



December 7, 2022

Honorable Members of the Los Angeles City Council  
Los Angeles Board of Airport Commissioners

**Re: Industrial, Economic and Administrative Survey of the Los Angeles World Airports**

As required under City Charter Section 266(a), the Los Angeles City Controller, the Office of the Mayor and the Los Angeles City Council shall regularly conduct an Industrial, Economic and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) by an independent qualified organization.

Representatives from the Mayor's Office, City Council and Controller's Office (Joint Administrators) selected KH Consulting Group (KH) to conduct the 2022 IEA Survey of LAWA. For the 2022 IEA survey, the Joint Administrators identified several objectives and focused heavily on LAWA's response and ongoing recovery from the pandemic, capital project management, long-term strategic planning and understanding LAWA's impact on historically disadvantaged communities. The attached "IEA Survey of the Los Angeles World Airport" is KH's final report addressing these objectives.

If you have any questions about the report, please contact Devang Panchal, Director of Auditing, at (213) 978-7388 or [devang.panchal@lacity.org](mailto:devang.panchal@lacity.org).

Sincerely,

RON GALPERIN  
City Controller

ERIC GARCETTI  
Mayor

PAUL KREKORIAN  
City Council President

cc: Honorable Michael Feuer, City Attorney  
Andre Herndon, Chief of Staff, Office of the Mayor  
Justin Erbacher, Chief Executive Officer, LAWA  
Sharon Tso, Chief Legislative Analyst  
Matt Szabo, City Administrative Officer  
Holly L. Wolcott, City Clerk

# Industrial, Economic and Administrative Survey of the Los Angeles World Airports



**RON**  **GALPERIN**  
LA CONTROLLER



# 2022



LOS ANGELES WORLD AIRPORTS

## Industrial, Economic, and Administrative (IEA) Survey Final Report December 2022



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## TRANSMITTAL LETTER

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December 2, 2022

**Attn.:** The Honorable Mayor Eric Garcetti, Office of the Mayor  
The Honorable Ron Galperin, City Controller, Office of the Controller  
Ms. Sharon Tso, Chief Legislative Analyst (CLA), Office of the CLA

***Re.: Industrial, Administrative, and Economic (IEA) Survey of Los Angeles World Airports***

KH Consulting Group (KH) is pleased to present the Final Report of the 2022 Industrial, Administrative, and Economic (IEA) Survey of Los Angeles World Airports (LAWA).

We thank the Joint Administrators who worked diligently with our KH Consulting Group (KH) team to review our findings, recommendations, and input from LAWA management, and think strategically about what is in the best interest of LAWA and Angelenos:

- Oswin Chan, Internal Auditor, Audit Services Division, Office of the City Controller
- David Ou, Director of Economic Infrastructure, Office of the Mayor
- Tristan Noack, Legislative Analyst, Office of the Chief Legislative Analyst, representing the City Council

We appreciate the time and effort of LAWA's management, staff, and assigned liaisons. The liaisons coordinated our work efforts with the various lines of business at LAWA. They diligently helped to find needed documents, set up interviews, and served as valuable sounding boards:

- Tatiana Starostina, Chief Financial Officer – Executive Lead
- Amanda E. Dyson, CIA, CFE, CGFM, CM-AAAE, Director of Internal Audit
- Thierry Sarr, CM, former Senior Airport Planner – Airport Affairs
- Grant G. Firestone, Special Projects Coordinator, Office of the Chief Executive Officer (CEO)

Finally, our KH team members brought a breadth of airport and airline operations expertise, combined with in-depth knowledge of government management practices, finance, capital projects, public health, equity, and greater Los Angeles to the project.

- Robert (Bob) Schilling, MPA, KH Vice President, Project Manager
- Charlotte Maure, MPA, KH Vice President, Project Manager
- Thai V. Le, Ph.D., KH Consultant, focusing on equity and historically disadvantaged communities



- Charles Wall, Director of Aviation and Senior Project Manager, IEA Inc., focusing on for capital projects
- Cameron (Cam) F. Koblish, MBA, airport and airline subject matter expert, focusing on capital projects
- S. Darryl Boyd, PE, C.M., Aviation Project Manager, IEA Inc., focusing on for capital projects
- James "Rick" Greenwood, Ph.D., MPH, University of California at Los Angeles (UCLA) Fielding School of Public Health, focusing on impact of COVID-19 from a public health perspective
- Hubert Horan, MBA, Horan Aviation, focusing on aviation economics and finance
- Terry Matsumoto, CPA, MBA, Matsumoto Consulting LLC, focusing on finance



We wish LAWA and the City of Los Angeles the best in addressing these change initiatives in making its airports world-class.

Sincerely,

A handwritten signature in blue ink, appearing to read 'GKH'.

Gayla Kraetsch Hartsough, Ph.D.  
President, KH Consulting Group

Attachment: 2022 LAWA IEA Survey Report





## EXECUTIVE SUMMARY

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Pursuant to Charter Section 266, the Los Angeles City Offices of the Controller, Chief Legislative Analyst (CLA), and Mayor retained KH Consulting Group (KH) to conduct an Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) in March 2022. The Offices of the Controller, CLA, and Mayor each appointed a Joint Administrator to oversee the IEA Survey.

### HIGHLIGHTS

The City of Los Angeles Department of Airports, commonly called Los Angeles World Airports (LAWA), manages and operates Los Angeles International Airport (LAX) and Van Nuys Regional Airport (VNY). Under the oversight of a seven-member Board of Airport Commissioners (BOAC), LAWA is financially self-supporting, without appropriations from the City Council. LAWA currently has approximately 3,700 employees.

LAWA has many strengths. It was skillful and responsive during to the COVID-19 pandemic. It has made noteworthy progress on massive capital projects that will transform the ways passengers and visitors access LAX. It has embraced Leadership in Energy and Environmental Design (LEED standards) in technological innovations in its capital projects.

The most important IEA Survey Report recommendations are for LAWA to:

- ***Take a larger role in viral disease preparedness, prevention, and response.*** LAWA should take a larger role in planning for viral epidemics and pandemics, especially in light of COVID-19. Other viral diseases can and likely will be brought to Los Angeles by incoming passengers. At a minimum, LAWA should retain an epidemiologist or public health planner with a background in infectious diseases to coordinate with the Los Angeles County Department of Public Health (LACDPH) in response planning. LAWA should also work with the Bureau of Sanitation and LACDPH to implement wastewater surveillance for the early detection of viral diseases entering through LAX.
- ***Successfully launch the Landside Access Modernization Program (LAMP).*** LAMP consists of multiple projects to deliver an Automated People Mover (APM), consolidated car rental facility (ConRAC), and other facilities. LAMP will fundamentally change how the public accesses and moves within LAX. At a projected cost of \$5.5 billion, it is essential for LAWA to maximize the value and use of LAMP, starting with smooth implementation. LAWA has one chance to get its launch right and earn essential public support. Operational readiness, combined with effective wayfinding, are critical to both the project's success, both internally and in the eyes of the public

- **Extend the long-range asset management plan.** At \$15 billion, LAWA’s Capital Improvement Program (CIP) is the largest public works program in the history of the City of Los Angeles. Asset management planning is important to maintain and extend the useful life of LAWA’s facilities. LAWA currently has a 10-year asset renewal plan, which it should extend to 30 years to address planned renovation and replacement cycles. LAWA’s CIP should be a rolling 10-year plan.
- **Extend and expand initiatives to mitigate noise and air quality impacts.** LAWA must continue and expand its environmental initiatives, especially related to noise levels and air quality in historically disadvantaged communities. To be most effective, LAWA’s outreach efforts require a new model for community engagement, including assessment of the quality of the engagement and decisions made based on that engagement. LAWA should also expand its engagement in emerging technologies that promise to reduce its own and the airlines’ carbon footprint.
- **Expand efforts to contract with local and underrepresented vendors.** LAWA should continue and expand its economic benefits (as outlined in a recent City directive) to identify multi-pronged strategies that equitably 1) lower barriers to participation (e.g., unbundling large contracts and exploring set-asides) and 2) increase the capacity and resources of local and underrepresented vendors.
- **Consolidate auditing.** With appropriated funding for operating expenses of \$910 million for Fiscal Year (FY) 2021-2022, LAWA is too big to underfund its audit functions. LAWA currently has a total of 7 auditors and plans to hire 2 more. This staffing level is insufficient. The three audit units report to two different individuals. LAWA should establish an audit division that integrates department-wide audit functions. The Audit Division should report directly to the Chief Executive Officer (CEO) with a dotted-line reporting relationship to the BOAC Audit Committee. The Audit Division should prepare annual audit plans that assess risks and set audit priorities for the BOAC Audit Committee’s review. Routine follow-up on audit recommendations is also required.

This IEA Survey Report is divided into two volumes, discussed next.

## Volume I: COVID-19 Impact, Capital Projects, and Management Practices

- A – COVID-19 Impact from a Public Health Perspective
- B – COVID-19 Impact on LAX’s Operations & Finances
- C – Capital Project Management and Cost Controls
- D – Management Practices

## Volume II: Equity and Historically Disadvantaged Communities

- A – Equity Framework and Initiatives
- B – Disadvantaged Communities Surrounding LAWA Airports
- C – Environment (Planet)
- D – Economic (Prosperity)
- E – Empowerment (People)
- F – Recommendations



## VOLUME I – COVID-19 IMPACT, CAPITAL PROJECTS, AND MANAGEMENT PRACTICES

Volume I outlines progress made at LAWA since the 2016 IEA Survey and its responses to the COVID-19 pandemic. The audit years are from the last IEA Survey in 2016 and span January 1, 2017, through June 30, 2022, with an emphasis on pre-COVID-19 (2019) and during COVID-19 (2020, 2021, 2022).

### Part A – COVID-19 Impact from a Public Health Perspective

#### FINDINGS

**Prior prevention and preparation.** Emergency management follows four phases, starting with prevention. Prior to COVID-19, LAWA was less focused on prevention. Moreover, its existing plans were less relevant due to the unique nature of COVID-19 – a challenge faced across the world. Consequently, COVID-19 overwhelmed both prevention and preparation strategies across the globe.

**Response.** LAWA showed creativity and commitment in addressing the crisis. LAWA executives' response was rapid and well communicated, engaging all of its senior executives and working collaboratively with other agencies.

LAWA faced challenges that were shared nationally, including:

- Conflicting information that was not always suited to an airport community, which created challenges in identifying the most helpful policies and procedures
- Supply shortages at the onset of COVID-19
- Collaborating with and assisting fellow agencies while dealing with conflicting policies and procedures
- Rapidly preparing safety protocols, teleworking schedules, and modified physical spaces for employees, contractors, and partners

LAWA also developed and implemented best-practice health responses, including:

#### Emergency Management Cycle





- Its "COVID-19 Enhanced Sanitizing and Disinfecting Protocols" playbook, which earned industry accreditations
- LAWA's onsite COVID-19 rapid test lab at LAX

LAWA encountered unanticipated problems, including:

- Initially inadequate quarantine capacity for sick and COVID-19 infected passengers
- The requirement for LAWA to report COVID-19 cases to LACDPH while dependent on voluntary reports from airlines and other partners for the information

***Current preparedness and planning.*** LAWA is currently planning for preparedness and recovery. It has completed an Infectious Diseases Response Plan (February 2021). As early as April 2020, LAWA recognized the importance of recovery efforts with a proposed framework for discussion.

## RECOMMENDATIONS

COVID-19 was a defining moment in aviation history. Its impact on air travel was more dramatic and longer lasting than any other event since 1945, including 9/11, World War II, and all postwar recessions. Moreover, COVID-19 is not over, and other viral diseases that affect air travel are likely to occur in the future.

As recently as October 2022, the Federal government required five U.S. airports to screen passengers originating in or transiting through Uganda for the Ebola virus. The next Presidential alert could involve potentially infected passengers entering the United States through LAX.

Because the air travel industry is likely to be central in future viral pandemic spread, the industry will be central in identifying and deploying resources for prevention, preparation, and response. LAWA is the City's gateway for international and domestic air travel to Southern California.

LAWA's response must be analogous to its mobilization after 9/11 to reduce the threat of terrorist activity. Failure to plan for contagious diseases would be comparable to LAWA's saying that the Federal Bureau of Investigation (FBI) and Los Angeles Police Department (LAPD) are taking care of terrorist threats at LAX, so deterrent planning is beyond LAWA's scope. There is no doubt that those agencies are key players with central responsibilities. There is also no doubt that having LAWA staff focus on terrorist response is required. In response to 9/11, LAWA consolidated its airport police functions at LAX, VNY, and ONT and created an executive-level position to oversee them and coordinate efforts with Federal and local authorities.

LAWA must learn from what happened with COVID-19 to better protect LAX passengers and workers and the people of Los Angeles. LAWA's actions cannot prevent another pandemic from





happening. They will enable LAX to have more effective responses, strong working relationships with its Federal and local partners, and reduced disease transmission rates related to LAX. Key KH recommendations are:

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**A larger role in viral infection preparation and response**

KH recognizes that acting as a coordinator in the prevention of and preparation for aviation-related health emergencies has not been a traditional responsibility for LAWA. As with security threats, however, a changing world requires new responses. LAWA must start by taking a more active role in ensuring that all involved agencies learn from recent events and use that learning to reduce the likelihood and impact of future pandemics that are likely to affect passengers at LAX and VNY.

LAWA must take the necessary steps to ensure that the Centers for Disease Control and Prevention (CDC), LACDPH, and other organizations are fully prepared with contingency plans and contracts. “We did not know...” was accurate for all agencies dealing the COVID-19 pandemic in 2019. Now we do know, and LAWA must ensure complete preparation and plans are in place that can be implemented. LAWA must take prudent and reasonable actions to reduce the risk of potentially catastrophic viral disease impacts on both public health and LAWA’s finances caused by health emergencies.

***LAWA executives should take a larger role in preparing for future viral infections that enter through LAX.*** This larger role should involve 1) actively engaging industry groups to advocate for funding and support by the Federal Aviation Administration (FAA) and 2) continuing to build relationships with the CDC to improve the ability to identify and respond to viral and other pandemics.

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**Epidemiology expertise**

LAWA should expand its Emergency Management Division (EMD) responsibilities to explicitly include management of public health and pandemics. LAWA should also retain the services of an epidemiologist or public health planner with a background in infectious diseases. This incumbent should:

- Oversee prevention, preparation, and response to health threats
  - Collaborate with national and international public health officials to learn about potential threats
-

- 
- Work with LAWA colleagues to support the maintenance, management, design, construction, and modification of facilities to minimize potential spread of contagious diseases
- 

## **Wastewater surveillance**

LAWA should work with LACDPH and the City's Bureaus of Sanitation and Engineering to identify an efficient means for conducting wastewater surveillance, a recognized early-detection public health practice.

For example, using a high-level surveillance method for incoming flights, the process identified the new COVID-19 Omicron strains at Frankfurt Airport, which helped contain its spread in Germany.

Such early detection at airports, especially major hub airports (such as LAX) for connecting flights within the United States and abroad, is vital. Airports are a common vector for the spread of a virus.

## **Expansion of planning and preparation efforts**

LAWA's recent capital projects incorporate advanced technology and design concepts. Future capital projects should consider disease prevention and containment, including evolving advanced HVAC technology, terminal design (e.g., Changi Airport's Terminal 5 in Singapore), quarantine areas, laboratory and immunization areas, wastewater testing, and health inspection checkpoints.

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## **Part B – COVID-19 Impact on LAX's Operations and Finances**

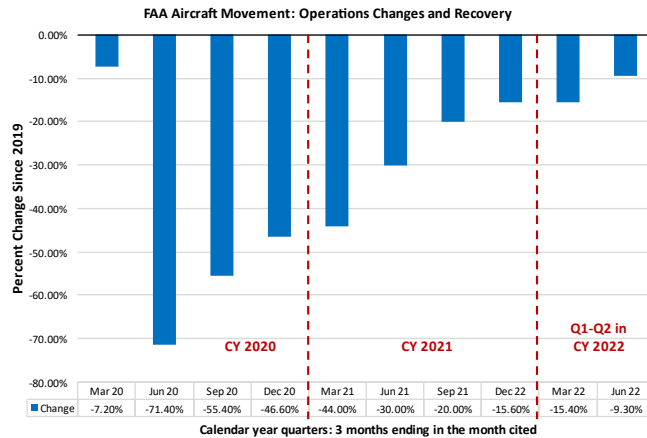
In 2020, LAWA's aviation statistics were dramatically affected by the COVID-19 pandemic. The number of passengers flying in and out of both airports dropped by 60 million passengers – from 88 million in 2019 to 28 million in 2020.



## LAX Airport Operations

Airport “operations” is measured by flights landing and taking off, including both passenger and cargo planes. This FAA aircraft movement includes air carriers, air taxis, general aviation, and military operations. In comparison to pre-COVID-19 levels in 2019, LAX airport operations rebounded from –71.4% in the quarter ending June 2020 to –9.3% in the quarter ending June 2022.

## LAX Airport Operations Changes, By Quarter, in Comparison to Pre-COVID-19 (CY2019)

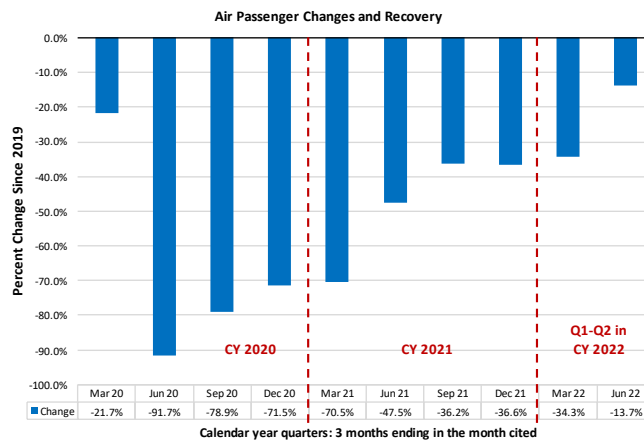


Source: LAWA’s Traffic Comparison (TCOM) report published at LAWA.org; data aggregated by quarter.

## LAX Air Passenger Traffic

In comparison to pre-COVID-19 levels in 2019, LAX air passenger traffic rebounded from –91.7% in the quarter ending June 2020 to –13.7% in the quarter ending June 2022.

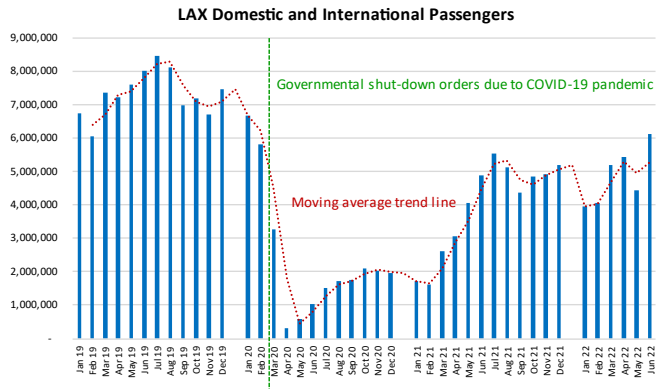
## LAX Passenger Changes, By Quarter, in Comparison to Pre-COVID-19 (CY2019)



Source: LAWA’s Traffic Comparison (TCOM) report published at LAWA.org; data aggregated by quarter.

## LAX Domestic and International Passengers (January 2019 through June 2022)

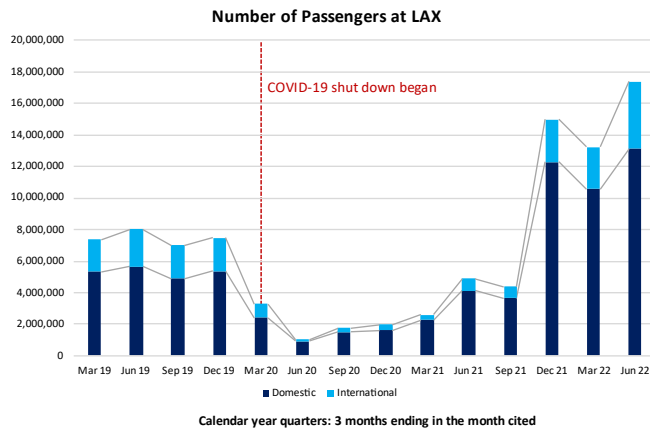
Air passenger traffic is recovering month-to-month but has a large gap to close from pre-COVID-19 pandemic levels in 2019. In June 2022, LAWA officials reported that, for the first time since January 2020, more than 6 million passengers passed through LAX.



Source: LAWA's Traffic Comparison (TCOM) report published at LAWA.org.

Domestic air passenger traffic began to recover in the quarter ending September 2021; however, international air passenger traffic did not begin to recover until December 2021.

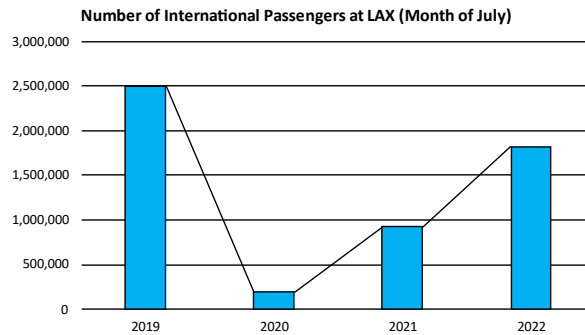
## Domestic and International Passenger Comparisons, By Quarter Ending (March 2019 Through June 2022)



Source: LAWA's Traffic Comparison (TCOM) report published at LAWA.org; data aggregated by quarter.

In July 2022, LAX reached the highest international air passenger level since the COVID-19 pandemic began. The bar graph (right) shows the changes in the number of international passengers for July 2019, 2020, 2021, and 2022. International air passenger numbers were 2.5 million in July 2019 and dropped to 191,781 by July 2020.

**Number of International Passengers  
(July 2019, 2020, 2021, 2022)**



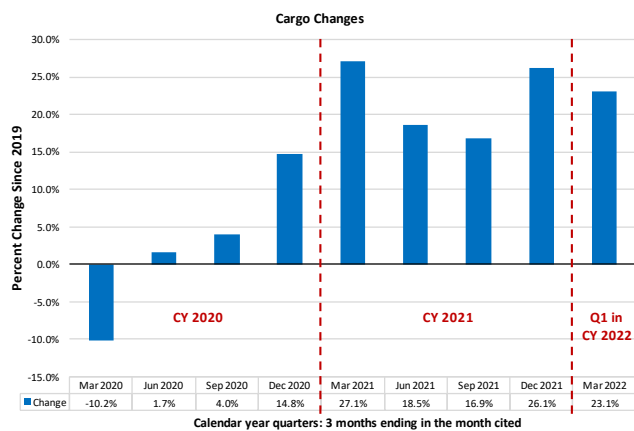
Source: LAWA's Traffic Comparison (TCOM) report published at LAWA.org.

The number of international air passengers increased in 2021, but at a slower pace because of international lock downs, especially in China and Japan along with Australia and New Zealand. As of July 2022, international air traffic remained below FY2019 levels but were increasing: 1.8 million international travelers in July 2022 – representing almost double the number in July 2021.

## Air Cargo

Cargo tonnage had faced a decline between 2018 and 2019. In contrast to air passenger traffic, air cargo levels began to grow at the onset of the COVID-19 pandemic.

**LAX Air Cargo Tonnage Changes, By Quarter,  
in Comparison to Pre-COVID-19 (CY2019)**



Source: Underlying statistics from LAWA's Traffic Comparison report published in the Investor Relations section of its website.



## FINANCIAL IMPACT

A quick overview of LAWA's financials show that:

- Operating revenues in FY2021 were down significantly (–\$465 million or –31%) compared to FY2019, largely due to reduced air passenger traffic that affected concession revenue and landing fees.
- Non-operating revenues in FY2021 were also down significantly (–\$280 million or –73%) because of revenue sources sensitive to air passenger traffic and reduced investment/interest income.

## LAWA'S RESPONSE

In response, LAWA executives:

- Imposed a hiring freeze
- Implemented a separation incentive program
- Launched other expense reduction measures that helped bring total operating expenses in FY2021 to levels similar to FY2019
- Obtained a Federal Coronavirus Aid, Relief, and Economic Security (CARES) Act (2020) grant for LAX that stabilized airline landing fees at sustainable levels

Total operating expenses in FY2021 were similar to FY2019.

## REVENUE BONDS

Starting in January 2021, LAWA developed four Official Statements to raise a combined total of more than \$1.8 billion in revenue bonds. LAWA's Official Statements set forth the financial requirements and risk factors for major capital expenditures for current projects. In any large organization, the central focus of long-term strategic planning is to protect financial health. At LAWA, this focus requires assessment of major "Profit and Loss" (P&L) issues, such as the ongoing alignment of revenues and expenses, and capital spending. Also important are financial obligations and strategic priorities.

## INDUSTRY TRENDS

As already noted, by May 2022, domestic travel was on the rebound, although International travel had not yet returned to pre-COVID-19 levels. Business travel – the mainstay of major airlines profit margins – may be affected now that businesses have partially transitioned to virtual meetings. Questions remain as to when international traffic, especially from Asia, and business travel will fully recover.

LAWA benefits from multiple market factors:

- Los Angeles is a place people want to visit or live, making it a major destination city for air passengers.



- LAX has a strong mix of airlines with no single air carrier dominating.
- Domestic travel is recovering. Americans have a greater propensity to use air travel now that COVID-19 vaccinations and boosters are available, and they feel comfortable flying.

Air traffic in Los Angeles is expected to surge as the 2028 Olympics in Los Angeles approach. LAWA is focusing on extensive airport infrastructure expansion to handle the expected surge in demand, discussed next.

## Part C – Capital Project Management and Cost Controls

At the time of the COVID-19 outbreak, LAX was in the midst of multiple major capital projects. During the COVID-19 pandemic, LAX continued with these projects to renew and rebuild its runways, taxiways, terminals, and airport access infrastructure.

### FINDINGS

LAWA nominated capital projects, which the Joint Administrators approved, for the KH team to review. Each of these projects had different delivery models.

#### Projects Reviewed and Delivery Models Used at LAWA



***Landside Access Modernization Program (LAMP)*** consists of the Consolidated Rental Automobile Center (ConRAC), two new Intermodal Transportation Facilities (ITF East and West), a connection to L.A. Metro’s Crenshaw extension, and an Automated People Mover (APM) that will connect the new facilities to the Central Terminal Area. These LAMP major projects use complex private partnerships as a method of delivery via a design/build/ finance/operate/maintain delivery model. LAWA is transferring significant construction and operations risks for LAMP to its private partners. KH conducted a high-level review of LAMP.



**Bradley West Gates** is a design/build delivery model. Airlines began using Bradley West Gates in May 2021, although demand at the terminal was reduced by COVID-19-related depressed air travel. Five international airlines have passengers check-in at the Tom Bradley International Terminal (TBIT) while using Bradley West Gates for departures and arrivals. Four other airlines have passengers check-in at Terminal 1.5 and board buses to Bradley West Gates. Prior to the opening of Bradley West Gates, these airlines were housed at either Terminal 5 or Terminal 6.

## Projects Reviewed and Delivery Models Used at LAWA



**Terminal 1.5** is a tenant alteration project managed by Southwest Airlines. LAWA has undertaken similar approaches to modernizing other terminals with airlines, including American, United, and Delta. Again, LAWA has transferred construction and some operational risks to the airline most affected by the new construction.



**Taxiway P** is a design/bid/build project. The new taxiway replaced one that was lost in the construction of Bradley West Gates. LAWA pursued opportunities to reduce cost and successfully managed complex construction phasing during the course of the project. LAWA worked with its airline partners in Terminal 4 and Terminal 5 since Taxiway P served 12 gates at LAX. This project was completed slightly ahead of schedule.

LAWA's capital program management is well-developed and represents a strong governance system. LAWA delivered the three capital construction projects – Bradley West Gates, Terminal 1.5, and Taxiway P – on time and on budget, allowing for normal changes due to field conditions and unforeseen circumstances.

LAWA now has a 10-year Capital Improvement Plan (CIP) for 2018-2028 with plans to initiate a new CIP for FY2023-2029. It has prepared a 10-year asset renewal forecast for its facilities, totaling \$580 million through 2032 with an uptick around the time of the 2028 Olympics.

### STRENGTHS

LAWA's capital projects have:

- Won multiple awards for excellence
- Embedded sustainability and LEED certification as a central component of new capital projects
- Leveraged technological advancements and passenger experience expected at world-class airports
- Optimized functional value, maintainability, and useful life in the design and construction of new capital projects
- Incorporated equity in terms of job creation and contracting opportunities into its planning and construction

## RECOMMENDATIONS

KH's recommendations cluster into the following areas:

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**Maximizing the Value  
and Public's Use of  
LAMP: Wayfinding**

***Public perception of the success of LAMP and terminal renovations will hinge on wayfinding.*** Despite how advanced or capable the new systems and facilities may be, if LAX guests cannot easily and confidently navigate them, these exceptionally large capital programs run the risk of being labeled as failures.

Given the importance of the successful launch of LAMP, the 2022 IEA Survey emphasizes the importance of improved wayfinding at LAX. During the next 18 to 24 months, LAWA will undergo a dramatic change in how people access and move within LAX. LAMP will dramatically transform LAX from a traditional vehicular-centric access system to a complex multimodal system of vertical and horizontal people movers.

While these improvements hold the promise of dramatically reducing vehicular congestion in the Central Terminal Area (CTA), they will present new challenges to the individuals who use them. LAX guests will be faced with new trains, escalators, elevators, moving sidewalks, and L.A. Metro stations. Providing passengers with clear guidance to help them to navigate these new facilities will be an important challenge for LAWA. LAWA has begun efforts in this area; they should be continued and expanded.

The scale of LAMP improvements at LAX makes clear directions important. For example, the ConRAC facility will contain approximately 6 million square feet of space, which will require exceptionally clear directions for patrons. Similarly, the Airport Metro Connector (AMC) station and ITF-West will present new dimensions of connectivity as well as directional challenges. All these new facilities need a uniform, integrated approach to wayfinding.

At least in the early stages, signs and wayfinding technology may need to be supplemented by airport staff, who can offer reassurance to guests who become lost or confused. LAX has used Airport Ambassadors for this function in the past and should consider a larger and stronger cadre to support the opening of LAMP.

LAWA should strengthen and integrate functions responsible for wayfinding throughout the LAX campus so that there is a single point of ownership and accountability within the Maintenance and Operations Group for the function.

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## Maximizing the Value and Public's Use of LAMP: Operational Readiness

In addition to a strong wayfinding function, the opening of the new facilities at LAX should be accompanied by the most rigorous preoperational testing and preparation possible. As stated previously, public perception of the success of these massive investments will hinge critically on their operations in the first 90 days after public opening. There can be no greater priority for LAWA than the absolute assurance that the new systems work reliably and well, and that guests find them friendly and easy to use.

LAWA currently has a core unit in its Maintenance and Operations group that has designed promising operational readiness testing programs for the new facilities. This effort should be strongly supported and provided with all of the resources needed to ensure its success. LAWA should not economize in this area. It should prioritize effectiveness above other decision factors in allocating resources and organizational support to the effort. Among the needed actions is an executive policy that assigns ownership and associated authority to the operational readiness team for pre-service testing and ensuring that the changes called for by those tests are acted on with dispatch.

LAWA's operational readiness team should serve as a single point of ownership and accountability to ensure that LAX's massive capital investments meet their functional expectations.

## Expanding LAWA's Readiness to Respond to Environmental Initiatives

***Electric vehicles and aircraft.*** LAWA should establish interdivisional teams to address the airports' infrastructure and operations to support the energy requirements of the growing – and now mandated – Electric Vehicle (EV) fleet. This need can include provisions to attract the electric short-range aircraft now nearing production. LAWA has provided EV charging capacity and is planning to provide more. It is not yet clear that LAWA's plans will meet the rapidly escalating demands for electric vehicle charging.

***Sustainable Aviation Fuel (SAF).*** LAWA should also take a leadership role to ensure the early and widespread adoption of Sustainable Aviation Fuel (SAF) (Note: Further discussed in Volume II, "Environment (Planet)").

## Improving Capital Management Elements

LAWA should develop a project-related index to link engineering files across division lines from planning to closeout. LAWA should continue to closely monitor the project close-out process. Similarly, it should revise its Prolog (engineering) design contract directory



structure to include planning and design tasks. LAWA has stated that it plans to improve or replace this system and should carry out this intention. Finally, LAWA should continue to implement the change order management recommendations from the Grant-Thornton audit.

## Extending Capital Planning

LAWA should implement a rolling 10-year CIP and adopt an Asset Management Plan that includes a 30-year Asset Renewal Plan.



## Pursuing Future Airport Technologies

LAWA is making great strides with its digital marketplace innovations that focus on concessions and the guest experiences (e.g., parking reservations; food ordering prior to arrival at LAX; and touchless baggage handling, boarding, and parking lot exit).

A Smart Airport Model includes those and other features: environmental sustainability; safety, security, and operations; guest experience; and financing solutions. The Smart Airport model expands on these guest experiences and touchless technology, as an added protection against future viral diseases, combined with reduced staffing costs.

The Chief Development Officer and Chief Digital Transformation Officer should integrate LAX technology initiatives to become an international Smart Airport model of the future.

## Part D – Management Practices

Part D discusses management practices and processes by the Joint Administrators for KH to assess progress on since the 2016 IEA Survey.

### STRATEGIC PLANNING

LAWA began strategic planning in 2017. The 2017 LAWA Strategic Plan was primarily an internal document with progress reports provided for BOAC. Most of LAWA's efforts focused on completing milestones and activities rather than outcomes; as of December 2021, LAWA had completed 64% of its 86 planned actions.

In many ways, the 2017 Strategic Plan was more of a comprehensive plan rather than a strategic plan. This approach made it difficult to use the Strategic Plan to set priorities and guide strategic expenditures. LAWA executives report that they are planning for a more strategic approach in 2022. LAWA should use the Strategic Plan “Refresh” as an opportunity to expand on the risk analysis conducted for its Operating Statements and develop ways to address those risks.

KH recommends that the next LAWA Strategic Plan “Refresh:”

- Institutionalize its strategic-planning process as part of best management practices
- Broaden its stakeholder engagement, including people and institutions outside of LAWA in completing its Strategic Plan “Refresh” and building better buy-in
- Improve transparency of Strategic Plan details, including making it available on its website

## PERFORMANCE MANAGEMENT

LAWA has made steady progress in the use of metrics since the 2016 LAWA IEA Survey; metrics were a central focus of that IEA Survey. It has built a data infrastructure that can serve as the foundation for metrics based on multiple data sources. Because of COVID-19-related turnover, however, LAWA does not currently have enough staff members trained as publishers in Power BI to fully use the data resources within LAWA.

Moreover, LAWA’s metric system cannot readily assess the status of its strategic priorities or outcomes. In its 2017 Strategic Plan, most of its metrics lacked targets or defined outcomes.

### Actions Linked to Strategic Plan that were Quantitative (as of December 2021)

Action Status	Percent
Metric/Target Set	13%
Yes/No Responses Regarding Deliverables	79%
No Metrics Set	8%
Total	100%

KH recommends that LAWA:

- Use metrics to track the success of strategic initiatives with one- to three-year targets and adopt an integrated system to track strategic outcomes
- Broaden the use of data and metrics to strengthen decision-making by training more Power BI Publishers and hiring Data Scientist(s) to further gather and analyze data for evidence-based decision-making
- Make “LAWA Metrics That Matter” an interactive reporting tool (e.g., dashboard format)

## PROCUREMENT AND CONTRACTING

Since the 2016 IEA Survey, LAWA has:

- Prepared a Procurement Improvement Plan (PIP)
- Improved management and tracking of the overall procurement program
- Implemented innovations in its processes for construction procurement
- Developed plans for a new organizational structure by designing a Procurement Center of Excellence and establishing a Strategic Sourcing Division (SSD)
- Begun the pursuit of new technology to streamline the procurement process

A standard practice in public procurement is receipt of three bids before selecting a final bid.

***The percent of single bid or fewer than three bids responses to Goods, Equipment, Non-Professional Services (GENPS) solicitations has increased since 2015:***

Percent of GENPS Contracts with Fewer Than 3 Bids					
GENPS Contract Solicitations	2015	2020	2021	Difference (2015 vs. 2021)	Difference (2020 vs. 2021)
Receiving a single bid	30%	16%	47%	+17% points	+31% points
Receiving fewer than 3 bids	28%	53%	76%	+48% points	+23% points

This situation in the last two years (2020 and 2021) may partially be attributed to supply chain challenges and urgent requests in response to COVID-19. Regardless of the cause, however, this trend needs to be addressed. KH recommends that SSD:

- Continue implementation of PIP and the North Highland Report recommendations
- Analyze why GENPS RFBs receive fewer bids and take steps to address the problem
- Continue to work with Business, Jobs and Social Responsibility (BJSR) to identify ways to increase the impact of LAWA's overall procurement program on local industries (Note: Further discussed in Volume II, "Economic (Prosperity)")
- Continue to explore innovations that preserve public procurement principles while supporting strategic directions of LAWA in the acquisition of new technologies

## AUDIT

LAWA currently has bifurcated audit functions:

- Internal Audit reports to the LAWA CEO
- Two finance-related audit functions, including a recently established unit to conduct audits of capital programs, report to the LAWA Chief Financial Officer (CFO)

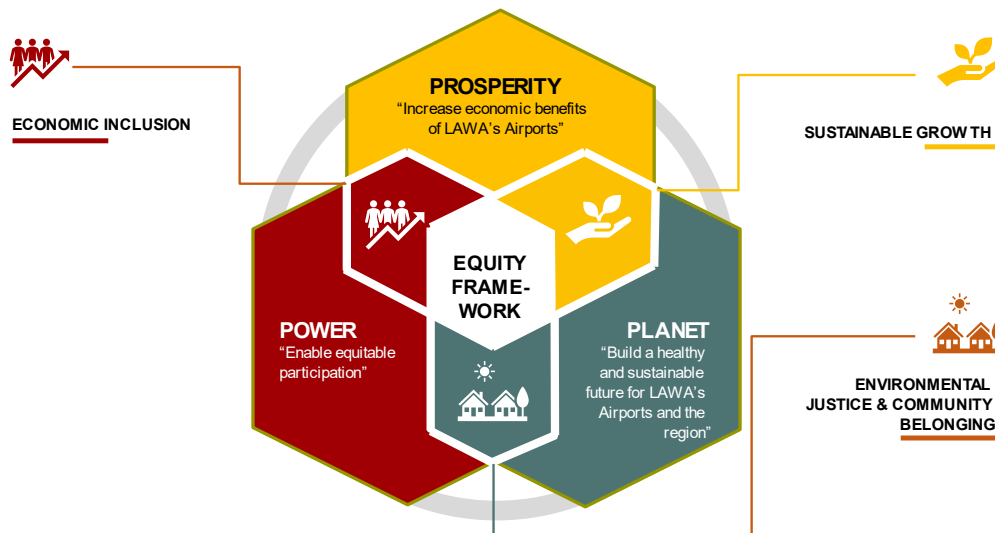
LAWA has reinstituted the BOAC Audit Committee; however, the Audit Committee does not regularly review Audit Plans, progress made against audit recommendations, and related risk assessments. Although audit functions have been strengthened since the 2016 IEA Survey, they are still thinly staffed, given the size of operations at LAWA.

To strengthen its audit capabilities:

- All audit functions should be organizationally integrated into an Audit Division under the CEO with a dotted-line reporting relationship to the Audit Committee to ensure the perception and reality of independence.
- The new Audit Division should update its risk-based Audit Plan(s) with annual refinements.
- The BOAC Audit Committee should conduct more regular reporting and reviews of audits.
- Audit managers should be authorized and staffed to follow up on audit reports and report unresolved items to the BOAC Audit Committee to ensure that audit recommendations are implemented.

## VOLUME II – EQUITY AND HISTORICALLY DISADVANTAGED COMMUNITIES

The Joint Administrators asked KH to assess LAX and VNY’s impact on historically disadvantaged communities. This IEA Survey used an equity framework of environmental justice and community belonging, economic inclusion, and sustainable growth:



The City of Los Angeles and LAWA have embarked on a number of sustainability and racial equity initiatives, including:

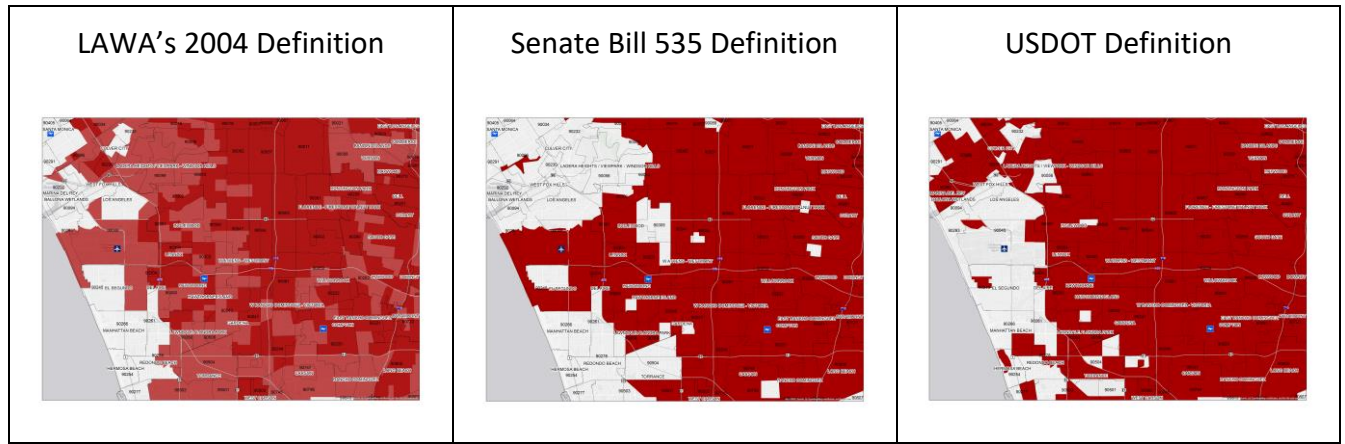
- Los Angeles City Office of the Mayor’s 2019 Sustainable Plan
- Los Angeles City’s Civil + Human Rights and Equity Department (CHRED)
- Los Angeles City’s Executive Directive 27 (2020)
- LAWA 2020 Working Group
- LAWA 2020 Racial Equity Action Plan



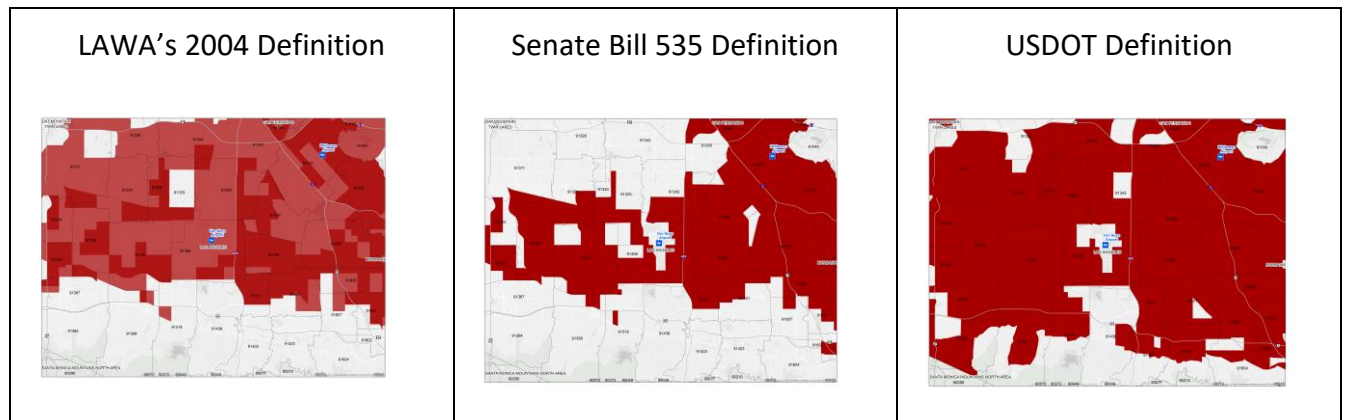
- LAWA's interest in equitable economic growth and sustainability in its current strategic-planning process

Because no single definition exists within the City of Los Angeles to define historically disadvantaged communities, KH applied definitions from LAWA's 2004 Community Benefits Agreement (CBA), California Senate Bill 535, and the U.S. Department of Transportation (USDOT). ***Regardless of the definition used, the communities around LAX and VNY are predominantly comprised of racially minoritized groups and low-income residents.***

## HISTORICALLY DISADVANTAGED COMMUNITIES AROUND LAX



## HISTORICALLY DISADVANTAGED COMMUNITIES AROUND VNY



KH developed 47 GIS maps to assess LAWA's impact on historically disadvantaged communities:

- Surrounding LAX (10 miles north, 10 miles south, and 20 miles east of LAX)
- Surrounding VNY (6 miles north, 6 miles south, 8 miles east, and 8 miles west of VNY)

Comparisons were also made with Los Angeles County overall with map overlays of the City Council Districts (CDs). The maps analyzed the following equity components:

	ENVIRONMENTAL (PLANET)	ECONOMIC (PROSPERITY)	ENGAGEMENT (POWER)
	<i>"Build a healthy and sustainable future for LAWA's Airports and the region"</i>	<i>"Increase economic benefits of LAWA's Airports"</i>	<i>"Enable equitable participation"</i>
INDICATORS	<b>Pollution Exposure</b> <ul style="list-style-type: none"> <li>Ground Ozone</li> <li>PM2.5</li> <li>Pollution Burden</li> <li>CalEnviroScreen Score</li> </ul> <b>Noise Impact</b> <ul style="list-style-type: none"> <li>Noise contours</li> <li>Noise complaints</li> <li>Land use compliance</li> </ul>	<b>Hiring</b> <ul style="list-style-type: none"> <li>Workforce representation</li> <li>LAMP</li> <li>Salary/wages</li> </ul> <b>Procurement</b> <ul style="list-style-type: none"> <li>Local contracting</li> <li>Contracting practices<sup>†</sup></li> </ul> <b>Initiatives</b> <ul style="list-style-type: none"> <li>Business inclusivity</li> <li>Local hiring</li> </ul>	<b>Community</b> <ul style="list-style-type: none"> <li>Relationships</li> <li>Engagement</li> <li>Representation</li> </ul> <b>Internal</b> <ul style="list-style-type: none"> <li>Employee engagement<sup>†</sup></li> <li>Decision-making<sup>†</sup></li> <li>Employee participation<sup>†</sup></li> </ul>

<sup>†</sup>Anecdotal evidence from LAWA staff.

## Environment (Planet)

LAWA has a number of strengths regarding its environmental initiatives that are worthy of recognition:

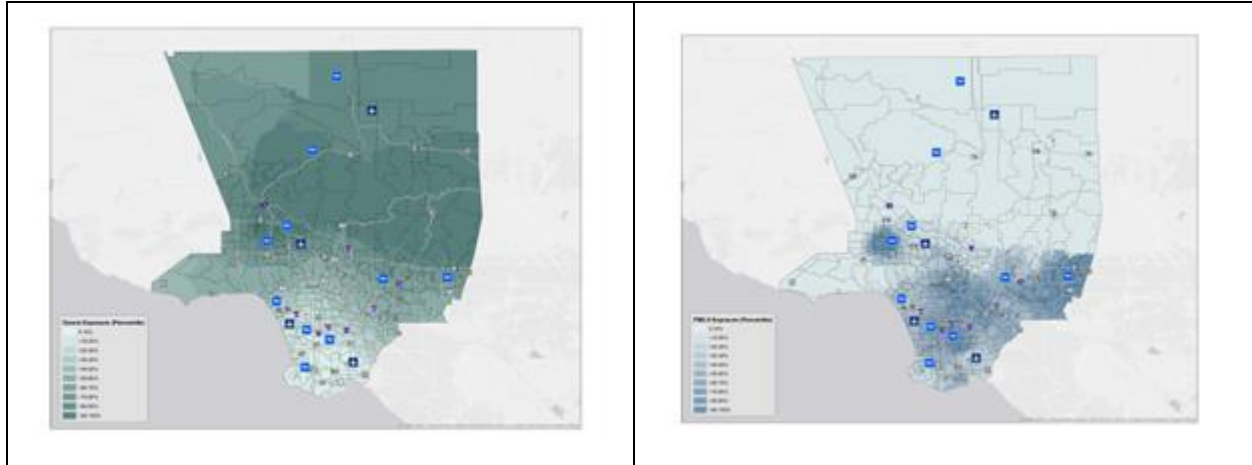
- LAWA's publication of its Environmental Sustainability Reports as part of its public accountability since 2008
- LAWA's major investment of \$796.5 million to date in its insulation efforts to mitigate noise impact on surrounding homes and schools
- Commitment to environmentally responsible practices, including: LEED certifications for new construction, established environmental goals, electric fleets, solar panels, and Sustainable Aviation Fuel (SAF)

## AIR QUALITY

LAX and VNY operate in regions that have higher exposure to pollutants and are environmentally vulnerable. LAX and VNY are among several contributors (e.g., oil refineries, ports, traffic, Hyperion Plant, fires, etc.) to air pollution. According to the [U.S. Environmental Protection Agency \(EPA\)](#), commercial airplanes and large business jets account for 10% of transportation emissions and 3% total greenhouse gas (GHG) production in the United States.

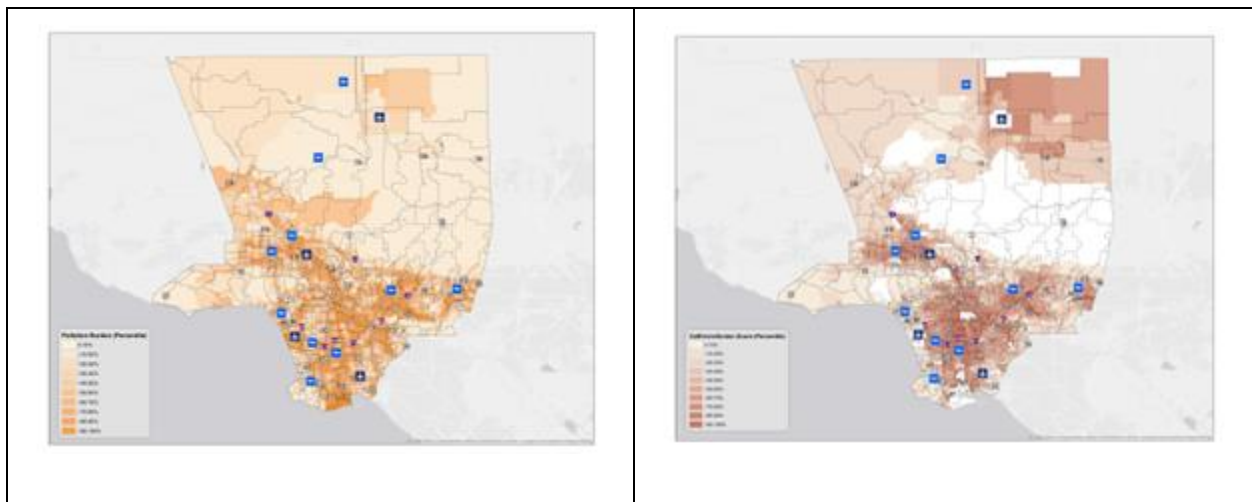
LAWA conducted its last comprehensive study of airport-related pollutants in the region in 2013. Subsequent independent studies analyze LAX's contribution to air quality; LAWA has identified shortcomings in those studies.

The GIS mapping identifies patterns of air pollution for Los Angeles County. The IEA Survey Final Report, Volume I (Environment (Planet)), provides greater granularity regarding these air quality indicators for the communities surrounding LAX and VNY.



**Ozone levels** affect the northern region more than the southern region of the county with the Santa Monica and San Gabriel Mountains serving as buffers.

**Small airborne particle pollution (PM2.5)** affects air quality, primarily in the San Fernando and San Gabriel Valleys and central and southern regions of the county.



**Overall Pollution Burden (Percentile)** affects primarily central and southern regions of the county.

Based on **CalEnviroScreen Scores (Percentiles)**, communities adversely affected are the San Fernando Valley, San Gabriel Valley, northeast/Antelope Valley, and South Central on down to the Ports.

The definition of Overall Pollution Burden is:

*“Pollution Burden scores for each census tract are derived from the average percentiles of the seven Exposures indicators (ozone and PM2.5 concentrations, diesel PM emissions, drinking water contaminants, children’s lead risk from housing, pesticide use, toxic releases from facilities, and traffic density) and the five Environmental Effects indicators (cleanup sites, impaired water bodies, groundwater threats, hazardous waste facilities and generators, and solid waste sites and facilities). Indicators from the Environmental Effects component were given half the weight of the indicators from the Exposures component.” – [CalEnviroScreen 4.0](#)*

The definition the CalEnviroScreen Score is:

*“In the CalEnviroScreen model, the Population Characteristics are a modifier of the Pollution Burden... The relationship between CalEnviroScreen scores of the state’s census tracts and their race/ethnicity compositions and children and elderly populations is an important context with which to understand environmental inequity in California. An analysis available on the CalEnviroScreen website shows clear disparities with respect to the racial makeup of the communities with the highest pollution burdens and vulnerabilities. People of color, especially Latino and Black people, disproportionately reside in highly impacted communities in California.”*

– [CalEnviroScreen 4.0](#)

There is currently limited use of SAF at LAX; industry trends spurred in part by the Inflation Reduction Act passed in August 2022 suggest use of SAF will grow. In addition, there is a limited number of solar panels installed around LAX, even though in a 2017 LAX Solar Feasibility Study, LEAN Engineering assessed 130 sites and found that:

- Only 9 (6.9%) of the sites were not feasible because of glare that may impact landing paths.
- A majority (61.5%) of the sites were rejected for solar panel installation development because they were designated for future land use, not because of glare issues.

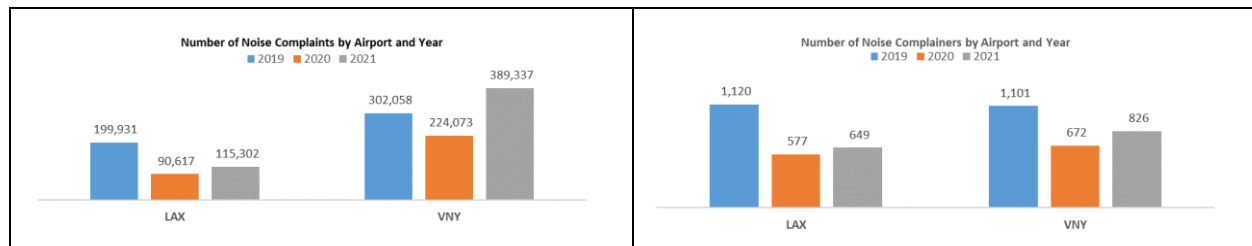
## NOISE

LAWA continues to address community concerns about noise impact from aircraft. A significant share of dwelling units and residents near the airports are in areas identified as incompatible land use (i.e., CNEL 65 dB and above). Almost 75% of the eligible units are insulated from noise. In addition, there is an unknown number of units ineligible for insulation regardless of their locations in the noise contours because of building code violations.

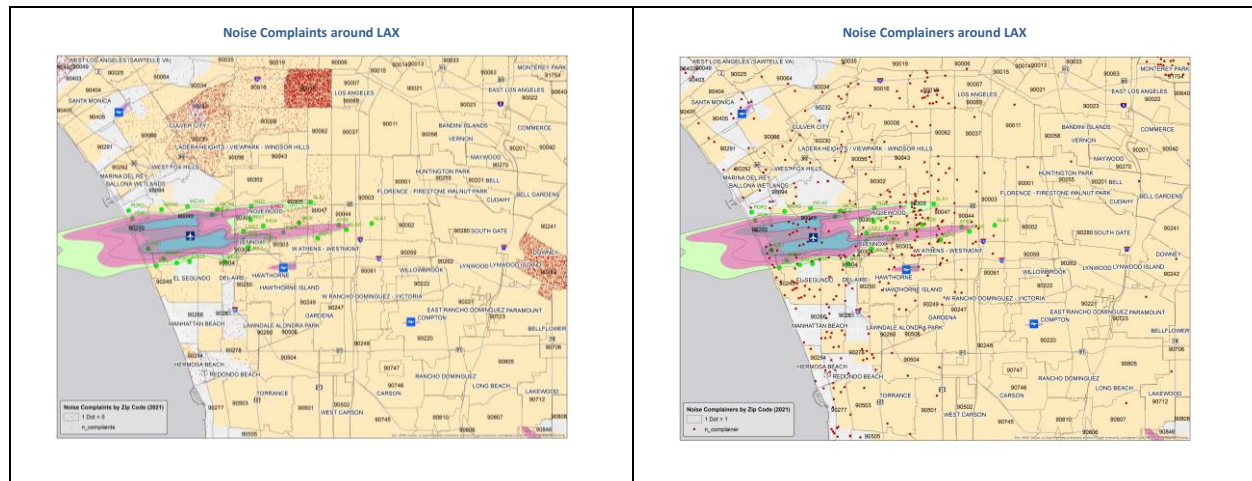
## Eligible Units for Noise Mitigation: Remaining, Mitigated, and Total Costs (\$millions)<sup>1</sup>

Jurisdiction	Remaining Eligible Units	Mitigated Units	Total Cost to Date (\$millions)
City of Inglewood	3,174	7,932	\$357.4
Los Angeles County (Unincorporated Areas)	1,870	4,353	\$191.6
City of Los Angeles	1,239	7,327	\$160.0
City of El Segundo	1,146	1,943	\$ 87.5
<b>Total</b>	<b>7,429</b>	<b>21,555</b>	<b>\$796.5</b>

LAWA works arduously to respond to noise complaints and reduce or limit aircraft noise with the FAA. While the number of complaints about noise from aircraft have decreased around LAX, complaints have increased around VNY. Many complaints come from the same people. For example, at VNY in 2021, 826 “noise complainers” generated 389,377 noise complaints – an average of 471 complaints per complainer.

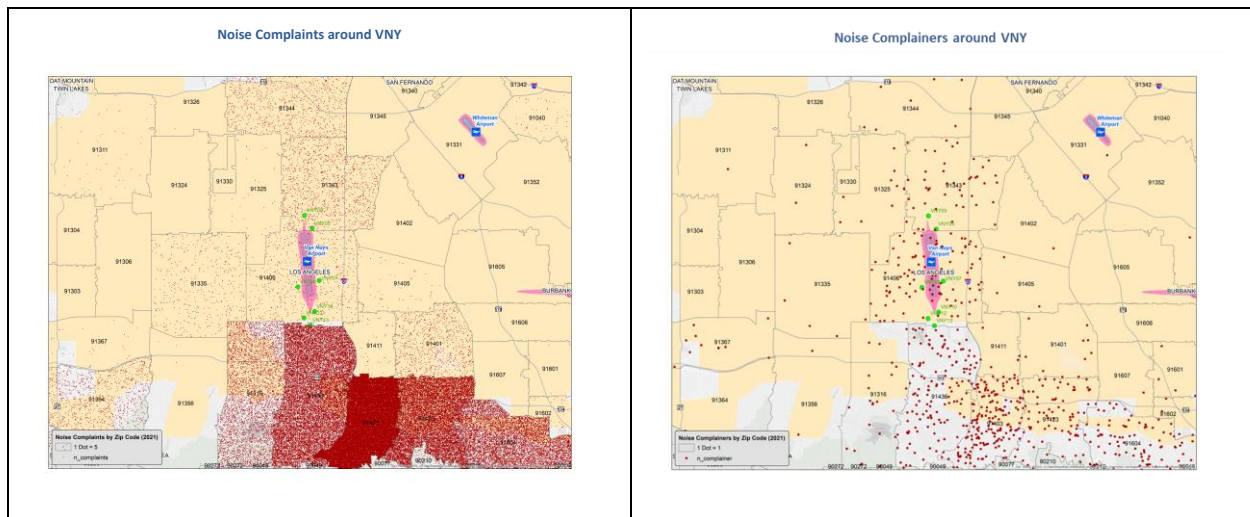


**LAWA continues to receive noise complaints from residents surrounding the airports, including zip codes that are partially in noise contours and others near noise contours.**



<sup>1</sup>Source: Sound Insulation Statistics by Jurisdiction provided by LAWLA on 04/29/2022.





## Economic (Prosperity)

To assess economic impact, KH focused on LAWA’s various procurement programs to help local businesses and facilitate local hires. Local business procurement programs and requirements aim to reduce barriers for certified businesses located in the airports’ regions. Some of LAWA’s noteworthy accomplishments in supporting local businesses and encouraging local hires are:

- BuildLAX Academy
- Monthly “Doing Business With LAWA” meetings
- Contractor Development and Bonding Assistance Program (CDBAP)
- Implementation of programs to increase local hiring
- HireLAX Apprenticeship Readiness Program (ARP)
- Targeted Local Hire (TLH)
- First Source Hiring Program (FSHP)
- Almost 7,000 local hires on LAMP and other projects

Since the 2016 IEA Survey, LAWA has made progress in monitoring the economic benefits of its job creation and less progress related to measuring the overall economic impact on the region.

## CERTIFIED BUSINESSES AND SUBCONTRACTORS

The majority of expended funds (\$5.96 billion) went to contractors located around LAX and VNY with LAWA working to reach more contractors in the surrounding disadvantaged areas.

Certified businesses made up the majority of contracted vendors located in Los Angeles County and around LAX and VNY.



From 2017 to 2022, certified businesses made up less than 50% of all vendors who participated in all LAWA contracts. Overall, certified businesses earned 25.2% of total contract dollars awarded (i.e., disproportionately less); specifically:

*Certified businesses include vendors certified in the Small Business Enterprise (SBE), Local Business Enterprise (LBE), Local Small Business Enterprise (LSBE), and Disabled Veterans Business Enterprises (DVBE) Programs.*

- In Los Angeles County, at 61.7%, certified businesses make up the majority of vendors contracted or subcontracted on LAWA contracts. They earned 24.7% of total contract dollars awarded to vendors in Los Angeles County (i.e., disproportionately less).
- Around LAX, at 59.5%, certified businesses make up the majority of vendors contracted or subcontracted on LAWA contracts. They earned 15.7% of total contract dollars awarded to vendors around LAX (i.e., disproportionately less).
- Around VNY, at 62.1%, certified businesses make up the majority of vendors contracted or subcontracted on LAWA contracts. They earned 69.9% of total contract dollars awarded to vendors around VNY (i.e., disproportionately more).

Of vendors participating on LAWA contracts, at 77.9%, the majority are subcontractors. They earned 35.5% of contract dollars (i.e., disproportionately less).

Some businesses perceive doing business with all government agencies as challenging, including LAWA. They have expressed concerns about primes not paying or using certified businesses at levels designated by the contract without consequences.

In the LAMP program, goals for certified businesses are incorporated into the contracts, and LAWA monitors contract compliance. LAWA has extended this practice to its other capital project contracts.

#### LAWA EMPLOYMENT

Many LAWA employees reside in areas surrounding LAX and VNY, which has a positive economic impact on those local communities. Moreover, LAWA employees living in communities around LAX and VNY earn a significant share of combined salaries paid in those areas.

Despite these benefits in aggregate, individual earning disparities exist by zip code. When examining the median salary by zip code around LAX, median salary earnings range from approximately \$42,000 to \$165,000. The spatial pattern shows lower individual earnings among LAWA employees living in the identified disadvantaged communities, including Lennox, Inglewood, West Athens, CD 8, and CD 9. For example, the median salary in a historically



disadvantaged community east of LAX is less than \$52,000 compared to the median salary of more than \$165,000 in one of the beachside communities.

Among the LAWA workforce, Hispanic/Latinx and Black employees make up a larger share but, in aggregate, earn disproportionately less than white, Asian, and Filipino employees.

### LAWA Workforce Representation and Salary Earnings by Race and Ethnicity, May 2022

Race/Ethnicity	Workforce Representation			Salary Earnings			
	Frequency	Percent	Cumulative Percent	Combined Total (\$millions)	Percent	Cumulative Percent	Median (Rounded)
Hispanic/Latinx	1,207	39.8	39.8	\$97.0	35.6	35.6	\$69,000
Black	864	28.5	68.3	\$70.0	25.7	61.3	\$73,000
White	469	15.4	83.7	\$53.5	19.6	80.9	\$110,000
Asian	314	10.4	94.1	\$34.1	12.5	93.4	\$108,000
Filipino	146	4.8	98.9	\$15.2	5.6	99.0	\$107,000
Other/Mixed-Race*	35	1.1	100.0	\$ 2.8	1.0	100.0	\$80,000
<b>Total</b>	<b>3,035</b>	<b>100.0</b>		<b>\$272.6</b>	<b>100.0</b>		<b>\$80,000</b>

\*Note: Other/Mixed-Race is inclusive of employees who self-identify as Other, American Indian or Alaskan Native, Two or More Races, and Pacific Islander. Due to small group size, this aggregation was done to protect the identity of employees.

### Engagement (Power)

KH reviewed LAWA's outreach efforts and stakeholder relationships, particularly with historically disadvantaged communities whose needs should be heard, understood, and considered.

LAWA continues to strengthen its stakeholder relationships through events, conversations, and briefings with community organizations. It is unclear whether community members have meaningful or equitable participation and input into the LAWA decisions that affect them, since LAWA lacks metrics to measure effectiveness and quality of community engagement. LAWA's communications with the public have largely been one-way, especially during the COVID-impacted years.

## Recommendations

KH's recommendations in Volume II cluster into the following areas:

<b>Overall</b>	<ul style="list-style-type: none"> <li>Standardize the definition of equity and the criteria for 'historically disadvantaged communities' at LAWA</li> <li>Leverage data to identify internal and external inequities to promote equitable strategies and track progress</li> <li>Expand resources and roles of the Racial Equity Core Team in LAWA programs and policies</li> <li>Expand, annually update, and publicize the Racial Equity Action Plan</li> </ul>
<b>Environment (Planet): Noise</b>	<ul style="list-style-type: none"> <li>Explore and engage community partners on why some areas report more noise complaints, especially those areas outside of noise contours</li> <li>Improve accessibility and functionality of LAWA's noise reporting application and tools</li> <li>Partner with other public entities to expand access to the residential sound insulation program (Note: FAA announced \$20 million for soundproofing around LAX.)</li> <li>Take advantage of FAA regulations that permit sound insulating homes in more areas</li> </ul>
<b>Environment (Planet): Air Quality</b>	<ul style="list-style-type: none"> <li>Expand solar energy generation at LAX and conduct an updated solar panel feasibility study</li> <li>Prepare for easier and increased use of SAF</li> <li>Assess and make more transparent the impact of airport-related pollutants on neighboring communities</li> <li>Continue to explore and invest in more pollution mitigation technology, products, and solutions</li> </ul>
<b>Economic (Prosperity)</b>	<ul style="list-style-type: none"> <li>Continue to improve data collection of procurement, as outlined in recent Executive Directive 35 (August 25, 2022), so future analyses can comprehensively identify strategies that are mutually beneficial and equitable</li> <li>Develop and implement multipronged strategies that equitably:               <ul style="list-style-type: none"> <li>Lower barriers to participation (e.g., unbundling large contracts and set asides)</li> <li>Increase capacity and resources of local and underrepresented vendors, particularly in historically disadvantaged communities surrounding LAX and VNY</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Help subcontractors and small businesses increase their capacity to become primes</li> <li>■ Expand ongoing analyses to 1) determine whether some vendor demographics are consistently less competitive in securing LAWA contracts and 2) identify whether geographic disparities in procurement are linked to other factors</li> <li>■ Conduct an in-depth wage disparity analysis of LAWA employees and remedy any found gaps</li> <li>■ Gain a greater understanding of the economic impact on the region of non-LAWA employees who work at LAX and VNY</li> </ul>
<b>Engagement (Power)</b>	<ul style="list-style-type: none"> <li>■ Define equitable participation from disadvantaged communities and determine the necessary indicators to monitor progress; ensure outreach efforts are based on community engagement methods</li> <li>■ Extend existing processes and tools to update stakeholder analyses and database systematically and regularly; measure the quality of community engagement, especially how well LAWA staff listen to and implement community ideas</li> <li>■ Build on relationships with communities and advocacy groups involved in historically disadvantaged communities and the previous CBA</li> <li>■ Continue to keep advisory council/committee meetings hybrid while exploring additional strategies to ensure accessibility to the public</li> <li>■ Expand official relationships with local universities to develop partnerships, research, practicum opportunities, internships, and fellowships</li> </ul>



## SUMMARY OF RECOMMENDATIONS

This section lists all of the recommendations in the IEA Survey Final Report. The body of the Final Report elaborates extensively on each of these recommendations. Pages are listed for easy reference of the full recommendation. LAWA reports that it has begun working on areas identified in the IEA Survey.

### **Vol. IA – COVID-19 Pandemic Impact from A Public Health Perspective** (PAGES I-22 THROUGH I-36)

#### OVERALL

- Rec. IA-1: LAWA should assume a larger role in ensuring plans are in place across all involved jurisdictions to respond quickly to viral infections that enter the greater Los Angeles area through LAX.
- Rec. IA-2: LAWA Emergency Management Division (EMD)'s responsibilities should be expanded to explicitly include management of public health and pandemic responses and supplemented with expertise in epidemiology.
- Rec. IA-3: LAWA executive team should continue to actively engage industry groups to advocate for funding and support for prevention, preparation, and response to public health emergencies.

#### PREVENTION

- Rec. IA-4: LAWA should continue to monitor and adopt best practices related to preventing the spread of infectious diseases within the airport community.
- Rec. IA-5: LAWA EMD should work with LACDPH and the Bureaus of Sanitation and Engineering to identify an efficient means for conducting wastewater surveillance.
- Rec. IA-6: LAWA EMD should expand its relationship with CDC to support efforts to identify and respond to infectious diseases.

#### PREPARATION

- Rec. IA-7: LAWA should expand its pandemic preparation efforts.
- Rec. IA-8: In designing its new terminals, LAWA's Chief Development Officer should review what other international airports are doing to identify best practices in preparing for future pandemics.
- Rec. IA-9: LAWA executives should modify LAX airport rules and regulations to require cooperative reporting of infectious disease transmission.

#### RESPONSE AND RECOVERY

- Rec. IA-10: LAWA should build on the lessons it learned from COVID-19 for future response planning, focusing on how the responses changed at the onset and during subsequent months.





## **Vol. IC – Capital Project Management and Cost Controls**

(PAGES I-113 THROUGH I-133)

### **MAXIMIZING THE VALUE AND PUBLIC’S USE OF LAMP**

- Rec. IC-1: LAWA should establish a single organization unit responsible for the LAX-wide oversight, development, and implementation of a LAX-wide wayfinding system.
- Rec. IC-2: LAWA should expand its existing operational readiness staff resources into a single point of ownership.

### **EXPANDING LAWA’S READINESS TO RESPOND TO ENVIRONMENTAL INITIATIVES**

- Rec. IC-3: LAWA should organize interdivisional teams to address the airports’ infrastructure and operations to support expanded use of Electric vehicles (EVs) and Sustainable Aviation Fuel (SAF) with sufficient supply from the power grid.

### **IMPROVING CAPITAL MANAGEMENT ELEMENTS**

- Rec. IC-4: Project close-out should be assigned an expected duration and monitored to ensure that it does not materially exceed that duration.
- Rec. IC-5: The change order management recommendations in the Grant-Thornton audit should be adopted and implemented.
- Rec. IC-6: LAWA should set up a project-related index to link files across division lines, starting with planning through closeout.
- Rec. IC-7: LAWA should revise its Prolog design contract directory structure to include design effort tasks and construction effort tasks.

### **EXTENDING CAPITAL PLANNING**

- Rec. IC-8: LAWA should implement a rolling 10-year CIP and adopt an Asset Management Plan that includes a 30-year Asset Renewal Plan.
- Rec. IC-9: The Chief Development Officer should expand LAWA’s involvement in land use planning around LAX and VNY as an active stakeholder.

### **PURSUING FUTURE AIRPORT TECHNOLOGIES**

- Rec. IC-10: LAWA’s Chief Development Officer and Chief Digital Transformation Officer should integrate its technology initiatives for LAX to become an international Smart Airport model of the future.

## Vol. ID – Management Practices

### STRATEGIC PLANNING (PAGES I-152 THROUGH I-157)

- Rec. ID-Plan.1: LAWA should broaden its stakeholder engagement in refreshing its Strategic Plan.
- Rec. ID-Plan.2: LAWA should complete its Strategic Plan “Refresh” and promote it within and outside the agency.
- Rec. ID-Plan.3: LAWA should institutionalize its strategic-planning process as part of best management practices.
- Rec. ID-Plan.4: LAWA should enhance its monitoring of the implementation of the strategic plan goals and objectives.
- Rec. ID-Plan.5: LAWA should ensure that all its values align with its strategic core values.

### PERFORMANCE MEASUREMENTS (PAGES I-165 THROUGH I-174)

- Rec. ID-Metrics 1: LAWA should develop outcome metrics to track the success of strategic initiatives.
- Rec. ID-Metrics 2: LAWA should identify the cause-and-effect relationships among its metrics to continuously improve and achieve desired outcomes.
- Rec. ID-Metrics 3: LAWA should endorse and support broad use of data and metrics as a tool to strengthen service and operational decision-making.
- Rec. ID-Metrics 4: LAWA should make “LAWA Metrics That Matter” an interactive reporting tool.

### PROCUREMENT AND CONTRACTING (PAGES I-180 THROUGH I-183)

- Rec. ID-Procure 1: Sustainability Sourcing Division (SSD) should continue its implementation of the North Highland Report recommendations.
- Rec. ID-Procure 2: SSD should conduct a formal analysis of why GENPS RFBs receive fewer bids and take steps to address the problem.
- Rec. ID-Procure 3: SSD should work with BJSR to identify ways to increase the impact of LAWA’s overall procurement program on local industries.
- Rec. ID-Procure 4: SSD should continue to explore innovations that preserve public procurement principles while supporting strategic directions of LAWA in the acquisition of new technologies.

### AUDIT (PAGES I-188 THROUGH I-192)

- Rec. ID-Audit 1: All audit functions must be organizationally integrated under the CEO with a dotted-line reporting relationship to the BOAC Audit Committee to ensure the perception and reality of independence.
- Rec. ID-Audit 2: The new Audit Division should integrate audit plans and update them in a risk-based, integrated Audit Plan with annual refinements.

- Rec. ID-Audit 3: The BOAC Audit Committee should require more regular reporting and reviews of audits.
- Rec. ID-Audit 4: Audit managers should follow up with audited organizations, reporting progress made in implementing recommendations.

## **Vol. II – Equity and Historically Disadvantaged Communities**

### **OVERALL (PAGES II-111 THROUGH II-114)**

- Rec. II-1. LAWA should standardize the definition of equity and the criteria for ‘historically disadvantaged communities’ at LAWA.
- Rec. II-2. LAWA should leverage data to identify internal and external inequities, promote equitable strategies, and track progress.
- Rec. II-3. LAWA should expand the resources and roles of the Racial Equity Core Team in LAWA programs and policies.
- Rec. II-4. LAWA should expand, annually update, and publicize the Racial Equity Action Plan.

### **ENVIRONMENTAL (PLANET): NOISE (PAGES II-115 THROUGH II-118)**

- Rec. II-5. LAWA should explore and engage community partners on why some areas report more noise complaints, especially those areas outside of noise contours.
- Rec. II-6. LAWA should improve accessibility and functionality of its noise reporting application and tools.
- Rec. II-7. LAWA can partner with other public entities to expand access to the residential sound insulation program. (FAA announced \$20 million for soundproofing around LAX.)
- Rec. II-8. LAWA should take advantage of FAA regulations that permit sound insulating homes in more areas.

### **ENVIRONMENTAL (PLANET): AIR QUALITY (PAGES II-118 THROUGH II-127)**

- Rec. II-9. LAWA should continue to expand solar energy generation at LAX and conduct an updated solar panel feasibility study.
- Rec. II-10. LAWA should prepare for easier and increased use of Sustainable Aviation Fuel (SAF).
- Rec. II-11. LAWA should assess and make more transparent the impact of airport-related pollutants on neighboring communities.
- Rec. II-12. LAWA should continue to explore and invest in more pollution mitigation technology, products, and solutions.

### **ECONOMIC (PROSPERITY) (PAGES II-127 THROUGH II-134)**

- Rec. II-13. LAWA should expand its ongoing analyses to determine whether some vendor demographics are consistently less competitive in securing LAWA contracts.
- Rec. II-14. LAWA should expand its analyses to identify whether geographic disparities in procurement are linked to other factors.

- Rec. II-15. LAWA should expand its resources to help subcontractors and small businesses to develop their ability to become primes.
- Rec. II-16. LAWA should unbundle large contracts when feasible, so smaller businesses have more opportunities to participate.
- Rec. II-17. LAWA should expand requirements and incentives for primes to subcontract with vendors in zip codes immediately surrounding LAX and VNY.
- Rec. II-18. LAWA should investigate L.A. Metro's Small Business Set Aside program to determine whether it can be adapted for selected LAWA procurements.
- Rec. II-19. LAWA should conduct a more in-depth wage disparity analysis among LAWA and, if found, remedy potential gaps.
- Rec. II-20. LAWA should gain a greater understanding of the economic impact on the region of non-LAWA employees who work at LAX and VNY.

#### EMPOWERMENT (POWER) (PAGES II-135 THROUGH II-144)

- Rec. II-21. LAWA should define equitable participation from disadvantaged communities and determine the necessary indicators to monitor progress.
- Rec. II-22. LAWA should ensure current outreach efforts are based on community engagement methods.
- Rec. II-23. LAWA should extend existing processes and tools to update stakeholder analyses and database systematically and regularly.
- Rec. II-24. LAWA should measure the quality of community engagement, especially how well it listens to and implements community ideas.
- Rec. II-25. LAWA should assemble, analyze, and develop programs, using disaggregated data (e.g., by zip code) on engaged communities.
- Rec. II-26. LAWA should build on relationships with communities and advocacy groups involved in historically disadvantaged communities, HireLAX, Targeted Local Hire (TLH), First Source Hiring Program (FSHP), and the previous Community Benefits Agreement (CBA).
- Rec. II-27. LAWA should continue to keep advisory council/committee meetings hybrid while exploring additional strategies to ensure accessibility to the public.
- Rec. II-28. LAWA can expand its official relationships with local universities to develop partnerships, research, practicum opportunities, internships, and fellowships.

## ARRANGEMENT OF THE IEA SURVEY

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The 2022 IEA Survey Final Report is divided into four parts.

- **Executive Summary.** The Executive Summary outlines our key findings and recommendations.
- **Volume I – COVID-19 Impact, Capital Projects, and Management Practices.** Volume I describes LAWA’s response to the COVID-19 pandemic, including COVID-19’s impact from a public health perspective and on LAX’s operations and finances. The IEA Survey also offers a high-level review of the Landside Access Modernization Program (LAMP), emphasizing the importance of a successful launch with effective wayfinding guidance for LAX visitors and travelers. In addition, KH analyzed LAWA’s project management of three other capital projects at LAX: Bradley West Gates, Terminal 1.5, and Taxiway P. The last part on “Management Practices” is made up of recommendations identified by the Joint Administrators from KH’s 2016 IEA Survey at LAWA, namely, strategic planning, performance management/metrics, procurement and contracting, and audit.
- **Volume II – Equity and Historically Disadvantaged Communities.** Volume II focuses on the historically disadvantaged communities surrounding LAX and VNY. It presents an equity framework and describes equity initiatives at LAWA and in the City of Los Angeles. It analyzes the environmental impact and economic benefits of the airports for these communities through analyses of data and geographic information system (GIS) mapping. It also reviews LAWA’s engagement with historically disadvantaged communities, including its outreach efforts. The final part sets forth recommendations to address the identified opportunities for improvement.
- **Appendices.** The Appendices define terminology and acronyms used and presents data used for compiling the GIS maps and tables in Volume II.

# 2022



## Industrial, Economic, and Administrative (IEA) Survey Final Report: Volume I – COVID-19 Impact, Capital Projects, and Management Practices



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# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA)

### PART A – COVID-19 PANDEMIC IMPACT FROM A PUBLIC HEALTH PERSPECTIVE



## A – COVID-19 IMPACT FROM A PUBLIC HEALTH PERSPECTIVE

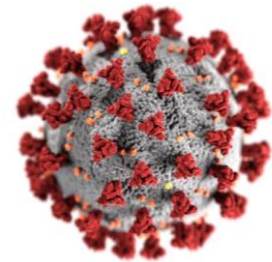
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In the past, airports in Asia and other parts of the world have faced epidemic crises (e.g., Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), and Bird flu). In contrast to COVID-19, ill passengers could be more easily identified, and treatment options were more rapidly available. As a result, these health crises were short-term; air traffic stabilized after a few months.

COVID-19 was both more severe and more widespread with correspondingly greater impact. In fact, the impact of COVID-19 on the world was historic. The life-or-death requirement to slow the spread of the then-deadly pandemic brought on an economic firestorm and widespread unemployment. Travel – especially air passenger travel – was severely restricted.

Starting in March 2020, airports participated in and responded to a variety of actions taken by governments and the airline industry to limit the spread of COVID-19, including:

- Travel bans, travel restrictions, and cross-border travel embargoes
- Lengthy quarantining of arriving passengers
- Flight cancellations
- Social distancing and masking requirements
- Increased cleaning and sanitizing requirements
- Issuance of protective equipment to airport workers
- Development and implementation of policies and practices to protect airport workers
- Implementation of new and evolving Federal, State, and County COVID-19 regulations affecting airports and air travel



Because of COVID-19, airports around the globe had to consider new health and safety factors and practices; some of these practices are likely to continue.

## A.1 IMPACT OF COVID-19 ON AVIATION

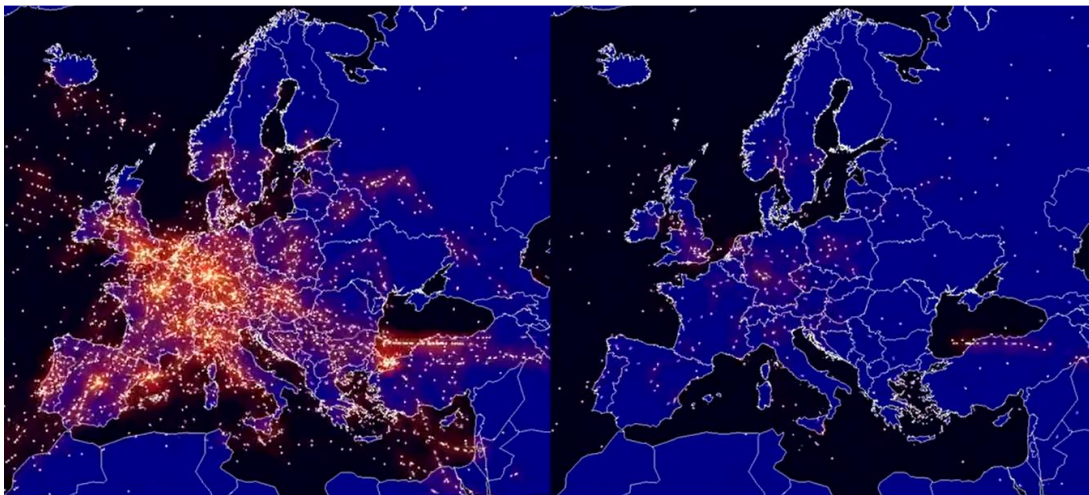
The COVID-19 pandemic had a global impact on air travel worldwide, nationwide, and at LAX in 2020.

### Worldwide Impact

---

***Worldwide, air passenger travel came to a virtual halt in April 2020.***

The immediate impact was unprecedented. Worldwide, reductions of air passengers and revenue passenger kilometers (RPKs) (both international and domestic) ranged between 52% and 59% in 2020 compared to 2019, according to the Airports Council International (ACI), International Civil Aviation Organization (ICAO), and International Air Transport Association (IATA). In addition, 62% of the world's passenger jets were grounded in 2020. The maps below illustrate the impact by showing the difference in European flight congestion on March 31, 2019 (pre-COVID-19) compared to March 29, 2020 (COVID-19).



