

## 2. Alternatives

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### 2.1 Introduction

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#### 2.1.1 SCOPE OF THE ALTERNATIVE ANALYSIS

This section summarizes the screening process that was used to identify, compare, and evaluate a wide range of alternatives to the Proposed Action. The process followed to identify the range of initial alternatives to be considered and the screening process used to determine which alternatives would reasonably satisfy the purpose of and need for the Proposed Action are described in this section. Those alternatives that would satisfy the purpose and need for the Proposed Action were carried forward for analysis of environmental consequences. Lists of applicable federal laws and regulations considered during the analysis are provided at the end of this section.

The alternatives presented in this EA were mainly developed as part of the *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study for Los Angeles International Airport* (RSA Practicability Study).<sup>1</sup> These alternatives were then further refined in the *Project Definition Booklet (PDB), Runway 6R-24L Safety Area (RSA) Improvements, Airport (LAX)*<sup>2</sup> and subsequently refined through coordination with FAA. The RSA Practicability Study was conducted following a review of an RSA determination by the FAA, several meetings with LAWA representatives and the FAA, and the development of order of magnitude construction cost estimates for each of the alternatives. Additionally, the practicability of RSA improvements was considered based on a review of airport operating characteristics, runway-use configurations, weather data, and aircraft operational characteristics.

LAWA also recently completed an EA examining proposed improvements to bring the Runway 6L-24R RSA into compliance with FAA design standards; that EA also examined some RSA improvements to Runway 6R-24L, but these improvements did not bring the Runway 6R-24L RSA into full compliance with FAA design standards.<sup>3</sup> These incremental improvements were included as a part of that EA since they would improve the

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<sup>1</sup> Ricondo and Associates, Inc., *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study for Los Angeles International Airport*, April 9, 2010.

<sup>2</sup> Los Angeles World Airports, *Project Definition Booklet (PDB) Runway 6R-24L Safety Area (RSA) Improvements*, June 19, 2014.

<sup>3</sup> Los Angeles World Airports and U.S. Department of Transportation, Federal Aviation Administration, *Final Environmental Assessment, Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Project*, June 26, 2014.

RSA and could be implemented prior to December 31, 2015. During the development and review of the *Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements EA*, LAWA continued to develop alternatives to address the remaining Runway 6R-24L RSA issues. Due to complexities between interactions of aircraft operating on the two north runways, additional analysis and coordination with FAA was necessary before LAWA could identify alternatives that would address all remaining RSA deficiencies for Runway 6R-24L. Alternatives for Runway 6R-24L that were developed as part of the *Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Final EA* are also analyzed in this EA.

The RSA improvement alternatives were ranked in order of magnitude of construction complexity. Based on FAA guidance, those alternatives that were not deemed practicable or otherwise had a negative impact on aircraft operations were not considered a viable or a practicable alternative. Recommendations provided by the FAA to improve the RSAs<sup>4</sup> were included to the greatest extent practicable.

### 2.1.2 REQUIREMENTS OF THE FAA AND NATIONAL ENVIRONMENTAL POLICY ACT

FAA Orders 1050.1E<sup>5</sup> and 5050.4B<sup>6</sup> set forth FAA policies and procedures to be followed in assessing the environmental impacts of aviation-related projects in compliance with NEPA. These Orders require a thorough and objective assessment of the Proposed Action, the No Action alternative, and all “reasonable” alternatives that would achieve the stated purpose and need for the Proposed Action. The alternatives analysis presented in this section of the EA is consistent with the requirements of FAA Orders 1050.1E and 5050.4B.

The Council on Environmental Quality (CEQ) regulations (Title 40, Code of Federal Regulations [CFR] § 1502.14) for implementing the *National Environmental Policy Act of 1969* requires that federal agencies perform the following tasks:

- Rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives which were eliminated from detailed study, briefly discuss the reasons for their elimination;
- Devote substantial treatment to each alternative considered in detail, including the Proposed Action, so that reviewers may evaluate the alternatives’ comparative merits;
- Include reasonable alternatives not within the jurisdiction of the lead agency; and,
- Include the alternative of no action.

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<sup>4</sup> U.S. Department of Transportation, Federal Aviation Administration, *Runway Safety Area Evaluation and Analysis, Los Angeles International Airport*, June 14, 2006.

<sup>5</sup> U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, *Environmental Impacts: Policies and Procedures*, June 8, 2004, Change 1, effective March 20, 2006.

<sup>6</sup> U.S. Department of Transportation, Federal Aviation Administration, Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, effective April 28, 2006.

The purpose and need for the Proposed Action, as described in Section 1.4 of this Draft EA, includes the following:

- Comply with the *Transportation, Treasury, Housing and Urban Development, the Judiciary, the District of Columbia, and Independent Agencies Appropriations Act, 2006* (Public Law [P.L.] 109-115).<sup>7</sup> This Act requires completion of RSA improvements by airport sponsors that hold a certificate under Title 14, Code of Federal Regulations (CFR) Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, to meet FAA design standards.

Reasonable alternatives that accomplish the purpose and need for the Proposed Action have been identified and evaluated in this Draft EA to satisfy CEQ requirements.

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## 2.2 RSA Alternatives Screening and Evaluation

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This section identifies potential RSA improvement alternatives for Runway 6R-24L, which includes alternatives identified in various planning documents, including:

- *Runway Safety Area Evaluation and Analysis*<sup>8</sup>
- *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study*<sup>9</sup>
- *Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Final Environmental Assessment*<sup>10</sup>
- *Project Definition Booklet (PDB) Runway 6R-24L Safety Area (RSA) Improvements*<sup>11</sup>

The alternatives have been divided into two categories: 1) conceptual alternatives and 2) refined alternatives. The conceptual alternatives were developed following the FAA guidelines listed in Section 2.2.3, and the refined alternatives are additional RSA improvements based on a combination of the conceptual alternatives, consistent with FAA Order 5200.8.<sup>12</sup> The Runway Safety Area Technical Team, comprised of LAWA and FAA

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<sup>7</sup> *The Transportation, Treasury, Housing and Urban Development, the Judiciary, the District of Columbia, and Independent Agencies Appropriations Act, 2006* Pub. L. No. 109-115, 109<sup>th</sup> Cong., 1<sup>st</sup> Sess. (November 30, 2005).

<sup>8</sup> U.S. Department of Transportation, Federal Aviation Administration, *Runway Safety Area Evaluation and Analysis, Los Angeles International Airport*, June 14, 2006.

<sup>9</sup> U.S. Department of Transportation, Federal Aviation Administration, *Runway Safety Area Evaluation and Analysis, Los Angeles International Airport*, June 14, 2006.

<sup>10</sup> Los Angeles World Airports and U.S. Department of Transportation, Federal Aviation Administration, *Final Environmental Assessment, Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Project*, June 26, 2014.

<sup>11</sup> LAWA, *Project Definition Booklet (PDB) Runway 6R-24L Safety Area (RSA) Improvements Airport (LAX)*, June 19, 2014.

<sup>12</sup> U.S. Department of Transportation, Federal Aviation Administration, Order 5200.8, *Runway Safety Area Program*, effective date: October 1, 1999.

officials, conducted preliminary review and the subsequent evaluation process for the alternatives as part of the RSA Practicability Study. The RSA Technical Team was responsible for identifying the pros and cons of the conceptual alternatives, providing suggestions for refined alternatives, and making final recommendations.

## 2.2.1 RSA ALTERNATIVES SCREENING EVALUATION CRITERIA

The identification and evaluation of RSA alternatives in this Draft EA incorporates information presented in the aforementioned planning documents. The evaluation of RSA alternatives in this Draft EA was performed using a three step evaluation process:

- Step 1: Would the proposed alternative enhance the 6R-24L Runway Safety Areas consistent with FAA Advisory Circular 150/5300-13A, *Airport Design*<sup>13</sup>?
- Step 2: Would the alternative be practicable and consistent with FAA Order 5200.8, *Runway Safety Area Program*, considering existing technology and logistics in light of overall project purpose, including implementation and completion by December 31, 2015 as specified in P.L. 109-115?
- Step 3: Would the alternative result in a safe and efficient use of navigable airspace and minimize airfield operational impacts?

**Exhibit 2-1** illustrates the alternative evaluation screening process.

Each alternative was first evaluated to determine whether it would meet the purpose of and need for the Proposed Action by enhancing RSAs consistent with FAA airport design standards and improve safety for arriving and departing passengers and aircraft. Each alternative found to meet the Step 1 criteria was then evaluated in Step 2 to determine whether or not it would be practicable, considering existing technology and logistics in light of the overall project purpose. In Step 3, alternatives that were found to meet both the Step 1 and Step 2 criteria were further evaluated to determine whether each would result in a safe and efficient use of navigable airspace, and would minimize impacts on existing airfield operations. Each criterion is described in more detail below. Alternatives that were found to satisfy the screening criteria were carried forward for evaluation of potential environmental effects, as described in Section 4, *Environmental Consequences*, of this Draft EA. In accordance with the requirements of the CEQ Regulations, the implementing regulations for NEPA, the No Action Alternative was retained and carried forward for detailed analysis in Section 4.

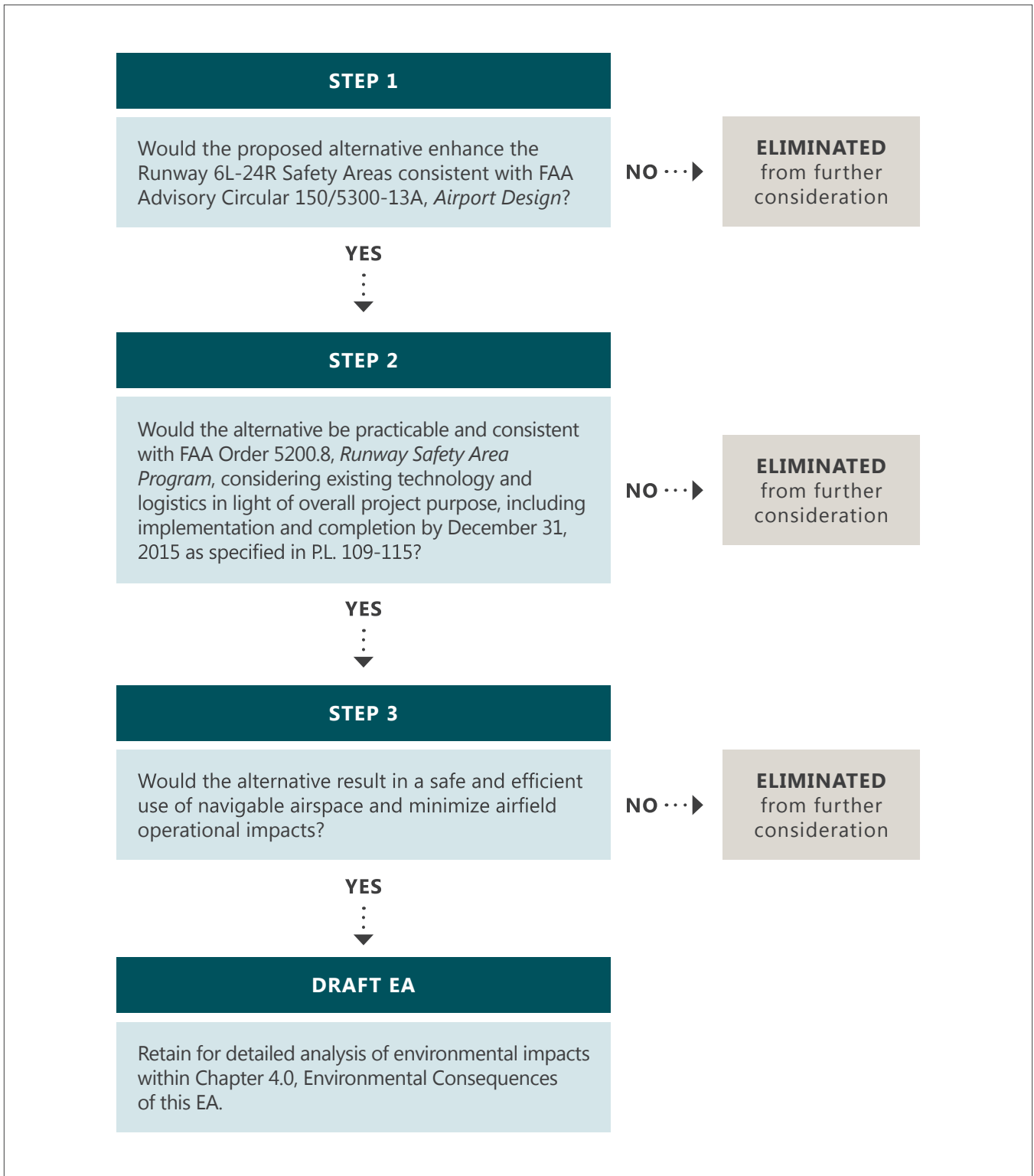
### 2.2.1.1 Step 1 Criteria: Purpose and Need

Would an alternative improve the Runway 6R-24L RSA consistent with FAA airport design standards, as articulated in FAA AC 150/5300-13A, *Airport Design*, and improve safety for arriving and departing passengers and aircraft? **Table 2-1** depicts the RSA dimensions for runways such as Runway 6R-24L that serve large commercial aircraft in Approach Categories C and D, per Table 3-8 of FAA AC 150/5300-13A, *Airport Design*.

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<sup>13</sup> U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13A, *Airport Design*, February 26, 2014.





SOURCE: Ricondo & Associates, Inc., July 2014.  
PREPARED BY: Ricondo & Associates, Inc., March 2015.

**EXHIBIT 2-1**

RSA Alternative Screening Process

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**Table 2-1: Runway Safety Area Dimensions**

RSA DIMENSIONS	APPROACH CATEGORY C AND D (FEET)
RSA Width	500
RSA Length Prior to Landing	600
RSA Length Beyond each Runway End	1,000

SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A, *Airport Design*, February 26, 2014.

PREPARED BY: Ricondo & Associates, Inc., July 2014.

As discussed in Section 1.2.2 of this Draft EA, a standard RSA must be capable, under dry conditions, of supporting aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

### 2.2.1.2 Step 2 Criteria: Practicality and Implementation Schedule

The criteria used in the Step 2 screening evaluation addressed several key considerations:

- Would the alternative be practical and prudent, considering existing technology, as well as design and construction challenges and relative costs when compared to other alternatives?
  - *Construction and Practicability*: This criterion addressed the relative engineering design and construction complexity of each RSA alternative, along with the projected construction cost (including any environmental mitigation requirements). For example, the requirement to relocate major surface transportation facilities (e.g., Sky Way or Pershing Drive) would pose substantial design and construction challenges and have a substantially relative higher cost than an alternative that did not affect such facilities. As such, alternatives that had fewer complexities in terms of staging, phasing, and construction activities were considered more feasible and practical than those with highly complex construction issues.
- Does the alternative provide the maximum practicable benefit to aviation safety in accordance with the guidance in FAA Order 5200.8, *Runway Safety Area Program*?
  - *Provision of Maximum Practical Benefit to Aviation Safety*: An explicit goal of FAA Order 5200.8, *Runway Safety Area Program*, is to encourage airports to provide the maximum practical benefit to aviation safety in developing their RSA program, when provision of standard RSAs specified in FAA AC 150/5300-13A, *Airport Design*, is not practical. The order recommends consideration of a sequence of possible improvements, and recommends that for each alternative improvement, the greatest practical conformance with the FAA airport design standards for RSA dimensions and/or performance be implemented.
- Would the alternative be practicable and consistent with FAA Order 5200.8, *Runway Safety Area Program*, to implement and complete by December 31, 2015 as specified in P.L. 109-115?

- *Implementation and Completion:* This criterion addressed the timeframe in which the alternative has to be implemented and completed. As specified in P.L. 109-115, , not later than December 31, 2015, the owner or operator of an airport certificated under Title 14, Code of Federal Regulations (CFR), Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, shall improve the airport's runway safety areas to comply with Federal Aviation Administration (FAA) design standards.

