed as part of a parking structure that would provide parking revenue and replace or enhance parking provided in the CTA. The P4 Intermodal Garage was originally programmed to replace landside long term surface parking on the north side of EWR and enable the surface lot to become developed as part of the Terminal C airside. The P4 Garage was sited in a direct relationship to an AirTrain Newark (i.e., APM) station, which was previously programmed to accommodate hotel shuttle buses, as well as a Kiss-n-Fly operation and Valet Parking service along the station curbsides.

Passengers arriving at the garage are able to park their cars in a weather-protected environment, circulate to the glass elevator core, which is highly visible from the parking decks, and seamlessly access the AirTrain P4 Station. With trains arriving every 2 minutes at peak AM time, passengers entering the AirTrain service at the P4 Garage would reach their terminal destination within minutes, making the P4 Garage LOS comparable to parking in the CTA. Over a short period of time, the P4 operation was so successful that the airport changed the service from long-term parking to a daily operation, again reflecting the comparable LOS with CTA parking. The relationship between the P4 Garage and AirTrain station served as a lesson learned when programming, planning, and designing an integrated intermodal airport facility.

A similar arrangement can be explored at the 98th Street ITF, which could be developed to accommodate a program phased in over time. An initial phase can look at a consolidated bus and a Kiss-n-Fly operation where bus and POV curbsides can be incorporated with a passenger-friendly building that offers amenities such as check-in facilities, restrooms, concessions, and remote

Figure B-1 - Newark Liberty International Airport P4 Garage/ Intermodal Center

Figure B-2 - Newark Liberty International Airport P4 Garage/ Intermodal Center

Figure B-3 -Newark Liberty International Airport P4 Garage/ Intermodal Center

Figure B4 - Newark Liberty International Airport P4 Garage/Intermodal Center

meeting and greeting areas. Passengers coming from hotel buses, car rental buses, off-airport parking buses, or being dropped off at the POV curbsides would be able to transfer to an airport branded bus that is minutes from their terminal building. Long-term surface parking can be also be developed adjacent the ITF in this initial phase. A second phase can incorporate a dedicated busway or APM system coming from Manchester Square to accommodate passenger transfer. Finally, a parking garage can be added to concentrate weather-protected parking in proximity to the ITF which, following the EWR model, can be considered as a daily parking operation.

AirTrain JFK Jamaica Station Intermodal Airport Terminal

The AirTrain JFK airport access system, which is comprised of 10 stations and support facilities around the airport, links up to all passenger services in the CTA and remote areas of JFK International Airport. It is also linked to Long Island Railroad (LIRR) and New York City Transit (NYCT) subway services, successfully transporting passengers to JFK from AirTrain Airport Gateway Terminals located at two regional transit hubs, Jamaica and Howard Beach.

The elevated train system circulates around the airport on a precast concrete guideway that provides direct passenger access within the CTA landside via both grade-level crossings and elevated connectors. The environmentally controlled stations are prototypical so that clarity of wayfinding within the system is consistent between terminal and remote area stations. The stations are treated as airport environments, with higher quality finishes than typical transit stations so that spatial continuity is retained throughout the airport. The journey from the airline terminals via AirTrain's on-airport service to the two AirTrain JFK Gateway Terminals built within regional transit hubs at the LIRR Jamaica Station Complex and the NYCT Howard Beach subway station is completed within minutes.

The AirTrain JFK Jamaica Station Intermodal Airport Terminal was conceived through an interagency partnership between the Port Authority of New York and New Jersey (PANYNJ) and the LIRR. The Terminal's main objectives were to bring airport service out to the regional

Figure B-5 - AirTrain JFK Jamaica Station Intermodal Airport Terminal

Figure B-6 - AirTrain JFK Jamaica Station Intermodal Airport Terminal

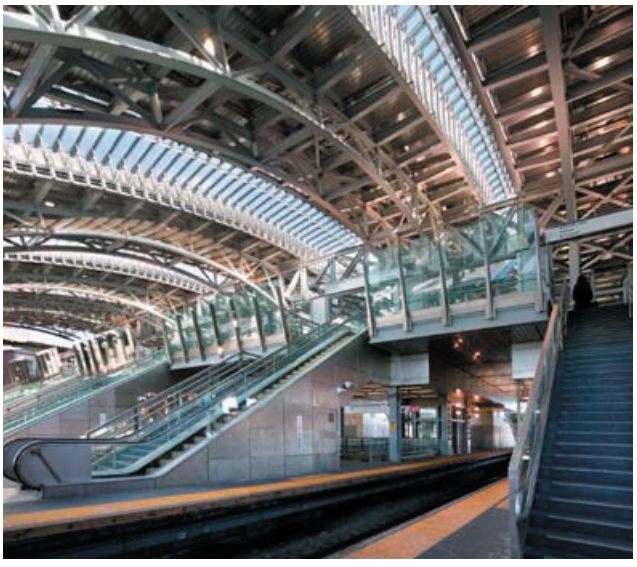

Figure B-7 - AirTrain JFK Jamaica Station Intermodal Airport Terminal

Figure B-8 - AirTrain JFK Jamaica Station Intermodal Airport Hub, AirTrain Terminal and Station

transit network, in proximity to the airport, providing a seamless transit connection for airport passengers, and to vastly improve LOS for LIRR patrons. A third goal was to exploit the Terminal as a catalyst for economic development in Jamaica Center.

The Terminal is a true multimodal facility where commuter rail, subway, city bus and AirTrain light rail services are integrated to accommodate seamless transfer between modes. The Terminal prompted New York City Economic Development Corporation (EDC) to upzone Jamaica Center, spurring commercial development opportunities in the streets and blocks surrounding the Terminal.

A similar arrangement can be explored at the Manchester Square Intermodal Transit Hub. Whereas AirTrain JFK could take advantage of the existing Jamaica Station transit infrastructure, the LA Metro initiative that will bring Metro Crenshaw and Green Line service, as well as the potential for city bus service, to the confluence of Aviation and Century Boulevard adjacent to Manchester Square provides the same opportunity to bring LAX out to regional transit.

A further opportunity exists to develop significant airport support facility program within Manchester Square. The potential for including a ConRAC, as well as a Parking Garage—again as a daily operation because of the high LOS that provides weather-protected parking within minutes of the CTA—can also make the Transit Hub a center of airport activity. Passenger services similar to the ITF can also be explored, including Kiss-n-Fly curbsides, check-in facilities, restrooms, concessions and remote meeting and greeting areas. Finally, the significant potential for economic development to be included, reimagining Manchester Square as an airport city can be also explored.