Source: Kaminski-Morrow, D. All-Cargo Flights Stay Level as Passenger Traffic Collapses; Eurocontrol: Brussels, Belgium, March 30, 2020. Available online: [PAX Evolution](https://www.pax-evolution.com)

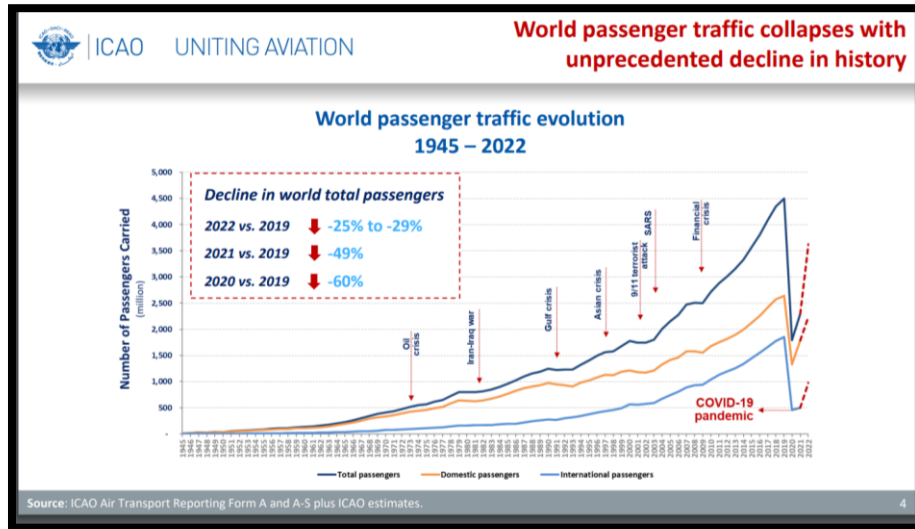
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***The COVID-19 pandemic had a greater impact on the airline industry than any other crisis since the end of World War II.***

No other crises have affected the airline industry as significantly as the COVID-19 pandemic. Figure A.1 displays the impact on passenger world traffic of the oil crisis in the 1970s; the Iran-Iraq War and Gulf Crisis in the 1990s; and the Asian crisis, 9/11 attack, SARS, and financial crisis after the year 2000. In all instances, the impact was short-lived, and the aviation industry rebounded.



Figure A.1: World Passenger Traffic Evolution (1945–2020)



Source: International Civil Aviation Organization (ICAO). Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis; Air Transport Bureau: Montréal, QC, Canada, December 3, 2020.

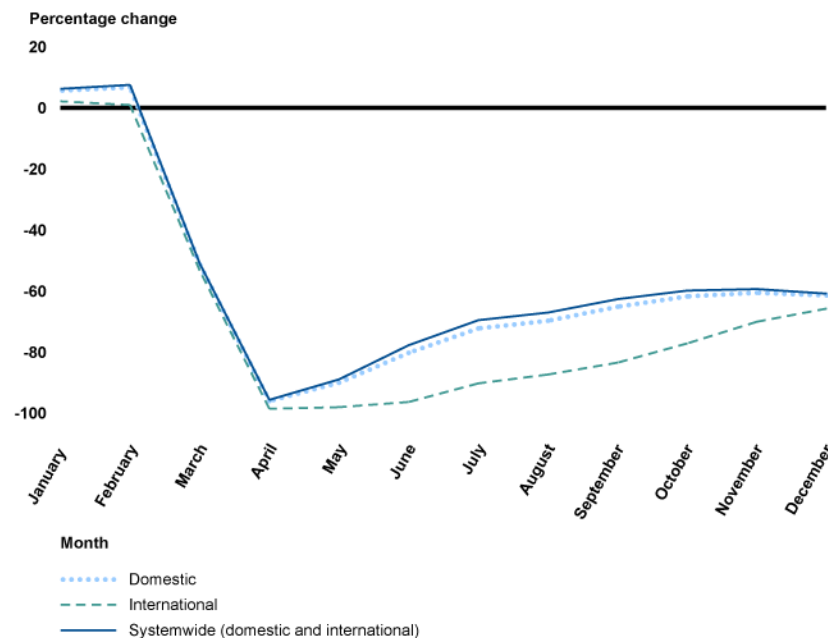
Unlike previous airline crisis, ***the air traffic recovery from COVID-19 pandemic has depended on new variables*** (e.g., public health policies in multiple countries, vaccine effectiveness, virus mutation rates, and public confidence).

## U.S. Impact

***The U.S. airline industry has gone through prior downturns but the magnitude of the collapse in airline traffic induced by the COVID-19 pandemic was unprecedented.***

The two largest previous airline crises – 9/11 attack in 2001 and the financial crisis of 2008 – caused U.S. airline traffic to decline 6% and 9%, respectively. Within the U.S. aviation industry (and similar to European aviation industry experience), air passenger traffic was 96% lower in April 2020 compared to April 2019. Air passenger travel remained 60% below 2019 levels during 2020. Airlines and airports in the United States required unprecedented levels of Federal government assistance to help them weather the crisis.

**Figure A.2: U.S. Airline Passenger Traffic, Percent Change 2019 versus 2020**



Source: U.S. Government Accountability Office (GAO), Fast Facts. Available online at: <https://www.gao.gov/products/gao-22-104429>

The ripple effects of the air passenger traffic decline are dramatic, affecting airports, the supply chain, and the economic engine for many regions. A simple example was the need for airlines to park or retire aircraft, which affected airline crews, staff, and maintenance workers. According to a [Bloomberg forecast](#), approximately 400,000 airline workers were fired or in danger of losing their jobs in 2020. As the airline industry began to recover, airlines then struggled to recover flight schedules and recruit and retain staff.

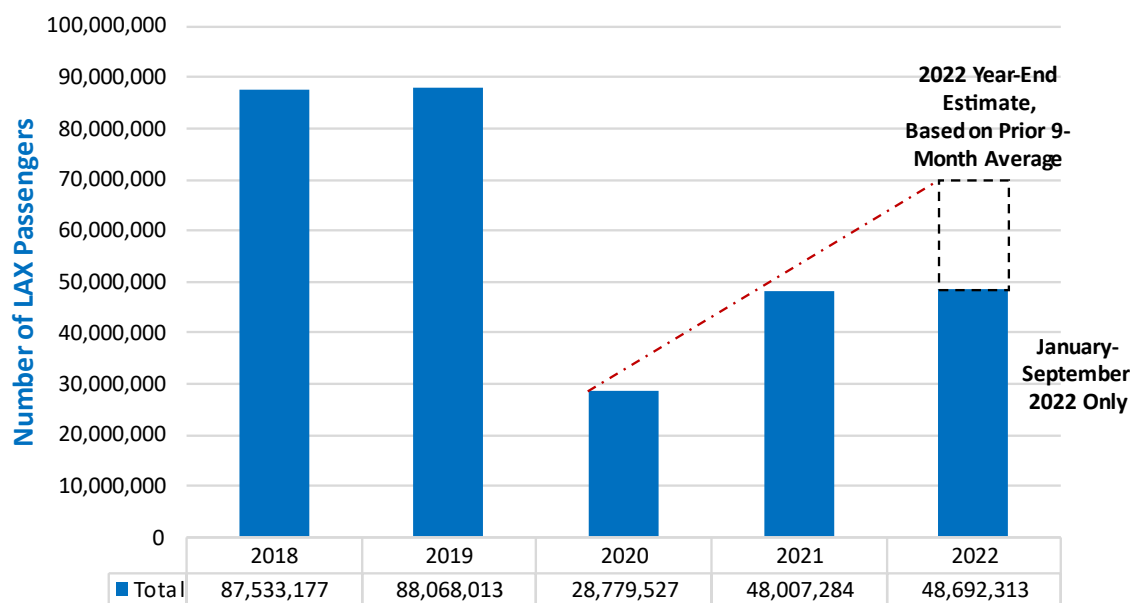
## LAX Impact

The City of Los Angeles Department of Airports (also called Los Angeles World Airports (LAWA)) manages the City's two airports: Los Angeles International Airport (LAX) and Van Nuys Regional Airport (VNY). Prior to COVID-19 in 2019, LAX:

- Was the third-busiest airport in the world and second-busiest U.S. airport
- Averaged 700 daily nonstop flights to 113 destinations in the United States and 1,200 weekly nonstop flights to 91 markets in 46 countries on 72 commercial airlines
- Handled 88 million passengers – slightly more than 7 million per month – who departed or arrived through LAX

The COVID-19-related decline was rapid: a total of 5.8 million passengers used LAX in February 2020. April 2020 was the lowest point for volume of aircraft operations and passengers. Only 299,364 passengers used LAX – a 95% reduction. As shown in Figure A.3, the number of passengers remained significantly lower than pre-COVID-19 levels throughout 2020 and 2021. By September 2022, the number of passengers (48.7 million) was close to the total number in 2021 (48.0 million). By multiplying the average number of passengers per month in 2022 (January through September), the estimated total passengers for 2022 could be 64.9 million or more with anticipated increased travel between Thanksgiving and the New Year.

**Figure A.3: Number of Passengers Departing and Total Passengers at LAX (2018 Through 2021)**



Source: [LAWA's 10-Year Summary](#) and LAWA's Traffic Comparison (TCOM) report published at LAWA.org.

As discussed in Part B, most of the gains in passenger travel are domestic. European travel is opening up. Travel to and from China has yet to recover. Therefore, as an international airport and major gateway from Asia to the United States, LAX was hit hard by COVID-19.

## A.2 LAWA'S PUBLIC HEALTH RESPONSE

This Part A focuses on LAWA's response to COVID-19 from a public health perspective. Part B explores the impact on LAWA's operations and financials.

The COVID-19 pandemic disrupted air travel for many months and required massive Federal spending to sustain the air transport industry. LAWA and its constituent airlines had to make major adjustments to their operations to protect the traveling public. Different work and travel patterns emerged. The pandemic also inserted a new level of concern regarding health and safety into the traveling public.

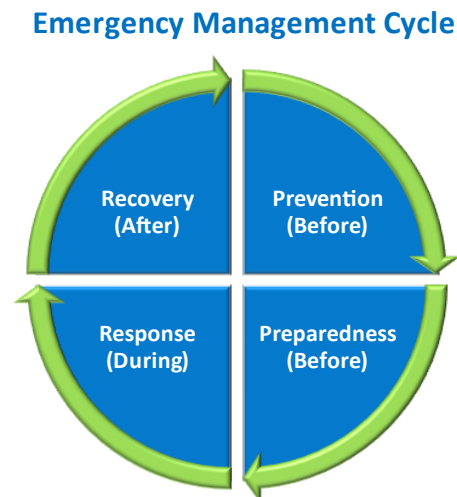
The City of Los Angeles and LAWA, along with other governmental agencies, corporations, and businesses across the United States and the world had not anticipated the challenges presented by COVID-19.



## Emergency Management Cycle

A standard framework for emergency risk management is the PPRR Model: Prevention, Preparedness, Response, and Recovery. Applying this model in assessing LAWA's pandemic actions is useful in considering how it can be better prepared for future health emergencies.

- **Prevention – Before.** The goal of prevention is to decrease the need for emergency response, as contrasted with increasing response capability.
- **Preparedness – Before.** The goal of preparedness is to ensure a rapid, coordinated, and effective response is possible when an emergency occurs.
- **Response – During.** The goal of an emergency response is to mitigate the impact of the event on people and the environment.
- **Recovery – After.** The goal of recovery is supporting emergency-affected communities through restoration of emotional, social, economic, and physical well-being. It can take months or years. As COVID-19 response was still underway during this IEA Survey, the KH team could not assess recovery efforts.



LAWA interfaces with public health agencies in preparing for, preventing, responding to, and recovering from a public health emergency. LAWA's Emergency Management Division (EMD) in Operations & Maintenance (O&M) coordinates with these entities regularly and maintains the LAX Infectious Disease Response Plan. The key public health agencies are:

- **Centers for Disease Control and Prevention (CDC)**. CDC serves as *"the nation's health protection agency,"* and sets the policies, provides health information, and develops the programs to protect the United States against *"...health, safety and security threats, both foreign and in the U.S."*
- **CDC's Quarantine and Border Health Services (QBHS)**. QBHS provides the CDC field offices at airports and other localities. QBHS's mission is to: *"...protect America's health at U.S. ports of entry by detecting, responding to, and helping to prevent the spread of contagious diseases into the United States."* It executes the CDC's policies and programs and focuses on:
  - Evaluating sick travelers arriving at U.S. ports of entry
  - Alerting other passengers about potential exposures and steps they can take to protect themselves
  - Restricting the importation of animals and products that may carry disease
- **Los Angeles County Department of Public Health (LACDPH)**. LACDPH is the local agency that provides public health services to most of Los Angeles County, including the City of Los Angeles. As such, LACDPH is the lead public health organization with jurisdictional authority overseeing LAX and VNY, including the Los Angeles Quarantine Station at LAX. During the COVID-19 pandemic, LACDPH kept abreast of the science, ramped up testing and contact tracing, provided health information and epidemiology statistics, and ensured frontline health care workers had the necessary Personnel Protective Equipment (PPE) and safety equipment.

## Prevention and Initial Preparedness

---

***Prior to COVID-19, LAWA's plans had not focused on prevention, and its existing plans were less relevant due to the unique nature of COVID-19.***

Federal response planning for a pandemic was based on historical pandemics related to influenza in which vaccines and anti-viral drugs were available for distribution. This health emergency differed radically from previous ones in the past 100 years, and even from the more recent SARS influenza.

***COVID-19 was more communicable, more deadly, and more difficult to identify due to asymptomatic carriers.*** Health responses, such as vaccines, therapeutics, and therapy devices, were either not effective or not available. ***COVID-19 was uniquely challenging and there was no "playbook" to work from.***

---

## Response During the First Two Months

*In the face of the unique nature of this public emergency, LAWA's response to the initial reports of the crisis was rapid and well communicated.*

LAWA responded rapidly to COVID-19. The timeline highlights some of the specific actions taken during the first quarter of 2020 by LAWA and City of Los Angeles in response to COVID-19:

### LAWA's Initial Responses to COVID-19 During First Quarter of Calendar Year 2020

#### Late January 2020 Through February 2020

Justin Erbacci, LAWA Chief Executive Officer (CEO), in his January 26, 2020, CEO Message to all LAWA employees:

- Alerted staff to presence of a Corona virus that originated in Wuhan, China, was found in California
- Provided staff with tips on preventing the spread of coronavirus in the United States
- Provided staff with tips on how to protect themselves and reduce the spread of germs
  - Avoid close contact with people suffering from respiratory infections
  - Stay home if one had symptoms of a respiratory illness
  - Wash hands frequently and for at least 20 seconds with soap
  - Use alcohol-based hand sanitizers if soap and water are not available
  - Cover mouth and nose with tissue or sleeve when coughing or sneezing
  - Avoid unnecessary travel to the affected areas
- Created an LAX Public Health Advisory for posting in terminals and offices

CDC began screening passengers arriving from Wuhan, China, at LAX. U.S. Customs Border Patrol (CBP) and LACDPH were also involved in this process. LAWA:

- Coordinated with CDC, CBP, and LACDPH officials on required health and safety related measures
- Placed signage throughout LAX to provide guests with tips on how to protect themselves
- Installed hand sanitizer dispensers
- Ordered daily deep cleaning of restroom facilities and other public areas

CDC and LACDPH were not recommending personal face masks, but LAWA CEO let employees know that they could wear a mask if they wished to do so.

Deputy Executive Director (DED) of Operations and Emergency (O&E) Management issued a Safety Bulletin to Operations and staff regarding how to perform their jobs safely in light of COVID-19.

#### March 1-2, 2020

Justin Erbacci, LAWA CEO, in his March 2, 2020, CEO Message:

- Shared what LAWA was doing to keep employees, guests, and the greater LAX and VNY communities safe from COVID-19
- Asked employees to stay home if sick; instructed supervisors to accommodate requested sick leave for staff
- Informed staff that LAWA was in close contact with and following guidelines from public health experts at the CDC, CBP, and LACDPH to keep employees and passengers safe



## LAWA's Initial Responses to COVID-19 During First Quarter of Calendar Year 2020

- Alerted staff that LAWA was facilitating implementation of Federally mandated screening of travelers with possible exposures
- Began numerous other measures:
  - Installed more than 250 additional hand sanitizer stations throughout terminals
  - Cleaned terminal public areas and restrooms at least once per hour
  - Used virus and bacteria-killing disinfectants
  - Increased deep cleaning, focusing on “high touch” areas, such as handrails, escalators, elevator buttons and restroom doors
  - Coordinated with LAWA's contracting partners to ensure their cleaning crews followed the same cleaning protocols
  - Added signage to high traffic areas with information on COVID-19 symptoms and how to reduce the spread of illness
  - Provided gloves to cleaning crews
  - Provided resources, links, and information from LACDPH and CDC on “How you can stay healthy” to staff

CDC employees proactively contacted all passengers who had traveled to China in the past 14 days with health and travel questionnaires for self-identification.

LACDPH staff began monitoring for signs of ill passengers who presented signs and symptoms of disease at LAX. This screening was built on established infectious disease protocols.

LAWA coordinated daily with Federal, State, and local partners, including Centers for Disease Control and Prevention (CDC), Transportation Security Administration (TSA), and State and local health departments to:

- Put procedures in place in the event passengers approach employees and state they may have COVID-19
- Put protocols in place to support CDC at LAX to isolate their screening operation from LAX employees and the public

### March 4, 2020

Justin Erbacci, LAWA CEO, in his March 4, 2020, CEO Message:

- Notified LAX staff that the Mayor of Los Angeles had issued a declaration of local emergency and activated the City Emergency Operations Center
- Launched a website to update passengers and provide information on efforts to protect them from the COVID-19
- Updated LAWA's employee website page with employee specific information related to COVID-19
- Alerted staff that one of the contracted medical professionals conducting screenings at LAX tested positive for COVID-19

### March 5, 2020

Justin Erbacci, LAWA CEO, in his March 5, 2020, CEO Message:

- Informed managers about LAWA's ongoing response to COVID-19; shared a link to the meeting with staff, thanking them for being diligent
- Reminded staff of the website for information about LAWA's COVID-19 efforts

### March 6-12, 2020

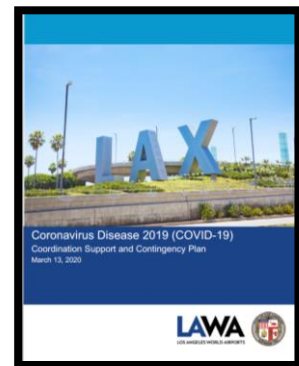
- Budget messages were presented to conserve funds (presented to BOAC with update).

## LAWA's Initial Responses to COVID-19 During First Quarter of Calendar Year 2020

- LAWA staff from the Emergency Management Team were deployed to the County and City Emergency Operations Centers to participate and report back to the executive team at LAX.
- First positive COVID-19 passenger tested at LAX.
- Nighttime closures to the public were implemented at LAX.
- Airline and concessions task forces were established.
- CDC and LACDPH were not recommending personal face masks.
- Protocols were put in place to support CDC at LAX to isolate their screening operation from LAX employees and the public.

### March 13-15, 2020

- On March 13, 2020, and at the direction of the Office of the Mayor, LAWA's EMD released its 80-page "Coordination Support and Contingency Plan" for COVID-19. The plan outlined assumptions, communication plans, mission critical functions for continuity of operations, and other responses.
- Telecommuting policy was under review by the City of Los Angeles.
- LAWA ordered that in-person meetings be avoided and held via conference call or WebEx.
- No visitors were allowed in administrative buildings.
- Two LAWA staff tested positive for COVID-19.
- LAWA stressed social distancing to its staff.



### March 18-19, 2020

- "Safer at Home" required County of Los Angeles residents to stay at home except for essential activities such as getting medical care or food.
- LAWA instituted a telework program by March 19, 2022.
  - It established protocols and organized teams to work staggered reporting hours to reduce risk of widespread contamination in the workplace.
  - Some LAWA employees (e.g., administrative positions) began to work remotely; other LAWA employees with responsibilities directly serving LAWA customers continued to work onsite with appropriate safety protocols.

By April 3, 2020, there were 1 million COVID-19 cases worldwide and 4,045 COVID-19 cases in Los Angeles County. LAWA continued to put other public health initiatives in place:

- LAWA developed "COVID-19 Patrol Operation Guidance for Supervisors" (May 2020)
- LAWA created a Standard Operating Procedures playbook for "COVID-19 Enhanced Sanitizing and Disinfecting Protocols" (June 2020).
- LAWA procured safety equipment for staff, including cloth, disposable, and surgical masks; gloves; and hand sanitizer, to name a few.
- Plexiglass was installed as protective barriers for employees.
- LAWA instituted Level 3 cleaning throughout the day in the control tower.

- LAWA upgraded its air quality by improving HVAC systems with ionization and UVC lights (ultraviolet light that kills airborne corona viruses) and used electrostatic sanitation.
- LAWA rolled out a “Daily Self Screening Web App” for all employees reporting to LAWA worksites. The app was also modified to verify employees’ vaccination status per the Mayor’s Directive.
- LAWA installed hands-free faucets, soap dispensers, and automatic hand-sanitizer dispensers.
- LAWA unveiled a touchless global entry kiosk in the Federal inspection areas, which uses facial recognition technology to screen and confirm passengers.
- LAWA launched other initiatives, such as self-serve bag drop, LAXOrderNow services, additional PPE vending machines, and an expanded digital concessions program to reduce human contact.

**LAWA engaged all senior executives to coordinate and develop responses to COVID-19 to protect staff and the traveling public.**

In March 2020, the executive team started meeting daily to respond both to emerging health issues and operating implications of the COVID-19 pandemic. On April 30, 2020, LAWA CEO Justin Erbacci announced in his CEO Message the establishment of a COVID-19 Recovery Task Force, displayed in Figure A.4, and its seven workstreams. Each workstream had working groups to coordinate the COVID-19 response. The aim was *“...to ensure everyone is able to travel and work safely at LAX.”*

**Figure A.4: Task Force Work Streams**



The approach that LAWA took entailed coordination across the workstreams:

- The executive team met daily, starting in March 2020.
- Each workstream defined its objectives, approach, work plan, and schedule. The workstream leads (who were all executives) met with sub-stream participants at least once per week.
- The assigned individuals were to provide regular updates to the executive team and BOAC, as *“... next steps in our recovery and return efforts”* were identified.

- Task Force coordinators kept track of overall progress and supported coordination across workstreams by participating as members on multiple substreams.
- Weekly reports were prepared that provided updates on the topics being addressed by the workstreams.
- LAWA's CEO provided regular updates to BOAC.

Examples of the actions taken as a result of the Task Force workstreams are cited in the LAWA CEO's Messages:

- In preparation for Memorial Day weekend (May 23-25, 2020) – a busy air travel holiday, the LAWA CEO announced the first phase of communicating the COVID-19 Recovery [Task Force actions](#), including tips on how to travel safely at LAX and LAWA's preventive measures
- On June 10, 2020, the LAWA CEO message outlined actions from the "Setting Our Organization Up for Success" workstream, involving organizational restructuring and division consolidation, furloughs, telecommuting, return to working on-site, plans for vulnerable populations, additional budget cuts, and a separation incentive program.
- On July 2, 2020, in preparation for another busy air travel holiday – the July 4<sup>th</sup> weekend, the CEO Message contained precautions to take and new COVID-19 handouts for LAWA employees. The COVID-19 Recovery Task Force prepared the handouts in English and Spanish and posted them on the employee portal.
- On July 10, 2020, the COVID-19 Recovery Task Force provided an update on "Getting Passengers Back to the Airport," involving the installation of UVC lights at the Tom Bradley International Terminal (TBIT) and Terminal 1 (selected escalators and a restroom). The "Communicating and Engaging with Stakeholders" workstream launched a new webpage on "Travel Safely at LAX" campaign, including information on [LAWA partners'](#) COVID-19 responses.
- On July 31, 2020, the CEO Message outlined the work of the "Setting Our Organization Up for Success" workstream and its five sub-streams that addressed procurement, legal, and accounting; digitizing processes; and internalizing activities previously performed by external consultants.
- On August 20, 2020, the LAWA CEO provided an update to BOAC on the COVID-19 Task Force initiatives, including a thermal scanning pilot, and facility modifications (e.g., touchless faucets, Plexiglas barriers, and COVID-19 testing facility).

LAWA regards this Task Force approach as a model for future response efforts. They report that it helped them to approach the COVID-19 pandemic strategically and shape effective policies, manage daily operations activities, and implement initiatives for recovery.

In addition, because COVID-19 led to a decrease in the traveling public and concomitant decrease in facility usage, LAWA accelerated some construction projects, saving both time and

money. The construction projects are elaborated on further in Part C on “Capital Projects” of this IEA Survey Report.

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***LAWA worked collaboratively with other agencies in coordinating responses.***

LAWA’s focus on internal and external collaboration was helpful. Federal partners at LAWA give high marks to LAX personnel for cooperation and information sharing. For example, Federal Aviation Administration (FAA) staff members at LAX reported that they were the only FAA group in the nation asked to join bi-weekly meetings with airport management. LAWA also worked with the airlines, TSA, CBP, and other partners that were also instituting responses to protect their workers. In addition, testing, vaccination, and sanitizing protocols were adopted and appreciated.

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***LAWA faced challenges when LACDPH had minimal capacity to quarantine airline passengers suspected of having COVID-19 in the initial start of the pandemic.***

CDC and LACDPH issue quarantine orders and must provide quarantine locations. Responsibility for quarantine planning and management is the sole responsibility of the agency (CDC or LACDPH) issuing the quarantine order.

At LAX, passengers suspected of having COVID-19 at the time of the initial outbreaks had to be quarantined. Some of the arriving passengers suspected of being infected were forced to sleep on cots until LACDPH could move them to March Air Reserve Base for quarantine purposes. The March Air Reserve Base is located in Riverside County – 83 miles from LAX. Transportation to the quarantine location was limited to one bus operated by LACDPH. The drive time for a round trip is between 3 to 4 hours. Multiple trips were required to relocate all arriving passengers suspected of being infected with COVID-19.

During that time, LAWA airport emergency staff brought food, diapers, and water to the interim holding area, as this need had not been anticipated.

### **Continuation of Response**

After the first two months, it was clear that the COVID-19 pandemic was going to last much longer than had been originally anticipated.

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***One of the greatest COVID-19 challenges at LAX and across the nation was conflicting policies and requirements from Federal, State, and local, governments.***

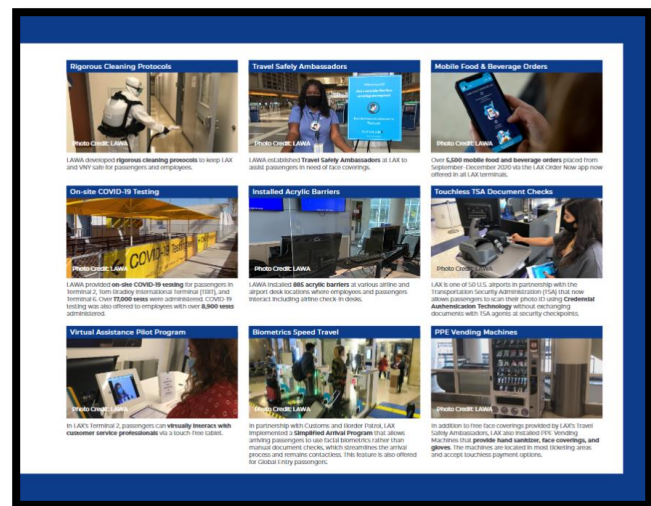
Many of the challenges that LAWA faced were common at other U.S. airports and governmental agencies across the nation. The complexity of LAX – nine terminals, each the size

of many cities' airports, and its diversity of passenger origins – presented unique challenges from many other U.S. airports.

## COVID-19 MULTIPLE INFORMATION SOURCES

***As new information surfaced over time, strategies and tactics to address COVID-19 changed from week to week at the County, State, and Federal levels.*** These changes led to difficult decision-making and communication challenges at the local level. LAWA conscientiously responded to COVID-19 requirements, based on existing response plans and the information available at a given time.

One of the greatest COVID-19 challenges was obtaining reliable information about the most effective policies and procedures. This access to information challenge affected LAX, other airports, other governmental agencies, and companies across the nation and globally. LAWA received information about how to respond to the COVID-19 situation from multiple sources: CDC, Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor (USDOL), State of California Public Health, LACDPH, the Governor's Office of California, and the news media. At times, this information was conflicting or incomplete. As a result of the uncertainty of the times with the initial outbreak of COVID-19, LAWA staff and other LAX-based employees described their confusion during KH interviews.



At the start of COVID-19, the public expected LAX to have up-to-date COVID-19 data and information; however, LAWA was in the same position as other U.S. airports, striving to sort out the guidance and protocols.

Even the CDC could not predict how the COVID-19 pandemic would spread. LAWA worked closely with the CDC's satellite office, located at LAX, to obtain CDC information updates.

## EXPANSION OF CDC'S INVOLVEMENT AT LAX

Prior to COVID-19, CDC staff at LAX had a limited mandate, primarily focused on the quarantine and isolation of animals and cargo. Once the COVID-19 pandemic began, CDC staff at LAX focused on checking for compliance with CDC guidelines. CDC staff members at LAX were not initially on the priority list of CDC staff in Atlanta, Georgia, for responding to their queries. Once



it was clear that LAX was an entry point for COVID-19, ***the role of the CDC staff at LAX changed dramatically. CDC staffing expanded from 8 to approximately 100 as the COVID-19 pandemic expanded.***

#### CONFLICTING GUIDELINES

***When LAWA issued its COVID-19 procedures based on available information and local guidelines, its procedures sometimes conflicted from what its partner Federal agencies were recommending.*** For example, within Federal spaces (e.g., CBP (Passport Control) and TSA), COVID-19 vaccines were mandated but an injunction prevented the mandate from being enforced. TSA workers were also not allowed to wear masks (April/May) because of concerns that masks might raise fear among the traveling public. In contrast, in adjacent LAX spaces, vaccines were mandated and enforced by the City of Los Angeles. Even within the Federal government response, TSA felt that they were getting mixed messages from CDC on passenger quarantine processes.

***Origin and destination airports are commonly located in different political and legal jurisdictions. Those jurisdictions had different infection levels and different understandings of the necessary health mandates,*** such as mask requirements and vaccinations. One airline commented that varied COVID-19 responses at airports caused confusion with the traveling public, and difficulty on the part of airlines in supporting their staff and their passengers in complying with regulations. An example given was that passengers could leave an airport that did not require masks and land at LAX where masks were required. Even in Fall 2022, Asian airports had stricter safety protocols than U.S. airports that the passengers traveling to those destinations had to know and comply with.

As time passed and public health officials learned more about the COVID-19 virus, modifications were made to protocols. For example, at LAWA, temperature checks of individuals were tested on a substantial number of departing passengers and no abnormal temperatures were discovered. When these data were reviewed and found to be of little value, testing was discontinued.

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#### ***Rapidly preparing employee and contractor safety protocols was a challenge at LAWA and across the nation.***

LAWA had to take steps necessary to protect the health of its employees and contractors.

LAWA demonstrated concern about employee safety. LAWA's Human Resources Division (HRD) established safety protocols, consistent with local and Federal public health agencies as early as mid-March 2020 – near the date of CDC's publicized requirements. Rapid, clear, and consistent

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details were not always possible, however, even around prosaic issues such as how many people can safely ride together on an elevator. Causes for this challenge were:

- Evolving, inconsistent, and changing information from different sources
- Conflicting policies from Cal-OSHA, Federal partners, and the City of Los Angeles

Trust in LAWA's recommendations for COVID-19 was harmed by changes beyond its control, such as highly publicized "reversals" regarding the helpfulness of mask mandates (originally considered unnecessary) and temperature testing (originally considered helpful).

***LAWA rapidly modified physical spaces to preserve employee, contractor, and partner safety.***

Specific examples of these physical space challenges were:

- Early in the pandemic, CDC struggled to find space for its employee workforce that expanded from approximately 8 employees to about 100 at LAX. These additional CDC staff needed larger work areas.
- Social distancing became a problem in moving crews onto LAX construction sites because of bus passenger loading restrictions.
- There was a lack of temporary quarantine space.

***LAWA was responsible for reporting COVID-19 cases at all LAX sites to LACDPH but had to rely on voluntary cooperation from the airlines and other partners to get the information.*** Because the current airport rules and regulations are silent on this issue, LAWA could not require partners to provide accurate information that LAWA was responsible for providing to LACDPH.

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***LAWA's "COVID-19 Enhanced Sanitizing and Disinfecting Protocols" playbook earned industry accreditations.***

LAWA's Standard Operating Procedures (SOP) playbook for "COVID-19 Enhanced Sanitizing and Disinfecting Protocols" (June 2020) earned industry accreditations from Global Biorisk Advisory Council (GBAC™) that accredits [STAR facilities](#) and ACI's Airport Health Accreditation. GBAC STAR facilities are the gold standard and "...demonstrate that a comprehensive program is in place supporting health, wellness, and resilience." To meet GBAC STAR standards, an accredited facility demonstrates that it is "...equipped and ready for what's next, they're also able to adapt quickly and withstand challenges." GBAC STAR also reviews the cleaning program to enhance occupant health, including "...cleaning protocols, disinfection techniques, and work practices in place to nurture occupant health and meet any biosafety challenges," along with proof that cleaning crews are trained in these standards for cleaning and maintaining the facilities.

## LAWA'S APPLICATION TO THE GBAC STAR™ PROGRAM

LAWA described 20 "elements," including the requirements and its responses. These elements involved such topics as terminal organizational roles, responsibilities, and authorities (element

1), including a table listing the organization (“company”) with overall responsibility, job title or organizational unit in the lead role, and the described responsibilities; sustainability and continuous improvement (element 3) with a table of “plan, do, check, and act” assignments; PPE quantities available (element 12); personal training and competency (element 14); worker health program (element 17); and documentation management (element 20), to name a few.

## LAWA’S APPLICATION FOR THE ACI AIRPORT HEALTH ACCREDITATION

LAWA completed a questionnaire on a number of practices, including cleaning and disinfection, and availability of disinfecting products (e.g., hand sanitizer dispensers in service by terminal); cleaning and disinfection staff awareness of the plan; available PPE; physical distancing for passengers, employees, and others; protocols for hand sanitizers, face coverings, and health screenings; passenger communications and flow (check-in, lounge areas, boarding, baggage claim, etc.); staff training; and maintenance and repair. LAWA attached supporting documents from outside groups, such as ABM Industries, Inc.’s overview of its enhanced cleaning protocols; Greenworld Maintenance, Inc. standard operating procedures for janitorial cleaning and schedules; LACDPH guidelines on cleaning and disinfection matrix; and its O&M’s new Standard Operating Procedures on “COVID-19 Enhanced Sanitizing and Disinfecting Protocols” (June 2020), to name a few.

### ***LAWA opened a COVID-19 rapid test lab onsite at LAX.***

LAWA opened a COVID-19 rapid test lab onsite at LAX on December 31, 2020. The primary lab was at Terminal 6, supplemented with open-air collection windows. Customers received test results electronically. A standard PCR test cost was \$125; customers were given itemized receipts to submit to their insurance providers for reimbursement. Testing was free in various Los Angeles County localities during the COVID-19 pandemic; however, the rapid-turnaround of test results at LAX was important to some air travelers, particularly international travelers for entry into foreign airports with narrow time periods for accepting test results. The lab eventually included an immunization site.

Both Federal and LAX employees cited the on-site laboratory and immunization services as an excellent resource for both Federal and LAX employees and the traveling public.



***Similar to the rest of the nation, LAWA faced supply shortages and collaborated to help fellow agencies during the first 9 to 12 months of the COVID-19 pandemic.***

LAWA faced supply shortages, similar to other entities nationwide, particularly in 2020 and the first part of 2021. For example, early in the COVID-19 outbreak, LAWA and other agencies struggled to establish employee safety protocols in a timely manner. PPE supplies were short. Before TSA was forbidden to wear masks, TSA was running out of PPE for its staff. As an example of collaboration and cooperation to keep passengers and TSA staff healthy, LAWA installed acrylic barriers.

## Planning for Preparedness and Recovery

***Recognizing the need to formalize planning related to diseases, LAWA completed an Infectious Diseases Response Plan in February 2021.***

In February 2021, LAWA's EMD released its "Infection Disease Response Plan" to:

*"...clarify and codify response protocols, outline communication flows, delineate roles and responsibilities, and provide courses of action (COAs) for leadership to utilize during public health emergencies."*

The goals were to:

- Minimize virus transmissions in coordination with public health authorities and directives
- Return LAX and VNY to full operations, based on available knowledge and understanding of infectious disease transmission
- Evaluate and revise the plan based on public health experts' guidance and new knowledge about infectious disease transmission became known

**Figure 2: Triggers & Notifications.** the identification of an infectious disease threat may be based on the triggers and alert levels detailed in **Table 1: Infectious Disease Alert System** below. Please note, this system was developed by the LAWA Emergency Management Division specifically for use at LAWA airports.

**Table 1: Infectious Disease Alert System**

Alert Level	Description/Triggers	Action to Take
4 – Very High Risk	Widespread community* outbreak that is growing; potentially large number of undetected cases.	<b>Take strong measures to limit all contact:</b> <ul style="list-style-type: none"> <li>All individuals should stay home when possible, including employees</li> <li>Only essential services should maintain operations</li> <li>Travel should be severely limited</li> </ul>
3 – High Risk	Many cases including community spread, with undetected cases likely.	<b>Limit everyday activities to increase safety:</b> <ul style="list-style-type: none"> <li>The general public should reduce non-essential travel</li> <li>Businesses can remain open with proper precautions (e.g., face masks; caps on number of individuals in gatherings)</li> <li>High-risk individuals should stay home or shelter when possible</li> </ul>
2 – Moderate Risk	Moderate number of cases, with most cases from a known source.	<b>Increase efforts to limit personal exposure:</b> <ul style="list-style-type: none"> <li>The general public can travel with proper precautions and should wear a mask in public</li> <li>Large public gatherings should include enhanced safety features (e.g., social distancing)</li> <li>High-risk individuals should limit public travel and take safety precautions</li> </ul>
1 – New Normal	Cases are rare and contact tracing can be used to control the virus.	<b>Take everyday precautions:</b> <ul style="list-style-type: none"> <li>All individuals should practice personal infection control: wash hands regularly, cover coughs, keep surfaces clean</li> <li>Wear a mask and stay home if sick</li> </ul>

This plan was prepared in conjunction with LACDPH, Los Angeles Department of the Medical Examiner/Coroner, Los Angeles Fire Department, the Federal CDC, TSA, and CBP. The plan details:

- Triggers and notification protocols
- Alert levels from green to red

- Organizational responsibilities within LAWA departments
- Protocols for convening an interagency response team
- Immediate and ongoing response assignments among the agencies
- Contact tracing

The plan covers known infectious diseases (e.g., Ebola, measles, botulism, cholera, dengue, etc.), and recognizes that future diseases may be unique, as was COVID-19. It will be important to keep the plan updated.

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***LAWA recognized the importance of considering recovery efforts as early as April 2020 and developed a proposed framework for discussion.***

Governor Newsom plans to announce the end of the COVID-19 pandemic, effective December 31, 2022. Therefore, LAWA had not officially started a recovery phase at the time of this IEA Survey Report.

In preparation for recovery, LAWA developed a dense two-page overview that established objectives and proposed action assignments for:

- Prioritizing passenger safety
- Ensuring staff and employee well-being
- Protecting stakeholders' businesses
- Caring for the community and local workforce
- Building resistance and resilience to future pandemics

## A.3 RECOMMENDATIONS

### Overall

***Scientists anticipate that there will be more viral diseases because of the disrupted environment and human-animal contact. The global nature of travel will increase the rapidity of the spread.*** Scientists have observed that 70% of emerging infectious diseases across the globe are passed to humans via contact with animals, an occurrence that is likely to accelerate as humans expand their dwellings into wildlife habitats. China has experienced two major outbreaks, including SARS in 2002-2003 and COVID-19, both possibly originating from bats.

Epidemiologists have predicted that airlines would enable the rapid spread of infectious diseases globally. Individuals will become infected in one part of the world, incubate on an airline flight, and then become ill and contagious thousands of miles from an outbreak. More than likely, COVID-19 is an example of what the future might hold for the City of Los Angeles as a major world city. LAX is a central piece of Los Angeles's local pandemic response with unique

responsibilities, access to data to provide potential early warning, facilities, challenges, and expectations.

As recently as October 2022, the Biden Administration required the United States to screen air passengers arriving from Uganda or had been to Uganda for the Ebola virus. These passengers were redirected to one of five airports for screening for the virus and alerting physicians of potential cases in the United States. Although LAX was not a designated screening airport for the Ebola virus, it could easily be assigned this role for other viral diseases. Moreover, it is not always newer viruses that are the only concern. Tuberculosis, which is airborne, remains the world's deadliest infectious disease and is the leading cause of deaths attributed to infectious diseases after COVID-19 (even more deadly than HIV/AIDS).

LAX is part of the global airline industry. What affects one airport affects other airports and their adjacent populations. Consequently, COVID-19 and other contagious diseases require a global approach to:

- Combat the spread of the pandemic
- Allow for air traffic operations
- Implement technological innovations
- Train staff to use new technologies and approaches and follow safety protocols
- Develop an aviation preparedness plan for disease threats, not just for LAX but across the nation ([GAO recommendations](#))

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***Rec. IA-1: LAWA should assume a larger role in ensuring plans are in place across all involved jurisdictions to respond quickly to viral infections that enter the greater Los Angeles area through LAX.***

Because the air travel industry is likely to be central in viral pandemic spread in the future, the industry must be central in identifying and deploying resources in planning for prevention, preparation, and response. LAWA is the City's link to air travel and a gateway for international and domestic travels to Southern California.

CDC and LACDPH are the lead agencies for responding to infectious diseases. During the outbreak of COVID-19, however, they were not positioned to respond rapidly at LAX and other U.S. airports. KH is not suggesting that LAWA replace these agencies, only that it assume a bigger role in ensuring that the plans are in place and coordinated and will work at LAX. For example:

- LACDPH may be in charge of handling quarantining, but LAWA needs to ensure such plans are in place, sites and transportation are identified, and the plans can be activated through



its Airport Response Center (ARC) and with its partner agencies, airlines, tenants, and employees.

- LAWA may need to provide holding areas (e.g., hangars, tents, sanitation facilities, etc.) until passengers can be transported to March Air Reserve Base or another location identified by LACDPH. LAWA should work with LACDPH to explore holding or quarantine localities that are closer to LAX.
- Airport operations may need to accommodate instructions to refuel aircraft that have infected passenger(s) and continue directly to March Air Force Base instead of having the passengers disembark at LAX.

These are just some of the examples of public health responses that LAWA can provide insights to public health officials on regarding the many logistical issues that need to be addressed and coordinated at LAX.

LAWA should ensure that plans are in place and regularly updated across all relevant jurisdictions so that immediate actions can be put into place to respond to viral infection outbreaks that will enter the Los Angeles region through LAX and VNY. As is the case with other types of incidents, LAWA will most likely have to respond without the luxury of extensive advance warnings. Preparation requires regular drills and tabletop exercises. LAWA and the other involved agencies should conduct joint exercises to improve existing plans and uncover any weaknesses in its response model for sudden viral outbreaks.

This situation is analogous to LAWA's mobilization after 9/11 to reduce the threat of terrorist activity. Not being proactive regarding infectious diseases would be similar to LAWA's saying that the Federal Bureau of Investigation (FBI) and Los Angeles Police Department (LAPD) is taking care of terrorist threats to LAX. There is no doubt that those agencies are key players. And it is a central responsibility of those agencies. There is also no doubt that having LAWA staff focused on terrorist response has also been required. In response to 9/11, LAWA:

- Consolidated its Airport Police functions at LAX, VNY, and ONT
- Created an executive-level position to oversee these consolidated Airport Police functions and coordinate efforts with Federal (e.g., TSA, CIA, and Homeland Security) and local (e.g., LAPD, Sheriff) authorities
- Hired a person with experience in terrorism response to interface with Federal and State representatives

Based on what happened with COVID-19, LAWA has many lessons it has learned to better protect LAX workers, City residents, and traveling public. KH recognizes that ensuring that plans are in place for preventing, preparing, and responding during aviation-related health emergencies has not been a traditional responsibility for LAWA. It must start taking a bigger



role in ensuring that 1) past problems are addressed when responding to any future pandemic and 2) CDC, LACDPH, and other involved organizations are fully ready with contingency plans and contracts that will work at LAX.

In many ways, being prepared in this arena is analogous to the presence of LAFD at LAX to provide crash, fire, rescue, and security services. LAWA provides a site for LACFD and coordinates LACFD's plans with Airport Police and other components of LAX operations.

"We did not know..." was true for all agencies dealing with the COVID-19 pandemic. LAWA now does know and must ensure more complete preparation. LAWA must take prudent and reasonable actions to reduce the risk of potentially catastrophic viral disease impacts on the public's health and LAWA's finances and operations.

The recommendations in this analysis should be considered in the broader context of infectious disease control for the protection of LAWA staff, partners, the traveling public, and greater Los Angeles residents. Our recommendations outline steps that could be taken to "harden" LAX for another pandemic agent that could infect and be transmitted by the traveling public.

Although LAWA may not be directly responsible for some of these aspects, the public equates LAX activities with LAWA as the overall responsible party, regardless of the issue or jurisdiction involved (e.g., LACDPH, TSA, CBP, or the airlines).

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***Rec. IA-2: LAWA EMD's responsibilities should be expanded to explicitly include management of public health and pandemic responses and supplemented with expertise in epidemiology.***

As we all learned from COVID-19 and discussed earlier, coping with pandemics is everybody's job. It is in LAWA's self-interest to take strong actions to reduce the likelihood, duration, and impact of serious public health emergencies. LAWA's vision includes safe and secure airports. LAWA's financial and operational sustainability depends on managing risks that impact the traveling public. LAWA was prepared to address prior public-health emergencies (e.g., SARS) and responded heroically to COVID-19. Hindsight from lessons learned in the COVID-19 pandemic shows that additional prevention and preparation efforts would have made for a smoother and less disruptive response, especially at the beginning of the emergency. Prevention actions can also halt or limit the spread of disease, allowing for improved outcomes.

***LAWA should hire or retain in EMD the services of an epidemiologist or public health planner with a background in infectious diseases and disease control to oversee LAWA's prevention, preparation, and response to health threats.*** As already noted, the need for this position is analogous to the hiring of intelligence professionals after 9/11, who had the clearances needed



to interact with local and national intelligence agencies, combined with local knowledge of airport needs and conditions. Likewise, there is an important alignment of knowledge, skills, and abilities needed for this effort.

***On the public health side***, the incumbent must be able to:

- Interact with CDC, LACDPH, and State, City, and County emergency operations groups
- Monitor and understand how global infectious diseases might affect LAWA in general and LAX specifically
- Harmonize the Federal, State, and County public health guidelines for airports and airlines
- Speak with authority and force on disease-related issues within and across the Los Angeles and aviation communities

***On the LAWA airport side***, the incumbent must be able to:

- Advocate on public health issues with LAWA facility planning staff
- Work with operations staff to understand the impact of public health proposals on LAWA and advocate for effective and non-disruptive approaches
- Collaborate on response plans and updates as facilities and operations change

This role will require inclusion in LAWA's strategic and operational decision-making on an ongoing basis.

***On the aviation industry side***, LAWA reports that it actively works with FAA, ACI, AAAE, CAC, Large Hub Airport Group, TSA, Homeland Security, CEO group, CFO group, Government Affairs, and the City of Los Angeles on public health issues. In support of these LAWA efforts, the incumbent must be able to:

- Advocate for a unified response to health threats
- Participate and stay abreast with the reports from the Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA) and other relevant organizations
- Work with industry groups to advocate with the FAA for funding authorizations (see Recommendation IA-3)

Dallas Fort Worth (DFW) airport is cited as an airport that appears to have implemented many best practices. When interviewing DFW management, they identified the presence of an individual with a background in epidemiology as a key element of its ability to understand the infectious disease environment and respond accordingly during COVID-19.

An epidemiologist or public health planner with a background in infectious diseases can help ensure that LAWA's needs are in place to protect airport employees, the traveling public, and residents throughout the region arising from unnecessary entry or spread of such viral diseases.

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***Rec. IA-3: LAWA executives should continue to actively engage industry groups to advocate for funding and support for prevention, preparation, and response to public health emergencies.***

LAWA staff have expressed concern that adopting a more active role in pandemic and other public health emergencies will exceed FAA limitations on the use of LAWA revenues generated at LAX for non-aviation purposes. Clarity around whether or how those limitations would impact decisions on prevention, preparation, and response to emergencies is important.

To the extent that there is a significant impact, LAWA should advocate for:

- The FAA to revisit or modify the interpretation of its FAA rules, many of which were written without the context of the COVID-19 experiences and other pandemic events at airports
- Congress and the FAA (to garner FAA support) to make airport revenues or other Federal funds available for preparing and protecting the traveling public from viral diseases and responding to public health requirements at airports as required

These lobbying efforts can occur at three levels: the Los Angeles City Congressional delegation, the various airport associations that LAWA belongs to, and other U.S. international airports facing the same challenges as LAX.

## Prevention

Prevention actions that LAWA can take cannot keep another pandemic from happening. They will enable LAX to have more targeted responses, have better working relationships with their Federal and LACDPH partners regarding infectious disease response, and have lower disease transmission rates within LAX, potentially limiting the spread of a viral disease to greater Los Angeles.

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***Rec. IA-4: LAWA should continue to monitor and adopt best practices related to preventing the spread of infectious diseases within the airport community.***

LAWA has identified useful prevention efforts from its response to COVID-19. Sanitation practices adopted by LAWA after the start of the COVID-19 pandemic have become industry standards and are accredited by two outside organizations: GBAC and ACI's Airport Health Accreditation. LAWA plans to maintain that accreditation. Other practices, such as the use of plastic barriers, will continue to reduce exposures of airport workers and the public to infectious diseases. Areas that LAWA should continue to monitor and remain abreast of are:

- ***Continuously strengthen facilities, technology, and HVAC systems.*** LAWA reports that it is currently monitoring ways to improve its facilities and operations to protect against

infectious diseases. As discussed in Part C, LAWA has installed state-of-the-art HVAC systems in its new facilities, such as Terminal 1.5 and Bradley West Gates.

This monitoring is important because new advances keep emerging and LAWA needs to stay on top of them. Given the COVID-19 pandemic, the HVAC industry is aggressively improving air filtration and purification systems to reduce transmission of airborne illnesses. LAWA should continue to track industry improvements in HVAC air handling systems that remove infectious agents within the terminals and adopt them wherever possible.

LAWA has plans to increase “touchless” travel with fully automated self-service passenger traffic flows, a prevention tool that can serve to reduce transmission of contagious diseases even further.

- ***Be prepared to re-establish laboratory and immunization areas.*** LAWA reports that it has plans to discontinue its laboratory and immunization areas since the demand is down for such services with COVID-19. Maintaining the testing laboratory and immunization area established at LAX has proven to be of significant utility in assisting staff and travelers requiring 1) testing data for traveling (negative COVID-19 tests) or 2) an immunization for personal safety or regulatory compliance.  
LAWA should maintain the on-call availability of such services. It will be important for the chosen laboratory to 1) continue to review the literature and 2) ensure that it is using the latest vaccinations and tests that will detect new variants of COVID-19 and other potential infectious diseases. Given the number of labs and service providers today working in this area, LAWA should find adequate competition for the work and be able to negotiate favorable rates with labs.
- ***Collaborate with international public health officials to learn about potential threats.*** Just as LAWA has implemented improved relationships with other organizations to learn about and combat terrorist threats after 9/11, LAWA can actively monitor global and regional infectious diseases and communicate this information to LAWA and LAX partners.
- ***Prepare to launch health inspection checkpoints if or when needed, depending on the given viral disease.*** Many international airports are adding new health inspection checkpoints. Health inspection checkpoints are a common practice at major airports in Asia. LAWA should build and test plans to set up such checkpoints at LAX.
- ***Prepare comprehensive emergency response plans that address a wide range of public health-related risks.*** In addition to viral diseases, airports have been on the alert for bioterrorism since 9/11. These responses can involve law enforcement, fire departments, airlines, public health, and other LAWA partners.

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***Rec. IA-5: LAWA EMD should work with LACDPH and the Bureaus of Sanitation and Engineering to identify an efficient means for conducting wastewater surveillance.***

Public health officials have found wastewater (sewage) surveillance can provide an early warning of viral diseases that might spread in communities. Viral diseases can frequently be detected in the waste stream from infected individuals, regardless of whether they exhibit any symptoms. Therefore, analyzing wastewater to detect viral diseases can provide a window of opportunity to act to prevent or contain the spread of a disease.

As a result, in September 2020 and in response to the COVID-19 pandemic, CDC launched the [National Wastewater Surveillance System \(NWSS\)](#) “...to coordinate and build the nation’s capacity to track the presence of SARS-CoV-2, the virus that causes COVID-19, in wastewater samples collected across the country.”

Such early surveillance is important because public health officials are notified of potential infections well before they receive reports from hospitals or doctors’ offices. Wastewater surveillance data are most robust in combination with other data related to wastewater analysis. Public health officials track:

- Percent change in virus levels in comparison to overall levels of the virus in wastewater
- Historical wastewater data for a given location
- Wastewater in areas with high tourism
- Early detection of small changes that may signal the need for early action
- Trends elsewhere that can inform public health responses

The wastewater is typically collected as it flows into treatment plants. In the case of LAX, the nearest treatment plant is nearby at the Hyperion Plant, operated by the City of Los Angeles Bureau of Sanitation. The samples are then typically sent to environmental or public health laboratories for testing.

Given the number of travelers through LAX, LAWA should work with LACDPH and the Bureau of Sanitation to develop a plan for sample collection at LAX, as part of a wastewater surveillance initiative. TBIT should be the first terminal for this initiative given the large number of international passengers using that terminal. In July 2022, 1.8 million international travelers passed through LAX.

As noted, these sewage sampling ports are important to test for viral DNA as an early warning mechanism. More far-reaching may be future collaboration with airlines in having sewage sampling done on international flights’ septic tanks at time of arrival.

The European Centre for Disease Prevention and Control (eCDC) has spearheaded wastewater surveillance across 20 European countries. Because of COVID-19, eCDC expanded its push to

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include airports for incoming flights. Using a high-level surveillance method, the process identified [new strains at Frankfurt Airport in Germany](#). The collection sites were at two wastewater streams: *“...a canal receiving wastewater from Frankfurt Airport and an influent stream at a wastewater treatment plant in the city of Frankfurt.”* Frankfurt Airport was the site of the first identified Omicron cases from an arriving passenger, a few days before its identification in the City of Frankfurt. Such early detection at airports, especially major hub airports for connecting flights within the United States and abroad, is vital since airports are a common way for the spread of a virus.

Nearer to home, the University of California at Los Angeles (UCLA) also installed sewage sampling ports in its dormitories and used the data to contain the spread of COVID-19 by isolating potential presence of the virus by dorm and even floors or wings of dorms.

During the first year of the COVID-19 pandemic, LAWA had offered to provide CDC with access to its sewer systems during the COVID-19 pandemic, although CDC was not able to accept the offer at that time. LAWA states that it is committed to *“...continue providing access to agencies who can conduct appropriate testing on LAWA's premises.”* Again, the KH team recognizes that this role is not a traditional airport responsibility, and KH is not suggesting that LAWA be responsible for the testing and reporting. Its involvement is critical in supporting wastewater testing:

- LAWA's Development Group should be responsible for planning for, designing, and installing safe access to wastewater at all terminals, starting with TBIT. The Development Group may need to work with the City's Bureau of Engineering, which is in charge of the sewer design standards that LAWA uses at LAX, if design standard modifications are needed.
- LAWA will also have to work with the airlines if waste is to be tested from specific aircraft arriving from airports with known or identified as at-risk of a viral disease outbreak. In such instances:
  - LAWA may need to have those passengers wait in isolated areas until testing is completed.
  - CBP would need to be informed when passengers from those flights are cleared for processing.
- LAWA executives should initiate the launch of a team with their counterparts in the Los Angeles City Bureau of Sanitation and LACDPH to ensure that this testing is regularly performed and can be scaled as needed.

LAWA has expressed a willingness to work with LACDPH, noting if it *“...wants to conduct wastewater surveillance testing, we can help facilitate their efforts.”*

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***Rec. IA-6: LAWA EMD should expand its relationship with CDC to support efforts to identify and respond to infectious diseases.***

In August 2022, [CDC announced plans](#) to overhaul the agency in light of lessons learned from COVID-19. The aim is to:

- Adopt a public health action orientation with faster response rates to public health crises
- Facilitate other governmental agencies working with CDC
- Simplify and streamline its website to ensure consistent public health guidance for the public and health care providers
- Share scientific findings and data faster and translate this information into practical and clear policies
- Increase CDC accountability
- Improve working relationships with its partners
- Improve work culture
- Restore public trust

A part of the organizational change at CDC is the creation of a new office of intergovernmental affairs. This office is to serve as the hub for public health information for states' health departments and other Federal agencies that interact with CDC. Given the new organizational alignment, LAWA EMD will need to identify how best to communicate with CDC headquarters, in coordination with the CDC field offices at LAX, to obtain up-to-date information and guidance.

In October 2022, The Office of the Inspector General in the U.S. Department of Health and Human Services (DHHS) issued a report, [“During the Initial COVID-19 Response, HHS Personnel Who Interacted With Potentially Infected Passengers Had Limited Protections.”](#) Although the report focuses on DHHS personnel, its recommendations are relevant for all staff interacting with the traveling public. Among its findings and recommendations are specific actions needed regarding:

- Transmission of COVID-19 through human contact through passenger travel, including the need to focus on the individual passenger during pre-departure, inflight, and post-arrival, among other actions
- Protection against all possible modes of transmission until the disease can be better understood and controlled
- The need for a comprehensive plan for recommended travel-related containment measures that weighs the risks relative to the public health benefits
- Protections for personnel interacting with potentially infected passengers
- Ensuring that PPE training meets OSHA standards

The report points out that it might have “...reached a determination earlier than September 2020 to alter its approach to travel-related transmission.”

LAWA states that it continues such efforts to coordinate with the CDC field office, regional office, and headquarters. This recommendation emphasizes the importance of maintaining and expanding CDC working relationships, particularly as CDC redefines its internal roles and responsibilities.

## Preparation

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### ***Rec. IA-7: LAWA should expand its pandemic preparation efforts.***

LAWA’s 2021 Infectious Disease Response Plan focuses on triggers and notifications of an infectious disease within existing structures. It was not intended to cover the preventive approaches at other airports (e.g., Singapore’s Changi Airport, discussed next in Recommendation IA-8). The LAWA plan also relies heavily on CDC to maintain “...*situational awareness on infectious disease events or threats globally*” and share “...*information with partners prior to any incident at LAX.*”

After-action analysis of the response to COVID-19 offers some suggestions into how LAWA can improve its preparation, such as quarantine planning.

***LAWA’s EMD should coordinate improved quarantine planning.*** The situation at LAX is similar to the role that of Los Angeles City Department of Recreation and Parks, which provides emergency shelters for individuals during times of emergencies or disasters. This department and its partner, the American Red Cross, store emergency supplies, including cots, at park locations; convert park facilities to emergency shelters during such times of need; and assign department staff to assist with the onsite relief efforts. LAWA should be prepared to work with its CDC and LACDPH partners in such a coordinated way.

Building on lessons learned during COVID-19, LAWA should either directly or through coordination with LACDPH:

- Establish contingency contracts for quarantine location(s) closer to LAX (e.g., using hotel rooms or hotel ballrooms as was done at DFW or nearby facilities such as SoFi Stadium or The Forum)
  - The collaboration could include arrangement of the contracts by LAWA, with agreements for reimbursement, as appropriate, by responsible agencies, thereby reducing the need for CDC and LACDPH to enter into separate contracts.
- Put plans in place to quickly expand space for outside agencies to work at LAX, if necessary, during a pandemic

- Plan for transportation of infected or potentially infected individuals to quarantine locations, including availability of PPE; food, water, and infant formula, supplies (e.g., diapers), buses or other vehicles, and trained staff
- Ensure availability of PPE:
  - Stockpile adequate PPE and cleaning agents for a rapid response to an expanding disease outbreak
  - Ensure that contracts are available to rapidly increase quantities of PPE
  - Manage pandemic supplies so that outdated supplies are discarded and replaced
- Develop a Memorandum of Understanding (MOU) with LACDPH to specify the ways that quarantine procedures will operate at LAX

***LAWA HRD should maintain up-to-date policies related to staffing and contractors during infectious disease outbreaks.*** Some of the HRD policies relate to distance between employees, as well as distances between passengers and airport staff (e.g., Airport Police). HRD should ensure it monitors changes and updates related to infectious diseases from the California Division of Occupational Safety and Health (CalOSHA) and, as appropriate, reflect such changes in its policies and procedures.

***LAWA executives report that they plan to maintain the workstream model developed during COVID-19 and incorporate it into plans for future pandemic responses.*** The proposed workstream framework that LAWA executives developed early in the COVID-19 pandemic was indeed a strength and presents a good roadmap for LAWA to follow. LAWA should document the workstreams in anticipation of future viral disease outbreaks, including:

- Assigned responsibility for each action
- Deadlines or milestones for accomplishment
- Procedures to be used
- Other organizations or employees involved, including their roles
- Training of employees in the assigned procedures

This documentation of the workstreams should be done in conjunction with the recommendations listed in the "Preparation" recommendations in this section. It is also important to do it now because of turnover and potential loss of institutional knowledge. For example, five of the individuals who led the seven workstreams are no longer with LAWA.

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***Rec. IA-8: In designing its new terminals, LAWA's Chief Development Officer should review what other international airports are doing to identify best practices in preparing for future pandemics.***

LAX plans to build Terminal 0, Terminal 9, and Midfield Satellite Concourse (MSC) South, adjacent to Bradley West Gates in preparation for the Olympics. LAWA's Chief Development Officer is in the best position to review and integrate best facility design practices that prepare for future pandemics and epidemics at other international airports.

Asian airports have been ahead of other airports in preparing for viral infectious diseases, starting 20 years ago with lessons learned from SARS. SARS was “...the first major novel infectious disease to hit the international community in the 21<sup>st</sup> century,” according to the [National Library of Medicine](#). For example, Changi Airport in Singapore is routinely voted among the world's best airports. As reported in [Bloomberg in August 2022](#), Singapore is building its fifth terminal (T5) at Changi Airport, scheduled to open in mid-2030s, with a revised design “...that allows it to adjust capacity during a pandemic...”. Changi T5 will not only be able to scale operations flexibly but also isolate passengers to limit cross-infection from different flights.

Even prior to COVID-19, Changi's terminals were heavily automated, using robotics and minimizing touchpoints. T5 will be able to handle 50 million travelers per year. Its plan will make it “...one of the largest and most automated passenger terminals in the world,” including:

- Technology and camera arrays that bypass the traditional flight control tower
- A laser-guided aerobridge that positions itself for passengers to disembark
- Automated vehicles to unload baggage
- Smaller sub-terminals that can operate if T5 needs to be contained
- Space that can be converted for testing or segregation of high-risk passengers
- Systems to reduce disease transmission, including contactless systems at passenger touchpoints and enhanced ventilation that can be activated during a pandemic to increase fresh air and avoid mixing air
- Construction of tunnels and other underground infrastructures
- An industrial zone

Tokyo International Airport is another example of an airport that extensively uses robots in many operational aspects to reduce the need for interpersonal contact.

LAWA should consider these practices as well as other innovations at other best-in-class airports around the world in designing its new terminals and updating existing terminals.

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***Rec. IA-9: LAWA executives should modify LAX airport rules and regulations to require cooperative reporting of infectious disease transmission.***

As noted earlier, LAWA was responsible for COVID-19 case reporting to LACDPH at LAX but was forced to rely on voluntary cooperation from the airlines and other partners to obtain the information. The current LAWA rules and regulations are silent on this issue. As a result, LAWA could not require partners to provide accurate information that it was responsible for providing. Such requirements are needed to be put in place in preparation for any future viral disease outbreaks.

This procedural change will require LAWA executive involvement with input from O&M, EMD, and Strategic Sourcing Division (SSD) regarding contractual requirements and will likely require BOAC approval.

## Response and Recovery

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***Rec. IA-10: LAWA should build on the lessons it learned from COVID-19 for future response planning, focusing on how the responses changed at the onset and during subsequent months.***

LAWA's response to COVID-19 was proactive, rapid, and comprehensive. LAWA can prepare to address disease threats in the future by:

- Learning from the challenges it faced during that response
- Institutionalizing what worked during COVID-19, such as the executive involvement in the Recovery Task Force and focus on workstreams
- Implementing the prevention and preparation recommendations in this IEA Survey Report
- Engaging the coordination model in alignment with the infectious disease planning

LAWA might think response and recovery actions in the following time frames:

- **Start of the pandemic through Month 6:** Actions needed to deal with the immediate impact and protection of staff, contractors, and the public; supply chain challenges; alternative operating locations (e.g., quarantine sites, expanded facilities for CDC staff); cash flow; reputation; information dissemination to the public; etc.
- **Month 7 through Month 12:** Actions needed to revisit all business and operating aspects if it appears the virus and associated economic impacts are to continue
- **Year 2 through Year 3:** Actions needed to change the facility configurations, technology upgrades to ensure passengers and air travel are safe and healthy, supply sources and staffing are available, etc. if the impact is more widespread to the aviation industry and internationally.





In the coming years, the passenger journey will involve more automated passenger flows, discussed in Part C, Section C.4, on the Smart Airport Model, which reduces personal contact – a public health benefit. Such technology – referred to as a digital marketplace at LAWA – requires periodic revisiting because technologies evolve, airport service users’ requirements change, and airport infrastructure needs upgrading. The use of such smart airport technology has multiple benefits: it reduces human contact for public health reasons, expedites airport procedures, increases quality of services, and reduces operating costs.

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA)

### PART B – COVID-19 IMPACT ON LAX'S OPERATIONS AND FINANCES



## B – COVID-19 IMPACT ON LAX'S OPERATIONS AND FINANCES

### B.1 LAX OPERATIONS

As discussed in Part A, the airline industry has gone through dozens of downturns, but the magnitude of the COVID-19 pandemic induced collapse in airline traffic was unprecedented – even greater than the two largest previous crises in the U.S. airline industry: the 2000 dot-com era overexpansion and 2008 financial crisis, as shown in Figure B.1.

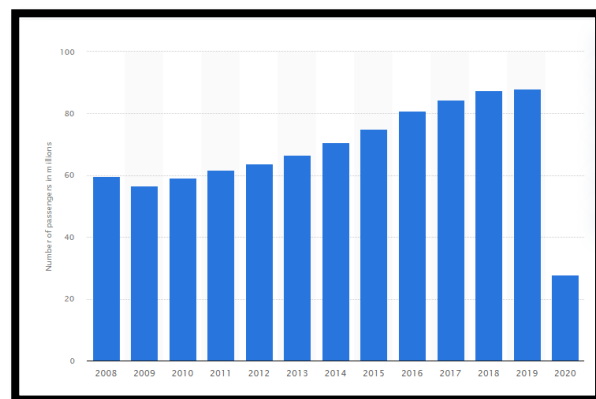
After the 2008 financial crisis, the U.S. Department of Transportation (USDOT) issued a report, [“Aviation Industry Performance: A Review of the Aviation Industry in 2008.”](#) For Los Angeles, the percent change in scheduled flights declined by 25% and percent change in scheduled seats declined by 15% from November 2007 through November 2008. Those declines, however, were minor in comparison to the declines as a result of the COVID-19 pandemic.

**Figure B.1: [Global Air Passenger Traffic \(1998-2018\)](#)**



Source: Airline Passenger Experience Association, June 2020.

**Figure B.2: [LAX Passenger Traffic \(in millions\) \(2008-2020\)](#)**



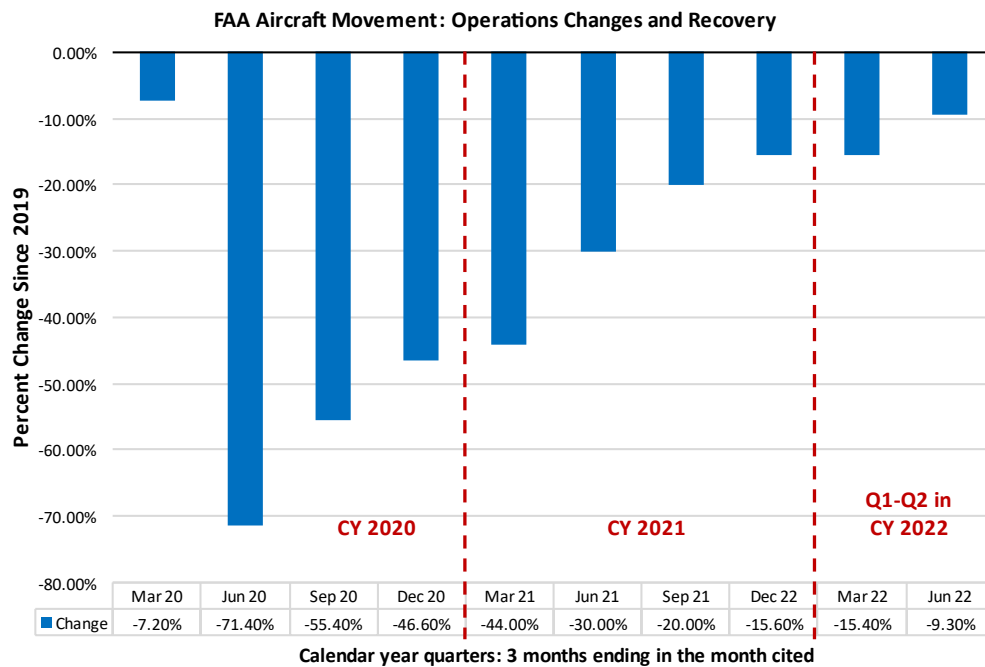
## Airport Operations

Airport “operations” is measured by aircraft arrivals and departures, including both passenger and cargo planes, as displayed in Figure B.3. This FAA aircraft movement measure includes air carriers, air taxis, general aviation, and military operations.

***LAX airport operations rebounded from –71.4% in the quarter ending June 2020 to –9.3% in the quarter ending June 2022 in comparison to pre-COVID-19 levels in 2019.***

Figure B.3 displays the gradual improvements after the initial shut down that affected the quarter ending March 2020.

**Figure B.3: LAX Airport Operations Changes, By Quarter, in Comparison to Pre-COVID-19 (CY2019)**



Source: LAWA’s Traffic Comparison (TCOM) report published at LAWA.org; data aggregated by quarter.

- **2020.** March 2020 was the beginning of the COVID-19 lock down. The initial shock effect was felt in the June 2020 quarter. The ensuing quarters show continuing recovery for LAWA.
- **2021.** Calendar Year (CY) 2021 was the first full year of COVID-19 impact.
- **2022.** Through the June 2022 quarter, LAX airport operations improvements are closer to returning to pre-pandemic levels.

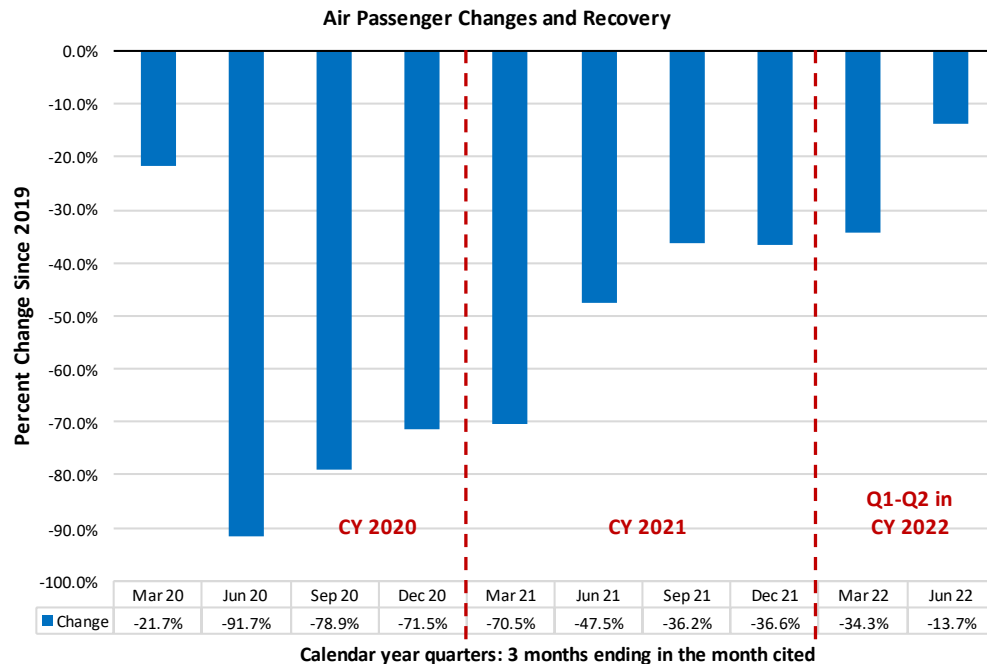
## Air Passengers

Driving the downturn in operations was air passenger traffic, including both international and domestic air travel.

***LAX air passenger traffic rebounded from –91.7% in the quarter ending June 2020 to –13.7% in the quarter ending June 2022 in comparison to the quarter ending June 2019.***

Air passenger travel followed a similar pattern as airport operations at LAX, although to a greater extent. The initial shock in the June 2020 quarter was reflected more clearly in the air passenger traffic: –91.7% in air passengers as compared to –71.4% in overall air operations.

**Figure B.4: LAX Passenger Changes, By Quarter, in Comparison to Pre-COVID-19 (CY2019)**

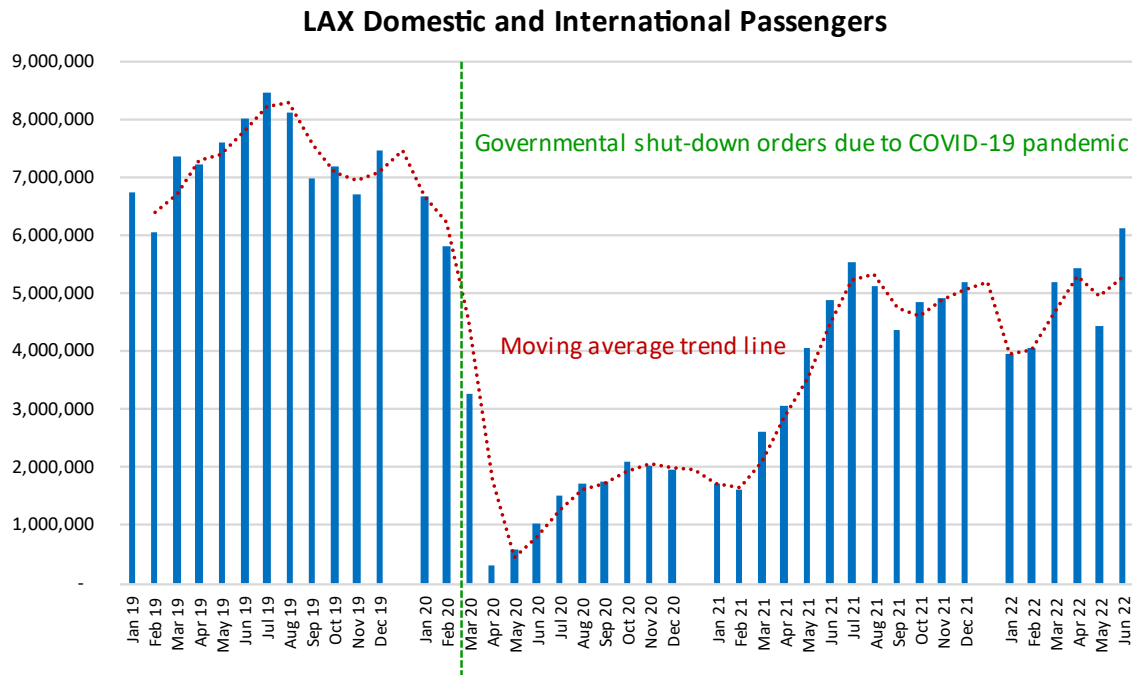


Source: LAWA's Traffic Comparison (TCOM) report published at LAWA.org; data aggregated by quarter.

Passenger numbers dropped in March 2020 when the COVID-19 pandemic hit. Passenger traffic collapsed through the quarter ending June 2020 and began to increase in the quarter ending September 2020 onwards.

**Air passenger traffic is recovering month-to-month but has a large gap to close from pre-COVID-19 pandemic levels in 2019, as shown in Figure B.5.**

**Figure B.5: LAX Domestic and International Passengers (January 2019 through June 2022)**



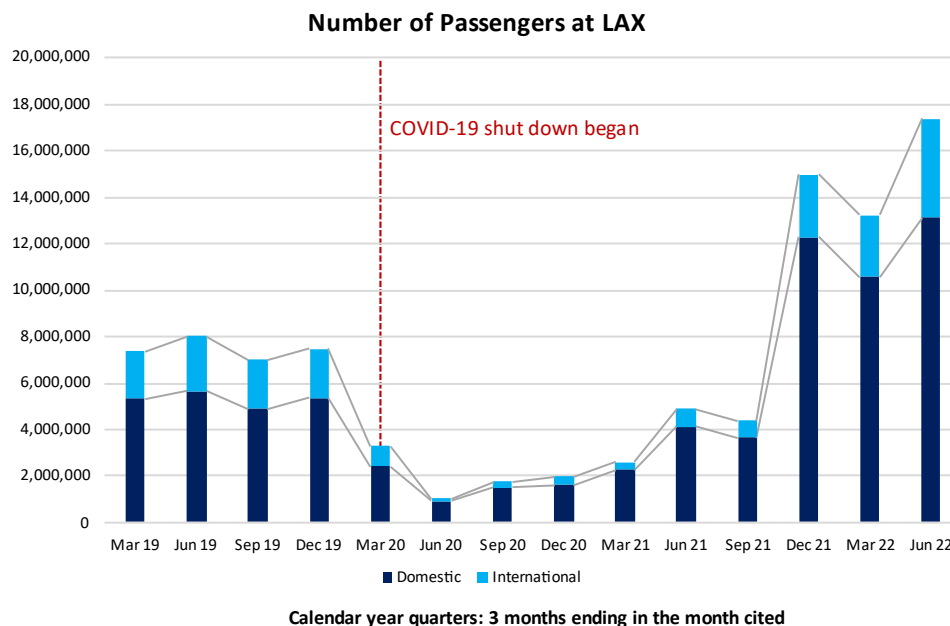
Source: LAWA's Traffic Comparison (TCOM) report published at LAWA.org.

In June 2022, LAWA officials reported that, for the first time since January 2020, more than 6 million passengers passed through LAX.

**Domestic air passenger traffic began to recover in the quarter ending September 2021, as shown in Figure B.6, with more dramatic increases starting in the quarter ending December 2021.**



**Figure B.6: Domestic and International Passenger Comparisons, By Quarter Ending (March 2019 Through June 2022)**



Source: LAX's Traffic Comparison (TCOM) report published at LAXA.org; data aggregated by quarter.

Figure B.7 compares changes in the number of international passengers for July 2019, 2020, 2021, and 2022. July was shown because LAX reached its highest international passenger level in July 2022 since the COVID-19 pandemic began.

- **2019.** In July 2019, LAXA had 2.5 million international passengers at LAX.
- **2020.** International air passenger traffic suffered a precipitous decline after March 2020. By July 2020, LAXA had 191,781 international passengers.
- **2021.** International air traffic had a more limited recovery in comparison to domestic travel. July 2021 international passenger counts at LAX were 923,000 million – 64% behind July 2019. Contributing factors were international lock downs, especially in China and Japan along with Australia and New Zealand.

**Figure B.7: Number of International Passengers (July 2019, 2020, 2021, 2022)**



Source: LAX's Traffic Comparison (TCOM) report published at LAXA.org.

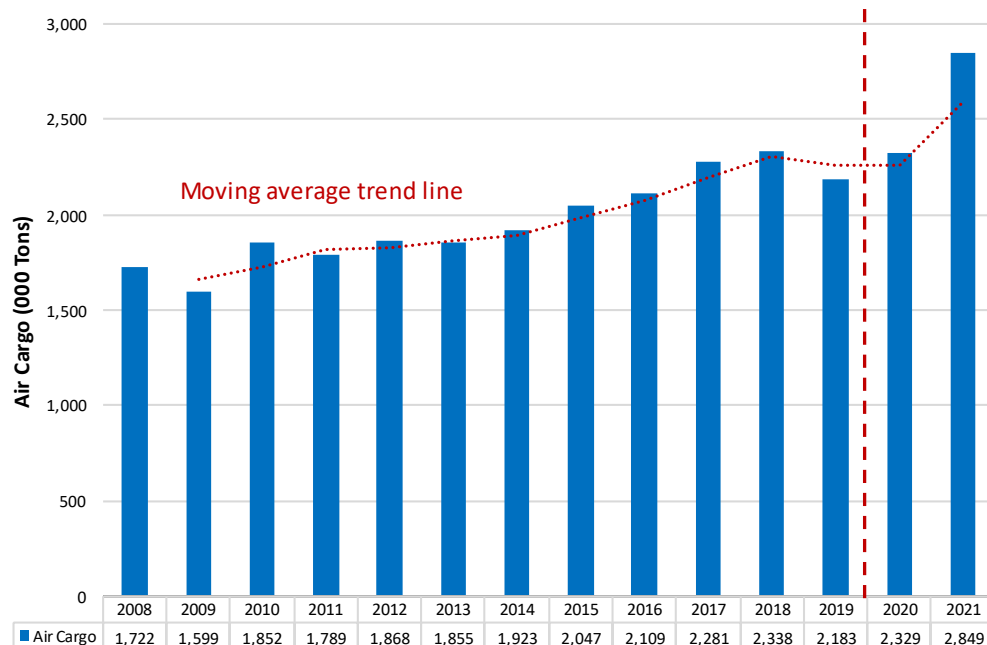
- **2022.** Although international air traffic remains below CY2019 levels, international air passengers at LAX have been increasing: 1.8 million international travelers in July 2022 – almost double from July 2021.

## Air Cargo

*In contrast to the decline in air passenger travel in response to COVID-19, air cargo levels have grown at LAX since 2019.*

In contrast to airport operations and air passenger initial declines, air cargo traffic immediately began to grow during the COVID-19 pandemic, as compared with CY2019 levels. According to LAWA statistics, LAX's cargo tonnage had faced a decline in 2019, as shown in Figure B.8. Air cargo tonnage grew from 2.18 million tons in CY2019 to 2.85 million tons in CY2020.