### 2.2.1.3 Step 3 Criteria: Safe and Efficient Use of Navigable Airspace and Impact on Airfield Operations

The final step of the screening evaluation considered these two criteria:

- Is the alternative consistent with the FAA's statutory mission to ensure the safe and efficient use of navigable airspace?
  - *Safe and Efficient Use of Navigable Airspace:* This criterion considered whether or not an alternative would require significant changes to either local or regional airspace procedures, as well as the potential to cause airspace conflicts.
- Would the alternative minimize the impact of the RSA improvements on the operation of LAX, including the ability to effectively serve the aircraft fleet currently using and expected to use LAX?
  - *Airport Operations:* This criterion evaluated to what extent an alternative may affect the efficient use of the airfield, reduce the utility of Runway 6R-24L, or otherwise substantially impact airfield operations. Examples of such impacts would be increased taxi distances and times; increased delay resulting from increased runway crossings; or reductions in runway length that would impose new operational restrictions on aircraft. Operational restrictions would include any increased weight limitations for departing aircraft that reduce the number of passengers, amount of cargo, or amount of fuel that can be carried by the departing aircraft.

## 2.2.2 EVALUATION OF OFF-SITE AND OPERATIONAL ALTERNATIVES CONSIDERED

As discussed below, off-site and operational alternatives such as alternative modes of transportation, use of other public airports, or the use of alternative aircraft would not meet the purpose and need of the Proposed Action. The implementation of off-site or operational alternatives would fail to enhance the RSA for Runway 6R-24L at LAX, which would still fail to meet applicable FAA airport design standards, as required by P.L. 109-115. Off-site and operational alternatives have therefore been eliminated from further consideration in this Draft EA.

### 2.2.2.1 Use of Alternative Modes of Transportation Alternative

The primary purpose of the Proposed Action is to enhance the Runway 6R-24L RSA consistent with FAA AC 150/5300-13A, *Airport Design*, as required by P.L. 109-115. The use of alternative modes of transportation to replace some or all of the air transportation activity at LAX does not meet this purpose because the Runway 6R-24L RSA would still fail to meet FAA airport design standards, and safety would not be enhanced as required by P.L. 109-115. In addition, FAA and LAWA do not have the authority to compel LAX airport users

to use other modes of transportation. The Use of Alternative Modes of Transportation Alternative was, therefore, eliminated from further consideration in this EA.

### 2.2.2.2 Use of Other Public Airports Alternative

The primary purpose of the Proposed Action is to enhance the Runway 6R-24L RSA consistent with FAA airport design standards. The use of other area public airports to replace some or all of the air transportation activity at LAX does not meet this purpose because the RSA for Runway 6R-24L at LAX would still fail to meet applicable FAA airport design standards, and safety would not be enhanced as required by P.L. 109-115. In addition, FAA and LAWA do not have the authority to divert air transportation activity from LAX to other area airports. The Use of Other Public Airports Alternative was, therefore, eliminated from further consideration in this EA.

### 2.2.2.3 Use of Alternative Aircraft Alternative

The primary purpose of the Proposed Action is to enhance the Runway 6R-24L RSA consistent with FAA airport design standards. The use of alternative aircraft to replace some or all of the transportation activity at LAX does not meet the purpose and need of the Proposed Action because the RSA for Runway 6R-24L would still fail to meet the applicable FAA airport design standards, and safety would not be enhanced, as required by P.L. 109-115. In addition, FAA and LAWA do not have the authority to compel airlines to use alternative aircraft. The Use of Alternative Aircraft Alternative was, therefore, eliminated from further consideration in this EA.

## 2.2.3 DESCRIPTION OF ON-SITE ALTERNATIVES CONSIDERED

In developing the alternatives to improve the RSA for Runway 6R-24L, consideration was given to an appropriate balance of improvements allocated to each runway end based on predominant direction of runway use, site constraints, environmental considerations, and practicability. The key FAA documents that have provided guidance in developing the conceptual alternatives include FAA Order 5200.8, *Runway Safety Area Program*; FAA AC 150/5220-22A, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*; and FAA Order 5200.9 *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*.

Based on the guidelines in FAA Order 5200.8, *Runway Safety Area Program*, six RSA conceptual alternatives, in addition to the No Action Alternative, were developed for Runway 6R-24L for comparative purposes. These alternatives include the alternatives identified in the FAA's *Runway Safety Area Evaluation and Analysis for LAX*:<sup>14</sup>

- No Action Alternative
- Construct Standard RSA Alternative

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<sup>14</sup> Federal Aviation Administration, *Runway Safety Area Evaluation and Analysis, Los Angeles International Airport*, June 14, 2006.

- Reduce Runway Length Alternative
- Implement Declared Distances Alternative
- Relocate, Shift or Realign the Runway Alternative(s)
- Install Standard EMAS Alternative
- Combination of the above alternatives

### 2.2.3.1 Construct Standard RSA Alternative

According to Section 4, *Considerations in Assessing Alternatives* of Appendix 2 of FAA Order 5200.8, *Runway Safety Area Program*, establishing a traditional, graded RSA that fully meets the dimensional and gradient requirements must be the first option considered. At a minimum, land acquisition, fill, soil improvement, and grading requirements must be identified and evaluated.<sup>15</sup> This alternative often involves the greatest unavoidable impacts on natural resources and surrounding communities, and therefore, the greatest potential costs for environmental mitigation.

### 2.2.3.2 Reduce Runway Length Alternative

Under this alternative, RSA dimensions compliant with FAA airport design standards may be obtained by shortening the length of a runway to achieve the required RSA length. This is a feasible alternative if the current aircraft serving LAX require less runway length than what is presently available, and the difference can accommodate the required RSA, or other runways, if available, can accommodate the larger aircraft without resulting in major impacts to airport operations.

### 2.2.3.3 Implement Declared Distances Alternative

Where it is impracticable to provide the clearances and dimensions for RSAs in accordance with FAA design standards, the implementation of declared distances is another alternative that may provide an acceptable means of providing an equivalent RSA. Declared distances are defined in Chapter 1, of FAA AC 150/5300-13A, *Airport Design*, as "...the distances the Airport owner declares available for a turbine-powered aircraft's takeoff run, takeoff distance, accelerate-stop distance, and landing distance requirements." Typically, this concept involves declaring that some portion of the existing runway pavement is unavailable for specific operations, and is instead used to provide an RSA meeting applicable FAA airport design standards. **Appendix A** provides further explanation of declared distances.

Declared distances are also used where different runway lengths are defined for each direction of operation (i.e., when displaced thresholds are present). Pilots use these declared distances, along with weather data and aircraft performance characteristics, to make determinations such as the maximum allowable takeoff or landing weight of the aircraft or the maximum payload and range for a flight. Declared distances at airports are considered in the Operations Specifications of commercial aircraft operations that are part of the air carrier certificates and operations certificates issued by FAA under 14 CFR Part 119, as well as in the internal

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<sup>15</sup> Federal Aviation Administration, FAA Order 5200.8 *Runway Safety Area Program*, effective date: October 1, 1999.

operations manuals of those operators. Pilots of commercial aircraft are required to comply with such specifications and manuals.

In this situation, the specified distance available for a particular operation such as landing may be different in each direction on the same runway pavement. As discussed in Section 1, *Purpose and Need*, declared distances include Takeoff Run Available (TORA), Takeoff Distance Available (TODA), Accelerate-Stop Distance Available (ASDA), and Landing Distance Available (LDA). The application of declared distances at a specific airport requires prior FAA approval on a case-by-case basis. FAA approval would be secured through the Airport Layout Plan (ALP) approval process set forth in FAA AC 150/5300-13A, *Airport Design*.<sup>16</sup>

#### 2.2.3.4 Relocate, Shift or Realign the Runway Alternative(s)

When a traditional, standard RSA is determined not to be practicable, an option to meet RSA standards can involve relocating, shifting, realigning, or otherwise changing a runway. In some cases the environmental impacts and construction/implementation costs of these types of RSA improvements may not be practicable.

#### 2.2.3.5 Install Standard Engineered Materials Arresting System (EMAS) Alternative

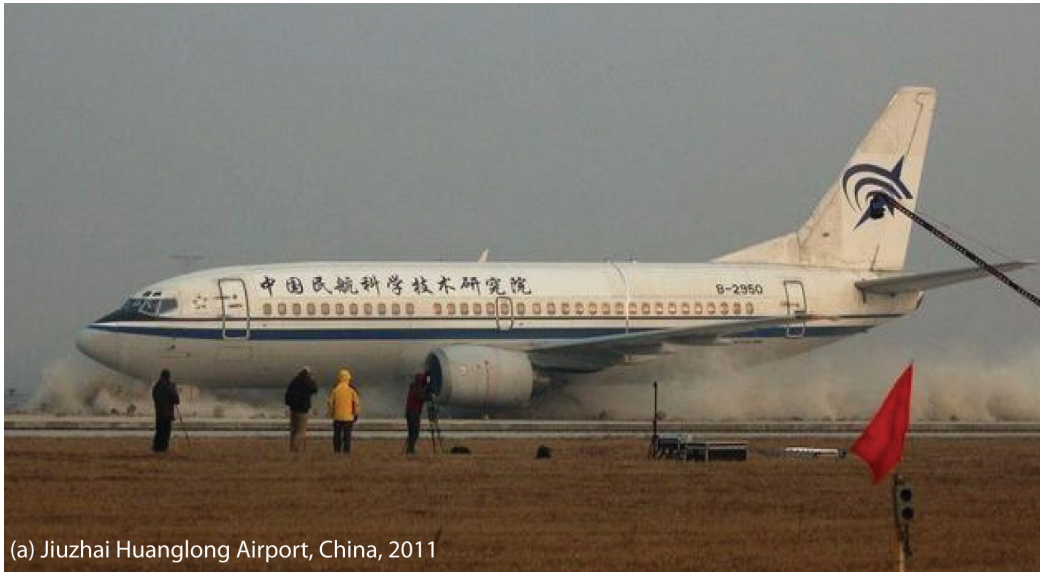
When it is not practicable to provide a standard RSA that meets FAA standards, consideration may be given to enhancing runway safety through the use of an Engineered Materials Arresting System (EMAS). An EMAS is an aircraft arresting system comprised of a specialized concrete material that is designed to crush under the weight of an aircraft. An EMAS can decelerate and stop an aircraft over a short distance. When an aircraft overruns the runway, these materials are crushed, absorbing the forward momentum of the aircraft and decelerating and arresting the aircraft's movement. The FAA requires that EMAS be engineered to decelerate the runway's design aircraft at exit speeds of 70 knots, without causing significant damage to the aircraft or injuries to passengers. Section 4 of FAA AC 150/5220-22B, *Engineered Materials Arresting Systems for Aircraft Overruns*, indicates that a standard EMAS provides a level of safety that is generally equivalent to a full RSA built to the dimensional standards in the latest version of FAA AC 150/5300-13A, *Airport Design*. For purposes of installing an EMAS, the FAA defines the design aircraft as an aircraft having at least 500 annual operations (takeoffs and landings) on the runway, and having the most demand on EMAS. This is usually, but not always, the heaviest aircraft that regularly uses the runway. Photographs of sample EMAS installations are provided in **Exhibit 2-2**.

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<sup>16</sup> Federal Aviation Administration, Advisory Circular 150/5300-13A, *Airport Design*, February 26, 2014.

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(a) Jiuzhai Huanglong Airport, China, 2011



(b) EMAS at JFK International Airport, NY, 2003

SOURCE: (a) Gizmodo Australia, <http://www.gizmodo.com.au/2011/12/why-did-this-airplane-landing-gear-destroy-this-concrete-runway>, 2011; (b) Port Authority of New York and New Jersey, 2004.  
PREPARED BY: Ricondo & Associates, Inc., March 2015.

**EXHIBIT 2-2**

### Sample Engineered Materials Arresting System (EMAS) Installations

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## 2.2.4 EVALUATION OF ON-SITE RSA DEVELOPMENT ALTERNATIVES

The FAA completed an RSA determination in June 2006 that evaluated the existing Runway 6R-24L RSA and practicable options to address deficiencies in the RSA. In the evaluation, entitled *Runway Safety Area Evaluation and Analysis*, the FAA made a determination for each runway end that “the existing RSA does not meet standards but is practicable to improve.” Furthermore, the FAA determined that the existing Runway 6R-24L RSA could be incrementally improved:<sup>17</sup>

- For Runway 6R, the FAA identified the following practicable alternative:
  - Application of declared distances for takeoffs; and
  - Declared distances and displaced threshold for landings.
- For Runway 24L, the FAA identified the following practicable alternative:
  - Application of declared distances;
  - Displace threshold for landings;
  - Install Engineered Materials Arresting System (EMAS); and
  - Relocate the localizer antenna, service road, and perimeter barrier fence.

Subsequently, in the 2010 *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study for Los Angeles International Airport* the Runway Safety Area Technical Team developed and evaluated practicable alternatives based on the FAA determination. Additional RSA development alternatives were included based on key FAA documents that provided guidance in developing the conceptual alternatives, including FAA Order 5200.8 *Runway Safety Area Program*, FAA AC 150/5220-22A *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*, and FAA Order 5200.9 *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*.

Consistent with the processes outlined in these documents, the conceptual alternatives for mitigating the RSA deficiencies include the following:

- Construct standard runway safety areas
- Reduce runway length
- Implement declared distances
- Relocate, shift, or realign the runway
- Install EMAS
- Develop a combination of alternatives to achieve a preferred alternative

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<sup>17</sup> Ricondo and Associates, Inc., *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study for Los Angeles International Airport*, April 9, 2010.

The RSA improvement alternatives for Runway 6R-24L were subjected to an evaluation process in accordance with FAA Order 5200.8, *Runway Safety Area Program* and FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting System*. This guidance ensures that the preferred alternative is operationally sound, environmentally safe, and financially feasible.

The comparative evaluation in this section is based primarily on qualitative measures identified in the preliminary review. The criteria used in the comparative evaluation focuses on aircraft operational impacts during construction, operational impacts after construction (end state), practicability, and environmental impacts.

#### 2.2.4.1 No Action Alternative

The No Action Alternative would not involve any changes to the current configuration of Runway 6R-24L. Under this alternative, Runway 6R-24L would not meet standard RSA dimensions for runways accommodating Approach Category C and D aircraft. This runway would fail to comply with FAA airport design standards that are required by P.L. 109-115. This alternative has been included to provide a basis for comparing the environmental consequences of the Proposed Action as required by 40 CFR § 1502.14(d). However, this alternative would include the improvements approved as part of the Runway 6L-24R and Runway 6R-24L RSA Improvements and Associated Projects EA. The No Action Alternative is identified and discussed in Section 2.2.5.2.