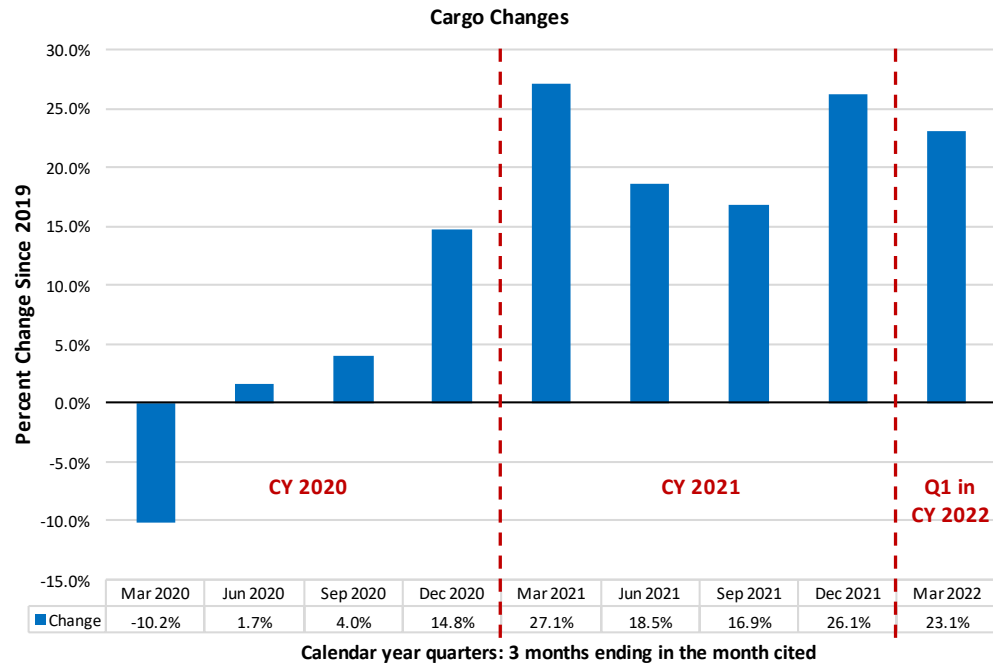
**Figure B.8: Cargo Tonnage (Mail and Air Freight): 2008 Through 2021**



Source: LAWA online: <https://www.lawa.org/lawa-investor-relations/statistics-for-lax/10-year-summary/air-freight>

Figure B.9 displays this growth in air cargo tonnage.

**Figure B.9: LAX Air Cargo Tonnage Changes, By Quarter, in Comparison to Pre-COVID-19 (CY2019)**



Source: Underlying statistics from LAWA's Traffic Comparison report published in the Investor Relations section of its website.

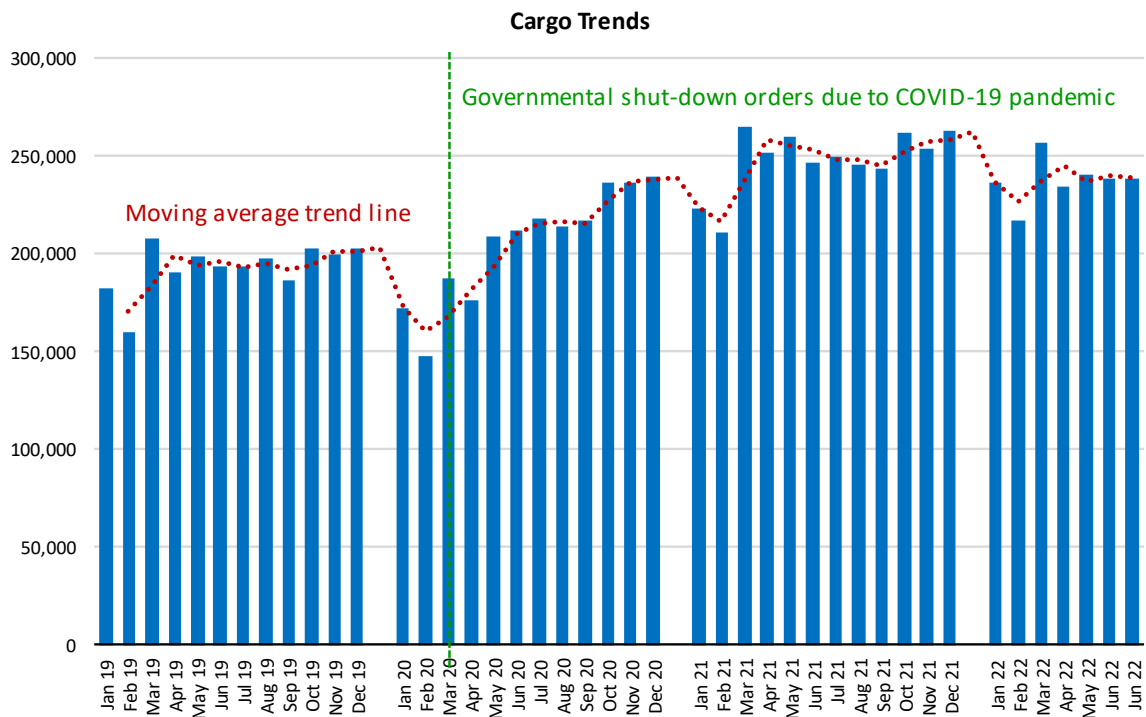
This increase is attributable to multiple factors:

- Airlines had to supplant lost passenger revenue with cargo revenue, particularly with the decline in Asian markets.
- The United States faced large and urgent demands for PPE and medications.
- The cost of shipping a container across the Pacific had risen to \$20,586 in September 2021, which increased the competitiveness of air cargo.
- The subsequent supply chain problems in the ocean shipping industry further helped the air cargo market segment.
- The quarter ending December 2021 benefited from the Thanksgiving and Christmas holiday seasons in the United States with 26.1% more air cargo tonnage than in 2019.

This growth in air cargo mitigated the air operations overall decline at LAX.

Figure B.10 displays cargo trends, by month, starting in CY2019 through June 2022. The moving average shows a steady upward trend through CY2021, followed by a slight reduction during the first six months of CY2022. Shipping containers across the Pacific Ocean cost \$2,265 in October 2022 – a 91% decrease in cost from \$20,586 in September 2021. This reduced cost of shipping containers will likely affect air cargo services in the coming months. Most recently, LAWA officials reported [226,012 tons of air cargo](#) at LAX in July 2022, a decrease of 9.4% from July 2021.

**Figure B.10: Cargo Tons, By Month (January 2019 Through June 2022)**



Source: LAWA's Traffic Comparison (TCOM) report published at LAWA.org.



## B.2 LAWA's FINANCIALS

LAWA's financial plans are tied to airport activity factors that affect LAWA's financial condition, as well as the revenue and expense patterns. In LAWA's [FY2021-2022 Proposed Budget](#)<sup>1</sup> presentation before BOAC in June 2021, it notes that:

*"65% of LAWA's revenues are driven by airline rates and charges, based on cost recovery formulas used to calculate terminal rates and landing and apron fees."*

**LAWA's Net Position has remained at its pre-COVID-19 pandemic level throughout the comparison period.** Net Position is the private sector equivalent of retained earnings. The statement of "Changes in Net Position" is the private sector equivalent of the profit and loss (P&L) statement. Table B.1 shows condensed changes in LAWA's Net Position for FY2019, FY2020, and FY2021.

**Table B.1: LAWA's Net Position (\$000) for FY2019, FY2020, and FY2021**

Net Position	(\$000s)			% Change from FY 2019	
	FY 2019	FY 2020	FY 2021	FY 2020	FY 2021
Operating revenue	\$ 1,537,949	\$ 1,365,494	\$ 1,072,156	-11.2%	-30.3%
Less - Operating expenses	\$ 818,011	\$ 909,985	\$ 792,778	11.2%	-3.1%
Operating income before depreciation and amortization	\$ 719,938	\$ 455,509	\$ 279,378	-36.7%	-61.2%
Less - Depreciation and amortization	\$ 407,664	\$ 450,606	\$ 444,981	10.5%	9.2%
Operating Income	\$ 312,274	\$ 4,903	\$ (165,603)	-98.4%	-153.0%
Other non-operating revenue (expenses), net	\$ 85,269	\$ (6,334)	\$ (214,858)	-107.4%	-352.0%
Federal and other governmental grants	\$ 36,340	\$ 105,346	\$ 331,730	189.9%	812.9%
Changes in net position	\$ 433,883	\$ 103,915	\$ (48,731)	-76.0%	-111.2%
Net position, beginning of year	\$ 5,385,927	\$ 5,819,810	\$ 5,923,725	8.1%	10.0%
Net position, end of year	\$ 5,819,810	\$ 5,923,725	\$ 5,874,994	1.8%	0.9%

Source: Underlying values from the Management Discussion and Analysis sections of LAWA's Annual Comprehensive Financial Reports for FY2019, FY2020, and FY2021.

Each of the major areas that comprise the Net Position – Operating Revenues, Operating Expenses, and Non-Operating Income/Expense – is discussed next.

<sup>1</sup> The City of Los Angeles and LAWA's fiscal year (FYI) is from July 1-June 30.

## Operating Revenues

***Operating revenues decreased significantly (–30%) in FY2021 compared to FY2019 because of reduced landing fees and concession revenues at LAX.***

LAWA's operating revenues decreased significantly – from \$1.5 billion in FY2019 to \$1.1 billion in FY2021, a decrease of \$465 million or 30% in those two years. Table B.2 displays operating revenues, which consist primarily of aviation and concession (including parking) revenues.

**Table B.2: LAWA's Quarterly Revenues (\$000s)**

Operating Revenues	\$000s			% Change from FY 2019	
	FY 2019	FY 2020	FY 2021	FY 2020	FY2021
Aviation revenue					
Landing fees	\$ 295,724	\$ 259,185	\$ 164,693	-12.4%	-44.3%
Building rentals	\$ 590,771	\$ 580,192	\$ 609,014	-1.8%	3.1%
Land rentals	\$ 129,411	\$ 127,105	\$ 121,235	-1.8%	-6.3%
Other aviation revenues	\$ 10,534	\$ 10,420	\$ 11,078	-1.1%	5.2%
Total aviation revenues	\$1,026,440	\$ 976,902	\$ 906,020	-4.8%	-11.7%
Concession revenue	\$ 501,179	\$ 380,339	\$ 161,423	-24.1%	-67.8%
Other operating revenue	\$ 10,330	\$ 8,253	\$ 4,713	-20.1%	-54.4%
Total operating revenue	\$1,537,949	\$1,365,494	\$1,072,156	-11.2%	-30.3%

Source: Underlying values from the Management Discussion and Analysis sections of LAWA's Annual Comprehensive Financial Reports for FY2019, FY2020, and FY2021.

### LANDING FEES

Landing fees are driven by the number and weight of aircraft landing. LAWA implemented the Airline Cost Stabilization and Recovery Plan to stabilize activity-based airline rates that would otherwise have been adversely impacted by the decline in airline activity. This plan resulted in lower landing fee revenues compared to FY2019.

The Airline Cost Stabilization and Recovery Plan mitigated increases in activity-based airlines' rates and charges, such as landing and common use fees. LAWA reports that it has discontinued the Airline Cost Stabilization and Recovery Plan in FY2023 because of the strong airline activity recovery.

LAWA used other mitigation measures, including the use of the Federal Coronavirus Aid, Relief, and Economic Security (CARES) Act grants to keep the rates and fees stable for LAX's airline partners to support the recovery of their LAX air service. The non-operating grant revenues increased, as grants were used to pay for costs that would normally be recovered through operating revenues.

## CONCESSION AND PARKING REVENUES

Airport revenues from concessions declined 67.8% in FY2021 in comparison to FY2019. Concession revenues are linked to number of passengers in terminals who purchase at the stores there. Similarly, airport parking revenues are related to the number of vehicles parked at the LAX structures. When guests visiting an airport decline, concessions and parking revenues drop.

As of May 2022, LAWA reported that almost 95% of its concessionaires re-opened at LAX. Moreover, air travel picked up during summer 2022, resulting in increased sales for airport concessionaires. Reduced international travel affects concession revenue because international travelers spend more on average on a per capita basis than domestic travelers.

## Operating Expenses

***LAWA imposed expense reduction measures that helped bring total operating expenses in FY2021 to be similar to FY2019.***

Operating expenses are primarily comprised of labor costs (i.e., salaries, benefits) and contractual goods and services associated with the operations and maintenance of the airport. Depreciation is a charge based on capital asset values.

Table B.3 compares pre-COVID-19 pandemic operating costs with COVID-19 pandemic operating costs. Salaries and benefits are nearly 60% of operating costs before depreciation. The increase in FY2020 is due to new labor agreements that year and a Separation Incentive Program to entice eligible workers to retire to reduce head count as a COVID impact mitigation measure.

**Table B.3: Operating Expenses (\$000s) in FY2019 versus COVID-19 FY2020 and FY2021**

Operating Expenses	\$000s			% Change from FY 2019	
	FY 2019	FY 2020	FY 2021	FY 2020	FY2021
Salaries and benefits	\$ 464,345	\$ 541,581	\$ 494,045	16.6%	6.4%
Contractual services	\$ 228,765	\$ 239,015	\$ 196,351	4.5%	-14.2%
Materials and supplies	\$ 53,983	\$ 56,279	\$ 44,103	4.3%	-18.3%
Utilities	\$ 47,122	\$ 48,202	\$ 39,649	2.3%	-15.9%
Other operating expenses	\$ 23,796	\$ 24,908	\$ 18,630	4.7%	-21.7%
Operating expenses before depreciation	\$ 818,011	\$ 909,985	\$ 792,778	11.2%	-3.1%
Depreciation	\$ 407,664	\$ 450,606	\$ 444,981	10.5%	9.2%
Total operating expenses	\$ 1,225,675	\$ 1,360,591	\$ 1,237,759	11.0%	1.0%

Source: Underlying values from the Management Discussion and Analysis sections of LAWA's Annual Comprehensive Financial Reports for FY2019, FY2020, and FY2021.





LAWA took early measures to help reduce operating expenses. Justin Erbacci, LAWA CEO, outlined the significant financial impacts caused by reduction in travel because of COVID-19. In his CEO Message on March 3, 2020, CEO Message, he:

- Encouraged staff to start reducing costs
- Initiated a hiring freeze unless for specific critical predesignated positions
- Deferred all non-essential discretionary spending
- Only approved new contracts and task orders that were essential
- Limited overtime to activities necessary for safety, critical operations, or emergency management and required CEO approval
- Requested every business unit to identify ways to reduce expenditures
- Requested hourly employees to consider voluntary furlough to reduce work schedules to 72 hours per pay period

In September 2020, 334 LAWA qualifying employees opted for the Separation Incentive Program as a retirement package. (Note: No additional years of service or age were added to the offering.)

Overall, operating costs before depreciation in FY2021 were 3% below FY2019 and, including depreciation, were essentially even with FY2019 (pre-COVID-19 pandemic). In FY2019, LAWA airport activities were lower; management reduced costs to prior budget levels.

## Non-Operating Revenues and Expenses

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***Non-operating revenues decreased significantly in FY2021 because of reduced passenger-based revenue sources and investment/interest income.***

LAWA defines non-operating transactions as activities that do not result from providing services or producing and delivering goods in connection with LAWA's ongoing operations. Table B.4 shows a summary of these activities pre-COVID-19 in FY2019 and during the COVID-19 pandemic: FY2020 and FY2021. Non-operating revenues decreased significantly – from \$85.3 million in FY2019 to –\$214.9 million in FY2021, a decrease of 352%. The decrease is primarily from reduced revenue sources directly based on air passenger traffic and reduced investment and interest income.



**Table B.4: Non-Operating Transactions (\$000s) as part of Ongoing Operations**

Non-Operating Transactions	\$000s			% Change from FY 2019	
	FY 2019	FY 2020	FY 2021	FY 2020	FY2021
<b>Nonoperating revenue</b>					
Passenger facilities charges	\$ 173,100	\$ 118,023	\$ 68,748	-31.8%	-60.3%
Customer facilities charges	\$ 80,248	\$ 65,621	\$ 32,606	-18.2%	-59.4%
Interest and Investment income	\$ 109,420	\$ 120,052	\$ (6,099)	9.7%	-105.6%
Other nonoperating revenues	\$ 23,996	\$ 14,286	\$ 10,265	-40.5%	-57.2%
	\$ 386,764	\$ 317,982	\$ 105,520	-17.8%	-72.7%
<b>Nonoperating expenses</b>					
Interest	\$ 294,767	\$ 320,892	\$ 311,701	8.9%	5.7%
Other nonoperating expenses	\$ 6,728	\$ 3,424	\$ 8,677	-49.1%	29.0%
	\$ 301,495	\$ 324,316	\$ 320,378	7.6%	6.3%
<b>Nonoperating revenues (expenses), net</b>	<b>\$ 85,269</b>	<b>\$ (6,334)</b>	<b>\$(214,858)</b>	<b>-107.4%</b>	<b>-352.0%</b>
<b>Federal and other government grants</b>	<b>\$ 36,340</b>	<b>\$ 105,346</b>	<b>\$ 331,730</b>	<b>189.9%</b>	<b>812.9%</b>

Source: Underlying values from the Management Discussion and Analysis sections of LAWA's Annual Comprehensive Financial Reports for FY2019, FY2020, and FY2021.

Passenger facilities charges are a flat fee per passenger. Customer facilities charges are based on car rentals at the airport. The declines in these revenues are consistent with the reduced passenger traffic due to COVID-19.

Interest and investment income decreased by 105.6% in FY2021 compared to FY2019. This decrease was mainly due to:

- The lower interest rate and average balance of cash and pooled investments held in the City's Treasury
- Decreases driven by the downward year-end net adjustment to the fair value of investment securities

## Federal CARES Act

***The Federal CARES Act (2020) grants helped stabilize airport activity-driven fees at LAX.***

The U.S. government provided more than \$100 billion in Federal assistance for payrolls, rents, and other airport- and airline-related costs to airports across the nation. In addition, the FAA approved actions to provide [temporary relief](#) from some its regulatory requirements (U.S. Government Accountability Office (GAO), Fast Facts, October 2021).



The CARES Act (2020) and the Coronavirus Response and Consolidated Appropriations Act (2021) “...provided fast and direct economic assistance for American workers, families, small businesses, and industries.” Together:

- The purpose of the CARES Act was to implement “...programs to address issues related to the onset of the COVID-19 pandemic.” CARES Act was signed into law on March 27, 2020.
- The Consolidated Appropriations Act continued many of these programs by “...adding new phases, new allocations, and new guidance to address issues related to the continuation of the COVID-19 pandemic.” The [Consolidated Appropriations Act \(2021\)](#) was signed into law on December 27, 2020 (U.S. Department of the Treasury).

**At LAWA, Federal and other government grants increased by 813% over FY2019.** LAWA was awarded CARES Act grants in the amount of approximately \$323.6 million for LAX and approximately \$157,000 for VNY, payable on a reimbursement basis. The drawn amounts of \$271.2 million and \$52.4 million in LAX were recognized as grant revenue and were used to pay for costs that would otherwise have been paid by the airlines. The CARES Act helped to stabilize cost increases in airline rates at LAX for FY2021 and FY2020, respectively. LAWA received no COVID-19 relief grants from the City of Los Angeles.

## Summary

Overall, LAWA’s financial position is approximately what it was prior to the COVID-19 pandemic in FY2019 because of:

- Cost recovery rate-making methodologies driving LAX operating revenues
- LAWA’s cost reduction measures
- Use of CARES funding
- Considerable rebound in operations and air traffic
- Increases in air cargo activity at LAX

## B.3 FUTURE MARKET AND INDUSTRY CONDITIONS

### LAX Market Advantage

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***LAX’s position as a hub airport for multiple airlines and Los Angeles as a favored destination will help the airport’s rebound.***

Two factors are competitive advantages of LAX in the aviation market: Los Angeles is a destination that travelers want to go to and LAX is a hub airport with multiple major airlines.

#### ORIGIN AND DESTINATION (O&D)

An important metric among airports is the number of passengers who begin or end their trip at an airport. This metric is referred to as Origin and Destination (O&D). O&D is also an important

economic metric for a region because these passengers stay – as tourists, business travelers, or residents, thus, generating more revenue for a region.

**LAX has one of the highest percentages of O&D passengers among U.S. airports.** LAWA's Official Statements (discussed later under "LAWA's Debt Service Coverage Forecasts") for debt service reinforced the importance of LAX being a major O&D airport:

*"The Los Angeles CSA [Combined Statistical Areas] will continue to be a major destination market for U.S. leisure and business travelers and a top global destination for tourism, meetings, and conventions... Los Angeles will remain a major economic center and the Airport will maintain its role as a leading O&D passenger airport and one of the largest international gateway airports in the U.S."*

#### MULTIPLE MAJOR AIRLINES WITH HUBS AT LAX

Most major U.S. cities have airports that are referred to as "hub" airports in the airline industry. A hub airport refers to an airline's connectivity from one airport to other airports. Airlines route flights through a central airport – or hub – that has spokes for routes to other destinations from the hub airport. This model is also referred to as a hub-and-spoke.

Large airport hubs have more destinations from them; even larger airport hubs have more frequent flights to the various destinations. Major airlines typically have multiple hubs so they can offer more flights for passengers. Hub status is important for airports, airlines, and passengers because generally they have:

- More frequent flights to destinations
- More options for business and holiday destinations
- Cheaper fares because of airline competition
- Better surrounding infrastructure (e.g., rail, buses, and roads) for easier access to/from the airport

Examples of major hubs are United at Denver International Airport (DEN) and O'Hare International Airport (ORD) outside of Chicago and Delta at Hartsfield–Jackson International Airport (ATL) outside of Atlanta. **LAX ranks fifth among U.S. airport hubs, as defined by the FAA, and has the advantage of being the hub for multiple major airlines: American, United, Delta, and Southwest. Serving as a hub for multiple airlines makes LAX more convenient for passengers who want to travel to various destinations.** In addition, LAX benefits from having multiple major airline hubs because no single airline dominates negotiations with LAWA.

#### COMBINATION OF O&D PASSENGERS AND HUB FOR AIRLINES

**LAX has the enviable market position of being both an O&D airport and a mature hub for multiple major airlines – important buffers from market fluctuations.** LAWA's Official



Statements reinforces the importance of LAX being a hub airport for O&D passengers: *“The mix of airlines serving the Airport will continue to be diverse and sufficient to accommodate O&D passenger demand at the Airport and in the Los Angeles CSA,”* which directly follows the observation that Los Angeles will remain an extremely strong travel market.

## LAWA’s Aviation Industry Forecasts

LAWA’s aviation industry forecasts are documented in its Official Statements.

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***LAWA forecasts a traffic rebound to FY2019 levels by FY2025, and 1.7% annual growth thereafter, based on a 20-year average growth prior to 2019.***

To date, LAWA’s forecasts present a reasonable estimate of what is happening in FY2022, despite the uncertainty pertaining to COVID-19.

- LAWA’s full-year FY2022 domestic traffic is forecasted to be 72% of full-year FY2019.
- LAWA anticipates that domestic and international traffic will grow after 2024, but at slower rates than prior to 2019.

As with any forecast based on compounding growth, LAWA’s overall conclusions will be sensitive to the accuracy of the Year 1 (FY2022) growth assumption. Despite all of the uncertainty that existed a year ago, actual 2022 LAWA traffic in the first nine months of FY2022 has tracked close to forecasted levels. The accuracy of the Year 1 assumption is especially important for multiple reasons:

- The Year 1 estimate will not distort the longer-term forecast, important because of the year-over-year growth that was projected. LAWA’s Official Statements used the same 2022 traffic estimates that were the basis for LAWA’s FY2022 budget with domestic traffic increasing 82% and international traffic increasing 89% over FY2021. According to LAWA’s BOAC budget update No. 2 (May 6, 2021), LAWA anticipates 22 million embarking passengers with a feasibility forecast of 26.7 million for FY2022.
- The airline industry is currently experiencing major differences between the drivers of international versus domestic demand, and even larger differences between the impacts of the COVID-19 pandemic on those two markets.
- Traditional airline industry forecasting techniques and factors that historically drove traffic shifts (e.g., business cycles, industry supply/demand fluctuations) did not have to deal with the level of volatility caused by COVID-19.

LAWA’s Official Statements note:

*“Economic closures, travel restrictions or other similar actions will be less impactful on the propensity of people to use air travel as compared to the months following the widespread emergence of the COVID-19 pandemic.”*

In other words, no catastrophic events are likely to produce demand collapses comparable to the 90%+ decline seen at the outset of the COVID-19 pandemic. The Official Statement's forecasts used a conservative growth rate for the post-rebound years for the repayment of the bonds:

- Domestic traffic is assumed to grow 1.4% per year after 2024 as compared to annual growth rates of 4.0% to 4.5% throughout the decade prior to 2019.
- International traffic is assumed to grow 2.6% per year after 2025 as compared to annual growth rates in the 5% to 8% range prior to 2019.

Reasonably, LAWA has not predicted the timing or magnitude of any recessions that might occur in the coming years, but these conservative growth rates are consistent with the average growth rate that might occur across a business cycle.

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***The future is hard to predict because several major factors may affect LAWA's forecast and timing of a full rebound of the airline industry.***

The belief that the COVID-19 pandemic crisis will fully pass, and previous industry economics will fully return—a belief widely held across the industry—is based on:

- The industry's long history of resuming strong growth following major crises (e.g., post-9/11 air traffic declines, prior recessions, and massive legacy airline overexpansion)
- More dynamic competitive conditions helped restore industry economics by reallocating resources to more efficient uses (e.g., low-cost or budget airline sector)
- Air travel between China and the United States increased and rebounded after each prior crisis during the last 20 years.

The COVID-19 pandemic led to a greater collapse in both demand and airline profitability than any previous industry crisis and was global in scope, as discussed in Section A.I. Other major but non-catastrophic external shocks that periodically occur in commercial aviation (e.g., recessions, major fuel spikes, inflation, or airline bankruptcies) are likely to occur.

At this point in time, assumptions about future external conditions are speculative, based on historic relationships between external factors and airline traffic growth rates, which may differ in today's post-COVID-19 pandemic conditions. The airline industry has greater challenges, and the tools for crisis recovery are not as predictable. Moreover, there are international events that are hard to predict and can affect the aviation industry (e.g., changing U.S.-China relations and trade, international uncertainty regarding the war between Russian and Ukraine, and potential global viral diseases).

Many hard-to-predict factors will also affect airline recovery, such as staffing levels (e.g., pilots). This staffing challenge has contributed to schedule disruptions in the airline industry and

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additional workload for LAWA employees. There is also the possibility that long-lasting structural changes may occur. These changes would not threaten the viability of the aviation industry but could make it difficult to achieve the high levels of efficiency and demand growth as seen in the past. Passengers today are more concerned about airfares and on-time schedules than travel amenities.

***Border restrictions and the public's health concerns.*** The public health issues that suppressed air travel demand will not completely go away in the next couple of years. International travel numbers cannot return to 2019 levels unless “...*travel restrictions and border closures will be lessened or removed.*” The assumption is viable, particularly for Asian passengers, but only if both:

- Travel restrictions are largely removed and
- The health concerns and other factors that contribute to consumer resistance are overcome

In a 2022 environment where numerous major countries, particularly China, see border closures and restrictions as the single most effective way to limit the spread of the virus, it is difficult to imagine that the entirely relaxed pre-COVID-19 pandemic conditions and consumer attitudes will completely return by 2025.

***Business travel.*** Business traffic, which historically paid higher fares that were critical to airline economics, is threatened by:

- The now standard option to use video conferencing for business meetings
- Potential for structural declines in global commerce
- Post-COVID-19 pandemic realization that some portion of stressful and expensive business travel may not have been financially justified

***Airlines' staggering losses.*** In LAWA's Official Statements, it assumed:

*“Airlines providing scheduled service at the Airport will continue to add seat capacity to meet increasing passenger demand at the Airport and industry trends reflecting increased aircraft load factors and the use of larger aircraft will continue”* (Source: Official Statement for LAX 2022 Series C, D, E, & F, page 239)

Since 2019:

- Airlines have suffered staggering losses, partly offset by large Federal CARES Act relief.
- Several major foreign carriers that use LAX were forced into bankruptcy reorganization or were nationalized.
- Sales of the widebody aircraft critical to LAX's recent growth have declined.



Airlines made severe cuts to conserve cash when demand first collapsed. Today, airlines are finding it difficult to restore services to pre-2020 levels of operational efficiency. The pre-pandemic balance that legacy air carriers had achieved between different types of routes (regional, narrowbody, long-haul) and market segments (high fare/low fare, business/vacation) no longer works. As a result, airlines are working on finding a new balance that can produce the same profits.

**Market share and networks.** Pockets of LAX’s recent growth were fueled by air carriers vying for market share on routes, particularly transcontinental routes, where there was little evidence that the capacity growth would produce sustainable profits.

LAX is both an O&D and, to a lesser extent, a hub airport. Prior to COVID-19, all three legacy airlines – United, American, and Delta – pursued major expansion at LAX to establish both stronger hub-type connectivity and a material seat/departure share advantage over the other legacy airlines. Despite the advantages of LAX as a hub airport, its ability to maintain that edge is declining. LAX’s connecting hub traffic has declined from 24% in 2014 to 17% in 2019 and to 14% today, which has financial implications for airlines, depending on connecting routes to their other destinations. Other U.S. airports (e.g., ATL, DFW, ORD) have less O&D traffic and rely on network geography advantages that are more profitable for them.

Airlines regularly expand their networks into new, somewhat speculative market opportunities that may or may not prove financially worthwhile. Asian carriers, led by China, began serving LAX and other U.S. airports from numerous secondary cities (e.g., Shenyang, Chengdu, Wuhan, and Chongqing) in the hopes of eventually building a viable network. Although Chinese air carriers were not focused on short-term network profits, the problems smaller air carriers faced were telling. The bankruptcy of Hainan Airlines (and the collapse of its corporate parent in January 2021) was tied to its operating profitability and inability to repay its debt to bondholders and creditors. Even when current travel restrictions are lifted, it is unlikely that this capacity will return quickly. The losses incurred as air carriers pursued market share and bigger networks were funded by profits that no longer exist for them.

**Airline consolidation.** Consolidation has reduced competitive pressures in numerous markets. COVID-19 pandemic pressures will further reduce the number of competitors in some cases (e.g., the merger of Korean and Asiana, cutbacks at secondary Chinese carriers) and will temper aggressive growth plans. Even the “low-cost” and “ultra-low cost” airline sectors, which had driven most domestic U.S. price competition have been pursuing mergers (e.g., Southwest and Frontier) that will reduce competition.

**Airfares and fuel prices.** The primary driver of airline traffic growth has been lower prices, combined with other factors affecting air traffic growth, including economic growth. The competitive forces that drove the capacity growth that forced prices down before the COVID-19 pandemic have been weakened. Given widespread financial difficulties and reduced competitive threats, many air carriers will see higher prices and service cuts as the easiest way to restore damaged P&L statements and balance sheets. Significantly higher fuel prices will significantly increase pressures to reduce capacity and raise prices.

**Environmental and climate issues.** Environmental and climate issues are unlikely to have material effects on LAX traffic levels in the forecast period but provide another example of potentially adverse structural change. Climatic effects would be analogous to long-term increases in fuel prices, forcing higher prices and capacity cuts that could only be partially offset by future technological gains.

## B.4 LAWA'S DEBT SERVICE COVERAGE FORECASTS

The purpose of LAWA's long-term financial forecasts is to:

- Project the available sources and uses of funds
- Verify LAWA's financial ability and commitment to deliver current and planned programs and services

LAWA's financing plan is based on a set of assumptions developed through the collection and analysis of historical revenue and expense data, forecasts of traffic and economic statistics, and trend projections.

Together, the capital plan and the financing plan are designed to:

- Ensure that sufficient resources are provided from current revenues to finance ongoing maintenance needs
- Provide reserves for periodic replacement and renewal of LAWA assets
- Fund necessary or required reserves

### Official Statements

During COVID-19, LAWA was undertaking massive capital improvement projects and sought additional funding through bonds and outside investments. Federal and State securities laws require debt issuers, such as LAWA, to provide investors with all material information regarding the securities issued in public capital markets in a disclosure document, titled the Official Statement. LAWA recently prepared four Official Statements in support of its 2021 Series DE Bonds, 2022 Series AB Bonds, 2022 Series CDEF Bonds, and 2022 Series A Customer Facility Charges (CFC) Revenue Green Bonds, which included LAWA's long-term financial forecasts.

The Official Statements' forecasts focus on LAWA's future ability to fund operating and capital expenditures and meet its financing obligations, based on forecasts of airline traffic airport revenues, expenses, and debt services. In the Official Statements, LAWA outlines the steps it took to manage the financial problems created by the biggest airline traffic collapse in history. Many U.S. airports use outside consultants to review and develop forecasts. As with previous LAWA Official Statements, LAWA used a consulting firm – WJ Advisors – to produce the traffic and financial forecasts.

## Key Terminology

LAWA develops its Official Statements in accordance with its "Debt Issuance & Management Policy and Debt Guidelines & Procedures Handbook" (BOAC Resolution No. 26835, September 10, 2019). The Handbook defines key terms:

- **Net Pledged Revenues:** *"The moneys that are obligated for the payment of Debt Service, and other deposits required under bond documents. A net revenue pledge obligates all revenues received for the payment of Debt Service, subsequent to deductions for maintenance and/or operating expenses. The pledge of revenues under the LAX Master Trust Indenture is a net revenue pledge."*
- **Debt Ratios:** *"Comparative statistics showing the relationship between a bond issuer's outstanding debt and factors affecting repayment. Such ratios are often used in the process of determining the credit quality of an issue. Examples of Debt Ratios applied to airport bonds include: debt/revenues/costs per enplaned passenger, Debt Service coverage ratio, and operating ratio."*
- **Debt Service:** *"The amount due for repayment of interest and principal on outstanding debt, including required contributions to a sinking fund for term bonds. Debt Service may be computed on a bond year, fiscal year, or calendar year basis."*
- **Debt Service Coverage:** *"The ratio of Net Pledged Revenues annually available to pay Debt Service on bonds to the annual Debt Service requirement. This ratio is one indicator of the credit quality of a bond issue."*

Debt service coverage is an important metric for corporations and government agencies because it allows investors to assess whether an organization has enough income to pay its debts.





## LAWA Methodology

### LAWA'S FRAMEWORK

Recent Official Statements follow the same methodological framework as ones produced prior to the COVID-19 pandemic. Assumptions about future marketplace and industry conditions are defined. Separate domestic and international traffic growth rate estimates provide the basis for forecasts of LAWA revenues and the Pledged Revenues supporting bond repayments. LAWA added new elements in the most recent Official Statements to address the impact of the COVID-19 pandemic on LAWA's financial outlook.

### FORECASTS

Pre-pandemic forecasts of traffic growth rates were extrapolations of recent actual growth rates, adjusted for expected near-term market changes and a conservative evaluation of risk. These standard techniques in airline industry forecasting can incorporate many of the factors that historically drove traffic shifts (e.g., business cycles, industry supply/demand fluctuations); other techniques are needed to deal with pandemic levels of volatility or factors where the travel industry has little expertise (e.g., virus mutation rates, public health policy changes).

In addition to domestic and international traffic, emplaned and deplaned traffic, and O&D and connecting passengers, the Official Statements provide other operating statistics (e.g., number and gross weight of aircraft movements, rental car volumes, and food and beverage purchases). Concession revenue is related to passenger air traffic.

Estimates were developed for operating and non-operating revenues, including non-airline revenues that are based on the airline traffic forecast. The four Official Statements were all prepared within a few months of each other; each of these four Official Statements presents the exact same airline traffic forecast and uses identical language to describe the forecasting methodology and assumptions. The first three Official Statements show traffic forecasts through FY 2027.

- 2021 Series DE Bonds, 2022 Series AB Bonds, 2022 Series CDEF Bonds Official Statements include the "Report of the Airport Consultant" that describes the Financial Feasibility Analysis as of September 2021 with the details about the forecasting methodology and assumptions.
- Series 2022A CFC Official Statement includes the "Report of the Airport Consultant for the Consolidated Rental Car Facility" project financing as of February 2022, which included the financial and traffic forecast as the September 2021 Report.
  - The debt service forecast presented in the CFC Revenue Bond Statement is different as bond proceeds are only supporting ConRAC, are not a secured LAWA obligation, and are only backed by funds raised by CFCs.



- The CFC Revenue Bond document extended the forecast through FY 2030 but made no changes to the forecast numbers for FY2022 through FY2027.

Most recently, LAWA has developed its FY2023 Budget and published a new Official Statement for Series 2022 GHI, which included updated assumptions.

Financial obligations for the outstanding debt, including total senior and subordinate debt service, are known with a high degree of certainty. Investors concerned with LAWA's ability to generate the Pledged Revenues that cover bond repayments need to understand, at a minimum:

- The sources and drivers of the airport revenues
- Assumptions about the growth rates of the operating expenses
- Calculations of the additional debt service for future bonds
- The specific annual growth rates driving the airline traffic forecast
- The assumptions about future marketplace/industry conditions used to justify those growth rates

## B.5 OBSERVATIONS

The following observations are provided as guidance regarding the contents of the Official Statements and are not intended as investor advice.

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***LAWA's financial forecasts provided investors with meaningful and reasonable estimates of future debt service coverage for LAWA's bonds.***

The most recent Official Statement addressed the impact of the COVID-19 pandemic on LAWA's financial outlook and LAWA management's ability to respond aggressively to large and unexpected external shocks; specifically, LAWA:

- Documented actions it has taken to mitigate COVID-19 pandemic's financial impacts and respond aggressively to large and unexpected external financial shocks, including:
  - Establishing Temporary Relief Programs for both passenger airlines and concessionaires
  - Restructuring Debt Service
  - Preparing an Airline Cost Stabilization and Recovery Plan, which established a new methodology for calculating terminal rent charges, and a variety of internal cost reduction efforts.
- Detailed positive impact on the financial results and forecasts from raising nearly \$700 million in stimulus and relief grants from the Federal government
- Identified estimates of when traffic is expected to fully recover



- Estimated the sensitivity of the base Debt Service Coverage forecasts to slower COVID-19 recovery rates

LAWA's forecast that it could meet the bond covenants is supported by:

- The high debt service coverage ratios
- Calculation of Net Pledged Revenues

Note: As per LAWA's Chief financial Officer (CFO):

- These calculations would have to drop by roughly 50% in this period to go below the required 9/5<sup>th</sup> coverage to go below the subordinated bond debt service coverage covenant of 115%.
- Coverage of senior bond debt service is roughly 500% (or better) throughout the forecast period. Larger revenue shortfalls would need to go below the required 9/5<sup>th</sup> coverage level to go below the senior bond service coverage covenants of 125%.

LAWA's Pledged Revenues include LAX operating revenues, as defined in the Bond Indentures, and do not include VNY revenue or certain non-operating revenues, such as Passenger Facility Charges, Customer Facility charges, and grants.

Detailed tables in the first three Official Statements note:

- The overall CIP cost and the sources of the funds expected to pay for it (page A-144)
- The sources and uses of the bond proceeds (page A-145)
- The various elements of "Pledged Revenues" (e.g., airline charges, terminal rents, concession fees) (pages A-146-150)
- LAX maintenance and operating expenses (page A-151)
- LAWA's overall debt service requirements (pages A-152-153)
- The flow of funds covering overall debt servicing, including LAWA's overall obligations (pages A-154-155)

Note: All page references in this report are to the Official Statement for the 2021 Series DE Bonds, although identical text and data tables were repeated in the later Official Statements, usually with the same page number.

While investors would need to consider a great deal of information and analysis, LAWA's forecast that Net Pledged Revenues would comfortably exceed the requirements of the bond covenants during the forecast period, as summarized in Table B.5:



**Table B.5: LAWA Debt Service Forecast, By Bond Source and Fiscal Year (\$ millions)**  
(Data from the 2021 Series DE Bond Official Statements)

LAWA Debt Service Forecast		Calculations	FY2025	FY2026	FY2027
<b>LAWA's Pledged Revenues (Line A) exceed the sum of anticipated Senior Debt (Line D) and projected maintenance and operating (M&amp;O) expenses (Line B).</b>					
<b>A</b>	Pledged Revenues	A	\$2,450	\$2,562	\$2,652
<b>B</b>	LAX M&O Expense Projected	B	\$1,063	\$1,116	\$1,171
<b>C</b>	Net Pledged Revenues ( <i>Pledged Revenues minus M&amp;O</i> )	C=A-B	\$1,387	\$1,446	\$1,481
<b>D</b>	Senior Aggregate Annual Debt Service (Senior Debt)	D	\$226	\$290	\$299
	Senior Bond Debt Service Coverage	C/D	614%	498%	494%
<b>After accounting for Senior Debt (Line D) and projected M&amp;O expenses (Line B), Net Subordinate Pledged Revenues exceeds Subordinate Debt (Line F).</b>					
<b>E</b>	Net Subordinated Pledged Revenues ( <i>Net Pledged Revenues minus Senior Debt</i> )	E=C-D	\$1,161	\$1,156	\$1,182
<b>F</b>	Subordinated Aggregate Annual Debt Service (Subordinate Debt)	F	\$345	\$355	\$341
	Subordinated Obligation Debt Service Coverage	E/F	337%	325%	347%
<b>G</b>	Total Aggregate Annual Debt Service	G=D+F	\$570	\$646	\$640
<b>LAWA's covenant with its bond holders requires it to cover 115% of the maximum anticipated debt. Net Pledged Revenue would need to be reduced by between 49% and 53% to challenge the coverage required by the covenant.</b>					
	Total Debt Service Coverage	C/G	243%	224%	232%
	Minimum Net Pledged Revenue (115% Covenant)	G*1.15	\$656	\$744	\$736
	% Reduction Net Pledged Revenue to go below 115% in the Covenant		53%	49%	50%

Source: Data in the table are from Exhibit F of the LAWA Financial Forecast (Operating Statement, page A-155), which is also the source of the data for the graph of forecasted debt service coverage shown on Figure 48, page A-142.

On the basis of the Operating Statement for the 2022 Series A CFC Revenue Green Bonds, total LAWA Customer Facility Charge debt service requirements will be \$20.9 million in FY2025 through FY2028 and will increase to \$41.9 million thereafter (Figure 46, page A-115).

**Overall, LAWA's long-range forecasting methodology and assumptions were reasonable and appropriate, particularly in addressing Debt Service Coverage questions.**

The Official Statements outlined other qualitative assumptions that would have had minimal bearing on the overall assessment of LAWA's current long-range forecasting if included. These qualitative assumptions do not have a direct relationship to the specific estimates of future traffic growth that drove the bottom-line Debt Service Coverage calculations. The Official Statements contain air traffic recovery forecasts, based on trends and actions taken since the COVID-19 pandemic.



The new traffic forecasting methodology assumes industry traffic will return to steady but modest growth rates, based on average growth seen in the past 20 years. The most important forecast assumption is the estimate of when “normality” (2019 traffic levels) will return. The assumptions about steady market growth rates thereafter are lower than the rates used in LAWA’s pre-pandemic forecasts. As stated in LAWA’s Official Statements (2018 Series C and 2019 Series DE), the summarized forecast rates of growth and the forecast number of passengers at LAX are:

- **Enplaned passengers.** “An average increase of 2.6% per year from FY2017 through FY2024, from approximately 41.6 million to approximately 49.9 million.”
- **Domestic enplaned passengers.** “An average increase of 2.3% per year, from approximately 29.5 million in FY2017 to 34.5 million in FY2024.”
- **International enplaned passengers.** “An average increase of 3.5% per year, from approximately 12.1 million in FY2017 to approximately 15.4 million in FY2024.”

Table B.6 displays LAWA’s anticipated air traffic recovery forecasts from 2022 through 2025.

**Table B.6: LAWA Air Traffic Recovery, By Year**

LAX Traffic Forecast	2019 Air Traffic Restored in	Growth 2022 vs 2021	Growth 2023 vs 2022	Growth 2024 vs 2023	Growth 2025 vs 2024	Growth All Outyears
<b>Domestic</b>	2024	82%	19%	16%	1.4%	1.4%
<b>International</b>	2025	89%	55%	66%	22%	2.6%
<b>Combined</b>		83%	24%	26%	7%	1.7%

This methodology is consistent with the approach most airlines, manufacturers, and investment analysts had been taking since the beginning of the COVID-19 pandemic.

The debt service coverage forecast included a sensitivity analysis where the recovery of 2019 traffic levels was delayed by one and two years compared to the base forecast. As shown in Table B.7:

- In the three-year period (2023 through 2025) where these downside assumptions would have the greatest impact, average Pledged Revenues per year would fall \$80 million (3.9%) if the traffic recovery were delayed 1 year and \$109 million per year (-5.3%) if delayed 2 years.
- During the full six-year forecast period (2022 through 2027), average Pledged Revenues per year would fall \$59 million (-2.8%) if the traffic recovery were delayed 1 year and \$77 million per year (-3.7%) if delayed 2 years.

The annual average impacts are smaller over the full six-year forecast period because:

- Final 2022 results are unlikely to fall short of the base forecast.
- Market conditions are assumed to stabilize after 2019 traffic levels are restored.

**Table B.7: LAWA Air Traffic Recovery, By Year (\$ Millions)**

Areas Affected	3 Years (2023-2025)	6 Years (2022-27)
Pledged Revenue: Total forecast period	\$6,218	\$12,836
Average Pledged Revenues per year	\$2,073	\$2,139
Reduction in Average Pledged Revenues per year:		
▪ If recovery of 2019 traffic level delayed 1 year	\$80 (3.9%)	\$59 (2.8%)
▪ If recovery of 2019 traffic level delayed 2 years	\$109 (5.3%)	\$77 (3.7%)

According to the Operating Statement, LAWA could still comfortably cover its debt service obligations, even if reductions in Pledged Revenues occurred.

Table B.8 displays LAWA's forecast of the 2027 debt service coverage under alternate assumptions of when 2019 traffic levels might be restored.

**Table B.8: Forecast 2027 Debt Service Coverage of When 2019 Traffic Levels Restored**

2027 Debt Service Coverage	Base Forecast	1 Year Delay	2 Year Delay
Senior Debt Service Coverage	494%	489%	486%
Overall Debt Service Coverage	231%	228%	226%

Source: The debt service coverage ratios under these downside scenarios are taken directly from the 2021 Series DE Official Statement (page A-143). KH calculated the impacts on Pledged Revenues, based on the assumptions stated in that Official Statement.

***LAWA's airline traffic forecasting methodology and assumptions were reasonable and appropriate in supporting LAWA's position that it can meet its bond covenants.***

LAWA's forecasts properly focused on the data that were relevant to the Debt Service Coverage issues LAWA needed to address. The analysis and conclusions LAWA presented were conservative and reasonable for investors, and useful for City of Los Angeles government officials. Although some of the stated forecasting assumptions (if considered in isolation) might have led to a different conclusion, these concerns had no impact on and were irrelevant to a proper assessment of the quality of the financial forecasts supporting the Debt Service Coverage. Therefore, LAWA's airline traffic forecasting methodology and assumptions support LAWA's central position that it can cover its debt service obligations. Specifically:

- The analysis in these Official Statements, based on the disclosed assumptions, document LAWA's ability to meet its financial obligations. LAWA appropriately presented debt coverage estimates against both a conservative base case and reasonable non-catastrophic downside scenarios.
- LAWA's forecast of its ability to cover its debt service obligations is consistent with historical evidence that major external shocks and industry downturns did not impact its ability to meet its financial obligations.



- LAWA's FY2022 estimates have proven to be accurate, as discussed earlier in Part B under "Future Market and Industry Conditions."
- As LAWA has done in the past, it will incorporate more accurate estimates of traffic levels, based on previous year actuals, in future bond sales.
- Because these Official Statements provide detailed information about what LAWA did in response to the COVID-19 pandemic, investors can readily judge LAWA's ability to cope with the most catastrophic shock in aviation industry history.
- LAWA's current Debt Service Coverage forecasts are driven primarily by air traffic data, combined with other revenues from landing fees and rentals.
- Market changes could occur at more detailed levels (e.g., the mix of connecting versus O&D traffic, legacy versus low-cost airline traffic, cargo versus passenger operations) that could affect LAX's day-to-day operations, but these changes would not materially affect the basic forecast of Pledged Revenues.

Recent history has demonstrated that a catastrophic demand collapse could financially cripple many large airlines while the impacts on large airports, while nasty, was less severe. A major fuel spike would immediately raise airline costs and recessionary conditions would immediately reduce revenue. A set of these external shocks could push an overleveraged airline into bankruptcy protection. But LAWA's current long-range financial forecasts recognize that the impact of external shocks like these on airport revenues would be more limited and more indirect.

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***LAWA consistently receives "AA" ratings from major agencies for its senior revenue bonds, reflecting the agencies' view that LAWA's ability to repay its debt is strong.***

Bond investors look to independent consultants to provide their opinions of the creditworthiness of the entities issuing bonds. In the bond industry, Moody's, Standard & Poor, and Fitch rating agencies render such opinions on virtually all bonds issued, including municipals. It is common for issuers seeking to sell large amounts of bonds, typically \$100 million and more, to engage two or more of these agencies to provide their ratings on those bonds.

LAWA engaged all three of these agencies to provide such ratings. As the bases for their ratings, the agencies independently review the information contained in the Official Statements and perform their own due diligence of the financial condition of the issuer and other factors that influence the issuer's creditworthiness. Each of the ratings were in the "AA" category, the highest credit level among U.S. airports. (Note: "AAA" rating is the best.)



WJ Advisors, LAWA's airport consultant for the Official Statements, provided their own opinion that LAWA's "...underlying assumptions provide a reasonable basis for the projections." This analysis is in addition to the analysis that the three independent rating agencies perform for LAWA.

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA)

### PART C – CAPITAL PROJECT MANAGEMENT AND COST CONTROLS



## C – CAPITAL PROJECT MANAGEMENT AND COST CONTROLS

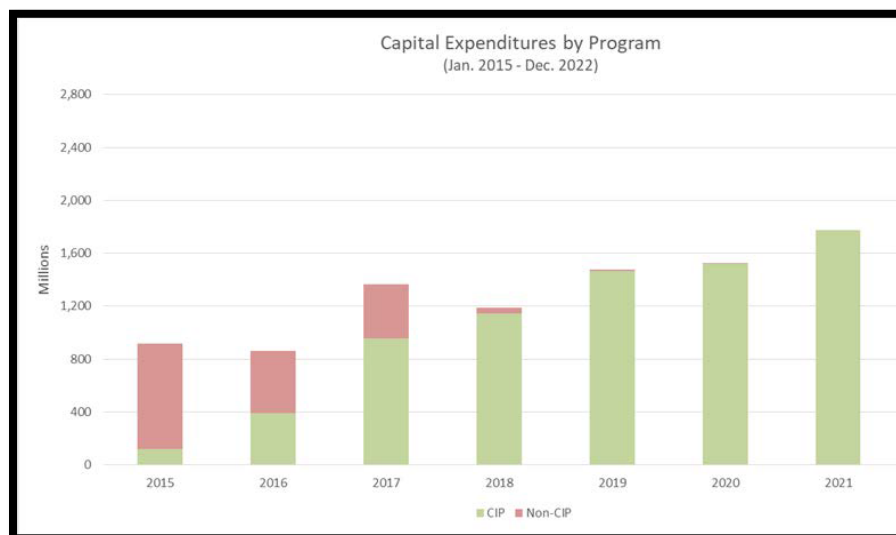
LAWA is implementing a \$15-billion Capital Improvement Program (CIP) at LAX, the largest public works program in the history of the City of Los Angeles.

### C.1 GENERAL OBSERVATIONS

***LAWA's emphasis has shifted to major capital programs that will transform LAX.***

Since 2015, LAWA's emphasis has shifted from non-CIP initiatives to major capital programs, as illustrated in Figure C.1. This shift has required an order-of-magnitude increase in project management skills at LAWA, made more essential by the number and complexity of major projects discussed in this Part C.

**Figure C.1: Capital Expenditures by Program (January 2015 Through December 2022)**



The rose-color bars are capital dollars "expended" under the previous Capital Budget (not operating).

The green-colored bars indicate the capital projects completed under LAWLA's 10-year CIP, prepared in 2018.

In the last eight years, LAWLA has completed or made major progress on major CIP projects that include:

- Terminal projects, most of which were tenant alteration projects by the airlines: Terminal 1 and Terminal 1.5 as a Terminal 1 extension by Southwest Airlines, Terminals 2/3 by Delta, Terminals 4/5 by American, Terminal 6 by LAWLA, and Terminals 7/8 by United



- Landside Access Modernization Program (LAMP), including a Consolidated Rental Automobile Center (ConRAC), a new Intermodal Transportation Facility (ITF), a connection to L.A. Metro's Crenshaw extension, and an Automated People Mover (APM)
- The recently completed Bradley West Gates, which LAWA designed and built to provide greater capacity (15 gates) at the Tom Bradley International Terminal (TBIT), with flexibility to serve a variety of aircraft types and new technology designed to improve passenger flow, baggage handling, and wayfinding
- Airport police facility
- Central Utility Plant (CUP)
- VNY airfield rehabilitation
- Power receiving station
- Taxiway P –a major aeronautical infrastructure project, designed and built under LAWA's project management oversight

Preparation for future projects is under way. LAWA is developing plans for:

- Terminal 9
- Southwest Airlines Concourse 0 (another Terminal 1 extension)

LAWA has not yet announced a delivery method for constructing Concourse 0 or Terminal 9.

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***LAWA holds ultimate accountability for the successful operation of its new terminals, parking facilities, and LAMP, regardless of partnership arrangements.***

Many of LAWA new assets are being constructed by private partners, such as the airlines' roles with building and renovating the terminals. Some of those facilities, such as APM – a key element of LAMP, will be maintained and even operated by third parties.

LAWA is accountable for the successful operation of its facilities and access systems, regardless of partnership arrangements. The City and the traveling public will expect quality, reliability, aesthetics, and ease of use of the new facilities. The full value of these LAWA assets and investment will be realized only if the facilities work reliably and are readily usable by passengers and guests.

LAWA executives must ensure that key managers and technical staff understand enough about these complex facilities to:

- Recognize inherent or emergent reliability or safety issues
- Make necessary decisions related to reliability or safety issues

LAWA has made a good start in this area. Current efforts should be continued and expanded to include:





- Monitoring and oversight of ongoing operations
- Identification of operational patterns
- Development of coping strategies required to achieve the highest possible levels of service

During the course of our IEA Survey study, LAWA allocated increased resources and executive focus to operational readiness. This focus is a positive development and should be both continued and expanded.

LAWA should also continue to be diligent in ensuring that it is knowledgeable about the facilities constructed as tenant alterations, even when the prime tenant airline assumes responsibility for some or all maintenance and operations. Regardless of the identity of the lessee, City officials and the public will expect LAWA to understand the features and systems in the terminals, and they will expect LAWA to act decisively to resolve serious breakdowns.

### **Capital and Financial Planning**

In the 2016 IEA Survey, the KH team found that LAWA's capital planning process was insufficiently robust for the organization's ongoing needs. At the time, LAWA lacked a 10-year or even a 5-year capital plan for future project planning purposes. There were also limited metrics to determine:

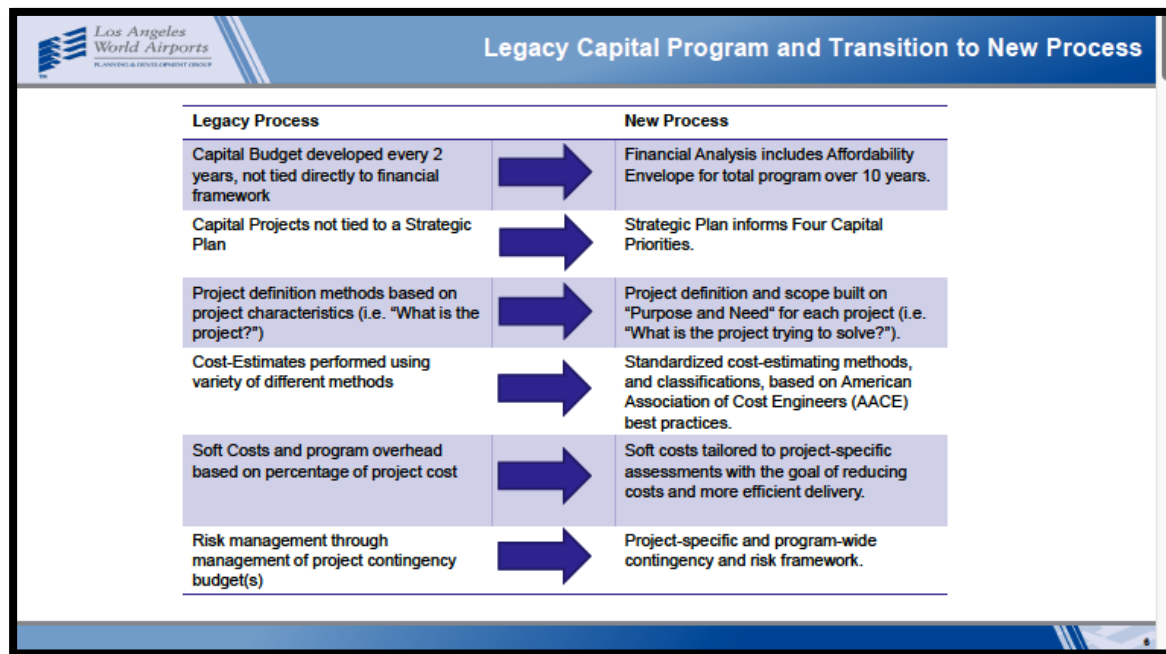
- Whether the life-cycle costs of proposed projects are justified by their anticipated benefits
- The comparative values of proposed projects

The KH team recommended that LAWA develop at least a 5- to 10-year CIP that reflects multi-year capital projects and maintenance of existing and planned facilities.

**LAWA's capital program management is well-developed and reflects a strong governance system.**

LAWA has formally defined its capital planning approach. Figure C.2 depicts the differences from the previous approach at LAWLA:

**Figure C.2: Legacy Capital Program and Transition to New Process at LAWLA**

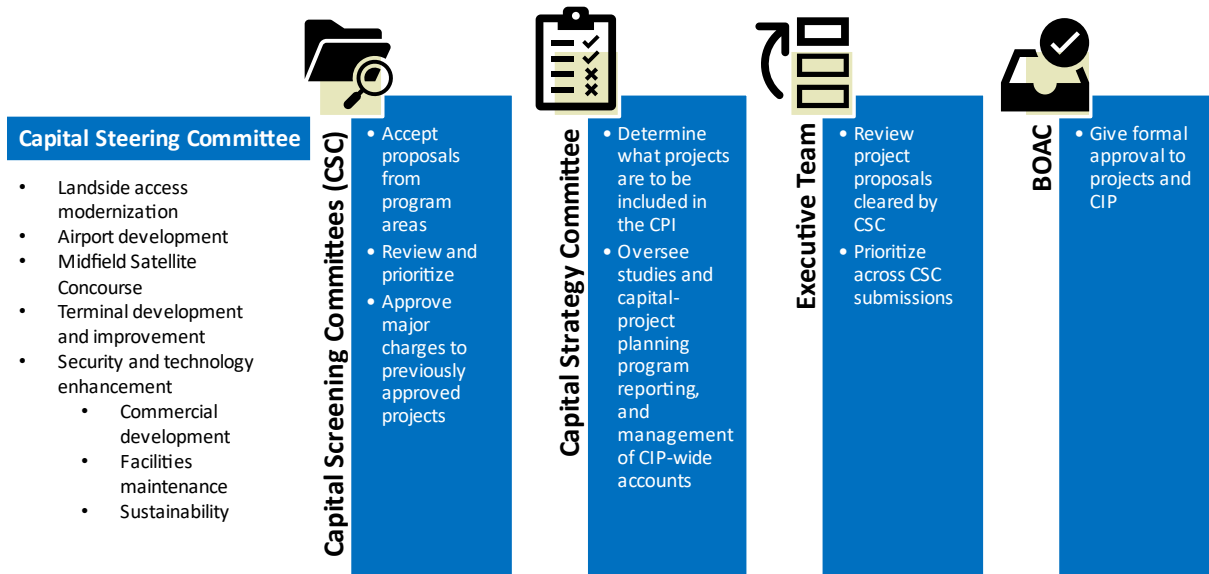


LAWLA's capital improvement process is currently governed by the CIP Oversight Charter, dated May 27, 2021. The Charter establishes a "governance and management framework" for the Steering Committee and the Strategy Committee. The Committee framework addresses:

- Decisions over \$150,000 or requiring BOAC approval
- Changes to key project or program outcomes
- Schedule impacts of 30 days or more or affecting other project schedules

Figure C.3 displays this revised capital improvement process. The Charter provides specific guidance regarding frequency of meetings, committee membership, and programs that are under the authority of the various Capital Steering Committees.

**Figure C.3: LAWA Oversight of its Capital Improvement Process**



LAWA has implemented a rigorous and well-disciplined system of project approval, design review, and capital construction oversight, as formalized in LAWA’s CIP Oversight Charter.

The Capital Strategy Committee reviews projects; this Committee consists of a broad cross-section of LAWA executives specified in the Charter. There is significant overlap in executive team membership between the Steering Committee and the Strategy Committee. All of them included the following titles, in addition to other unspecified members.

- Chief Executive Officer
- Chief Development Officer
- Chief Sustainability and Revenue Management Officer
- Chief Corporate Strategy and Affairs Officer
- Chief Financial Officer
- Deputy Executive Director for Public Safety and Security
- Deputy Executive Director for Operations and Maintenance
- Deputy Executive Director for Commercial Development
- Deputy Executive Director for Innovation & Technology

As designs are prepared, both operations and maintenance staff members review drawings and submissions to ensure both operability and maintainability. Significant change orders must be presented for review by the Steering Committee for the respective components of the CIP, drawn from members of the Capital Strategy Committee with the addition of key program executives.

Steering Committee review is required before the submission of change orders to BOAC for formal acceptance. This level of transparency significantly reduces the risk of major design errors or schedule and cost overruns arising from multiple change orders.

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***LAWA has a 10-year CIP for 2018-2028 with plans to initiate a new CIP for FY2023-2029.***

LAWA has established a 5-year and 10-year planning cycle, which includes capital investment and reinvestment in its CIP. The LAWA executive team conducts a robust review of proposed projects and prepares a CIP, which reflects input from multiple parts of the organization. The reviewing team includes financial input at all parts of the review.

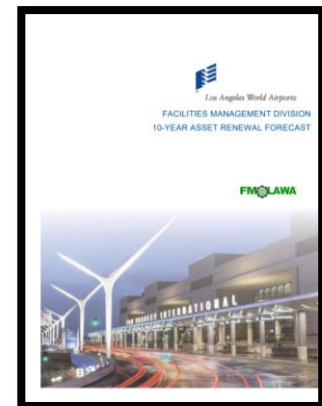
Improvements to the capital planning process were presented to BOAC in 2018. The stated purposes of the CIP and budgeting processes included prioritizing capital development, financial management, and managing development.

In addition to LAWA's 10-year capital plan, prepared in FY2018, it is currently working to establish an updated CIP to cover through FY2029.

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***LAWA has a 10-year asset renewal forecast for its facilities, totaling \$580 million through 2032.***

On April 11, 2022, LAWA's Facilities Management Division's (FMD) Asset Management Unit issued an "Asset Renewal Forecast," focusing on the FMD-maintained assets: asphalt paving; carpet; Central Utility Plant (CUP); conveyance; electrical; fire life safety; fleet vehicles and equipment; heating, ventilation, and air conditioning (HVAC); instrumentation; mechanical; plumbing; and roof. The forecasts are based on LAWA's Maximo asset data (e.g., install date, design life, and remaining life), combined with input from LAWA maintenance shop supervisors.



## Strengths and Accomplishments

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***LAWA has received multiple awards for its capital improvements.***

LAWA lists multiple awards in its CIP or construction-related initiatives, including:

- Best Project, United Airlines Terminal 7 and Terminal 8 Redevelopment Program (ENR California)
- Bradley West Gates, LEED Gold certification
- California's Best Projects, 2019 Excellence in Safety (ENR)

- California's Savings by Design Award for Terminal 1 Renovation
- Construction in Workforce Development Award for the HireLAX Apprenticeship Readiness Program
- Innovation of the Year, ConRAC Facility
- Innovative Transportation Solution of the Year, Automated People Mover (APM) (WTS LA)
- North American Public-Private-Partnership Deal of the Year (IJ Global)
- Public-Private Partnership of the Year (P3 Bulletin)
- 2022 Innovative Facility of the Year, LAX economy parking facility (National Parking Association)

LAWA's CIP also lists other awards related to facilities or a well-run airport, including:

- Airports Council International (ACI)-Europe Airport Carbon Accreditation for LAX and VNY
- Most Innovative Airport for Passenger Experience (American Association of Airport Executives)
- No. 7 Best On-Time Performance for a Mega-Hub Airport (OAG)
- No. 9 Best Airport (Wall Street Journal)
- Recipient of Los Angeles Department of Water and Power (LADWP) Second Place Demand Response Recognition Award
- The World's Best Airports for Business Travelers (GlobeHunters)
- Urth Caffe, Best Airport Coffee Concession of the Year (Global FAB Awards)

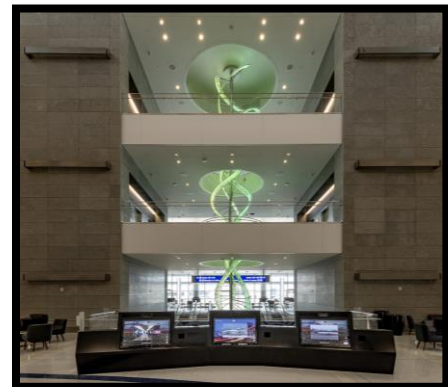
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***LAWA has embedded sustainability as a central component of new capital projects.***

LAWA's commitment to sustainability has deepened since the IEA Surveys in 2008 and 2016, reflected in LAMP and the terminals that the KH team reviewed. LAWA now has a sustainability design and construction policy that mandates a minimum of LEED Silver from the U.S. Green Building Council for its facilities. LAWA is meeting or exceeding this policy's goal at Bradley West Gates and Terminal 1.5. LAWA has set a goal to achieve a LEED Silver or higher certification for the major building structures in LAMP. The APM command center and maintenance facility is designed to be LEED Gold Certified.

***Bradley West Gates earned LEED Gold certification from the U.S. Green Building Council.*** Achievement of LEED Gold certification that also meets the requirements of CAL Green Tier 1 is noteworthy. Some of the sustainability features include:

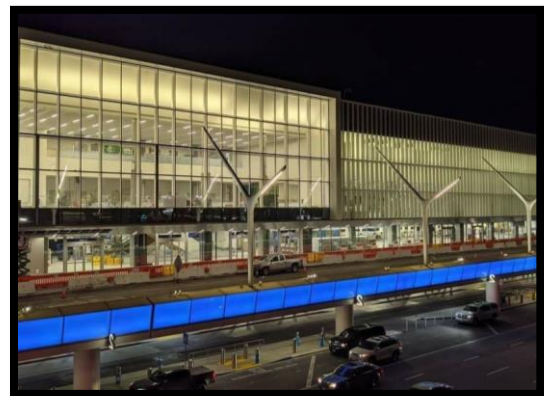
- "Cool" roofing and paving materials that reduce heat absorption



- Reduced electricity consumption by 29% through a combination of incorporating daylight, insulated glass, efficient HVAC, and smart interior lighting design systems
- Reduced water consumption by 41% by installing water-saving plumbing fixtures
- A gray water piping system for future connection
- More than 24% recycled content in the building
- Diversion of an estimated 95% of its construction waste from landfills.

**Terminal 1.5 earned LEED Silver certification by the U.S. Green Building Council.** Terminal 1.5 achieved an exemplary performance credit in its LEED score for its use and incorporation of recycled materials in the building, along with the contractor's recycling of waste material during construction. Terminal 1.5's sustainability features include:

- 35% recycled materials
- 78% of construction waste recycled
- A recycled water system that works with low-flow faucets and flush valves, thus, reducing the amount of potable water used
- A new stormwater collection and management system for rainwater runoff, which is filtered and reclaimed at an off-site treatment facility
- An advanced lighting control system that is programmed to increase or decrease the amount of artificial light within the terminal automatically, based on time of day and number of occupants
- Energy efficient air handling units to maintain occupant comfort by monitoring and regulating temperature, humidity, and air quality
  - The units use fan wall arrays and outside air mode to take advantage of LAX's cool coastal climate.
  - In addition to Merv14 filtration, the new air handlers use both bi-polar ionization and ultra-violet germicidal irradiation to provide healthy indoor air quality.




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***LAWA's new capital projects leverage technological advancements and passenger experience expected at world-class airports.***

LAWA initially hired CEO Justin Erbacci in 2016 as Chief Innovation and Technology Officer (CITO) to lead the way to digitally and technologically transform LAW. LAW hired a Chief Digital Transformation Officer on May 9, 2022.

In the design phase of the projects KH reviewed, LAW:

- Considered opportunities to apply innovative technology into the remodeled terminals and LAMP facilities
- Embedded environmental sustainability design concepts in the new capital projects and renovations
- Identified ways to improve technology

Table C.1 lists some of these innovations in technology that enhances the passenger experience.

**Table C.1: Technological and Passenger Experience Advancements at LAX**

Aspect of LAX	Technological Advancement Examples
<b>LAMP</b>	LAMP is a game changer at LAX, including plans for central operations of trains at 2-minute intervals at APM stations with an end-to-end travel time maximum of 10 minutes. It will offer an entirely new way to access LAX, with some operational risk and need for public education.
<b>Bradley West Gates</b>	<p>Bradley West Gates has a number of innovations that LAX plans to adopt in its other terminals, such as:</p> <ul style="list-style-type: none"> <li>■ Electronic gates with biometric photo match capabilities at all 15 gates (e-Gates)</li> <li>■ 14 interactive, touchscreen kiosks that provide access to airport information, including flight status, ground transportation options, wayfinding maps, that also support Americans with Disabilities Act (ADA) travelers</li> <li>■ Highly automated baggage handling that allows for 12-hour advanced check-in and storage, elaborated on later</li> <li>■ Visual docking guidance system</li> <li>■ Air circulation towers (also in Terminal 1.5)</li> <li>■ Plug-ins for phones and electrical devices in passenger waiting area seats</li> <li>■ Wi-Fi 6 and 5G speeds for cell phone reception</li> <li>■ Devoted areas, including two nursing rooms, service animal relief area, art exhibitions, and three children's play areas</li> </ul>
<b>Mobility</b>	<p>LAWA is making investments that will provide connectivity from Terminal 1 to Terminal 8 through LAMP.</p> <p>Terminal access after the TSA checkpoints is a long-sought amenity and improvement at LAX. LAWA is building Secure Connectors (i.e., walkways through tunnels) that allow TSA-screened passengers to walk between terminals without going through a second TSA security screening:</p> <ul style="list-style-type: none"> <li>■ The Secure Connectors between Terminal 1 and Terminal 3 opened in 2022.</li> <li>■ Secure Connectors between Terminal 4, Terminal 8, and TBIT/Bradley West Gates already exist.</li> </ul>



Aspect of LAX	Technological Advancement Examples
	<ul style="list-style-type: none"> <li>■ The final leg – a Secure Connector between Terminal 3 and TBIT – is currently under construction with a planned opening in 2024.</li> </ul> <p>LAWA is evaluating urban air mobility and anticipates the use of helicopter pads for this purpose, as early as next year. LAWA is exploring the use of self-driving vehicles on the airside.</p>
<b>Guest Experience</b>	<p>LAWA has added technological innovations to improve the guest and travelers' experiences:</p> <ul style="list-style-type: none"> <li>■ U.S. Customs Border Patrol (CBP) simplified arrival technology (2020)</li> <li>■ Chatbots</li> <li>■ Digital marketplace</li> <li>■ LAXOrderNow</li> <li>■ Pilot programs for touchless kiosks and health passports</li> <li>■ Self-service bag drop (2020)</li> <li>■ TSA automated screening lanes</li> <li>■ Wheelchair tracking using transponders</li> <li>■ Wi-Fi improvements (2019)</li> </ul>
<b>Parking Lot Upgrades</b>	<p>LAWA now offers pre-booking, valet parking, green/red lights to indicate occupied/free parking spaces, and electric displays of the number of spaces available in the CTA parking garages. At its new parking garages outside of the CTA at the ITF, LAWA is incorporating such technology as:</p> <ul style="list-style-type: none"> <li>■ Contactless exit (e.g., license plate readers/identification)</li> <li>■ Parking lot availability indicators (i.e., red/green lights for vacant spots)</li> <li>■ Documentation of available parking spots per level</li> <li>■ Smart parking technologies</li> </ul>
<b>Wi-Fi Speeds for Free Public Service</b>	<p>LAX ranks among the <a href="#">top 10 airports for overall Wi-Fi</a> speeds on its free public service in the first quarter of 2022 – a vast improvement over its Wi-Fi ranking in the 2016 IEA Survey; today it is No. 6 in the United States and No. 8 in the world.</p>
<b>Environmental Sustainability</b>	<p>In addition to its goal for LEED Silver certification, LAWA has added many innovative technology solutions, such as the building automation systems to remotely monitor HVAC in Terminal 1.5 and Bradley West Gates. There are multiple other examples presented in this IEA Survey Report.</p>
<b>Energy</b>	<ul style="list-style-type: none"> <li>■ LAX is constructing a new feed from LADWP (RS-X) to provide more reliable electrical power supply.</li> <li>■ LAWA has taken steps to provide more consistent power for sensitive equipment to reduce the number of times key elevators and escalators, among other installations, “trip out” due to power fluctuations.</li> </ul>
<b>Security</b>	<p>LAWA has adopted new security technology, such as:</p> <ul style="list-style-type: none"> <li>■ Security Analysis and Action Programs</li> <li>■ Autonomous Surveillance Robot</li> </ul>

Aspect of LAX	Technological Advancement Examples
	<ul style="list-style-type: none"> <li>Virtual queuing reservation pilot program for security checkpoints</li> </ul>
Other Innovations	LAWA now has the ability to change lit airline signs at terminal drop-off points, making it easier to provide wayfinding as airlines shift terminals.

***In addition to the cited technological improvements, Bradley West Gates has state-of-the-art baggage handling technology.*** Bradley West Gates’s technology includes features not typically found at LAX’s older terminals. These technology features are candidates for adoption at other LAX terminals in the coming years.

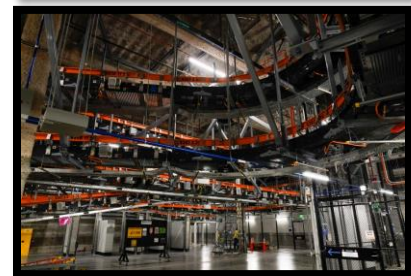
Vanderlande designed and built the \$261-million Baggage Optimization Project at Bradley West Gates. It includes approximately 7 miles of conveyors, making it the largest outbound individual carrier system in the nation, capable of moving up to 6,400 bags per hour.

In addition, LAX is the first U.S. airport with an Automated Storage and Retrieval System (ASRS), using technology which is usually associated with warehousing and distribution. Bags destined for Bradley West Gates are automatically loaded into a special plastic tray or "carrier" and conveyed through an underground utility tunnel to its flight preparation area at the apron level.

Bags that are checked in early for a flight, and stored for later retrieval, are directed to the ASRS, where they are stored until the flight time is closer. This technology allows passengers to check in bags earlier than ever before – up to 24 hours in advance of a flight.

16 robotic cranes place and retrieve bags in more than 3,000 racking storage locations, which use radio-frequency tags to track bag locations within the system. The facility can house approximately 3,100 bags in early bag storage facilities, including 980 at Bradley West Gates.

Therefore, LAWA has made major technological advancements since the 1999 IEA Survey, as outlined in Table C.2. LAWA is poised to move to the “innovative/optimized” maturity level once these new technologies are fully operational, maintained, and renewed.

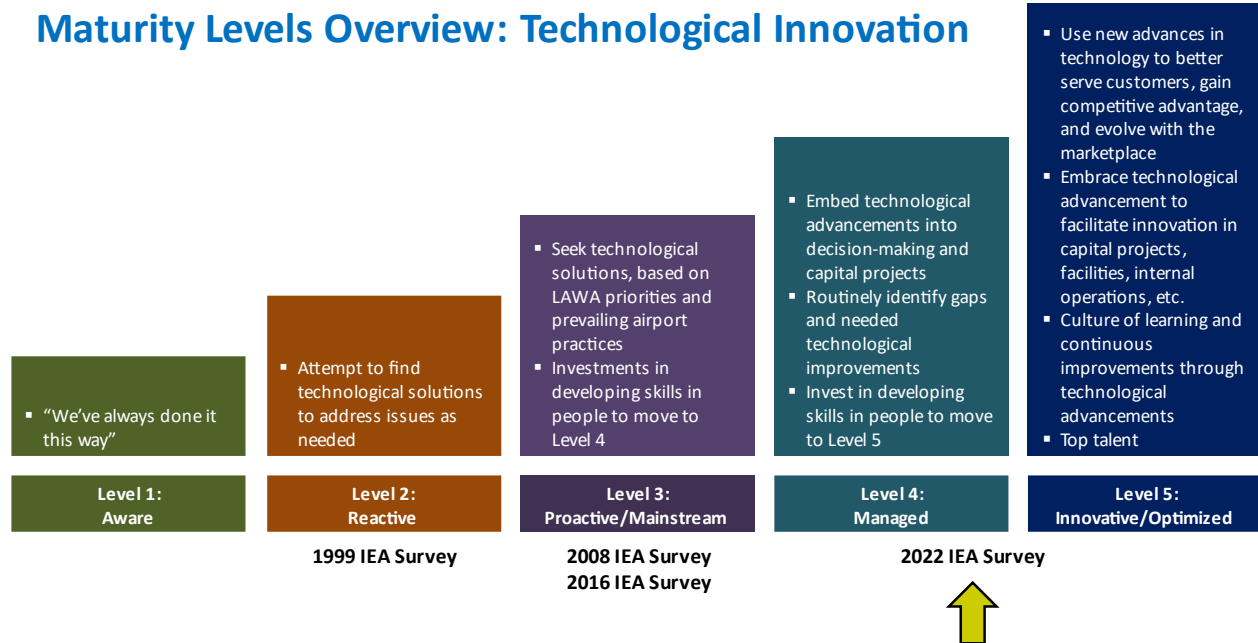


**Table C.2: LAWA’s Technological Innovation Efforts (1999-Present)**

Maturity Levels	LAWA Progress
<b>Reactive</b>	<p><b>1999 IEA Survey Status:</b> In 1999, LAWA had been unable to advance its Master Plans, which were opposed by community groups who feared the impacts of LAX expansion. The last major upgrade to LAX at that time had been in preparation for the 1984 Olympics, featuring the CTA’s upper deck roadway, the Sepulveda Boulevard underpass, the construction of TBIT, and the Terminal 2 upgrade.</p>
<b>Proactive</b>	<p><b>2008 IEA Survey Status:</b> A new air traffic control tower was built. LAWA management focused on LAX modernization, beginning with much needed upgrades to TBIT.</p> <p><b>2016 IEA Survey Recommendations:</b> LAWA embarked on the major capital improvement program to transform LAX with LAMP, Delta’s move to Terminal 2 and Terminal 3, consolidation of functions at the high-tech Airport Operations Center (AOC), and other terminal upgrades.</p>
<b>Managed</b>	<p><b>2022 IEA Survey Findings:</b> LAWA has embedded airport technological innovation and LEED features into its new and modernized facilities, including LAMP, Bradley West Gates, airport police facility, new parking lots, and terminal upgrades. LAWA is committed to the digital marketplace model for LAX.</p> <p>In moving forward, LAWA will need to ensure that its staff are trained in maintaining, refreshing, and upgrading the facilities, equipment, and technology as part of its routine management of its properties.</p>
<b>Innovative/ Optimized</b>	<p><b>Aspirational:</b> LAX would be regarded worldwide as best-in-class among international airports, meeting standards set by such airports as Singapore and Hong Kong.</p>

LAWA is now at the “managed” level of KH’s maturity model in terms of technological innovations and enhancements. LAWA’s digital marketplace and its new facilities position LAWA to move to Level 5.

## Maturity Levels Overview: Technological Innovation



***LAWA is optimizing functional value, maintainability, and useful life of the new capital projects.***

Capital program and construction management teams at LAWA are working at full capacity to bring current projects to completion in time for the upcoming major sports events, including the 2026 FIFA World Cup and 2028 Olympics, that Los Angeles will host in the next several years. Faced with the scale and urgency of its CIP, LAWA has demonstrated its ability to manage complex projects and place facilities in service on schedule.

As part of the governance system noted earlier, interdivisional executive reviews occur for both new projects and changes to existing ones. A review of a selection of the decisions made from that process reveals that LAWA is willing to invest, within prudent reason, to provide better functionality and longer life for the assets they are building.



A business triangle model addresses the balance among being good, delivering fast, and being cheap. According to this business model, organizations can only excel in two of the three. LAWA



strives for excellence and defines excellence as “good” and “fast.” In other words, LAWA is optimizing for functional value, maintainability, and useful life, with immediate construction cost as a real but slightly secondary issue.

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***LAMP has incorporated equity in terms of job creation and contracting opportunities into its planning and construction.***

Volume II, “Equity and LAWA’s Impact on Historically Disadvantaged Groups,” provides maps and data on the economic impact of LAMP and other project opportunities at LAX to date.

LAWA has prepared estimates of what the economic impact potential is:

- More than \$585 million has been identified for local, small, or disabled veteran-owned businesses, with an \$85 million commitment to certified local, small businesses in Los Angeles.
- LAMP will create more than 2,000 construction jobs, with 30% of those opportunities being reserved for residents of Los Angeles and highly impacted communities near LAX.
- 60% of careers during the 25-year operations and maintenance phase are designated for local workers.
- LAX Integrated Express Solutions (LINXS) joint venture for LAMP, discussed later, has built partnerships with community-based organizations to expand the pipeline of workers, especially from non-traditional backgrounds.
- LAWA’s tenant-led projects, such as Terminal 1.5, participate in its inclusivity program.
- LAWA has set aside \$1 million in investments to create career pathways, including:
  - Women, former foster youth, individuals in reentry and transitioning out of gang involvement, and persons with disabilities
  - HireLAX, LAWA’s Apprenticeship Readiness Program

## **C.2 LANDSIDE ACCESS MODERNIZATION PROGRAM (LAMP)**

The KH team reviewed the LAMP project from an overall management perspective, and as an example of a Public Private Partnership.

### **Overview**

LAMP’s stated purpose is to give LAX guests time-certain access to terminals and provide a long-awaited connection to the regional transportation system. LAMP is intended to improve guest access and vehicular circulation in the CTA at LAX. At a projected cost of \$5.5 billion, LAMP consists of multiple projects to deliver APM, ConRAC, and other facilities.



### AUTOMATED PEOPLE MOVER (APM)

The APM cost of \$4.9 billion includes design, construction, partial financing, and operations and maintenance for 30 years. LINXS is the joint venture selected to design, build, finance, operate, and maintain the APM. The firms that constitute LINXS are:

- Lead firm: Fluor
- Stations and pedestrian bridge construction: Balfour Beatty
- Quality assurance (QA) and quality control (QC): Dragados USA
- Guideway construction: Flatiron and Hochtief PPP Solutions
- Lead designer, fixed facilities: HDR
- Architectural services: HNTB
- Train manufacturer and operator, including APM vehicle design, construction, operations, and maintenance: Alstom

LAWA broke ground in March 2019; the APM is anticipated to be completed by 2023. The electric train will operate across a 2.25-mile elevated guideway with six stations:

- Three inside the CTA, serving all CTA terminals.
- Three outside the CTA, starting at ConRAC, continuing on to Intermodal Transportation Facility (ITF-East)/L.A. Metro stop, and then ITF-West, which will serve economy parking and connections to bus services.





Its operating plans include free APM services with 2-minute headways from 9 a.m. to 11 p.m., with operations 24/7. Peak operating capacity is 9 four-car trains. Each train will have the capacity for 200 passengers and their luggage. One-way travel time will be 10 minutes end-to-end (from ConRAC to the West CTA Station). Passengers while inside the car can view public art in a variety of media and the iconic Theme Building as the train enters the CTA.

For easy access, the APM trains will include:

- Large, wide doors with level boarding
- 12 seats per car

LAWA anticipates approximately 30 million passengers per year will use LAMP when it comes online.

In terms of sustainability:

- The system's fleet of 44 cars are fully electric, are 98% recyclable, and generate a portion of their own power through regenerative braking.
- The command center and maintenance facility generate nearly one-half of their power from solar energy and are designed to be Leadership in Energy and Environmental Design (LEED) Gold certified.





## CONSOLIDATED RENT-A-CAR (CONRAC)

LAX represents the No. 2 rental car market among U.S. airports. Once completed, ConRAC will be the largest rental car facility in the world. The purpose of ConRAC is to:

- Consolidate a significant portion of the car rental operations currently spread across the area east of LAX
- Replace CTA bus access to most car rental operations with the APM. LAWA anticipates a reduction of 3,200 daily rental car shuttle bus trips through the CTA.

LAWA expects ConRAC will result in material reduction of bus traffic in the CTA, thereby reducing competition for curbside vehicular access and LAX's carbon footprint.



ConRAC is a \$2-billion, P3 agreement between LAWA and LAX ConRAC Partners (LAXCP), consisting of:

- Developer: Fengate Capital Management Ltd.; PCL Investments USA, LLC
- Design-Build Contractor: PCL Construction Services Inc.
- Designer of Record: PGAL, Inc., and AC Martin Partners
- Operation and Maintenance Provider: Johnson Controls, Inc.
- Quick Turn Around Manager: MVI Field Services, LLC

The P3 design/build/finance/operate/maintain (DBFOM) contract is for a 28-year period.

Some background information on ConRAC:

**Location:** Adjacent to the 405 freeway (bordered by Arbor Vitae Street to the north, Aviation Boulevard to the west, Century Boulevard to the south, and La Cienega Boulevard to the east)

**Opening:** Broke ground in October 2019; scheduled to open in 2023



**Size:** 6.4 million square feet

- The concrete superstructure is second in use of concrete in the United States only to the Pentagon.
- ConRAC will house more than 18,000 vehicles, including ready/return rentals, idle vehicle storage, and employee parking spaces.

**Quick Turn Around (QTA) building:** Allows for light maintenance of vehicles (car washing, oil changes, and tire rotation)

**Sustainability:**

- LAX estimates 117,000 fewer vehicle miles traveled per day.
- LAWA has set a goal to achieve a LEED Silver rating for the facilities.
- The facility has installed native drought-tolerant landscaping and uses reclaimed water for irrigation.
- It has a solar farm that generates approximately 4.7 megawatts.

APM transportation links LAX with L.A. Metro, ConRAC, and parking garages, which is a best practice at most world-class, international airports in large metropolitan areas.

## Observations

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### ***Complex private partnerships are delivering major portions of LAMP.***

LAMP's contractual arrangements are the most complex P3 contracts in LAX's history. There are separate partnerships for ConRAC and APM. The APM project at \$4.9 billion is the largest contract ever awarded in the City of Los Angeles and includes eight major corporations. There are also different delivery models used:

- The ITF projects have been built by LAWA as a progressive design-build project.
- There is a separate Roadways, Utilities, and Enabling (RUE) project being delivered as a progressive design-build project.

LAWA uses several firms to provide owner services for oversight of LAMP:

- Project management and construction management (PM/CM)
- Project controls (PC)
- Program management advisory (PMAS) services

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### ***LAWA has transferred significant risk for LAMP to its private partners.***

Through its P3 arrangement involving designing, building, maintaining, and operating, LAWA has transferred significant risk for LAMP to its private partners. In doing so, it has placed a vital segment of airport access in the hands of those partners. Transferring this risk to private

partners reduces the burden of project management on LAWA. LAWA has an oversight process in place to govern significant changes.

At the same time, given LAMP's complexity, it is critical for LAWA management to retain enough oversight transparency into the project to:

- Understand and respond to emerging risks
- Understand the critical decisions that need to be made to bring the system online

On June 2, 2022, LAWA achieved a major construction milestone; it made the ConRAC space available to 13 rental car tenants to construct their customer spaces (e.g., rental counters, waiting areas, office spaces, and entry/exit booths).

LAMP program managers indicate that:

- Safety planning is in progress.
- System simulation, needed for adequate operations planning, is under way.
- An "owner" role is being created within LAWA's Operations and Maintenance (O&M) to oversee LAMP and protect LAWA's interests in it.
- Recruitment is under way to fill that position.

Significant delays in any of these preparations will expose LAWA to material risks of failure in service inauguration.

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## ***LAWA has protected its interests in LAMP through milestone-based progress payments and transfers the risk to the joint venture***

LAWA has protected its interests in LAMP through milestone-based progress payments and transfers the risk of design, construction, and maintenance to the joint venture (LINX). Moreover, LINX is building LAMP and will operate the system once completed, thereby increasing LINX's commitment that it be built right.

- ***Milestone progress payments.*** LAWA protects its interests in LAMP through milestone-based progress payments to the builders of fixed facilities and a complex "pay for performance" arrangement with LINX, the operator/maintainer of the APM. LINX is a joint venture made up of several transport companies. LAWA maintains a contracted oversight staff for LAMP to ensure that schedules and construction standards are met. Specifically:
  - LAMP contractors must achieve defined milestones to receive progress payments.
  - Contracted LAWA oversight staff must verify milestones.
  - LADBS conducts inspections of the structures to confirm building code compliance.

Progress payments are made with significant reliance on the Lenders Technical Advisor (LTA). This outside reviewer certifies to the banks and investors associated with the private

partners that work included in a request for funding is complete and of acceptable quality. LAWA's progress payments generally parallel the private partner funding installments.

- **Transfer of design risks.** Because the project includes design/build provisions, LAMP contractors have taken responsibility for ensuring that structures are constructed as designed. This arrangement removes one major risk element from LAWA.
- **Operations and maintenance based on availability.** The APM will essentially pay for its operations and maintenance on the basis of its availability. This arrangement transfers the risk of design, construction, and maintenance to the joint venture (LINX) that is building and will operate the system.

LAMP is progressing on schedule against the adjusted schedule for the redesign of the APM guideway to improve its seismic resilience.

- **Seismic redesign of APM.** As documented in a recent Grant Thornton audit, LAMP had many change orders. The most significant cost increase and schedule delay was due to a redesign of the guideway for the APM to improve its seismic resilience. That change order added about \$97 million to the cost and resulted in a delay of 157 days.
- **Revised completion schedule.** Since then, LAWA reports that the seismic change order set that phase of the APM project back from a planned delivery date of March 31, 2023, to September 4, 2023. LAMP has five major components, most of which are still in progress. ITF-West is in service and appears to be substantially completed; the other elements (e.g., ConRAC, Airport Metro Connector (AMC), and roadway improvements) are still under construction.

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***An external audit identified weaknesses in LAMP's change order process, which should be addressed on a priority basis.***

The size of LAWA's capital program and the complexity of its delivery systems make it important to maintain strong oversight of change orders. LAWA reports that it:

*"...encourages a detailed documentation of risks and 'trends' during project delivery so that [it] can properly mitigate the impact of realized risks on project budgets, schedule, and outcomes. Not all risks become change orders (i.e., uses of project contingency)."*

LAWA has a well-developed change order governance process, which ensures that significant change orders will be reviewed by a wide range of senior executives. There is an oversight unit within the Airport Development Group that coordinates the administration of change order requests and ensures that cost estimates comply with standard practice.

Even with these robust systems in place, change order volumes, overall costs, and trends deserve further attention, especially in cases of third-party projects, such as P3s. With P3

arrangements, LAWA needs to be steadfast in ensuring that change orders do not result in unintended alterations to project scope or unplanned additions to capital budgets.

This observation is notably true for LAMP, which is immensely complex. A recent Grant Thornton audit of LAMP underscores this need. Grant Thornton identified the need to improve the level of detail and cost estimates supporting change orders. These recommendations align with the high levels of complexity and challenges in maintaining transparency.

LAWA reports that it is strengthening its change order process to respond to the auditors' recommendations. This responsiveness should be encouraged. The BOAC Audit Committee should hold LAWA accountable for the successful implementation of these changes. (Refer to Part D, Section D.4, for further elaboration of the BOAC Audit Committee.)

#### LAMP OPERATIONAL AND IMPLEMENTATION PLANNING

To fully realize the value of its new assets and ensure that its investments are reflected in an improved passenger experience and international reputation, LAWA must make sure that the new facilities deliver their promised increases in passenger and guest convenience. Achieving this goal will actualize LAWA's vision of a state-of-the-art, 21<sup>st</sup>-century air transport hub, easily accessed and navigated. Failure to do will cause severe reputational harm to LAWA and LAX.

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#### ***LAMP is an order-of-magnitude change in the way people access LAX.***

LAX passengers are used to entering the CTA and accessing the terminals from the curb or parking lots. The recent changes in establishing a taxi and ride-sharing app lot (LAXit) confused some and frustrated other travelers. It added travel time to their trips and created inconveniences for travelers either waiting for the LAX buses or walking to the LAXit lot.

LAWA is optimistic that LAMP will subside most of those current passenger and guest complaints. APM will be a great new guest experience. That said, LAMP is not without its challenges in acclimating the traveling public to use APM. LAWA has begun a program of outreach on social media to raise public awareness of APM. This outreach is a good start. Much more will be needed.

***Multiple level changes are a potential APM barrier for passengers with mobility impairments or large luggage loads.*** Passengers could need to make up to three level changes to reach the check-in counters in the terminals. For example:

- A person would disembark from L.A. Metro, embark on APM, and disembark from APM to move along a moving sidewalk to get to luggage check-in.
  - A person would park their car, take an elevator to the APM, and disembark from APM to move along a moving sidewalk to get to luggage check-in.
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- A person arriving at LAX would get their baggage; take an elevator or escalator to a higher floor; use the moving sidewalk to get to APM; embark on APM; disembark APM; and take an elevator to their parked car, taxi or ride-sharing service, or ConRAC.

***Each level change is a potential choke point.*** For example, if an elevator or APM train were to become inoperative, there would a disruption to passenger flow to the terminals with potential safety implications. Given its complexity and “newness” to Angelenos, LAMP is almost guaranteed to confuse a segment of its users.



Full realization of the value of LAWA’s massive investments in capital improvements depends critically on the ability of passengers, guests, and workers to use them effectively. Success in this domain includes both the facts on the ground – the actual ease of access and navigation – and the public understanding and conversation surrounding those facts.

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***Effective wayfinding systems are critical to the full realization of the value of LAWA’s terminal and ground transportation investments.***

LAWA is making a concerted effort to improve and refine its wayfinding systems. Effective wayfinding systems are critical – an important element in operational readiness and success.

LAWA is well aware of the challenge. It is making an unprecedented effort to improve and refine its wayfinding systems. It has developed a comprehensive signage policy, contracted with the LAMP P3 to develop signage for APM, and is preparing a Request for Proposal (RFP) that will result in the selection of a contractor to integrate APM signage with an integrated wayfinding plan for all of LAX. This effort represents a large body of professional work and an important

commitment on the part of LAWA executives. LAMP's opening, and the increased levels of activity expected in the latter part of the 2020s, make the implementation of this wayfinding system urgent. Beyond that, signage alone will not be sufficient to ensure that a renovated LAWA is easy to navigate for a broad range of guests.

***Public perception of the success of LAMP, APM, ConRAC, and terminal renovations will hinge on consistent, clear, and frequent wayfinding information.*** Over the next 18 to 24 months LAWA will undergo further dramatic changes in access systems between its passenger automotive, transit and terminal facilities. LAMP will include multiple elements of this transformation. At its heart will be the APM with its elevated guideway. While these improvements are intended to dramatically reduce vehicular congestion in the CTA, they will present new challenges. Patrons will be required to locate and use dramatically different facilities including new terminals, parking lots, trains, escalators, elevators, moving sidewalks and stations. Providing passengers with clear guidance to help them to navigate these new facilities will be a critical challenge for LAWA and its P3 partners.

No matter how advanced or capable the new systems and facilities may be, if airport guests cannot easily and confidently navigate them, these large capital programs run the risk of being labeled as failures. LAWA's experience with LAXit, the consolidated taxi/rideshare pickup terminal, should be instructive in this regard. Because of LAXit's critics, it is critical for LAWA to make every effort it can muster to ensure that its guests, whether they originate in a nearby community or a far-off country, are capable of finding their way to their respective gates or destinations.

***Terminal access behind TSA checkpoints will be an added convenience but also pose challenges.*** Until now, passengers who needed to move from one terminal to another were required in many cases to exit security, walk down the sidewalk (or take a CTA bus), re-enter, and re-clear through a TSA checkpoint. One of the key improvements that will occur at LAX is the development of infrastructure that will permit guests cleared through TSA checkpoints to reach all LAX terminals without exiting secure areas. This ability will be a great convenience for passengers who need to transfer between terminals. It will also open the possibility of some passengers becoming hopelessly lost in what will now be a single large airport.

Until now, passengers were effectively confined to a single terminal. If they became disoriented, they could only go the wrong way within the limits of that terminal or the CTA. With the new access provisions, this limitation will no longer be the case. Passengers who get lost will do so on a much larger scale. Furthermore, distances are significantly greater. Before, passengers who exited secure areas could board circulation buses that traveled to all terminals. APM will substitute for buses for those passengers who now choose to leave the secure area. If





passengers choose to remain in the secure area, they may need to walk the entire LAX circumference. Note: LAWA provides golf car services for those passengers walking through the tunnels between terminals.

***Bradley West Gate wayfinding kiosks warrant broader installation across LAX and in LAMP.*** In a state-of-the-art wayfinding effort, Bradley West Gates has an advanced system with electronic kiosks that can be used to search for connecting flights, communicate with passengers' smart phones, and provide instructions on ways to reach their desired on-airport destinations. It will be of great assistance to passengers who are confident with technology. LAWA plans to expand this wayfinding technology to other terminals.

***No single organizational unit oversees wayfinding at LAX.*** There does not appear to be a single organizational unit or integrated team responsible for development and oversight of wayfinding as an operational discipline, including signage, information services, and human support. In its effort to address wayfinding challenges, LAWA has involved the following organizations:

- LAWA's Airport Planning Unit develops and maintains wayfinding signage standards.
- LAWA's Delivery Teams (ADP, LAMP, TDIP) design and construct new signage, based on those wayfinding standards.
- LAWA's O&M team's Sign Shop fabricates, installs new signs for operational needs, and maintains existing signs.
- LAWA's Information Management & Technology Group (IMTG) operates and maintains digital signage systems.

LAWA reviews signage submittals (e.g., design packages, shop drawings) for conformance with wayfinding standards.

***LAX's diverse passengers have different wayfinding needs, including foreign languages, handicap conditions, and different levels of expertise in navigating airports.*** The large number of passengers and other users of LAX means that a broad range of human beings must navigate from parking lots or transit stations to terminal gates in both directions. LAX passengers and guests speak a variety of languages. Some will be utterly unfamiliar with large and complex facilities such as LAX. Some will be fatigued and disoriented from long flights. Other may have disabilities. Some will just get lost. This calls for extensive, overlapping systems to guide, direct, and reassure tens of millions of people on their way from one end of LAX to another.

Beyond the provision of "best practice" signage systems, human support for passengers who become confused or disoriented is important. LAWA has an Ambassador program in place, which is a foundation on which to build the necessary human wayfinding support. Current plans



do not highlight the employment of guides or ambassadors to assist airport guests in navigating these complex new facilities.

Time is short to complete critical wayfinding activities at LAX.

### C.3 CAPITAL PROJECTS REVIEWED

The KH team reviewed the project management and cost controls for three projects, identified by the Joint Administrators:

- Bradley West Gates
- Terminal 1.5
- Taxiway P

The VNY capital construction program was outside the scope of this IEA Survey.

### Overall Observations

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#### ***LAWA has adopted advanced delivery models for these capital projects.***

Progressive public agencies have adopted several delivery models. For LAWA, these delivery models include:

- ***Design/bid/build:*** Design/bid/build is a classic governmental model, which most government officials are familiar with. A governmental agency designs the project (or bids for a contractor to do the design work). With the completed design in hand, the agency issues a Request for Proposal (RFP) and reviews the submitted bids to build the project as advertised for a fixed price. The agency selects a separate contractor to perform the construction. This classic model has a number of disadvantages, including higher costs and longer timelines for completion of projects. Taxiway P is an example of this model.
- ***Design/build:*** A single contractor is selected to provide both design and construction services, eliminating conflicts between design specifications and construction site realities common in the design/bid/build approach. Bradley West Gates is an example of this design/build approach.
- ***Tenant alteration:*** The major tenant in a facility – in this case, almost always a terminal – provides the design and construction of a facility expansion or renovation at a negotiated fixed price and completion date. This Private Public Partnership (P3) model provides the tenant with substantially greater control over construction pace and phasing, while LAWA reduces its own errors and omissions risk. LAWA has a history and success record in the tenant alternation model and working with airlines, including American, Delta, United, and most recently Southwest Airlines in Terminal 1.5. Southwest had also worked with LAWA under this model for its prior renovations of Terminal 1.
- ***Design/build/finance/operate/maintain:*** This model is a complex P3 model, in which a single contractor – in reality a consortium of contractors and consultants – is selected to



provide, operate, and maintain facilities with 1) specified functions and capabilities and 2) a negotiated repayment plan that includes at least partial financing by the contractor. This model requires sophisticated oversight and management skills and institutional capacity. If successful, it can offer major savings in cost and schedule for complex programs, such as LAMP.

Note: Both the tenant alternation and design/build/finance/operate/maintain P3 models can help LAWA ensure that project costs remain within reason when the business arrangements within the partnerships make cost control advantageous to the private partners.

The next section elaborates on each of these approaches for LAMP and the 3 capital projects that the KH team reviewed. ***Despite the blight that the COVID-19 pandemic caused in so many people's lives and severe impact it had on the aviation industry, LAWA's construction projects benefited from the ability to take advantage of the minimal air traffic and vehicle traffic in the Central Terminal Airport (CTA) during 2020 and 2021.***

***LAWA delivered the three capital construction projects on time and on budget, allowing for normal changes in such projects.***

LAWA delivered the three specific projects reviewed in this IEA survey on time and on budget, allowing for normal changes due to field conditions and unforeseen circumstances. All were being built during the COVID-19 pandemic.

Table C.3 compares the schedule and budget for these three capital projects. The key element in project management is good design and effective governance. That is one of the arguments for a design/build delivery system, which allows design and construction forces to communicate throughout the project with the mutual objective of a balanced “good/fast/cheap” business triangle.

**Table C.3: Capital Project Comparisons: Schedule and Budget**

	<b>Bradley West Gates</b>	<b>Terminal 1.5</b>	<b>Taxiway P</b>
<b>Delivery Model</b>	Progressive Design/ Build/RFP Process	Tenant Alteration	Design/Bid/Build
<b>Schedule – Design and Construction</b>			
<b>Design</b>	15 months	12 months	19 months (July 2017-February 2019)
<b>Construction – Start (Notice to Proceed)</b>	September 2016	August 2017	November 2019
<b>Construction – Contracted Completion</b>	September 2020; dates not updated in LAWA system	November 2020; dates not updated in LAWA system	February 2021 (based on contract negotiations)
<b>Construction – Contract Completion Modification</b>	See Note 1	See Note 1	July 2021
<b>Construction – Actual Completion</b>	Closeout in progress	April 2022 for beneficial occupancy; closeout	March 2021



Bradley West Gates		Terminal 1.5	Taxiway P
		managed by tenant and details unavailable to KH	
Schedule – Duration (Calendar Days)			
Duration – Contracted	See Note 1	See Note 1	470 days
Duration – Contracted Modification	4.5 years	3.5 years	625 days (after change orders)
Duration – Actual	See Note 1	See Note 1	492 days
Duration – Difference	See Note 1	See Note 1	-133 days
Budget			
Budget – Planned/ Contracted	Guaranteed Maximum Price (GMP): \$1.3 billion without change orders	\$498 million	\$84.1 million
Adjusted Budget	Expenditure at most recent report is approximately \$1.5 billion	Expenditure at most recent report is approximately \$478 million	\$76. 6 million (\$78.1 million total for final pay items minus \$1.5 million ; total of 18 change orders)
Budget – Difference	Has not been closed out; currently approximately \$200 million under the adjusted budget See Note 2	Has not been completely closed out; currently approximately \$20 million under plan	\$7.5 million under budget; see Note 3 and Note 4

Note 1: The KH team reviewed the latest dashboards provided for the month ending April 2022 for Bradley West Gates and Terminal 1.5. Planning for Bradley West Gates started as far back as 2012. For Terminal 1.5, planning started in mid-2016. The KH team was not provided planning documentation that may have provided actual planned durations for design or construction. To locate this information, the KH team reviewed LAWA's Strategic Plan, Terminal Development and Improvement Program (TDIP), CIP, CIP status reports from February 2022, the bond reports, and CIP BOAC update documents.

Note 2: In analyzing on time/on budget outcomes at Bradley West Gates: In a progressive design/build, design moves forward in parallel with construction. The budgeted cost at time of the award is not a reliable baseline to use for budget performance. A progress design/build delivery system relies on strong governance system and full transparency.

Note 3: In analyzing on time/on budget outcomes for Taxiway P: In a design/bid/build, the construction contract cost can be used as a baseline for budget performance. The construction schedule can also be used as a baseline.

Note 4: The KH team was able to review Taxiway P's Total CIP Project costs (i.e., hard costs (construction) plus soft costs (professional services, staff costs, etc.)). Taxiway P's original CIP budget was \$93.28 million; its final CIP budget was \$98.86 million – an additional cost of \$5.58 million. The CIP contains an estimated schedule for planning, design, bidding, construction, and closeout.

## BRADLEY WEST GATES

Bradley West Gates is a design/build/RFP project. The design/build approach places greater responsibility on the contractor to get the project done on budget and on schedule. Moreover, the contractor and the designer are held jointly accountable and, thus, cannot place blame on each other if the project is not completed as planned. One of the major advantages of



design/build projects is that the detailed design of some elements can be done in parallel with construction as an iterative process. This approach generates change orders as details are fleshed out, resulting in no specific or easy border between design and construction.

Each change order over \$150,000 for Bradley West Gates was presented to and approved by LAWA's Capital Project Oversight Committee (discussed earlier in Part C). This approach is a sound business practice because it takes the agreement of several major LAWA executives to move a large change order forward. BOAC gives the final approval to significant change orders.

Comparing the original budget to final expenditures has some limitations because it does not capture the legitimate changes, based on field conditions and improvements identified by LAWA to improve the project during construction. Such improvements do not indicate any project management errors or omissions.

LAWA knew that the Bradley West Gates had known bio-hazardous materials from an underground fuel spill that would require a major change order once the excavation for the underground access tunnel began. LAWA included a contingency for it in the original budget but did not know what the impact of the extra work would be when they set the original budget.

Finally, since the project had still not been closed out at the time of this IEA Survey, it is not possible to determine the final project costs or complete a project postmortem.

#### TERMINAL 1.5

Southwest Airlines managed the construction of Terminal 1.5 as a tenant alteration project. LAWA assigned a Project Manager to oversee the work. The Project Manager attended progress meetings and was advised of developments as they occurred. The City of Los Angeles Department of Building and Safety (LADBS) carried out normal inspections as construction progressed.

LAWA planned for the turnover of Terminal 1.5 to LAWA to be effective April 1, 2021, at which point LAWA would be responsible for its security, service calls, and maintenance – typically referred to as a “beneficial occupancy” since close-out was not fully completed at that time. At that time, TSA, Southwest, and the domestic airlines serving Bradley West Gates through Terminal 1.5 could begin operations there.

On March 23, 2021, LAWA announced 1) the completion of the Terminal 1.5 Development Program with Southwest Airlines Co., and 2) the Certificate of Occupancy (COO) for the building was in process. LAWA received closeout materials (e.g., operations and maintenance,



warranties, and digital copies of as-builts) and assumed responsibility for maintenance. The final cost to LAWA, if they opted to exercise their purchase option, was established.

Final close-out documents that all claims have been resolved, final payments have been made, and the contractor has removed all construction equipment and excess materials) are in progress. The actual status of construction contract closeout for Terminal 1.5 was not available to KH because Southwest held the contract and did not share those details.

#### TAXIWAY P

Taxiway P was able to come in under schedule and under budget, taking advantage of reduced air traffic on the runways during the peak of the COVID-19 pandemic.

***LAWA pursued opportunities to reduce cost and maintain construction schedules during construction of Taxiway P.*** Changes in FAA taxiway clearance requirements allowed LAWA to eliminate contracted renovations to an electrical vault adjacent to the taxiway. This change resulted in a decrease in project construction cost.

Although there were 18 change orders during the Construction Phase of Taxiway P, the overall impact was a reduction in contract value of approximately \$7.5 million. The project was completed ahead of schedule, benefiting from reduced air traffic at the time because of the COVID-19 pandemic's impact on air travel. These contract changes during the Construction Phase have been documented through the use of:

- Contractor changes requests
- Contract potential change orders
- Change orders
- Change directives

LAWA engaged impacted tenants (airlines) and started early discussion and coordination regarding the phasing of reconstruction to minimize operational impacts.



## Bradley West Gates

As shown in the photo, Bradley West Gates was completed in 2021. Airlines began using Bradley West Gates in May 2021. The interior structure has visually appealing architecture. For example, its roofline reflects the ocean swell, which ties into TBIT's ocean roofline. Some facts on Bradley West Gates are:

### Size:

- Five levels
- 750,000-square-foot facility
- 15-gate concourse, serving both international and domestic flights
- Length of almost 1,700 feet
- Nearly 60,000 square feet of space for future airport lounges

**Contractor and Architects:** The joint venture of Turner-PCL served as the contractor for the project, with Corgan and Gensler serving as architects. The project was built using a design/build delivery model.

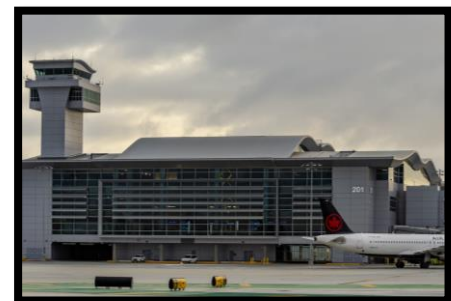
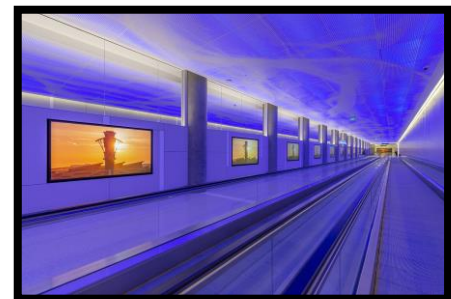
**Opened:** May 2021

A pedestrian tunnel connects TBIT at Gate 148 with the Bradley West Gates. The tunnel continues the ocean theme and includes:

- Moving walkways along the underground corridor connecting Bradley West Gates to TBIT
- Courtesy passenger shuttles
- 24 100-inch video screens

The northern portion of the tunnel provides two-way traffic for outbound passengers and arriving domestic passengers. The south half of the tunnel provides a secure route to the U.S. Customs and Border Patrol (CBP)'s Federal Inspection Station at TBIT.

Bradley West Gates also has a ramp control tower where LAX operations staff control aircraft ramp movements in the area between TBIT and the West Gates, acting as a complement to the FAA control tower.







Bradley West Gates has a flexible Multiple Apron Ramp System (MARS), which enables its gates to accommodate both widebody and narrowbody aircraft, making the terminal more flexible and maximizing aircraft parking space on the ramp.

In preparing for the project, LAWA had to address a HazMat soil contamination. LAWA knew this condition likely existed and created a contingency allocation in the project budget to accommodate it. The issue was successfully resolved.

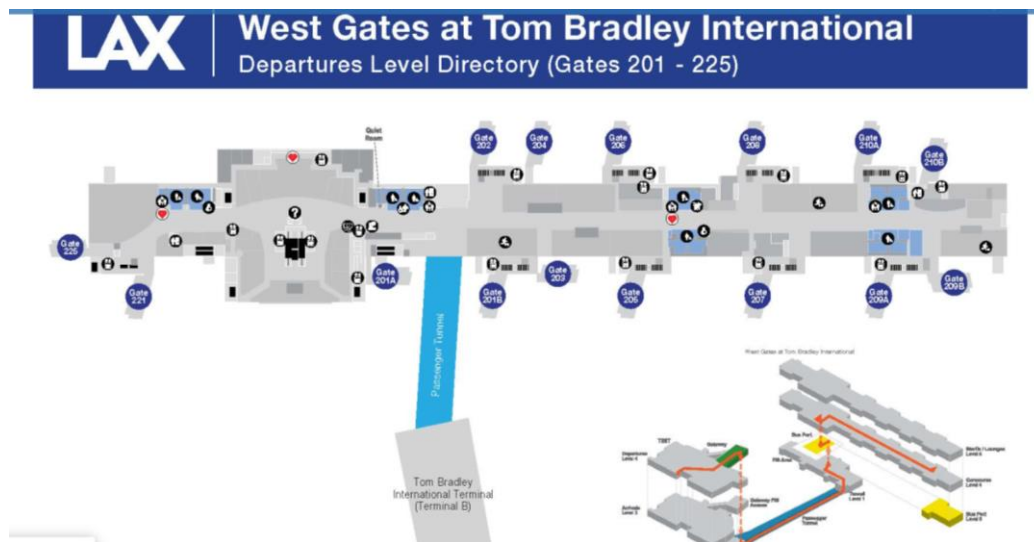
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***COVID-19 affected the immediate need for additional gates and demand for services at Bradley West Gates because of reduced air passenger travel.***

Bradley West Gates was built to handle forecasted increases in international passenger traffic. These planned increases were adversely affected by COVID-19, which led to LAWA to make changes in airline utilization of the terminals. LAWA now includes both international and domestic carriers at Bradley West Gates.

- ***International carriers.*** The following airlines will continue to have passengers check in at TBIT while using Bradley West Gates as their departure and arrival stations: Air France, Air Tahiti Nui, El Al, KLM, and Volaris.
- ***Other domestic and international carriers.*** Passengers traveling with the following airlines check in at Terminal 1.5 and are bused to Bradley West Gates: Allegiant, Frontier, Sun Country Airlines, and Viva Aerobus. Prior to the opening of Bradley West Gates, these airlines were housed at either Terminal 5 or Terminal 6.

Bradley West Gates includes more than 50,000 square feet of new concessions spaces. As of June 2022, international passenger traffic was still below forecast levels due to the COVID-19 pandemic. Because passenger activity remains limited at Bradley West Gates, many retail spaces remain unleased and inactive due to limited commercial interest at Bradley West Gates. This situation reflects the impact of COVID-19, which resulted in a sharp decline in both then-current terminal usage and significant uncertainty regarding forecast usage. Several concessionaires were unable to meet their commitments, and those that remained open faced daunting conditions. Commercial development staff took emergency measures to provide relief to existing businesses. As soon as the COVID-19 pandemic abated and passenger traffic began to stabilize, LAWA began concerted efforts to populate Bradley West Gates with restaurants, shops, and other amenities.



Passengers currently using Bradley West Gates still have limited food and shopping opportunities. This scarcity is emphasized by the comparison to the rich offering at TBIT and other terminals and reinforced by the remote location of Bradley West Gates. Passengers entering Bradley West Gates through the tunnel from TBIT may be less aware of the limited options at Bradley West Gates. Thus, they may be disappointed at their missed opportunities. Others are bused to Bradley West Gates from Terminal 1.5 and do not have the ability to take advantage of TBIT's full range of opportunities and services unless they both 1) know about them and 2) have time to travel down the connecting tunnel to reach them and return in time to board their flights.

LAWA is working diligently to provide additional stores and services at Bradley West Gates. At least one concession is under construction. Its commercial development team has developed a plan to bring more businesses into Bradley West Gates and is pursuing it with vigor. Significant additions to food and shopping offerings are expected in the near future.

### Terminal 1.5

Terminal 1.5 is a major alteration of Terminal 1, totaling nearly \$980 million, including the complete modernization of Terminal 1 and an extension of the building – Terminal 1.5 – that provides:

- Additional passenger processing capacity for Terminal 1
- Passenger processing capacity to support Bradley West Gates
- Access between Terminal 1 and Terminal 2 behind TSA checkpoints
- Near-future access to the APM system by means of an elevated pedestrian bridge

This complex project had to integrate with Terminal 1, the passageway to Terminal 2, and the Vertical Core – the structure and level change system that allows passengers to transfer between the terminal and the APM passenger bridge.

Some of its facts are:

**Size:** 283,000-square-foot terminal

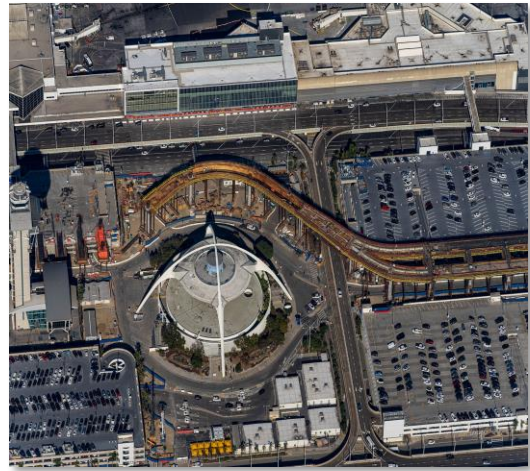
**Opened:** June 2021

**Cost:** \$478 million

**Contractors:** Hensel Phelps constructed the Terminal 1 extension with PGAL designing the facility.

**Features:**

- Two new baggage carousels on the lower/arrivals level. (Southwest Airlines gained a third baggage carousel.)
- Six-lane TSA checkpoint with Automated Screening Lane (ASL) technology on the concourse level
- Additional restrooms on all three levels
- Additional ticket counters, including self-service check-in kiosks with biometric and touch-free capabilities from Materna Intelligent Passenger Solutions (IPS) on the upper/departures level (Southwest Airlines gained three additional ticket counters and fourth-floor office space.)
- Indoor service-animal relief area on the lower/arrivals level near baggage claim
- Southwest Airlines crew base



Terminal 1.5 was formally opened for use in June 2021. The project is currently in closeout.

***The use of a tenant alteration delivery model has been an effective way to deliver Terminal 1.5.***

LAWA agreed to have Southwest Airlines manage the project, which reduced procurement time and made for rapid and effective management of changes. Expediting the speed of project construction is widely thought to be an effective way to reduce overall costs.



Southwest paid for the construction and abided by the City's building codes and inspections. LAWA provided input into the project, as is the case with any tenant project. Southwest Airlines had to obtain approvals from LAWA on the design, based on LAWA's design and alteration policies.

Upon completion, LAWA had the option to purchase the asset from Southwest Airlines and lease it back to them. LAWA notes that with tenant projects that:

*"...LAWA had an option to purchase (not an obligation). As such, if LAWA never exercised the option to purchase, it would continue to be a tenant-owned alteration. The terms of the purchase were negotiated in advance if LAWA exercised the option to purchase."*

In the case of Terminal 1.5, LAWA did in fact exercise the option to purchase.

LAWA tracks capital projects in its Prolog construction management software to monitor and control projects, including scheduling, budget, and quality. In the case of Terminal 1.5, most of the contract-based information typically kept in Prolog at LAWA is held between the sponsor airline (i.e., Southwest) and their contractor (i.e., HP). LAWA did not directly manage the design and construction of this project and, thus, does not have project files in its Prolog system. LAWA did provide oversight on the overall project.

The challenge with a tenant alteration delivery system – for Terminal 1.5 or any other alteration – relates to reduced transparency of procurement, design, and construction management. For example, the delegation of procurement and contracting controls is a potential risk. Public procurement ensures fairness to bid on projects that ultimately are funded by government dollars and allows for audit reviews.

LAWA adopted the role of building owner for this project, delegating significant responsibility to Southwest Airlines.

- Southwest selected the design and construction contractors and managed the construction process.
- LAWA provided oversight, including its own inspections of the facility as work in progress.
- LADBS applied its normal building and safety inspection and approval requirements.

The end product is functionally effective and was delivered on time and on budget

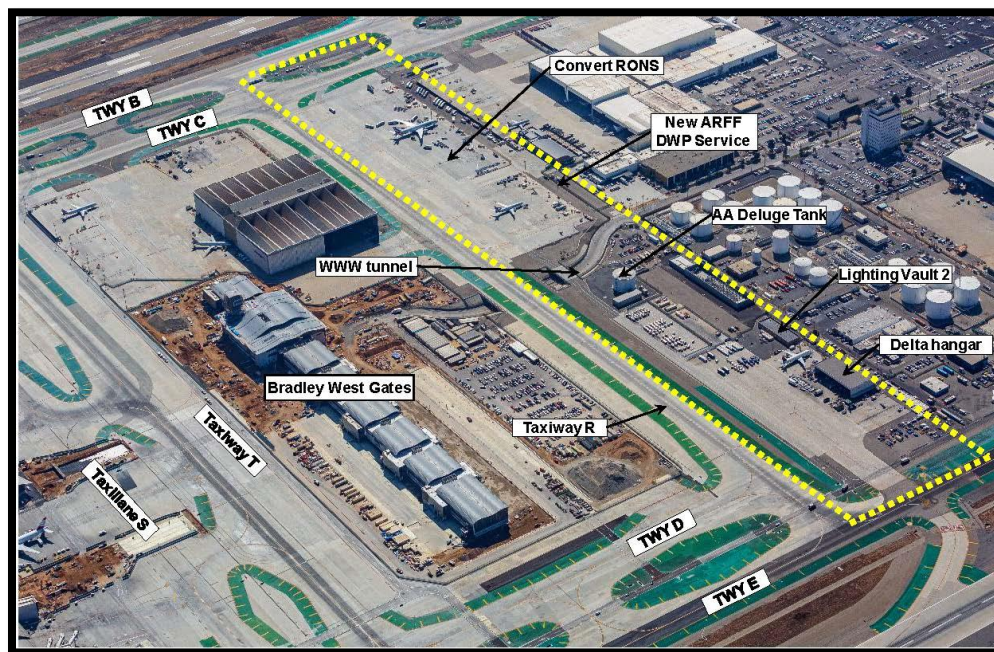
This observation does not indicate negligence of oversight. Rather, it is a function of transferring the construction risk from LAWA to Southwest. LAWA traded a measure of transparency – the detailed documentation of day-to-day construction activities and decisions – for a firm-fixed price for the facility. Once negotiated, any price increases would have required approval by the Capital Project Oversight Committee and BOAC.



## Taxiway P

Construction of Bradley West Gates required the demolition of the north-south connecting Taxiway T (see photo). Taxiway T allowed aircraft to move between Taxiways D and E to the north and Taxiways C and B to the south. Removal of Taxiway T without making other accommodations would have left FAA Air Traffic Control (ATC) with only two connecting taxiways to move aircraft between the north and south airfield complexes: Taxiway R on the west side of the Bradley West Gates and Taxiway AA at the west end of the airfield. Taxiway P was required to replace Taxiway T.

LAWA decided to replace Taxiway T with a new taxiway to maintain the availability of three connecting taxiways for FAA ATC's use. The taxiway was preliminarily designated as Taxiway C14 and constructed as Taxiway P.



The project involved significant impacts to existing airfield facilities and infrastructure including:

- Demolition of an aircraft hangar
- Extensive modifications to an airfield electrical vault
- Demolition and replacement of a deluge tank used for hangar fire protection
- Removal of the World Way West (WWW) access road and filling of the associated tunnel under Taxiway R
- Modifications to an Aircraft Rescue and Firefighting (ARFF) Station's exterior facilities and utilities

- Conversion of multiple Remain-Over-Night (RON) parking positions to active aircraft pavement

Some facts on the project are:

**Size:** 3,600 feet long by 82 feet wide

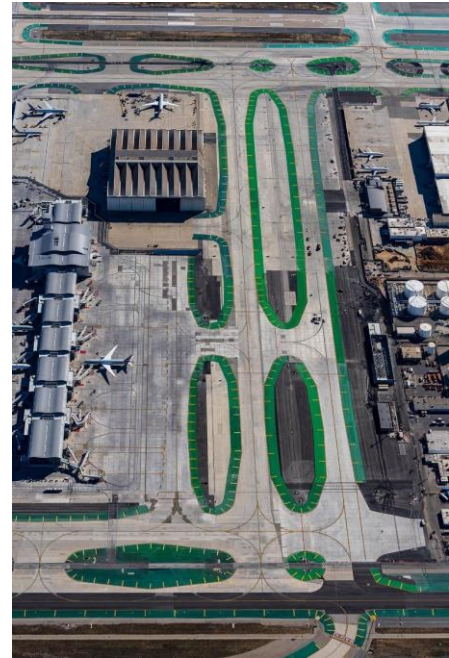
**Pavement:** Concrete section with the exception of an asphalt tie-in area with Taxiway E

**Number of Phases:** 13, many of which were constructed simultaneously, requiring logistical and labor management coordination with all stakeholders to manage the overlapping work

**Engineering Design Contractor:** RS&H

**Prime Construction Contractor:** Sully-Miller

**Funding:** FAA Airport Improvement Program funds and airport revenue bond proceeds




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***Documentation of Taxiway P construction activities are improved since 2018, but the system lacks ready reference to all documentation.***

Taxiway P construction activities undertaken after the adoption of the Project Development Manual (PDM) are improved, but the system lacks ready reference to all documentation.

Documentation of Taxiway P planning and design activities conducted are fragmented and difficult to follow prior to the adoption of Prolog (LAWA's document control system in 2014) and PDM in 2018. Adoption of Prolog and PDM improved documentation of the Taxiway P project.

- **2014-2016.** LAWA presented a plausible narrative for the origin of the project. It was needed because Bradley West Gates pre-empted the use of a previous north-south connector. The documentation of the process that identified the need was not as thorough as it could have been. Prior to 2018, planning and design activities conducted were incomplete and difficult to follow. The decision-making process for implementing the project between 2014 and 2016 does not appear to be documented, with the exception of text references in descriptions of the project.
- **2018 to present.** LAWA's 2018 implementation of the PDM established specific steps and associated documentation for the planning process, which superseded the methodology used before. LAWA maintains project planning files on a separate server. There was not a readily accessible index that identified all files related to the project across the planning, procurement, finance, and construction disciplines.

## INCOMPLETE PROJECT FILES

Review of the Taxiway P project revealed that LAWA's project document control system does not provide ready reference to all documentation ideally expected. The project document control systems for Taxiway P lack expected information:

- There is limited project information in Prolog from the document control systems of groups outside of the Development Group (e.g., Finance, Procurement).
- There is no connectivity with those systems or information in Prolog on what files are available.

## LACK OF SINGLE SOURCE OF INFORMATION

In addition, the Taxiway P project has been documented in Prolog under multiple projects (DA-XXXX) that correspond to actual contracts (e.g., with RS&H for engineering services and Sully-Miller for construction services). Thus, there does not appear to be a single source of information on all Prolog projects associated with the Taxiway P project.

## MULTIPLE FILE LOCATIONS

**LAWA's multiple locations of Taxiway P project files created challenges in analyzing the projects from design through construction.** LAWA's Prolog project document control system does not contain all documentation ideally expected for the Taxiway P project. Data recorded in LAWA's Prolog system is contained in several workspaces. LAWA outlined the various workspaces:

- "Parent Project" information (i.e., project-wide data)
- Design-Contract Workspaces (for designers)
- Construction-Contract Workspaces (for work with the adopted Construction Contract)

LAWA states that it maintains these datasets separately because of:

*"...the dynamic relationship and redundant deliverables shared between the Owner, Designer, Design-Builder, and Contractor."*

LAWA reports that the:

*"...contract elements between these different parties do not need to be shared and should be maintained separately. For standardization and organization purposes, LAWA maintains a common folder structure for all workspaces."*

This situation made the KH team's work more complex because of the need to access multiple workspaces to obtain a complete understanding of Taxiway P and other projects. This complexity would be true for all future investigators. For example, as discussed earlier, to gain an understanding of the project schedule for Bradley West Gates and Terminal 1.5, the KH team



had to review LAWA's dashboards, Strategic Plan, TDIP, CIP, CIP status reports, bond reports, CIP BOAC update documents, and other documents and databases,

#### PROLOG DIRECTORIES

The standard Prolog directory structure is 16 numbered directories and based on construction. Additional, non-numbered directories for the Contractor, Designer, and LAWA have been added to the structure. The subdirectories and files under these additional directories can be duplicates of the numbered directories, as well as unique directories that are not included in the standard structure. For example:

- **Quality Control and Quality Assurance directory.** DA-5389 for the construction services includes a directory "12.2 QC-QA Reports." The directory contains only Quality Control (QC) files from the contractor and does not have corresponding Quality Assurance (QA) reports. This listing implies the existence of a separate project directory documenting QA testing services and QA testing results.
- **Professional services and construction projects.** The Prolog directory structures for professional services projects and construction projects appear to be the same, based on accessed projects DA-5173 and DA-5389, although 6 of the 16 directories under the construction project were deleted under the design project.

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#### ***LAWA embarked on Taxilane C reconstruction during the course of the Taxiway P project to take advantage of limited air traffic during COVID-19.***

A taxilane designation denotes an aircraft pavement connecting to a FAA ATC-controlled air traffic movement area. A taxiway is a non-FAA, ATC-controlled apron (non-movement area). The official Airport Layout Plan (ALP) shows the pavement as Taxilane C adjacent to the south group of terminals and as Taxiway C on either side of the terminals. FAA responsibility for an aircraft ends once it starts taxiing on Taxilane C.

According to LAWA, Taxiway C Reconstruction Phase 1 was planned and designed as a part of the Accelerated Taxiway B, C, and D reconstruction project. The idea was to use unprecedented low air traffic and underutilization of the affected gates due to the COVID-19 pandemic, especially along Taxiway C just south of Terminal 4 through Terminal 8. Therefore, LAWA expanded the scope and budget to both the RS&H's contract and Sully-Miller's contract for the reconstruction of areas of Taxilane C and Taxiways B and D.

At that point, Taxiway P had been built; the project was completed and closed. Consequently, BOAC and LAWA treated Taxilane C as a different project under the same contract. LAWA decided to use the existing Taxiway P contract with Sully-Miller for this taxiway improvement because of Sully-Miller's:



- Proven performance on similar construction at LAX, including Taxiway P
- Capacity to perform this work concurrently with other tenants' improvement projects
- Ability to perform the work on short notice once agreement was reached

LAWA used RS&H on-call contract for the Taxilane C professional services. The original Taxiway P project budget increased from \$93.3 million to \$120.3 million, an increase of \$27 million. The Taxilane C budget accounts for \$18.6 million of the increase. LAWA documented these projects separately from the Taxiway P project.

Again, LAWA engaged impacted tenants and started discussion and coordination regarding the phasing of reconstruction to minimize operational impacts. Coordination with tenants stretched over the course of a year, primarily due to uncertainty of tenants' gate improvement schedule. LAWA reached agreement with tenants only for one portion of Taxiway C reconstruction, just south of Terminal 4 and Taxilane C-9.

***For the design phase, LAWA retained RS&H, using an on-call contract, to define the initial project scope, schedule, and budget for Taxiway P.*** The deliverable produced by RS&H included multiple project scopes and budgets. Resolution of final scope, schedule, and budget does not appear to be documented. The previous methodology has been superseded by the PDB.

Sections of the PDM related to Executive Oversight did not exist until after the start of the 10-year CIP prepared in 2018. Governance documents relating to this project (post-2018) are included in LAWA's document released on June 17, 2022.

Project DA-5173 with RS&H provided engineering services for the project. RS&H was selected under a separate solicitation from the previously used on-call planning contract. The LAWA Prolog directory for DA-5173 does not include any files for:

- ***Design Phase interim deliverables*** (i.e., 30% design, 60% design, 90% design, 100% design; subsequent comments and responses; and resulting changes)
- ***Bid Phase deliverables*** (i.e., addenda)
- ***Construction Phase deliverables*** (e.g., initial change documents; subsequent comments and responses; and resulting changes)

Bid Phase changes by addenda are documented under the Construction Phase contract. A total of four addenda were issued. The KH team was unable to review addenda coordination or reviews in the documentation. LAWA reports that:

*“For security and fairness reasons, Contractor Questions were distributed to appropriate party [parties] by [the] Procurement Administrator and stored on a separate and secure*



*server. The Responses and Addendum items were reviewed by [the] Procurement Group and appropriate Project Management Team before publishing.”*

***Sully-Miller provided construction services for the Taxiway P project, which began after LAWA implemented the PDM.*** Project DA-5389 with Sully-Miller provided construction services for the project. The PDM was in place prior to 2018; however, the sections on project initiation and CIP processes were not added until after the start of the 10-year CIP prepared in 2018.

During construction, LAWA executed a total of 18 change orders, including a final change order to reconcile final quantities and contract value.

The rationale and approval process for changes during the Design and Bid Phases does not appear to be documented under the accessed contracts in Prolog. The previous methodology has been superseded by the PDM.

## **C.4 ADDITIONAL OBSERVATIONS**

The RFP and contract for the IEA Survey asked for KH to identify opportunities regarding future capital project or facility considerations.

### **Capital Project Management**

Many of the opportunities in capital project management relate to how LAWA can reap significant benefits by formally learning from its experiences and applying lessons learned to future capital projects.

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***LAWA has extensive data on capital construction performance that could be used to improve its understanding and management of capital construction projects.***

LAWA has increased use of metrics since the 2016 IEA Survey. LAWA has access to a large amount of data on its capital projects. For example:

- The Capital Governance and Controls unit holds considerable data on all of its capital projects as part of its oversight role. This unit collects data on capital projects from inception to closeouts; reviews change orders and scope changes; and maintains visibility on budget variances.
- LAWA’s Development Group reports on key performance indicators (KPIs) related to capital construction and trends and reports the KPIs to other groups at LAWA that perform planning and project evaluation functions.
- LAWA collects change order pricing in an estimating database and uses that database to review other contractors' pricing and develop budgetary estimates.
- LAWA collects soft cost and contingency performance data and uses that information to establish budgetary thresholds for future projects.



At present, the data are not readily aggregated or analyzed to identify trends or establish benchmarks. Doing so would improve LAWA's ability to increase its reliance on past performance data in planning and managing future projects.

Part D (Section D.2 on "Performance Metrics") elaborates further on recommendations to enhance LAWA's use of such data.

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***LAWA's project closeout timing meets industry standards and has opportunities for further improvements in this area.***

LAWA has approximately 127 projects included in its CIP. Of these, 61 projects are completed; 36 projects have been fully closed. That leaves 25 projects left to be closed.

***LAWA's project closeout timing is within industry standards.*** LAWA documents its closeout procedures in accordance with Procedure No. 11.03. LAWA reports that:

- It generally closes its projects, on average, in 13 months (or approximately 400 days).
- The average length of closeout for large projects was 17 to 18 months.

LAWA cites a benchmarking study by Michigan State University of 39 large public owner closeouts during 2020-2021; the study found the average length of closeout was 531 days (approximately 17 to 18 months).

***LAWA's closeout is dependent on collaboration with other City agencies and grant makers.***

LAWA depends on other City agencies, such as LADBS, to:

- Conduct inspection
- Issue the permits that confirm that contractors have met City standards, and, thus, are allowed to move forward with construction on schedule

The complex projects that LAWA undertake make it vital to coordinate with these other City departments so that inspections are conducted in a timely manner.

In addition, LAWA notes that many of its projects receive grant funding, which may require additional closeout time to address the Federal closeout processes related to grant funding.

***LAWA should continuously strive to expedite project closeouts as much as possible.*** Capital project closeout absorbs significant time and effort. The close-out phase requires that:

- Final invoices need to be generated.
- Punch list items must be completed.
- Any claims must be resolved.



LAWA cites a number of challenges in closing out projects:

- Slow delivery of or difficulty in obtaining final invoices from sister City departments
- Outstanding claims regarding projects
- Delays in resolving claims
- Lack of authority to set timelines for claims resolution once it is in the hands of the City Attorney

LAWA currently accepts these sources of undesirable delay as inevitable.

***LAWA's use of Memoranda of Understand (MOUs) helped to coordinate with City departments on large capital projects.*** LAWA has prepared MOUs with several City departments for at least two of its major projects: LAMP and Bradley West Gates. The managers of both projects reported that these MOUs worked well and can be used with some refinements for future projects. Extension of such arrangements to the full range of involved City departments would further strengthen this element of facility development.

Both Taxiway P and Bradley West Gates, although substantially complete and in use, have not yet been formally closed. LAWA cites late receipt of final invoices from other City agencies and outstanding claims among the causes of this. (Note: Bradley West Gates is currently the subject of several claims, which LAWA is seeking to resolve. LAWA's claims resolution process includes direct negotiation, mediation, and litigation phases, some of which can take an extended period of time.)

Until a project is closed, it requires continuing effort on the part of project management staff, as well as legal and financial support. These activities consume valuable resources.

Identification of the causes of delay in closing a project, and a concerted effort to reduce or eliminate them, will improve both staff utilization and cost efficiency.

LAWA understands the importance of closing projects and reports that it works aggressively toward that end on all projects. LAWA plans to continue to monitor closeout timelines.

### **Fast-Developing Policy and Technology Developments**

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***Alternate fuels and vehicle power sources, including electric vehicles (EVs), will likely require alterations to LAWA operations and facilities within the next decade.***

Two trends are emerging – the increased use of electric vehicles (EVs) by both the public and ground transportation fleets at airports and the increased interest in electric aircraft.

## ELECTRIC VEHICLES

The transition to EVs has been spurred by Federal and State legislation, policies, and initiatives.

- During this IEA Survey, the State of California announced its intention to ban the sale of new gasoline-fueled vehicles by 2035. The initiative is expected to be followed in 18 states. Assuming this policy is implemented, there will be a large increase in the use of battery-electric vehicles. This increase will affect LAWA’s public parking facilities, employee parking facilities, the ITF-West, and ConRAC.
- It is reasonable to anticipate that the California requirements will also impact ground-service equipment. Additional charging capacity or alternate fuel systems will be required.
- In a broader policy initiative, the Federal Government (“Green Energy Czar” John Kerry) has recently stated that it is the objective of the government that the number of electric vehicles be increased by 22 times the current amount, which is about 1%. In California, there are about 1 million EVs (7%) of the 14.2 million registered passenger vehicles.
- The Inflation Reduction Act of 2022 contains powerful incentives for a transition away from gasoline-powered vehicles. Thus, even if the California mandate is modified or blocked, there will be a powerful ongoing trend in the direction of alternate fuel and electric vehicles.
- The impending introduction of electric-powered aircraft and the substantial increase in the use of sustainable fuels – the latter spurred by the Inflation Reduction Act – will also bring new demands for support facilities and increased power requirements.

As a result, additional demand for charging stations in public parking facilities, employee parking areas, and ConRAC is likely to be substantial. Plans for additional EV charging stations need to be considered now since they will require more capacity from LADWP, which may take years to provide. Although LAWA reports that it is focusing on this issue, there does not appear to be any team or individual within LAWA that has comprehensive oversight responsibilities for coordinating the number of charging stations or other accommodations for LAWA’s growing EV fleet or the public’s EV usage.

As of now:

- ConRAC is being planned, built, financed, operated, and maintained by P3 Partners. Hertz is providing the only charging capability. Initially 6% of the parking stalls were planned to have EV charging facilities. Hertz is planning to provide 234 charging stations as of this point. Other rental car companies are taking a “wait-and-see” attitude.
- The Economy Parking Garage adjacent to ITF-West is operated by a contractor ABM. This location will ultimately provide:
  - 1,600 spaces with charging stations, which represents 37% of the 4,300 total spaces

- 500 stations are being installed there and are scheduled to be completed by the end of this year

#### ELECTRIC AIRCRAFT

American Airlines has ordered a small number of electric aircraft for commuter air service. It has also made a significant investment in electric-power vertical takeoff and landing vehicles, with the stated intent of using them to transport passengers to its airport terminals. This investment is likely to be relevant to LAX and, along with other developments, may significantly impact the power requirements at LAX. These demands could coincide with higher costs and potentially greater competition for electric power through the grid.

Other agencies face similar changes in fuel types and sources. For example, the rapid bus transit industry is already preparing to make changes to its facilities. *Mass Transit* magazine recently published a guideline that outlines options and strategies for conversion to battery electric or hydrogen fuel cell systems.

#### POWER GRID REQUIREMENTS

The lead time associated with providing EV charging stations is sufficiently long that advance planning is necessary. While ConRAC is being provided with 14 megawatts of electrical capacity, it is envisioned that another 17 megawatts of capacity may need to be developed in the future, primarily due to increased EV charging station capacity. The lead time for such a megawatt increase will be at least three years and will depend on LADWP capability.

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***Sustainable Aviation Fuel (SAF) represents an opportunity for airlines at LAX and VNY to reduce their absolute carbon footprint and impact on neighboring communities.***

LAWA's goal regarding Sustainable Aviation Fuel (SAF) is to "...partner with airlines and fuel suppliers to encourage more SAF use at LAX and VNY." SAF is already being used at VNY and by United Airlines at LAX. Delta Airlines recently announced a major commitment to SAF. QANTAS and Airbus have committed \$200 million to assess SAF and prepare for its introduction as a "bridge fuel" to eventual net zero aviation emissions in Australia in 2050. Additional airlines are interested in SAF and making investments in that area.

A recent Bain report found that governments are making commitments to incentivize SAF through the Toulouse Declaration. The U.S. administration's aim is to have enough SAF to meet between 5% and 10% of jet fuel demand by 2030. In addition, the Inflation Reduction Act recently signed into law provides powerful incentives for the transition to sustainable fuels. In September 2022, LAWA rescinded an 11 cent per gallon delivery fee for SAF at VNY to encourage the use of SAF.





LAWA does not purchase fuel and notes that it cannot dictate what type of fuel airlines use. The fueling infrastructure at LAX is owned and operated by an airline consortium. That said, LAWA can and should continue to advocate for the increased use of SAF. LAWA should be viewed by the community as front-and-center and committed to such efforts, given the environmental impact of aviation fuel.

Although LAWA is not involved in procuring or supplying fuel to aircraft, most fuel dispensed at LAX is done so through the in-ground hydrant fueling system. Current infrastructure requires sustainable fuel to be trucked to the ramp. SAF is currently dispensed at VNY by truck.

As noted earlier, the State of California has published its intent to eliminate gasoline-powered vehicles by 2035. In addition to passenger vehicles, this policy will affect ground support equipment (GSE). SAF facilities and distribution channels are being developed; airline use of SAF use appears likely to expand. The use of SAF may have implications for ramp configurations and for support requirements for fueling at LAX.

In the longer term, the development of hydrogen as a fuel is progressing, and may become an element of aircraft fueling in mid-range or long-range planning horizons.

Volume II, “Equity and LAWA’s Impact on Historically Disadvantaged Groups,” elaborates further on SAF from an environmental perspective.

## Planning for the Future

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***The recently filled Chief Development Officer position offers an opportunity to develop a long-term vision for LAX and VNY.***

When the IEA Survey began, LAWA’s Deputy CEO for Development position was vacant. While the executives over LAMP, Terminal Development Improvement Program, and the Airfield and Terminal Modernization Project appeared to be doing a commendable job in their respective areas, LAWA needed this position filled for general coordination and oversight of all major projects.

In the past, with the exception of the mobility group, much of the development work at LAWA appeared to be focused on short-term planning and project delivery. Given the current level of LAWA’s capital construction, this approach is understandable and has been effective in managing the capital projects.

There is a substantial level of planning under way at LAWA, which the Chief Development Officer will need to spearhead, including:



- **New terminals:** Terminal 0, sponsored by Southwest Airlines, and Terminal 9 (a similar model to Bradley West Gates). These major construction efforts will further increase the passenger capacity of LAX and offer additional passenger amenities desired by the airlines.
- **Air freight infrastructure.** In September 2022, LAX released a Phase I Request for Proposals (RFP) to redevelop 27 cargo buildings that are currently crowded and dated. This modernization project will improve the functionality of the air freight infrastructure and improve the cargo utility and capacity at LAX.
- **Airport access.** In addition, there is a unit dedicated to monitoring emerging systems related to airport access, including electrically powered rotorcraft, self-driving automobiles, and other potentially disruptive technologies. The purpose of this group is to help LAWA prepare for changes in the way people move in cities that will impact its facilities.

This newly filled Chief Development Officer position is also critical to:

- Provide a high-level executive sponsor whose role includes a long-term vision for LAX and VNY
- Oversee long-term development planning, integration of economic forecasts, and leveraging of emerging transportation technology into development option scenarios
- Develop a facility planning horizon that extends at least 20 years in the future
- Lead the planning for rapidly emerging changes, such as electric vehicles, SAF, or new terminal technology

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***LAWA would benefit from a longer planning horizon, and a broader vision of the scope of its potential activities.***

Significant changes in the ways airports operate are emerging, and the rate of that change is accelerating. LAWA has two units – an Airport Planning Unit and Environmental Services Unit – that:

- Develop future forecasts
- Evaluate potential infrastructure solutions to changes at LAX and VNY that relate to compliance with environmental regulation and best practices

LAWA prepares the financial capacity analysis as part of its capital planning and financial feasibility analysis for its bond issuance (refer to Part B, Section B.4) for more information about LAWA's Official Statements for bonds).

#### CAPITAL IMPROVEMENT PLAN

LAWA has prepared a 10-year CIP for 2018 through 2028. This CIP is a material improvement on past practices. LAWA demonstrates high levels of capacity in delivering the projects currently included in the CIP. LAWA is in Year 4 of this 10-year CIP and has published its plans to extend the CIP through FY2029 with the addition of a new CIP preliminary estimated at \$15 billion.

LAWA does not yet have a fully developed long-range economic and infrastructure planning function for internal planning purposes that:

- Projects potential demand for airport services beyond 10 years
- Projects possible changes in air transport technology and considers the impact on LAWA airports
- Develops optimum responses to potential demand

Although not done consistently for all projects, LAWA reports that:

*“This type of analysis is done for specific projects (i.e., ATMP where we do future forecasting) and did it as part of the cargo study, etc.”*

This situation may be related to the vacancy in the position of Chief Development Officer, which was filled in July 2022.

## ASSET RENEWAL PLAN

LAWA currently has a 10-year Asset Renewal Plan. In total, the 2,912 assets on LAWA’s campus have a replacement value greater than \$580.63 million over the next 10 years. The asset renewal costs may be significantly higher, because the facilities LAWA is building today are more complex than those built 10 years ago. Some of the facilities require the contractor to build, operate, and maintain; these costs are included in LAWA’s financial plans.

Staffing and training needs can and should be linked to this Asset Renewal Plan. LAWA would benefit from a long-term Asset Renewal Plan to cover a 30-year timeframe to preserve and extend the life of its facilities, technologies, and equipment.

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### ***LAWA has the components of a master plan, but they are not fully integrated.***

A master plan for an airport differs from a specific plan for City planning. LAX is zoned as an airport and the FAA reviews those master plans that include all the airports' major features and describe plans for what to build over a defined time frame. The FAA uses the master plan to determine eligibility for Federal funding.

LAWA has today the components of what might become an integrated master plan. These components are not comprehensively developed as one document. A complete master plan includes the following documents to be presented to FAA for approval:

- Goals and objectives
  - Airport layout plan document
  - Existing conditions and facilities assessment
  - Aviation forecasting
  - Demand capacity and facility requirement
-

- Development options for terminals and land use
- Environmental overview and sustainability plan
- Plan of finance

LAWA has said that it prefers to set statements of vision, connected to specific operational outputs. Such an approach is a step forward, but it does not carry the weight and specificity of an integrated Master Plan.

Beyond that, the community input that accompanies an integrated Master Plan is both useful and necessary, as discussed in Volume II. LAWA has briefed communities extensively on its programs and intentions. Such briefings, however, do not necessarily offer the most impacted residents with meaningful input into development decisions before they are advanced beyond the point of significant change.

## C.5 RECOMMENDATIONS

### Maximizing the Value and Public's Use of LAMP

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***Rec. IC-1: LAWA should establish a single organization unit responsible for the LAX-wide oversight, development, and implementation of a LAX-wide wayfinding system.***

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LAX is undergoing a dramatic change with LAMP and APM. During the next 18 to 24 months, people will experience new ways to access and move within LAX. LAMP will dramatically transform LAX from a traditional vehicular-centric access system to a complex multimodal system of vertical and horizontal people movers. This shift will be challenging, given that Los Angeles is a car-centric culture.

Public perception of the success of LAMP and terminal renovations will hinge on wayfinding. An effective wayfinding system can help the public appreciate LAX's new advanced systems and facilities as they easily and confidently navigate them. If done well, these exceptionally large capital programs can be celebrated as successes – reduced traffic in the CTA; less carbon footprint; and quick APM access from L.A. Metro, ConRAC, and parking lots. If not done well, LAWA runs the risk that LAMP will be viewed as a failure and wasted dollars.

The scale of LAMP improvements at LAX makes clear directions important. For example, ConRAC facility will contain approximately 6 million square feet of space, which will require clear directions for patrons. Similarly, the Airport Metro Connector (AMC) station and ITF-West stations will present new points of connectivity and directional challenges.

As discussed earlier, LAWA currently has different organizational units working on wayfinding for LAMP. ***LAWA should establish a single organizational unit responsible for the airport-wide oversight and development of wayfinding.*** This organization's focus should be on:

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- A uniform integrated approach and careful planning to wayfinding, beginning now, to establish clear signage, beginning with approaches to LAX; access to parking lots, ConRAC, and APM; transitions to the terminals; and guidance within and between the terminals
- Facilitation of guests and passengers with a quick and easy access experience so they can navigate these new facilities, involving new trains, escalators, elevators, moving sidewalks, new entrances to parking lots, ConRAC, and stations
- Integration of the LAMP wayfinding plans with the rest of the LAX campus, entailing management of the upcoming RFP and project on wayfinding
- Expansion of the Bradley West Gates's kiosks throughout the LAX campus, where feasible
- Oversight of all wayfinding elements, such as signage, electronic mapping, terminal design, and use of Artificial Intelligence (AI)
- Integration of approaches to LAX from the freeways and exits from LAX to the freeways
- ADA accommodations needed for guests
- Provision of wayfinding information in at least the region's major threshold languages, particularly important given that 40% of LAX passengers are international
- Contingency plans to cover temporary disruption of APM, creating a need for LAWA to provide a backup bus bridge
  - When such a disruption occurs, there will be an immediate need for human assistance to safely direct and control the ensuing crowds.
- Development of personal assistance, such as Ambassadors, to guide guests through the complexities and options for using the new systems, particularly during the initial stages of the implementation of APM
  - Note: L.A. Metro is currently developing an ambassador program for similar purposes. LAWA should be aware of this effort and should parallel it where appropriate. LAWA has had experience with this approach in the past with passenger assistants.

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***Rec. IC-2: LAWA should expand its existing operational readiness staff resources into a single point of ownership.***

LAWA should establish a position or team within its organization to be responsible for understanding the operations and management of LAMP and multiple terminal development projects. The system being built is complex and contains multiple interrelated systems, which will be operated by different entities. These systems must operate effectively and reliably to maintain the integrity of LAX.

For example, in addition to the APM cars, there will be numerous escalators, elevators and moving sidewalks – all of which are part of the pedestrian walkway system, which connects the spine of the system (APM) to the various terminals. These systems will interact with the

dynamics of terminal renovations and parking facility changes in terms of passenger and guest traffic flows.

The responsibility for the effective and efficient operation of the multiple facilities and systems ultimately rests with a large number of airlines and contractors. The traveling public, however, will not know or care what company or agency is responsible for what component of the operations. LAWA will be inescapably viewed as the owner and must prepare accordingly.

LAWA has in place an Airport Operational Readiness (AOR) team that is presently focused on preparing for the start of LAMP operations. This AOR team is a good base from which to start. It needs to be expanded and strengthened to make certain that new facilities are usable and easy to navigate from Day 1. At least during the runup to initial operations and for the first year or two after inauguration, this support should be generous. In this way, the AOR team can:

- Hold overall “ownership” of airport operations with a clear focus on intermodal accessibility and efficient vehicle and pedestrian flows
- Identify disruptions and inefficiencies within what is now a single airport and ensure that they are dealt with quickly and effectively
- Monitor vendors, such as Alstom, which is currently conducting simulations to evaluate the planned new system and provide for solutions to service interruptions, load factors, and congestion, which will inevitably occur
- Coordinate with the wayfinding team, already discussed, regarding multidimensional wayfinding challenges
- Coordinate with LAWA’s public affairs staff on communications regarding access

The reputational benefits to LAWA of successful opening of LAMP and the new terminals is great; the downside risks are even greater.

LAWA reported that it recently consolidated the AOR Division under the new Deputy Executive Director (DED) of LAMP Performance and added three consultant staff to the AOR team, which is a good first-step in addressing this recommendation. The AOR team is small (a staff of 3). Adding 3 consultants helps. LAWA will need to monitor to determine whether this staffing configuration is sufficient, given the size, scope, and complexity of LAMP and other facilities that will need to be launched.

## Expanding LAWA's Readiness to Respond to Environmental Initiatives

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***Rec. IC-3: LAWA should organize interdivisional teams to address the airports' infrastructure and operations to support expanded use of EV and SAF.***

LAWA's Environmental Programs Group (EPG) is well aware of the changes in the energy landscape at LAX and VNY. In addition to EPG, LAWA should form an interdisciplinary team to develop a full understanding of the physical and operational changes needed at LAX and VNY with expanded use of EV and SAF.

- ***LAWA needs to accommodate increased use of EVs*** as gasoline and diesel-fueled vehicles are replaced by battery-electric and alternate-fuel equipment. The Federal government has adopted policies to encourage the transition away from gasoline and diesel fuels. The State of California plans to mandate it. These policies and programs portend a significant change in the fleet mix for rental cars, parked vehicles, employee vehicles, and ground service equipment used by LAWA, its tenants, and its airport partners.
- ***LAWA needs to ensure its power grid can accommodate these changes.*** Accommodating the increased demand will require significant physical changes to LAWA's infrastructure, most especially the structure and management of the power grids that serve LAX and VNY. Multiple LAWA divisions and development partners are currently responsible for the electrical systems serving LAWA's various parking lots and vehicle support systems. The changes will affect airport-wide infrastructure, especially the electrical grid.
- ***LAWA needs to prepare for increased use of SAF.*** The corporations that provide aviation fuel are making investments in SAF. Major airlines, including American and Delta, have announced commitments to purchase meaningful amounts of SAF. Shell Oil Corporation has announced investments in the refineries required to produce such fuels. It seems only prudent for LAWA to stay current with such developments and gain an understanding of the likely impacts they will have at LAX and VNY.

The point of focus should be placed at a sufficiently high level within LAWA's organization that it can generate the necessary infrastructure alternatives and the influence needed to motivate airlines, tenants, LADWP, other City departments, and partners to take timely action.



## Improving Capital Management Elements

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***Rec. IC-4: Project close-out should be assigned an expected duration and monitored to ensure that it does not materially exceed that duration.***

As noted earlier, of the 61 of the completed CIP projects, 36 projects are fully closed, and 25 projects remain to be closed. There are two elements to closing out a project.

- The first is the construction close out which in most cases occurs promptly since contractors are anxious to get compensated for their work.
- The second involves administrative details, which may include multiple agencies such as the FAA, City departments, and City attorneys.

LAWA has expressed interest in tracking its closeout process at a more detailed level and creating KPIs around the time to complete closeout to achieve continuous improvement in this area. Steps that LAWA can take to monitor the closeout process are:

1. An expected duration for project closeout should be established at the beginning of construction, based on the scope and complexity of the work.
2. This timeline should be modified in light of developments that have taken place during the construction process.
3. The timeline should be revisited at time of substantial completion.
4. The closeout process should be monitored to identify any transactions that appear to be exceeding their expected duration.
5. When delays occur, these transactions should be escalated, using existing escalation ladders, to ensure that they are resolved in a timely manner.

LAWA should focus on the ones that linger, such as receipt of pending invoices from other City departments. Moreover, LAWA has additional staff cost when close outs take longer than expected.

The Chief Development Officer may want to create closeout teams, including engineering, finance, and administrative staff, who specialize in obtaining needed documents, pursuing administrative actions, and working with the City Attorney's Office to resolve claims as quickly as possible.

LAWA should also weigh the cost-benefits of claims. It may be that extending the claims process results in what appears to be favorable results to LAWA as the contracting party. But there may be another cost related to LAWA's reputation of an extended closeout process. Such word quickly spreads through the construction industry and is priced into subsequent bids.



In addition to the Chief Development Officer's placing further emphasis on fully closing out projects, she can enable project teams and management to conduct a post-project analysis (postmortem) to determine opportunities for improvement going forward on other projects.

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***Rec. IC-5: The change order management recommendations in the Grant-Thornton audit should be adopted and implemented.***

Due to the size and scope of the APM program, Grant/Thornton was engaged to review and make recommendations for improving the management of the change order process. Key recommendations included more focus on obtaining definitive estimates of the various elements of change order costs. These recommendations need to be adopted uniformly as part of the construction management process. LAWA reports they intend to implement those changes. LAWA should also consider:

- Were all of the change orders carried out as specified?
- Do they all appear to be justified?
- Did those reviewing the proposed changes and decisions have a reasonable understanding of the alternatives?
- What lessons are to be learned, and what changes would make the system better and faster?

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***Rec. IC-6: LAWA should set up a project-related index to link files across division lines, starting with planning through closeout.***

Capital project files are understandably held in different divisions as a project moves through its life cycle. Without an index, though, it can be difficult to recall the division that holds particular files or documents. As KH proceeded with the IEA Survey review, we needed to make multiple inquiries to gain access to the documents needed to do our work.

LAWA is currently dependent on the considerable skills and experience held by key members of its staff, who helped KH track down the information needed. Over time, however, dependence on key staff can falter as individuals resign or retire. It would be preferable to build a project index for each project with links to the appropriate files.

Therefore, LAWA should set up a project-related index for all capital projects, linking files related to a given project across division lines. These files should encompass: Planning, Design, Procurement, Construction, Finance, Operational Readiness, and Closeout.

LAWA anticipates that its document control naming and filing conventions will be improved when it implements more robust project management tools and processes, which are currently underway.

**Rec. IC-7: LAWA should revise its Prolog design contract directory structure to include design effort tasks and construction effort tasks.**

Prolog as presently configured for LAWA documents construction efforts but does not easily accommodate planning and design efforts. As a result, folders within Prolog appear to be informally adapted to allow various documents to be held. This results in awkward and sometime idiosyncratic file structures that make review of a project difficult and dependent on the memory of project managers and oversight staff.

The next two diagrams provide a framework for structuring the directories for the design and construction phases. Figure C.4, “Traditional Design Workflow,” displays the areas requiring documentation during the design phase.

**Figure C.4: Traditional Design Workflow**

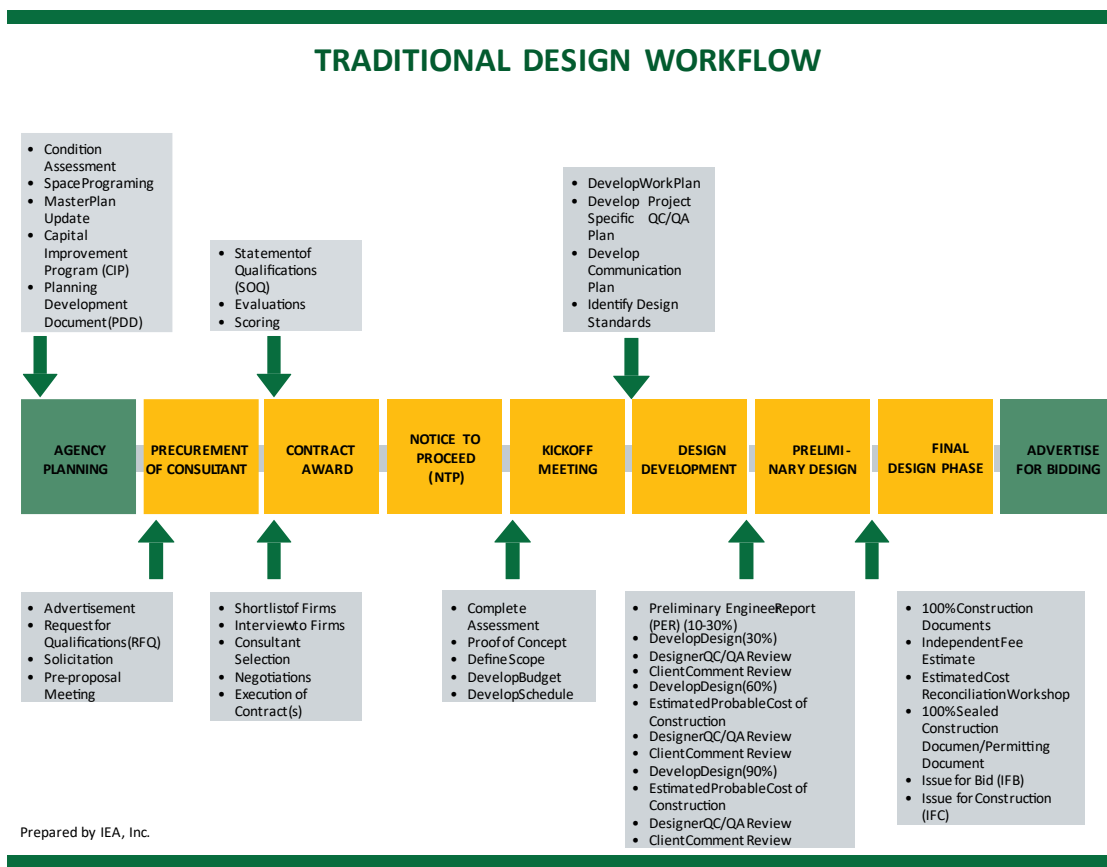
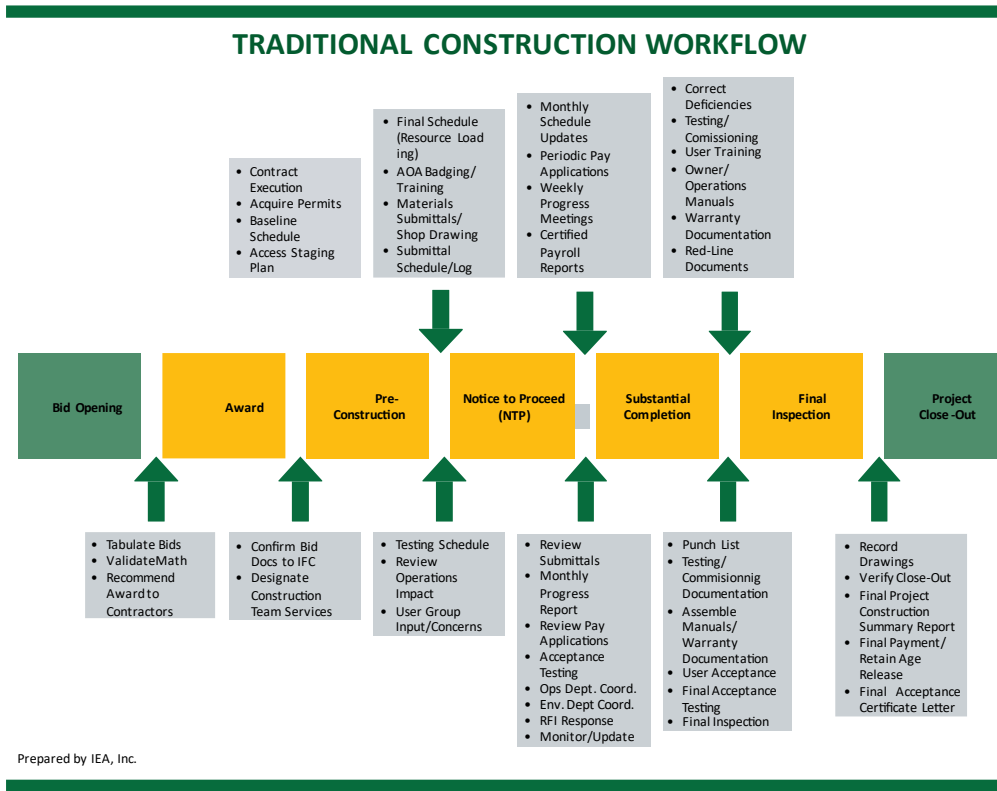


Figure C.5, “Traditional Construction Workflow,” displays the areas that require documentation during the construction phases of a project.

**Figure C.5: Traditional Construction Workflow**



LAWA should review the structure of these files and amend Prolog appropriately to make it more adaptable. Contract directories should be updated to eliminate catch-all subdirectories such as “Designer,” “Contractor,” and “LAWA.”

As noted in Recommendation IC-6, LAWA anticipates that this issue will be addressed when it finishes implementing more robust project management tools and processes.

## Extending Capital Planning

***Rec. IC-8: LAWA should implement a rolling 10-year CIP and adopt an Asset Management Plan that includes a 30-year Asset Renewal Plan.***

LAWA should implement a rolling, 10-year CIP. In addition, it should extend its Asset Renewal Plan to 30 years. It is of upmost importance to take care of existing assets first. Finally, LAWA should adopt an Asset Management Plan framework that would include the elements of what LAWA is currently doing or needs to do, as outlined next.

## ASSET MANAGEMENT APPROACH

In December 2018, LAWA recognized the need for an asset management program. BOAC heard a LAWA presentation about the capital improvement projects, including the need for LAWA to develop [an asset management approach](#) to ensure the new and newly renovated facilities were maintained. At that time, LAWA stated that it had sufficient revenues to maintain the facilities through 2025 but acknowledged the need to develop more “robust tools” and sophisticated analytics “...to effectively plan for and track LAX’s future facility renewal and replacement.”

LAWA’s assumptions were:

- In 2018, LAX’s annual depreciation was approximately \$350 million per year, which indicated the need to reinvest \$2.8 billion in LAX facilities “...over the 8-year period to maintain a ‘stable’ asset base.”
- LAWA reported that its current capital plan included \$3.5 billion in projects that were “renewal and replacement” of existing facilities, thereby, “...exceeding the depreciation on assets over the period and indicating a stabilization in the asset base.”

In the past, LAWA financed most projects out of reserves. In contrast, the current capital program is billions of dollars, with continued major expenditures planned through FY2029. Given the billions of dollars involved, the need for a longer-term asset management approach is even greater.

LAWA’s focus on the first 10 years is important; it also is important to anticipate investments needed to refresh or replace its assets – facilities, technology, and equipment. This time horizon is typically at least 30 years, as shown in Figure C.6. Some airport assets may have life cycles well beyond 30 years.

**Figure C.6: Time Horizon for Asset Management Planning**



LAWA should begin to put into place an integrated Asset Management Plan. An Asset Management Plan is a tactical plan that entails various components, many of which LAWA already has in place in different documents. Asset management plans typically include variants of the following content:

- Overview of the facility/system or network of assets included in the plan
- Management objectives
- Standards or levels of service – current performance and targets
- Strategies and investments to close performance gaps
- Risk assessment and mitigations
- Renewal plan
- Planned future improvements
- Demand and growth forecasts
- Capital plan (new assets)
- Ten-year infrastructure investment plan
- Ten-year funding plan
- Business improvement plan to improve efficiency and effectiveness of business processes, data, and information
- Challenges for implementing the plan and actions for addressing the challenges
- Human resource requirements, including staffing and training needs to maintain the assets and implement the plan

Such Asset Management Plans cover the life cycle of the assets, some of which can last 30 or more years.

Asset Management Plans are commonplace in any large organization and particularly important when billions of dollars are being invested in infrastructure, as is the case at LAWA. For example, the [U.S. Federal Highway Administration](#) in USDOT has Asset Management Plans for every state in the United States. Caltrans produces its “California Transportation Asset Management Plan (TAMP).”