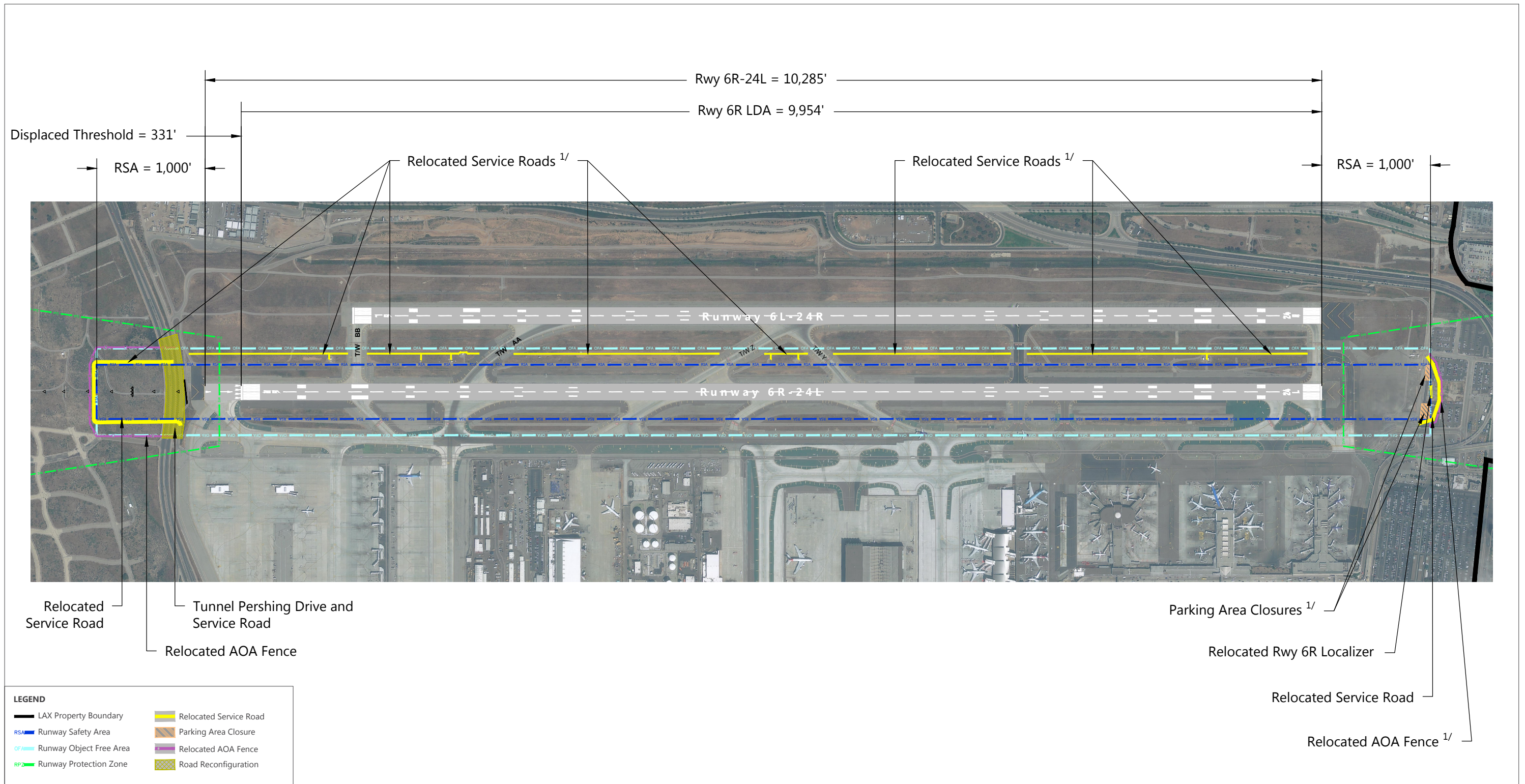
#### 2.2.4.2 Construct Standard RSA Alternative

As depicted in **Exhibit 2-3**, this alternative proposes the construction of a standard RSA. It would extend the RSA at the east end 115 feet and at the west end 835 feet to obtain a standard 1,000- by 500-foot RSA beyond each runway end. All objects that are in the current RSAs or that would fall within the extended RSAs would be relocated. At the east end, the Runway 6R localizer, a service road, a perimeter fence, and parking facilities would be relocated outside the RSA.<sup>18</sup> At the west end, a section of Pershing Drive would be tunneled under the RSA, and portions of the service road and perimeter fence would be relocated outside the RSA. An extensive amount of earthwork would be necessary in the dunes to comply with RSA grading standards. This alternative maintains all existing take-off and landing distances for Runways 6R and 24L (see **Table 2-2**).

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<sup>18</sup> Note that the relocation of the perimeter fence and closure of parking facilities has already been approved as part of the Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Project, which will be implemented by LAWA in 2015.





NOTE: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



Runway 6R-24L  
Construct Standard RSA Alternative

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Table 2-2: Runway 6R-24L RSA Alternatives Comparison Matrix

ALTERNATIVE	RUNWAY END	RUNWAY SHIFT/ EXTENSION (FEET)	DISPLACED THRESHOLD (FEET)	USE OF DECLARED DISTANCES	STANDARD RSA	AVAILABLE DISTANCES (FEET)			
						TAKE OFF RUN AVAILABLE (TORA)	TAKE OFF DISTANCE AVAILABLE (TODA)	ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	LANDING DISTANCE AVAILABLE (LDA)
No Action	6R		331	X		10,285	10,285	10,285	9,954
	24L					10,285	10,285	10,285	10,285
Construct Standard RSA	6R		331	X	X	10,285	10,285	10,285	9,954
	24L				X	10,285	10,285	10,285	10,285
Reduced Runway	6R				X	9,335	9,335	9,335	9,335
	24L				X	9,335	9,335	9,335	9,335
Declared Distances	6R		331	X		10,285	10,285	10,170	9,839
	24L			X	X	10,285	10,285	9,450	9,450
Shift Runway	6R				X	10,285	10,285	10,285	10,285
	24L	835			X	10,285	10,285	10,285	10,285
EMAS	6R					10,095	10,095	10,095	10,095
	24L	265				10,095	10,095	10,095	10,095

NOTES: Numbers in RED indicate different numbers than existing conditions.

X = Alternative satisfies this condition

SOURCE: Ricondo and Associates, Inc., *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study for Los Angeles International Airport*, April 9, 2010; Ricondo & Associates, Inc., February 2015.

PREPARED BY: Ricondo & Associates, Inc., February 2015.



The complications associated with tunneling Pershing Drive and modifications to the LAX/El Segundo Dunes associated with this alternative may adversely impact the federally listed El Segundo blue butterfly and its host plant, the Coast Buckwheat, and were considered to be impractical to implement when compared with other alternatives. Impacts to the coastal zone would require coordination with the U.S. Fish and Wildlife Service (USFWS) as well as coordination and permitting through the California Coastal Commission (CCC). Because of the time required, substantial complexities with renovations to Pershing Drive, impacts to the coastal zone, and coordination required with the USFWS and CCC, this alternative could not comply with the statutory deadline of December 31, 2015. Thus this alternative does not pass the Step 2 screening criteria and it was not retained for detailed study in this EA.

### 2.2.4.3 Reduce Runway Length Alternative

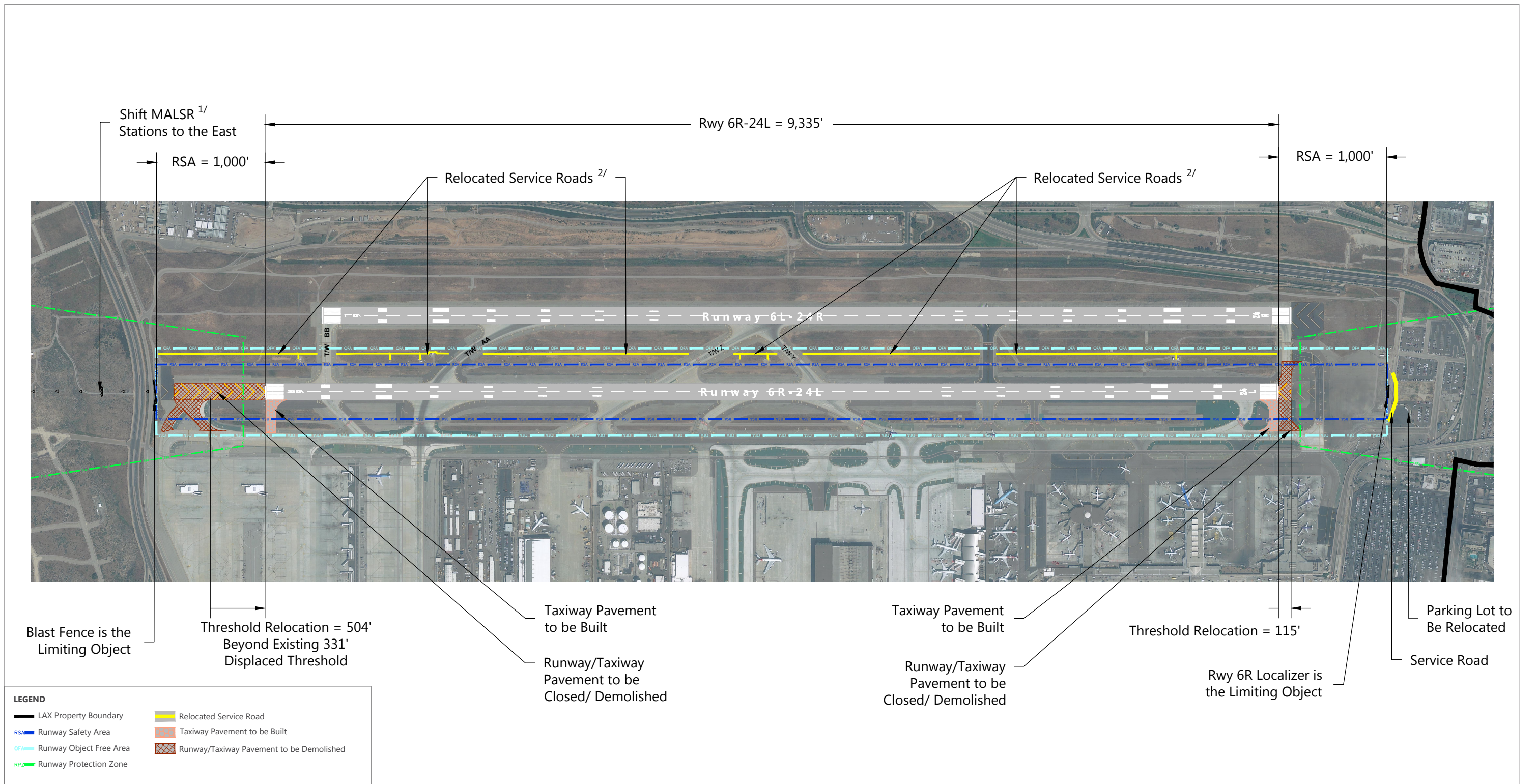
As depicted in **Exhibit 2-4** this alternative meets all RSA requirements by reducing the length of the runway from 10,285 feet to 9,335 feet (see Table 2-2). At the east end, the Runway 24L threshold would be relocated west 115 feet to provide 1,000 feet of RSA beyond the east end of the runway. At the west end, the Runway 6R threshold would be relocated east 504 feet beyond the existing 331-foot displaced threshold to provide 1,000 feet of RSA beyond the west end of the runway. The 835 feet of runway west of the relocated threshold would be demolished and graded to RSA standards. The Runway 6R and 24L approach lights would require relocation. This alternative reduces the overall length of Runway 6R-24L by 950 feet.

This alternative would satisfy the Step 1 Purpose and Need criteria. This alternative would also satisfy the Step 2 criteria regarding practicality and implementation schedule. However, this alternative did not satisfy the Step 3 screening criteria regarding the minimization of impacts on airfield and aircraft operations. This alternative had the largest adverse impact on usable runway length among all alternatives considered. Because the existing runway pavement beyond the relocated thresholds would not be available for any aircraft operations, this alternative would impose operational restrictions on certain large aircraft that use the runway.

For Runway 6R-24L the available takeoff and landing lengths of the runway, for both 6R and 24L departures, would be reduced by 950 feet. While only about 2 percent of arrivals occur on Runway 24L on an annual basis, approximately 37 percent of departures occur from Runway 24L annually in order to reduce noise impacts to communities north of LAX.

The impacts associated with implementation of the Reduced Runway Length Alternative on Runway 24L would impose operational restrictions and reduce the utility of Runway 6R-24L, which the RSA Technical Team determined would have a negative impact on airport operations at LAX. LAX accommodates a substantial amount of long-haul and international air carrier arrivals and departures, including passenger and all-cargo flights. A reduction in runway length would impose operational restrictions on these aircraft, which would include, but not be limited to, reduced fuel loads, reduced number of passengers, and/or reduced cargo to meet weight restrictions and performance requirements of a reduced runway. Because the reduced runway length resulting from this alternative would reduce the utility of Runway 6R-24L and have a negative impact on aircraft operations at LAX, this alternative was removed from further consideration in this EA.





NOTES: <sup>1/</sup> Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR).

<sup>2/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.

SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, *April 2013 (aerial photography)*.

PREPARED BY: Ricondo & Associates, Inc., May 2015.



EXHIBIT 2-4

Runway 6R-24L  
Reduce Runway Length Alternative

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#### 2.2.4.4 Implement Declared Distances Alternative

**Exhibit 2-5** depicts the use of declared distances necessary to meet RSA requirements. A 1,000-foot RSA from the Runway 6R localizer on the east side reduces the Runway 6R ASDA by 115 feet from 10,285 feet to 10,170 feet, and the Runway 6R LDA by 115 feet from 9,954 feet to 9,839 feet (see Table 2-2). A service road would also be relocated around the east end of the RSA. A 1,000-foot RSA from the blast fence on the west side reduces the Runway 24L ASDA and LDA by 835 feet from 10,285 feet to 9,450 feet. A standard arrival RSA of 600 feet is not achieved on Runway 6R with this alternative because it would require a 104-foot relocation of the Runway 6R threshold and approach lights. Therefore, this alternative does not satisfy the Step 1 Purpose and Need criteria.

Therefore, implementation of declared distances on Runway 6R-24L did not meet the purpose and need criteria for Runway 6R-24L and was eliminated from consideration.

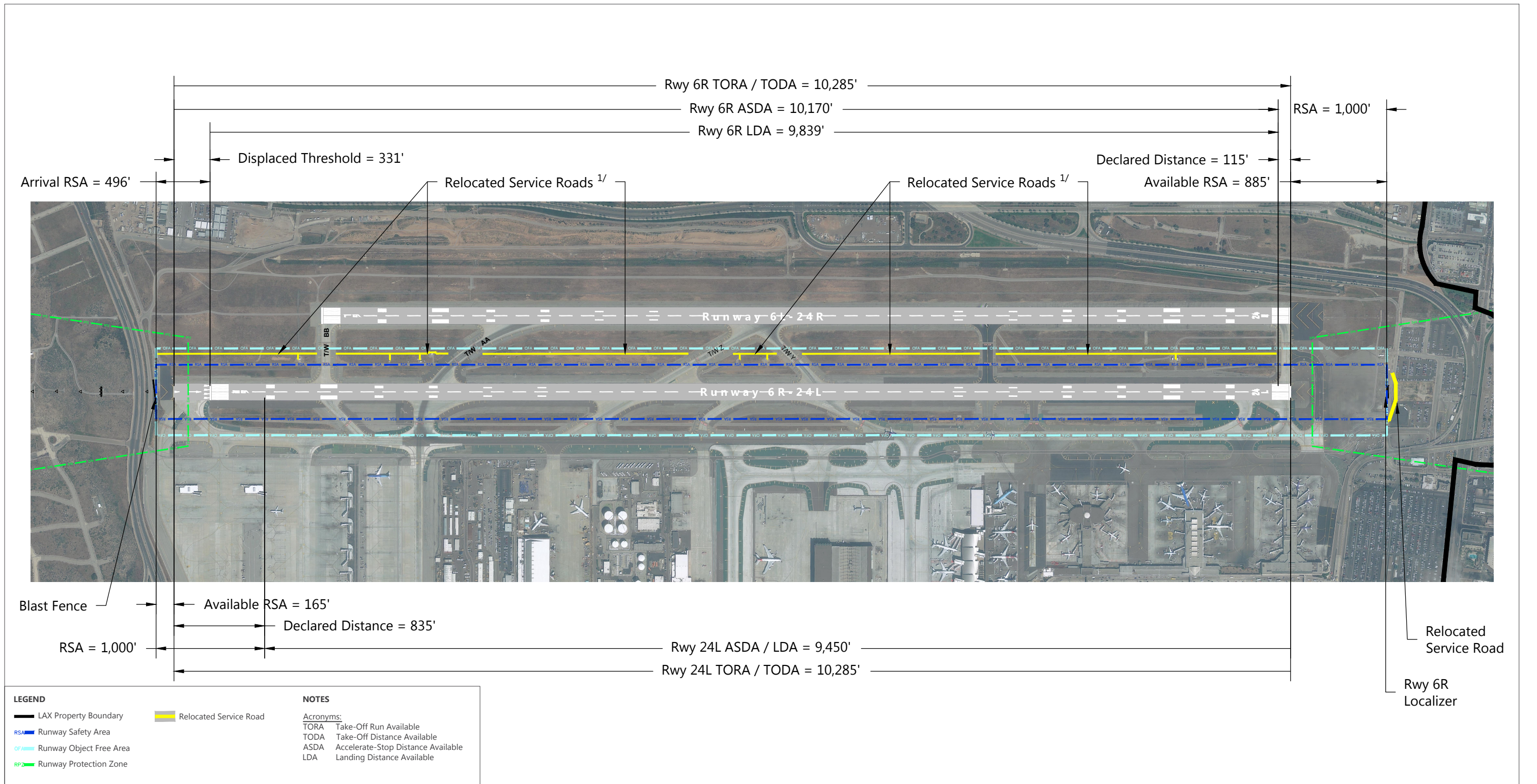
#### 2.2.4.5 Relocate, Shift or Realign the Runway Alternative(s)

As depicted in **Exhibit 2-6**, the existing blast fence at the west end is the limiting object and requires a runway shift 835 feet east to obtain a 1,000-foot standard RSA at the west end. The 835 feet of runway pavement west of the new Runway 6R threshold and Taxiways E16 and E17 would be demolished and the Runway 6R approach lights relocated. The equivalent 835-foot shift of the east runway end would require the tunneling of Sepulveda Boulevard and the relocation of the Runway 6R localizer, as well as relocation or closure of numerous commercial parking/staging lots, a service road, and the perimeter fence.