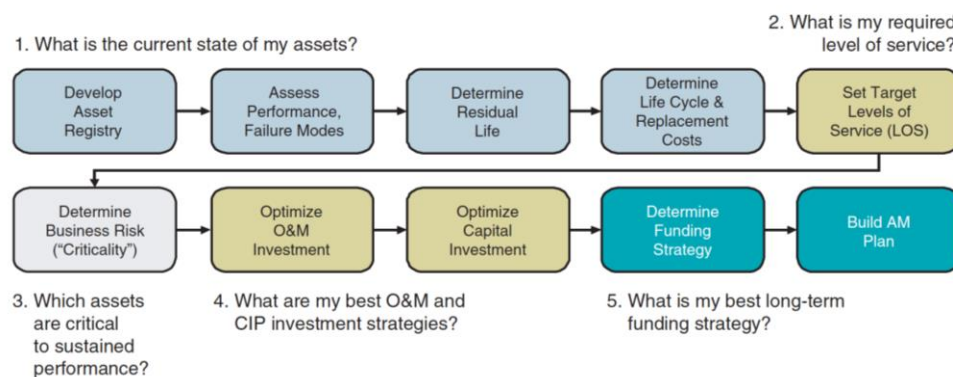
The Airport Cooperative Research Program of the Transportation Research Board publishes [Report 69, “Asset and Infrastructure Management for Airports – Primer and Guidebook,”](#) as a resource. The Guidebook outlines asset management’s governance questions that demonstrate the linkage or overlap between the development and the finance teams at an airport. LAWA should regularly ask itself how well it is doing in addressing these Guidebook questions:

1. *Do you know what the required service function is for each asset you own, how that service requirement is changing over the life of the asset, and how each asset is performing in that context?* (See Part D, Section D.2, for a discussion of performance measurement)
2. *Do you know what assets you have, what condition they are in, and whether they are enabling you to perform efficiently and effectively in the context of the current strategic business drivers?* (See Part D, Section D.1 on “Strategic Planning) for a discussion of focusing on strategic goals to address such questions)

3. *Are you actively managing risk to prioritize and optimize investments in your assets and infrastructure, and to identify the relative importance from a business/financial perspective of your assets?*
4. *Do you have documented operations, maintenance, and capital investment plans that reflect what you know about your assets?* (See earlier elements in this Part C of the IEA Survey Report)
5. *Are you balancing the business risk associated with your assets with long-term funding and management improvement strategies to sustain your current business model?*

Figure C.8 displays these five questions graphically:

**Figure C.8: 5 Core Questions in a 10-Step Approach to Developing an Asset Management Plans**  
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The [Port Authority of New York and New Jersey](#) (PANY&NJ), which owns, maintains, and operates John F. Kennedy International (JFK), Newark International (EWR), and La Guardia (LGA) airports, has recently upgraded its asset management approach to an Enterprise Asset Management (EAM) program, incorporating “*lifecycle management best practices*” and standards. PANY&NJ is quoted in the Guidebook:

*“To provide the consistently high levels of service that the region requires, the Port Authority spends nearly \$1 billion annually to maintain the region’s ports and airports, bi-state bridges, tunnels, and rail facilities in a state of good repair... using systematic asset management to ensure cost-effective use of capital resources, replacing aging facilities based upon economic lifecycle analysis to avoid failures of operational facilities while minimizing unnecessary maintenance costs...”*

In June 2022, Hartsfield-Jackson Atlanta International Airport (ATL) retained consulting services to develop a strategy for its physical assets, including operations, maintenance, modernization, and future growth.



Figure C.7 displays the various components of an Asset Management Plan graphically. For further elaboration, the International Organization for Standardization (ISO 55001) specifies the requirements for an asset management system.

**Figure C.7: Asset Management Life Cycle**



## ROLLING 10-YEAR CIP

Now that LAWA has established a 10-year CIP and a 10-year Asset Renewal Plan, its next steps are to:

- LAWA should expand the 10-year CIP with a rolling time horizon, requiring that the CIP be annually updated and extended another year to reflect funded projects at LAX and VNY. A rolling 10-year CIP should address:
  - Changes in regulation and technology that are certain or likely to arise
  - Changes that will require new construction or major modification of existing facilities
  - Land acquisition needs

- Plans for new operations that affect capital plans (e.g., air taxi operations or rapid adaption of SAF and EVs)

Continued development and extension of its CIP planning process will increase LAWA's capabilities for resilience and stability. Note: Long-range planning would include both funded elements of the CIP and unfunded projects anticipated to be included in the CIP

- LAWA should link the 10-year CIP and 10-Year Asset Renewal Plan with an achievable timetable and resource plan for implementing it.

### 3-YEAR ASSET RENEWAL PLAN

O&M should extend the 10-year Asset Renewal Plan to cover at least 30 years. Table C.4 displays LAWA's 10-year asset renewal forecast of \$580.63 million. Between FY2027-28 and FY2028-2029 – around the time of the Olympics – LAWA will have greater increases, representing 28% of the total replacement values for the 10-year period. The Asset Renewal Plan does not include future assets that are currently under development and will be operated and maintained by LAWA before 2032.

**Table C.4: Facilities Management Division's 10-Year "Asset Renewal Forecast"**  
(FY2023 Through FY2032)

Fiscal Year	Replacement Value Forecast	Percent of Total Forecast
FY2022-2023	\$94.48 million	16%
FY2023-2024	\$60.17 million	10%
FY2024-2025	\$45.48 million	8%
FY2025-2026	\$43.97 million	8%
FY2026-2027	\$48.72 million	8%
FY2027-2028	\$73.21 million	13%
FY2028-2029	\$89.89 million	15%
FY2029-2030	\$18.42 million	3%
FY2030-2031	\$62.81 million	11%
FY2031-2032	\$43.48 million	7%
	<b>\$580.63 million</b>	<b>100%</b>

As already noted, the asset renewal costs may be significantly higher for the facilities being built today because of their technological advancements. LAWA has protection against these added costs for the facilities that contractors will maintain and operate (e.g., APM).

While it is not known, specifically, for example, when elevators and escalators at Bradley West Gates will be replaced, it is known that there is an expected life of that equipment. Given the high level of expenditures currently underway, the cumulative anticipated replacement or capital maintenance costs of those projects in the next 15, 30, and even more years needs to be factored into capital planning.

## BENEFITS

The purpose of an asset management approach is to avoid the problems of the past and adopt best practices. For example, LAWA rebuilt LAX for the 1984 Olympics, only to have many of its facilities and equipment not regularly renewed. By the time of the 1999 IEA Survey, the facilities were in desperate need of updating. LAWA was waiting to update the facilities as part of its master plan, which faced major community resistance to LAX expansion. By the time of the 2008 IEA Survey, LAWA shifted its approach with the community to modernize LAX, starting with TBIT. At that point, the community saw the need for modernization because of LAX's outdated facilities and physical conditions.

In moving forward, an asset management approach will support LAWA in making the best possible decisions to:

- Maintain, refresh, refurbish, and replace facilities, equipment, and technology at LAWA, building on a 30-year Asset Renewal Plan and a rolling 10-year CIP
- Anticipate operational requirements
- Inform decisions about deferring maintenance by documenting long-term implications
- Position LAWA for changes in the competitive market
- Anticipate and plan for resource reallocations based on internal forecasts related to capital planning efforts that assess passenger air traffic, cargo, and other general aviation factors (e.g., inflation, fuel costs, pilot shortages, airplane mechanic shortages, or foreign government policies)

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***Rec. IC-9: The Chief Development Officer should expand LAWA's involvement in land use planning around LAX and VNY as an active stakeholder.***

LAWA is more engaged with local cities and communities, and such engagement should be expanded with respect to land use development around LAX and VNY. To date, much of this coordination with local cities and communities involved LAWA's capital projects, noise mitigation, traffic, mobility, and environmental impact (e.g., CEQA and NEPA entitlements).

LAWA's ability to do land use planning outside of the airports is limited to areas under regulatory control by the FAA. That said, LAWA does see the benefit of the Chief Development Officer and executive staff being active participants in providing feedback concerning surrounding land use decisions and planning efforts.

***Developments surrounding LAX and VNY have major implications – both positive (increased airport revenues and City sales taxes) and negative (increased traffic congestion and environmental impact).*** For example, LAWA works with management at SoFi Stadium, a sports and entertainment complex in Inglewood, which opened in 2020. It is home to the National



Football League (NFL)'s Los Angeles Rams and Los Angeles Chargers and hosts the annual L.A. Bowl in college football. SoFi Stadium is 3 miles from LAX and attracts many visitors from outside Southern California.

Consequently, this complex has major implications for LAX in terms of traffic congestion as well as increased air passengers and tourism, as demonstrated by Super Bowl LVI that was held at SoFi on February 13, 2022. In addition to upcoming planned championships, SoFi will also host the opening and closing ceremonies (as well as soccer (football) and archery events) for the 2028 Summer Olympics. In addition, LAWA works with the City of Inglewood and other jurisdictions during LAX construction (the CALM/LIR process) and with several Metro mobility task forces and working groups.

It is important that LAWA collaborate with its neighbors in other ways, including to ensure land development around LAX is compatible with an airport (e.g., non-residential). The 2016 IEA Survey Report stated: *“LAWA should continue to leverage land use planning and investments to maximize economic development around LAX.”* This leveraging involves both LAWA’s real estate and real estate owned by other jurisdictions. In 2016, the KH team envisioned that the new L.A. Metro Crenshaw/LAX Line would stimulate further economic development in the vicinity of LAX. Therefore, KH recommended LAWA participate in land use planning for areas impacted by its proposed off-site capital investments to increase its economic benefits. As noted in the 2016 IEA Survey:

*“Economic benefits to the community surrounding LAX and City of Los Angeles as a whole can be maximized through a comprehensive land use plan that integrates transportation imperatives with community economic development goals. When looking at land use surrounding the airports, it is important to the City of Los Angeles to coordinate land use planning and investments in a manner that maximizes economic development within the community plans, particularly for the proposed new off-site capital investments.”*



Today, LAWA views the responsibility of land development around the L.A. Metro stop at Crenshaw/LAX as the responsibility of L.A. Metro and City Planning, and not LAWA. LAWA has focused on its property and the LAMP project and believes a different approach to land use might violate the FAA’s requirement that LAWA revenues be used solely for aviation-related programs, services, and facilities.

***Depending on LAWA’s ultimate position in land use planning, it has opportunities to advocate for the best possible use of land by working with other jurisdictions.*** LAWA cannot escape its



impact on the surrounding community. It may be limited in its direct allocation of funds, but it can encourage, coordinate, and advocate for sensible, beneficial airport-related development in neighboring communities, such as commercial versus residential development. It should do so.

The following actions continue as opportunities for LAWA from the 2016 IEA Survey, while abiding by FAA's revenue diversion restrictions:

- LAWA should formally assign economic impact analysis responsibility to an organizational unit. This organization should monitor LAX and VNY's economic impact on the region.
- The land use plan can be part of LAWA's economic development strategy that focuses on opportunities outside the boundaries of LAX, including collaborative opportunities along Century Boulevard and within the Westchester and Playa Del Rey Community Plan areas. Note: These efforts may be funded by other jurisdictions but have direct impact on LAX.
- LAWA can develop better uses for some of its perimeter land holdings. For example, LAWA is proud of its LAX Northside Plan to use approximately 340 acres of under-utilized land adjacent to the Westchester and Playa del Rey communities. The original plan was to have the site include mixed-use (retail, restaurant, hotel, office); community/civic spaces, office spaces; and recreation. Plans to develop a park have moved forward as a result of a benefactor. LAWA has engaged community groups in its planning efforts.
- The goals for an economic development strategy should include efforts to:
  - Monitor contributions to tax revenues for Los Angeles City and other jurisdictions
  - Continue collaborating with City Planning, L.A. Metro, Los Angeles County, and neighboring communities to foster the highest and best use of the commercial real estate surrounding LAX, particularly while balancing adjacent communities' needs
  - Explore potential LAWA real estate developments beyond the LAX or VNY footprint, similar to what other airports do with real estate divisions (e.g., Port of Oakland) that generate non-aviation revenues

Volume II, "Equity and LAWA's Impact on Historically Disadvantaged Groups," elaborates further on how LAWA can assess its economic impact and benefits.

## Pursuing Future Airport Technologies

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***Rec. IC-10: LAWA's Chief Development Officer and Chief Digital Transformation Officer should integrate its technology initiatives for LAX to become an international Smart Airport model of the future.***

Smart Airport models are popular because they:

- Reduce the risk of infection by minimizing physical contact with passengers, guests, staff, and other users of airport services – important precautions in light of the COVID-19 pandemic and important considerations in terms of future viral diseases



- Speed up processes, optimize costs, improve efficiency, and increase safety
- Deliver quality services for passengers and other airport users

As already discussed, LAWA has implemented technology innovations in its digital marketplace, which includes elements of the Smart Airport model:

- Biometrics for boarding (eGates)
- Self-service bag drop
- Automation systems to remotely monitor HVAC in terminals
- Chatbots
- “Smart parking” technology
- Visual docking guidance system at Bradley West Gates
- A Facial Recognition Access Control Pilot Program
- A Guest Experience Pilot Program with three robots (programmed in multiple languages) in parking garages (Note: Parking lot 1 (P1) has had a robot since Spring 2022 with plans to extend the program for one year after deployment.)
- A pilot of Counter-Unmanned Aircraft System (C-UAS) technology for rogue drones in partnership with TSA
- Security, Technology, Enhancement Projects (STEP) for inter-modal transportation (IMT) initiatives

What remains is the more comprehensive application of these elements into a fully articulated Smart Airport model. The development of such a model is a dynamic process, as airport terminal technology continues to advance at a high rate. The Smart Airport model contains the following components:

- **Smart airport mobility** – Sustainable mobility of passengers, employees, and other airport visitors via the fastest route and different means of transport (e.g., subways, railways, bicycles, and electric cars).
- **Smart airport logistics** – Supply chain logistics for goods and services needed for airport operations, which is also tied to smart technologies.
- **Smart airport infrastructure** – Sustainable management of passenger terminals, runways and aprons, cargo facilities (e.g., warehouses), access roads, parking lots (including entrance and exit), and other operating areas.
- **smart airport services** – Automated processes of aircraft, passengers, cargo, and mail handling, thus, minimizing tasks performed by staff.
- **Smart airport equipment** – Reduction in physical human work, which also expedites airport operations and reduces the environment’s negative impact.
- **Smart airport grids** – Needed to support the other smart airport components, listed above.

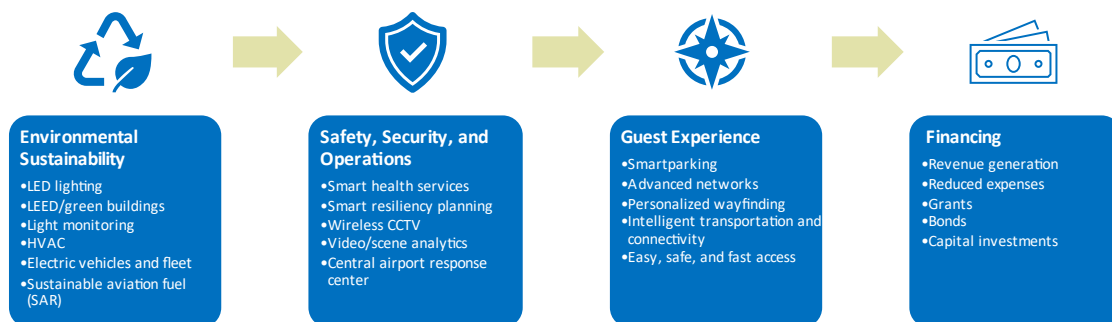
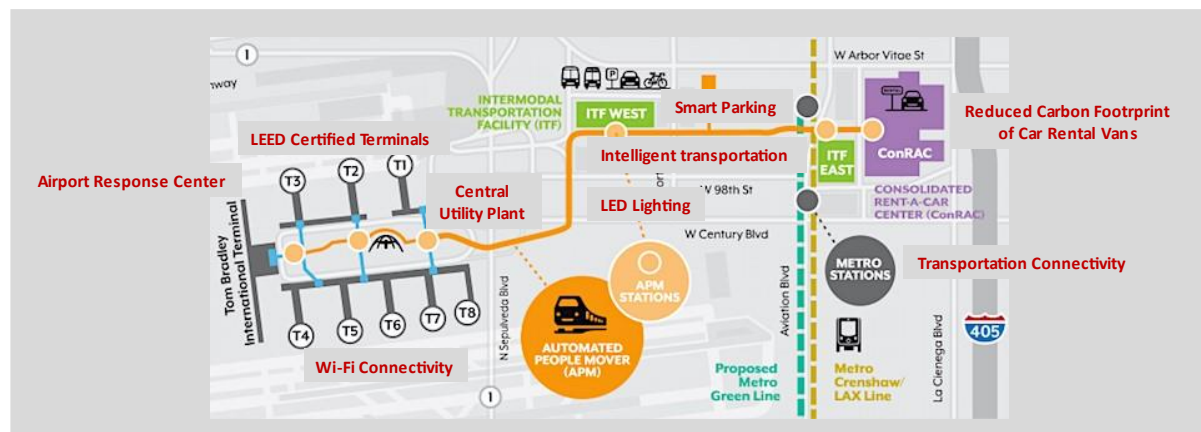
Moreover, the Smart Airport model is not static:

- Technologies are constantly evolving.
- Airport service users' needs are constantly changing.
- Airport infrastructure requires reinvestment to stay abreast of needed changes.

Technology is a critical component of the Smart Airport model. ***New technologies simultaneously will require new competencies.*** Airport employees will need to acquire new knowledge and skills to manage recent technologies within airport operations.

LAWA's digital marketplace focuses on concessions and the guest experiences (e.g., parking reservations; food ordering prior to arrival at LAX; and touchless baggage handling, boarding, and parking lot exit). A Smart Airport Model includes those and other features: environmental sustainability; safety, security, and operations; guest experience; and financing solutions.

## Smart Airport Model – Both Airside and Landside Aspects



Note: The SMART Airports & Regions Conference & Exhibition are held at various locations throughout the world, most recently in July 2022 in Ontario, California.



Table C.5 displays the impact of these technological changes, particularly in reducing social contact from a public health safety perspective and improving overall efficiencies from a guest experience perspective.

**Table C.5: Technological Components of Smart Airport Model<sup>2</sup>**

Note: In selecting and implementing any of these technologies, especially those involving biometrics, LAWA will need to ensure that it has addressed associated privacy and legal issues.

Typical Pre-COVID-19 Passenger Flow		Future Smart Airport Model	
Current Technology	Social Contact	Future Technology	Social Contact
<b>Check-In</b>			
<b>General</b> – Passengers still use conventional check-in desk services, resulting in direct contact between passengers and airport staff.	Yes	<b>General</b> – Check-in will be primarily contactless technology. Check-in desk services will be offered at an added cost.	Yes/No
<b>Self-Service Kiosks</b> – More passengers are using kiosks to avoid long lines. Some passengers do not use kiosks due to a lack of IT knowledge. <i>LAX has self-service kiosks at all of its terminals.</i>	No	<b>Self-Service Kiosks</b> – Kiosks will become the standard technology for passenger check-in. The additional value will be that during check-in, passenger data from the passport will be correlated with biometrics (face recognition) used as an identity base through the entire traffic flow process.	No
<b>Bag Drop Desk</b> – If there is no automated baggage drop-off for passengers after kiosk or web check-in, passengers have to go to a baggage drop-off counter, resulting in direct contact between passenger and airport staff.	Yes	<b>Bag Drop Desk</b> – Baggage drop-off will be fully automated without any contact with airport staff.	No
<b>Internet Check-in</b> – Airports have a low rate of passengers using Internet or Web Check-In.	Yes	<b>Internet Check-in</b> – Most passengers will use Internet check-in because they will use their IT equipment for check-in.	No
<b>Boarding Pass Control</b>			
Most airports use airport staff for checking boarding passes, resulting in	Yes	All airports will use automated boarding pass control equipment where employees will be monitoring	No

<sup>2</sup> Table adapted from Drljaca, M.; Štimac, I.; Bracic, M; and Petar, S. The Role and Influence of Industry 4.0. in Airport Operations in the Context of COVID-19. Sustainability, December 18, 2020.

Typical Pre-COVID-19 Passenger Flow		Future Smart Airport Model	
Current Technology	Social Contact	Future Technology	Social Contact
direct contact between passenger and airport staff.		the entire process from a distant (separate office).	
Security Control			
Most airports use conventional security equipment where four persons need to be in place for one security unit, resulting in direct contact between passengers and airport staff.	Yes	Airport security will use highly sophisticated equipment, including scanning baggage cabins (touchless, digital alternatives to physical security). Officers will monitor the entire process from a distance (separate office) and will react only if the alarm is goes off.	No
Emigration/Immigration Control			
U.S. CBP (or police if overseas) provide emigration and immigration control. Most airports use a conventional approach with emigration counters, resulting in direct contact between passengers and CBP officers.	Yes	Airports will implement technology with biometrics, similar to current mobile devices with face recognition. Passengers' faces will become their clearance for entry.	No
Boarding			
Most airports use a conventional boarding process and gate counters, resulting in direct contact between passengers and airport staff.	Yes/No	Automated gate readers and face recognition will create contactless boarding checks. Passengers' faces will become their boarding passes. Airport employees will monitor the entire process from a distance (separate office).  <i>Note: Bradley West Gates has installed this kind of boarding technology at LAX.</i>	No

The adoption of specific technologies by airline tenants will remain at their discretion. LAWA can, where appropriate, advocate such adoption, and it is responsible for ensuring that the terminals are supplied with power and data infrastructures that will support such adoption. LAWA's Chief Development Officer and Chief Digital Transformation Officer can collaborate to help drive these innovations.



### **Related Recommendations**

- Part D, Section D.2, elaborates on LAWA’s need for data scientists to help various divisions mine data and drive evidence-based decision-making.
- Volume II, “Equity and LAWA’s Impact on Historically Disadvantaged Groups,” expands on the use of SAF from an environmental impact perspective.

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART D – MANAGEMENT PRACTICES



## D – MANAGEMENT PRACTICES

Part D focuses on Management Practices that the Joint Administrators identified and is grouped into the following areas: Strategic Planning, Performance Metrics, Procurement and Contracting, and Internal Audit. (Note: Please refer to Volume II for further discussion regarding procurement practices from the perspective of economic impact on the region.)

### D.1 STRATEGIC PLANNING

#### Background

##### 2016 STRATEGIC PLAN DEVELOPMENT AND LAUNCH

KH had recommended that LAWA needed a Strategic Plan and an ongoing strategic-planning process in previous IEA Surveys in 1999, 2008, and 2016. In 2016, LAWA engaged an outside firm to assist and train LAWA in strategic planning.

- LAWA Deputies were assigned to “Design Teams” and selected LAWA employees to be involved, including employees who had volunteered to participate.
- Those LAWA employees expressing interest in being part of the Design Team but who were not selected were designated as the “Advisory Group” and received special briefings and emails about every 18 months.
- On July 6, 2016, the Design Team and executives participated in a half-day conference at Flight Path, featuring a presentation by a London-based futurist, Rohit Talwar from FastFuture.
- The Design Team developed the vision, mission, values, goals, and objectives.
- The 2016 Strategic Plan was presented to LAWA staff at the Sheraton Grand Ballroom in November 2016.
- Brochures on the strategic plan were given to LAWA staff, new hires, BOAC, and City Council Offices, along with other give-ways to promote the strategic plan.
- In November 2016, LAWA included an article, “LAWA Unveils New Strategic Plan,” in its *Aerogramme* newsletter for LAWA employees.



## ACTION PLANNING

- Starting in Spring 2017, LAWA assigned four “goal leads” and began to work on preparing action plans.
  - The goal leads organized the action-planning teams to develop actions to implement the assigned goals and objectives.
  - The teams were drawn from LAWA managers, Design Team, and Advisory Group, although most were from the management ranks.
  - The action-planning teams finished the proposed action plans, which the then-CEO Deborah Flint and executives reviewed and revised.
  - At the time, LAWA noted that the action plans had some shortcomings (e.g., steps were vaguely worded or lacked metrics and realistic timeframes).
- Each year around August, the goal leads updated the action steps and reported on progress made to BOAC.
- Progress updates were also provided at LAWA employee forums in 2017, 2018 and 2019.

## STAFF ENGAGEMENT AND STAKEHOLDER OUTREACH

LAWA outlined its staff engagement and stakeholder outreach efforts in a BOAC PowerPoint presentation:

- Staff engagement. LAWA met with more than 300 staff members through interviews, 13 focus groups, 5 townhall briefings, and the Advisory Group; 244 out of 3,035 staff responded to an online survey on the Strategic Plan (11% response rate).
- Stakeholder outreach. LAWA interviewed all BOAC Commissioners and representatives from the Office of the Mayor, Council District 11, Airline Airport Affairs committee, Tom Bradley International Terminal Equipment Company, Inc. (TBITEC) (a California not-for-profit organization of the member airlines at LAX), AvAirPros, and Van Nuys Airport Association.

LAWA solicited input from other external partners – airlines, concessionaires (e.g., car rental companies regarding ConRAC) and FAA – as part of the capital projects work in subsequent years.

## VISION, MISSION, AND VALUES

LAWA executives today report that the vision, mission, and values remain current. LAWA’s vision is its “...collective ambition for the next 10 years:”

## **“Gold standard airports... delivered”**

- Safe and secure airports to meet the demands of a global city
- All LAWA facilities of consistently high quality, delivered successfully and well-maintained
- Easy airport access via public or private transportation
- Services delivered flawlessly on a daily basis



LAWA defined achievement of the “gold standard” as *“...recognition of LAX as being in the top tier of major airports worldwide for quality of passenger experience, with Van Nuys in the top tier of General Aviation airports.”*

LAWA’s mission or its *“...core purpose and reason for existence”* is:

## **“To serve the world – connecting people, places and cultures”**

- Safely and securely bringing people together, connecting L.A. with a global society
- Serving global customers and local communities
- Enriching quality of life for individual travelers, the community, the region

LAWA defined its core values:

<b>Service</b>	Provide safe, exceptional service to our guests, stakeholders, colleagues, and business partners
<b>Respect</b>	Treat each other honestly and fairly to build trust and accountability
<b>Collaboration</b>	Work together to achieve common goals
<b>Creativity</b>	Think differently, imagine better ways of doing things
<b>Stewardship</b>	Act as a responsible, long-term steward, recognizing LAX and VNY as critical community assets

LAWA referred to these values as its *“...guiding principles that describe what we believe in, and how we intend to operate.”*

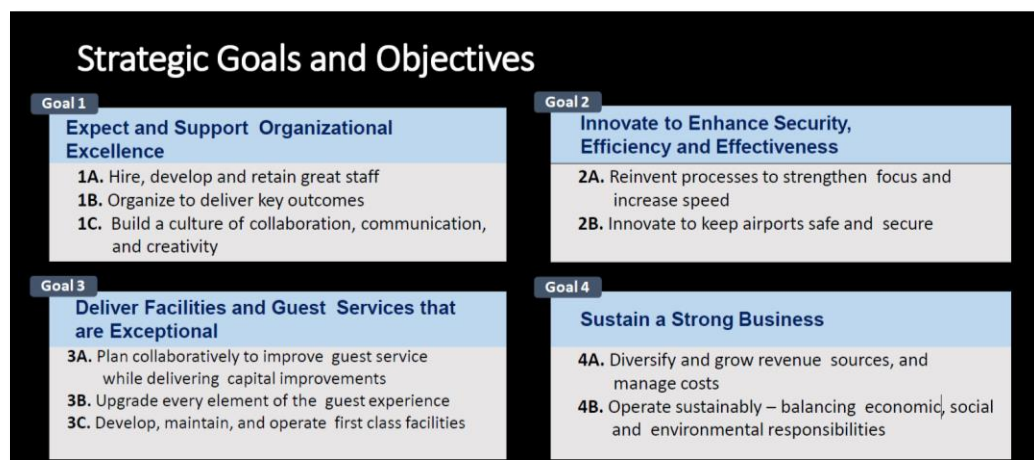
## **GOALS**

LAWA’s four goals were:

- 1.0 – Expect and Support Organizational Excellence
- 2.0 – Innovate to Keep Airports Safe and Secure
- 3.0 – Develop Facilities and Guest Experiences that are Exceptional
- 4.0 – Sustain a Strong Business



Each goal had two or more objectives:



## Progress Updates

LAWA presented its 2016 Strategic Plan to BOAC on October 20, 2016. LAWA executives provided annual updates of accomplishments and subsequent-year plans to BOAC during the budgeting process. LAWA refined its budgeting system so that, where appropriate, divisions could indicate what Strategic Plan goal a budget request was linked to.

### STRATEGIC PLAN STATUS IN 2017

2017	LAWA Updates
<b>June</b>	The CFO reviewed the 2016 Strategic Plan goals with BOAC in preparation of the FY2017-2018 budget.
<b>Fall</b>	LAWA produced a video, regarding implementation of the first year of the 2016 Strategic Plan, using an award ceremony motif, for the employee forum.
<b>November</b>	<p>Then-CEO Flint presented to BOAC an overview of the 2016 Strategic Plan, process, and action plans. She emphasized the need to be outcome-oriented and presented metrics by goal. Other deputies presented and talked about the importance of their initiatives, by goal.</p> <ul style="list-style-type: none"> <li>▪ <b>Goal 1 highlights.</b> BOAC asked questions regarding the gender equity target. LAWA had obtained the second-year results of an employee engagement survey.</li> <li>▪ <b>Goal 2 highlights.</b> Innovation involved awards, innovation technology pilots, and specific improvements around airfield and traffic congestion, procurement processing time, and other areas.</li> <li>▪ <b>Goal 3 highlights.</b> Facility and guest experience priorities were highlighted, particularly during the massive construction process through information updates using new technologies and improved personal services (e.g., white glove concierge service). The aim was to improve LAWA's ASQ scores.</li> <li>▪ <b>Goal 4 highlights.</b> The focus in this area was around increasing non-aeronautical revenue by 20%; identifying cost savings; increasing small, local, and diverse</li> </ul>

## 2017 LAWA Updates

business participation in LAWA contracts; implementing new sustainability initiatives; and obtaining a recognized Corporate Social Responsibility (CSR) ranking.

## STRATEGIC PLAN STATUS IN 2018

### 2018 LAWA Updates

**September** Then-CEO Flint expressed her commitment for annual updates on the Strategic Plan for BOAC. She presented an overview of key metrics: 3,700 LAWA employees, 50,000 badged employees at LAX and VNY, 13 new routes, \$1 billion spent on capital projects, and 86.6 million passengers, an increase of 4.5% from 2017 to 2018. BOAC learned about progress against the guest experience goal:

- Importance of smart bathrooms (e.g., lights indicating available stalls, buttons for users' ratings)
- Improvements in LAWA's ASQ scores and rankings
- Planned improvements in wayfinding

Progress made against sustainability plans was also presented, including environmental impact metrics (e.g., EV recharging, EV fleet), sustainability and commitment to LEED certification in construction projects, and the Sustainability action plan.

An update was given regarding improvements made in cycle time to hire, a new Memorandum of Understanding (MOU) with City Personnel for a better way of hiring, employee training, participation in an ACI program for better techniques, and a new mentoring program, among other initiatives.

**September** LAWA conducted guest experience and business-to-business surveys. The results of the 2018 business-to-business (B2B) survey were presented to BOAC.

**November** LAWA produced a video, highlighting the deputies and thanking employees for their work on strategic planning.

**December** BOAC heard a presentation that tied the capital improvement projects to the 2016 Strategic Plans objectives around:

- Delivery of safety and security initiatives
- Minimizing environmental impact
- Benefiting the community
- Ensuring financial stewardship

It stated that capital investments are prioritized as per the strategic priorities and to solve critical business challenges:

- Meeting demand
- Enhancing operational performance
- Enhancing the guest experience
- Growing net revenue

## STRATEGIC PLAN STATUS IN 2019

### 2019 Updates

**March** Then-CEO Flint reinforced before BOAC that the four goals in the 2016 Strategic Plan remained relevant.

2019	Updates
<b>March</b>	Then-CEO Flint emphasized the strategic importance of diversity and inclusion as part of LAWA's contract development and bonding program at BOAC.
<b>March-June</b>	Chief Financial Officer (CFO) reinforced the importance of linking the budget to the Strategic Plan and presented the annual budget, including an update on LAX revenues and expense trends before BOAC.
<b>August</b>	Then-CEO Flint and her staff provided an update to BOAC, emphasizing that the Strategic Plan not become stale, and that the organization be in alignment with the strategies. <sup>3</sup> In addition, FY2020 priorities were outlined. For example, LAWA formed a Power Resiliency Task Force and added an energy resiliency and power sustainability priority because of the need to address power outages at LAX.  The update expanded on the Capital Improvement Plans, including projects that were terminated and status of current projects.

In December 2019, the Harvard Business School (HBS) published a case study, entitled "The New LAX: Ready for Takeoff?". It outlined the changes that the then-CEO Flint made at LAWA, including streamlining and modernizing LAX's complex capital projects (\$12 billion worth at that time); reorganizing and retooling staff resources and processes; revitalizing the LAX guest experience; establishing a governance model, including the executive committee's involvement in decision-making; and launching strategic planning. The HBS case study recognized that:

*"From 2015 to 2019, LAX's performance improved, yet many challenges remained, and new ones continued to come to light. In December 2019, as Flint prepared to move onto a new position, Burton and the board [BOAC] are assessing the progress the team has made, and looking to next steps."* ([HBS Case 420-025, revised June 2020](#)).

In 2019, Justin Erbacci (now LAWA's CEO) reported to BOAC that:

*"WE LAUNCHED OUR STRATEGIC PLAN IN 2016,  
AND WE'VE UPDATED THE PLAN ANNUALLY AND REPORTED  
ON THE ACCOMPLISHMENTS & NEW INITIATIVES AT OUR ANNUAL  
EMPLOYEE FORUMS. NOW WE'RE IN THE HOME STRETCH  
BEFORE WE DEVELOP OUR NEXT PLAN IN LATE 2020."*

COVID-19 overtook LAWA's plans to develop the next Strategic Plan in late 2020. In the face of the COVID-19 pandemic, LAWA executives remained focused on strategic and operational priorities. Although the outbreak of COVID-19 in 2020 disrupted LAWA's plans to update the Strategic Plan, there is no evidence that LAWA has neglected critical problems.

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<sup>3</sup> Available online, including taped presentations, at:

[https://lawa.granicus.com/player/clip/547?view\\_id=4&caption\\_id=111308&redirect=true](https://lawa.granicus.com/player/clip/547?view_id=4&caption_id=111308&redirect=true)

## STRATEGIC PLAN STATUS IN 2022

LAWA is currently embarking on a 2022 Strategic Plan “Refresh” initiative, which is currently in the draft stages. In 2021, LAWA engaged a consultant to assist in the strategic refresh efforts. The LAWA executives have met numerous times to:

- Review the 2016 Strategic Plan
- Debate, discuss, and draft an updated strategic plan with a focus on updating the key goals, action items, and metrics for the next five years
- Revisit the core values to ensure they reflect the vision and values of LAWA and the City

## Findings

### ***LAWA’s strategic-planning process has improved.***

LAWA has moved aggressively to address major challenges in the last ten years, including inadequate terminal space for growing international traffic, outdated passenger space in terminals, central terminal area roadway congestion with LAMP, and the post-COVID-19 pandemic revenue collapse. Moreover, LAWA’s strategic-planning process has vastly improved from prior efforts; today, LAWA has:

- Embraced and communicated its vision, mission, values, and goals to its employees
- Provided progress updates to BOAC and in employee forums, CEO messages, and newsletters
- Identified the need for and benefits of strategic planning in preparing the initial Strategic Plan
- Completed the first cycle of its initial strategic-planning efforts, starting in 2016 through 2020

Table D-1 elaborates on LAWA’s strategic-planning efforts, by maturity level, since 1999.

**Table D.1: LAWA’s Strategic-Planning Efforts (1999-Present)**

Maturity Levels	LAWA Progress
<b>Aware</b>	<p><b>1999 IEA Survey Status:</b> LAWA was aware of what a strategic plan was but had not embarked on strategic planning. It had prepared a mission statement but, at the time of the 1999 IEA Survey, LAWA:</p> <ul style="list-style-type: none"> <li>■ Had no clear vision of the strategic directions</li> <li>■ Struggled to get the Master Plan for modernization of LAX approved</li> <li>■ Focused on operations</li> <li>■ Had no defined strategic objectives or metrics linked to strategic outcomes</li> </ul>

Maturity Levels	LAWA Progress
	<p>In response to KH's recommendations in the 1999 IEA Survey, LAWA organized workshops, led by Arthur Andersen consultants, to develop mission, vision, goals, and objectives. The workshops included most division heads.</p> <p>At a BOAC retreat, Commissioners were unable to set priorities among the goals and objectives presented. Subsequent efforts focused on implementing the CEO's goals developed in collaboration with the Mayor. The goals were neither publicized internally nor developed with much internal input.</p>
Reactive	<p><b>2008 IEA Survey Status:</b> LAWA management did not see the benefits of a formal Strategic Plan and prepared responses as issues arose. The then-CEO Gina Marie Lindsay disbanded a five-person strategic planning and metrics group because of her Mayoral mandate to deliver and focus on capital projects.</p> <p>LAWA management focused on modernization of TBIT while maintaining operations. LAWA's strategic priorities could be inferred from whatever was in the capital program and budget, but there was never a structured, transparent process, ensuring that the determination of the most important things that LAWA needed to change were fully integrated with the resource allocation decisions incorporated into spending plans.</p>
Proactive (with Managed Aspects)	<p><b>Response to 2016 IEA Survey Recommendations:</b> LAWA management recognized the need to develop a robust strategic-planning process. LAWA commissioned an external firm (ICF) to develop a Strategic Plan. The process in developing the Strategic Plan was top-down, beginning with a kick-off with deputies, division heads, and some supervisors and a series of forum meetings for LAWA employees.</p> <p>External stakeholder input from airlines, communities, City Council, FAA, and others.</p> <p>LAWA defined and embraced:</p> <ul style="list-style-type: none"> <li>▪ Its vision and mission</li> <li>▪ Its four goals</li> <li>▪ Linkages between initiatives and goals</li> </ul> <p>LAWA held annual employee meetings, combined with updates to BOAC, in 2017, 2018, and 2019.</p>

Maturity Levels	LAWA Progress
	LAWA refined its budgeting system so that, where appropriate, divisions could indicate what Strategic Plan goal a budget request was linked to.
Proactive (Disrupted by COVID-19)	<p><b>2022 IEA Survey Findings:</b> LAWA is putting planning tools and metrics in place to sustain strategic planning. Long-range planning is now part of LAWA’s understanding of its mission. The update of the 2016 Strategic Planning was understandably put on hold due to COVID-19.</p> <p>Some divisions have defined their own mission and values (although they do not appear to consistently tie back to LAWA’s mission and values). LAWA has also developed subplans to support strategic directions:</p> <ul style="list-style-type: none"> <li>▪ Environmental Sustainability Plan</li> <li>▪ Mobility Strategic Plan (February 2020), which ties its plan to the LAWA 2016 Strategic Plan goals</li> <li>▪ Procurement Improvement Plan, discussed later in Section D.3</li> <li>▪ IT Plan</li> </ul> <p>The subplans in place will help LAWA divisions to be more strategic and move toward better outcomes as they are implemented, refined, updated, and measured.</p> <p>Missing subplans (e.g., HRD) should be developed. LAWA HRD conducted an employee survey in 2018 that contained some questions pertaining to the Strategic Plan and LAWA’s vision, mission, and values. Although LAWA does not have a HR Plan, it had Kincentric prepare two reports (November-December 2021) that assessed LAWA HR against the Kincentric standards and develop recommendations to address issues.</p> <p>In many instances, LAWA has made important progress, as documented in this 2022 IEA Survey. For example, in Goal 3, LAWA is delivering new and modernized facilities and improving the guest services, despite disruptions with COVID-19.</p> <p>Since January 2020, CEO Erbacci routinely delivers his “CEO Message” to all LAWA employees, frequently conveying LAWA’s “gold standard” vision and leadership’s support of a culture of continuous improvement. LAWA’s website:</p> <ul style="list-style-type: none"> <li>▪ Does not post its vision, mission, and values</li> <li>▪ Has a tab “About Us” that posts mission and values for some of its divisions (e.g., Airport Police, Commercial Development Division, and Business, Jobs and Social Responsibility (BJSR)), but not for LAWA itself.</li> </ul>

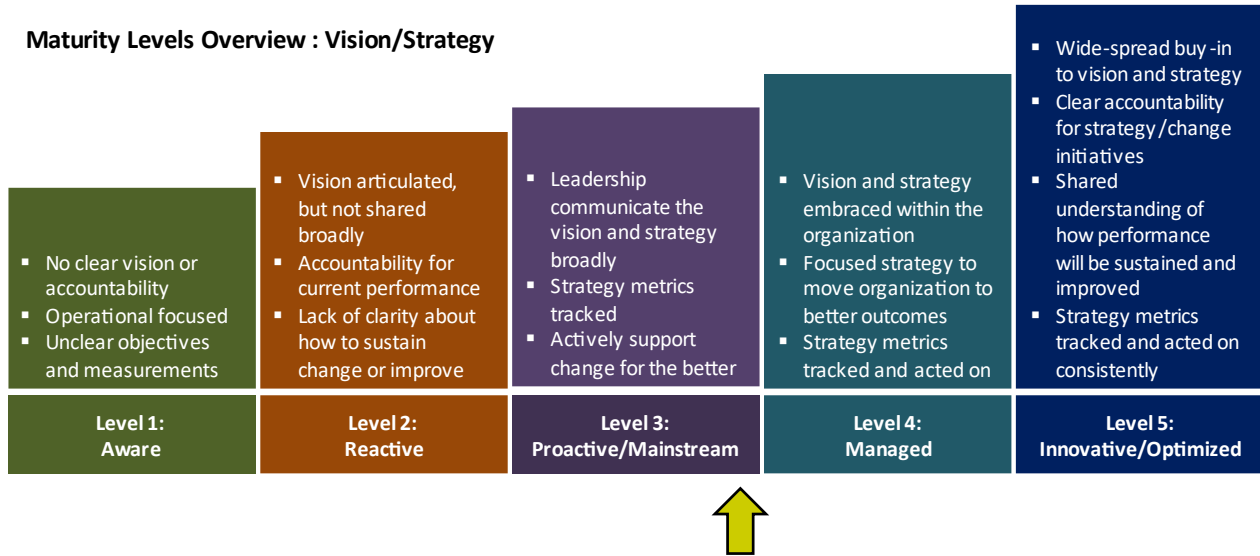
Maturity Levels	LAWA Progress
	<ul style="list-style-type: none"> <li>Does not post LAWA’s goals although the goals are presented as public documents before BOAC</li> </ul> <p>LAWA has improved its operational metrics and tracked milestones in the 2016 Strategic Plan. It developed few strategic metrics that were outcomes oriented.</p> <p>At the time of the 2022 IEA Survey, LAWA had revived its strategic-planning efforts.</p>
Managed	<p><b>Next steps:</b> On the basis of LAWA’s strategic-planning efforts prior to COVID-19, it has built the foundation for making strategic-planning an ongoing and managed endeavor. COVID-19 disrupted LAWA’s plans to update the strategic plan in 2020. More of the metrics should focus on outcomes that are monitored, as discussed later. In addition, LAWA should broaden ownership of the strategic changes within LAWA. This IEA Survey recommendations are designed to help institutionalize LAWA’s strategic-planning process.</p>
Innovative/ Optimized	<p><b>Aspirational:</b> As discussed in Part C, LAWA is implementing innovative technology in its new facilities that will improve the guest experience, operational costs, and public health safety of those working or visiting the airports. Such optimized innovations will position LAWA strategically to be best in class.</p> <p>Employees need to embrace how performance will be sustained and improved and track performance metrics to achieve strategic outcomes.</p> <p>LAWA should expand its stakeholder engagement, including two-way communications with its employees, partners (e.g., airlines and concessionaires), and affected communities for building buy-in.</p>

Therefore, LAWA is currently approaching the managed maturity level, as defined in KH’s maturity model. For LAWA’s strategic planning to become “managed,” the foundation laid in 2016 and reported on through 2020 needs to be reinvigorated and reinitiated as part of an ongoing, institutionalized process.



## Maturity Levels Overview: Strategic Planning

### Maturity Levels Overview : Vision/Strategy



Delays in implementing and institutionalizing intended strategic-planning improvements are understandable, given COVID-19. LAWA management understands its biggest challenges and has effectively mobilized resources to address them. Moreover, it does not appear that LAWA has under-resourced major needs or wasted significant resources on low-value issues.

LAWA management understands the need to refocus on strategic planning and its efforts seem to be going in the right direction. Processes have appropriately expanded to incorporate important issues that do not easily fit budget-driven planning models (e.g., sustainability, transportation mobility, etc.).

***LAWA's 2016 Strategic Plan was primarily an internal document with progress reports provided for BOAC.***

Governmental agencies use different approaches in sharing information about their strategic plans. Some envision strategic planning as an internal document and only share the “big picture” items – vision, mission, values, and strategic priorities or major goals – with the public. Other agencies seek approval of the strategic plan from their governing bodies. In some instances, the governing bodies drive the strategic planning process, particularly when agencies are reluctant to embrace change.

Most agencies use action plans to achieve the goals as internal working documents and update them annually as action steps are accomplished or require modifications based on lessons

learned or unanticipated events (e.g., legislative changes, emergency events, or economic crises).

In the case of LAWA, BOAC never officially adopted the 2016 Strategic Plan; however, LAWA executives provided routine updates of progress against the Strategic Plan. BOAC agenda items also identify what strategic goals each item relates to. BOAC adopts LAWA's budget each year, which reflects the Strategic Plan goals. LAWA chose not to post the Strategic Plan or its vision, mission, and values on its website. LAWA reports that the strategic-planning process entailed extensive consultation across the organization, involving all functions at all levels.

Best practices involving transparency entail sharing the strategic plan highlights – vision, mission, values, and goals – and reporting progress vis-à-vis targeted outcomes.

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***LAWA reports that it is undertaking a more top-down approach to strategic planning in 2022.***

Despite the interruption of strategic planning because of COVID-19, LAWA executives are in the process of reinvigorating and reinitiating strategic planning as part of an ongoing, institutionalized process. LAWA states that its Strategic Plan “Refresh” initiative focuses on revising goals, objectives, action plans, and metrics, and will not be a bottom-up planning or public consultation effort. Specifically, LAWA has:

- Met as an executive team
- Prepared an initial draft Strategic Plan “Refresh” with goals and metrics
- Appointed an individual to lead the strategic planning process and another person to serve as the process coordinator
- Developed an action plan template to prepare action plans to drive implementation of the strategic plan
- Assigned executives to “own” each of the goals
- Begun working with “objective owners” to construct plans for delivering each objective, specifying responsibilities and timeframes
- Begun meeting with objective owners to identify initiatives, leads for each initiative, timetables, and metrics for each objective, so that the resulting metrics enable more effective tracking of progress against the strategic plan
- Begun to engage employees in the development of the Action Plans to build buy-in

LAWA's strategic-planning process is largely top-down. Senior executives establish strategic priorities and dictate the capital and budgetary spending needed to execute them. While recent decisions have been sound, this top-down orientation is not the most effective approach for building buy-in.

## Opportunities

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***LAWA's strategic planning efforts since 2016 are a good foundation, but it needs to be more transparent about Strategic Plan details.***

The 2016 strategic-planning efforts and subsequent updates are good foundations for institutionalizing strategic planning as an ongoing management process.

- The vision is well communicated and “gold standard” is incorporated into LAWА’s guest experience and capital planning efforts. (Note: LAWА has set LEED Silver as the minimum standard for its new and updated facilities.)
- LAWА redefined its budgeting process to reference Strategic Plan goals, as appropriate, in budget requests.
- LAWА links initiatives and identifies metrics that support goals, although the metrics are not necessarily strategic or outcome-oriented (see discussion in later on “Performance Metrics”).
- LAWА worked with airlines as stakeholders in facility decisions to deliver “...airline value that meets or exceeds cost of investment.” Similarly, LAWА worked with car rental companies regarding ConRAC.

There are areas for improvement:

- The vision, mission, values, and goals should be more widely communicated, including on LAWА’s website and with the public.
- LAWА should have a formal Strategic Plan, not just PowerPoint slides.
  - Note: Because of staff turnover, it took two months for LAWА to locate the 2016 Strategic Plan PowerPoint for KH to review, indicating that it is not a living document that is easily found.
- The Strategic Plan should be posted on its website for public viewing.
- LAWА’s objectives clarified the goals but as already discussed, the objectives are not S.M.A.R.T. (specific, measurable, achievable, realistic or relevant, and time specific) objectives, making it difficult to assess progress, success, or outcomes.
- LAWА shared an Excel spreadsheet that listed 86 planned actions that aligned with the 4 strategic goals. No priorities were set for the 86 actions. LAWА did not have more detailed or uniform internal action plans that outlined what action steps will be taken over a two- to three-year period, the organization or executive with lead responsibility, and target completion dates.
  - Action plans are important for LAWА to have a structured approach for monitoring progress, celebrating successes, and identifying lessons learned. Without such action plans, the updates of accomplishments cannot be easily tracked to prior year plans.

- External community stakeholders (beyond current vendors, airlines, and concessionaires) were not actively engaged in strategic planning, particularly around areas that directly affect them, which did not honor LAWA’s stewardship value: *“Act as a responsible, long-term steward, recognizing LAX and VNY as critical community assets.”*

It does not reflect the City’s commitment to equity. As discussed in Volume II, much of the community engagement today is primarily one-way communication from LAWA, partially because of COVID-19, but also as a long-standing approach in community engagement.

- LAWA did not report how performance will be sustained and improved over time. Strategy metrics are not tracked and acted on consistently.

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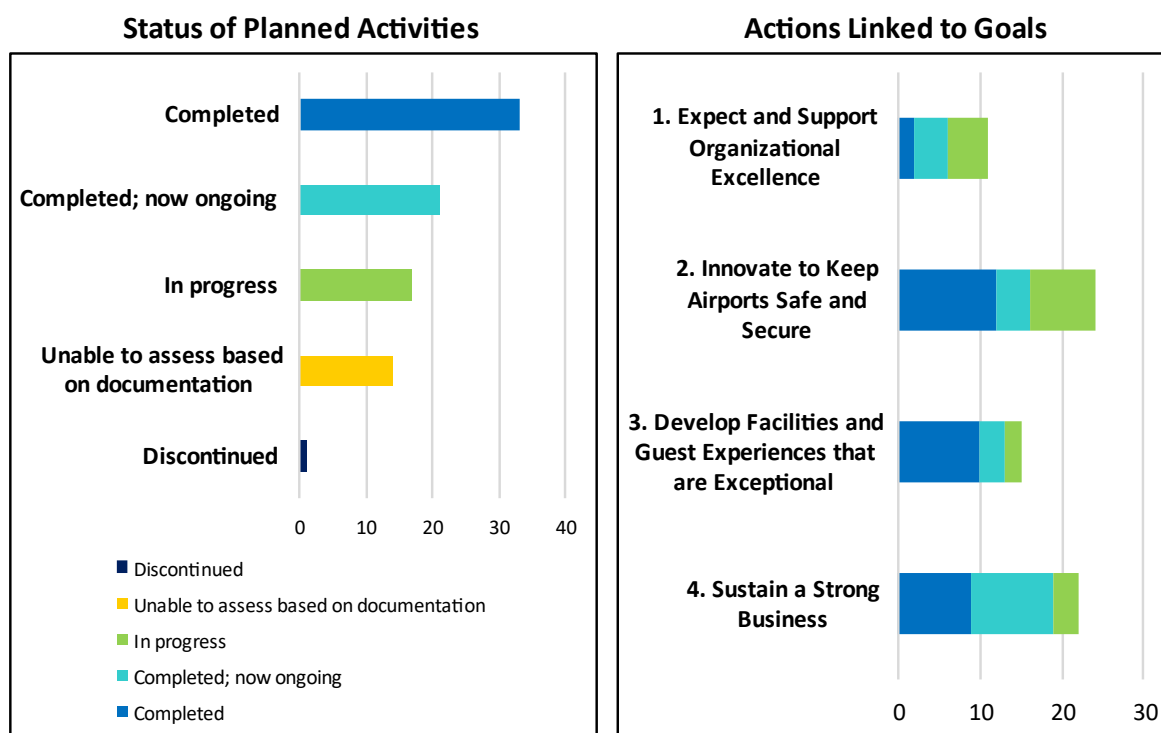
***LAWA is continuing to work on strategic initiatives and has completed 64% of its 86 planned actions in the 2016 Strategic Plan report as of December 2021.***

LAWA provided an Excel spreadsheet, entitled “LAWA 2016-2021 Strategic Plan Completion Report,” which listed goals, tasks or action steps, metrics, comments, and completion status as of December 2021. The 86 actions were linked to the 4 strategic goals, the majority involved Goal 2 – Airport Safe and Secure (38%), followed by Goal 4 – Strong Business, Goal 3 – Facilities and Guest Experiences.

As shown in Figure D.1, LAWA completed 64% of its planned activities. Of those activities completed, 24% are ongoing. Another 20% are in progress. Goal 2 has the most activities still in progress to be completed. There was insufficient documentation for KH to assess 16% of the activities regarding status. Only one activity was discontinued.

There were no ratings provided to describe what activities might be of greater criticality to LAWA. Therefore, it was not possible to assess if the most critical activities were achieved or if the numbers reflected easier accomplishments.

**Figure D.1: Status of Planned Actions Linked to Strategic Plan Goals  
(as of December 31, 2021)**



Note: The Excel spreadsheet does not indicate progress, by year, just overall status as of December 2021.

One of the values of a strategic plan is that it distinguishes those key elements that are truly strategic from ongoing initiatives and operational improvements. When strong and specific metrics are coupled with a limited number of strategic action plans, it is possible to prioritize efforts and funds to the elements that have the greatest impact on outcomes. It appears that this Strategic Plan is approaching a Comprehensive Plan, given the large number of actions associated with the stated goals.

#### ***LAWA focused on completing milestones or activities rather than outcomes.***

In a November 16, 2017, LAWA executives made a presentation before BOAC, where they identified metrics for each goal and performance area. Some targets were set for improvement in performance areas; baseline metrics were not included in the report. Many areas did not have consistent updates, based on measurable progress or references to the prior year's plans.

**11% of the 85 actions linked to the Strategic Plan had metrics. 79% listed deliverables (e.g., projects, reports, awards) as anticipated outcomes.** As displayed in Table D.2, 11 (13%) of the 85 actions had metrics, some with baseline data or targets. The majority of the actions involved



“Yes/No” responses (79%) determinations of completed deliverables, such as completed studies or reports, new policies, strategy development, pilot programs, awards, documentation, etc. Finally, 7 (8%) actions had no metrics or processes defined, such as “design creative/appealing construction zones” (Goal 3), making its achievement subjective.

**Table D.2: Actions Linked to Strategic Plan that were Quantitative  
(as of December 2021)**

Action Status	Percent
Metric/Target Set	13%
Yes/No Responses Regarding Deliverables	79%
No Metrics Set	8%
Total	100%

The number of metrics tracked is not as important as ensuring that strategic outcomes are achieved. Moreover, other than the Excel spreadsheet, KH could not locate dashboards that would make it easy to track metrics that would reflect the results of actions and outcomes.

***LAWA reported on progress made in BOAC updates, but it was not always easy to track quantitative progress made using metrics and baseline data.*** Most of the progress updates presented to BOAC related to tasks completed versus metric comparisons to the baseline year of 2017.

The guest experience group is a good example of reporting against baseline metrics set in 2017. Metrics established in 2017 were monitored each year and reported to BOAC. Guest experience was logically linked to the new facility upgrades and construction as one of the four goals in the 2016 Strategic Plan

Prior to LAWA’s 2016 strategic planning efforts, the Office of Mayor Garcetti and the then-CEO Flint had identified “Guest Experience” as a priority at LAX. The Joint Administrators at that time asked the KH team to help develop guest experience metrics as part of the 2016 IEA Survey. LAWA had already begun work in this area by appointing an individual to lead the effort, convening a working group, retaining an external consultant, and developing work plans.

In 2020, LAWA reported:

<i>Objective 3.15: Put in place at least one new amenity and service per year</i>	<i>Objective 3.16: Train 100% of badged employees on guest experience programs like iCare</i>	<i>Objective 3.18: Increase LAWA's business-to-business satisfaction by 2% per year</i>
<ul style="list-style-type: none"> <li>Launched "LAX Order Now," which allowed passengers to order meals via their mobile devices – "a touchless food ordering experience for airport guests" (offered in partnership with URW and Servy)</li> <li>Set up COVID-19 testing (including PCR and Antigen testing) at three LAX locations</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing training for newly badged employees</li> <li>Since inception, delivered iCare training via computer-based training (n=7,247), train-the-trainer programs (n=10,623), and video loops while waiting at the Security Badge Office (SBO) (n=229,134).</li> <li>Plans to roll out Phase 2 of the iCare training during the second half of 2022</li> </ul>	<ul style="list-style-type: none"> <li>Completed follow-up B2B survey (conducted between December 2019 and February 2020) and prepared a report on findings from the 537 LAWA partners who responded in May 2020</li> <li>Achieved a 5% improvement in LAWA's B2B satisfaction in 2020 compared to 2018; its goal was to increase by 2% per year (Objective 3.18)</li> <li>Plans to conduct follow-up B2B and guest experience surveys in 2022</li> </ul>

***LAWA reports it is focusing on better linkages of metrics to goals in its next Strategic Plan***

***"Refresh."*** As discussed further in Section D.2 on "Performance Metrics," the metrics listed in the 2016 Strategic Plan are by-and-large not strategic. Instead, LAWA's metrics reflect:

- Operational metrics that LAWA should track in the normal course of day-to-day operations and have long existed. Examples include numbers of security incidents and ratios of non-aeronautical to total revenues.
- Capital project milestones (e.g., whether LAMP is on schedule and on budget) but not the strategic measurable results (e.g., reductions in carbon footprint, reductions in CTA congestion once LAMP and ConRAC are completed and connected to L.A. Metro).

As discussed further in Section D.2 on "Performance Metrics:"

- LAWA does not delineate how detailed "leading" metrics (e.g., escalator outage rates) are supposed to work together with many other metrics to produce measures of higher-level, "lagging" indicators of performance (e.g., improved customer satisfaction).
- LAWA has not leveraged artificial intelligence (AI), information data management/retrieval, and other data technologies to improve:
  - Evidence-based decision-making
  - Accuracy and sensitivity of its long-term planning and planning models



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***LAWA has multiple sets of values to clarify the desired culture that were prepared independently of each other.***

LAWA core values in its Strategic Plan are posted on its Intranet for its employees, but are not shared with the public: respect, collaboration, creativity, service, and stewardship. When members of the public searches “LAWA values,” they find different sets of values. Ideally, organizations have a set of core values that its units can then elaborate on further versus developing their own sets of values.

In March 2006, BOAC “...*unanimously adopted a set of ethical values to help set the standard and expectations for all LAWA employees and commissioners.*” These [ethical values](#) and their definitions are:

<b>Honesty</b>	We support a culture that nurtures truth, sincerity, and openness.
<b>Integrity</b>	We uphold our personal conviction to the truth, and we fulfill our obligations.
<b>Respect &amp; Collaboration</b>	We promote human worth and the dignity of all, and foster partnerships of inclusion and cooperation.
<b>Responsibility</b>	We strive for excellence in performing our duties and cultivate a climate of shared accountability.
<b>Public Trust</b>	As one of our most significant responsibilities, we uphold the principles of open government including transparency in our decision-making, public disclosure and public access.
<b>Citizenship</b>	We understand we are part of a larger community from which we benefit and, in turn, are obliged to promote and enhance this necessary collaboration.

There are areas of overlap with these ethical values and those values listed in the Strategic Plan: stewardship, public trust, and citizenship.

Other division strategic plans, such as Airport Police and the Mobility Strategic Plan, set forth yet other sets of values. Airport Police cites its values as: service before self, respect for people, commitment to professionalism, integrity in all we say and do, and we value our personnel. Again, there are compatible values cited (e.g., respect). All values are important.

When there are multiple lists of values that do not align with the Strategic Plan core values, it reduces the opportunity for a common set of behavioral expectations to govern all LAWA staff.

LAWA management states that the “...*different sets of values are not communicated widely,*” even though some values (e.g., ethics, airport port police, and other divisions) are posted on LAWA’s external website.

## Recommendations

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### ***Rec. ID-Plan.1: LAWA should broaden its stakeholder engagement in refreshing its Strategic Plan to build buy-in.***

LAWA senior managers understand its challenges. Under its current strategic-planning process, a small team of senior managers will set the strategic priorities and make the financial allocations. Although this approach is expedient, a more inclusive approach is important for:

- Performing both an external and internal environmental scan to develop and refine a formal SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis that can serve as a basis for priority setting and can inform debates over service/revenue maximization versus cost minimization.
- Building buy-in – both on the part of LAWA staff, vendors, and partners, and in the communities surrounding LAX and VNY

#### INTERNAL ENVIRONMENTAL SCAN

In an internal environmental scan, an organization assesses its internal strengths and weaknesses. LAWA should use available employee surveys and other information to define its internal strengths and weaknesses. In 2016, LAWA announced its Strategic Plan and educated employees about its contents. In the next iteration, LAWA should engage employees in the process – an important factor for:

- Building buy-in to the strategic directions and goals, particularly in new areas (e.g., social equity, Smart Airport models, etc.)
- Developing the next generation of leaders at LAWA
- Improving morale and re-building a collaborative work culture that had to overcome many barriers, develop workarounds, and adapt new ways of working during and post COVID-19

#### EXTERNAL ENVIRONMENTAL SCAN

In an external environmental scan, an organization assesses its external opportunities and threats. LAWA's Official Statements contain useful information about external opportunities and threats, which could be integrated into the Strategic Plan. The SWOT analysis should also acknowledge LAWA's dependence on (and potential conflicts) with outside parties (e.g., airlines, TSA, Caltrans, L.A. Metro), and neighboring communities. Volume II describes opportunities to include a broad section of Historically Disadvantaged Groups in decision-making at LAWA. The external scan is a key first step of inclusion.

COVID-19 disrupted global air trade and travel. Aviation planning assumptions have changed as a result. LAWA is confident that its long-term forecasts remain accurate; current forecasts indicate a slower return over the next three years (see Part B for further details) than was

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projected before the COVID-19 pandemic struck. The Strategic Plan reflects these changes (e.g., passenger traffic, revenue, vehicular traffic, costs, and airline industry competition).

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***Rec. ID-Plan.2: LAWA should complete its Strategic Plan “Refresh” and promote it within and outside the agency.***

The Strategic Plan “Refresh” is an important start. Once completed, the new Strategic Plan should be formally adopted by BOAC and made publicly available on the LAWA website, along with the vision, mission, values, and goals.

In preparing the new Strategic Plan and SWOT analysis, LAWA should ensure it develops these other key components:

- LAWA should develop S.M.A.R.T. objectives with specific indicators that show how well LAWA is achieving targets for:
  - Maximizing the region-wide economic benefits of airline service
  - Maximizing the number of high-quality jobs supported by the airport
  - Maximizing the quality of the customer experience at LAX
  - Minimizing adverse environmental and carbon impacts
  - Becoming the employer of choice in regional airports
  - Keeping passengers, guests, and workers healthy and safe
- LAWA should compare the costs and benefits of different projects, actions, or tasks and determine whether there are more efficient ways to achieve the stated outcomes.
- The Strategic Plan should go beyond affirming things that LAWA has been doing for decades (e.g., controlling costs, ensuring safety) to include lingering problems and new challenges that must be addressed.

A rigorous Strategic Plan facilitates the complex decisions as to which items need to be deferred or launched immediately, particularly regarding required spending levels or resource allocation for implementing strategic initiatives.

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***Rec. ID-Plan.3: LAWA should institutionalize its strategic-planning process as part of best management practices.***

In governmental organizations, strategic planning is intended to ensure that the public purpose of the organization can be strengthened and sustained. Strategic planning at LAWA must therefore also provide a foundation for managing resources so they can support important financial and non-financial objectives.

LAWA should incorporate strategic-planning as a standard management practice so that it does not become a once-every-five-years event. Such standardization is important for LAWA to

perform at the managed (versus proactive) level. Building on the progress made, LAWA should build an integrated planning process that:

- Defines and prioritizes initiatives
- Defines action plans with assigned accountabilities and timelines for at least 2- to 3-years out
- Improves quantitative measures of costs and benefits, and integrates processes and tools across every step (e.g., mission statement through budgets)
- Develops strategic metrics focused on outcomes
- Identifies linkages across division plans

LAWA has developed an action plan template (Excel workbook), which is a significant improvement over what was used for the 2016-2020 Strategic Plan. It lists:

- Goals and objectives
- Action schedule, listing planned activities by goal, target dates of sub-activities by quarter for CY2024, and lead organizations to implement the activities
- Dashboard for monitoring the number of activities by goal: total, not started, active, and completed
- Resources
- Status updates, required and confirmed outcomes, and comment, by goal
- Metrics that are more outcome based (e.g., greenhouse gas, VMT, or waste reduction), by goal

This template approach will make it easier for LAWA to monitor progress by quarter and by year with clear metrics. It also reflects an increased appreciation of the value of strategic measurements.

When progress is routinely monitored and challenges in meeting the objectives are identified and addressed, LAWA will achieve a higher success rate for its planned activities. Therefore, LAWA should complete its action plans for internal monitoring of progress, year by year, and adjust them, based on lessons learned and progress made.

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***Rec. ID-Plan.4: LAWA should enhance its monitoring of the implementation of the strategic plan goals and objectives.***

Until September 2020, LAWA had one staff person assigned to strategic planning and metrics development and monitoring, along with other duties. That individual has since retired. In 2022, LAWA assigned strategic planning and metrics to another person, along with other duties. Such part-time focus may not suffice.

Staff resources should be assigned to:

- Add a bottom-up element to its current top-down approach to planning
- Engage more community stakeholders, particularly regarding social equity
- Design strategy maps or other relational tracking systems to show how the strategic planning components work together
- Develop dashboards and scorecards, as discussed later in “Performance Metrics”
- Develop and monitor outcome metrics, including leading and lagging indicators, as discussed later in “Performance Metrics”
- Tie strategic objectives to individual and group performance improvement goals
- Implement action plans
- Prepare “what-if” analyses of alternative plans
- Assess the future effect of project timing and priority alternatives operating efficiency levels, debt capacity, airline fee schedules, and operations
- Provide concrete guidance for the resource allocations embedded in capital plans, budgets, and action plans
- Ensure the evaluation of LAWA’s likely financial condition as part of its strategy

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***Rec. ID-Plan.5: LAWA should ensure that all its values align with its strategic core values.***

Ideally, organizations have a set of core values that its units can then adopt and adapt. Values help define the behaviors that LAWA expects of successful employees. LAWA should avoid values that try to define everything, thereby diluting their importance or focusing on the latest trends in hodgepodge of values rather than how LAWA wants its employees to behave. LAWA should define its core values – a short list – and live by them. The benefits of aligning LAWA’s divisional values with its Strategic Plan core values are multiple:

- LAWA’s core values should define what it cares about the most and provide the guidelines for day-to-day employee conduct.
- Values help employees understand workplace expectations regarding their behavior.
- Core values enable employees to make decisions informed by LAWA’s vision and goals.

There are different types of values as well:

- **Core values** are part of an organization’s DNA or “essential tenets,” according to [Collins and Porras](#) in “Building your Company’s Vision” in the [Harvard Business Review](#). They found that most companies have only three to five core values. They contend that more than five values create confusion. Core values distinguishes an organization from its peers, should never be compromised, are deeply ingrained principles, and guide an organization’s decisions or actions.
- **Aspirational values** are requirements for future success but may not currently be ingrained in the current organization. Such values may be important for supporting a new strategic

priority, such as equity, or address changes in the industry, such as technological innovations. Organizations must be careful that aspirational values do not undermine or dilute core values.

- **Foundational values** or principles simply reflect “...the minimum behavioral and social standards required of any employee,” according to [Patrick M. Lencioni](#) in “Make Your Values Mean Something” in the [Harvard Business Review](#). They vary little across governmental agencies and are rarely distinguishable between one agency and another.
- **Accidental values**, according to Patrick M. Lencioni, “...arise spontaneously without being cultivated by leadership and take hold over time.” Such values “...reflect the common interests or personalities of the organization’s employees.” They may be positive (e.g., taking pride in one’s work) or negative (e.g., undermining consensus or thwarting change).

LAWA management should:

- Adopt core values that are strategic and sound beliefs that can be shared by all LAWA employees
- Define its core values with specific behavioral descriptions such as are included in the Ethics values
- Distinguish among values that are core, aspiration, foundational, or accidental values
- Avoid bland or motherhood-and-apple pie ideals that no one can argue with but do little to distinguish LAWA or serve as a blueprint for how employees should behave (e.g., more than 50% of [Fortune](#) 100 companies identify integrity, customer satisfaction, and teamwork as core values)
- “Walk the talk” – make a commitment to demonstrate the organization’s values in daily behaviors, (e.g., claim a value of respect but belittle colleagues or others)
- Identify vivid examples within LAWA where values were demonstrated and use these stories to help describe for employees how they might embody these values
- Integrate core values into employee-related processes (e.g., hiring, performance evaluations, and promotional criteria) to reinforce their importance

## Related Recommendations

Some other recommendations in this IEA Survey Report elaborate on related recommendations, including:

- **LAWA’s strategic priorities should encompass the Smart Airport model as a critical strategic driver or vision of the future.** As discussed in Part C, Section C.4, U.S., Asian, and European airports are exploring a Smart Airport model in the context of COVID-19. A Smart Airport model and technological advancements should be the centerpiece of LAWA’s strategy – if not a key strategic lever – in the coming years. LAWA refers to this area as “digital marketplace.”

- **LAWA should focus on critical strategic outcome metrics in its strategic planning efforts**, as elaborated next in “Performance Metrics.” LAWA has strengthened its use of near-term metrics/performance monitoring and should explore metric models that focus on measuring strategies and outcomes, such as Google’s Objectives and Key Results (OKR) or the Balanced Scorecard (developed in the 2016 IEA Survey).
- **LAWA’s strategic priorities should address equity**. Volume II on “Social Equity” elaborates further on the importance of equity at LAWA regarding the environmental impact (planet), economic impact (prosperity), and community engagement (power).

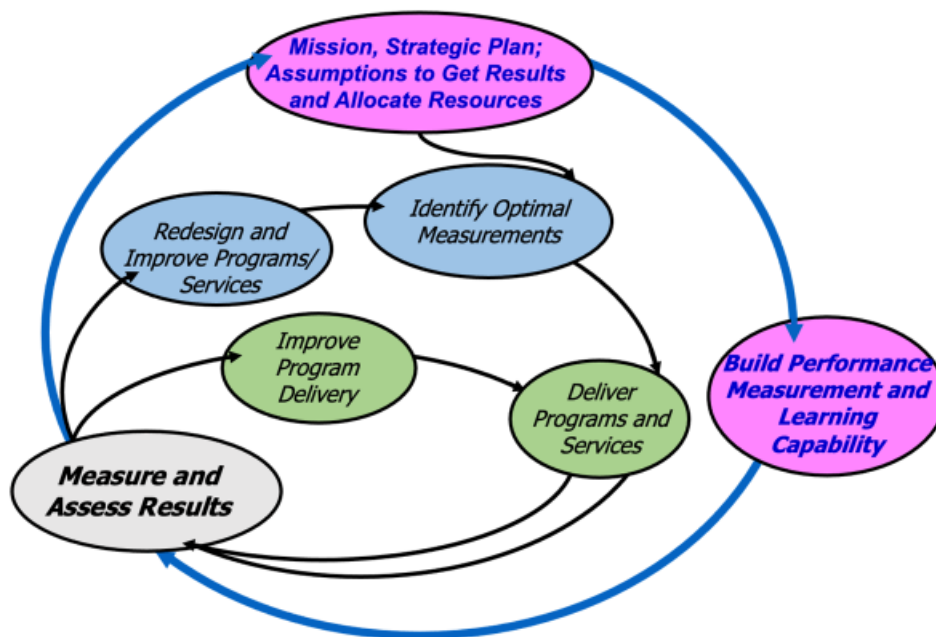
## D.2 PERFORMANCE METRICS

### Background

Metrics are useful to improve program and service delivery, improve program design, and assess the effectiveness of those programs and services in achieving strategic outcomes. They are central to organizational learning capacity and resource allocation decisions.

Figure D.2 displays three learning loops that chart a path to improve results through metrics, starting with improving program and service delivery, progressing to identifying improvements, and linking them to the strategic plan. The loops reinforce a continuous improvement approach to metrics.

**Figure D.2: Performance Feedback Loops for Measuring and Assessing Results**







**Strategic metrics** should be tied to the organization's mission and strategic plan. As organizations become more sophisticated, they expand employees' knowledge for using metrics to make decisions based on data and empirical evidence.

Metrics were the primary focus of the 2016 IEA Survey. For the 2022 IEA Survey, the KH team:

- Reviewed progress made
- Evaluated the metrics and measurement system currently in place for monitoring performance and tracking trends
- Developed sample strategic metrics for executive and management staff to consider
- Reviewed how the measurements are used and linked to strategic planning and executive decision-making, involving management of operations and administration (e.g., budgeting processes, capital planning, guest experiences)

## Accomplishments

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***LAWA has built a data infrastructure that can serve as the foundation for metrics reporting using multiple data sources.***

There is a difference between data and metrics. Data are reliable measurements of specific actions or outcomes. Metrics relate those data to desired outcomes. LAWA has multiple systems that gather and analyze data in support of its operations. As examples, SAP, originally installed in 1999, is the Enterprise Resource Planning (ERP) system for finance at LAWA. MAXIMO is the facilities maintenance system. These systems and others accrue large amounts of data.

What remains is to relate those data points to each other, and to LAWA's strategic and operational goals. To be able to use the data from those systems in helpful ways, an infrastructure is required. LAWA Information Management and Technology Group (IMTG) has established a Data Repository that includes data from its core systems. The repository is accessible using Power BI, a Microsoft application that is an extension of Excel to visually display data and can be used by any LAWA business unit. Training is required to successfully generate reports in the system. LAWA's IMTG authorizes access to the system to ensure security and data integrity.

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***LAWA has made steady progress in the use of metrics since the 2016 LAWA IEA Survey.***

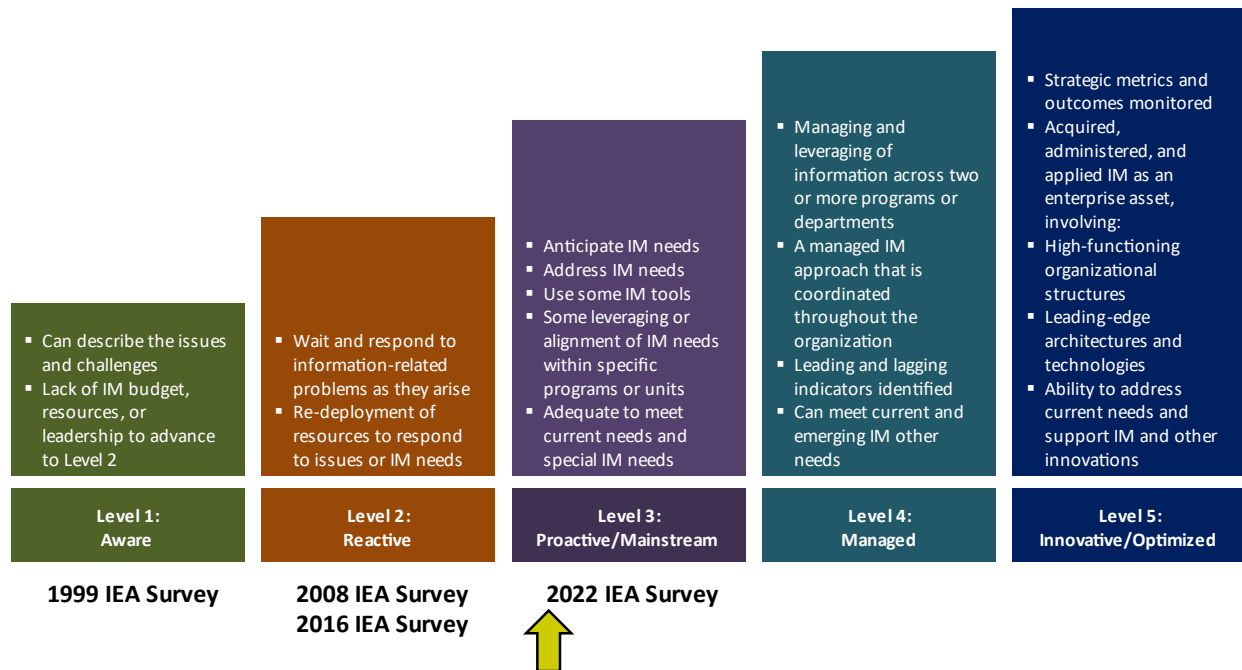
Most of LAWA's progress in developing better uses of metrics has occurred since the 2016 IEA Survey, which focused on metrics, as highlighted in Table D-3:

Table D.3: LAWA's Information Management and Metrics Efforts (1999-Present)

Maturity Levels	LAWA Progress
<b>Aware</b>	<b>1999 IEA Survey status:</b> LAWA relied on standard airport statistics (million annual passengers, cargo tonnage, airport police activities, concessionaire revenue, etc.) and was aware of what key performance indicators (KPIs) were but had no formal dashboards or few data reporting systems. No resources were allocated to developing metrics.
<b>Reactive</b>	<p><b>2008 IEA Survey status:</b> LAWA would compile data as required to respond to issues as they arose.</p> <p><b>2016 IEA Survey Status:</b> LAWA executive leadership asked KH to develop a framework for LAWA to begin to design and implement a more robust and routinized metric program, starting with the guest experience, administrative areas, and environmental and economic impact.</p>
<b>Early Proactive</b>	<b>2022 and response to 2016 IEA Survey recommendations:</b> LAWA is no longer merely responding to situations where metrics are needed but is beginning to think proactively about what information is needed. In addition, it has developed a data warehouse infrastructure and trained staff in developing useful metric reports and dashboards.
<b>Managed</b>	<b>Next steps:</b> LAWA's next steps involve an information management approach to data, including the identification of leading and lagging indicators, outcome metrics as part of its strategic-planning process, and an evidence-based, decision-making culture.

Therefore, LAWA is at the proactive level of Maturity of Information Management metric production.

## Maturity Levels Overview: Information Management (IM) for using data and information in an evidence-based culture



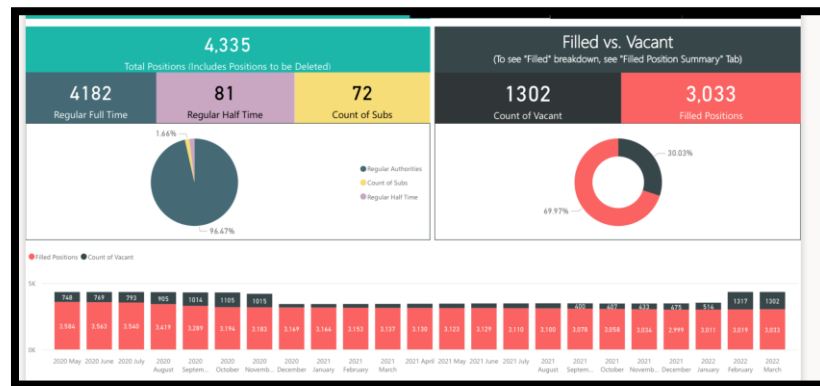
LAWA’s Data Repository and Power BI are good foundations for more extensive use of metrics. They enable divisions to do more in managing such information. LAWLA’s environmental programs exhibit high skills in displaying complex metrics in understandable formats. Other groups are developing divisional metrics, including IMTG, External Affairs, Public Relations, Community Relations, Airport Police, Security Credentials Section (badging), Ethics and Ombudsman, and Procurement. Most of the organizational units interviewed are tracking some measures of volume or efficiency.

### Opportunities

***There are not enough staff members trained as publishers in Power BI across LAWLA.***

LAWLA has trained LAWLA staff who can develop and pull metrics reports, using Power BI. These trained staff are located in individual divisions and units. These staff are called “publishers.” They develop dashboards for use by their divisions. The reports contain data that can be filtered by non-trained users to develop reports that help them plan and manage their work.

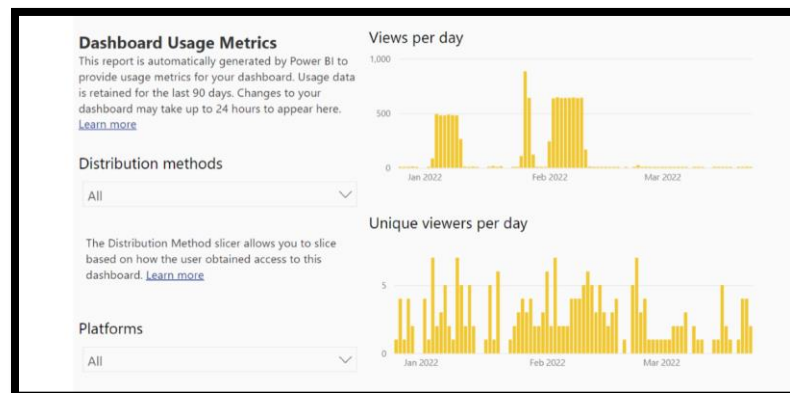
Data are updated regularly, and when reports are accessed, they reflect the latest information. A sample of a Human Resources report/dashboard on vacancies looks like:



Publishers are located in HRD, Environmental, Facilities, and Airport Operations units. Examples of robust publicly displayed dashboards on the LAWA.org website are:

- LAX Facts and Figures, [“Statistics for LAX Airport”](#)
- Environmental section
- LAMP

***Although LAWA has trained staff to develop Power BI reports and dashboards using that infrastructure, it has experienced turnover among these trained staff.*** Of 19 staff members trained in Power BI in March 2019, 8 have left the organization. Of 13 other staff members who learned through regular attendance at IT Power BI “office hours,” 2 have been promoted or transferred. While some units – Airport Operations – appear to have several staff members trained in Power BI, the majority of units have either none or one staff member trained.



To maximize usage of metrics in evidence-based decision-making, LAWA needs widespread use of the data in the Data Repository to set up dashboards for most – if not all – of the organization.

While LAWA has been exemplary in responding to requests for information during this IEA Survey, delays in providing data in helpful formats point to insufficient resources across the organization who are capable of mining the necessary reports. Moreover:

- Part C of this report outlines the impact of these shortfalls in CIP management, and advocates for the allocation of additional resources to support a more robust data analysis capability.
- Volume II of this report discusses the need for improved capacity in understanding and improving equity through empirical evidence regarding LAWA’s environmental and economic impact on historically disadvantaged communities.

LAWA does have the capability to see usage metrics for Power BI reports. The reports must be done on a per-report basis and are only used ad-hoc as they are resource intensive.

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***LAWA does not have data scientist expertise to oversee data integrity and support evidence-based decision-making***

LAWA hired a Chief Digital Transformation Officer, who started May 9, 2022. This position is properly focused on expanding LAWA’s use of digital advantages in passenger experience and service delivery. Although use of data is a core requirement of such a position, there is a need for a more targeted data capacity.

Many organizations with complex and vast volumes of data similar to LAWA have acquired not only chief data officers but also data scientists. A data scientist focuses on the management of information – not just the management of data. Recommendation D-Metrics 3 elaborates more on the role of the Data Scientist in building the data infrastructure, data analytics, data interpretation and evidence-based problem-solving, information management guidelines, and communication of metrics through dashboards and infographics.

These skills are helpful in supporting robust organizational use of data to support decision-making and critical analyses of operational opportunities. For example:

- At LAWA, the Airport Operations Center (AOC) reviews thousands of data points daily. The data are not mined for trend analysis, or to identify interrelationships between different “stations” in the center.
- Likewise, the capital projects oversight unit in the Development Group holds a rich trove of data regarding the design and construction of LAWA’s physical infrastructure. (Note: A further discussion of this opportunity is contained in Part C.)

These data, properly analyzed, could provide powerful information on the relative effectiveness of differing approaches to project management.

Metrics are important for understanding what is really happening – without a sobering dose of reality, perceptions seem real, even if the data indicates otherwise. For example, the KH team heard from multiple sources that LAWA has lost large numbers of staff to LADWP because of higher salaries paid there. LAWA provided data on staff “lost” to LADWP. Over a three-year period, 104 LAWA employees took positions at LADWP. This number appears low, out of a workforce of 3,035 – approximately 30 individuals per year. The anecdotal information, though, typically relates to valued employees or employees with unique and needed skills (e.g., engineers, skilled trades expertise) who left LAWA for LADWP. In reality, the job classifications with 5 or more transfers to LADWP are mostly in the administrative and management assistant positions (23 of the 33 employees), as shown in Table D-4:

**Table D.4: Number of LAWA Employees Transferring to LADWP (Three-Year Period)**

Positions	Number of Employees Transferring from LAWA to LADWP
Administrative clerk	13
Management assistant	10
Security officer	5
Systems analyst	5

Note: LAWA did not have data regarding how many LADWP employees transferred to LAWA.