This alternative would increase the Runway 6R LDA to 10,285 feet and maintain all other take-off and landing distances (see Table 2-2). Shifting the runway would meet the Step 1 Purpose and Need criteria by providing standard RSA distances and maintaining take-off and landing distances. However, this alternative did not satisfy the Step 2 practicality and implementation schedule criteria.

Staggering the runway thresholds causes operational impacts to the airport by increasing the time aircraft must wait to takeoff in order to avoid aircraft wake turbulence. This alternative would introduce air traffic control complexities for aircraft operating on the north runways. FAA Order JO 7110.65V, *Air Traffic Control*, states that for parallel runways separated by less than 2,500 feet (such as Runways 6L-24R and 6R-24L) that have runway thresholds greater than 500 feet apart from each other (i.e., if the runway ends are staggered more than 500 feet apart), aircraft departing Runway 24L would need to be held for three minutes after a heavy aircraft (Boeing 757 or larger) arrives on Runway 24R or departs from Runway 24L due to potential wake turbulence issues. Additionally, due to the time necessary for the tunneling of Sepulveda Boulevard, this alternative could not be completed in time to comply with the statutory deadline of December 31, 2015, therefore this alternative was not retained for detailed study in this EA.

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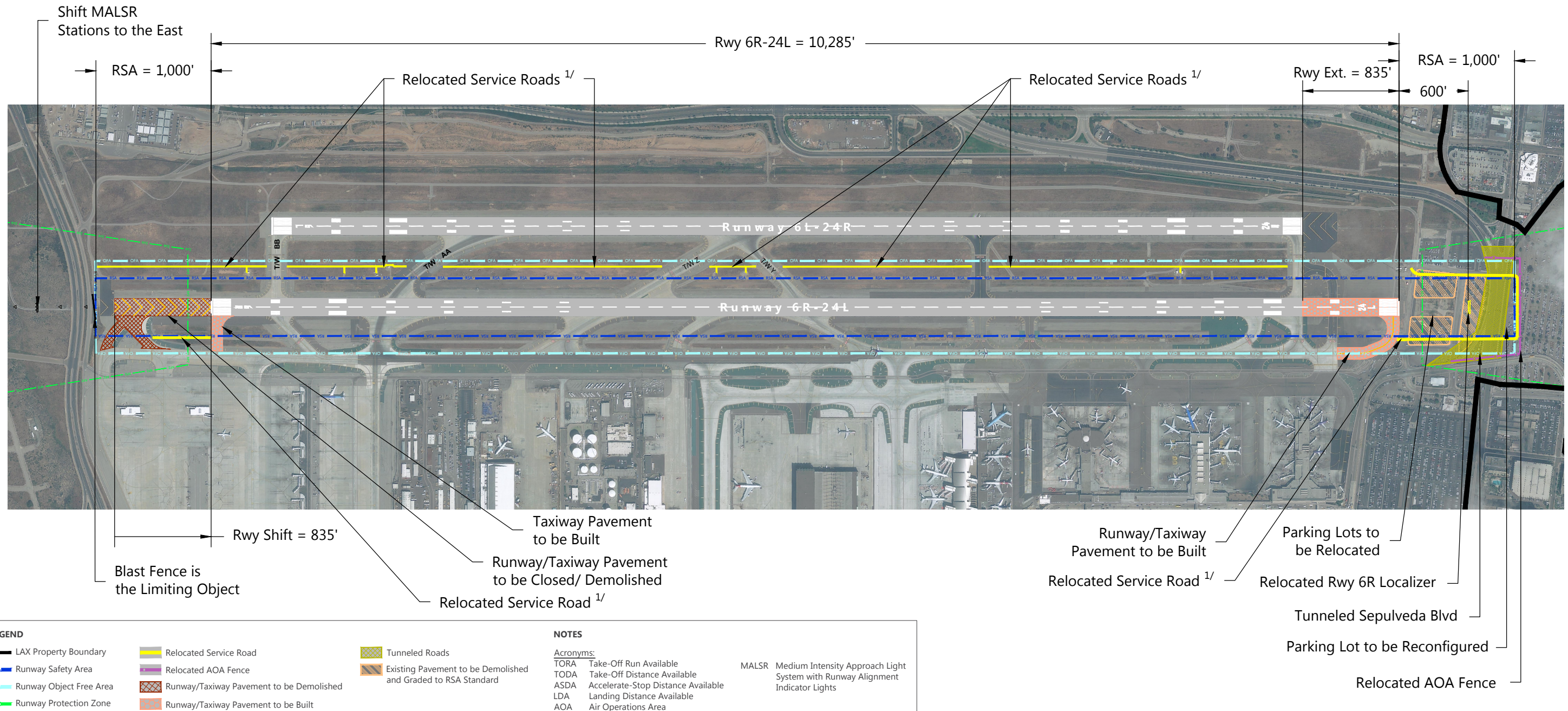


NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A, Airport Design, September 28, 2012; Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



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**LEGEND**

- LAX Property Boundary
- Runway Safety Area
- Runway Object Free Area
- Runway Protection Zone
- Relocated Service Road
- Relocated AOA Fence
- Runway/Taxiway Pavement to be Demolished
- Runway/Taxiway Pavement to be Built
- Tunneled Roads
- Existing Pavement to be Demolished and Graded to RSA Standard

**NOTES**

Acronyms:  
 TORA Take-Off Run Available  
 TODA Take-Off Distance Available  
 ASDA Accelerate-Stop Distance Available  
 LDA Landing Distance Available  
 AOA Air Operations Area

MALSR Medium Intensity Approach Light System with Runway Alignment Indicator Lights

NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



Runway 6R-24L  
Relocate, Shift or Realign Runway Alternative(s)

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### 2.2.4.6 Install Standard EMAS Alternative

As depicted in **Exhibit 2-7**, standard EMAS beds would be installed at both runway ends. Although the EMAS bed length is shown to be 550 feet, the ultimate length would be determined during the design phase and could be different than what was assumed for this study. These beds assume a 50-foot setback from the runway ends, requiring a total length of 600 feet for the RSA. The existing blast fence is the limiting object on the west end, requiring the Runway 6R threshold to be relocated east 124 feet of the existing 331-foot displaced threshold to provide a 600-foot long area for the installation of the EMAS bed. The 455 feet of runway pavement west of the new Runway 6R threshold and Taxiways E16 and E17 would be demolished and the Runway 6R approach lights relocated. The existing Runway 6R localizer is the limiting object on the east end, allowing for a Runway 24R end shift of 265 feet to the east. A service road would be relocated to the east around the RSA. The Standard EMAS configuration for Runway 6R-24L results in a net runway length reduction of 190 feet from 10,285 feet to 10,095 feet (see Table 2-2).

Installation of standard EMAS beds would meet the Step 1 Purpose and Need criteria. While the required standard RSA distances would not be obtained, a standard EMAS in accordance with Section 4 of FAA AC 150/5220-22B provides a level of safety that is generally equivalent to a full RSA built to the dimensional standards. The Practicability Study determined that installation of an EMAS on two runway ends would be cost prohibitive and not feasible to carry forward in subsequent evaluations. Because of the substantial complexities and costs associated with this alternative, it was not retained for further evaluation in this EA.

### 2.2.5 PRELIMINARY REVIEW AND REFINEMENT OF RSA ALTERNATIVES

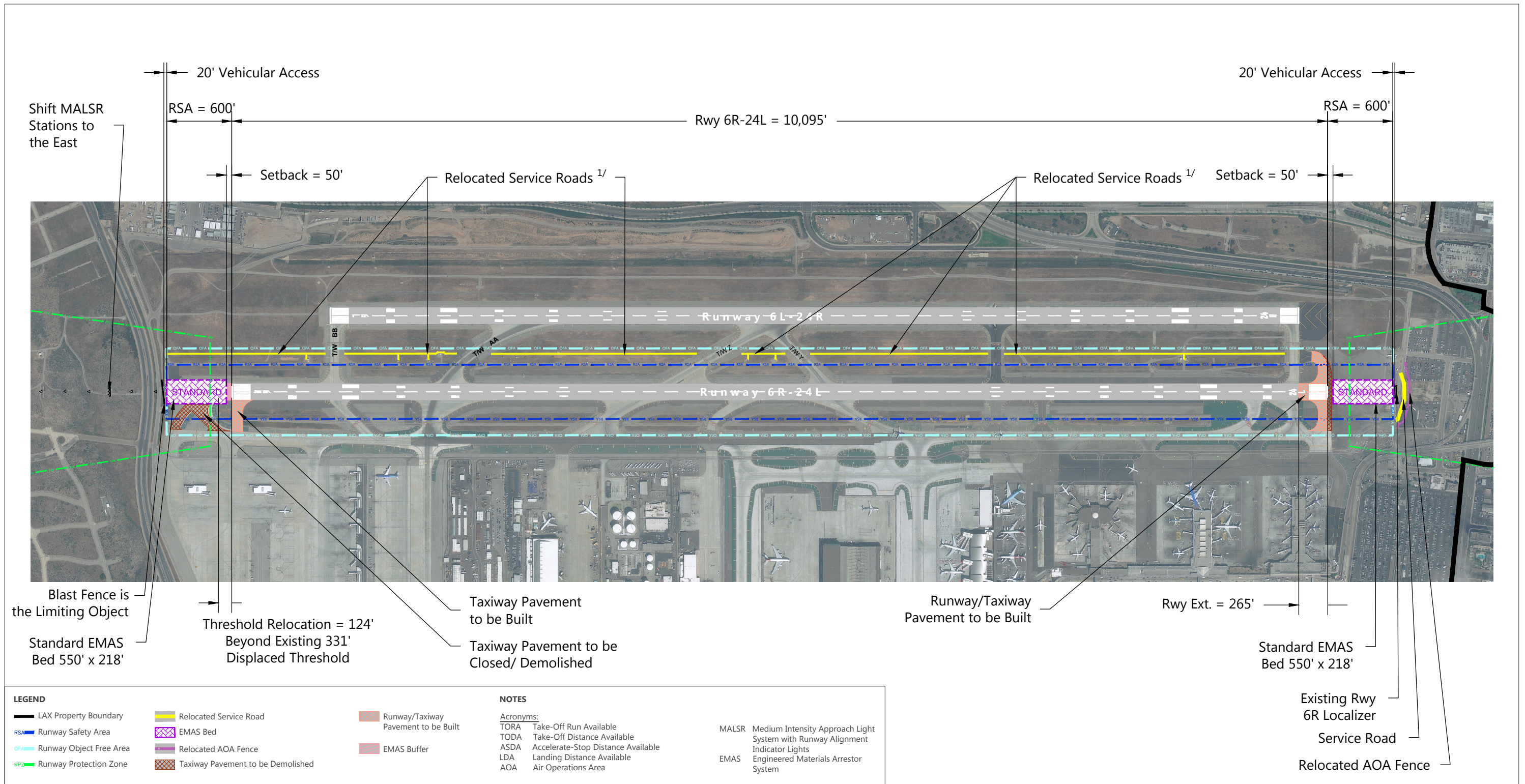
Preliminary review of the conceptual alternatives was conducted by the RSA Technical Team and consisted of a general evaluation of engineering practicability, site constraints, the extent for which the RSAs would comply with standards, and the benefits achieved for each of the alternatives. The objective of the preliminary review was to identify key elements for eliminating alternatives and identifying the most feasible alternative(s) for satisfying RSA standards. During the review, FAA representatives stated that improvement alternatives included in the *Runway Safety Area Evaluation and Analysis* document for LAX were suggested solutions and were not necessarily required as long as the ultimate preferred RSA alternative could meet the RSA standards in accordance with FAA criteria. LAWA officials requested that the preferred alternative not reduce take-off length or airlines' operational capabilities.

Following are the RSA Technical Team's initial review comments for the conceptual alternatives:

- Construct Standard RSA and Reduce Runway Alternatives - A consensus was reached by the RSA Technical Team that these two alternatives would not be practicable to implement. The Construct Standard RSA alternative was considered infeasible because of the time needed to modify Pershing Drive, which could not be completed by the P.L. 109-115 December 31, 2015 deadline. Additionally, this alternative would potentially impact the LAX/EI Segundo Dunes, while the Reduce Runway alternative would likely increase operational restrictions to unacceptable levels.
- Shift Runway Alternative - The RSA Technical Team recognized that this alternative would be impractical due to requiring the tunneling of Sepulveda Boulevard, and the length of time to implement would likely be significantly longer than the Declared Distances alternative.

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NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A, Airport Design, September 28, 2012; Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



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- Install Standard EMAS Alternative - The RSA Technical Team recognized that although this alternative would have minimal operational impacts, its development cost would likely be significantly higher than the Declared Distances alternative and was determined by the RSA Technical Team to be infeasible.
- Implement Declared Distances Alternative – The Runway 6R ASDA would be reduced 115 feet from 10,285 feet to 10,170 feet, and the Runway 6R LDA would be reduced by 115 feet from 9,954 feet to 9,839 feet, which were considered negligible since landings on Runway 6R occur less than 2 percent annually and departures occur less than 1 percent on an annual basis. However, the implementation of declared distances on Runway 24L would reduce the Runway 24L ASDA and LDA by 835 feet, reducing the utility of Runway 6R-24L, which would have a negative impact on airport operations at LAX. Thus, the declared distances alternative was determined infeasible.
- Combination – The RSA Technical Team agreed to consider for refinement a combination of specific elements from the Declared Distances, Shift Runway, and Standard EMAS alternatives.

### 2.2.5.1 Refinement #1 Alternative

The Runway 6R-24L Refinement #1 Alternative is a combination of the Declared Distances and the Shift Runway Alternatives. The RSA improvements to the east end would include an 835-foot extension, but the Runway 24L threshold would remain in its existing location, which would require implementation of declared distances; the Runway 24L LDA would decrease to 9,450 feet and the Runway 6R TORA and TODA would increase to 11,120 feet. All other runway distances would be maintained (see **Table 2-3**). On the east end, this Alternative also includes relocated taxiways; closures of several parking lots; demolition and relocation of taxiways, an existing Secure Area Access Post, service road, and perimeter fence; and the realignment of Sky Way. On the west end, taxiway pavement would be demolished and relocated (see **Exhibit 2-8**).

Additionally, the RSA Practicability Study included Refinement #2 which was similar to Refinement #1 but included a standard 600-foot Runway 6R arrival RSA. The Runway 6R threshold was relocated 104 feet to the east to provide a standard RSA for Runway 6R arrivals. This refinement required the Runway 6R approach lights to be relocated. Similar to Refinement #1, this alternative maintained the Runway 24L ASDA of 10,285 feet while it reduced the Runway 24L LDA from 10,285 feet to 9,450 feet and the Runway 6R LDA from 9,954 feet to 9,850 feet. The Runway 6R take-off distances remained unchanged.

Since the RSA Practicability Study Refinement #2 would have a greater impact on operations due to the decreased LDAs, the RSA Practicability Study Refinement #2 was deemed less feasible by the RSA Technical Team than Refinement #1. Because this alternative was very similar to Refinement #1, it was combined with Refinement #1 for further consideration in this EA. A different alternative has replaced Refinement #2 in this study, as described in Section 2.2.5.2 below. The Refinement #1 Alternative would meet the Step 1 Purpose and Need criteria by providing standard RSA distances. The Refinement #1 Alternative was rejected in the *Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements EA* because of cost and schedule considerations in order to comply with the December 31, 2015 deadline for P.L. 109-115.