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***LAWA’s metric system to assess the status of its strategic priorities or outcomes is limited.***

LAWA has made major strides in the use of metrics for operations, forecasting, and planning.

**“LAWA METRICS THAT MATTER”**

LAWA has started to build “LAWA Metrics That Matter” for use by the executive team. This worksheet is a good foundation for developing more sophisticated approaches. LAWA’s “Metrics that Matter” lists many strategic and operational indicators and cites the following strategic goals:

- Expect and Support Organizational Excellence
- Innovate to Enhance Security
- Efficiency and Effectiveness
- Deliver Facilities and Guest Experiences that are Exceptional
- Sustain a Strong Business

“LAWA Metrics that Matter” has a mix of metrics:

- Standard metrics that are central to airport operations and sustainability (e.g., passenger counts, cargo tons and flight operations volumes)
- Quality measures such as:

- TSA and CBP wait times
- On-time gate arrivals and departures
- Organizational metrics on:
  - Talent attraction (e.g., vacancies, recruits, interns, promotions, turnover)
  - Employee engagement (e.g., participants in Team LAWA volunteer programs)
  - Employees trained
- Innovation culture
- Procurement timelines
- Recruitment processing
- Parking strategy and CTA congestion
- CTA elevators, escalators, and moving walkway availability
- Ramp and airfield safety (aircraft, vehicle, other)
- Emergency preparedness
- Guest experience
  - Use of website
  - Construction area “distractions”
  - Loyalty program enrollment
  - Training of LAWA staff in iCare
- Revenue measures – LAX and VNY
- Economic development measures
  - Jobs per passenger
  - SBE/LBE/LSBE/DVBE participation
- Environmental initiatives
- American Society for Quality scores
- Various guest experience items

FOR INTERNAL USE ONLY

		Metric Month*		Annual Change	
	Target	01/2022	01/2021	Δ	Previous Month
<b>LAWA-WIDE METRICS</b>					
<b>LAX</b>					
LAX domestic passengers (PYTD)	NA	27,081,812	10,796,487	156.11%	24,768,389
LAX international passengers (PYTD)	NA	6,137,054	2,006,147	206.95%	5,276,589
LAX total passengers (PYTD)	NA	33,099,766	12,802,764	185.61%	30,098,958
LAX operations or movements (PYTD)	NA	313,552	182,870	62.57%	271,455
<b>LAX Cargo</b>					
LAX air cargo tons (PYTD)	NA	1,756,923	1,555,410	10.62%	1,520,200
LAX air cargo tons - bulk (PYTD)	NA	428,961	341,090	25.45%	376,099
LAX air cargo tons - bulk (PYTD)	NA	1,327,962	1,214,320	8.89%	1,144,101
<b>VNY</b>					
VNY total FAA and after hours operations (PYTD)	NA	177,389	148,824	18.19%	155,063
FAA aircraft movements (PYTD)	NA	175,739	145,279	18.93%	148,875
After hours operations (PYTD)	NA	3,650	3,545	2.89%	3,188
VNY Customs Flight Clearances (PYTD)	NA	113	101	13.08%	110
VNY Fuel Delivery (PYTD)	NA	2,769,511	2,679,945	3.33%	2,652,425
Jet A	NA	2,769,511	2,679,945	3.33%	2,652,425
AvGas	NA	19,571	18,930	3.39%	24,357
<b>FIS Federal Inspection Services - TSA</b>					
<b>TSA throughput - LAX wide</b>					
TSA passenger throughput	NA	1,796,926	791,119	127.14%	2,451,877
TSA baggage throughput	NA	1,231,418	529,480	132.57%	1,680,229
TSA average wait time	NA	4.55	2.59	76.00%	6.00
<b>FIS Federal Inspection Services - CBP</b>					
<b>CBP throughput - LAX wide</b>					
CBP passenger throughput	NA	433,186	197,049	118.84%	483,704
CBP average wait time	NA	17.27	12.86	34.29%	22.47
CBP maximum wait time	NA	121.00	78.00	55.12%	155.00

\*Unless otherwise stated, the metrics reflect the 01/2022 period.  
 Printed: 3/10/2022      LAWA-WIDE METRICS      Printed by: USAMM\_MVAlbrow      Page 1 of 12

These metrics do, indeed, “Matter.” The list represents a thoughtful list of relevant indicators.

The structure calls for target, current month, annual change and previous month data to be entered for each indicator.

As it stands now, “LAWA Metrics That Matter” is still in its infancy stage and has some gaps:

- There is no baseline information for almost one-half of the 60+ metrics.
- Targets are not established but are described as “increase” or “decrease”
- Trend data are missing, which makes it hard to set targets.
- Linkage between initiatives and outcomes is not clear.
- LAWA has not yet fully evaluated metrics within divisions or across divisional programs.
- LAWA has not given significant attention to metrics of strategic importance. It has not aligned strategic initiatives with leading and lagging indicators to assess progress.



- LAWA has not gathered performance feedback systematically to improve programs, services, and processes.

In addition, “LAWA Metrics That Matter” is presented as a PDF file, which limits the ability of readers to conduct independent evaluations and test ideas about relevant interrelationships among the metrics. Note: Some of these metrics (e.g., passenger counts) are available in dashboard format on LAWA’s website for the public’s information.

#### OPERATIONAL METRICS OPPORTUNITIES

LAWA is hampered in its ability to use existing data sources to focus on evidence-based decision-making. Although LAWA has a significant database infrastructure in place (e.g., SAP, MAXIMO):

- Not all divisions have developed metrics for monitoring and managing their operations.
- The number of staff members trained in Power BI reports and dashboards has decreased.
- Expertise is limited to mine data for these purposes.

As a result, it is difficult for LAWA to take its metric efforts to the next level of sophistication.

#### METRICS LINKED TO STRATEGIC PLANS

The kinds of metrics used in LAWA’s 2016 Strategic Plan were discussed earlier in Section D.1 on “Strategic Planning.” LAWA is currently developing measurements linked to goals in its Strategic Plan “Refresh” initiative.

### Recommendations

#### STRATEGIC METRICS

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***Rec. ID-Metrics 1: LAWA should develop outcome metrics to track the success of strategic initiatives.***

LAWA’s current tracking of its Draft Strategic Plan “Refresh” indicates that there are 105 actions to support its 6 strategic goals. LAWA’s stated goals can be interpreted to cover virtually all activities and responsibilities across the organization. This structure is not helpful when difficult resource allocation decisions need to be made.

### Progress Dashboard

Goal		Actions
Goal 1	Foster equitable economic growth and sustainability in our region	21
Goal 2	Build and operate facilities to meet demand	14
Goal 3	Develop workforce and organizational capabilities for the future	14
Goal 4	Provide exceptional guest experiences	21
Goal 5	Enhance financial capacity	21
Goal 6	Ensure safety and security for guests and employees	14
		<b>105</b>

As LAWA learned during COVID-19, unexpected local, national, or international events can lead to difficult decisions about program cuts or extensions. The true value of a strategic plan is to identify key actions that are likely to have the greatest impact on the most important priorities. Armed with this information, LAWA can make the best possible decisions between competing priorities. It can also better understand and mitigate the negative effects of difficult decisions in other areas of interest.

#### EXAMPLE 1: ECONOMIC GROWTH AND SUSTAINABILITY

**LAWA should identify specific indicators and establish 1–3-year targets that their strategic actions are designed to achieve.** LAWA’s Draft Strategic Plan “Refresh” lists Objectives, Metrics, and Key Initiatives without clearly linking them. As an example, the initial Objective within the goal of “Fostering Equitable Economic Growth and Sustainability in Our Region” is displayed in Figure D.3.

**Figure D.3: Strategic Plan Refresh Detail**

#### Goal 1: Foster Equitable Economic Growth and Sustainability in Our Region

**DRAFT**

Objective	Metric(s)	Key Initiatives
a) Increase economic benefits of LAWA’s Airports	<ul style="list-style-type: none"> <li>Economic output (5yr-recurring study: jobs, \$output, \$value, \$added)</li> <li>More frequent measures: <ul style="list-style-type: none"> <li>Cargo: \$value and metric tons</li> <li>MAP (total/international)</li> <li>Revenue</li> <li># New Jobs</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Air service development</li> <li>CIP</li> <li>Cargo modernization</li> </ul>

Provided with this overview, executive decision-makers and BOAC might well want to ask:

- How does cargo modernization impact (more frequent measurement of) cargo value and tons? What other factors are involved?
- What might be missing from the modernization program?

- How significant is Air Service Development in increasing number of passengers (million annual passengers (MAP)? Can LAWA isolate that from other factors?
- What elements of the CIP affect economic output – is it only dollars spent on construction?
- How do all three initiatives affect revenue? Are other initiatives more central? More cost-effective?
- Which elements of LAWA airports are most economically beneficial? How do those elements relate to the proposed metrics and key initiatives?

Improved strategic metrics would permit answering these questions.

#### EXAMPLE 2: GUEST/TRAVELERS' EXPERIENCES

LAX and VNY both received disappointing ratings in the most recent 2022 JD Powers survey. LAX ranked third worst, scoring 753 points out of a possible 1,000 points, among 20 “mega” airports.

These ratings can provide additional information to LAWA, who uses American Society for Quality (ASQ) scores as a metric in its Strategic Plan to target customer experience improvement plans. Between 2016 and 2020, LAWA’s overall ASQ satisfaction score increased .6 points, reaching 4.24, but still falls below the overall average of 4.64. Table D.5 compares these two rating agencies’ scores for LAX:

**Table D.5: Comparison of ASQ and JD Powers Ratings of LAX**

LAX	ASQ	JD Powers
<b>Overall Ranking</b>	63 <sup>rd</sup> out of 71 airports	17 <sup>th</sup> out of 20 mega airports
<b>Overall Rating</b>	4.24 while overall average of 4.64, based on a 5-point scale	753 while overall average was 769 and best was 791

JD Powers assesses 19 factors; passengers cared the most about reliability. According to ASQ, the top five areas that mattered the most to passengers surveyed were:

1. Wait times and check in
2. Ground transportation, making it critical that APM get done well (see Part C recommendations)
3. Courtesy and helpfulness of security staff
4. Wait times at security
5. Wayfinding (see Part C recommendations)

LAWA is putting into place improvements at LAX that should have a positive impact on future JD Powers and ASQ ratings, but it is still too soon to evaluate. Table D.6 highlights some of LAWA’s initiatives that are completed or underway that may have a positive impact on these rankings and ratings going forward.

**Table D.6: Priorities of Survey or Surveyed Passengers in ASQ and JD Powers Evaluations**

Note: Numbers in parentheses indicate passenger priorities on the ASQ survey.

Passenger Priorities	ASQ	JD Powers	LAWA Initiatives Completed or Underway
Check-in/baggage check	☑ (1)	☑	<ul style="list-style-type: none"> <li>▪ Touchless baggage check and check-in in the planning phase</li> <li>▪ Bradley West Gates baggage facility – potential expansion to other terminals</li> </ul>
Airport arrival/departure	☑ (2)	☑	<ul style="list-style-type: none"> <li>▪ Parking lot initiatives</li> <li>▪ Reduction in CTA congestion with APM</li> <li>▪ Relocation of LAXit for taxi or ride app services (Uber, Lyft, or Opoli) with access via the APM</li> </ul>
Courtesy of security staff	☑ (3)		<ul style="list-style-type: none"> <li>▪ TSA is separate from Airport Police</li> <li>▪ LAWA is considering reservations times for TSA security clearance</li> </ul>
Security check	☑ (4)	☑	<ul style="list-style-type: none"> <li>▪ 15-minute appointment window for security in planning</li> </ul>
Wayfinding	☑ (5)		<ul style="list-style-type: none"> <li>▪ Bradley West Gates on-line system</li> <li>▪ Contracts on wayfinding in development or awarded for APM</li> </ul>
Terminal facilities		☑	<ul style="list-style-type: none"> <li>▪ Many are recently renovated</li> </ul>
Baggage claim		☑	<ul style="list-style-type: none"> <li>▪ Bradley West Gates baggage facility – potential expansion to other terminals</li> </ul>
Food, beverage, and retail		☑	<ul style="list-style-type: none"> <li>▪ Digital marketplace for online reservations orders prior to arrival for parking, food, and beverages</li> </ul>

LAWA will need to monitor these improvements, along with others planned, and continue to solicit and measure customer satisfaction so it can take corrective actions as part of its continuous improvement efforts.

### EXAMPLE 3: ENVIRONMENTAL/EV USAGE

LAWA has metric reporting models to apply in other areas. For example, some of the strategies and metrics associated with environmental programs are robust and published. This approach and sharing should be more consistently adopted throughout LAWA. Even with this example, the impact of a specific program (e.g., EV charging stations) on the reported air quality indicators is not directly measured. For example, an interesting metric might be the number of electric cars using LAX, as measured by EV Charge Station usage. This metric could then be used as an input into a model that would estimate LAX's carbon reduction attributed to EV usage

It would, in fact, be difficult to do so without advanced data and statistical analysis. The EV charging station program could also be linked to other strategic priorities, such as improved passenger satisfaction, thus supporting multiple goals.

#### SUMMARY

LAWA should strive to make clear linkages, which will then, in turn, allow adjustments to the actions when approaches that seem initially to be effective are not meeting anticipated targets.

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***Rec. ID-Metrics 2: LAWA should identify the cause-and-effect relationships among its metrics to continuously improve and achieve desired outcomes.***

To date, LAWA has not used balanced scorecards (BSCs), linked to its Strategic Plan, as recommended in the 2016 IEA Survey Report. BSCs involve strategic management performance metrics that identify targeted improvements in internal functions that result in external outcomes. BSCs, especially when accompanied by an integral strategy map, allow executives to:

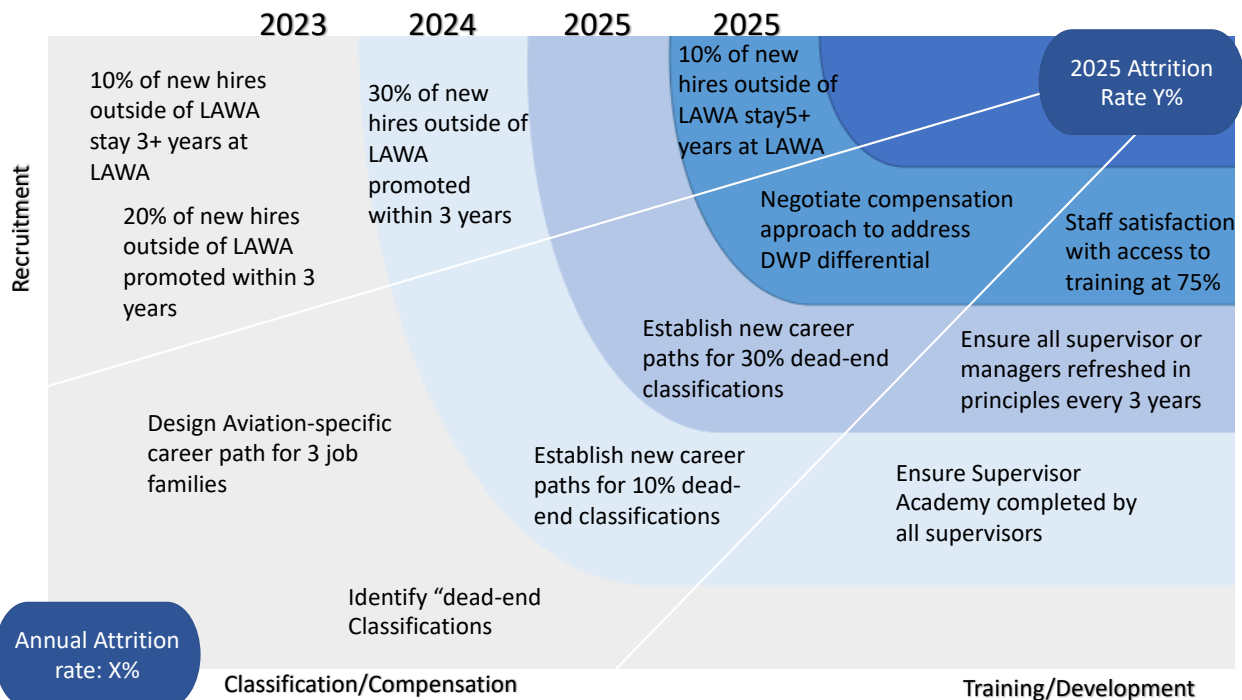
- Identify linkages between subordinate strategies and final outcomes
- Increase the ability of managers to diagnose, make better decisions, and correct problems during Strategic Plan implementation

Although BSCs are widely adopted in both public and private sector organization, some LAWA executives are not convinced that the BSC system is helpful to them in managing their strategic program.

There are other strategic metric models for LAWA to consider. An alternate system currently in use in some large organizations, especially in the high-tech industry (e.g., Google), is OKR – Objectives and Key Results. OKR is highly outcome focused and establishes a discipline that tracks measurable results. In OKR, a measurable outcome is linked to major results. Figure D.4 illustrates in a transformation map what an OKR for reduced attrition – one of the metrics that is proposed for “Make LAWA a great place to work” – might look like.

Figure D.4: Sample OKR for LAWA Strategic Outcome Tracking

Make LAWA a Great Place to Work

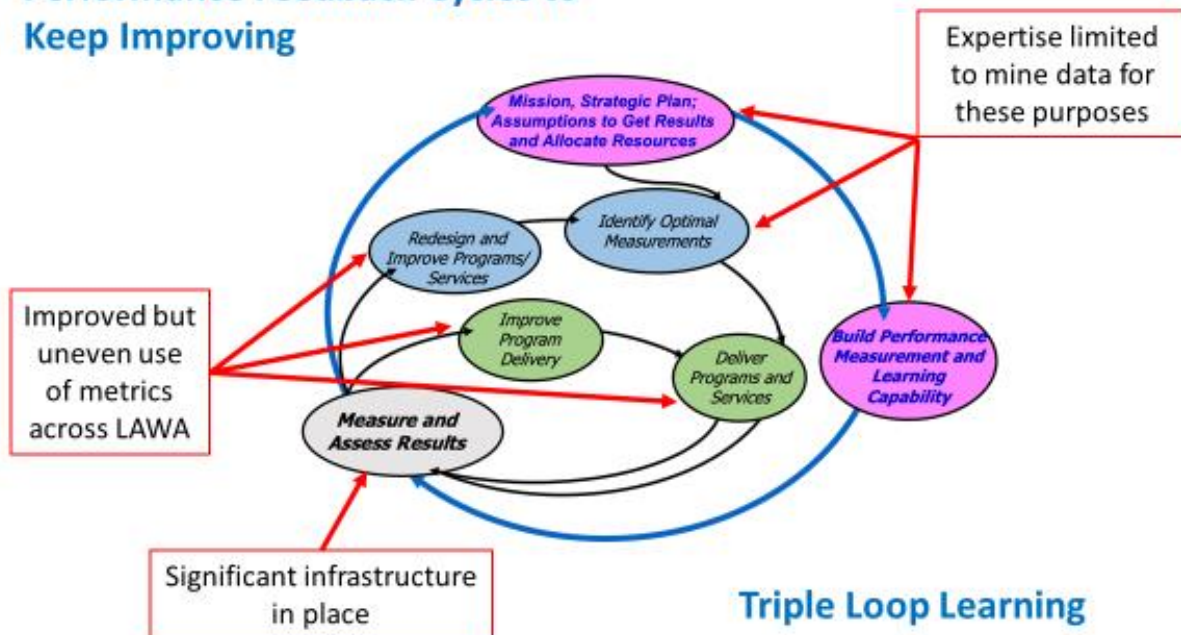


These examples are meant to highlight the importance of multi-year **result** milestones in the accomplishments of difficult challenges. If there were a 2025 Key Result associated with addressing the compensation issue raised by LADWP, it could lead to discussions about allowing the other City proprietary departments being allowed to match the highest internal offer on a non-promotional transfer of high-skill workers to LADWP. Data associated with attrition and its causes could serve as helpful support for such a position.

Whether LAWA adopts an OKR approach or a different model, what is key is that a specific outcome is measurable and linked to the actions and desired results. Through such metrics, LAWA management can take corrective actions and enhance planned activities in a timely manner to reach that outcome, as illustrated in Figure D.5.

Figure D.5: Performance Feedback Cycles for Continuous Improvement

## Performance Feedback Cycles to Keep Improving



### OPERATIONAL METRICS

***Rec. ID-Metrics 3: LAWA should endorse and support broad use of data and metrics as a tool to strengthen service and operational decision-making.***

For LAWA to support broad use of data and metrics as a tool to strengthen service and operational decision-making, it will require more Power BI publishers and data scientists.

#### POWER BI PUBLISHERS

All organizational units should have access to on-line reporting to inform management and supervisory decision-making. Therefore, LAWA should have a sufficient publisher capacity to design, provide, and update regular reports on all key responsibilities within each Chief's or Deputy Executive Director's area of responsibility. This capacity can be distributed, or centralized in IT. In addition, organizations underneath that reporting level that have multiple processes and data-driven workloads or have data requests that come regularly from other LAWA units or external organizations would be well-served to have staff trained in Power BI.

#### WORKDAY

In addition to Power BI, LAWA's HRD reports that it is working on streamlining processes and procedures for a new system – called WorkDay – that will be implemented Citywide. According





to HRD, the Power BI tool may still be used in human resources and non-human resources activities related reporting. WorkDay is limited to human resources activities, such as onboarding, employee transfers, and bonus additions or deletion processes. LAWA employees can also view their records in WorkDay. HRD staff will perform the bulk of transactions on WorkDay.

The original date for Phase II for WorkDay was slated for March 2023; it has now been moved to December 2023. As WorkDay is implemented, LAWA will need to monitor the staffing and training requirements, based on the usage of Power BI and WorkDay as well.

#### DATA SCIENTIST(S)

LAWA has the building blocks in place to accelerate operational improvements through the use of data mining and analysis. It has multiple data bases that reflect real-time events across LAX, ranging from airline arrival/departure data, to traffic patterns, to police activity, to equipment status, and staffing levels. Those independent data points and streams can serve as a “gold mine” for information that can identify patterns and non-obvious relationships among different data points. While individual staff members with data scientist skills may be located within LAWA, there is no dedicated data scientist function.

With such a dedicated function, LAWA can count on expertise to evaluate, clean, and manage the structured and unstructured data that exists. Data scientists focus on:

- **Data infrastructure and security.** Identifies available databases and creates an infrastructure for accessing them; collects large sets of structured and unstructured data from disparate sources; cleans and validates the data to ensure accuracy, completeness, and uniformity; considers data security and consistency issues in managing data usage
- **Data analytics.** Identifies the data-analytics problems that offer the greatest opportunities to the organization; determines the correct data sets and variables to use; devises and applies statistical models and algorithms to mine, extract the stores of big data, and interpret data; employs other analytical tools, such as artificial intelligence and machine learning; analyzes the data to identify patterns and trends
- **Data interpretation and evidence-based problem-solving.** Applies statistical methods to interpret data; interprets the data to discover solutions and opportunities; advises Power BI publishers on the development of available, reliable, and relevant indicators
- **Information management guidelines.** Establishes guidelines to ensure that data are available, secure, and meet standards of consistency so that reports are viewed as dependable
- **Communication of metrics.** Communicates findings to management and stakeholders, using visuals (e.g., graphics, infographics, and other means); builds organization-wide dashboards and scorecards for management use in:



- Monitoring activities and operations and for decision-making
- Preparing reports to BOAC
- Identifying trends and patterns to uncover potential solutions to issues or problems

Many of the opportunities identified through LAWA’s strategic planning process, as well as the challenges identified by their executives and in this IEA Survey Report are not easily addressed, and can benefit from expert data mining and analysis, using LAWA, City, and external sources. As examples:

- What is the distribution of local businesses that can respond to LAWA Goods, Equipment, and Non-Professional Services (GENPS) Request for Bids (RFBs) (discussed later in Section D.3 on “Procurement and Contacting”)?
- What factors affect Workers Compensation costs at LAWA? How have costs been impacted by:
  - Administrative processing changes
  - Industrial health assessments
  - Risk audits
- What factors measured in the AOC are statistically related to CTA congestion?
- How does each element of the Mobility Strategy Plan affect CTA congestion?

...and there are many more.

To start, LAWA should hire one data scientist and, based on the work effort, determine additional staff needs in this area. The data scientist can work closely with the Power BI publishers. The data scientist might work for the Chief Digital Transformation Officer, as an LAWA-wide function.

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***Rec. ID-Metrics 4: LAWA should make “LAWA Metrics That Matter” an interactive reporting tool.***

With strategic indicators covered in a cohesive system, the “LAWA Metrics That Matter” report should mainly focus on the “lagging” indicators – that is metrics that are end-states, as contrasted with short-term changes. Examples of lagging indicators include Passenger Counts, Cargo Tons, and Passenger Wait Times for LAXit buses. There are many, many factors that influence those metrics. In the old metaphor, lagging indicators are the forest, not the trees. In fact, most of the strategic goals impact several of the data points included in “LAWA Metrics That Matter.”

LAWA should assign responsibility for building on the work started with “LAWA Metrics That Matter” into a report that highlights areas to focus on. This effort would include:

- **Dashboards.** LAWA would benefit by developing more elaborate dashboards that present information and allow the executive team to “drill down” when they have questions about what factors were included in the indicators. For example, passenger counts might be broken down into arrival, departure, international, domestic, and perhaps country of origin of incoming flights. It might be useful to combine arrivals and departures into total passenger flows by time period to identify peaks. These dashboard metrics could be linked to the Strategic Plan metrics system.
- **Managing the timing of the reports to match the volatility of the indicator.** For example, under most circumstances, daily changes in passenger counts are not useful; monthly reporting of year over year of passenger counts would be more helpful. Other ways of arraying the data, such as seasonal traffic flows or even changes to traffic related to national holidays in other countries, might be useful.
- **Strategic outcomes.** Where relevant, LAWA should identify when strategic outcomes have been achieved and assess the impact on the Metric that Matters indicator. For example, how has the achievement of a targeted ASQ score changed the trend line for passenger counts?

## D.3 PROCUREMENT AND CONTRACTING

### Background

The role of a public procurement and contracting organization is to:

- Provide for economical, efficient, and effective procurement and contracting
- Ensure fair, impartial, and transparent processes in the procurement of public goods and services
- Ensure compliance with established procurement policies, procedures, and guidelines, as set forth in applicable sections of the Los Angeles City Charter, Los Angeles Administrative Code, BOAC Resolutions, and Mayoral Directives

LAWA buys and contracts for more than \$500 million per year in goods, materials, and services. This level of activity makes strong management of the procurement process a central concern to LAWA. Given the dollars involved, LAWA must be diligent in ensuring the application of governmental best practices, oversight, and solicitation of diverse, qualified vendor pools.

### Strengths and Accomplishments

During the course of this IEA Survey, LAWA created a Strategic Sourcing Division (SSD) to replace the Procurement Services Division (PSD) to handle procurement and contracting functions.



The Joint Administrators asked KH to assess status of the following recommendation in the 2016 IEA Survey: ***“Changes in procurement can reinforce LAWA's commitment to a fair and impartial Requests For Proposal (RFP) process.”*** The proposed sub-recommendations were:

- *“Procurement Services should evaluate the underlying causes for single- and two-bid responses to RFBs, and take appropriate steps to increase the number of bidders.”*
- *“LAWA should engage Procurement more actively in larger RFPs to ensure greater consistency and transparency in the process.”*

SSD has implemented significant improvements in procurement and contracting since the 2016 IEA Survey.

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***SSD prepared and is implementing its Procurement Improvement Plan (PIP).***

In 2021, LAWA contracted with North Highland to *“...to assess their procurement function and develop plans for efficiently and effectively centralizing it.”* It addresses the structure and processes of bidding within LAWA. The focus areas were:

- Procurement organization
- Performance management
- Technology
- Staffing and capability
- Process management
- Ways of working

In the methodology, the consultants conducted the following fact-finding:

*“...a total of 18 interviews with non-executive stakeholders took place, some in one-on-one sessions and others with two participants at a time. These interviews included representatives within PSD, Requesting Divisions, the City of Los Angeles, the City Attorney’s Office, and select vendors.”*

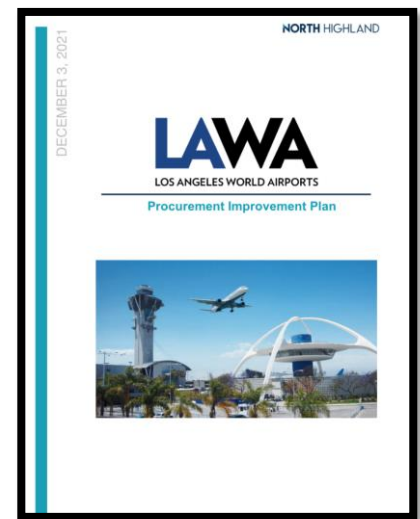
Six of those interviews were with “external stakeholders” although is not clear with whom (i.e., City officials or vendors).

SSD is implementing the procurement recommendations in this study. Highlights of the recommendations are:

- Shift to an outcomes-driven organization
- Establish a Procurement Collaboration and Governance Forum
- Select an e-Procurement tool
- Establish procurement pipeline planning
- Establish a robust capability building program

Some of SSD's efforts to date involve:

- **Procurement Improvement Plan (PIP)** (completed). SSD has prepared a Procurement Improvement Plan (PIP). SSD reports that: "The report contains 17 Recommendations. Staff is implementing those with most immediate need and value." The plan also calls for a variety of changes to ensure excellence that align with that intention and KH's recommendations in the 2016 IEA Survey.
- **Governance** (in progress). SSD is setting up a collaborative governance system, which supports SSD's goal for enhanced review of and support for RFPs and RFBs.
- **Standardization of the evaluation criteria** (nearing completion by year-end)
- **Procurement standards, simplification, and templates** (nearing completion by year-end). North Highland developed procurement standards and templates for SSD. SSD is streamlining the legal review of RFPs and RFBs through agreement of "boilerplate" wording for common contract elements.
- **Establishment of the new structure** (in progress and discussed next). LAWA established SSD and is the process of filing positions to complete the PIP.



SSD tracks progress toward plan completion. SSD reports that it does not have specific dates for the start of PIP implementation, but that implementation began fairly immediately after the preparation of the PIP, starting with the formation of working groups to implement the recommendations.

Key to its successful implementation is obtaining approval of positions and recruiting individuals with the needed procurement skills sets.

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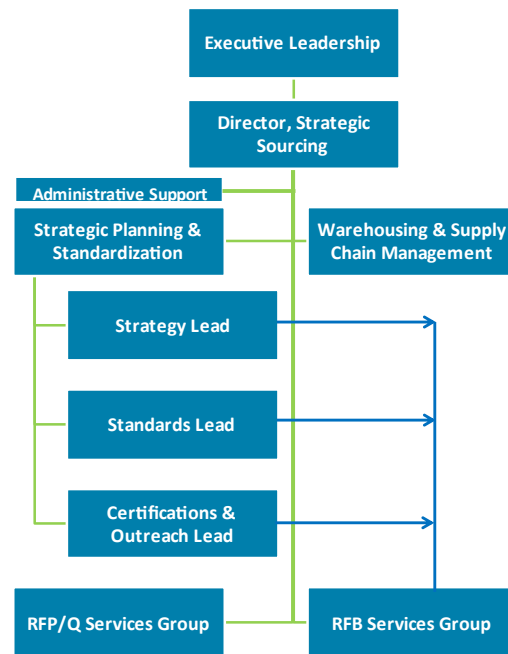
***SSD is implementing a new organizational structure: a Procurement Center of Excellence and a Strategic Sourcing Division.***

This PIP outlined the approach to creating a Procurement Center of Excellence, which SSD is now working to implement.

Central to the changes was the establishment of SSD within the Sustainability and Revenue Management Group that will consolidate procurement of GENPS with procurement of professional services, construction projects, leases, and concessions. LAWA describes the features of the new SSD structure as follows:

- The new division structure centralizes all procurement functions, using a matrix-type organization with three focused areas for each procurement.

- **Strategy** – reviews the strategic approach to procurement (type of procurement, other contracting opportunities, etc.)
- **Standards** – establishes standardized templates and documents to be used on each procurement; works with the City Attorney on approval
- **Certifications and Outreach** – reviews each procurement for the required inclusivity goals and potential outreach opportunities (further discussed in Volume II of this 2022 IEA Survey Report).



- SSD has dedicated groups for RFB and RFP/Q approaches, which provide some specialization in the given area and opportunities for procurement specific resources to join a team.
- The Director of SSD collaborates with executives to ensure quality service.

This organizational change also aligns with the guidance provided by the U.S. Federal Transit Agency (TSA) that states:

*“The internal control principle of separation of duties... normally translates to a requirement that a user organization not be responsible for the procurement of its needed resources. It is preferable to establish an independent procurement organization, reporting to a high level within the agency that is not a direct user or customer of the procurement office.”* [USDOT Procurement Organizational Structure](#)

## **SSD has improved its management and tracking of the overall procurement program.**

SSD provides executive team and divisions access to an online list of upcoming opportunities and procurements to allow input in advance. This online tracking system also provides updates and information about status.

In addition, SSD is implementing a variety of changes designed to improve overall performance improvements, including:



- Working with the City Attorney to review and approve a standard RFB template and general conditions for clarity and to reduce the time it takes to review RFBs
- Hiring a consultant to develop improved solicitation templates
- Holding after-action sessions to review RFBs that are being rebid to address the reasons for the rebids and update the RFB to reduce or eliminate those reasons

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***LAWA has implemented innovations in its processes for construction procurement.***

LAWA has been tackling important challenges associated with upgrading facilities and access to accommodate demands associated with the upcoming 2028 Olympics. In response, LAWA has implemented innovative construction procurement approaches. For example:

- As discussed in Part C on “Capital Projects,” LAWA used a design/bid/finance/build/operate/maintain contract for its APM train system and ConRAC facility.
- SSD has innovated a Request for Industry Comment (RFIC) process that solicits industry input into how to undertake complex projects prior to the issuance of the formal bid requests. The most recent RFIC is associated with cargo modernization at LAX.
- As a precursor to the RFP scoring, SSD convenes a Technical Evaluation Panel to review and reach consensus on proposals submitted. This approach bifurcates the process, separating the technical review from the review of other criteria, providing a consensus of the reviewing Subject Matter Experts on the best technical proposal as input into the scoring.

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***SSD is pursuing new technology to streamline the procurement process.***

SSD is in the process of selecting and implementing an e-procurement tool to interface with the Regional Alliance for Marketplace Procurement (RAMP). This tool is intended to provide LAWA leadership and its divisions with:

- Greater visibility into upcoming procurements
- Improved pipeline procurement planning
- Reduced turnaround time by automating manual processes
- Simplified on-line bidding process for vendors

## **Opportunities**

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***LAWA continues to have high levels of single-bid and fewer than three-bid responses to GENPS solicitations.***

A KH concern in the 2016 IEA Survey was the large percent of RFBs that received fewer than three responses.





*"Procurement has challenges in knowing whether LAWA is getting the optimal pool of potential vendors and contractors to respond to RFBs... In 2014-2015, 28% of the solicitations received only 2 bids; 30% of the solicitations had only 1 bid."*

KH recommended that SSD (then PSD) should evaluate the underlying causes for single and two-bid responses to RFBs and take appropriate steps to increase the numbers of bidders.

SSD has not followed up on this 2016 IEA Survey recommendation. North Highland focused on improving procurement performance, including the use of technology; it did not directly address low bids. North Highland, however, noted in its report the value of advance planning: *"Inadequate planning often results in an inadequate number of bidders."* As a result, SSD lacks data or analysis for the underlying reasons for lower-than-expected response rates.

A standard practice in public procurement is receipt of three bids before selecting a final bid. ***The number of single bid or fewer than three bids has become more dramatic since 2015***, as displayed in Table D.7:

**Table D.7: Percent of GENPS Contracts with Fewer Than 3 Bids**

GENPS Contract Solicitations	2015	2020	2021	Difference (2015 vs. 2021)	Difference (2020 vs. 2021)
Receiving a single bid	30%	16%	47%	+17% points	+31% points
Receiving fewer than 3 bids	28%	53%	76%	+48% points	+23% points

This situation in the last two years (2020 and 2021) may partially be attributed to supply chain challenges and urgent requests in response to COVID-19.

The contracts or purchase orders are awarded based on dollar amounts. Some purchase orders can be approved at the division and SSD level. Contracts require CEO (or designee) or BOAC approval.

For those contracts awarded over \$5,000, LAWA requires at least three quotes from vendors or some type of competitive process and advertisement to determine the lowest responsive, responsible bidder. In other words, LAWA wants three bids, but does not require them. The approval process remains the same regardless of the number of bids received.

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***SSD's efforts to conduct RFB outreach was delayed because of COVID-19 and staffing shortages.***

SSD designed an RFB Outreach effort targeted to vendors who downloaded RFBs and did not respond. Those potential bidders were listed on a spreadsheet with contact information. Buyers were to reach out to learn about the underlying causes for non-submission, such as:

- Clarity
- Restrictive requirements
- Tasks or items requested beyond the capacity of the potential bidder
- Restrictive administrative requirements
- Insurance
- Not enough time

Once COVID-19 happened, this outreach did not occur because of SSD staff shortages:

- LAWA's budget saving measures eliminated the Community Administrator Support Worker (CASW) program that was intended to perform this analysis.
- Four of the SSD staff retired as part of the early retirement incentive program, making it difficult to follow up.

SSD leadership would like to initiate vendor outreach once vacancies are filled, and additional staff are hired.

## Recommendations

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### ***Rec. ID-Procure 1: SSD should continue its implementation of the North Highland Report recommendations.***

SSD has been working on implementation of the North Highland Report recommendations. SSD's procurement function will strengthen and improve as it acquires the necessary staff to complete its Procurement Implementation Plan.

If successful, SSD will also address a 2016 IEA Survey recommendation for LAWA engaging SSD more actively in larger RFPs to ensure greater consistency and transparency in the process. During the 2016 IEA Survey, SSD's role in LAWA's acquisition of goods and services was more limited.

- ***Goods, Equipment, Non-Professional Services (GENPS).*** In 2016, LAWA used a distributed procurement model. As noted in the 2016 IEA Survey:
 

*"LAWA has adopted a distributed model for procurements. The Procurement Services Division acquires GENPS for LAWA. For GENPS items common to all of LAWA, such as office supplies, copiers, etc., Procurement Services is responsible for developing specifications, scope, gaining approval to solicit, analyzing vendor responses, and arranging for the award. For products required by a specific division within LAWA (e. g., custodial cleaning supplies or runway lighting), the requesting division performs those steps."*
- ***Professional Services and Construction.*** The 2016 IEA Survey found that LAWA's divisions typically performed the processes related to RFPs:

*"By far, the largest procurements undertaken by LAWA are Professional Services and Construction. In these acquisitions, which typically involve RFPs, Procurement Services largely acts as a support function. The requesting organization is responsible for drafting the scope of work, determining the evaluation criteria, and handling all other major elements of the solicitation, including specifying membership and running the evaluation process. Procurement ensures that all administrative requirements and Business Enterprise programs (e. g., SBE, SLBE, LBE, DBE, and ACDBE inclusion and applicable Federal guidelines) are followed.*

*Procurement does not participate in RFP evaluation panels, although it does verify the proposers' administrative compliance and that rating sheets were filled out after the panels are completed."*

Implementation of the PIP should address these issues.

---

***Rec. ID-Procure 2: SSD should conduct a formal analysis of why GENPS RFBs receive fewer bids and take steps to address the problem.***

While it is occasionally appropriate to award a contract without multiple bids, it is not recommended as a regular practice. As a start, SSD should analyze the causes for and prevalence of only 1 or 2 vendors. On the basis of that analysis, SSD might:

- Evaluate whether causes for low participation include:
  - Narrow specifications that are difficult for potential bidders to meet
  - Broad vendor qualification requirements that eliminate too many potentially interested bidders
  - Perceptions of LAWA as difficult to work with (e.g., bonding, insurance requirements, payment speed, or invoicing hurdles)
- Continue to identify piggyback opportunities to take advantage of economies of scale, especially when a low bidder turnout is anticipated
- Encourage the FAA to approve multiple local vendors for aviation-related products subject to FAA approval
- Coordinate with procurement professionals in other City agencies to conduct surveys of potential vendors to determine why they are not competing for City work
- Explore "proof of concept" pilot programs, which would allow competing technologies to demonstrate their durability
- Explore multi-jurisdictional procurement efforts for common supply items, such as cleaning materials (with other City or even County agencies) and aeronautical electrical supplies (with other airports or ports)

LAWA should seek to address any issues uncovered or confirmed. LAWA reports that it is looking into new ways to address this issue, including:

- A new “E-Sourcing” system or e-Procurement tool
- Conducting additional outreach as the COVID-19 pandemic subsides
- Removing barriers for small business to contract with LAWA

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***Rec. ID-Procure 3: SSD should continue to work with BJSR to identify ways to increase the impact of LAWA’s overall procurement program on local industries.***

North Highland identified partnering with BJSR as an opportunity to be pursued. BJSR programs are designed to:

*“...promote small business contractor opportunities and to build pathways for students and adults to gain valuable work experience and secure employment throughout Los Angeles and the surrounding communities... [to] increase its impact as a socially responsible entity and a champion for business inclusivity.”*

Volume II’s recommendations on economic impact on the region more fully describes areas to explore in increasing local business participation.

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***Rec. ID-Procure 4: SSD should continue to explore innovations that preserve public procurement principles while supporting strategic directions of LAWA in the acquisition of new technologies.***

As noted in this IEA Survey Report, LAWA has been implementing state-of-the-art, best practices in a wide variety of areas, including its capital program and environmental sustainability initiatives. One of the consistent themes related to the need for these and other innovations has been rapidly evolving technology advancements. This rapid change will continue to be the case. New technologies are destined to affect LAWA facilities, passengers, and guests. Examples might include alternate vehicle options, drones, and air taxis capable of transporting passengers to LAX. LAWA is working, through its Digital Transformation Officer and Mobility Strategy positions, to keep ahead of the curve on these new developments.

It is likely that LAWA may need in the coming years to pilot and evaluate technology initiatives that have not yet been widely accepted or even developed. LAWA must ensure competition whenever possible, so that processes to acquire new technologies are fair and transparent while permitting it to have access to the best available solutions.

Acquisition of technology is challenging, and public procurement laws can make it even more so.

- The RFP process often takes 6 to 9 months or longer. In today’s world of rapidly changing technology solutions, LAWA can end up with technologies which, at the start of the process, were high functioning standard products, but were since surpassed by new developments,



rendering them obsolete and unsupported within a few years. It is thus essential to speed up the procurement process.

- Standard public contracting practices call for vendors to have an established business record, while some of the most innovative ideas are supported by start-ups.
- Contracting for maintenance and upgrades can be difficult, as they require sole-source agreements – especially for new technologies.

As needs are defined, LAWA should consider:

- Both partnerships and leasing that includes updates and upgrades
- Approaches to protect LAWA's interests while having the flexibility to consider new products and technologies

#### RELATED RECOMMENDATIONS

As noted earlier, Volume II on equity documents LAWA's economic impact, including in the area of procurement on historically disadvantaged communities, and outlines additional recommendations for procurement.

## D.4 AUDIT

### Background

The mission of LAWA's Internal Audit is to:

- Provide independent assurance that public funds are spent appropriately and efficiently and in accordance with applicable laws and ordinances
- Promote transparency, strengthen public accountability, and increase efficiency
- Help prevent fraud, waste, and abuse
- Conduct independent performance, compliance, and financial related audits

The Joint Administrators asked KH to assess progress made in Internal Audit since the 2016 IEA Survey; the recommendation was: *"LAWA may reduce **the risk of losses** and improve performance with a stronger internal audit function with BOAC oversight."* The Joint Administrators for the 2022 IEA Survey agreed that the **words in red** *"... may reduce **the risk of...**"* should be included in the 2016 IEA Survey recommendation.

Today, LAWA now has three audit functions. Under the CFO is the Payroll, Revenue, and CIP Audit Division with a staff of five auditors assigned to two units:

- **Revenue Audit Unit** and its staff of four (one Senior Auditor and three Auditor IIs) perform audits of accounts and records of airport tenants (airlines and concessionaires) to ensure that they accurately reported and paid applicable revenues to LAWA in accordance with terms and conditions of their operating permits, agreements, or contracts. Revenue audits



are scheduled to be conducted on a 3-year cycle. LAWA is in the process of recruiting two additional Auditor II positions.

- **Construction Audit Unit** with its staff of one (a Senior Auditor) performs continuous audits of LAWA's \$15-billion Capital Improvement Program (CIP) projects, including design and construction budget management, change order management controls, contract billing compliance, project close-out controls, and accuracy and timeliness of payments. This audit unit will be coordinating the Grant Thornton audit, discussed in Part C.

Under the CEO is:

- **Internal Audit** and its staff of two (an Internal Auditor II and a Departmental Audit Manager) oversee special priority and performance audits for LAWA.

## Accomplishments

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### ***BOAC has re-instituted its Audit Committee.***

In 2016, BOAC lacked an active Audit Committee. In 2017, the BOAC reactivated the Audit Committee as part of a best practice in protecting the public's interests in a governmental agency. Such a Board-level Audit Committee helps ensure that decisions are based on objective analysis and credible information that result in a better future for Los Angeles and the region.

The BOAC Audit Committee:

- Established a charter that covered its authority and purpose, responsibilities regarding financial reporting and internal controls, external auditor reviews, and standard meeting times. (Note: LADPW's Audit Committee modeled its charter after this BOAC document.)
- Meets quarterly as called for in the Charter
- Receives regular reports on tenant/concessionaire revenues, external auditor reports, and related audit activities
- Reviewed the 2019 LAWA Audit Plan, which included "*continuous processes for ongoing Internal Audit assignments*," such as bank certifications, internal controls for such items as accounts payable, bank accounts, payroll, petty cash, etc. The Audit Plan called for audits of four other areas.

There has been no Audit Committee review of the Audit Plan since the submission of the 2019 Audit Plan. One of the 2020 Audit Plan areas covered soundproofing. The Audit Committee has received regular updates on audits of that program.

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***LAWA has strengthened its audit functions.***

In 2016, LAWA's Internal Audit functions had been a low priority at LAWA.

- Prior to 2016, the Internal Audit Division served primarily as a “clearinghouse” for many outside audits of LAWA, such as audits by the California Department of Transportation – Office of the Inspector General, Office of the Controller, FAA, TSA, and Los Angeles County Civil Grand Jury.
- Internal Audit had prepared a risk-based Audit Plan, which recommended four “Top-Tier” audits; only one was approved involving an overbilling issue with an airport development contractor.
- Audits of contracts valued at \$2 billion were skipped in favor of audits with less financial risk (e.g., petty cash).
- There were no independent audits of parking lot financial operations, despite its significant revenues of \$87.6 million. Note: LAWA has since had a parking audit done in 2017.

In 2021 and 2022, LAWA augmented audit staff with contracted audits. Those contracted audits included:

- 2021 HR/Payroll Audit Contract with Sjoberg, Evashenk Consulting Services
- 2021 North Highland Procurement Improvement Plan Study/Review (Procurement) (discussed earlier in Section D.3)
- 2021 HRD Strategic Assessment (Kincentric)
- 2021-2022 LAMP Construction Audit by Grant Thornton (Construction Audit: Phase I Risk Assessment) (discussed in Part C)
- 2022 LAMP Construction Audit by Grant Thornton (Construction Audit: Phase II Review) (One of the objectives is to follow up on Phase I recommendations) (in progress)

Within its staffing limitations, Internal Audit has a standard practice of:

- Reviewing findings with the areas audited
- Reflecting additional input in their final audit reports
- Reviewing the work of contracted audits and performance of contracted auditors

---

***LAWA has a Code of Ethics.***

In prior IEA Surveys, KH recommended that LAWA executives establish a Code of Ethics. LAWA established both a Code of Ethics and had an Office of Ethics and Ombudsman. LAWA's Code of Ethics includes multiple key elements including:

- A statement of values and how they are expressed in action
- Code provisions including:
  - Open government





- Focus on excellence
- Customers and stakeholders
- Compliance with rules and regulations
- Conflict of interest
- Procurement, purchasing, and contracting
- Supervision
- Gifts and gratuities
- Technology and communication
- Record-keeping
- Confidential information
- Accurate and exemplary report writing
- Tips and guidelines on ethical decision-making
- Information and referrals

The Code of Ethics is provided to all on-boarding employees at employee orientations by LAWA's Ethics Office.

## Opportunities

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***The BOAC Audit Committee does not regularly review Audit Plans, progress made against audit recommendations, and related risk assessments.***

In the 2016 IEA Survey, KH recommended that the BOAC Audit Committee review, approve, and ensure the completion of a risk-based Audit Plan, prepared by the Internal Auditor. In addition, the Audit Committee was to:

- Provide guidance regarding the audit cycle, the assignment of audits to the risk tiers, and the frequency with which high-, medium-, and low-tier audits be conducted
- Have the LAWA organization respond to audit findings and recommendations, so Audit Committee members understand the issues raised in an audit
  - Note: Today, all LAWA auditees provide responses to audit reports, which are shared with the BOAC Audit Committee at the time audits are presented to it.
- Require regular progress reports regarding how the LAWA organization implements audit recommendations, so BOAC Audit Committee members have assurance that the issues raised in an audit are being addressed
- Review audit performance, including audit objectives and progress, professionalism of audit staff, audit report quality, and overall satisfaction
- Monitor LAWA management's implementation of the IEA Survey Report's recommendations, given Internal Audit's role in coordinating the conduct of this IEA Survey



- LAWA executive management opted to use another executive office staff member (not Internal Audit) to track, monitor implementation, and report status of the 2016 IEA recommendations and Strategic Plan initiatives.
- In 2018, the Audit Committee received reports of status of response to the 2016 IEA Survey recommendations; such monitoring was not continued after COVID-19 occurred.

Minutes of the Audit Committee meeting do not show routine review of all of these items.

LAWA reports that the BOAC Audit Committee does not regularly review Audit Plans, progress made against audit recommendations, and related risk assessments because such activities were not part of its Charter.

The LAWA organization chart does not show the audit function as being independent, as recommended in the 2016 IEA Survey report. The 2016 IEA Survey report noted that audit should have a reporting-relationship with direct access to the BOAC Audit Committee:

*“This reporting relationship is important if there are findings associated with his/her direct supervisor or others up the chain of command because it provides an appropriate avenue to bring forward findings for review and action. This safeguard is essential to both the fact and perception of Internal Audit independence.”*

Today:

- The Internal Audit function and its staff of two employees report directly to the CEO. Internal Audit works with the BOAC Audit Committee and has an informal reporting relationship with it.
- Internal Audit can go directly to the BOAC Audit Committee if necessary.
- The Payroll Revenue and CIP Audit Division reports to the CFO with responsibility for financial audits and capital program audits.

The safeguard issue remains. There is an obvious potential inherent conflict of interest in having a financial audit function report to the CFO, creating the impression of an organization auditing its own functions. While it is not a universal practice, audit functions for other major U.S. airports are located in different parts of the organization reporting to the highest levels.

- DFW’s organization chart shows Audit Services reporting directly to the Board of Directors, in alignment with the CEO and the General Counsel.
- PANY&NJ has its Audit and Investigation functions report to an independent Inspector General.
- ATL organization chart shows the Senior Audit Manager reporting directly to the General Manager.

---

***LAWA's audit functions are thinly staffed, given the size of operations at LAWA.***

The KH team was concerned about the level of importance LAWA places on audits, given the small investment in the function in comparison to the LAWA's size and budget. Despite the additional dollars in contracting services that augment audit functions, the staffing and dollars seem low. For example:

- **Internal Audit.** An Internal Audit staff of two is still small given the complexity and size of LAWA (3,035 staff) to:
  - Manage external audits
  - Conduct smaller audits
  - Follow up on audit findings
  - Support the BOAC Audit Committee
  - Monitor this 2022 IEA Survey Report recommendations
  - Stay abreast of the work of the former Office of Ethics

Internal Audit is an important for ensuring adherence to policies and procedures, and that processes are efficient and effective across the many LAWA divisions with the greatest risk of exposure. As such, it would be responsible for auditing major support functions (e.g., SSD, Human Resources, and Finance) and other programs and functions (e.g., parking) at LAWA. Two people, even with consulting help, is insufficient for that breadth of work.

- **Construction Audit Unit.** The assignment of one individual in the Construction Audit Unit to monitor the expenditures related to LAWA's CIP appears unrealistic. LAMP alone is a \$5.5-billion undertaking; LAX Economy Parking is the first LAMP component to be completed and open to the public. The workload related to APM and the upcoming terminal and cargo projects indicates a steady stream of work.
- **Revenue Audit Unit.** Similarly, a staff of four (and eventually two additional Auditors) in the Revenue Audit Unit also appears low, given the revenues generated with airport tenants (airlines and concessionaires). As discussed in Part B, LAWA generates \$501 million in concession revenue in FY2019 (pre-COVID-19). Although concession revenue in FY2021 was significantly lower at \$161 million, the dollar amount is still large for such a small staff. LAWA's forecasts indicate that domestic air passenger travel is rebounding and with it will come increases in revenue sales. Moreover, LAWA will have additional concession revenues as its new parking lots open with the completion of LAMP and international travel rises.

## Recommendations

Establishing audit as a foundation for good organizational governance is important. LAWA should build on its establishment of the BOAC Audit Committee and assignment of Internal Audit to the CEO.

---

***Rec. ID-Audit 1: All audit functions must be organizationally integrated under the CEO with a dotted-line reporting relationship to the BOAC Audit Committee to ensure the perception and reality of independence.***

For an organization that operates one of the top 5 airports in the country, it is important for all audit units be elevated organizationally. All audit functions should be under an audit division chief, reporting immediately and directly to the CEO with a dotted-line relationship to the BOAC Audit Committee to bring matters to its attention as needed. This safeguard is essential to both the fact and perception of audit independence. This organizational structure is consistent with the structures at other major airports, such as DFW, PANY&NJ, and ATL. Moreover, it is a classic organizational model for corporations and other governmental agencies.

Given the span of control of the CEO, a single-point of contact – a division chief – is important for this function. The scope of this Audit Division should include compliance audits, operational and performance audits, construction audit, revenue audits, financial audits, external audits, and information technology audits, among other audits.

The division chief should also have an independent review of the audit division’s mission, structure, staffing, and budget requirements at LAWA. The size of an Internal Audit function is linked to its mission. On the basis of Deloitte’s research on [“Optimizing Internal Audit: Developing Top-flight Teams”](#) (February 2021), the *“...the best team size for most work tasks lies somewhere between four and seven people.”*

For example, it is not reasonable to expect two individuals in Internal Audit to possess the skills and capabilities required today, ranging from risk assessments (e.g., digital, data, cyber, culture) to analytical skills related to performance of audits of the varied LAWA functions. Moreover, when operating in isolation, it is difficult for small audit units to develop diverse thinking, innovation, and resiliency.

In 2020, Deloitte conducted a [global survey](#) of internal audit functions and found that:

- Internal audit functions have expanded into advisory roles.
- The quality and speed of internal audits has increased.
- Internal audit is more valued, particularly by management and audit committees.
- Recent events and changes related to COVID-19 have heightened and reinforced risk concerns.
- High-performing teams create an environment of psychological safety, where people are comfortable asking for help and admitting mistakes. Transparency accelerates learning and improves the performance of the whole team.

Given the variety of risks that LAWA should manage and audit, and the concomitant variety of skills required to analyze and address those risks, the Audit Division will likely require more staff. The Audit Division should have sufficient bandwidth to fully:

- Follow up on resolution of audit findings
- Evaluate the effectiveness and thoroughness of all contracted audits
- Monitor multiple risk areas
- Advise the BOAC Audit Committee on potential new issues that may arise
- Support the duties of the prior Office of Ethics

The Audit Division will also need to prove its value to LAWA. In addition, the Audit Division should have a training budget to meet the requirements to remain certified.

In the event, that LAWA decides not to integrate its audit functions into an Audit Division, it will need to put in place safeguards for the audit functions under the CFO and augment the existing Internal Audit staff to cover the breadth of new responsibilities outlined in this IEA Survey. Internal Audit should be responsible for:

- Developing an integrated Audit Plan, discussed in Recommendation ID-Audit 2
- Reporting progress and accomplishment of the integrated Audit Plan to the BOAC Audit Committee, discussed in Recommendation ID-Audit 3 and Recommendation ID-Audit 4

---

***Rec. ID-Audit 2: The new Audit Division should integrate audit plans and update them in a risk-based, integrated Audit Plan with annual refinements.***

LAWA should have an integrated Audit Plan that is risk-based and encompasses all areas to be audited. Risk can be defined as any situation or event that inhibits an organization from achieving its goals. Risk categories include:

- **Image risks:** How well does the organization maintain the public trust through a perception of being well-managed?
- **Operational risks:** How well does the organization focus on effectively implementing its responsibilities?
- **Human resources risks:** How effective are internal workplace policies, programs, and practices in ensuring a stable and effective workforce?
- **Financial risks:** How well does the organization manage its fiscal affairs?
- **Legal/regulatory risks:** How well does the organization abide by laws and regulations?
- **IT/data security risks:** Are systems and data secure from external threats or breakdowns?

Managing those categories requires:

- Identifying and assessing the risk and potential impact
  - Developing and implementing risk control measures
-

- Reviewing and auditing compliance with the measures to improve them, as necessary

The BOAC Audit Committee should annual review the refined and integrated Audit Plan. It should integrate existing audit plans, including:

- The Financial Audit Plan, which was developed according to criteria developed in conjunction with an external consultant
- The Payroll Revenue and CIP Audit Division, which developed a multi-year plan to major revenue items on a three-year cycle
- Internal Audit, which handles special and performance audits

---

***Rec. ID-Audit 3: The BOAC Audit Committee should require more regular reporting and reviews of audits.***

Having re-established the Audit Committee, BOAC can strengthen its effectiveness further by:

- Revising the BOAC Audit Committee Charter to include regular reviews of Audit Plans, progress made against audit recommendations, and related risk assessments
- Having Internal Audit, Revenue Audit, and Capital Audit report their audit plans, findings, and follow up directly to the BOAC Audit Committee
- Reviewing and approving the risk-based Audit Plan each year
- Monitoring changes in the accomplishment of the Audit Plan as necessary
- Routinely reviewing the reports on progress made against recommendations from all audits
- Assuming responsibility for monitoring the 2022 IEA Survey recommendations

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***Rec. ID-Audit 4: Audit managers should follow up with audited organizations, reporting progress made in implementing recommendations.***

Audit managers should follow up with the audited organizations regarding their levels of satisfaction with the process, staff or consultants, and report for audits conducted by their staff and consultants. This assessment could be an online tool, followed up by an interview, on such components as:

- **Audit process.** The audit objectives and audit progress were clearly communicated. Areas of concern were solicited and considered.
- **Audit staff or consultants.** The audit team conducted the audit in a professional and technically proficient manner.
- **Audit report.** Audit results were accurately reported with logical and reasonable recommendations. Adequate time was given to respond to the draft report. The overall time to complete the audit and issue the final report was acceptable.
- **Overall satisfaction.** Overall, the audit added value and provided meaningful results.



This kind of evaluation will support the perception of fairness in the conduct of reviews.

In addition, depending on the nature of the recommendations, Audit managers should establish a schedule of review meetings to determine how well the subjects of the audits have resolved audit findings in preparation for reporting to the BOAC Audit Committee. In this manner, LAWA will have some assurances that the organization is committed to reducing the risks and deficiencies identified by the audits.



# 2022



## Industrial, Economic, and Administrative (IEA) Volume II Final Report: Equity and LAWA's Impact on Historically Disadvantaged Groups



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# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART A – EQUITY FRAMEWORK AND INITIATIVES

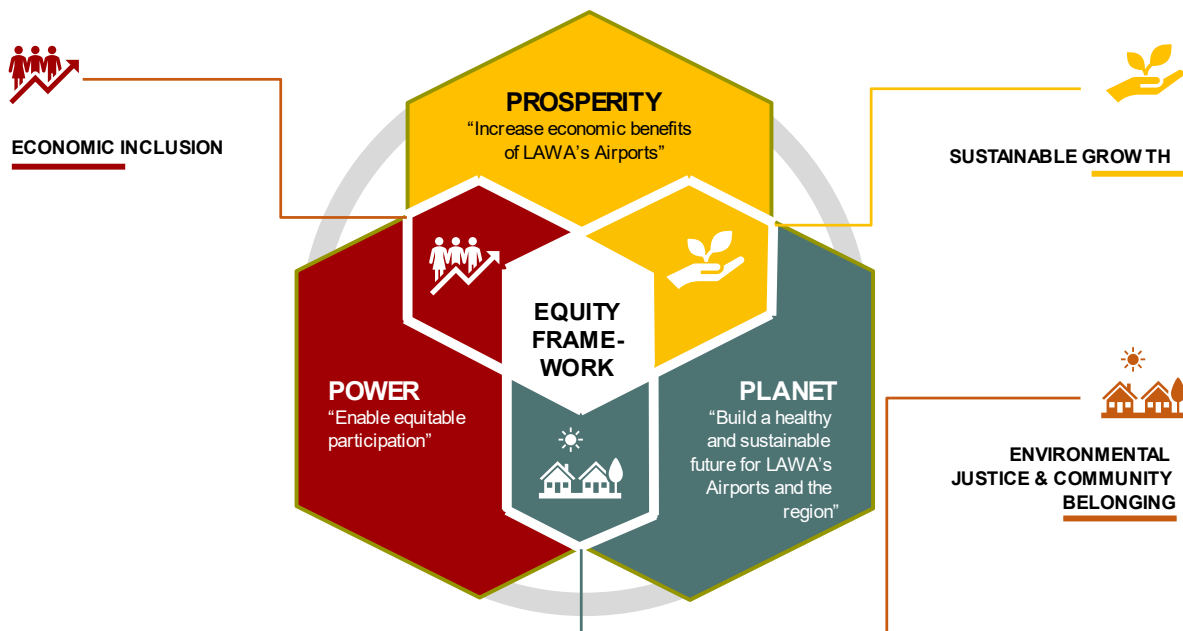


## A – EQUITY FRAMEWORK AND INITIATIVES

Equity has come into the spotlight in recent years as the COVID-19 pandemic and civil unrest have revealed inequities among low-income and racially minoritized communities. Public entities have since promised to address these racial disparities and inequities, including explicit goals for remediation.

### A.1 EQUITY FRAMEWORK

The KH team developed an equity framework for this assessment that focuses on the environment (planet), the economy (prosperity), and engagement (power):







## A.2 EQUITY INITIATIVES AT LAWA AND L.A. CITY

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***LAWA and the City of Los Angeles have embarked on numerous social equity initiatives.***

The City and LAWA are committed to addressing social equity issues.

### OFFICE OF THE MAYOR 2019 SUSTAINABLE CITY PLAN

[The 2019 Sustainable City pLAn](#), issued by the Office of the Mayor, focuses on sustainability, rather than racial equity. The pLAn statement on sustainability is:

*“L.A. is home to a diverse population, a dynamic workforce, and a growing economy. Yet too often, the Angelenos left behind by progress – low-income families and communities of color – are disproportionately impacted by pollution and face dire consequences for their health. If we wish to build a truly fair, just, and prosperous city, we have to ensure everyone experiences the benefits of a sustainable future. That’s why we’re electrifying our entire bus fleet, slashing emissions at the Port, and cutting oil production and consumption in the city. That’s also why we’ve partnered with community groups to successfully secure key investments in sustainability and economic growth through Transformative Climate Community (TCC) grants and we are expanding access to community solar and electric vehicle car sharing. Across our plan, we are acting to improve air and water quality, reduce the energy burden of low-income households, address food deserts, provide economic opportunity in green jobs, build greater access to open space – and correct long-running environmental injustice across our city.”*

### CIVIL + HUMAN RIGHTS AND EQUITY DEPARTMENT (CHRED)

The City of Los Angeles established CHRED in December 2020, in part, to guide policy and programmatic decisions on racial equity in the City. CHRED’s mission is *“...to maintain and strengthen the city’s diversity, equity, and accountability. We are focused on reducing bias and injustices while leveling the playing field through community engagement, equity initiatives, and upward mobility programming.”* There is a Working Group developing an equity framework for the City, but it is still in the early stages.

### LAWA’S 2020 WORKING GROUP

On June 10, 2020, in response to renewed social unrest sparked by the murder by police of George Floyd, Los Angeles World Airports (LAWA) Chief Executive Officer (CEO) Justin Erbacci announced that he had directed Paula Adams, then-Director of Airports Administration, to oversee a working group to: *“...find opportunities where we can improve how we think, act, and connect with one another.”* CEO Erbacci challenged all staff to work to: *“eliminate racism, bias, and hatred in professional and personal lives.”* The responsibilities of the working group included:



*“...explore how LAWA can combat racism and discrimination and ensure diversity and equality at LAWA and in its communities”*

*“...identify concrete steps, small and large, short- and long-term that we can take to help us improve”*

*“...confront head-on the difficult questions and look for ways we can act to help enable the necessary change”*

In a message to all LAWA employees, CEO Erbacchi invited those team members who were interested in participating in the working group to contact Director of Airports Administration Paula Adams (who has since retired).

#### CITY OF LOS ANGELES EXECUTIVE DIRECTIVE #27 (2020)

On June 19, 2020, Los Angeles Mayor Eric Garcetti recognized that *“...demonstrations for racial justice ...have laid bare the urgent and overdue demand to end structural racism.”* He issued Executive Directive #27, which instructed City workers to address recruitment, hiring, training, retention, promotions, and contracting. Mayor Garcetti expected departments and offices to:

*“...marshal every tool at our disposal to ensure everyone in our community is given the opportunity to thrive and reach their full potential”*

*“...think broadly and creatively to ensure that people of color, women, persons with disabilities, and veterans may equally participate and prosper in public life and society”*

*“...redouble our efforts to promote equity in our City, beginning with our own government. In employee recruitment and procurement, there remain many ways to enhance diversity and equal opportunity”*

The Executive Directive also required department heads and general managers of every City department, including LAWA, to submit a Racial Equity Action Plan no later than September 16, 2020. Since then, LAWA has updated and resubmitted its racial and gender equity action plans to the Office of the Mayor for FY 2020-2021 and FY 2021-2022.

#### LAWA'S 2020 RACIAL EQUITY ACTION PLAN

LAWA's Racial Equity Action Plan discusses successes and further commitments to racial equity:

*“The success we have achieved the last couple of years... have opened many doors for our employees and jobs for local community members for generations to come. Moving forward, we want to make sure that our programs and initiatives further promote, elevate and truly address the racial equity needs within our department.”*

*“We are committed to our employees and business partners and will make every effort possible to support, continue to grow and nurture a workforce that is inclusive of the LAX impact areas and the entire City of Los Angeles. Los Angeles International Airport (LAX) is the gateway to the rich and diverse racial makeup of the City, and our goals will always*



*align and strive for representative demographic racial equity that reflects the vibrancy of the City and County of Los Angeles.”*

In this 2020 action plan, LAWA listed objectives and goals toward an equitable workforce, equitable operations, and equitable services. To reach these goals and objectives, LAWA has begun to implement programs and initiatives. Examples include the Racial Equity Core Team, Disparity Study, Inclusivity and Evaluation Guidelines, Business Enterprise Programs, and BuildLAX Academy.

#### LAWA’S INTEREST IN EQUITABLE ECONOMIC GROWTH AND SUSTAINABILITY

LAWA is proposing goals in its current strategic-planning process that support equitable economic growth and sustainability, involving:

1. Increased economic benefits of LAWA’s airports
2. Equitable participation
3. A healthy and sustainable future for LAWA’s airports and the region

Reaching these goals would increase LAWA’s beneficial impact on the planet, the region’s economic prosperity, and the community’s power and participation.

### A.3 INVESTIGATION FOCUS

In addition to interviews and reviews of LAWA documents, this analysis provides insights on how local disadvantaged areas have been affected, based on available environmental, economic, and engagement indicators:

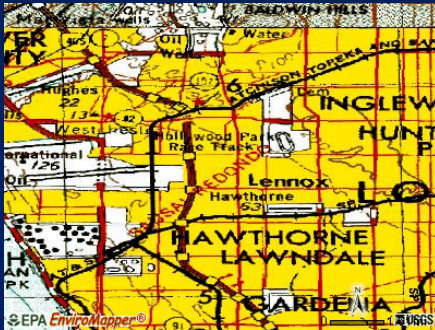
	ENVIRONMENTAL (PLANET)	ECONOMIC (PROSPERITY)	ENGAGEMENT (POWER)
	<i>“Build a healthy and sustainable future for LAWA’s Airports and the region”</i>	<i>“Increase economic benefits of LAWA’s Airports”</i>	<i>“Enable equitable participation”</i>
<b>INDICATORS</b>	<b>Pollution Exposure</b> <ul style="list-style-type: none"> <li>▪ Ground Ozone</li> <li>▪ PM2.5</li> <li>▪ Pollution Burden</li> <li>▪ CalEnviroScreen Score</li> </ul> <b>Noise Impact</b> <ul style="list-style-type: none"> <li>▪ Noise contours</li> <li>▪ Noise complaints</li> <li>▪ Land use compliance</li> </ul>	<b>Hiring</b> <ul style="list-style-type: none"> <li>▪ Workforce representation</li> <li>▪ LAMP</li> <li>▪ Salary/wages</li> </ul> <b>Procurement</b> <ul style="list-style-type: none"> <li>▪ Local contracting</li> <li>▪ Contracting practices<sup>†</sup></li> </ul> <b>Initiatives</b> <ul style="list-style-type: none"> <li>▪ Business inclusivity</li> <li>▪ Local hiring</li> </ul>	<b>Community</b> <ul style="list-style-type: none"> <li>▪ Relationships</li> <li>▪ Engagement</li> <li>▪ Representation</li> </ul> <b>Internal</b> <ul style="list-style-type: none"> <li>▪ Employee engagement<sup>†</sup></li> <li>▪ Decision-making<sup>†</sup></li> <li>▪ Employee participation<sup>†</sup></li> </ul>

<sup>†</sup>Anecdotal evidence from LAWA staff.

KH’s analysis relies on the accuracy and comprehensiveness of the available data. Where data are unavailable or incomplete, the analysis notes such limitations. Appendix 3 presents detailed tables as background data for the GIS maps presented and discussed in Volume II.

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART B – DISADVANTAGED COMMUNITIES SURROUNDING LAWA AIRPORTS





## B – DISADVANTAGED COMMUNITIES SURROUNDING LAWA AIRPORTS

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The first step in determining how equitable LAWA’s impact has been on the region involves identifying historically disadvantaged communities. Building on the core tenets of equity as defined by the City, California, and U.S. Department of Transportation (USDOT), the KH team focused on local geographical areas that have significant shares of racially minoritized groups and low-income residents.

### B.1 DISADVANTAGED COMMUNITIES’ DESIGNATIONS

As historical context, LAWA’s environmental justice analysis, as outlined in the [Final Environmental Impact Report \(EIR\)](#) (subsection 4.4.3.2) associated with the 2004 LAX Master Plan, defined impact areas to determine:

*“...the area in which the collective environmental effects resulting from the Master Plan alternatives would be likely to occur, extends beyond the areas immediately adjacent to LAX to include those neighborhoods potentially affected by aircraft noise and aircraft or airport-related emissions as well as airport-related traffic impacts, including congestion, noise and air pollution.”*

Some LAWA employees indicate that this 2004 LAX Master Plan designation is less relevant to today’s environment and not a reference point that it uses in its work. This document, however, appears to contain the most recent guidelines used by LAWA to identify disadvantaged communities in the region.

In line with USDOT Order 5610.2 (“Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”), LAWA uses USDOT’s definition to identify areas with significant shares of “...minority and low-income populations”:

*“...consistent with guidance developed by the federal Interagency Working Group established by Executive Order 12898, minority communities were identified where the minority population of a census tract was greater than 50 percent.”*

*“Minority” means a person who is Black (having origins in any of the black racial groups of Africa); Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or Southern American, or other Spanish culture of origin, regardless of race); Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).”*

USDOT Order 5610.2 defines low-income populations as:

*“...those individuals whose median household income is at or below the U.S. Department of Health and Human Services poverty guidelines, which was \$17,050 for a family of four in the year 2000. The 1990 U.S. Census data used in this analysis reported families below the poverty level based on \$12,674 for a family of four in 1989... if a particular census tract’s proportion of population below poverty level according to the 1990 U.S. Census is greater than that of Los Angeles County as a whole (15 percent), the census tract is considered to be low income.”*

California’s [Senate Bill 535](#), focusing on environmental justice, alternatively designates disadvantaged communities as:

*“After receiving public input at workshops and in written comments, in May 2022, CalEPA released its updated [Designation of Disadvantaged Communities PDF download](#) for the purpose of SB 535. In this designation, CalEPA formally designated four categories of geographic areas as disadvantaged:”*

- *“Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 (1,984 tracts).”*
- *“Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores (19 tracts).”*
- *“Census tracts identified in the 2017 DAC [disadvantaged communities] designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0 (305 tracts).”*
- *“Lands under the control of federally recognized tribes.”*

USDOT provides the following approach in determining disadvantaged communities:

*“Consistent with OMB’s Interim Guidance, DOT has developed a definition for highly disadvantaged communities using existing, publicly available data sets and where source data did not exist (Tribal lands, Puerto Rico, Guam and the Northern Mariana Islands) OMB’s Common Conditions definition. The disadvantaged Census Tracts, as identified in this tool, exceeded the 50<sup>th</sup> percentile (75<sup>th</sup> for resilience) across at least four of the following six transportation disadvantaged indicators. Each of the six disadvantage indicators are assembled at the Census Tract level using data from the- CDC Social Vulnerability Index, Census America Community Survey, EPA Smart Location Map, HUD Location Affordability Index, EPA EJ Screen, FEMA Resilience Analysis & Planning Tool and FEMA National Risk Index.”*

- ***“Transportation Access disadvantage** identifies communities and places that spend more, and longer, to get where they need to go. (CDC Social Vulnerability Index, Census America Community Survey, EPA Smart Location Map, HUD Location Affordability Index)”*





- ***“Health disadvantage*** identifies communities based on variables associated with adverse health outcomes, disability, as well as environmental exposures. (CDC Social Vulnerability Index)”
- ***“Environmental disadvantage*** identifies communities with disproportionate pollution burden and inferior environmental quality. (EPA EJ Screen)”
- ***“Economic disadvantage*** identifies areas and populations with high poverty, low wealth, lack of local jobs, low homeownership, low educational attainment, and high inequality. (CDC Social Vulnerability Index, Census America Community Survey, FEMA Resilience Analysis & Planning Tool)”
- ***“Resilience disadvantage*** identifies communities vulnerable to hazards caused by climate change. (FEMA National Risk Index)”
- ***“Social disadvantage*** identifies communities with a shared history of discrimination, or other forms of disadvantage that warrant consideration along with each/any of the above measures. (CDC Social Vulnerability Index)”

Additional details about the underlying indicators and sources that USDOT uses to define disadvantaged communities can be found [here](#).

The USDOT’s definition of disadvantaged communities is relevant as LAWA has applied for Federal grants that encourage projects to improve airport access for historically disadvantaged populations. For example, on FAA Form 5100-144 (Bipartisan Infrastructure Law, Airport Terminal and Tower Project) for LAX Terminal Roadways Project, LAWA stated:

*“This project benefits the surrounding communities of LAX airport by enhancing public access to local multi-modal transit systems (rail, bike, etc.). The impacted Census Tracts have been identified as Areas of Persistent Poverty or Historically Disadvantaged based on <http://datahub.transportation.gov>.”*

Relevant to LAWA, FAA is offering discretionary funds for newly [established Airport Terminal Program \(ATP\)](#). One of the funding criteria is to “...improve airport access for historically disadvantaged populations:”

*“Applicants should describe how the project increases mobility, expands access, and improves connectivity for historically disadvantaged populations. The information should demonstrate how the proposed project provides a significant local and regional impact and benefits historically disadvantaged populations. **The applicant should include a description of public engagement on a local and regional level that has occurred, demonstrates proactive inclusivity of historically disadvantaged communities, and the degree to which public comments and commitments have been integrated into the project.** DOT is providing a list of communities that meet the definition of Historically Disadvantaged Communities, available at: <https://adip.faa.gov/agis/public/#/disadvantagedCommunities>.”*



The FAA notes that it:

*"...encourages applicants to consider how the project will address the challenges faced by individuals in underserved communities and rural areas,"* in support of Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (86 FR 7009).

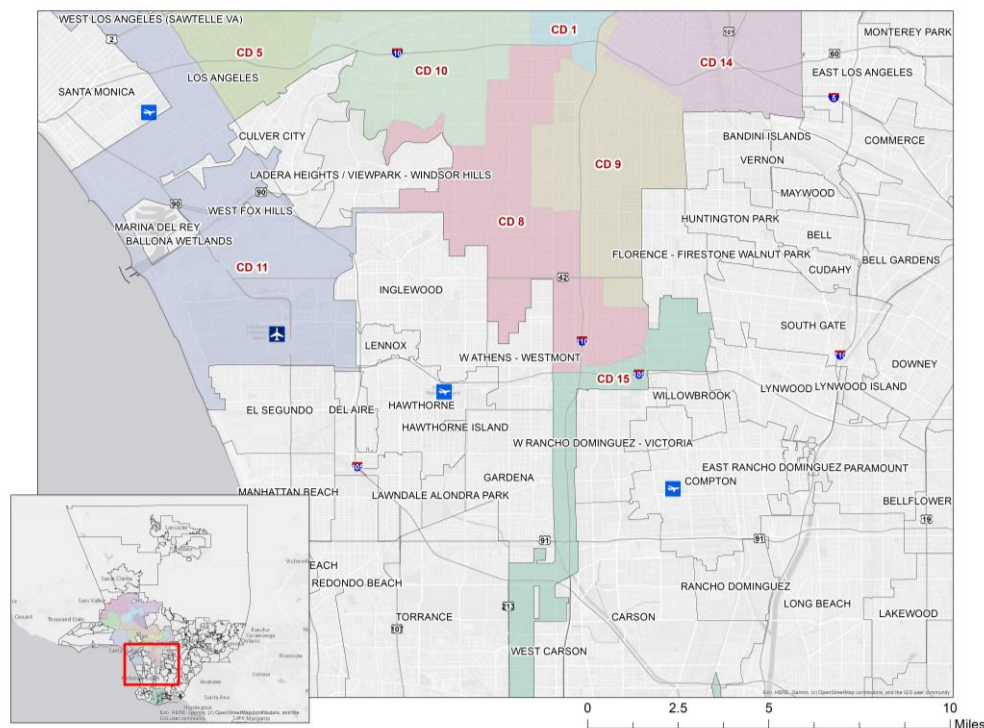
## B.2 MAPPING AREAS SURROUNDING LAWA AIRPORTS

In Volume II, the areas surrounding the LAWA airports are mapped to determine the airports' impact on the surrounding communities.

### Around LAX

LAX map frames show the areas that are approximately 10 miles north, 10 miles south, and 20 miles east of LAX. With an extended frame to the east, we capture more of the historically disadvantaged communities and areas that may be impacted by [aircraft arrivals from the east](#).

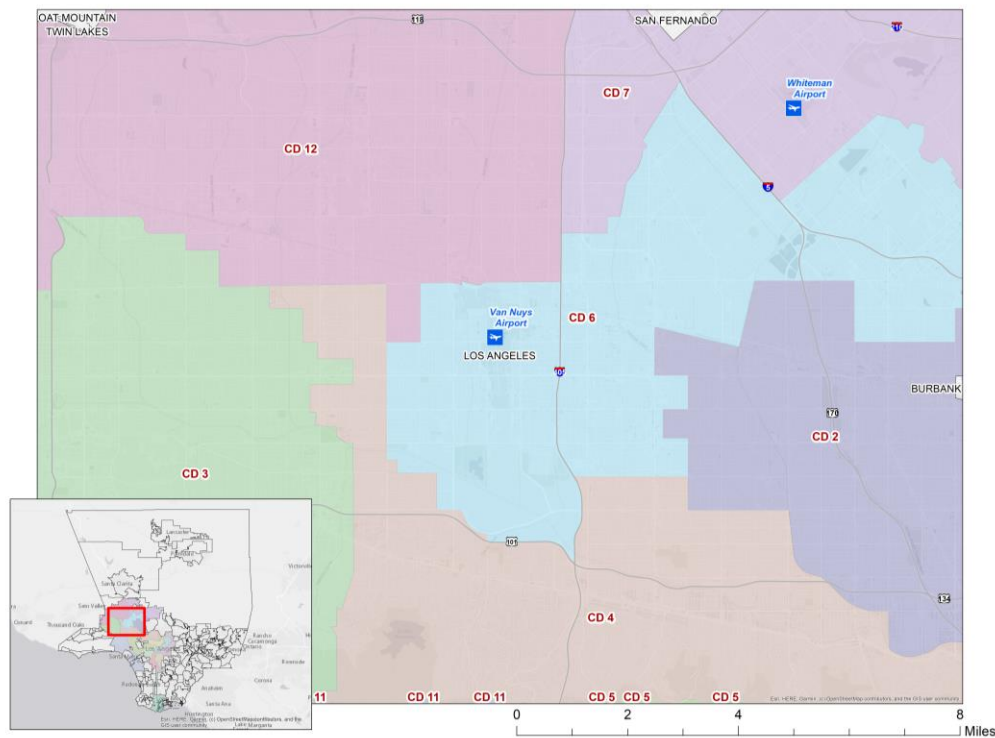
**Map 1. Mapped Area for Equity Analysis, Displaying Los Angeles City Council Districts and Surrounding Cities, around LAX**



## Around VNY

VNY map frames show the areas that are approximately 6 miles north, 6 miles south, 8 miles east, and 8 miles west of VNY. This rectangular shape reflects the neighboring populated areas in the San Fernando Valley, where VNY is located.

**Map 2. Mapped Area for Equity Analysis, Displaying Los Angeles City Council Districts and Surrounding Cities, around VNY**



## B.3 HISTORICALLY DISADVANTAGED COMMUNITIES

The subsequent maps show how the areas around LAX and VNY that are predominantly comprised of racially minoritized groups and low-income residents (**shaded in red**), based on these different definitions. As expected, different communities are identified as historically disadvantaged under LAWA's 2004, Senate Bill 535, and USDOT definitions. The more recent definitions – Senate Bill 535 and USDOT – use more complex indices that factor in measures that were unavailable with LAWA's 2004 definition, including the CalEnviroScreen and EPA EJ Screen. This suggests that an updated analysis of historically disadvantaged around LAX and VNY is needed and should be integrated into LAWA's definitions.