Table 2-3: Runway 6R-24L RSA Alternative Refinements Comparison Matrix

ALTERNATIVE	RUNWAY END	RUNWAY SHIFT/ EXTENSION (FEET)	DISPLACED THRESHOLD (FEET)	USE OF DECLARED DISTANCES	STANDARD RSA	AVAILABLE DISTANCES (FEET)			
						TAKE OFF RUN AVAILABLE (TORA)	TAKE OFF DISTANCE AVAILABLE (TODA)	ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	LANDING DISTANCE AVAILABLE (LDA)
Refinement #1	6R		331	X	X	11,120	11,120	10,285	9,850
	24L	835	835	X	X	11,120	11,120	10,285	9,450
Refinement #2	6R		331	X		10,285	10,285	10,170	9,839
	24L				X	10,285	10,285	10,285	10,285
Refinement #3	6R	455			X	10,285	10,285	10,285	10,285
	24L	455	455	X	X	10,285	10,285	10,285	9,830
Refinement #4	6R		331	X	X	10,970	10,970	10,970	10,639
	24L	685	685	X	X	10,970	10,970	10,135	9,450
Refinement #5	6R		435	X	X	10,970	10,970	10,970	10,535
	24L	685	685	X	X	10,970	10,970	10,135	9,450
Refinement #6	6R		435	X	X	10,285	10,285	10,170	9,735
	24L			X	X	10,285	10,285	9,450	9,450
Refinement #7	6R		51	X		10,285	10,285	10,285	10,234
	24L	480	480	X	X	10,285	10,285	10,285	9,805
Refinement #8	6R		558 <sup>1/</sup>	X		10,285	10,285	10,285	9,727 <sup>1/</sup>
	24L	796 <sup>1/</sup>	796 <sup>1/</sup>	X	X	10,285	10,285	10,285	9,489 <sup>1/</sup>

NOTES: Numbers in RED indicate different numbers than existing conditions.

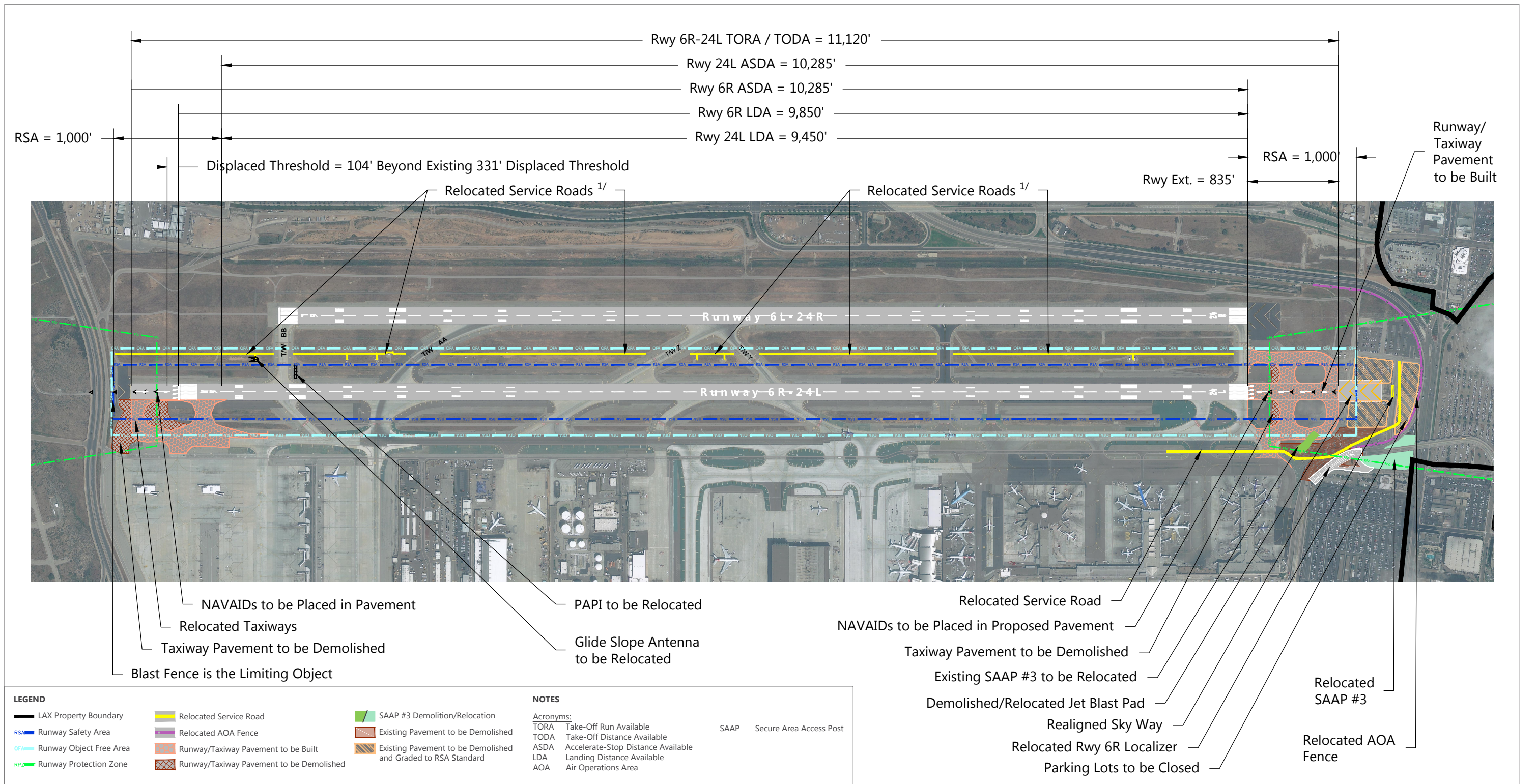
X = Alternative satisfies this condition

1/ These distances may be subject to refinement.

SOURCE: Ricondo and Associates, Inc., *Runway 6L-24R & 6R-24L Safety Area (RSA) Practicability Study for Los Angeles International Airport*, April 9, 2010; Ricondo & Associates, Inc., July 2014.

PREPARED BY: Ricondo & Associates, Inc., November 2014.





NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A, Airport Design, September 28, 2012; Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



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However, LAWA has determined that declared distances could be implemented on Runway 6R-24L during construction to provide standard RSA dimensions by the end of December 31, 2015. Although this alternative is more expensive than some other alternatives considered, LAWA has determined that it is economically feasible. FAA Order JO 7110.65V, *Air Traffic Control*, states that for parallel runways separated by less than 2,500 feet (such as Runways 6L-24R and 6R-24L) that have runway thresholds greater than 500 feet apart from each other (i.e., if the runway ends are staggered more than 500 feet apart), aircraft departing Runway 24L may need to be held for three minutes after a heavy aircraft (Boeing 757 or larger) arrives on Runway 24R or departs from Runway 24L due to potential wake turbulence issues. This could effectively reduce the capacity of the north runway complex. Although the LDA would decrease under this alternative, LAWA determined that the impact to airfield operations would be acceptable since arrivals on Runway 24L occur less than 2 percent on an annual basis. Although this alternative could result in an operational impact to the airfield, it would maintain the usable length of the runway for departures and was retained for further consideration.

### 2.2.5.2 Refinement #2 Alternative

The Refinement #2 Alternative was the Proposed Action Alternative for Runway 6R-24L as approved in the *Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Final Environmental Assessment*. As shown in **Exhibit 2-9**, this includes relocation of a service road within the Runway 6R-24L RSA north of the runway, and closure of parking areas located within the Runway 6R-24L RSA. Declared distances would also be implemented: the Runway 6R ASDA and LDA would be reduced by 115 feet to provide a 1,000-foot RSA from the Runway 6R Localizer (see Table 2-3).

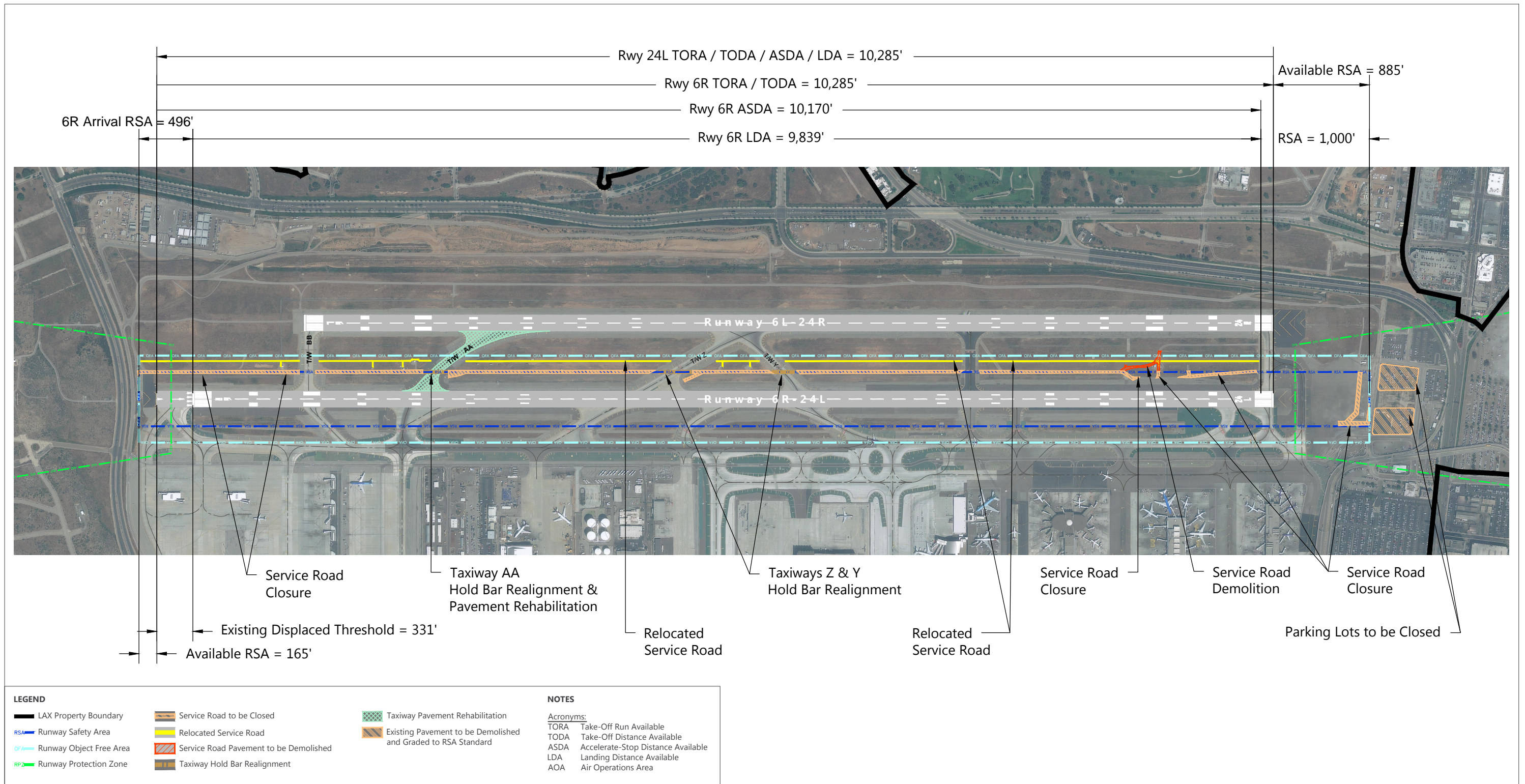
The proposed improvements under the Refinement #2 Alternative will be implemented as part of the Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Project, approved by FAA in July 2014, but it does not provide a long-term solution in accordance with P.L. 109-115. The Refinement #2 Alternative does not correct the 104-foot deficiency for the Runway 6R arrival RSA, or the 835-foot deficiency for Runway 24L arrivals and departures. Therefore, this alternative does not satisfy the criteria in Step 1 Purpose and Need for providing Standard RSA distances. However, because these improvements will be implemented as part of the Runway 6L-24R and Runway 6R-24L Runway Safety Area and Associated Improvements Project approved by FAA, these improvements are considered part of the No Action Alternative evaluated in this EA.

### 2.2.5.3 Refinement #3 Alternative

As depicted in **Exhibit 2-10**, this alternative uses a combination of installing standard EMAS beds, shifting the runway to the east, and implementing declared distances. The EMAS bed configuration at the west end is identical to the Standard EMAS conceptual alternative; the Runway 6R threshold would be relocated 124 feet to the east beyond the existing 331-foot displaced threshold and a standard EMAS bed would be located between the shifted runway end and the existing blast fence. This alternative would require demolishing the runway pavement, connecting taxiways west of the new Runway 6R threshold, and relocating the approach lights. At the east end, the runway would be extended 455 feet, although the Runway 24L landing threshold would remain in its existing location. A standard EMAS bed would be installed between the new runway end and the relocated Runway 6R Localizer. Portions of parking lots would require relocation and the Runway 24L approach lights would need to be reinstalled.

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NOTES: The features of Refinement #2 have been included as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography); Ricondo & Associates, Inc., June 2014.  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.

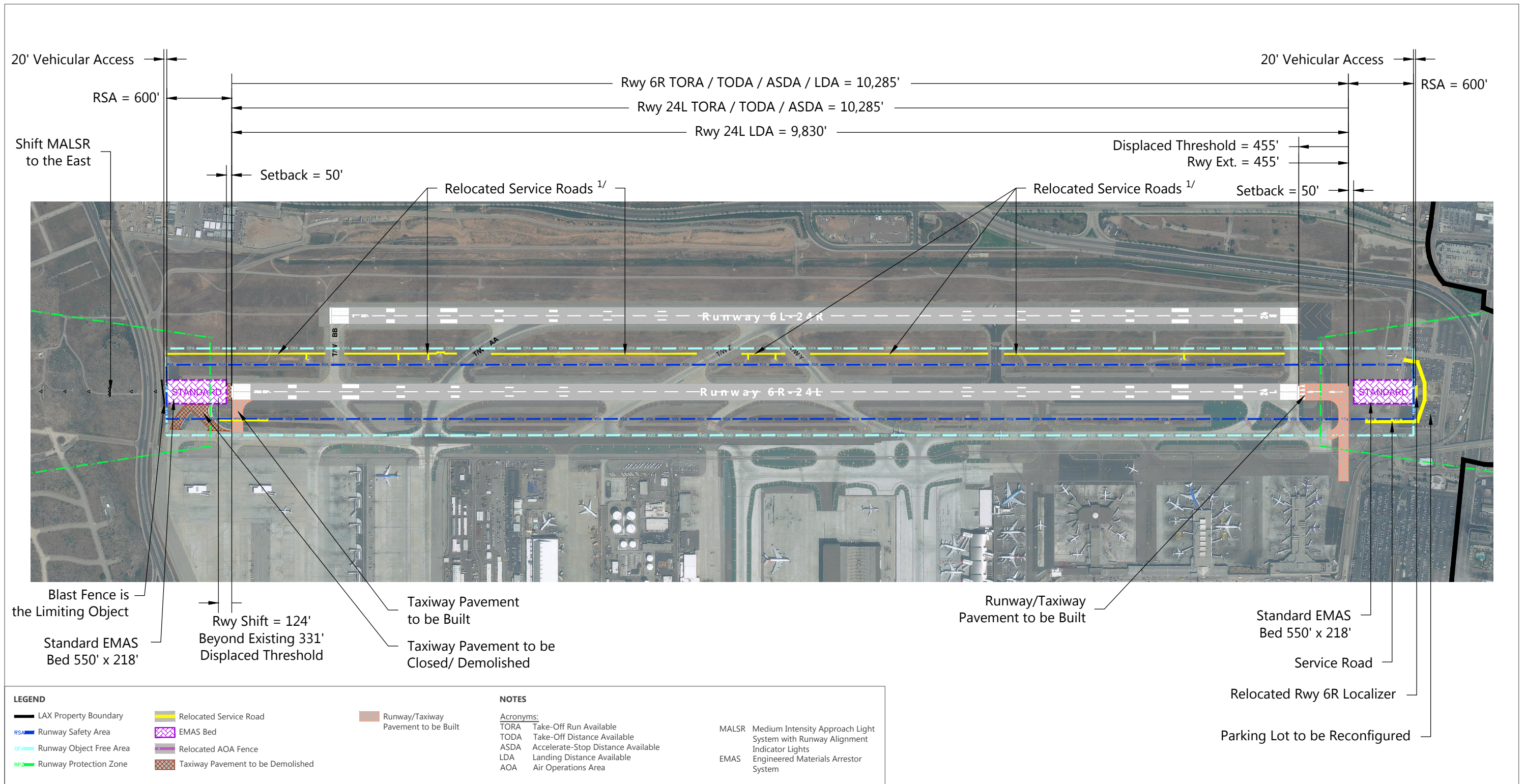
EXHIBIT 2-9



Runway 6R-24L  
Refinement #2 Alternative

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NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A, Airport Design, September 28, 2012; Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



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This alternative maintains all distances for Runway 6R and take-off distances for Runway 24L. The existing Runway 24L LDA would be reduced from 10,285 feet to 9,830 feet (see Table 2-3).

Installation of standard EMAS beds would meet the Step 1 Purpose and Need criteria. While the required standard RSA distances would not be obtained, a standard EMAS in accordance with Section 4 of FAA AC 150/5220-22B provides a level of safety that is generally equivalent to a full RSA built to the dimensional standards. However, installation of an EMAS on both ends was eliminated from further consideration by the RSA Technical Team. Because of the substantial complexities and relative cost associated with this alternative, it was determined by the RSA Technical Team to be infeasible and was not retained for detailed study in this EA.

#### 2.2.5.4 Refinement #4 Alternative

Similar to Refinement #3, this alternative proposes the installation of a standard EMAS bed and a runway extension to the east on the Runway 24L end to meet RSA standards and maintain as much take-off and landing length as possible. The key difference with Refinement #4 is that this alternative does not make any changes to the west end. As depicted in **Exhibit 2-11**, the east runway end would be extended 685 feet to the east, requiring the relocation of the Runway 6R localizer, a service road, and the parking lots and the reinstallation of the Runway 24L approach lights. The Runway 24L threshold would remain in its existing location. This alternative would increase the Runway 6R distances by 685 feet.<sup>19</sup> The Runway 24L ASDA would be reduced from 10,285 feet to 10,135 feet and the Runway 24L LDA would be reduced from 10,285 feet to 9,450 feet (see Table 2-3).

This alternative would not satisfy the Step 1 Purpose and Need and Step 2 Practicability and Implementation criteria. Refinement #4 would not provide a 600-foot arrival RSA for the Runway 6R end to meet RSA standards. Since Refinement #4 would not satisfy Step 1 criteria and would not meet RSA standards, this alternative was removed from further consideration in this Draft EA.

#### 2.2.5.5 Refinement #5 Alternative

This alternative is the same as Refinement #4 at the east end of the runway but displaces the Runway 6R threshold 435 feet to the east to obtain a standard 600-foot Runway 6R arrival RSA, as shown on **Exhibit 2-12**. The relocation of the Runway 6R arrival threshold would require the relocation of the Runway 6R approach lights. This alternative would increase the Runway 6R take-off distances by 685 feet and the Runway 6R LDA by 250 feet.<sup>20</sup> However, the Runway 24L ASDA would be reduced from 10,285 feet to 10,135 feet and the Runway 24L LDA would be reduced from 10,285 feet to 9,450 feet (see Table 2-3).

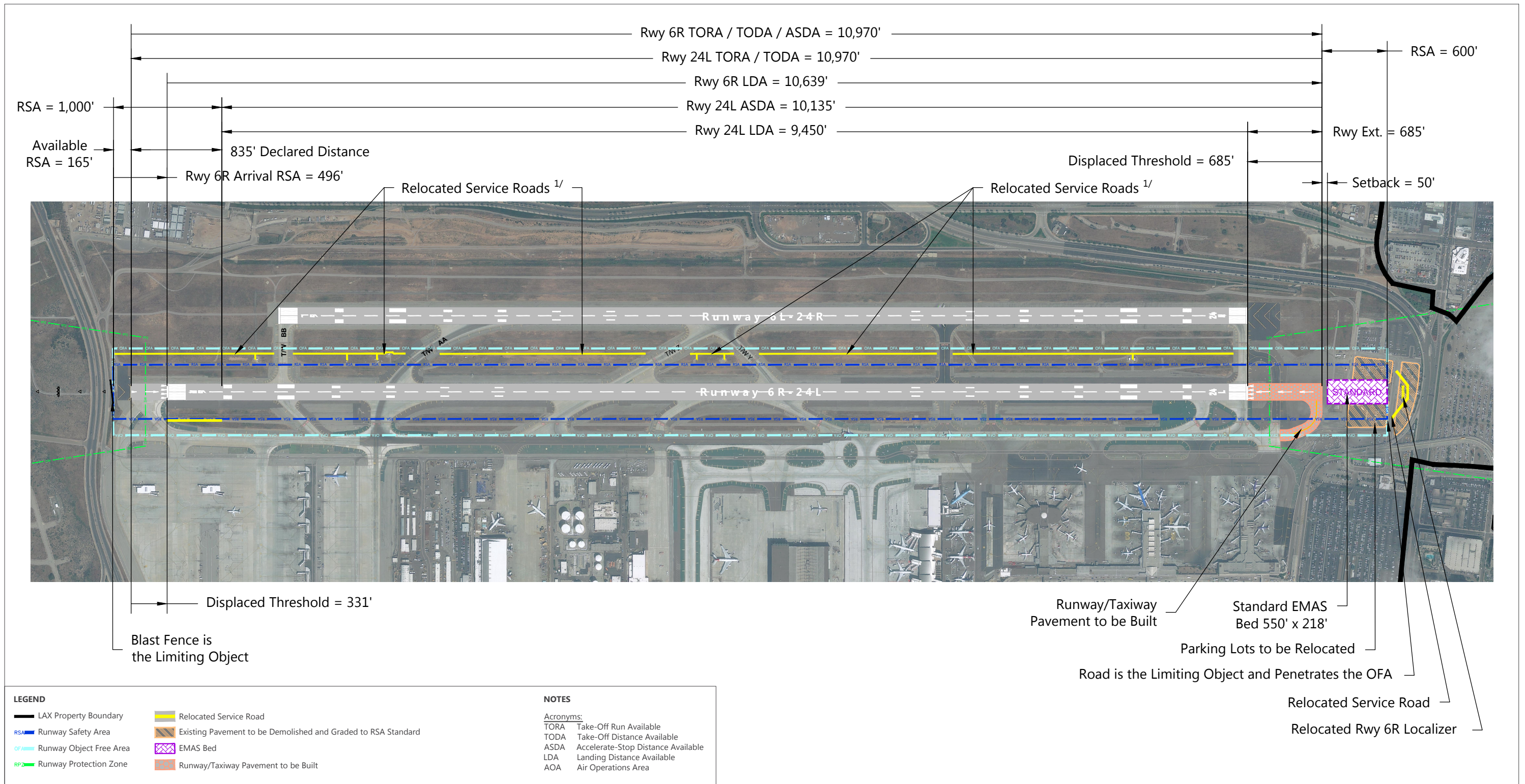
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<sup>19</sup> An extension of the TORA, TODA will require an airspace study with respect to the relocation of the Title 14 Code of Federal Regulations (14 CFR) Part 77 surface and the Runway 6R departure surface with respect to Terminal Instrument Procedures (TERPS).

<sup>20</sup> An extension of the TORA, TODA will require an airspace study with respect to the relocation of the Title 14 Code of Federal Regulations (14 CFR) Part 77 surface and the Runway 6R departure surface with respect to Terminal Instrument Procedures (TERPS).

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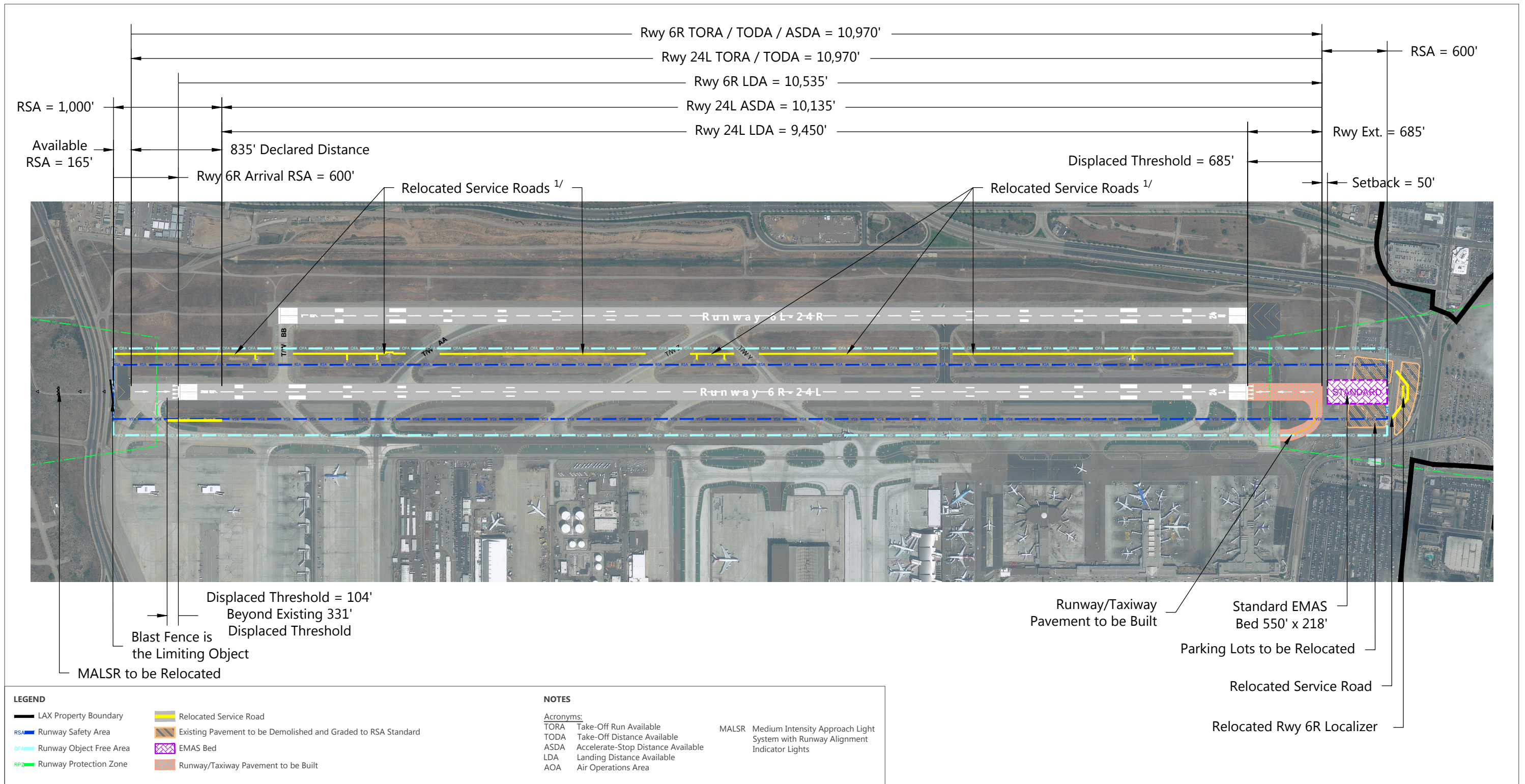


NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project. Rwy 6R Arrival RSA does not meet the 600' FAA requirement.  
 SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



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NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project. Rwy 6R Arrival RSA does not meet the 600' FAA requirement.  
 SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.

EXHIBIT 2-12



Runway 6R-24L  
Refinement #5 Alternative

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Refinement #5 would satisfy the Step 1 Purpose and Need and Step 2 Practicability and Implementation criteria. Similar to Refinement #1, the installation of a standard EMAS bed on the eastern end of Runway 6R-24L along with a 685-foot runway extension on this end would introduce air traffic control complexities for aircraft operating on the north runways. FAA Order JO 7110.65V, *Air Traffic Control*, states that for parallel runways separated by less than 2,500 feet (such as Runways 6L-24R and 6R-24L) that have runway thresholds greater than 500 feet apart from each other (i.e., if the runway ends are staggered more than 500 feet apart), aircraft departing Runway 24L may need to be held for three minutes after a heavy aircraft (Boeing 757 or larger) arrives on Runway 24R or departs from Runway 24L due to potential wake turbulence issues. The Refinement #5 Alternative would have similar physical impacts as the Refinement #1 Alternative, but would result in greater operational impacts when compared to the Refinement #1 Alternative. Therefore, the Refinement #5 Alternative was not retained for further consideration in this Draft EA.

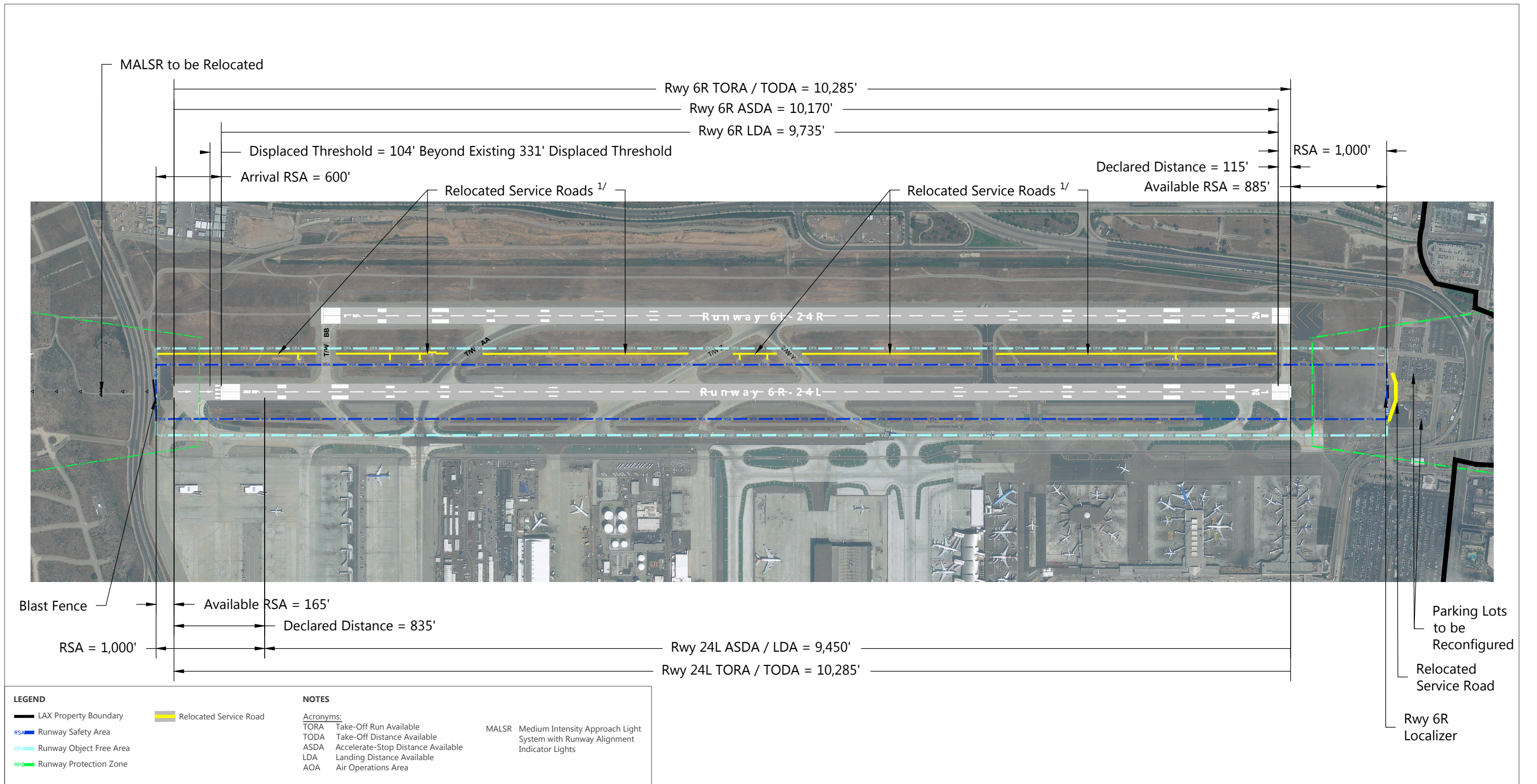
#### 2.2.5.6 Refinement #6 Alternative

As shown on **Exhibit 2-13**, this alternative is the same as the Declared Distances conceptual alternative at the east end of the runway but displaces the Runway 6R arrival threshold 435 feet east (104 feet beyond the existing 331-foot displaced threshold) to obtain a standard 600-foot Runway 6R arrival RSA. Additionally, this would require the relocation of the Runway 6R approach lights. This alternative would decrease the Runway 6R ASDA from 10,285 feet to 10,170 feet and the Runway 6R LDA from 9,954 feet to 9,735 feet. The Runway 24L ASDA and LDA would be reduced from 10,285 feet to 9,450 feet (see Table 2-3).