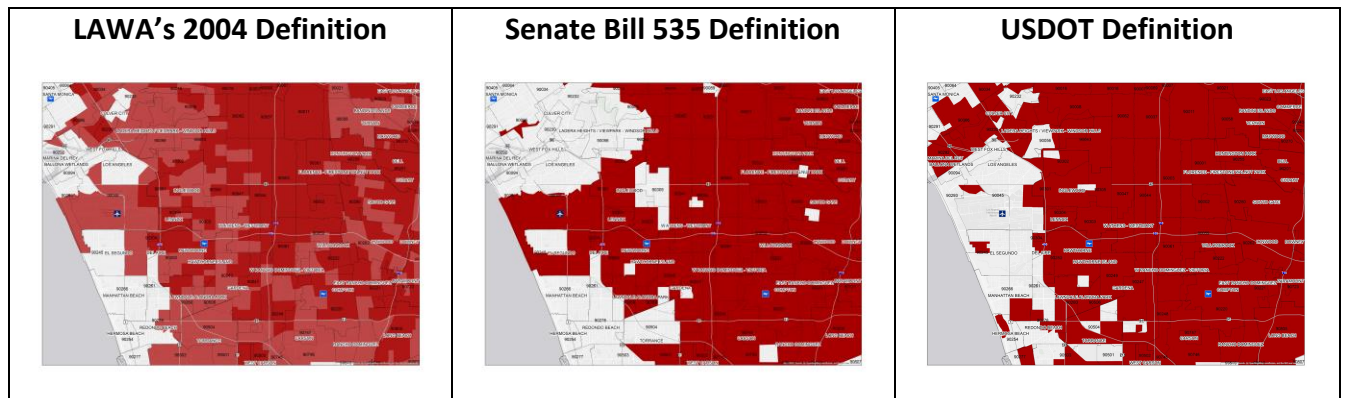
## Around LAX

***Regardless of the definition used, the communities around LAX are predominantly comprised of racially minoritized groups and low-income residents.***

When mapping the three definitions, it becomes visually clear that many communities surrounding LAX have been or are classified as historically disadvantaged communities.

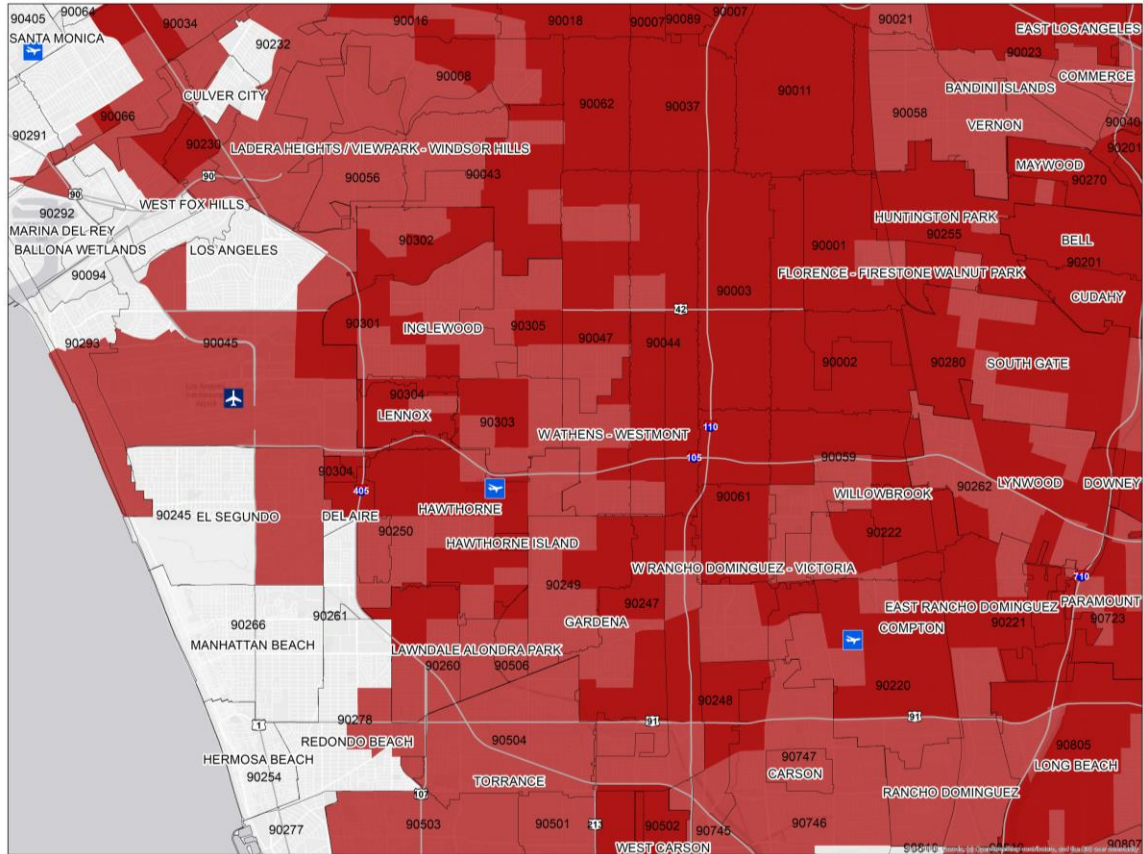
An increasing number of communities no longer fit the definition used in LAWA's 2004 LAX Master Plan, but many communities to the east, southeast, and northeast of LAX remain defined as historically disadvantaged communities.

The beach communities south (El Segundo and south) and north (Venice, Marina del Rey, and Santa Monica) are typically not included.



The following pages provide enlargements of these maps for closer scrutiny of what communities are included.

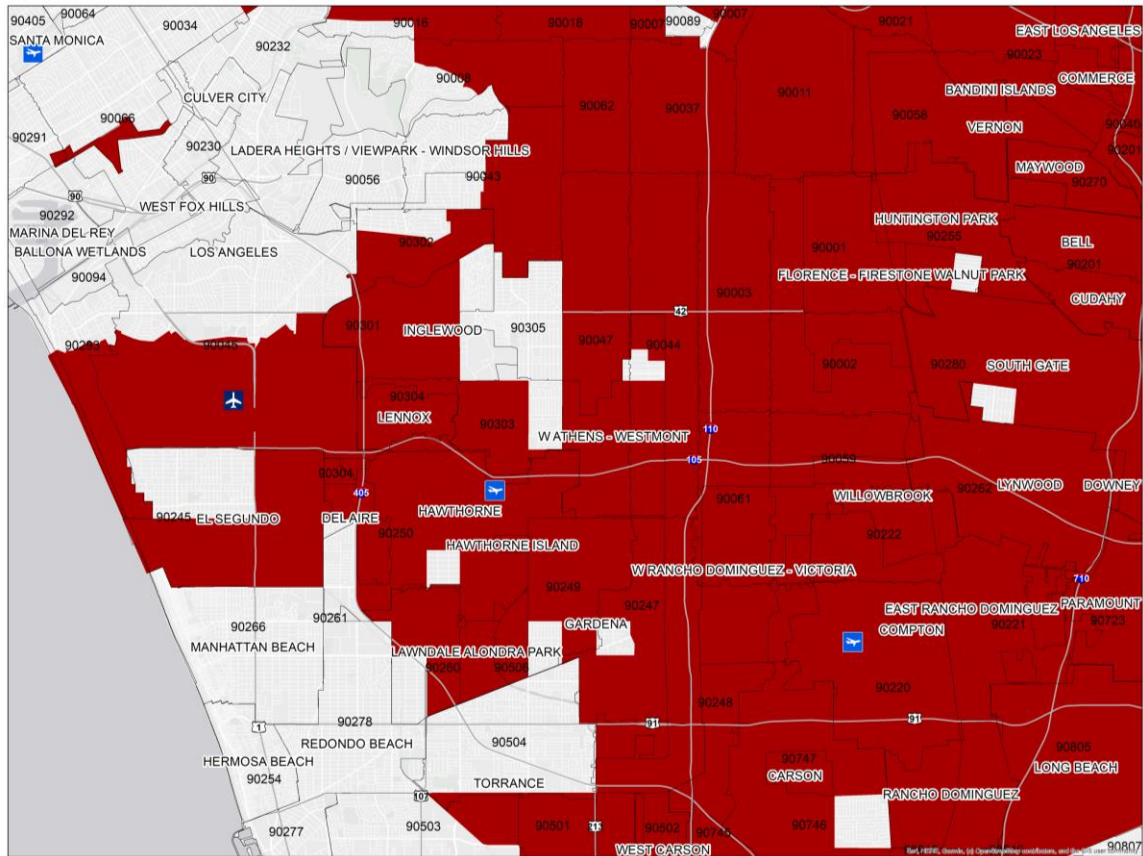
**Map 3. LAWA's 2004 Definition of Historically Disadvantaged Communities around LAX**



Note: Data are at census tract level; darker red indicate census tracts that fit both criteria (i.e., minority and low-income tract).

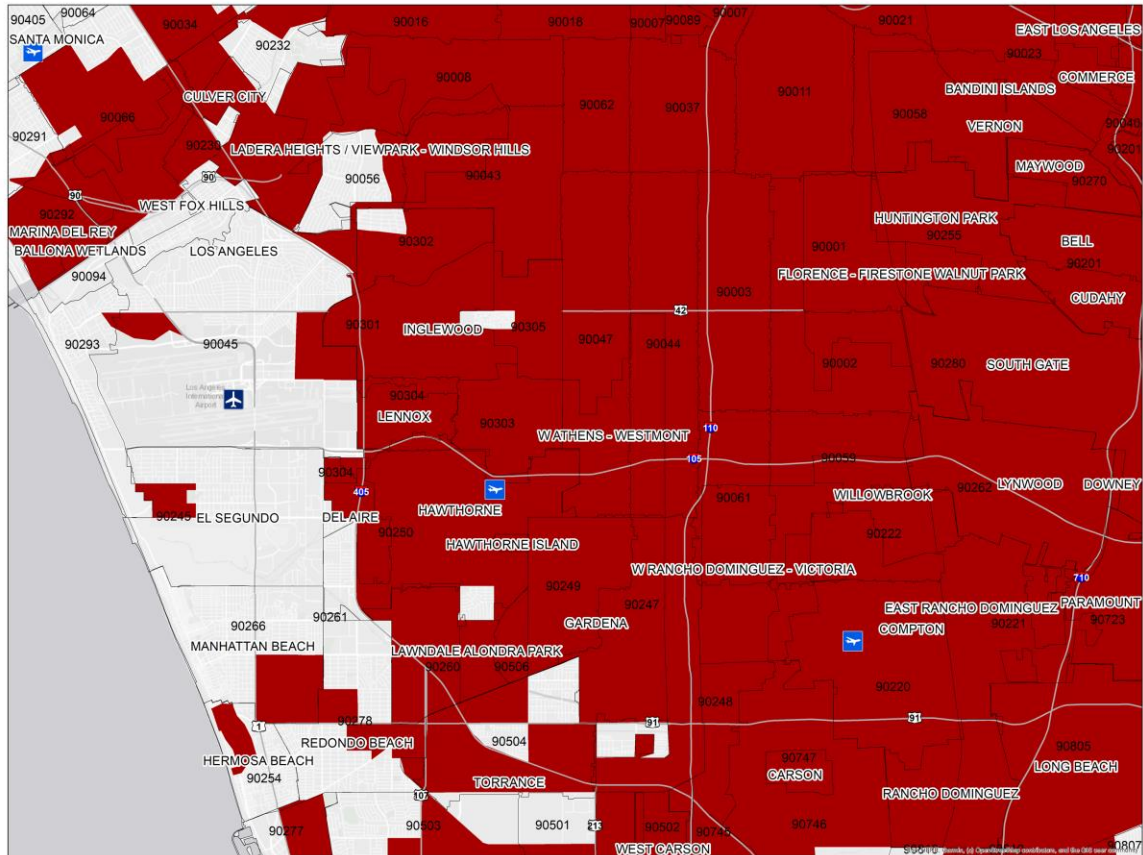


**Map 4. Senate Bill 535 Definition of Historically Disadvantaged Communities around LAX**



Note: Data are at census tract level.

**Map 5. USDOT'S Definition of Historically Disadvantaged Communities around LAX**



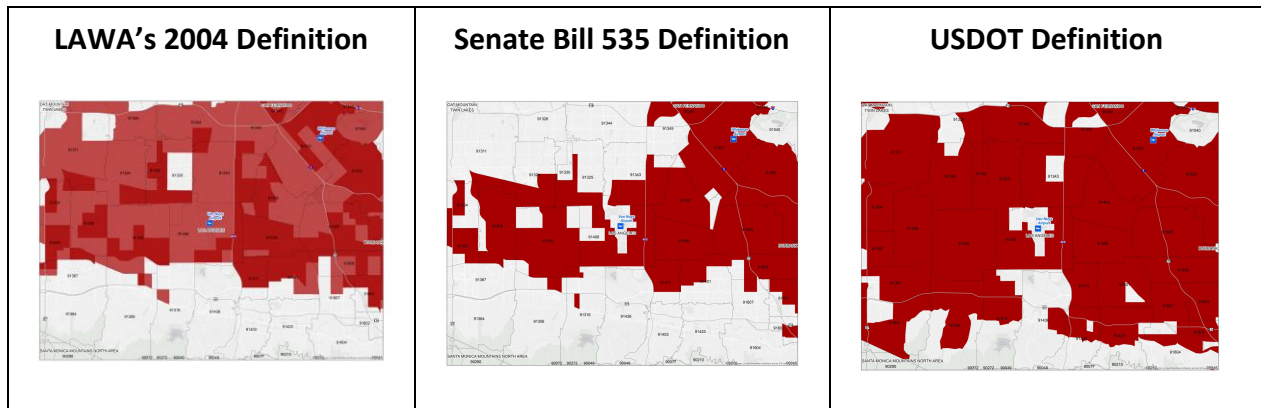
Note: Data are at census tract level.

## Around VNY

***Similarly, regardless of the definition used, the communities around VNY are predominantly comprised of racially minoritized groups and low-income residents.***

When mapping the three definitions, it becomes visually clear that many of the communities surrounding VNY have been or are classified as historically disadvantaged communities.

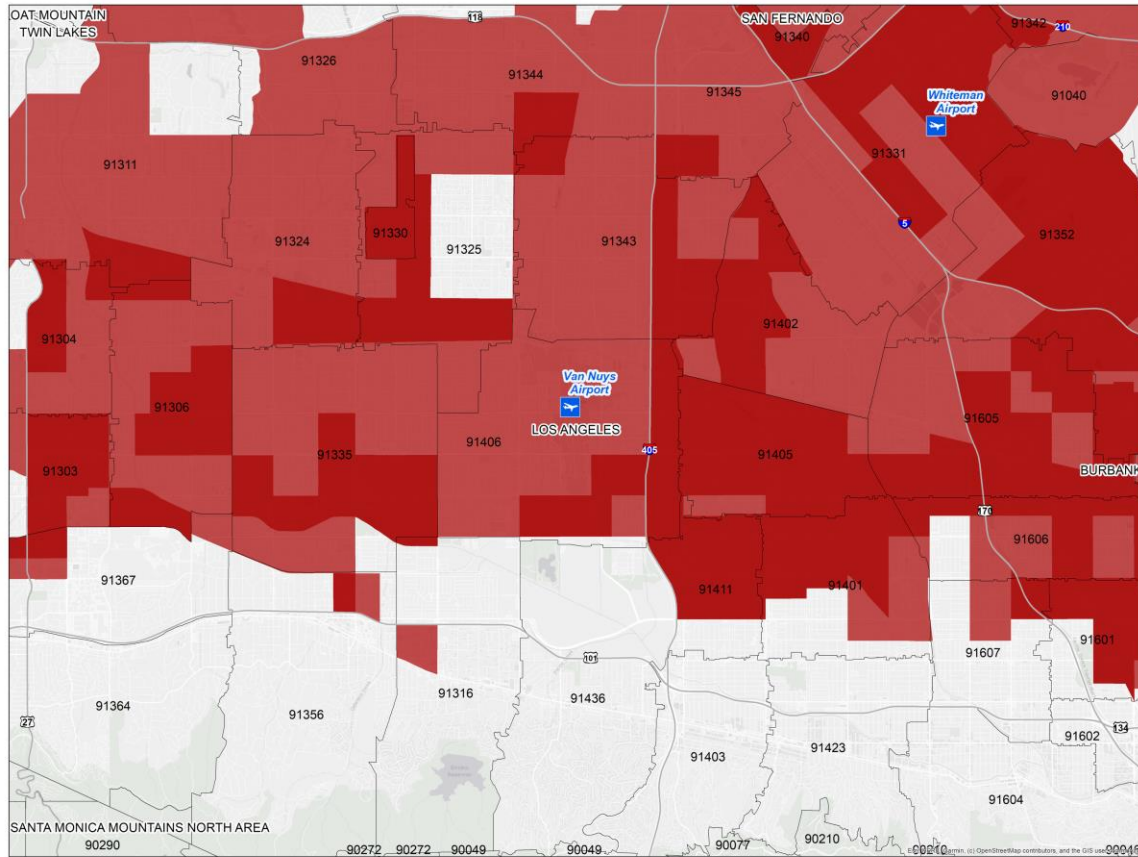
An increasing number of communities no longer fit the definition used in LAWA's 2004 LAX Master Plan under Senate Bill 535. The sharpest contrasts in the most recent definitions are between Senate Bill 535 (which includes fewer communities) and the USDOT definition (which includes more communities).



The following pages provide enlargements of these maps for closer scrutiny of what communities are included.

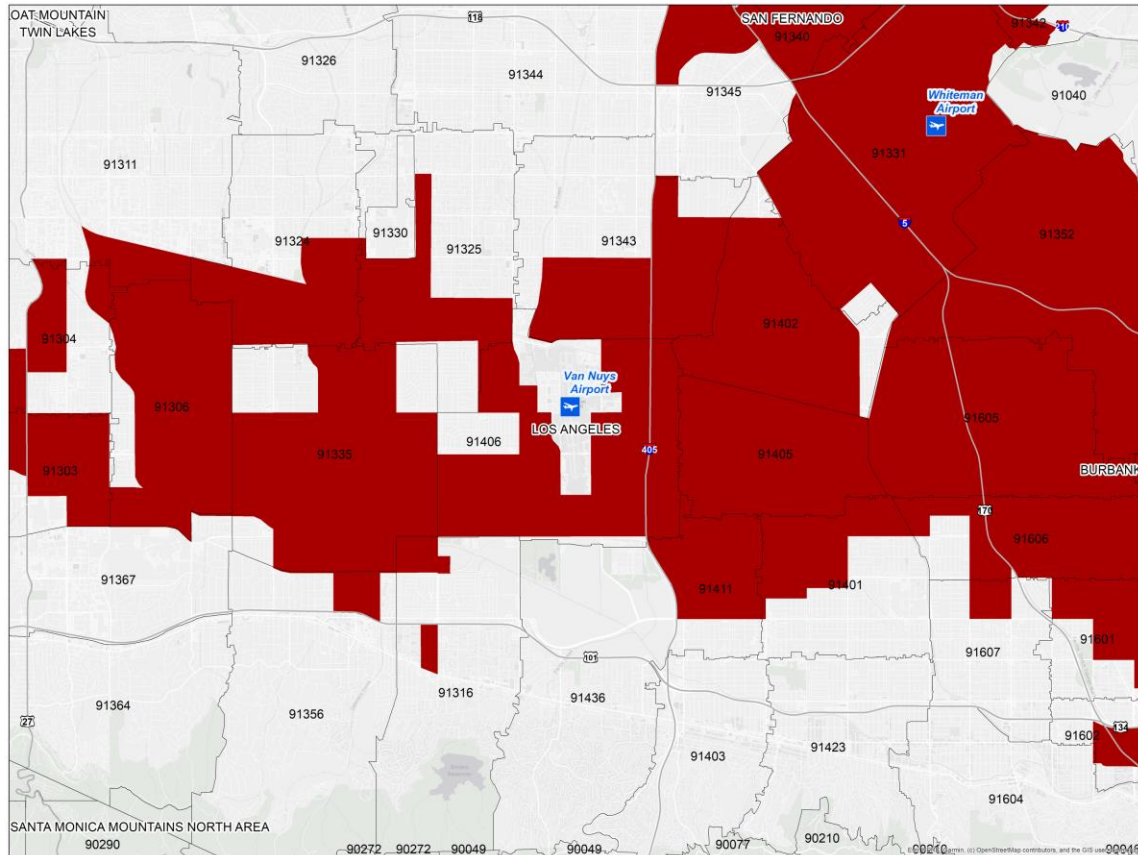


**Map 6. LAWA's 2004 Definition of Historically Disadvantaged Communities around VNY**

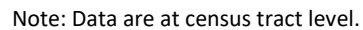


Note: Data are at census tract level; darker red indicate census tracts that fit both criteria (i.e., minority and low-income tract).

**Map 7. Senate Bill 535 Definition of Historically Disadvantaged Communities around VNY**

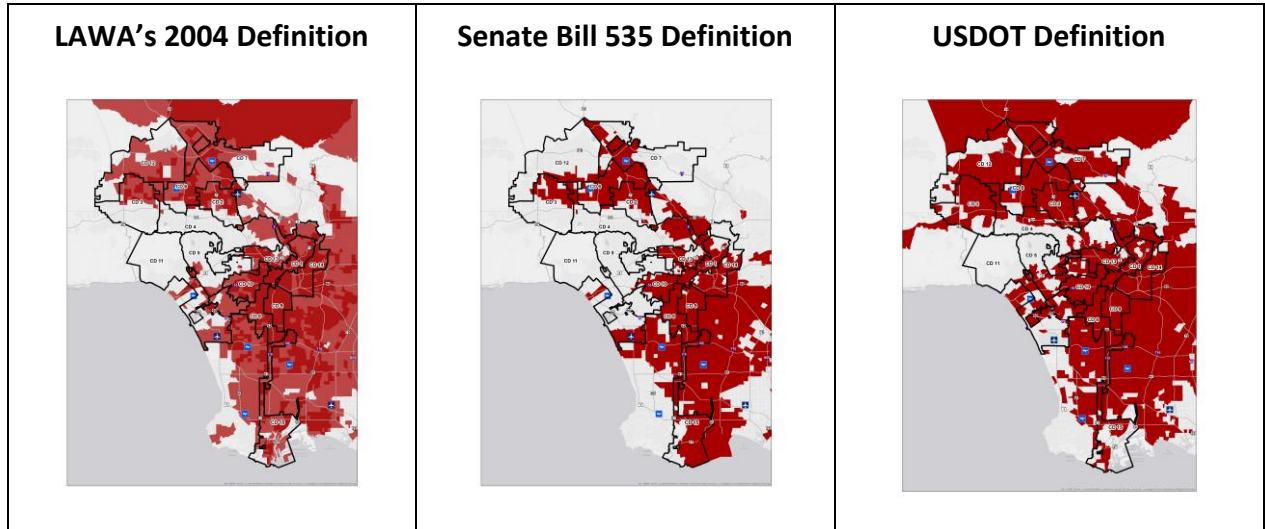


Note: Data are at census tract level.



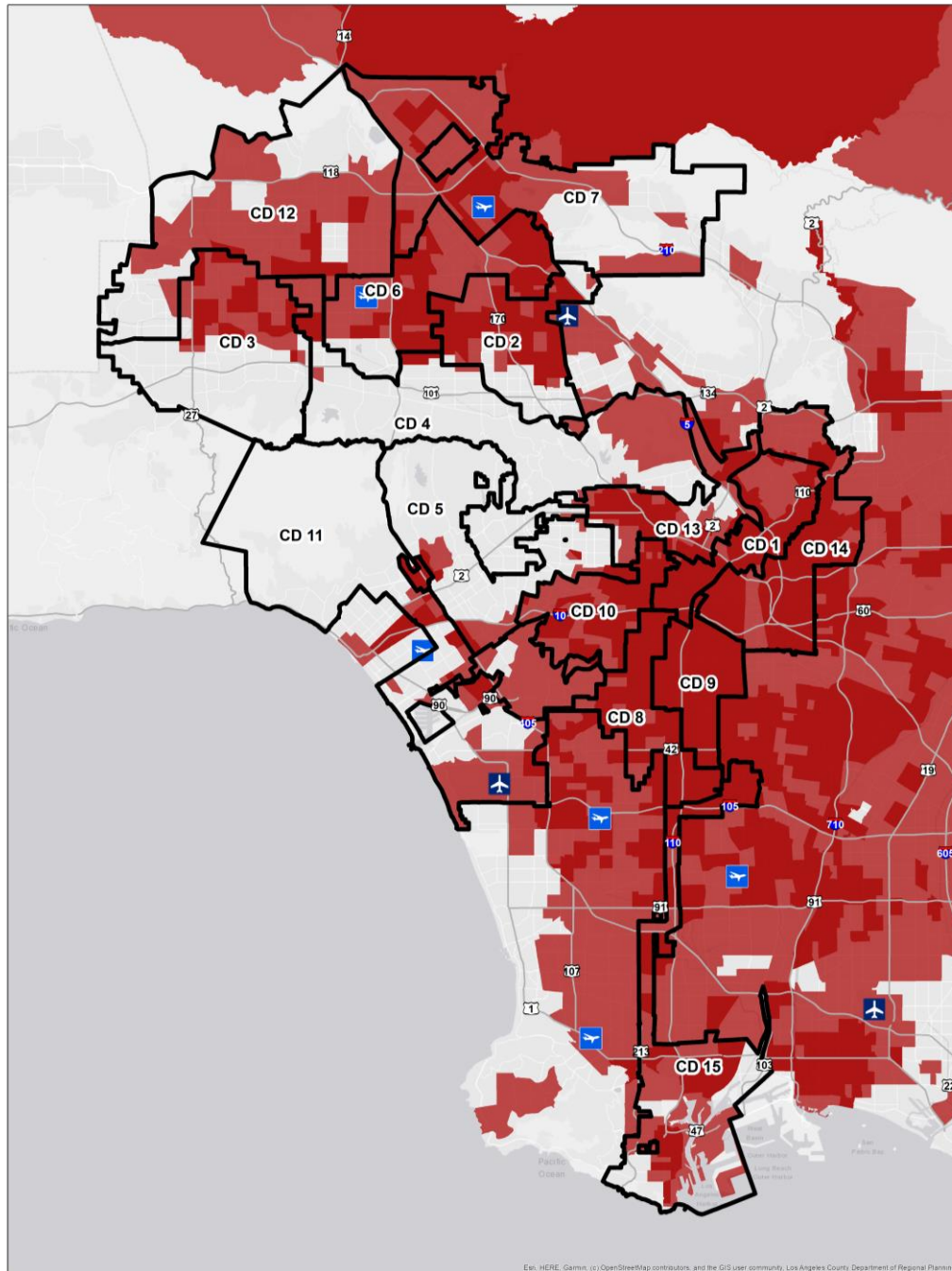
## The City of Los Angeles

To provide further context, the following maps visualize how census tracts throughout the City of Los Angeles and by Council Districts are classified across the different designations and definitions of a disadvantaged community.



The following pages provide enlargements of these maps for closer scrutiny of what communities are included.

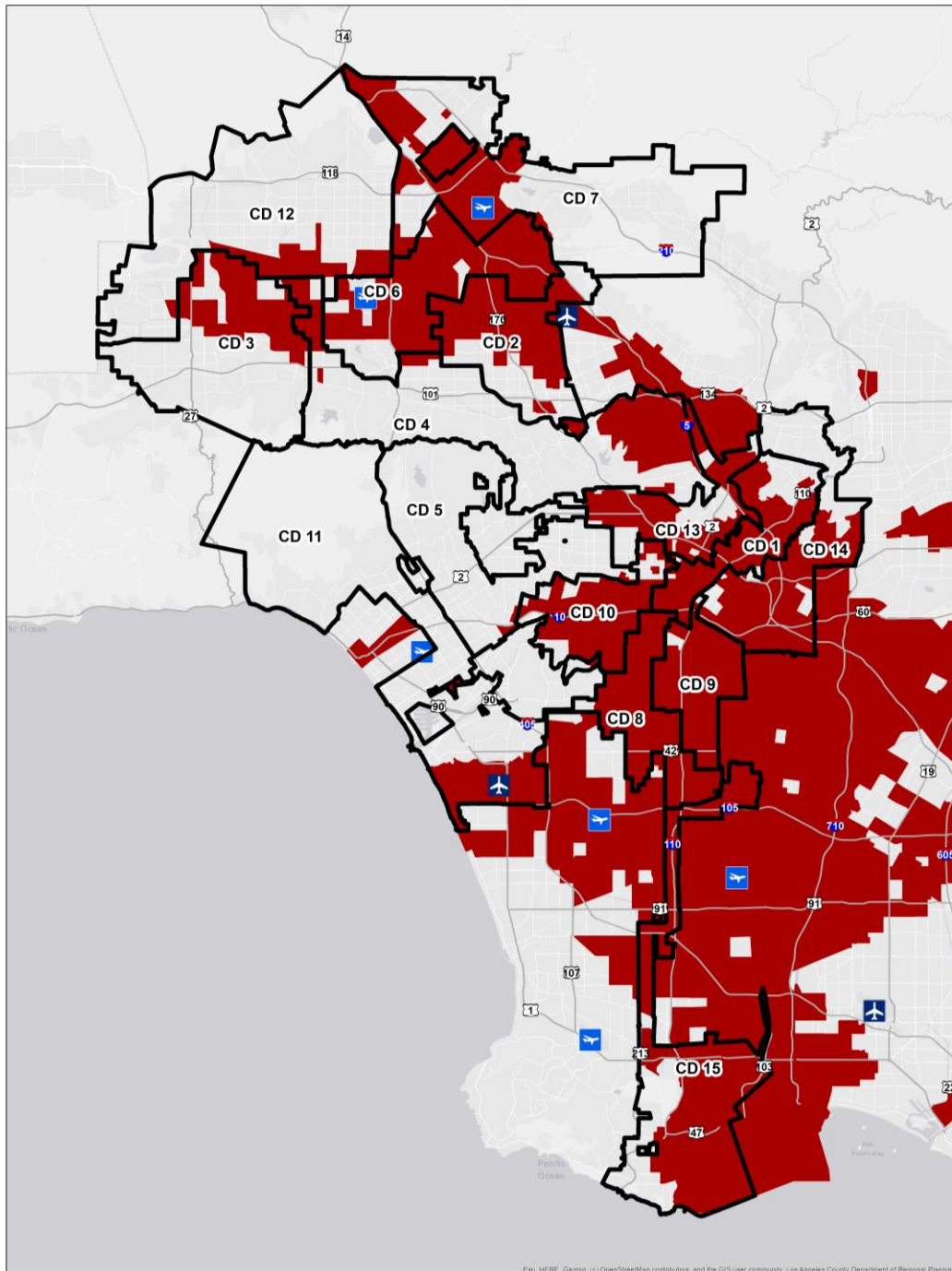
**Map 9. Overlay of City of Los Angeles and Council District Boundaries on LAWA's 2004 Definition of Historically Disadvantaged Communities**



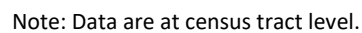
Note: Data are at census tract level; darker red indicate census tracts that fit both criteria (i.e., minority and low-income tract).



**Map 10. Overlay of City of Los Angeles and Council District Boundaries on Senate Bill 535 Definition of Historically Disadvantaged Communities**



Note: Data are at census tract level.





# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART C – ENVIRONMENT (PLANET)



## C – ENVIRONMENT (PLANET)

Airports, by their nature, are sources of pollution. LAWA has worked hard to mitigate the environmental impact it views as within its control – airport facilities, airport ground access alternatives, and noise mitigation of eligible homes and schools.

### C.1 STRENGTHS AND ACCOMPLISHMENTS

*Since 2008, LAWA has been preparing Environmental Sustainability Reports as part of its public accountability.*

Since 2008, LAWA has prepared environmental sustainability reports as part of its public accountability. In the 2016 IEA Survey, KH noted that LAWA's Sustainability Reports were among LAWA's strengths for guiding its sustainability efforts. LAWA's sustainability program has received national and international visibility.

[LAWA's approach to sustainability](#) is extensive, including:



Environmental	<ul style="list-style-type: none"> <li>■ Air quality and emission reduction</li> <li>■ Natural resources management</li> <li>■ Noise management</li> <li>■ Water consumption</li> <li>■ Water quality</li> </ul>
Business and work practices	<ul style="list-style-type: none"> <li>■ Procurement practices</li> <li>■ Tenant partnerships</li> <li>■ Material resources management</li> </ul>
People and communities	<ul style="list-style-type: none"> <li>■ Employee wellness</li> <li>■ Guest experience</li> <li>■ Local communities</li> </ul>
Economic	<ul style="list-style-type: none"> <li>■ Economic viability</li> </ul>
Energy	<ul style="list-style-type: none"> <li>■ Energy management</li> </ul>

---

***LAWA has established goals for environmental responsibility.***

In 2016, to measure and evaluate LAWA's environmental responsibility, KH recommended that LAWA develop goals in such areas as green buying, water conservation, noise, energy stewardship, greenhouse gas/vehicular miles traveled (GHG/VMT), air quality, materials and resources, green construction, and natural resources.

In 2019 LAWA developed its Sustainability Action Plan (SAP), which includes ambitious sustainability goals across a number of resource areas and a framework to mitigate environmental impacts and lead LAWA to net zero.

LAWA now reports current environmental metrics and progress towards achieving these goals in its annual Sustainability Report. The latest report can be found on LAWA's website, along with its environmental impacts reporting system for noise, land-use planning, and sustainability. Website "hits" are not regularly tracked.

---

***LAWA is committed to environmentally responsible practices in many areas.***

Since the 2016 IEA Survey, LAWA has made progress in adopting environmentally responsible practices; for example:

- LAWA established a policy that requires new building construction and renovation projects at LAX and VNY to achieve LEED Silver certification or higher.
- LAMP promises environmental benefits by reducing the number of shuttles circulating in the Central Terminal Area (CTA) and single vehicle trips to/from LAX, thereby reducing Vehicle Miles Travelled (VMT) to and from LAX by 2024.
- LAWA has built a new Central Utility Plant (CUP), certified LEED Gold, to reduce its carbon footprint.
- LAWA has increased its alternative fuel vehicle fleet.

LAWA's environmental management function under the Chief Sustainability & Revenue Management Officer was restructured in 2019 to place greater emphasis on sustainability while still ensuring compliance.

---

***LAWA continues to mitigate its environmental impact on its surrounding communities.***

LAWA continues to mitigate its environmental impact on surrounding communities by meeting standards and objectives set by the Southern California Air Quality Management District (SCAQMD) Memorandum of Understanding (MOU) and Air Quality Improvement Plans. Among other strategies to reduce the airports' negative environmental impact on local communities:

- LAWA encourages the use of sustainable aviation jet fuel (SAF) at LAX and VNY. All SAF delivered to LAX and VNY is blended 30% SAF/70% Jet A Fuel blend before being introduced into the Jet A fuel supply (SAF blend).
  - In 2019, at VNY, Jet Aviation received 18,975 gallons of SAF.
  - In 2020, Jet Aviation and signature flight support received 100,483 gallons.
  - In 2021, at LAX, 6.8 million gallons were dispensed.
  - In 2021, Jet Aviation, Signature, and Clay Lacy delivered a total of 906,041 gallons.
- LAWA's electric vehicle purchase policy targets 100% of LAWA's sedan fleet to be electric by 2031.
- At LAX, 33% of ground support equipment, which is not under LAWA's regulatory control, is electric.
- Regarding infrastructure, VNY has become the "#1 California general aviation airport in solar panel rooftops." As of 2020, VNY had a total of 20,127 rooftop solar panels. In 2021, nearly 30,000 solar panels were installed by 11 VNY tenant solar projects.

LAWA earned second place in Leadership for the Los Angeles Department of Water and Power (LADWP) 2020 Sustainability award for its 2019 performance in the Demand Response Program.

*"LAWA's 2019 performance in the program resulted in approximately 2,200 kW of energy saved during times when LADWP's grid was experiencing peak demand."*

Additional accomplishments are outlined in LAWA's recently-released [2021 Sustainability Report](#) and [LAWA's 2020 Sustainability Report](#), including:

## SUSTAINABILITY ACTION PLAN UPDATE



LAWA's 2019 Sustainability Action Plan (SAP) is the framework on which sustainability is applied throughout LAWA's business practices, operations, community engagement,

and environmental conservation efforts. The SAP focuses on seven sustainability categories, each with goals and initiatives to guide LAWA through continuous improvement and implementation.

### SAP GOALS AND OBJECTIVES

🕒 = complete



#### CORPORATE RESPONSIBILITY

- » Continue to implement **inclusivity requirements** in LAWA contracts and monitor compliance 🕒
- » Develop and expand partnerships to promote a **sustainable local workforce** for the airport and airport-related projects



#### ENERGY MANAGEMENT

- » Achieve **100% Renewable electricity** by 2045
  - » Reduce energy use per passenger
- ↓ **15%** | **30%** | **65%**  
by 2025 | by 2035 | by 2045  
compared to 2011 levels



#### WATER MANAGEMENT

- » Reduce potable water use per passenger
  - » Increase **recycled water use** as a percentage of total water use
  - » Eliminate potable water consumption for non-potable uses such as landscaping and the cooling towers by **2045**
- ↓ **25%** | **30%**  
by 2025 | by 2035  
compared to 2017 levels
- ↑ **30%**  
by 2035



#### AIR EMISSIONS MANAGEMENT

- » Achieve **Carbon Neutrality** by **2045**
- » Strive for higher ACA ranking by **2023**
- » Aim for **100% zero-emissions** bus fleet by 2030
- » Develop stronger ground support equipment (GSE) targets 🕒
- » Achieve **100% compliance** with LAX Alternative Fuel Vehicle Policy 🕒
- » Establish electrification requirements for all aircraft parking positions
- » Develop Mobility Strategic Plan 🕒
- » Implement Clean Construction requirements for all LAWA projects 🕒
- » Release smart parking Request for Proposal (RFP) for existing parking structures 🕒



#### MATERIAL RESOURCES MANAGEMENT

- » Achieve **non-construction** waste diversion:
- 25%** | **50%**  
by 2025 | by 2035
- » Develop **Zero Waste Plan**
- » Achieve **construction** waste diversion:
- 90%** | **95%**  
by 2025 | by 2035



#### NOISE MANAGEMENT

- » Implement the LAX "Fly Quieter" Program 🕒
- » Launch web-based noise portals for LAX and VNY 🕒
- » Continue with the Sound Insulation Grant Program as funds are identified 🕒



#### NATURAL RESOURCES MANAGEMENT

- » Apply for grants to benefit LAX Dunes 🕒
- » Strive for natural addition of flora and fauna with no net loss of biodiversity in LAX Dunes 🕒
- » Implement invasive plant management in the El Segundo Blue Butterfly Habitat Restoration Area
- » Work to improve the Coastal Dunes Improvement Plan (CDIP) area in the northern section of the LAX Dunes 🕒
- » Continue weeding and restoration activities in the northern Dunes 🕒

## C.2 FINDINGS

Environmental (planet) findings are divided into air quality and noise.

### Environmental (Planet) – Air Quality

***LAX and VNY operate in regions that have higher exposure to pollutants and are environmentally vulnerable.***

In achieving one facet of equity, LAWA states its objective to build a healthy and sustainable future for LAWA's airports and the region. To meet this objective, at a minimum, LAWA must meet standards set by AQMD to mitigate its negative impact on the environment.

***LAWA's airports operate in an environmentally vulnerable region affected by multiple polluters (e.g., local traffic, highway traffic, oil refineries, and manufacturing).*** Therefore, the environmental pollutants surrounding LAX and VNY can be considered substantial and consequential to the health and well-being of local residents, recognizing that the airports are one of multiple contributing factors.

[CalEnviroScreen 4.0](#) data<sup>1</sup> from the California Office of Environmental Health Hazard Assessment (OEHHA) shows that the regions around LAX and VNY have relatively higher exposure to pollutants and are more environmentally vulnerable compared to the rest of Los Angeles County. ***Note: LAWA states that determining the pollutants directly attributable to LAX and VNY alone is not possible with current data.***

The next series of maps visualize overall environmental vulnerabilities. Percentile comparisons are made for LAX and VNY relative to Los Angeles County overall.

*Ozone levels affect the northern region more than the southern region of the county with the Santa Monica and San Gabriel Mountains serving as buffers.*

The definition for and impact of ozone on air quality and residents is:

#### **Air Quality: Ozone (Percentile)**

*"Ozone is the main ingredient of smog. At ground level, ozone is formed when pollutants chemically react in the presence of sunlight. The main sources of ozone are trucks, cars, planes, trains, factories, farms, construction, and dry cleaners. Ozone can irritate the lungs, cause inflammation, and make chronic illnesses worse, even at low levels of exposure. Children and the elderly are sensitive to the effects of ozone. Ozone levels are highest in the afternoon and on hot days. People who spend a lot of time outdoors may also be affected by ozone."* –

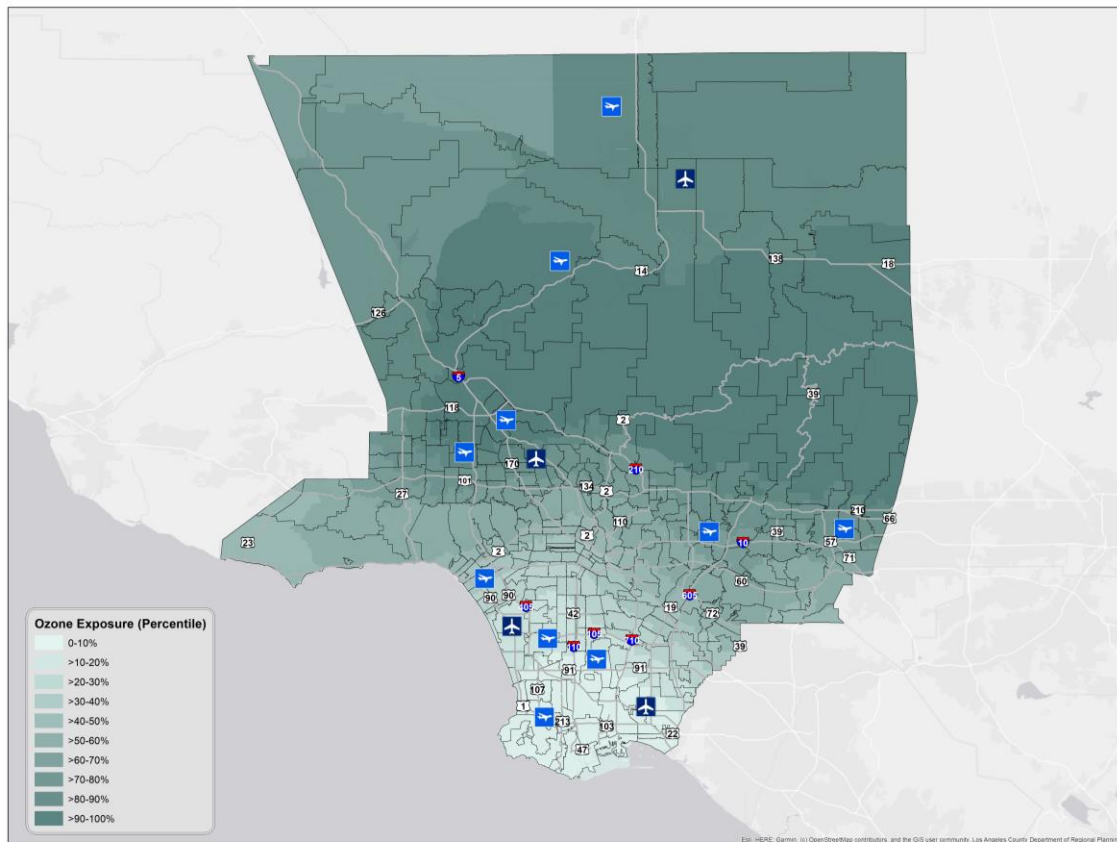
[CalEnviroScreen 4.0](#)

<sup>1</sup> Note: Data from CalEnviroScreen 4.0 are at the census tract level.

## LOS ANGELES COUNTY – OZONE EXPOSURE

The areas with greater exposure to ozone are in the northern region of the county. The southern and coastal areas have relatively lower ozone exposure.

**Map 12. Ozone Exposure in Los Angeles County**



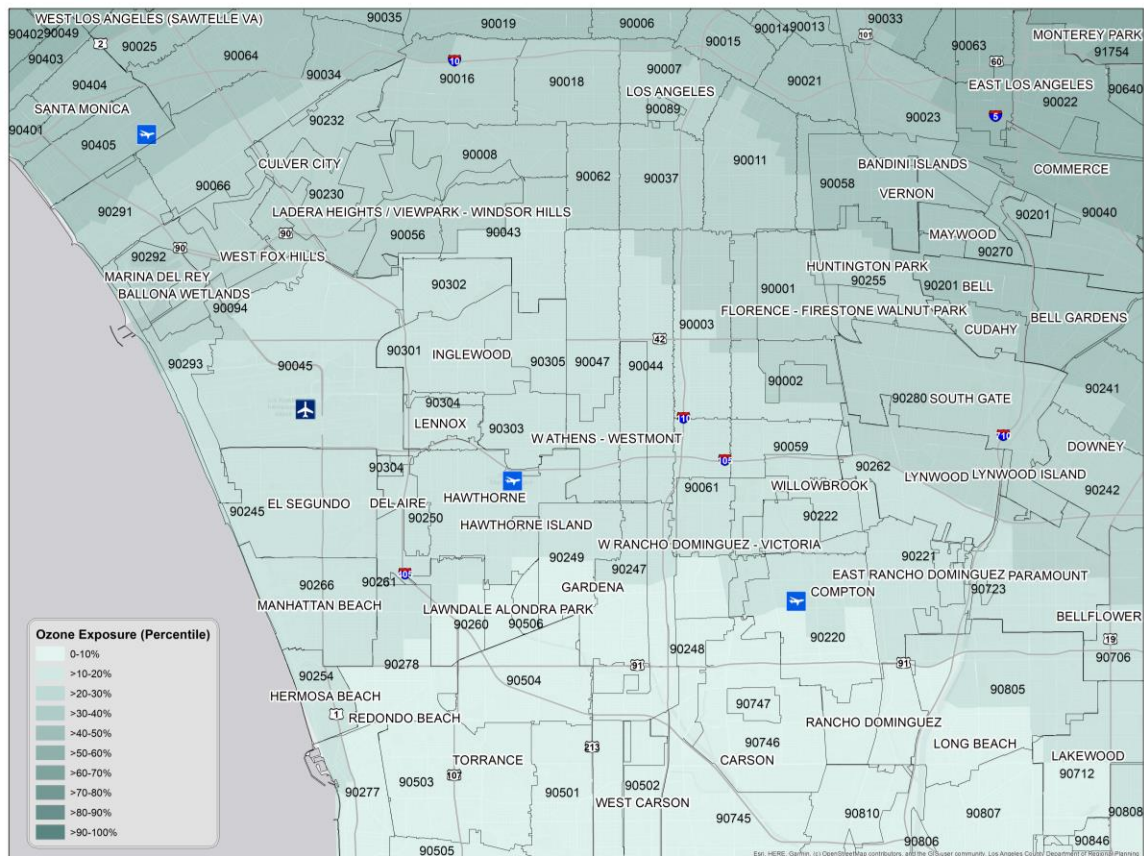
Note: Data are at census tract level.



## AROUND LAX – OZONE EXPOSURE

Around LAX, ozone exposure is relatively low compared to the rest of the county. Based on the ozone exposure score, areas in the map frame score are at or below the 50<sup>th</sup> percentile of all Los Angeles County. This relatively lower percentile may be attributed to LAX's proximity to the Pacific Ocean.

**Map 13. Ozone Exposures around LAX**

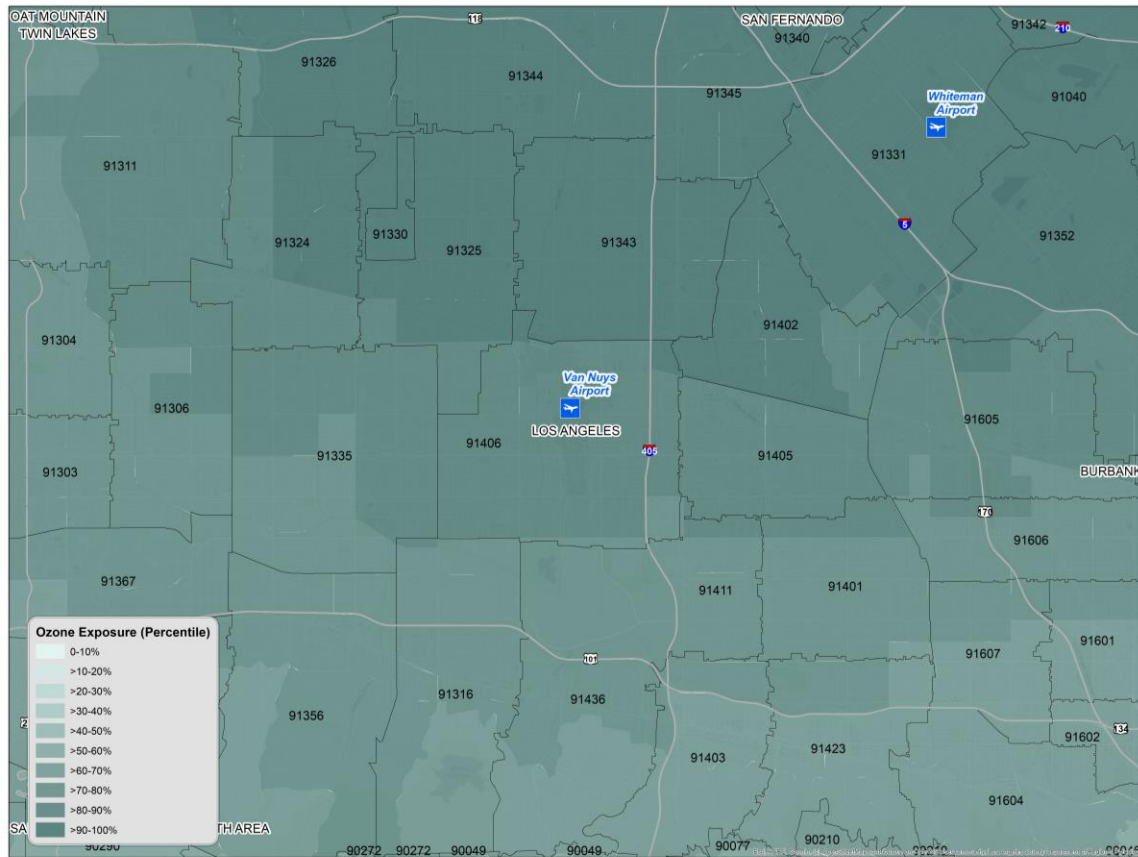


Note: Data are at census tract level.

## AROUND VNY – OZONE EXPOSURE

Around VNY, ozone exposure is relatively higher with areas in the map frame scoring as high as the 90<sup>th</sup> percentile of all Los Angeles County.

**Map 14. Ozone Exposures around VNY**



Note: Data are at census tract level.

*Small airborne particle pollution (PM2.5) affects air quality, primarily in the San Fernando and San Gabriel Valleys and central and southern regions of the county.*

The definition for and impact of PM2.5 on air quality and residents is:

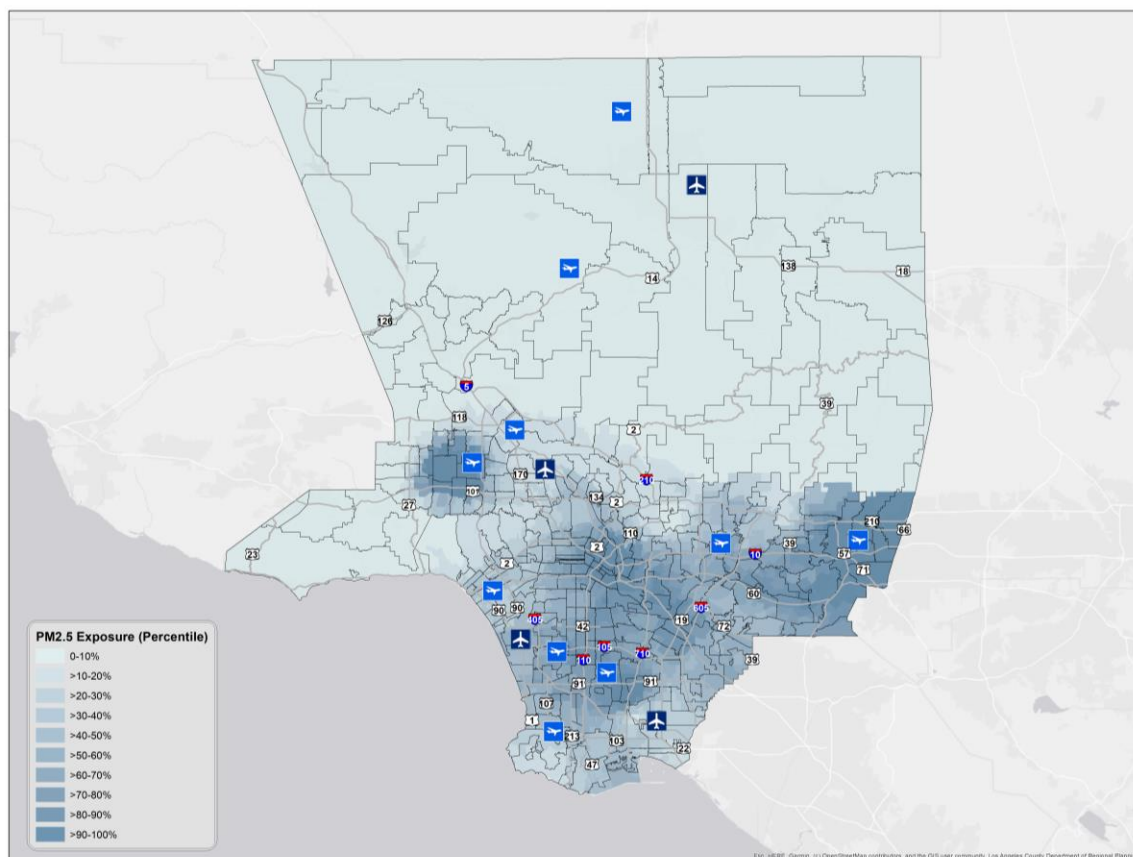
## Air Quality: PM2.5 (Percentile)

*“Particulate matter or PM2.5 is very small airborne particle pollution, less than 2.5 micrometers, which is less than the thickness of a human hair. PM2.5 is a mixture of particles that can include organic chemicals, dust, soot and metals. These particles can come from cars and trucks, factories, wood burning, and other activities. They can travel deep into the lungs because they are so small and cause various health problems including heart and lung disease. Children, the elderly, and people suffering from heart or lung disease, asthma, or chronic illness are most sensitive to the effects of PM2.5 exposure.” – [CalEnviroScreen 4.0](#)*

## LOS ANGELES COUNTY – PM2.5

The areas with greater exposure to PM2.5 are in the southern and central regions of the county. The northern and less populated areas have relatively lower PM2.5 exposure.

**Map 15. PM2.5 Exposures in Los Angeles County**

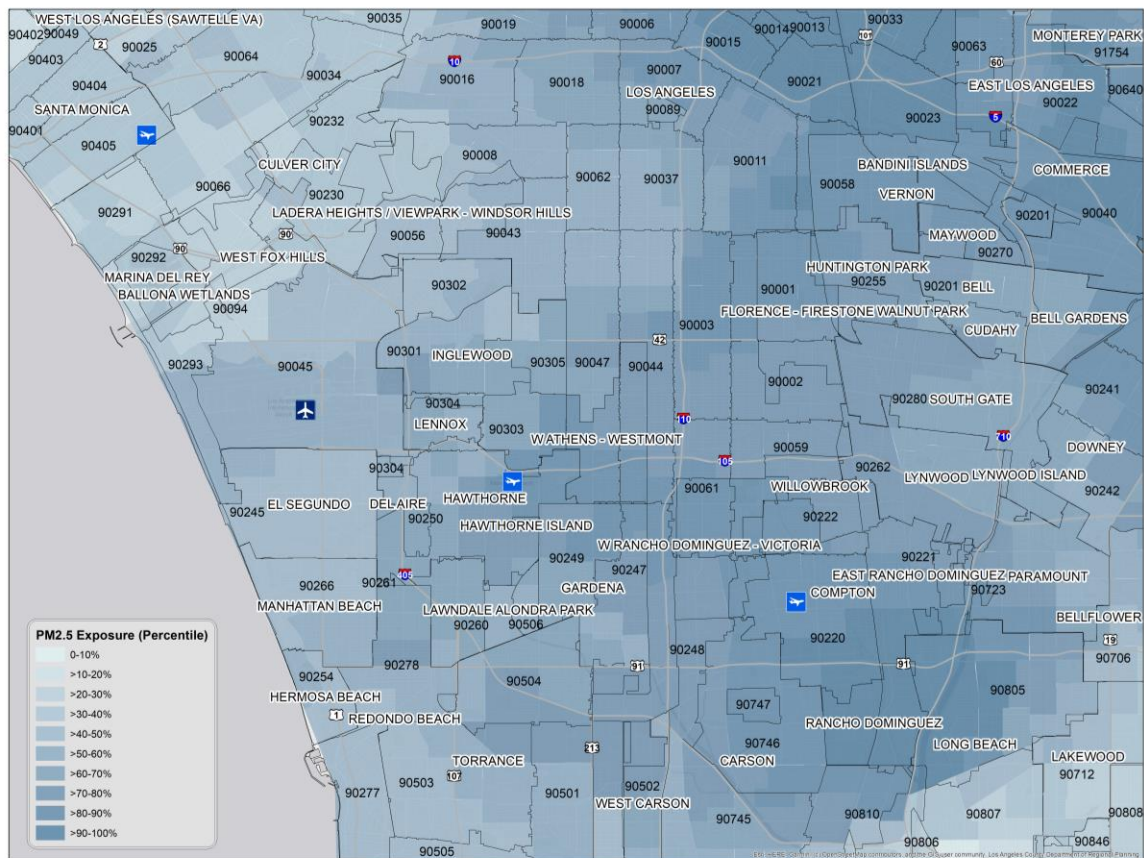


Note: Data are at census tract level.

## AROUND LAX – PM2.5

Around LAX, PM2.5 exposure is relatively higher compared to the rest of the county. Based on the PM2.5 exposure score, ***areas to the northeast, east, and southeast of LAX on the map frame score as high as the 90<sup>th</sup> percentile of all Los Angeles County. Areas closer to the Pacific Ocean have lower PM2.5 exposures, ranging from the 30<sup>th</sup> percentile upwards.***

**Map 16. PM2.5 Exposures around LAX**



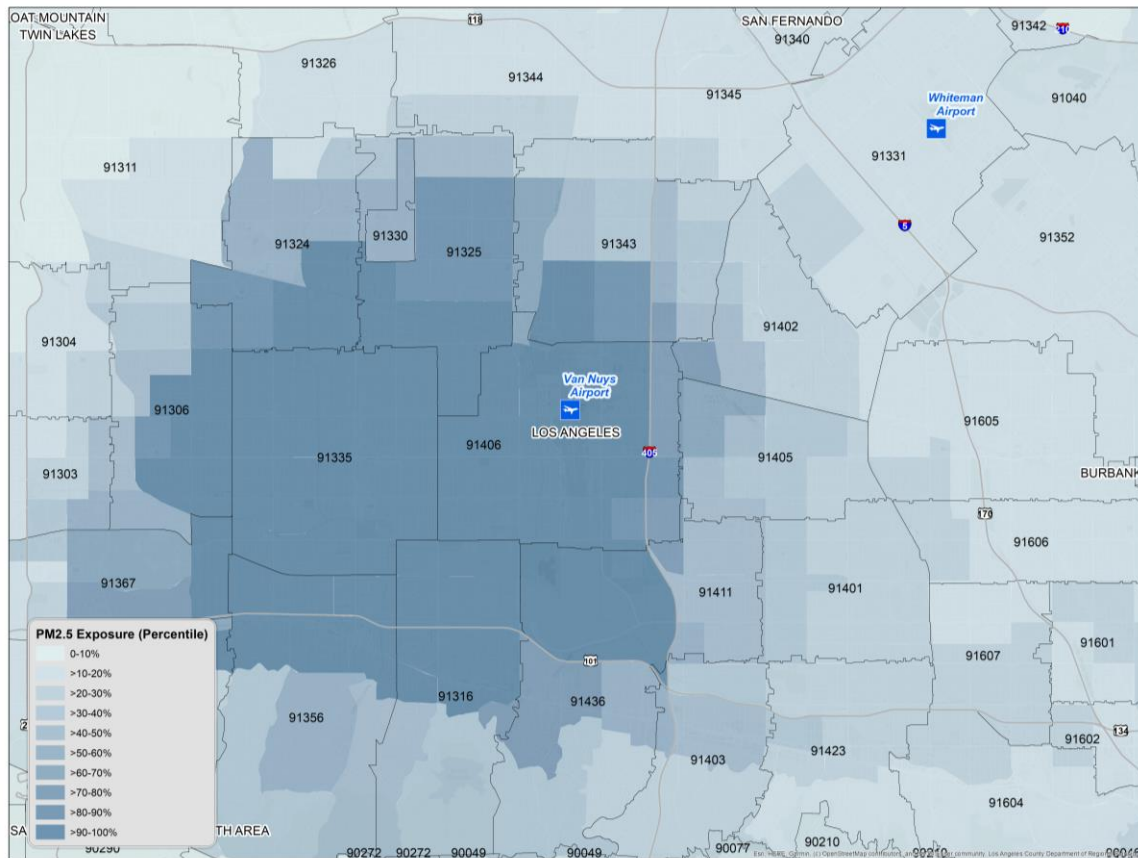
Note: Data are at census tract level.



## AROUND VNY – PM2.5

Around VNY, PM2.5 exposure is relatively higher with areas in the map frame scoring up to the *90th-100th percentile of all Los Angeles County*, with ***higher concentration around and directly west of VNY.***

**Map 17. PM2.5 Exposures around VNY**



Note: Data are at census tract level.

*Overall pollution burden affects primarily central and southern regions of the county.*

The overall pollution burden (percentile) definition and impact on air quality and residents is:

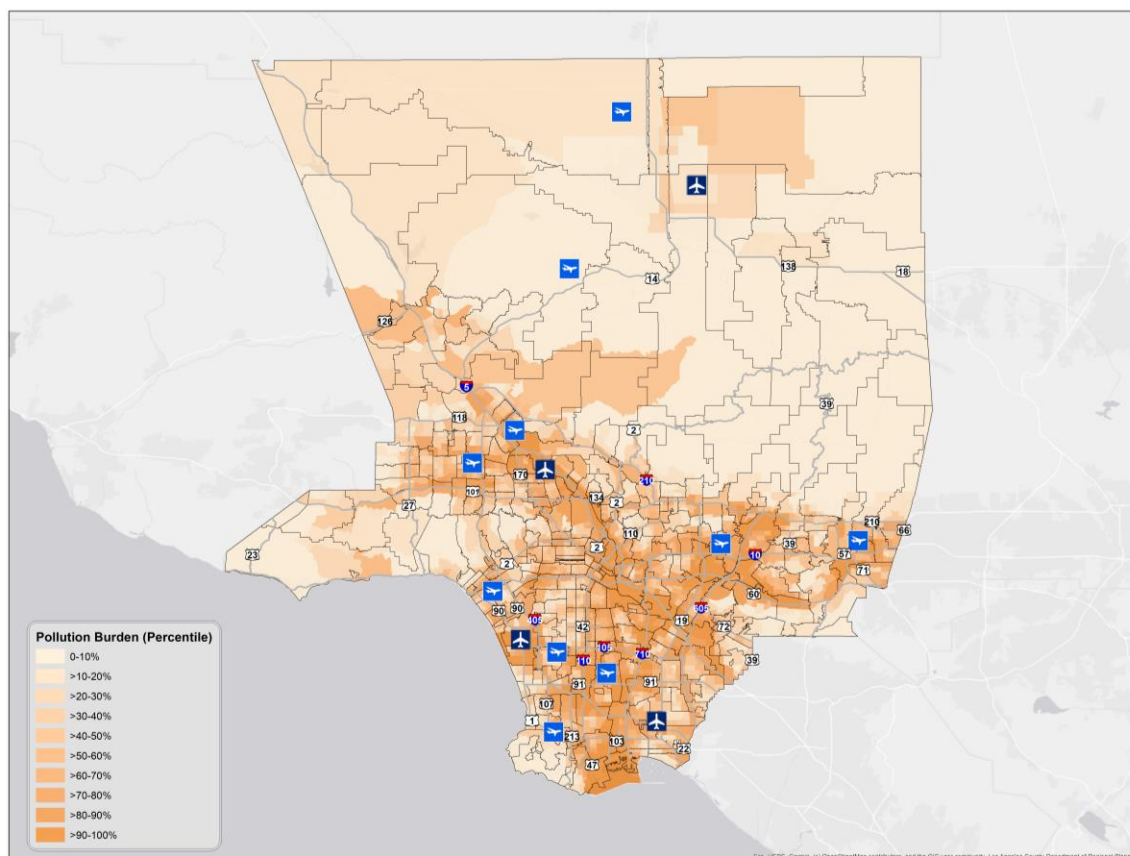
## Overall Pollution Burden (Percentile)

*“Pollution Burden scores for each census tract are derived from the average percentiles of the seven Exposures indicators (ozone and PM2.5 concentrations, diesel PM emissions, drinking water contaminants, children’s lead risk from housing, pesticide use, toxic releases from facilities, and traffic density) and the five Environmental Effects indicators (cleanup sites, impaired water bodies, groundwater threats, hazardous waste facilities and generators, and solid waste sites and facilities). Indicators from the Environmental Effects component were given half the weight of the indicators from the Exposures component.” – [CalEnviroScreen 4.0](#)*

## LOS ANGELES COUNTY – OVERALL POLLUTION BURDEN

The areas with greater pollution burden are in the southern and central regions of the county. The northern and less populated areas have relatively lower pollution burden.

**Map 18. Overall Pollution Burden in Los Angeles County**

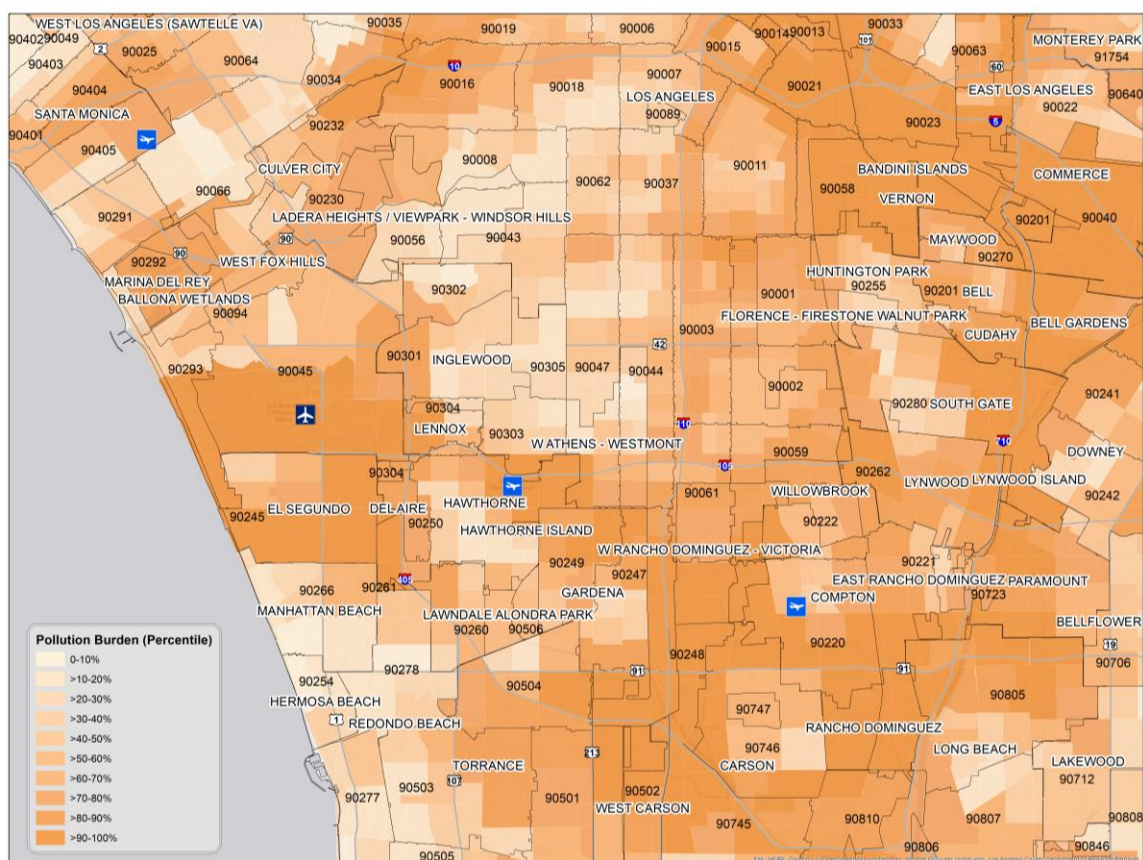


Note: Data are at census tract level.

## AROUND LAX – OVERALL POLLUTION BURDEN

Around LAX, the pollution burden is relatively higher compared to the rest of the county. Based on the pollution burden score, areas in the map frame score up to the *90th-100th percentile of all Los Angeles County*. It is important to note that there are many sources of pollution impacting the region, including operations at LAX, other area airports, oil refineries, Hyperion Treatment Plant, and traffic congestion.

**Map 19. Overall Pollution Burden around LAX**



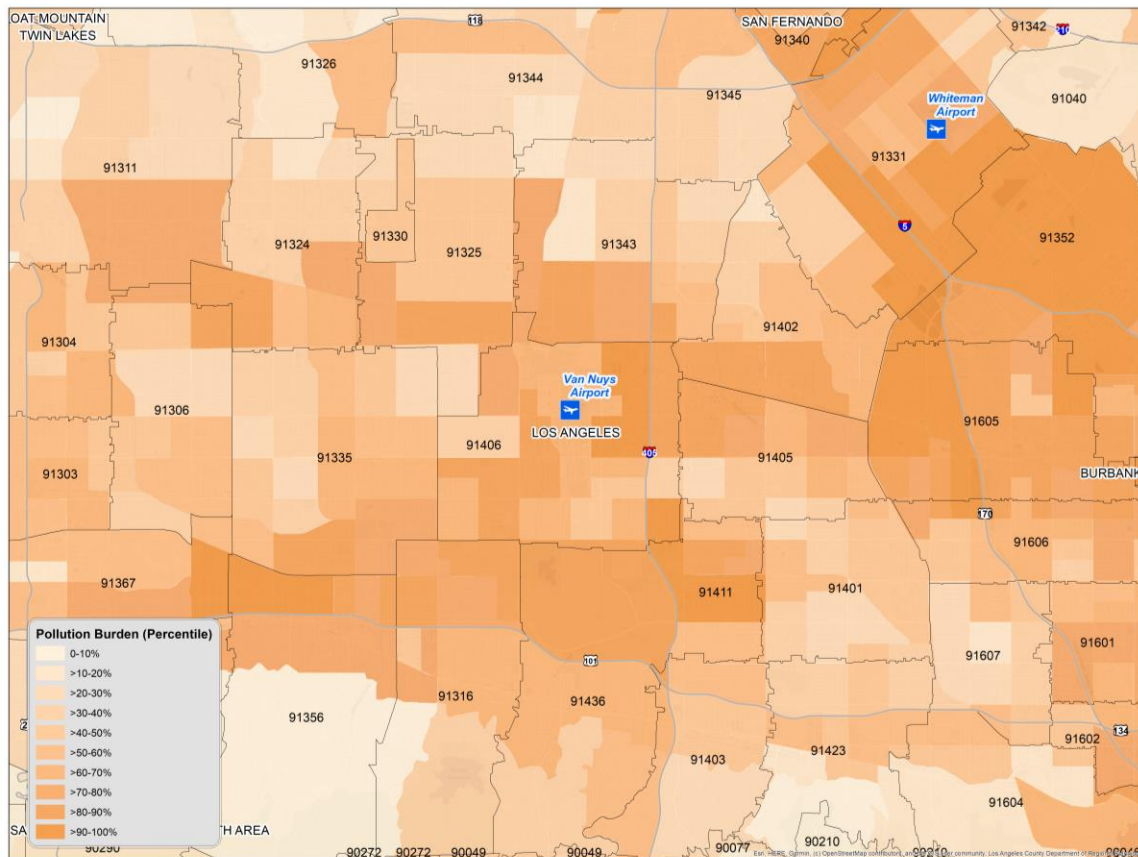
Note: Data are at census tract level.



## AROUND VNY – OVERALL POLLUTION BURDEN

Around VNY, pollution burden is relatively higher with areas in the map frame scoring up to the 90<sup>th</sup> percentile of all Los Angeles County.

**Map 20. Overall Pollution Burden around VNY**



Note: Data are at census tract level.

Based on CalEnviroScreen scores, communities adversely affected are the San Fernando Valley, San Gabriel Valley, northeast/Antelope Valley, and South Central on down to the Ports.

The definition the CalEnviroScreen Score (Percentile) is:

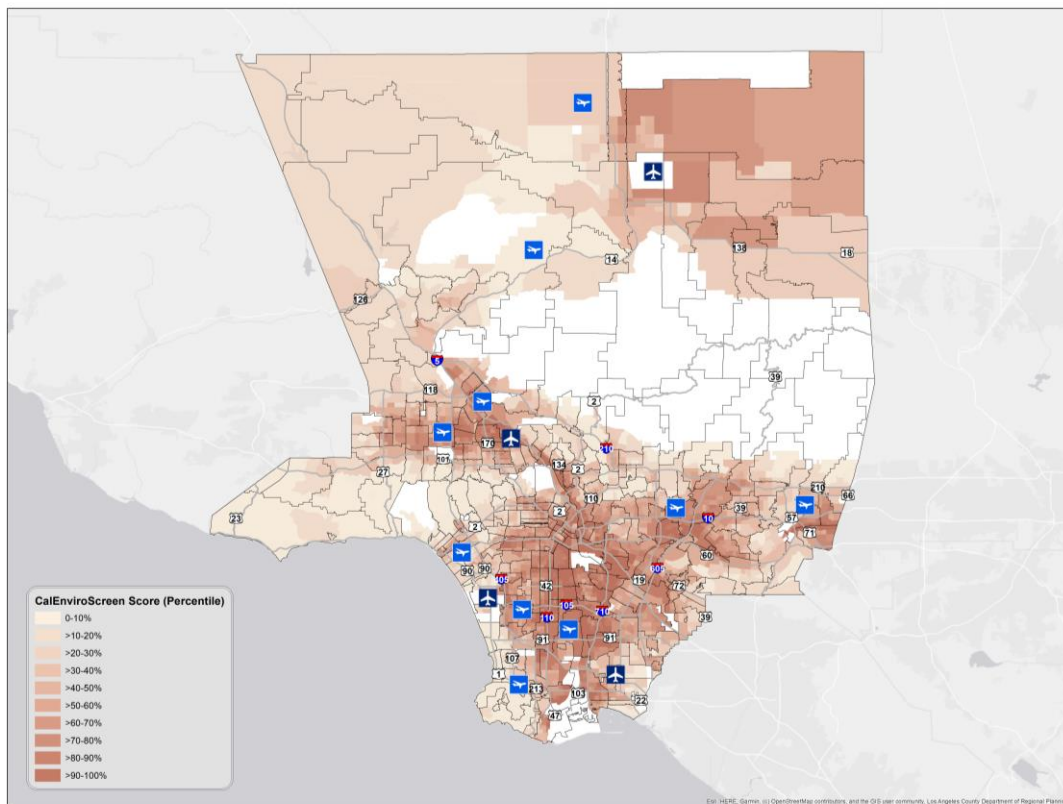
## CalEnviroScreen Score (Percentile)

*“In the CalEnviroScreen model, the Population Characteristics are a modifier of the Pollution Burden... The relationship between CalEnviroScreen scores of the state’s census tracts and their race/ethnicity compositions and children and elderly populations is an important context with which to understand environmental inequity in California. An analysis available on the CalEnviroScreen website shows clear disparities with respect to the racial makeup of the communities with the highest pollution burdens and vulnerabilities. People of color, especially Latino and Black people, disproportionately reside in highly impacted communities in California.” – [CalEnviroScreen 4.0](#)*

## LOS ANGELES COUNTY – CALENVIROSCREEN SCORE

Greater environmental vulnerabilities as determined by a relatively higher CalEnviroScreen score are in the northeastern, southern, and central areas of the county.

### Map 21. CalEnvironScreen Scores for Los Angeles County

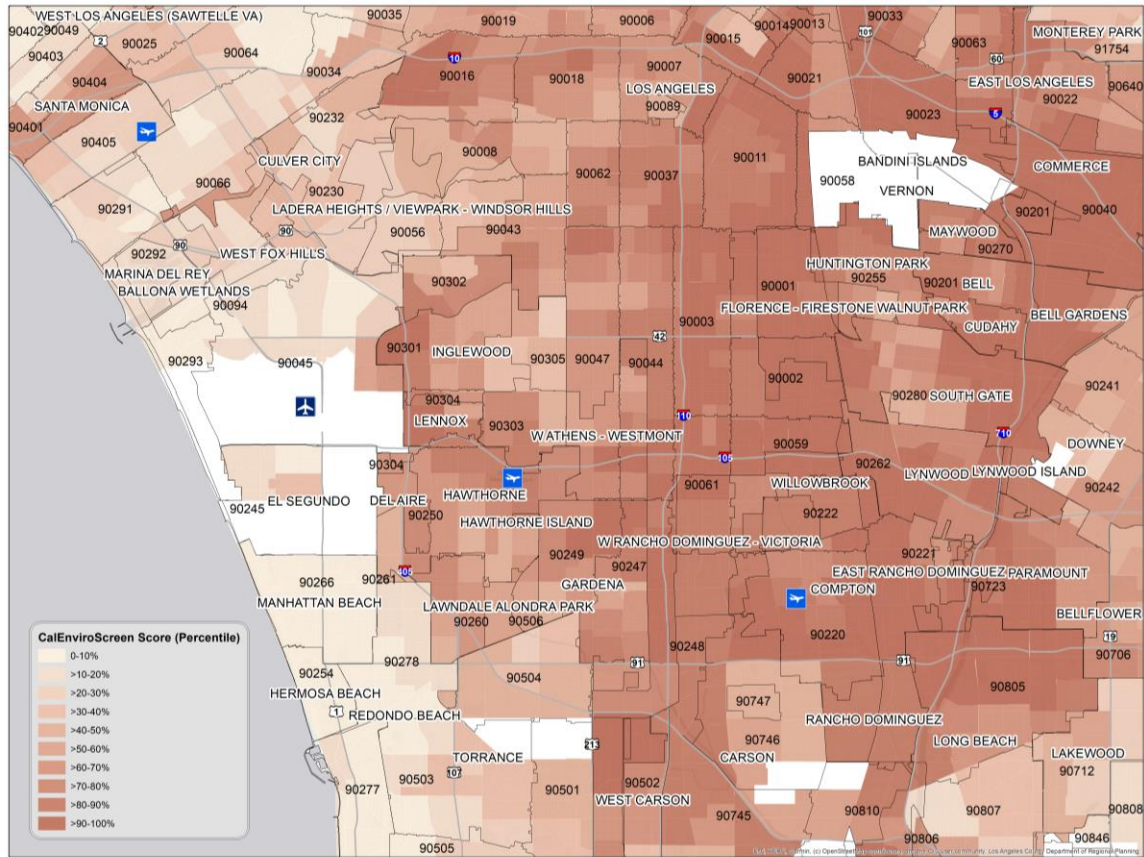


Note: Data are at census tract level. Areas with no color indicate unavailable data, such as population data.

## AROUND LAX – CALENVIROSCREEN SCORE

The areas closer to the Pacific Ocean, such as Westchester, Manhattan Beach, and Hermosa Beach, have lower CalEnviroScreen scores. No data are available for LAX. The CalEnviroScreen Scores become relatively higher to the east of LAX as compared to the rest of the county. Areas in the map frame to the east of LAX score up to the *90th-100th percentile of all Los Angeles County*.

**Map 22. CalEnviroScreen Scores around LAX**

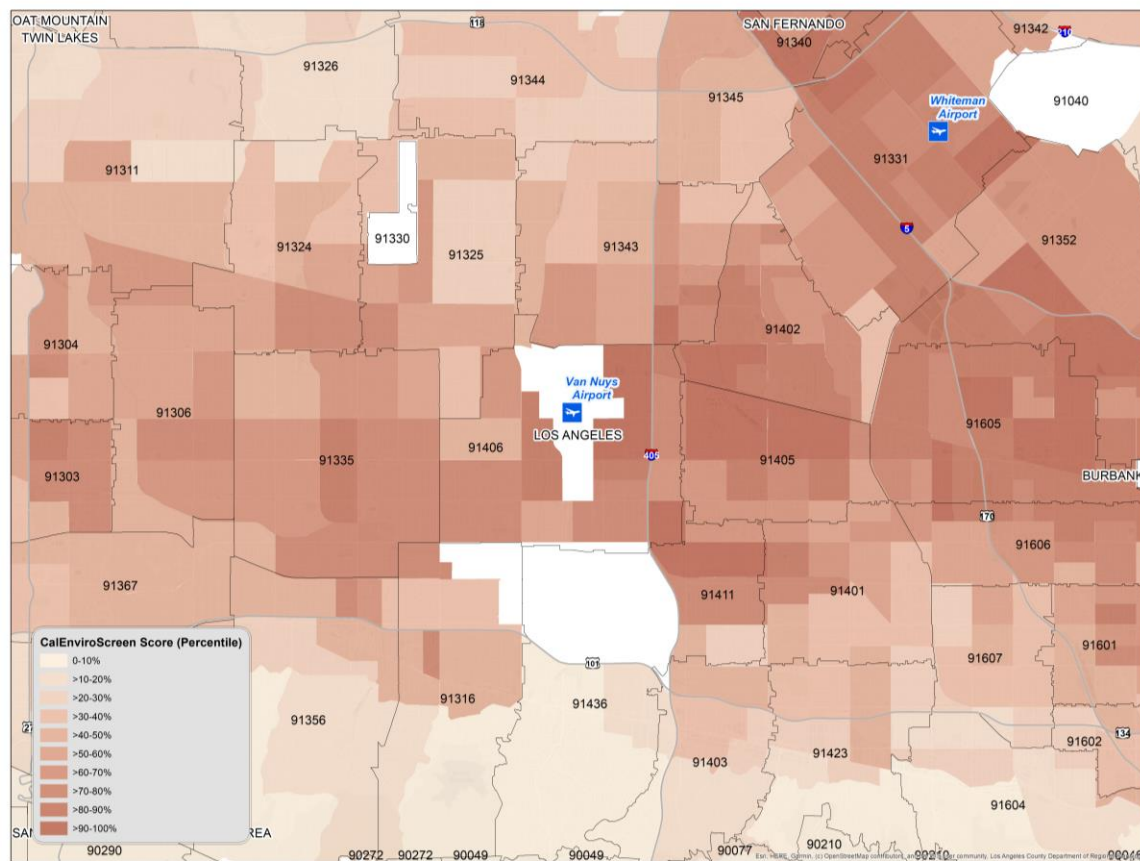


Note: Data are at census tract level. Areas with no color indicate unavailable data, such as population data.

## AROUND VNY – CALENVIROSCREEN SCORE

The areas immediately adjacent to VNY show higher CalEnviroScreen scores. No data are available for VNY. The CalEnviroScreen Scores become relatively higher to the east of VNY and between VNY and Hollywood-Burbank Airport (BUR). Areas in the map frame immediately around VNY and BUR score up to the *90<sup>th</sup> percentile of all Los Angeles County*. Communities in the map frame, such as the communities along the Santa Monica Mountains to the south, have relatively lower CalEnviroScreen scores – 30<sup>th</sup> percentile or lower than the county median.

**Map 23. CalEnviroScreen Scores around VNY**



Note: Data are at census tract level. Areas with no color indicate unavailable data, such as population data.

Understanding the environmental vulnerabilities of the regions where the airports operate is important in determining how operations and resources at the airports may need to shift to equitably address LAWA's contributions to the environmental health of the neighboring areas.