Refinement #6 would satisfy the Step 1 Purpose and Need criteria. This alternative would also satisfy the Step 2 criteria regarding practicality and implementation schedule. However, this alternative did not satisfy the Step 3 screening criteria regarding the minimization of impacts on airfield and aircraft operations. This refinement would have an adverse impact on usable runway length.

The primary concern with this alternative is the reduction in the Runway 24L ASDA from 10,285 feet to 9,450 feet and the potential adverse impact that the reduced runway length could have on aircraft operations. LAX accommodates a substantial amount of long-haul and international air carrier arrivals and departures, including passenger and all-cargo flights. A reduction in runway length would impose operational restrictions on these aircraft, which would include, but not be limited to, reduced fuel loads, reduced number of passengers, and/or reduced cargo to meet weight restrictions and performance requirements of a reduced runway. Because the reduced runway length resulting from this alternative would reduce the utility of Runway 6R-24L and have a negative impact on aircraft operations at LAX, this alternative was removed from further consideration in this EA.

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NOTES: <sup>1/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.  
 SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography).  
 PREPARED BY: Ricondo & Associates, Inc., May 2015.



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### 2.2.5.7 Refinement #7 Alternative

As depicted in **Exhibit 2-14**, the Refinement #7 Alternative includes a combination of the Shifting Runway Alternative, Declared Distances, and EMAS. The Refinement #7 Alternative includes shifting Runway 6R-24L 480 feet to the east, as well as the implementation of an EMAS for Runway 6R and declared distances for Runway 24L. For Runway 6R-24L, the TORA, ASDA, and TODA distances would be retained at 10,285 feet. However, the Runway 24L LDA distance would be reduced by 480 feet from 10,285 to 9,805 feet and the Runway 6R LDA would be reduced by 51 feet from 10,285 to 10,234 feet (see Table 2-3). The RSA improvements to the east end would also include construction of a jet blast pad, demolition and grading to RSA standards of existing parking lot pavement, relocation of a taxi staging lot, and demolition and relocation of the existing Secure Area Access Post, service road, and perimeter fence. Connector taxiway pavement on both runway ends would be demolished and relocated.

This alternative satisfied the Step 1 Purpose and Need criteria for Runway 6R-24L. Because no substantial construction, practicality, or schedule issues are associated with this alternative, it also satisfied Step 2 criteria as well. Although declared distances would reduce the Runway 24L LDA by 480 feet and the Runway 6R LDA by 51 feet, the impact to airfield operations would be minimal since arrivals on Runway 24L occur less than 1 percent on an annual basis and arrivals on Runway 6R occur less than 2 percent on an annual basis. Therefore, this alternative satisfies Step 3 criteria and was retained for further consideration in this EA.

### 2.2.5.8 Refinement #8 Alternative

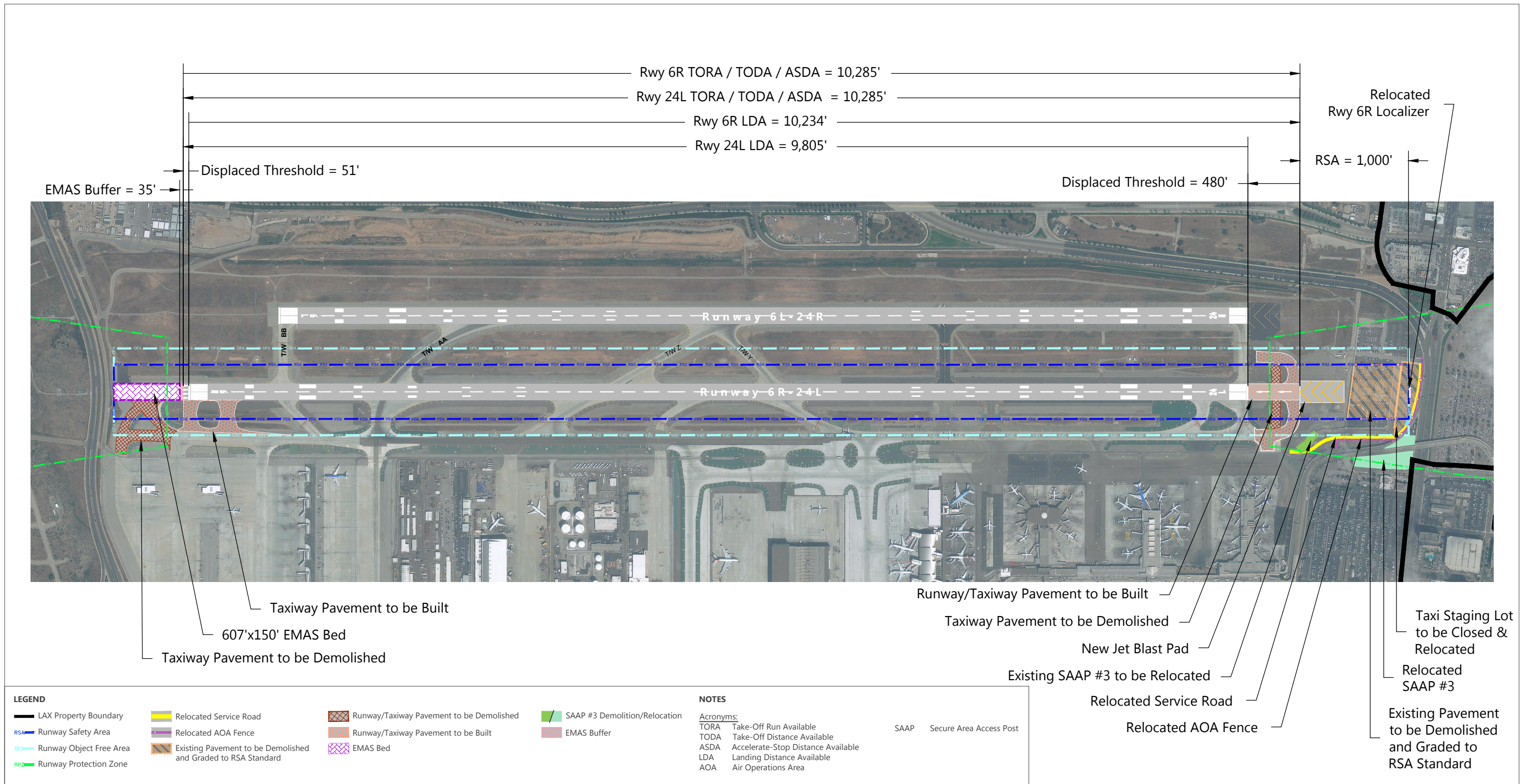
As depicted in **Exhibit 2-15**, the Runway 6R-24L Refinement #8 Alternative is a variation of the Refinement #1 Alternative. The RSA improvements to the east end would include an approximate 800-foot extension, but the Runway 24L threshold would remain in its existing location. The Runway 6R end would be shifted 200 feet east and the threshold would be displaced 550 feet. Refinement #8 would require implementation of declared distances; the Runway 24L LDA would decrease to 9,489 feet and the Runway 6R LDA would decrease to 9,727 feet. The overall runway length would increase to approximately 10,885 feet, however due to the implementation of declared distances useable runway length would remain at 10,285 feet. All other runway distances would be maintained (see Table 2-3). Therefore, no increase in usable runway length or capacity would occur from the Refinement #8 Alternative.

On the east end, this Alternative also includes relocated taxiways; closures of several parking lots; construction of a blast pad; and demolition and relocation of taxiways, an existing Secure Area Access Post, service road, and perimeter fence. On the west end, taxiway pavement would be demolished and relocated and a blast pad would be constructed. Refinement #8 would require the relocation of navigation aids on the west end of Runway 6R-24L.

The Refinement #8 Alternative would meet the Step 1 Purpose and Need criteria by providing standard RSA distances. LAWA has determined that declared distances could be implemented on Runway 6R-24L during construction to provide standard RSA dimensions by the end of December 31, 2015. Although this alternative is more expensive than some other alternatives considered, LAWA has determined that it is economically feasible and therefore meets Step 2 criteria.

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SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A, Airport Design, September 28, 2012; Landrum & Brown, Los Angeles International Airport, Airport Layout Plan, 2005; Los Angeles World Airports, April 2013 (aerial photography); Ricondo & Associates, Inc., June 2014. PREPARED BY: Ricondo & Associates, Inc., May 2015.

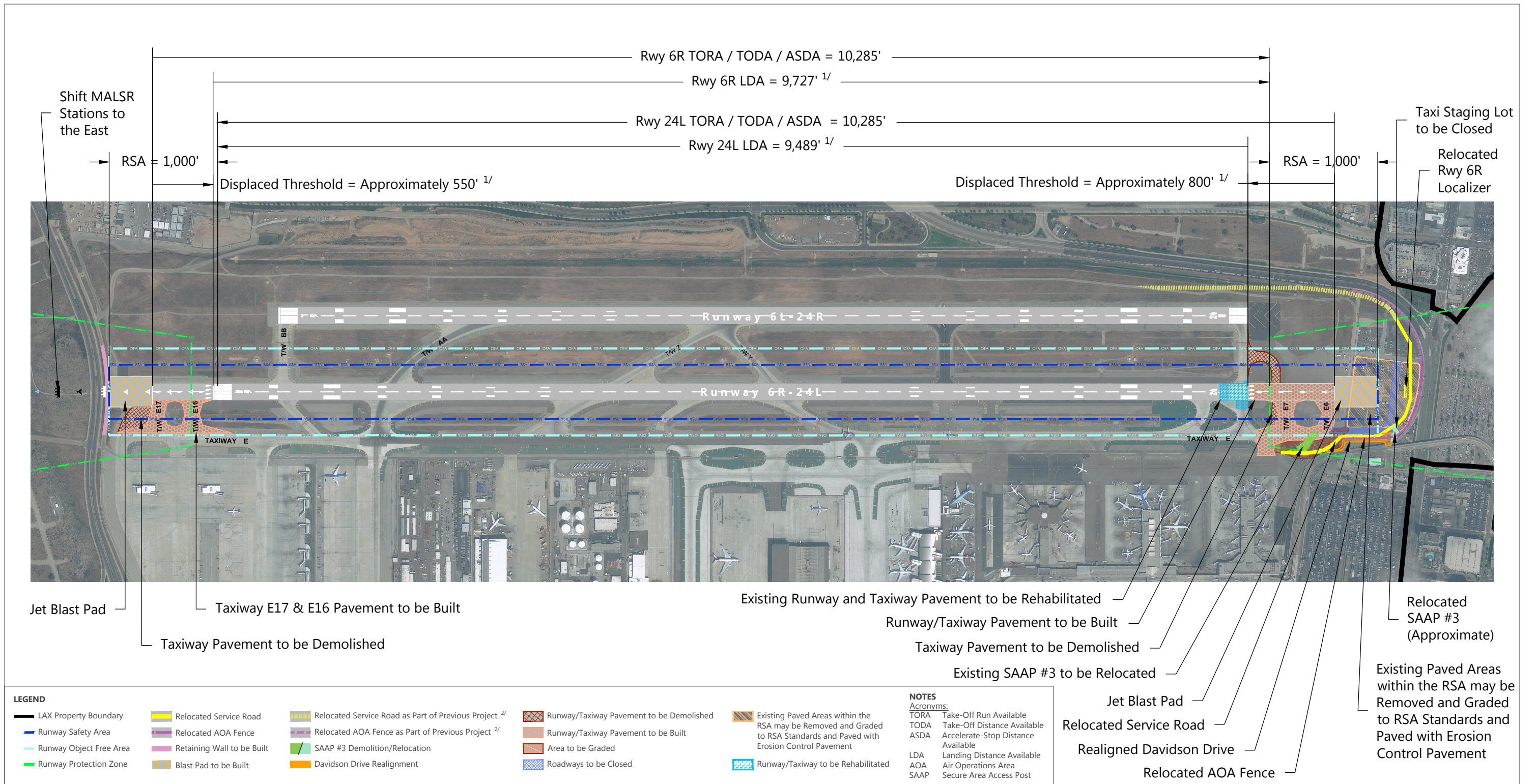
EXHIBIT 2-14



Runway 6R-24L Refinement #7 Alternative

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NOTE: <sup>1/</sup> These measurements may be subject to refinement.

<sup>2/</sup> These features are being closed and/or relocated as part of the Runway 6L-24R and Runway 6R-24L RSA and Associated Improvements Project.

SOURCE: Federal Aviation Administration, *Advisory Circular 150/5300-13A, Airport Design*, September 28, 2012; Landrum & Brown, *Los Angeles International Airport, Airport Layout Plan*, 2005; Los Angeles World Airports, April 2013 (aerial photography); Ricondo & Associates, Inc., June 2014.  
PREPARED BY: Ricondo & Associates, Inc., May 2015.



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This alternative would also include removal of two approach light system (MALSR) stations and shift of light stations to the east coincident with existing light station locations to accommodate the proposed relocated runway end and approximate 550-foot displaced threshold. The two western-most stations including concrete pads would be removed. Towers, lights, and equipment control boxes and concrete pads would be removed. Concrete pads would be excavated and areas would be restored to pre-project conditions. Pending funding approval, FAA will replace the entire approach light system (towers, lights and equipment control boxes) for Runway 6R. New power and communication conduits would be installed using soil boring equipment instead of open trenches between the stations.

This alternative would also maintain the usable runway length (see Table 2-3). FAA Order JO 7110.65V, *Air Traffic Control*, states that for parallel runways separated by less than 2,500 feet (such as Runways 6L-24R and 6R-24L) that have runway thresholds greater than 500 feet apart from each other (i.e., if the runway ends are staggered more than 500 feet apart), aircraft departing Runway 24L may need to be held for three minutes after a heavy aircraft (Boeing 757 or larger) arrives on Runway 24R or departs from Runway 24L due to potential wake turbulence issues. This could effectively reduce the capacity of the north runway complex. Although this alternative could result in an operational impact to the airfield, it would maintain the usable length of the runway for departures and was retained for further consideration in this EA.

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## 2.3 RSA Alternatives Carried Forward for Evaluation

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**Table 2-4** summarizes the results of the alternatives screening evaluation. As stated above, the Runway 6R-24L Refinement #1, #7, and #8 Alternatives were carried forward for further analysis in this Draft EA, because of their ability to meet the three screening level criteria described in Section 2.2. Although the No Action alternative does not meet the purpose and need for the proposed project, it was retained for further consideration as required by 40 CFR § 1502.14(d) and paragraph 706(d) of FAA Order 5050.4B.

**Table 2-4: Summary of RSA Alternatives Screening Evaluation**

LOCATION	ALTERNATIVE	ALTERNATIVE PASS TO THE NEXT STEP			RETAINED FOR FURTHER ANALYSIS IN THE DRAFT EA?
		STEP 1	STEP 2	STEP 3	
<b>Off-Site/Operational Alternatives</b>	Use of Other Modes of Transportation	No			No
	Use of Other Public Airports	No			No
	Use of Alternative Aircraft	No			No
	No Action Alternative <sup>1/</sup>	No			Yes
	Construct Standard RSA Alternative	Yes	No		No
	Reduce Runway Length Alternative	Yes	Yes	No	No
	Declared Distances Alternative	Yes	Yes	No	No
	Relocate, Shift, or Realign the Runway Alternative(s)	Yes	No		No
<b>On-Site Alternatives</b>	Implement EMAS Alternative	Yes	No		No
	Refinement #1 Alternative	Yes	Yes	Yes	Yes
	Refinement #2 Alternative	No			No
	Refinement #3 Alternative	Yes	No		No
	Refinement #4 Alternative	No			No <sup>2/</sup>
	Refinement #5 Alternative	Yes	Yes	No	No <sup>2/</sup>
	Refinement #6 Alternative	Yes	Yes	No	No
	Refinement #7 Alternative	Yes	Yes	Yes	Yes
	Refinement #8 Alternative, Proposed Action Alternative	Yes	Yes	Yes	Yes

NOTE:

1/ Analysis of the No Action Alternative is required by 40 CFR § 1502.14(d).

2/ The Refinement #5 Alternative would have similar physical impacts as the Refinement #1 Alternative. Because Refinement #5 would result in greater operational impacts than Refinement #1 Alternative, it was dropped from further consideration.

SOURCE: Ricondo &amp; Associates, Inc., November 2014.

PREPARED BY: Ricondo &amp; Associates, Inc., November 2014.

### 2.3.1 SPONSOR'S PREFERRED ALTERNATIVE

The Proposed Action Alternative (Refinement #8 Alternative) for Runway 6R-24L includes a shift of the Runway 6R end by approximately 200 feet to the east and a displaced threshold of approximately 550 feet, a shift of the Runway 24L end by approximately 800 feet to the east with a displaced threshold of approximately 800 feet, and implementation of declared distances. The Proposed Action Alternative for Runway 6R-24L is depicted in Exhibit 2-15. The description of the Proposed Action Alternative that follows is subject to modification during final design, including surveys and FAA approvals. The primary components of the RSA improvements include:

- Runway 6R (West End)
  - Relocate the end of Runway 6R approximately 200 feet to the east and displace the threshold of Runway 6R approximately 550 feet;
  - Construct a blast pad 400 feet long and 280 feet wide;
  - Construct retaining wall and add fill graded to RSA standards;
  - Shift existing connector Taxiways E16 and E17 to the east;



- Construct new and rehabilitate existing runway and taxiway pavement, as needed in the areas of the improvements identified above, and modify airfield signage, lighting, and markings;
- Relocate navigation aids, including the glide slope antenna, and Precision Approach Path Indicators (PAPI);
- Installation of in-pavement Approach Lights in proposed pavement east of Pershing Drive and proposed retaining wall;
- Remove two approach light system (MALSR) stations and shift of light stations to the east coincident with existing light station locations to accommodate the proposed relocated runway end and approximate 550-foot displaced threshold;
  - o The two western-most stations including concrete pads would be removed. Towers, lights, and equipment control boxes and concrete pads would be removed. Concrete pads would be excavated and areas would be restored to pre-project conditions;
    - Relocate the "1,000-foot light bar" (supported by three separate towers) to a location immediately east of Pershing Drive (outside of the coastal zone). The northern and southern concrete pads which currently support the "1,000-foot light bar" would be excavated, removed, and restored to pre-project conditions. The central pad would be retained in order to support a new single-pole light station tower at this location; and
    - Pending funding approval, FAA will replace the entire approach light system (towers, lights, and equipment control boxes) for Runway 6R. To the extent possible, FAA will utilize the existing concrete pads. However, FAA will need to replace the existing concrete support pads at three light stations. One of the existing five-light steady burning stations would change to a single flasher light station. This change requires removal of the existing footing and five poles supporting each light and replacing it with a single pole and foundation along with a foundation for the power and controller boxes for the flasher station. The total amount of square footage at that station is expected to increase by one square foot. The overall amount of concrete footing in the California Coastal Zone will be reduced as a result of the proposed project
- Runway 24L (East End)
  - Shift Runway 24L endpoint by constructing approximately 800 feet of new runway pavement to the east. The landing threshold will remain in current location and pavement marked as a displaced threshold;
    - o Shift Taxiway E endpoint approximately 500 feet to the east with 400-foot separation from the Runway;
    - o Remove existing Taxiway E7 including the existing loop westbound that joins Taxiway V between Runways 24L and 24R;
    - o Construct new connector Taxiways E7 and E6;
    - o Construct new and rehabilitate existing runway and taxiway pavement, as needed in the areas identified above, and modify airfield signage, lighting, and markings. Several fatigue-cracked

panels (the first 250 feet of Runway 24L), would be replaced. Additionally, nine fatigue-cracked panels on Taxiway V immediately adjacent to the south edge of the runway, and two panels on Taxiway V directly adjacent to the northern edge of the runway, will also be replaced (approximately 6,875 square feet);

- Relocate the existing ILS Runway 6R Localizer Antenna to the east;
- Demolish and relocate existing Secure Area Access Post (SAAP) #3;
- Protect in place existing storm sewer and utilities;
- Relocate Air Operations Area (AOA) fence;
- Construct 400-foot long jet blast pad;
- Relocate taxicab holding/staging area and associated buildings;
- Implement declared distances;
- Extend and realign existing vehicle service road(s) south of Taxiway E, which will require closure of Alverstone Avenue and Davidson Drive as well as the adjacent parking lot (all of which are on airport property and currently closed to the public). Existing paved areas within the RSA may be removed and graded to RSA standards and paved with erosion control pavement; and
- Realign a portion of Davidson Drive to accommodate authorized vehicle access.

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## 2.4 Permits Required

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As required under paragraph 405d (4) of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures, Change 1*, a preliminary list of permits required for implementation of the Proposed Action Alternative is provided in **Table 2-5**.

**Table 2-5: Preliminary List of Permits Required for the Proposed Action**

ISSUING AGENCY	PERMIT NAME/TYPE
California State Water Quality Control Board	General Construction Storm Water Permit; and Standard Urban Stormwater Mitigation Plan (SUSMP)
Los Angeles Regional Water Quality Control Board	Water Discharge Requirements Application
Los Angeles Regional Water Quality Control Board	General National Pollutant Discharge Elimination System (NPDES) Stormwater permit under Section 402 of the Clean Water Act (CWA) for construction activities.
Los Angeles Regional Water Quality Control Board	General NPDES Stormwater permit under Section 402 of the CWA for industrial activities.
California Department of Transportation	Amended/Corrected Airport Permit, in accordance with California Code of Regulations (CCR), Title 21 §3530

SOURCE: Ricondo & Associates, Inc., July 2014.

PREPARED BY: Ricondo & Associates, Inc., July 2014.

## 2.5 Federal Laws and Regulations Considered

In accordance with FAA Order 1050.1E, Paragraph 405(d)(4), the relevant federal laws and statutes, executive orders, and other federal regulations considered during preparation of this EA are listed in **Table 2-6**, **Table 2-7**, and **Table 2-8**, respectively.

**Table 2-6 (1 of 2): Federal Laws and Statutes Considered**

	CITATION
National Environmental Policy Act of 1969	42 U.S.C. 4321 <i>et seq.</i>
Clean Air Act of 1970, as amended	42 U.S.C. 7401 <i>et seq.</i>
Department of Transportation Act of 1966, Section 4(f)	49 U.S.C. 303(c)
Vision 100 – Century of Aviation Reauthorization Act of 2003	49 U.S.C. 40101
Airport and Airway Improvement Act of 1982, as amended	49 U.S.C. 47101 <i>et seq.</i>
Airport and Airway Revenue Act of 1987	P.L. 100-223, Title IV
National Environmental Policy Act of 1969	42 U.S.C. 4321 <i>et seq.</i>
Clean Air Act of 1970, as amended	42 U.S.C. 7401 <i>et seq.</i>
Department of Transportation Act of 1966, Section 4(f)	49 U.S.C. 303(c)
Vision 100 – Century of Aviation Reauthorization Act of 2003	49 U.S.C. 40101
Airport and Airway Improvement Act of 1982, as amended	49 U.S.C. 47101 <i>et seq.</i>
Airport and Airway Revenue Act of 1987	P.L. 100-223, Title IV

**Table 2-6 (2 of 2): Federal Laws and Statutes Considered**

	<b>CITATION</b>
Community Environmental Resource Facilitation Act	42 U.S.C. §9601, <i>et seq.</i>
Policy on Lands, Wildlife and Waterfowl Refuges, and Historic Sites	49 U.S.C. § 303 [formerly known as Section 4(f) of the Department of Transportation Act of 1966]
Section 201(a), Federal Land Policy and Management Act of 1976	43 U.S.C. § 1701, <i>et seq.</i> ; P.L. 94-579
The Archaeological and Historic Data Preservation Act of 1974	P.L. 86-253, as amended by P.L. 93-291, 16 U.S.C. § 469
The Noise Control Act of 1972	P.L. 92-574; 42 U.S.C. § 4901
The Transportation, Treasury, Housing and Urban Development, the Judiciary, The District of Columbia, and Independent Agencies Appropriations Act of 2006	P.L. 109-115
Airport Noise and Capacity Act of 1990	49 U.S.C. 4752 <i>et seq.</i>
Aviation Safety and Noise Abatement Act of 1979	49 U.S.C. 47501 <i>et seq.</i>
Aviation Safety and Capacity Expansion Act of 1990	49 U.S.C. App. 2226
Subtitle VII, Title 49, U.S.C. – “Aviation Programs” recodified from, and formerly known as, the “Federal Aviation Act of 1958” as amended (P.L. 85-726)	49 U.S.C. 40101 <i>et seq.</i>
Endangered Species Act of 1973	16 U.S.C. 1531 <i>et seq.</i>
Fish and Wildlife Coordination Act of 1958	16 U.S.C. 661 <i>et seq.</i>
Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended	16 U.S.C. 1801 <i>et seq.</i>
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Community Environmental Response Facilitation Act of 1992	42 U.S.C. 6901 <i>et seq.</i>
Resource Conservation and Recovery Act of 1976, as amended by the Solid Waste Disposal Act of 1980	42 U.S.C. 6901 <i>et seq.</i>
Section 106, National Historic Preservation Act of 1966, as amended	16 U.S.C. 470 <i>et seq.</i>
Archaeological and Historic Preservation Act of 1974, as amended	16 U.S.C. 469 <i>et seq.</i>
Land and Water Conservation Fund Act of 1965	16 U.S.C. 4601 <i>et seq.</i>
Section 404, Federal Water Pollution Control Act of 1972, as amended (commonly referred as the Clean Water Act), as amended by the Clean Water Act of 1977	33 U.S.C. 1251 <i>et seq.</i> , 33 U.S.C. § 1251; P.L. 95-217
Rivers and Harbors Act of 1899, Section 10	33 U.S.C. 403 <i>et seq.</i>
Farmland Protection Policy Act	7 U.S.C. 4201 <i>et seq.</i>
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970	42 U.S.C. 4601 <i>et seq.</i>
Wild and Scenic Rivers Act of 1968	16 U.S.C. 1271 <i>et seq.</i>
Toxic Substances Control Act	15 U.S.C. 2601 <i>et seq.</i>
Coastal Zone Management Act of 1972	16 U.S.C. 1452 <i>et seq.</i>
Oil Pollution Control Act of 1990	33 U.S.C. 2701 <i>et seq.</i>

SOURCE: Ricondo &amp; Associates, Inc., July 2014.

PREPARED BY: Ricondo &amp; Associates, Inc., July 2014.



**Table 2-7: Executive Orders Considered**

	CITATION
Executive Order 11593, Protection and Enhancement of the Cultural Environment	36 Federal Register (FR) 8921
Executive Order 11988, Floodplain Management	43 FR 6030
Executive Order 11296, Flood Hazard Evaluation Guidelines	31 FR 10663
Executive Order 11514, Protection and Enhancement of Environmental Quality (dated March 4, 1970)	35 FR 4247
Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency	65 FR 50121
Executive Order 11990, Protection of Wetlands	42 FR 26961
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	59 FR 7629
Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks	62 FR 19883

SOURCE: Ricondo & Associates, Inc., July 2014.

PREPARED BY: Ricondo & Associates, Inc., July 2014.

**Table 2-8 (1 of 2): FAA Orders, Advisory Circulars, and Federal Regulations Considered****U.S. DEPARTMENT OF TRANSPORTATION AND FAA ORDERS**

U.S. Department of Transportation (DOT), FAA Order 1050.1E: *Environmental Impacts: Policies and Procedures*

U.S. DOT, FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*

U.S. DOT, FAA Order 5200.5A, *FAA Guidance Concerning Sanitary Landfills On or Near Airports*

U.S. DOT, FAA Order 5200.8, *Runway Safety Area Program*

U.S. DOT, FAA Order 5200.9, *Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Materials Arresting Systems*

U.S. DOT, Order 5650.2: *Floodplain Management and Protection*

U.S. DOT Order 5610.1C, *Procedures for Considering Environmental Impacts* (44 FR 56420, October 1, 1979) and Order DOT 5610.1C, *Change 1* (July 13, 1982)

U.S. DOT, Order 5660.1A: *Preservation of the Nation's Wetlands*

U.S. DOT, Order 5680.1: *Final Order to Address Environmental Justice in Low-Income and Minority Populations*

U.S. DOT, FAA Joint Order 7110.65V, *Air Traffic Control*

**FAA Advisory Circulars**

U.S. DOT, FAA Advisory Circular (AC) A/C 91-53A, *Noise Abatement Departure Profile*

U.S. DOT, FAA AC 150/5020-1: *Noise Control and Compatibility Planning for Airports*

U.S. DOT, FAA AC 150/5070-6B, *Airport Master Plans*

**Table 2-8 (2 of 2): FAA Orders, Advisory Circulars, and Federal Regulations Considered****U.S. DEPARTMENT OF TRANSPORTATION AND FAA ORDERS**

U.S. DOT, FAA AC 150/5070-7, *Airport System Planning Process*

U.S. DOT, FAA AC 150/5200-33B: *Hazardous Wildlife Attractants on or near Airports*

**U.S. Department of Transportation and FAA Orders**

U.S. DOT, FAA AC 36-3H: *Estimated Airplane Noise Levels in A-Weighted Decibels*

U.S. DOT, FAA AC 150/5300-13A: *Airport Design*

U.S. DOT, FAA AC 150/5320-6E, *Airport Pavement Design and Evaluation*

U.S. DOT, FAA AC 150/5370-10F: *Standards for Specifying Construction of Airports*

**Code of Federal Regulations**

Title 7 CFR Part 657 (43 FR 4030, January 31, 1978), *Prime and Unique Farmlands*

Title 14 CFR Part 36, *Noise Standards Type and Airworthiness Certificates*

Title 14 CFR Part 71: *Designation of Class A, Class B, Class C, Class D, and Class E Airspace Areas; Airways; Routes; and Reporting Points*

Title 14 CFR Part 75, *Establishment of Jet Routes and Area High Routes*

Title 14 CFR Part 77: *Objects Affecting Navigable Airspace*

Title 14 CFR Part 135: *Operating Requirements: Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft*

Title 14 CFR Part 139, *Airport Operations Specifications*

Title 14 CFR Part 150: *Airport Noise Compatibility Planning*

Title 14 CFR Part 151, *Federal Aid to Airports*

Title 14 CFR Part 152, *Airport Aid Program*

Title 14 CFR Part 153, *Acquisition of U.S. Land for Public Airports*

Title 14 CFR Part 154, *Acquisition of U.S. Land for Public Airports under the Airport and Airway Development Act of 1970*

Title 14 CFR Part 155, *Release of Airport Property from Surplus Property Disposal Restrictions*

Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*

Title 14 CFR Part 169, *Expenditures of Federal Funds for Non-Military Airports or Air Navigational Facilities Thereon*

Title 36 CFR Part 800 (39 Federal Register [FR] 3365, January 25, 1974, and 51 FR 31115, September 2, 1986), *Protection of Historic Properties*

Title 40 CFR Part 93: *Determining Conformity of Federal Actions to State or Federal Implementation Plans, Subpart B*

Title 40 CFR Part 122: *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*

Title 40 CFR Part 123: *State Program Requirements*

Title 40 CFR Part 124: *Procedures for Decision making*

Title 40 CFR Part 172: *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements*

Title 40 CFR Parts 1500-1508: *President's Council on Environmental Quality*

Title 49 CFR Part 24 (March 2, 1989), *Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs*

SOURCE: Ricondo & Associates, Inc., July 2014.

PREPARED BY: Ricondo & Associates, Inc., July 2014.