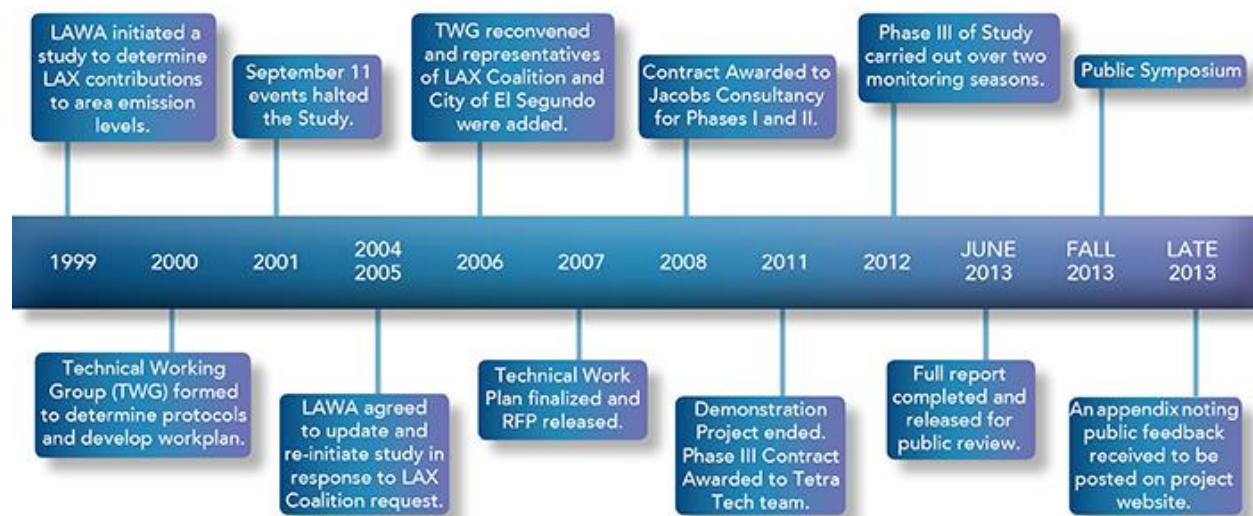
**LAWA conducted its last comprehensive study of airport-related pollutants in the region in 2013.**

Given existing data, it is challenging to extrapolate the environmental impact LAX and VNY have had on local air quality; however, a prior study by LAWA and peer-reviewed research provide insight into the airports' negative impact.

Limited resources have been invested in determining LAWA's direct environmental impact on local disadvantaged communities. Previous work on this matter includes the [LAX Air Quality and Source Apportionment Study](#), which:

*"...was conducted to measure pollutant concentrations in the vicinity of LAX and to assess the potential impacts of airport-related emissions on ambient air quality of communities adjacent to the airport."*

This air quality study was conducted by LAWA and *"...satisfies requirements of the LAX Master Plan Mitigation and Monitoring Reporting Program commitments and various legal agreements."* This report was completed in 2013 with the following timeline:



Source: <https://www.lawa.org/lawa-environment/lax/lax-air-quality-and-source-apportionment-study/final-report-and-materials>

The report concluded that:

*"...the ambient concentrations of criteria pollutants within the communities adjacent to LAX were well below national and state health-based ambient air quality standards and ambient concentrations of air toxic contaminants were generally lower than measured elsewhere in the SoCAB. The generally lower pollutant concentrations in the LAX area can be attributed to its coastal location and the typical daytime sea breeze that helps to*

*disperse local emissions. The concentrations of most measured pollutants were higher east of LAX compared to monitoring locations north or south of the airport.” See [Volume 1 of the LAX Air Quality and Source Apportionment Study](#) for specific key findings.*

**LAWA has not done such a comprehensive study since then.** Therefore, the results may not reflect operational changes over the last decade. LAWA reports that it is prohibited from using FAA funds to undertake such a study. LAWA also points out that aircraft operations are the main causes of the pollutants, which LAWA maintains it has no control over and observes that FAA’s control is limited.

LAWA takes pride in being a leader in reducing air pollutant emissions from those activities it does control (e.g., electric fleet for its ground transportation, solar energy farms, LEED-certified buildings, etc.). LAWA has agreed to cooperate with Service Employees International Union (SEIU) should the City of Los Angeles or other entities fund a health and exposure study. LAWA is supportive, stating that if SEIU can find funds to do the study, LAWA will cooperate.

Other than the LAX Air Quality and Source Apportionment Study in 2013, there are few published studies reviewed by panels of scientists since then. Two studies are available that focused on separating what contributed to air pollution around LAX: aircraft operations and other sources.

- In the National Library of Medicine, National Center for Biotechnology Information, the [Hudda et al. \(2014\)](#)<sup>2</sup> research project measured the size of impacted areas with high particle numbers concentrations and the impact of wind on its spread along the Los Angeles freeways. These researchers found a ten-fold increase in an area within 3 kilometers of LAX’s boundary. Data collection was done between 2011 through 2013.
- The U.S. Environmental Protection Agency (EPA), Health & Environmental Research Online (HERO), cite [Shirmohammadi et al. \(2017\)](#)<sup>3</sup> and their more recent study on air quality, where they collected samples on six randomly chosen days between 10:00 am and 4:00 pm when there was less rush hour traffic and between the months of May 2016 and July 2016 when there were similar weather conditions. These researchers found: “LAX airport has a significantly higher impact on air quality degradation within the neighborhoods in its vicinity compared to the three major freeways (i.e., I-110, I-105, and I-405) traversing that area.” (p. 92).

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<sup>2</sup> Hudda, N., Gould, T., Hartin, K., Larson, T. V., & Fruin, S. A. (2014). Emissions from an international airport increase particle number concentrations 4-fold at 10 km downwind. *Environmental science & technology*, 48(12), 6628-6635.

<sup>3</sup> Shirmohammadi, F., Sowlat, M. H., Hasheminassab, S., Saffari, A., Ban-Weiss, G., & Sioutas, C. (2017). Emission rates of particle number, mass and black carbon by the Los Angeles International Airport (LAX) and its impact on air quality in Los Angeles. *Atmospheric Environment*, 151, 82-93.



A common finding across these studies shows that pollutants are higher east of LAX, which include communities that have been identified as disadvantaged by LAWA's, SB 535's, and the USDOT's definitions.

LAWA's air quality experts noted shortcomings in these studies:

- These studies are “...*narrow in scope focusing on particulate numbers.*” In contrast, the LAX Source Apportionment Study was a more comprehensive research project in scope.
- “*Particle numbers do not have an established regulatory limit or health standard. Ultrafine particles from aircraft are likely found downwind of LAX during operations; however, 10km downwind attributed to LAX is unlikely as motor vehicles and other sources contribute to particle counts.*”

The studies were not conducted over a long-term time period. Moreover, it is difficult to determine the cause of the pollutants being higher to the east of LAX because, as LAWA observes, these communities:

*“...are urban environments with many sources of pollutants and other conditions impacting the socio-economic status of communities in the south Los Angeles region.”*

LAWA does have several hundred aircraft operating at LAX at any given time, combined with vehicular traffic and ground service equipment to and around LAX, emissions from LAX Central Utility Plan (CUP), and prevailing westerly winds. What is safe to assume, pending further study, is that it is a reasonable conjecture that LAX contributes meaningfully to air pollution to the east of the facility.

LAWA also notes that their air quality experts were not interviewed as part of either of these studies.

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***There is limited use of sustainable aviation fuel (SAF) at LAX (compared to VNY), but industry trends suggest the use of SAF will grow.***

According to the [U.S. Environmental Protection Agency \(EPA\)](#), commercial airplanes and large business jets account for 10% of transportation emissions and 3% total greenhouse gas (GHG) production in the United States.

LAWA has set a goal “...to [reduce GHG emissions from LAWA-controlled facilities](#) by 45 percent below 1990 levels by 2025, and by 80 percent by 2050.” To achieve this goal, LAWA has adopted multiple strategies, including increased use of sustainable aviation fuel (SAF). SAFs, such as biofuels:

- Release up to 50% less pollutants than conventional jet fuel when burned
- Reduce [life cycle emissions](#) (across its sourcing, production, and use) by 80%

In 2016, with an agreement to purchase up to 15 million gallons of sustainable biofuel from its suppliers over a three-year period, United Airlines and LAX became the first airline and airport in the country to use biofuels to reduce pollution on a commercial scale. In the same year, KLM



Airlines signed a three-year contract for the sustainable biofuel supply at LAX. Subsequently, both American and Delta Airlines announced plans for more SAF purchases and major investments in SAF production facilities.

Although LAWA continues to encourage the use of SAF, the current share of overall aviation fuel use at LAX is small, equivalent to saving approximately seven transcontinental flights from Los Angeles to New York on a 747 aircraft per year. LAWA points out that many airports face challenges in increasing SAF adoption. According to a LAWA employee, it is:

*“...hard to get [sustainable] fuel, so [LAWA] has been working with other airports and other states to get on board... would make transportation and distribution of sustainable aviation fuel more cohesive.”*

In LAWA’s 2019 Sustainability Action Plan (SAP), it states that:

*“LAWA will explore partnerships with other airports to study the current worldwide supply of SAF, supply chain logistics, and a financing study to identify strategies LAWA can deploy to increase SAF use at its airports.”*

During the course of this IEA Survey, some airlines became increasingly committed to sustainable fuel. For example, QANTAS and Airbus SE are jointly investing \$200 million in sustainable fuels in Australia. QANTAS Chief Executive Officer Alan Joyce announced at a joint press conference at IATA’s annual meeting in Doha: *“The use of SAF is increasing globally as governments and industry work together to find ways to decarbonize the aviation sector.”*<sup>4</sup>

LAWA reports that it explores and adopts best practices in use at other airports, monitors SAF trends, and ensures that SAF is used as it becomes feasible. LAX’s fuel consortium remains positioned to receive SAF in greater quantities when it becomes available and based on what the airlines contract for. Some of LAWA’s actions include:

- In the 2019 SAP, LAWA states that *“...additional partnerships with airlines and fuel suppliers could allow for increasing volumes of SAF to be used at both LAX and VNY.”* The plan suggests that such partnerships with airlines and fuel suppliers could occur within five years, which would be beyond the agreement with United Airlines and KLM Airlines in 2016.
- LAWA worked with a fixed-base operator [Atlantic Aviation when it announced that it would begin providing SAF at LAX in 2021.](#)
- [JetBlue began using 1.5 million gallons of SAF annually at LAX with plans to use it for at least three years, starting in July 2021.](#)
- [In November 2022, digital news source Simple Flying reported that Finnish manufacturer Neste delivered 500,000 gallons of SAF to LAX, using barges and the existing pipeline](#)

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<sup>4</sup> Charlotte Ryan. “Qantas, Airbus to make \$200 Million Sustainable Fuels Investment,” Bloomberg, U.S. Edition, June 19, 2022 <https://www.bloomberg.com/news/articles/2022-06-19/qantas-airbus-to-make-200-million-sustainable-fuels-investment>

[system. This effort is important, as it demonstrated the feasibility of using existing fuel transportation systems to handle SAF as well as conventional jet fuel.](#)

- BOAC has rescinded the delivery fee for SAF at VNY.

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***There are limited numbers of solar panels installed around LAX (compared to VNY) because of glare issues that may impact landing paths.***

Going solar is another strategy LAWA has relied on to reduce GHG and mitigate the airports' impact on the environment. In California, VNY is the “#1 general aviation airport in solar panel rooftops” with a total of 20,127 rooftop solar panels as of 2020. LAWA is installing solar panels as part of ConRAC and the Maintenance and Storage Facility (MSF) for the Automated People Mover (APM), described in Volume I, Part C.

LAX lags due to infrastructure and logistical issues, such as:

- Limitations in the Central Terminal Area (CTA) creating potential glare impacting landing paths.
- Existing infrastructure compatibility with solar
- Electrical distribution network accessibility
- Cost-benefit analysis for solar project success

According to LAWA:

*“...at LAX, preliminary solar feasibility studies suggest that the potential for on-site generation capacity is up to 23.5MW. In the medium- and long-term, LAWA will further explore the solar projects at LAX through a solar PV (photovoltaic) installation plan.”*

## **Environmental (Planet) – Noise**

### NOISE MONITORING AND COMPLAINTS

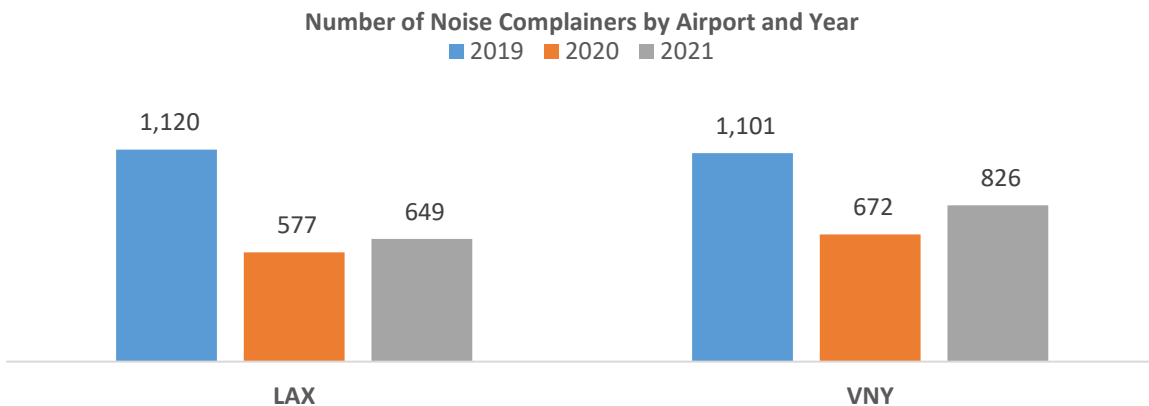
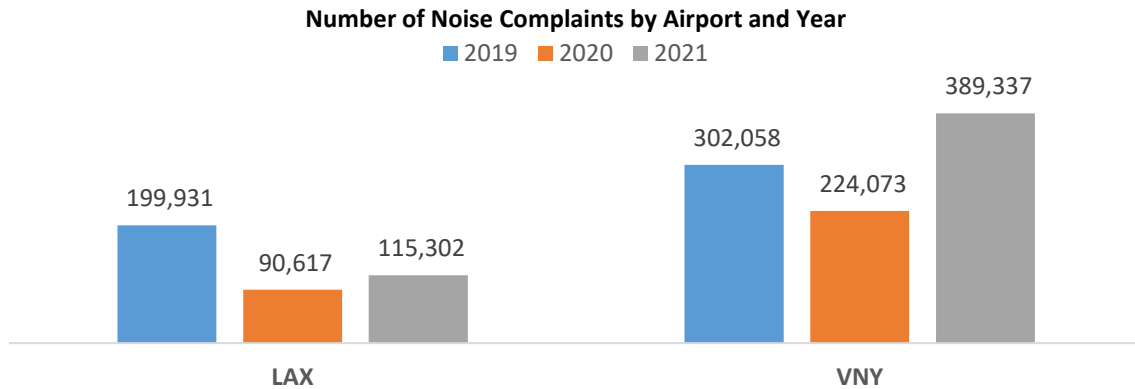
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***The number of complaints about noise from aircraft have decreased around LAX and increased around VNY; the number of individual complainants is down for both LAX and VNY in comparison to 2019.***

LAWA is “...committed to [minimizing noise impacts](#) in neighboring communities from aircraft operating at LAX and VNY” and providing “...meaningful [response to the community](#) on noise-related issues.” From 2019 to 2021, LAX saw a 42% decrease in noise complaints and a 42% decrease in unique complainers, whereas VNY saw a 29% increase in noise complaints and a 25% decrease in unique complainers.

Note: The number of take-offs and landings between 2019 and 2021 were significantly reduced at LAX because of the COVID-19 pandemic, as discussed in Volume I, Part A. Such reductions were not the case at VNY.

In 2021, the number of complaints at VNY (389,337) were 3 times greater than at LAX (115,302). In 2021, LAX averaged 177 complaints per complainer, whereas VNY averaged 471 complaints per complainer. LAWA employees shared that some complainers may be using apps to generate repeated complaints. For example, 12,172 complaints were documented in 2021 for zip code 90242 (Downey, CA). They all came from only one complainer. It is also possible that residents may be submitting multiple complaints to reflect multiple incidents.



In February 2022, the number of individual complainers and noise comments around VNY had decreased from July 2021; 8,353 (40%) noise comments came from the 10 most active individuals.

Source: Van Nuys Airport (VNY) Aircraft Noise Comment Monthly Report (February 2022)

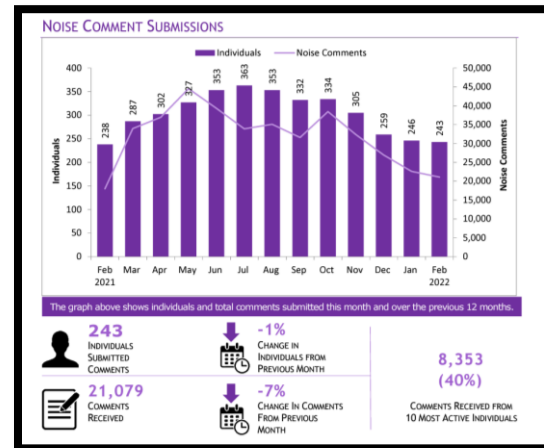
## ***LAWA receives noise complaints from residents surrounding the airports, including zip codes that are partially in noise contours and others near noise contours.***

The following maps visualize where noise complaints and complainers are located by zip code.

### **AROUND LAX – NOISE COMPLAINTS AND COMPLAINERS**

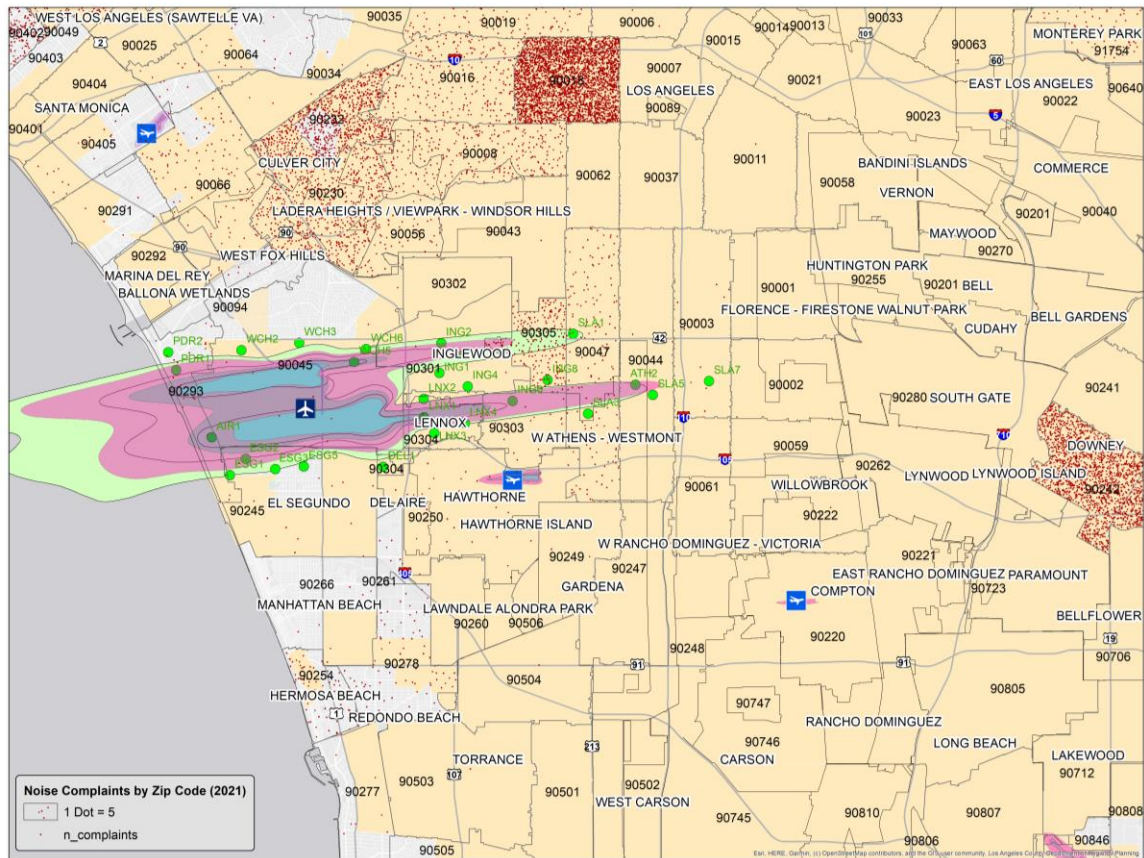
Around LAX, a noticeable number of noise complaints are coming from zip codes north of the airport, including zip codes located in Culver City, Ladera Heights/Viewpark-Windsor Hills, and the Jefferson Park area (e.g., zip code 90018).

These areas do not fall within the noise contours nor are they near noise monitors, so it is difficult to determine the CNEL in those areas. LAWA is not required by Part 150 or State Title 21 to have noise monitoring in these areas; however, such noise monitoring equipment would help LAWA to explain to people who complain what the levels are and for LAWA to monitor if these areas were indeed under 65 dB CNEL. Although aircraft CNEL levels do not exceed 65 dB in these neighborhoods, noise may still be a nuisance for residents living in these communities.



There are also multiple noise complaints coming from areas east of LAX either in or near defined noise contours, including zip codes 90305 and 90047.

Map 24. Noise Complaints around LAX



## Legend:

Areas shaded in yellow are considered disadvantaged by LAWA's, SB 535's, USDOT's definitions.

Noise contours around LAX and VNY are included as an overlay:

Blue indicates community noise equivalent level (CNEL) of 75 and above decibel (dB).

Mauve indicates CNEL of 70 to 74 dB.

Pink indicates CNEL of 65 to 69 dB.

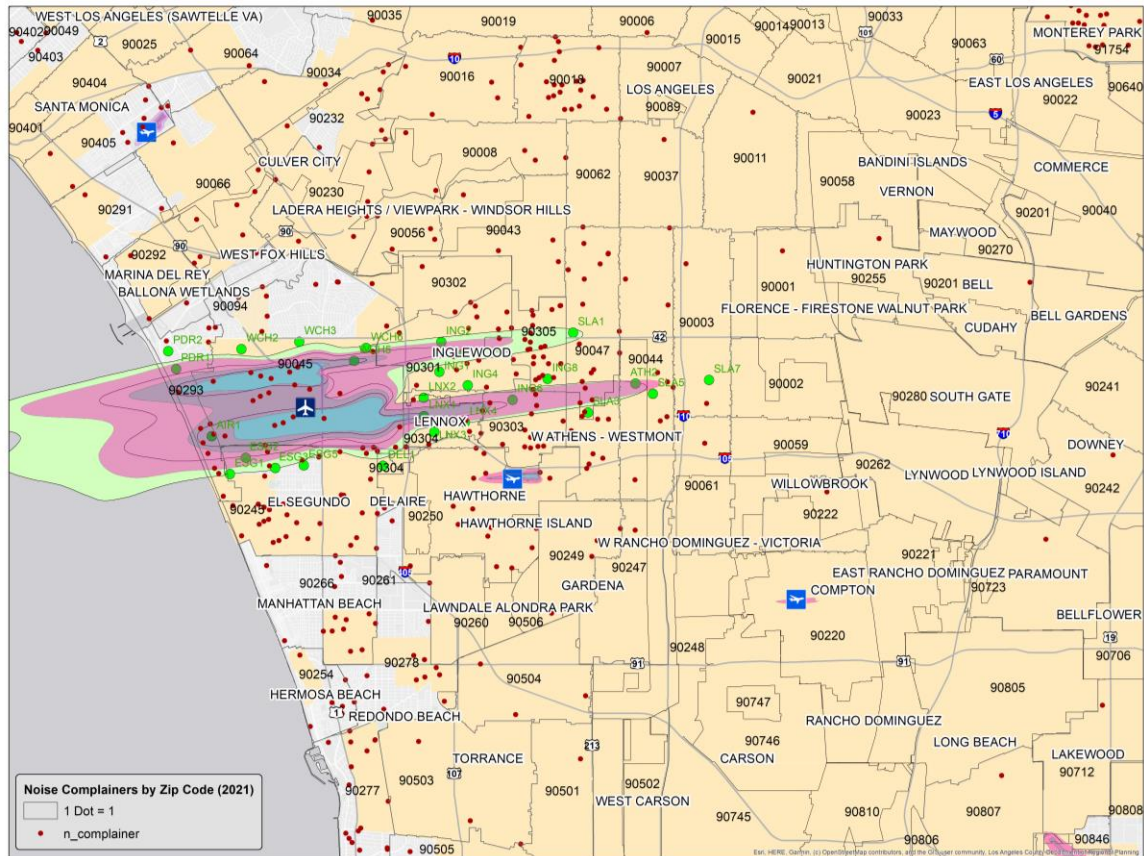
Green overlay represents the 2020 noise exposure map submitted to FAA.

Bright green dots represent [noise monitors](#).

Each red dot in the noise complaint maps represents 5 noise complaints in that zip code in 2021.



**Map 25. Noise Complainers around LAX**



[See Table 2 in the Appendix for the numbers of unique complainers and complaints in 2021 by zip codes]

**Legend:**

Areas shaded in yellow are considered disadvantaged by LAWA's, SB 535's, USDOT's definitions.

Noise contours around LAX and VNY are included as an overlay:

Blue indicates community noise equivalent level (CNEL) of 75 and above decibel (dB).

Mauve indicates CNEL of 70 to 74 dB.

Pink indicates CNEL of 65 to 69 dB.

Green overlay represents the 2020 noise exposure map submitted to FAA.

Bright green dots represent [noise monitors](#).

Each red dot in the noise complainer maps represent one noise complainer in that zip code in 2021.



## AROUND VNY– NOISE COMPLAINTS AND COMPLAINERS

In 2021, the number of noise complaints around VNY continued to impact the areas immediately around the airport.

- In zip code 91344, there were nearly 9,000 noise complaints from 25 unique complainers.
- In zip code 91343, there were more than 4,300 noise complaints from 44 unique complainers.
- In zip code 91406, there were about 2,300 noise complaints from 96 unique complainers.

There have also been noticeable increases in the number of noise complaints from areas south of VNY. This is likely because of the FAA's implementing a new satellite-based departure procedure with a new waypoint (PPRRY). This new waypoint shifted VNY departures south.

- In zip code 91403, there were nearly 154,000 noise complaints in 2021 from 180 unique complainers.
- In zip code 91436, there were nearly 70,000 noise complaints in 2021 from 133 unique complainers.
- In zip code, 91316, there were more than 15,500 noise complaints from 23 unique complainers.

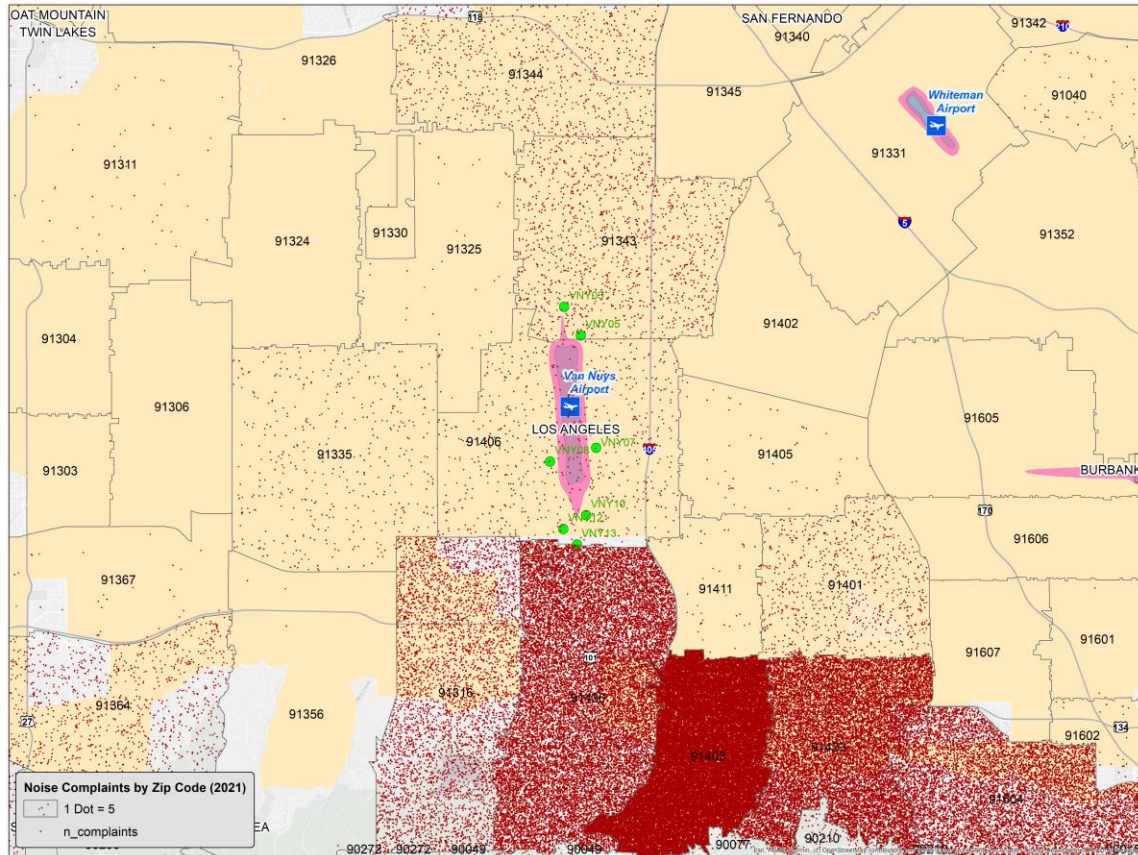
LAWA observes:

*“...most noise concerns continue to be related to aircraft flying farther south over hillside communities since the FAA's implementation of [revised area navigation \(RNAV\)](#) departure procedures at VNY under the Southern California Metroplex Project.”*

The Southern California Metroplex Project, implemented by the FAA, was designed to improve the efficiency of airspace by optimizing aircraft arrival and departure procedures. This project changed aircraft landing and take-off patterns in a way that moved noise levels to different communities.



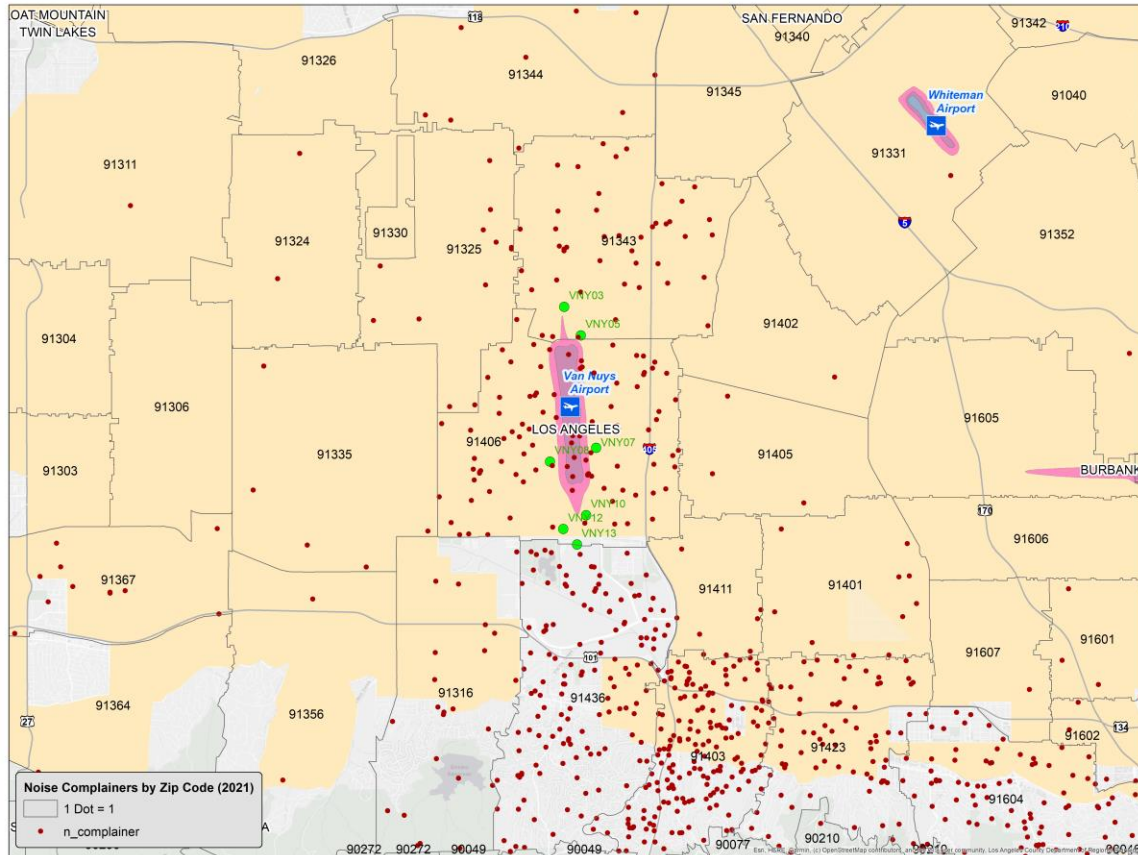
**Map 26. Noise Complaints around VNY**



**Legend:**

Areas shaded in yellow are considered disadvantaged by LAWA's, SB 535's, USDOT's definitions.
Noise contours around LAX and VNY are included as an overlay:
Blue indicates community noise equivalent level (CNEL) of 75 and above decibel (dB).
Mauve indicates CNEL of 70 to 74 dB.
Pink indicates CNEL of 65 to 69 dB.
Bright green dots represent <a href="#">noise monitors</a> .
Each red dot in the noise complaint maps represents <u>5 noise complaints</u> in that zip code in 2021.

**Map 27. Noise Complainers around VNY**



[See Table 2 in the Appendix for the numbers of unique complainers and complaints in 2021 by zip codes.]

**Legend:**

Areas shaded in yellow are considered disadvantaged by LAWA's, SB 535's, USDOT's definitions.

Noise contours around LAX and VNY are included as an overlay:

Blue indicates community noise equivalent level (CNEL) of 75 and above decibel (dB).

Mauve indicates CNEL of 70 to 74 dB.

Pink indicates CNEL of 65 to 69 dB.

Bright green dots represent [noise monitors](#).

Each red dot in the noise complainer maps represent one noise complainer in that zip code in 2021.

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**LAWA works arduously to reduce or limit aircraft noise and respond to noise complaints.**

LAWA's [efforts to reduce or limit aircraft noise at LAX](#) include:

- Over-Ocean Operation Procedure
- Preferential Runway Use Procedure
- Early Turn Notification Program
- Restriction on Engine Run-Up between 11 p.m. and 6 a.m.

In response to these noise complaints, LAWA has made available [web-based Noise Portals](#) for LAX and VNY that provide residents information about aircraft operations impacting their communities and to learn what is being done to address them. Noise management programs for VNY listed are:

- [“No Early Turn” Program at VNY](#) formalized by [Board Resolution No. 25735](#) in 2015.
- [Airport Fly Friendly Program](#) established as a voluntary program in 1994. This program consists of the voluntary Quiet Departure Program (separate and in addition to existing mandatory nighttime noise curfew in effect at VNY).
- The [Friendly Flyer Award Program](#) established in 2012.
- LAWA implements a [Quieter Nights Program](#).
- The [Soundproofing Program](#), discussed earlier, established in 2001 and noted to be completed at VNY.

LAWA stated that:

*“...since most of the increased noise complaints [around VNY] are due to the FAA implementation of the Metroplex project, any possible resolutions are being addressed by working with the FAA and airport supported community organizations such as the LAX/Community Noise Roundtable and VNY Citizens Advisory Council. For VNY, the FAA is currently processing a request supported by the Southern San Fernando Valley Airplane Noise Task Force, as well as the VNY CAC, to redesign the Metroplex satellite-based departure procedures to address noise complaints in the south San Fernando Valley caused by changes implemented due to Metroplex.”*



In 2019, LAWA requested FAA to conduct further analysis to determine possible alternative departure procedures. In 2020, LAWA submitted a request for FAA to:

*“...revise RNAV departure procedures to return the flight paths back as close as possible to where they were prior to the Metroplex implementation.”*

The latest conceptual design would “move flight paths North to more closely match conventional departure procedure paths.”<sup>5</sup> This change may shift noise impact further north, including areas that are designated as disadvantaged.

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### ***LAWA continues to address concerns about noise impact from aircraft.***

LAWA continues to address noise impact from aircraft through monitoring and reporting of noise levels, conversions, noise mitigation, and noise abatement programs.

VNY has been compliant with noise mitigation under State Title 21 since 2012. There are zero incompatible land uses (i.e., residential land uses) within community noise equivalent level (CNEL) 65 db.

Regarding noise mitigation around LAX, according to data retrieved from LAWA:

- 20,815 eligible units have been sound insulated, totaling a cost of \$796.5 million<sup>6</sup>
- As of 2020, sound insulation has been completed at 8 local schools and nearly finished at 2 additional schools, totaling a cost of \$60 million.

LAWA continues to monitor and report noise levels. Nonetheless, members of the community continue to file complaints about noise levels around both LAX and VNY. Noise experienced at a specific point on the ground is a function of aircraft type, traffic, and FAA flight path routing. It is a major concern of communities adjacent to airports.

In the past, San Fernando Valley residents focused on noise issues around VNY, particularly helicopter operators at night and early in the morning. San Fernando Valley communities objected when the FAA rerouted flight paths into LAX, increasing noise levels in their communities compared with previous flight paths. LAWA’s noise group identified the VNY departures issue and worked with the FAA on possible solutions regarding the LAX flight paths.

### **SOUND INSULATION PROGRAM**

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5 LAWA FAA Presentations from Virtual Briefing on Proposed Redesign of VNY Departure Procedures (August 8, 2021).

<sup>6</sup> Note: The number in the 2020 Sustainability Report is slightly different, noting 21,356 units sound insulated as of 2020.

***More than 25% of eligible units remain uninsulated from noise and an unknown number of units are ineligible for insulation regardless of their locations in the noise contours.***

As of April 29, 2022, LAWA has insulated almost 21,000 units at a cost of \$796.5 million. Nearly 7,500 units eligible for the [Sound Insulation Grant Program \(SIGP\)](#) remain uninsulated from noise, with the largest share residing in the City of Inglewood, as shown in Table II.1.

**Table II.1: Eligible Units for Noise Mitigation:  
Remaining, Mitigated, and Total Costs (\$millions)<sup>7</sup>**

Jurisdiction	Remaining Eligible Units	Mitigated Units	Total Cost to Date (\$millions)
City of Inglewood	3,174	7,932	\$357.4
Los Angeles County (Unincorporated Areas)	1,870	4,353	\$191.6
City of Los Angeles	1,239	7,327	\$160.0
City of El Segundo	1,146	1,943	\$ 87.5
<b>Total</b>	<b>7,429</b>	<b>21,555</b>	<b>\$796.5</b>

LAWA shared that:

*“...many of the remaining dwelling owners have already been contacted and many choose not to respond, participate, or address any code issues to allow participation in the voluntary sound insulation programs. Some may also not be eligible based on the acoustical noise measurement requirements per federal policy.”*

As noted previously, not all residential homes that fall within noise impact areas are eligible for SIGP. Some of these residences are not in compliance with current building code requirements. Owners may not want to or are unable to bring these dwellings up to standard and, thus, do not participate in the Residential Sound Insulation Program (RSIP). Renters of such properties have little recourse if the owners do not participate in the RSIP.

#### CITY OF LOS ANGELES AND CITY OF EL SEGUNDO

LAWA is in the process of developing and implementing the LAX Residential Sound Insulation (LAX-RSI) Program, spanning the next six to seven years. The LAX-RSI Program will offer mitigation to:

- The remaining 1,239 eligible dwelling units in the City of Los Angeles that were not previously mitigated because of owners not participating in the program, not responding, or not addressing code violations as required to participate prior to when the City of Los Angeles program was completed and closed out in 2014

<sup>7</sup> Source: Sound Insulation Statistics by Jurisdiction provided by LAWA on 04/29/2022.





- The remaining 1,146 eligible dwelling units in the City of El Segundo since the City of El Segundo terminated its program in 2018

#### COUNTY OF LOS ANGELES AND CITY OF INGLEWOOD

The County of Los Angeles and City of Inglewood are addressing the remaining eligible dwelling units in their jurisdictions by implementing their own sound insulation programs, using Federal and LAWA funding. These sound insulation programs are fully funded and were delayed due to the COVID-19 pandemic.

The County of Los Angeles chose to carry out the soundproofing initiatives in its unincorporated areas. East of LAX are two unincorporated communities that are also historically disadvantaged communities, both heavily affected by noise: West Athens (population 9,400) and Lennox (population 22,500).

LAWA reports the number of remaining dwelling units in noise contours that are eligible for sound proofing. They do not know which of these dwelling units are ineligible because of building code non-compliance. During LAWA interviews, individuals speculated that there are likely to be multiple challenges in implementing a soundproofing program for these communities:

- Owners, not renters, are responsible for building code compliance. In the meantime, low-income renters continue to live in units that are not in code compliance and, therefore, must cope with noise.
- Making upgrades may negatively impact affordability for current renters, making the renters reluctant to encourage such improvements.

Other complicating factors include:

- Some of the residences have been modified to converted garages as living spaces, a code violation and potential fire hazard. Bringing such converted properties up to code would involve terminating the unlawful use.
- Gaining a variance to change an R-1 property into an R-2 would be difficult.
- There is a perception that some of these units house undocumented people, further increasing the challenge.

***Consequently, the remaining uninsulated residences are the really hard ones to address and not because of LAWA's inaction.*** LAWA needs help from Federal, State, and local sources to address this issue. Equity concerns arise as these disadvantaged communities may not benefit from established programs, such as SIGP, despite living in areas impacted by noise. Considering the barriers to building permitting and cost of implementing renovations, there are inequitable consequences of noise on the well-being of local residents.

## OTHER REQUIREMENTS

There are funding barriers when determining eligibility for sound insulation. A prerequisite for receiving Federal funding relied on by LAWA is that it must meet Part 150 requirements, including outreach and the development of noise exposure maps using modeled noise data with a 5-year projection. This was last done in 2015. The update of the 2020 noise exposure map was delayed due to the COVID-19 pandemic and the substantial decrease in operations, which would impact the accuracy of a realistic forecast. LAWA stated that as operations stabilize and approach pre-COVID levels, it will explore the process of updating the noise exposure map. Dwelling units eligible for SIGP would need to fall within noise impact areas, as defined by the noise exposure map submitted to the FAA.

Under State Title 21, LAWA produces quarterly noise contours that are submitted to the County and the State. These contours are routinely adjusted based on measured data from noise monitoring, which some argue may be more realistic than the noise exposure maps.

***A significant share of dwelling units and residents still live in areas that are identified as incompatible land use (i.e., CNEL 65 dB and above).***

CNEL is a weighted average to measure noise impact over a 24-hour time period on neighborhoods surrounding airports. Under State Title 21:

*“...the standard for the acceptable level of aircraft noise for person living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels.”*

To comply, LAWA must prove a good faith effort in mitigating noise and addressing incompatible land uses. As of the fourth quarter of 2021, 4,760 dwelling units near LAX with approximately 18,300 residents still live in areas that are in noise-impacted areas with at least CNEL 65 decibels (dB). Of these, 881 dwelling units with approximately 3,700 residents live in areas that are noise-impacted areas CNEL 70 dB and above.

4Q21	Total Cumulative Noise Impact Areas - All Jurisdictions											
	CNEL 65 dB and Above				CNEL 70 dB and Above				CNEL 75 dB and Above			
Land Use	Acres	Dwelling Units	Parcels	Population	Acres	Dwelling Units	Parcels	Population	Acres	Dwelling Units	Parcels	Population
Single Family	187.1	1,286	1,313	4,915	33.6	221	224	1,018	0.0	0	0	0
Multi-Family	167.4	3,462	1,040	13,378	36.2	660	250	2,709	0.0	0	0	0
Mobile Home	0.6	0	2	0	0.0	0	0	0	0.0	0	0	0
Schools	5.0	0	23	0	3.0	0	17	0	0.0	0	0	0
Churches	15.0	12	30	34	2.4	0	2	0	0.0	0	0	0
Hospitals	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0
<b>Total Incompatible</b>	<b>375.1</b>	<b>4,760</b>	<b>2,408</b>	<b>18,327</b>	<b>75.2</b>	<b>881</b>	<b>493</b>	<b>3,727</b>	<b>0.0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Source: Land use tables provided by LAWA.



High levels of aircraft noise disturb local communities and have detrimental effects on the health and well-being of the environment and residents, including historically disadvantaged communities closest to the airports. Researchers point out that noise pollution can lead to “...increased stress levels, sleep disturbance, or hearing damage,” according to the [Medical News Today \(2020\)](#) and reinforced in [Harvard Medicine \(Spring 2022\)](#). The impact is even greater in historically disadvantaged communities, which have other health inequities that impede their quality of life; combining those factors with the noise pollution creates an even more tenuous living environment.

For example, Wing et al. (2022)<sup>8</sup> evaluated:

*“...interaction between in-utero exposure to airport-related noise and traffic-related air pollution on the risk of PTB [(preterm birth)]. Although exposure to both noise and air pollution are known risk factors for PTB, results suggest a synergism between multiple transportation related sources of exposure for women living close to LAX that negatively impact pregnancy. Most importantly the synergism detected was concentrated in low SES [(socioeconomic status)] neighborhoods, suggesting that these women may face a double or triple burden from high-traffic noise and air pollution exposures from two sources (airplanes and local traffic) associated with living in close proximity to a major international airport” (p. 4).*

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<sup>8</sup> Wing, S. E., Larson, T. V., Hudda, N., Boonyarattaphan, S., Del Rosario, I., Fruin, S., & Ritz, B. (2022). Aircraft noise and vehicle traffic-related air pollution interact to affect preterm birth risk in Los Angeles, California. *Science of the Total Environment*, 829, 154678.

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART D – ECONOMIC (PROSPERITY)



## D – ECONOMIC (PROSPERITY)

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LAWA, especially LAX, is a major economic engine in the region. This section discusses LAWA’s economic impact (prosperity), including procurement/contracting opportunities and employment. Note: Procurement and contracting dollars are awarded to primes who then may subcontract to other vendors.

### D.1 STRENGTHS AND ACCOMPLISHMENTS

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**LAWA has implemented programs to increase local hiring.**

To increase local hiring, LAWA has implemented programs, set project goals, and, on its two largest projects, established minimum local hiring requirements with contractors. Most construction projects are subject to LAWA’s Project Labor Agreement (PLA), which establishes a 30% local hiring goal for construction labor. The PLA Administrator monitors contractor compliance with the goal and posts contractor attainment on its public website.

On LAWA’s two largest projects, the Automated People Mover (APM) and the Consolidated Rent-A-Car Center (ConRAC), LAWA incorporated the 30% local hiring goal as a contract requirement. Because of this, and a broad array of additional inclusivity requirements on these two projects, LAWA provides increased oversight and compliance monitoring for these and other LAMP projects.

**HireLAX Apprenticeship Readiness Program (ARP).** LAWA has implemented an apprenticeship readiness program, HireLAX, to provide local residents no-cost training and career development in construction roles. Since the inception of the HireLAX Apprenticeship Readiness Program (ARP) and up until May 2022, there have been 271 HireLAX graduates spread across 11 cohorts:

- Nearly 90% of the graduates are Hispanic/Latinx or Black/African American.
- 196 (72.3%) have been placed in jobs. The majority of graduates have been placed in union construction jobs.
- Graduates earned more than \$10 million in salaries and clocked nearly 245,000 hours.<sup>9</sup>

**Targeted Local Hire (TLH).** [Targeted Local Hire \(TLH\)](#) provides alternative paths to employment by reducing barriers to employment for potential applicants who face challenges in the civil service examination process.

*“LAWA is allowed to use the TLH Program to fill vacant Custodian, Gardener Caretaker, Garage Attendant, and Administrative Clerk positions... the employee then serves a six (6) month on-the-job training and assessment period. After six (6) months, the employee is reclassified as an ‘Assistant’ and serves a six (6) month civil service probationary*

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<sup>9</sup> Source: LCPtracker Payroll Data (checked 3/31/2022) for HireLAX graduates.



*period. Upon successful completion of the probationary period, the employee is transferred into the targeted civil service job classification.”*

As of July 2022, LAWA has hired 152 employees through the TLH program, 35 of whom are classified as Office Trainee (Administrative Clerk) and 117 classified as Vocational Worker (Custodian). LAWA accounts for 11.5% of the City of Los Angeles’s 1,237 TLH hires. Across City departments, LAWA is among the top three City departments that have hired the most employees through the TLH program—third to Recreation and Parks (191 employees hired through TLH) and the Bureau of Sanitation (154 employees hired through TLH).

**First Source Hiring Program (FSHP).** Overseen by LAWA’s Business, Jobs, and Social Responsibility Division (BJSR), the First Source Hiring Program (FSHP):

*“...is designed to provide employment consideration and access to vacant positions for residents from the communities immediately surrounding the airport and those most impacted by airport operations... LAWA employers submit their open positions to the FSHP and [LAWA] attempt[s] to fill those positions by working closely with program partners to find prescreened and qualified candidates to apply.”*

More than 50 companies participate in FSHP. Until data from the FSHP web portal can be linked to persons who are issued LAWA personnel badges, the system will be unable to “... track job placements or any related data.” Therefore, analysis on FSHP’s job placement effectiveness is not possible at this time.

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**LAWA’s local business procurement programs and requirements aim to reduce barriers for certified businesses located in the airports’ regions.**

Vendors certified in Business Enterprise (BE) Programs (henceforth known as certified businesses) include Small Business Enterprise (SBE), Local Business Enterprise (LBE), Local Small Business Enterprise (LSBE), Disabled Veterans Business Enterprise (DVBE), and Disadvantaged Business Enterprise (DBE) companies.

***Certified businesses include vendors certified in the Small Business Enterprise (SBE), Local Business Enterprise (LBE), Local Small Business Enterprise (LSBE), and Disabled Veterans Business Enterprises (DVBE) Programs.***

Since the last IEA Survey Report, LAWA has implemented additional BE programs:

- LBE/LSBE was effective on April 21, 2016.
- DVBE was effective July 1, 2017.

Note: Vendors certified as DBE or in the in the Airport Concession Disadvantaged Business Enterprise (ACDBE) Program can be considered for projects that fully or partially receive Federal funding.



LAWA implemented an inclusivity evaluation policy, in which firms proposing on professional services contracts and development projects valued at greater than \$150,000, are evaluated on past Business Enterprise performance, inclusivity, and social responsibility, as well as inclusivity commitments on the prospective contract on which the entity is proposing. This score is part of the overall final score given to the proposing firm.

LAWA has transitioned to an online compliance system, which streamlined compliance and reporting capabilities by eliminating paper forms. The system also requires subcontractors to verify that they received payments.

In conjunction with the City's Department of Public Works, LAWA also began to use an online system for firms to apply for ACDBE and DBE certification.

#### **BUILDLAX ACADEMY AND MONTHLY DOING BUSINESS WITH LAWA**

LAWA's [BuildLAX Academy](#) program focuses on training small businesses on how to do business with LAWA on construction projects. It is a no-cost, 8-week program for small contractors to receive support and preparation to:

- Bid for contracting opportunities on LAWA projects
- Navigate LAWA's procurement process
- Understand and comply with contract requirements
- Strengthen contracting capacity
- Pre-qualify with primes
- Build relationships with peers, primes, and LAWA staff
- Successfully deliver projects at LAWA

Since its inception in 2019, there have been two cohorts due to the COVID-19 pandemic:

- In 2019, 17 contractors participated.
- In 2022, 10 contractors participated virtually.

LAWA also holds monthly "Doing Business with LAWA" sessions to prepare firms to bid on opportunities and provides information on upcoming procurements on its website.

#### **CONTRACTOR DEVELOPMENT AND BONDING ASSISTANCE PROGRAM (CDBAP)**

LAWA participates in the Contractor Development and Bonding Assistance Program (CDBAP) *"...more so than the other proprietary departments, including DWP and the Port."*

CDBAP is administered by Merriweather & Williams Insurance Services through a contract with the City of Los Angeles. Through education and training, CDBAP helps contractors develop capabilities to work with public agencies. CDBAP provides bonding assistance where public agencies can:



- Put up collateral for a small contractor's construction bond, a requirement of most public agencies as a form of insurance on public works projects
- Subsequently monitor project progress of contractors receiving bonding assistance

In addition, LAWA has requirements in RFPs valued at \$150,000 or more to include designated percentages of contract value allocated to certified businesses. The certified firms may be primes or subcontractors. Larger contracts often have more than one set of requirements, requiring designated percentages go to SBEs, LBEs, LSBEs and/or DVBES, respectively. Of all procurements evaluated from 2017 to 2022:

- 2,540 of 5,414 (46.9%) participating vendors—inclusive of primes and subcontractors—were certified businesses.
- 1,440 of 2,335 (61.7%) participating businesses were certified and located in the County of Los Angeles.

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***Almost 7,000 employees on LAMP and other projects are local hires with economic benefits of \$204 million for the local communities.***

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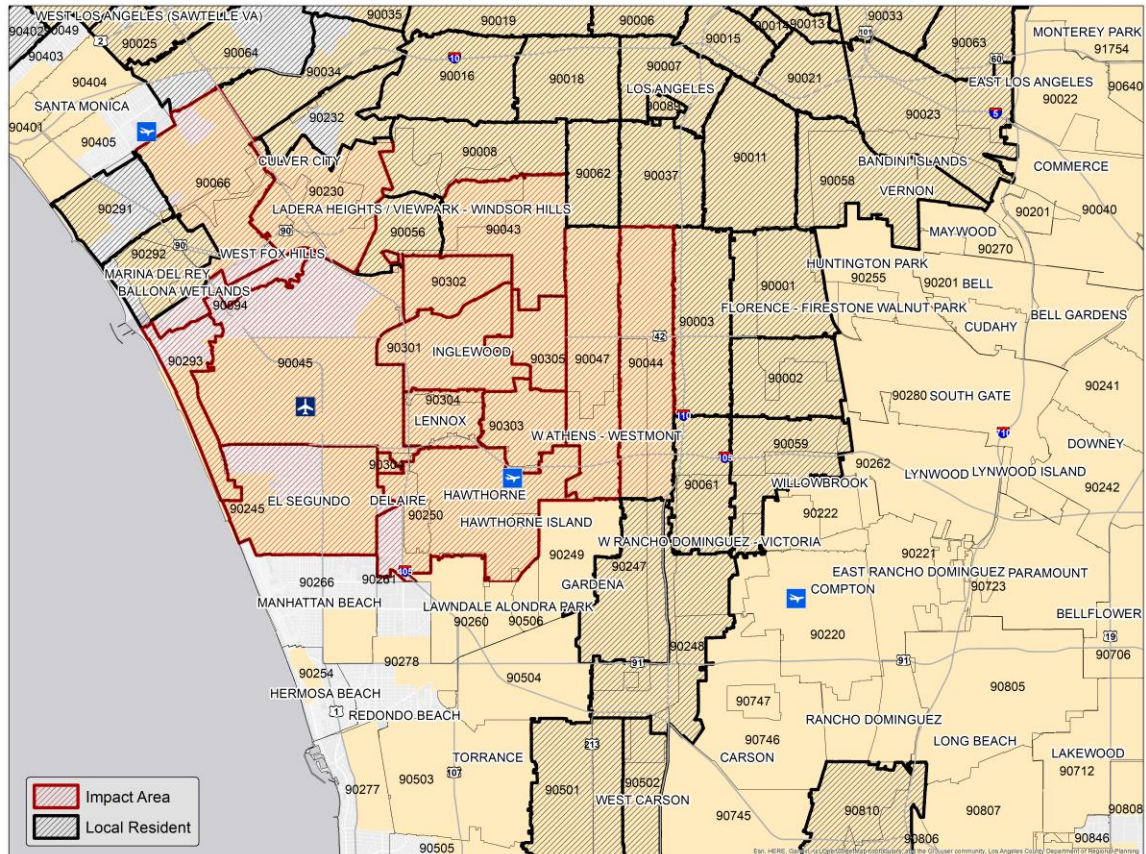
LAWA has recruited almost 7,000 local hires on LAMP and other projects.

- Approximately 30% (6,387) of employees on LAMP projects (27,067), inclusive of APM, ConRAC, ITF West, and LULEP, are from either impact areas or are local residents—zip codes classified as local hires.
- Since the start of LAMP, local hires on these projects clocked in more than 3.2 million hours and earned more than \$204 million (with benefits).
- Available data show that of 227 of the 544 (41.7%) listed employees on Roadways, Utilities, and Enabling (RUE) projects are from zip codes deemed by LAWA as local hires.

The next series of map visualize patterns in LAWA's local hire program, followed by statistics on LAMP workers, apprentices, and journeymen.



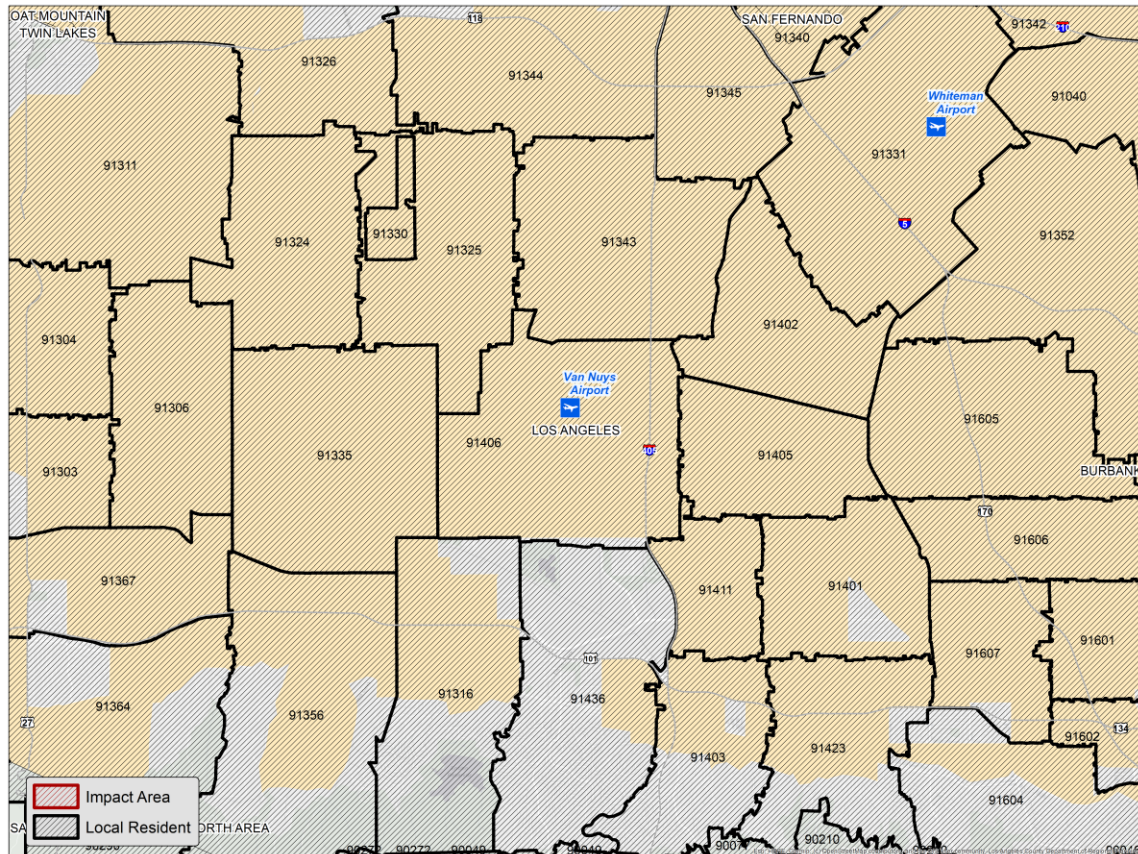
**Map 28. LAMP Local Hires at LAX, by Zip Code, with an Overlay of the City of Los Angeles's Borders and Hash Patterns to Identify Areas that Qualify for the Local Hire Program**



Note: Shaded yellow areas are considered historically disadvantaged communities using either LAWA's, SB 535's, or the USDOT's definitions, as described in Part B of Volume II.

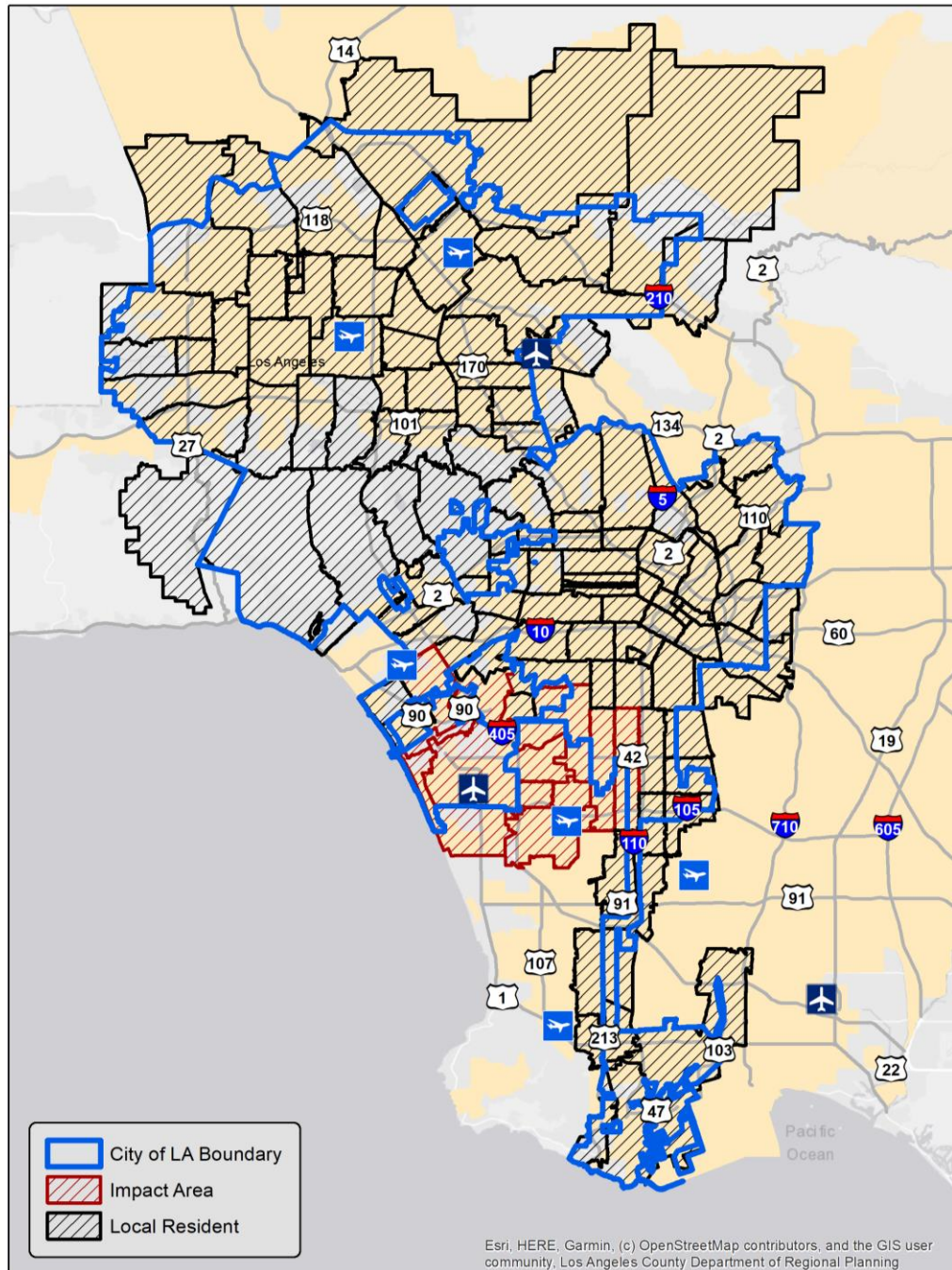


**Map 29. LAMP Local Hires at VNY, by Zip Code, with an Overlay of the City of Los Angeles's Borders and Hash Patterns to Identify Areas that Qualify for the Local Hire Program**



Note: Shaded yellow areas are considered historically disadvantaged communities using either LAWA's, SB 535's, or the USDOT's definitions, as described in Part B of Volume II.

### Map 30. Local Hires within the City of Los Angeles







## STATISTICS ON LAMP WORKERS

	Number of Workers	% of Total Workers	Total Hours	% of Project Total Hours	Wages w/ Benefits	Wages w/o Benefits
<b>AREA</b>						
LA County   LAX – Impact Area	1,385	6.70%	703,782	7.33%	\$45,138,973.89	\$29,083,342.95
LA County   LAX – Local Residents	5,002	24.19%	2,502,279	26.05%	\$159,369,244.93	\$102,963,406.25
LA County	13,706	66.28%	6,313,445	65.72%	\$427,714,795.00	\$276,420,869.49
Outside of LA County	6,974	33.72%	3,120,369	32.48%	\$229,015,886.20	\$149,754,796.12
<b>LOCAL WORKERS</b>						
AIA + Other Local Residents	6,387	30.88%	3,206,060	33.37%	\$204,508,218.82	\$132,046,749.20
<b>DEMOGRAPHIC PROFILE</b>						
None Specified	2,506	12.12%	607,789	6.33%	\$40,348,345.24	\$26,448,595.65
African American / Black	1,021	4.94%	581,659	6.06%	\$38,249,564.55	\$24,852,917.76
Asian	221	1.07%	125,676	1.31%	\$9,291,233.07	\$6,097,240.19
Caucasian / White	3,117	15.07%	1,698,633	17.69%	\$132,597,034.05	\$86,633,221.01
Hispanic / Latinx	11,654	56.35%	6,110,254	63.63%	\$412,618,714.13	\$266,709,677.95
Native American	57	0.28%	34,947	0.36%	\$2,456,726.45	\$1,572,865.69
Other	2,098	10.15%	443,814	4.62%	\$30,100,867.48	\$19,661,309.27
Two or More Races	6	0.03%	4,222	0.67%	\$254,069.60	\$168,073.51
<b>GENDER</b>						
Male	20,300	98.16%	9,384,509	98%	\$651,984,977.40	\$423,211,555.28
Female	380	1.84%	222,565	2%	\$13,934,921.18	\$8,934,416.54
<b>TOTAL</b>	<b>20,680</b>	<b>100%</b>	<b>9,607,074</b>	<b>100%</b>	<b>\$665,919,898.58</b>	<b>\$432,145,971.82</b>

Note: Data pulled 06/13/2022 from LCPTTracker-provided Power BI dashboard using Azure Analysis Services database and provided by LAWA.



## STATISTICS ON LAMP APPRENTICES AND JOURNEYMEN

	Number of Apprentices	Number of Apprentice Hours	Number of Journeyman	Number of Journeyman Hours
<b>AREA</b>				
LA County   LAX - Impact Area	444	262,889	970	425,521
LA County   LAX - Local Residents	1,650	921,758	3,473	1,495,106
LA County	3,339	1,836,803	9,450	4,192,853
Outside of LA County	1,112	474,381	5,772	2,438,908
<b>LOCAL WORKERS</b>				
AIA + Other Local Residents	2,094	1,184,647	4,443	1,920,628
<b>DEMOGRAPHIC PROFILE</b>				
None Specified	463	162,552	2,020	411,434
African American / Black	350	213,362	694	345,956
Asian	56	27,096	160	92,933
Caucasian / White	585	324,775	2,486	1,245,015
Hispanic / Latinx	2,933	1,548,408	8,874	4,272,863
Native American	14	10,205	44	24,742
Other	338	103,939	1,774	325,248
Two or More Races	3	2,524	3	1,180
<b>GENDER</b>				
Male	4,577	2,294,641	15,832	6,601,492
Female	165	98,258	223	117,918
<b>TOTAL</b>	<b>4,742</b>	<b>2,392,900</b>	<b>16,055</b>	<b>6,719,410</b>

Note: Data pulled 06/13/2022 from LCPTTracker-provided Power BI dashboard using Azure Analysis Services database and provided by LAWA.

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***LAWA's workforce is diverse in its racial/ethnic makeup with a significant share from areas surrounding LAX and VNY.***

Compared to the overall City workforce, LAWA is much more diverse in its racial/ethnic makeup—a point corroborated by the City of Los Angeles [Controller's Diversity with Equity Tool](#). As of May 6, 2022, when the data was provided, employees of color make up more than 85% of LAWA's 3,035-person workforce. The most represented group in LAWA's workforce are:

- Hispanic/Latinx (39.8%)
- Black/African American (28.5%)
- Asian Americans (15.2%, inclusive of Filipino Americans)

## D.2 FINDINGS

As discussed in Volume I, the negative impact of COVID-19 on passenger traffic affected LAWA's economic benefits as a regional economic engine, particularly for tourism. Because LAWA continued its major capital program, discussed in Volume I, Part C, during the COVID-19 pandemic, the local economy benefited from these construction jobs and contracts.

### General

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***LAWA has made progress in monitoring the economic benefits of its job creation and less progress related to the overall economic impact on the region since 2016.***

A 2014 LAWA study of the economic impact of LAX reported that:

- LAX generates 620,600 jobs in Southern California, with labor income of \$37.3 billion and economic output (business revenues) of more than \$126.6 billion, \$6.2 billion to local and State revenues, and \$8.7 billion in Federal tax revenues.
- LAX's ongoing capital improvement program creates an additional 121,640 annual jobs with labor income of \$7.6 billion and economic output of \$20.3 billion, \$966 million in State and local taxes, and \$1.6 billion in Federal tax revenues.<sup>10</sup>

LAWA has not updated this study since then and reports planned updates were delayed due to COVID-19.

LAWA has not developed a strategic approach to maximize its economic impact and benefits for the region. LAWA prioritized its economic development resources to address land use entitlements, compile environmental documents, and support capital projects at the airports. The economic impact data presented to the public was limited.

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<sup>10</sup> LAWA 2021 IEA Survey RFP, according to an economic study based on 2014 operations

In the 2016 IEA Survey, KH recommended that “LAWA can monitor and plan to increase its contributions to the Los Angeles economy.” Then and now, LAWA lacks comprehensive economic development policies or plans. It posts metrics related to aircraft operations, passenger levels, million metric tons of cargo, revenue, and budget items.

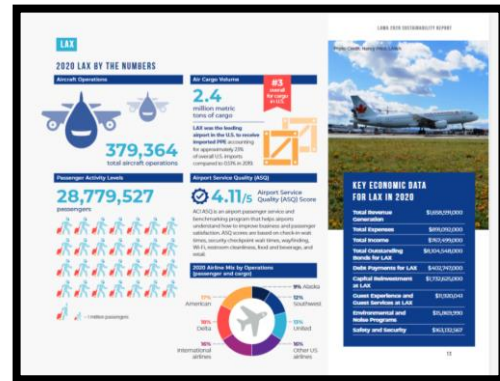
The one recent exception is in the area of job creation linked to LAWA’s major capital projects, which LAWA reports on, particularly in connection with LAMP. LAWA does not distinguish the impact of among temporary jobs, new permanent full-time hires, and businesses supported by a completed new facility. Such long-term term measurements are considered a better measure of lasting outcomes, although temporary construction jobs have a positive economic impact.

Also in the 2016 IEA Survey, KH recommended that LAWA adopt economic development strategies and report the impact of those strategies.

LAWA employees shared challenges in streamlining and systematizing data to effectively analyze LAWA’s economic impact on local disadvantaged communities, including:

- Staff shortages and turnover of trained staff to work with the data
- Lack of a single system to effectively track employee data for all projects
  - The current system uses multiple platforms, such as LCPtracker, OCPS, and consolidated reporting, which requires manual integration.

A major caveat, then and now, regarding this recommendation was that the FAA requires LAWA to spend all airport-generated revenues for aviation-related purposes.



*The FAA requires LAWA to spend all airport-generated revenues for aviation-related purposes.*





## Economic (Prosperity) – Procurement and Contracting

***Majority of expended funds (\$5.955 billion) went to contractors located around LAX and VNY with LAWA working to reach more contractors in surrounding disadvantaged areas.***

In achieving one facet of equity, LAWA states it is interested in increasing the economic benefits of the airports. To meet this objective, LAWA is committed to:

*“...maximize access to business and job opportunities, ensuring that local, diverse communities benefit from LAWA’s investments and setting the global airport standard for public corporate social responsibility.”<sup>11</sup>*

The majority of expended funds through procurements from 2017 to 2022 went to contractors located in the areas around LAX and VNY, but not all disadvantaged communities benefitted directly. LAWA states that it *“...is working to increase the number of disadvantaged communities that benefit from expended funds.”*

There are several caveats regarding the maps in the next section:

- Analyses on procurement data include Board of Airport Commissioners awarded contracts from 2017 and up to May 3, 2022, when the data on procurement was provided.
- This analysis does not capture the concentration of businesses in each zip code. Some areas may be more residential than commercial. ***Therefore, there may be some residential zip codes with few vendors and, thus, fewer contract dollars with LAWA.***
- Due to current data availability, this analysis does not integrate other variables that may impact differences in awards, including zip code-level data on bids and bidders (e.g., bidding rate, success rate, size of bidders, scores bidder receive).
- The data that LAWA provided did not show whether the vendors’ addresses reflected their primary operating offices, headquarters, regional offices, or home offices.
- LAWA’s Business Enterprise programs were not designed to address procurement disparities by location (e.g., zip codes) or council district.
- The data do not include demographic makeup of bidders.
- An important facet of equity is understanding racial disparities. Due to data limitations and unavailability for purposes of this KH analysis, this analysis is unable to confirm that expended funds for procurement are going to racial minorities in these disadvantaged communities.

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<sup>11</sup> <https://www.lawa.org/groups-and-divisions/business-jobs-and-social-responsibility>

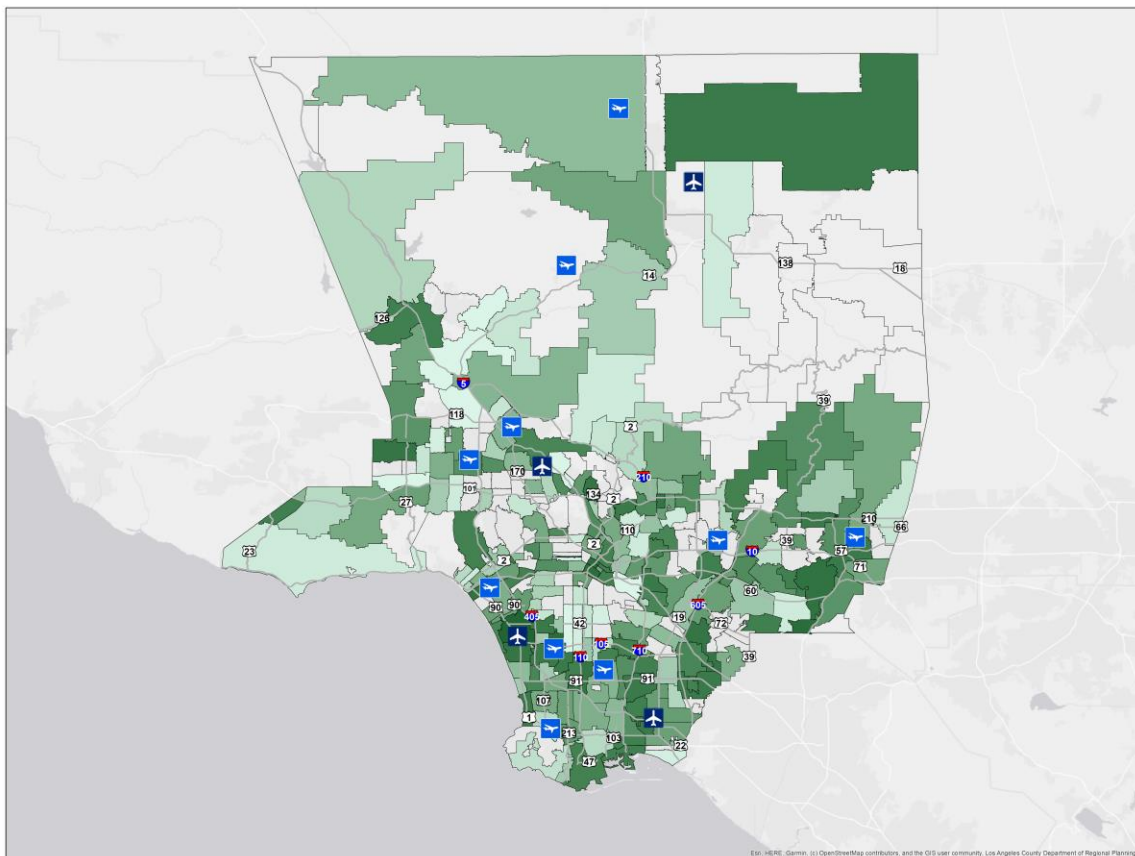
- Data on the race/ethnicity and gender of vendor owners (available according to the Loyola Marymount University (LMU) Disparity Study) may provide further insight on how LAWA's procurement practices impact racial minorities in disadvantaged communities.

The following map of Los Angeles County visualizes the “retained” amount by zip code with the **darker shade of green** indicating larger sums. Retained amount refers to how much is paid directly to and kept by the vendor – or “earned” by the vendors. The zip codes identify where the vendors are located.

## LOS ANGELES COUNTY – EXPENDED FUNDS

***Of procurement contracts awarded in audit years 2017 to 2022, LAWA paid \$9.34 billion to 5,414 vendors; 63.8% (\$5.96 billion) went to 2,335 vendors with a reported address in Los Angeles County.***

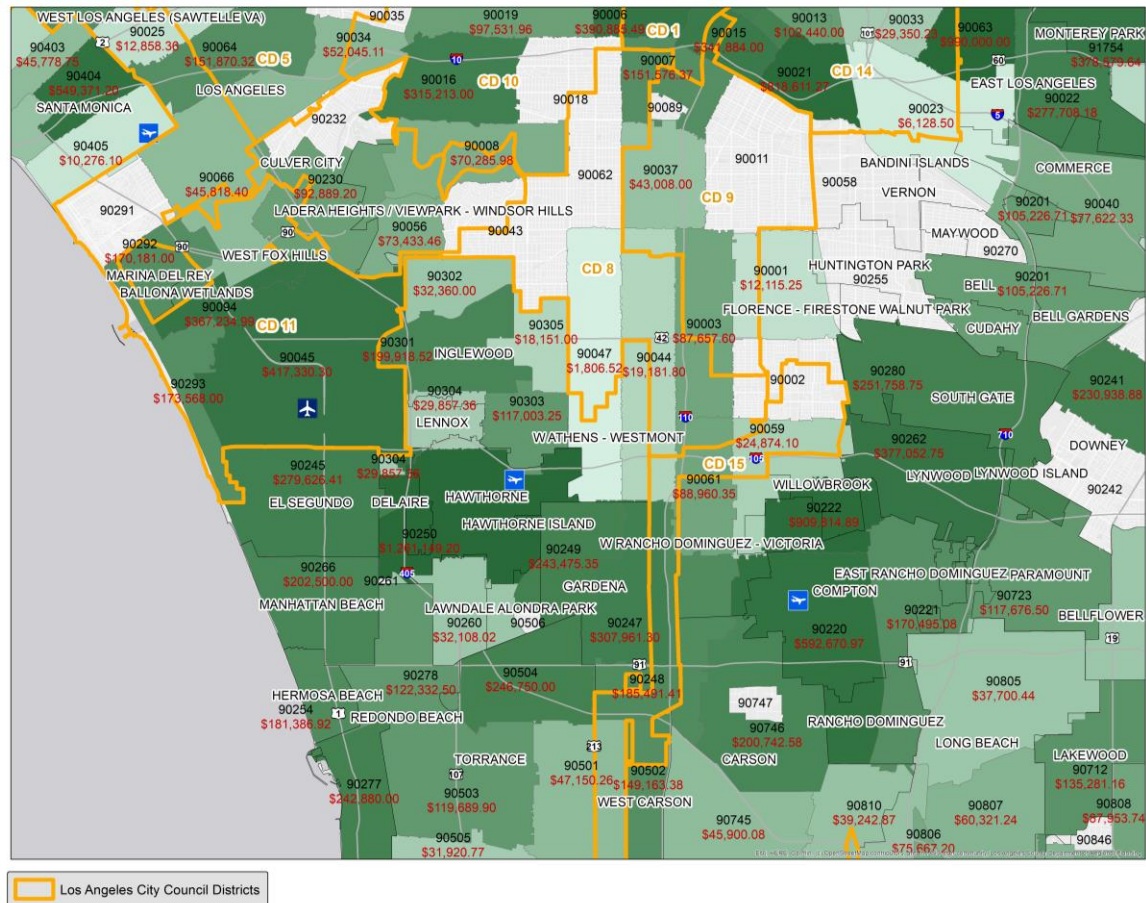
**Map 31. LAWA's Expended Funds in Los Angeles County (2017-2022)**





Similar patterns of uneven distribution emerge when mapping the *median* (i.e., 50<sup>th</sup> percentile) amount earned by zip code:

**Map 33. LAWA's Median Expended Funds around LAX with Overlay of Zip Codes and Council Districts (2017-2022)**

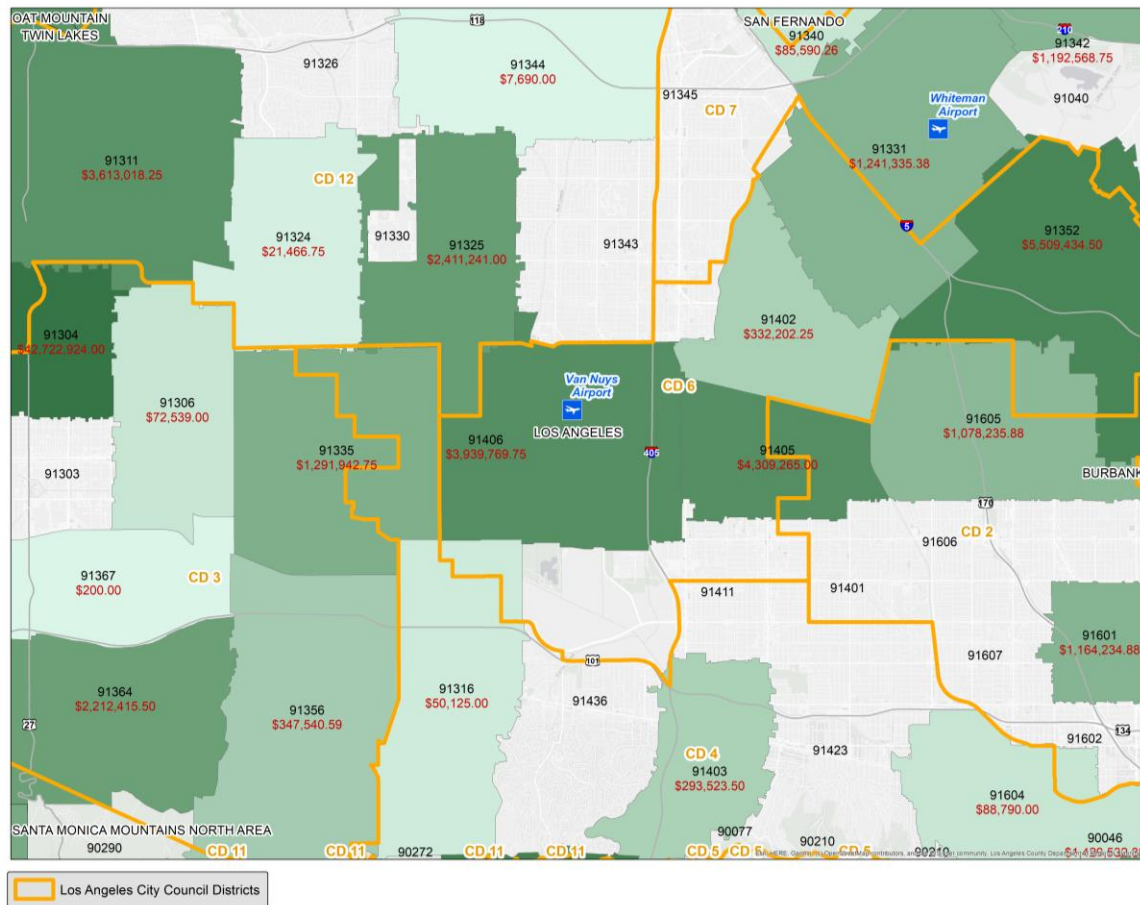




## AROUND VNY – EXPENDED FUNDS

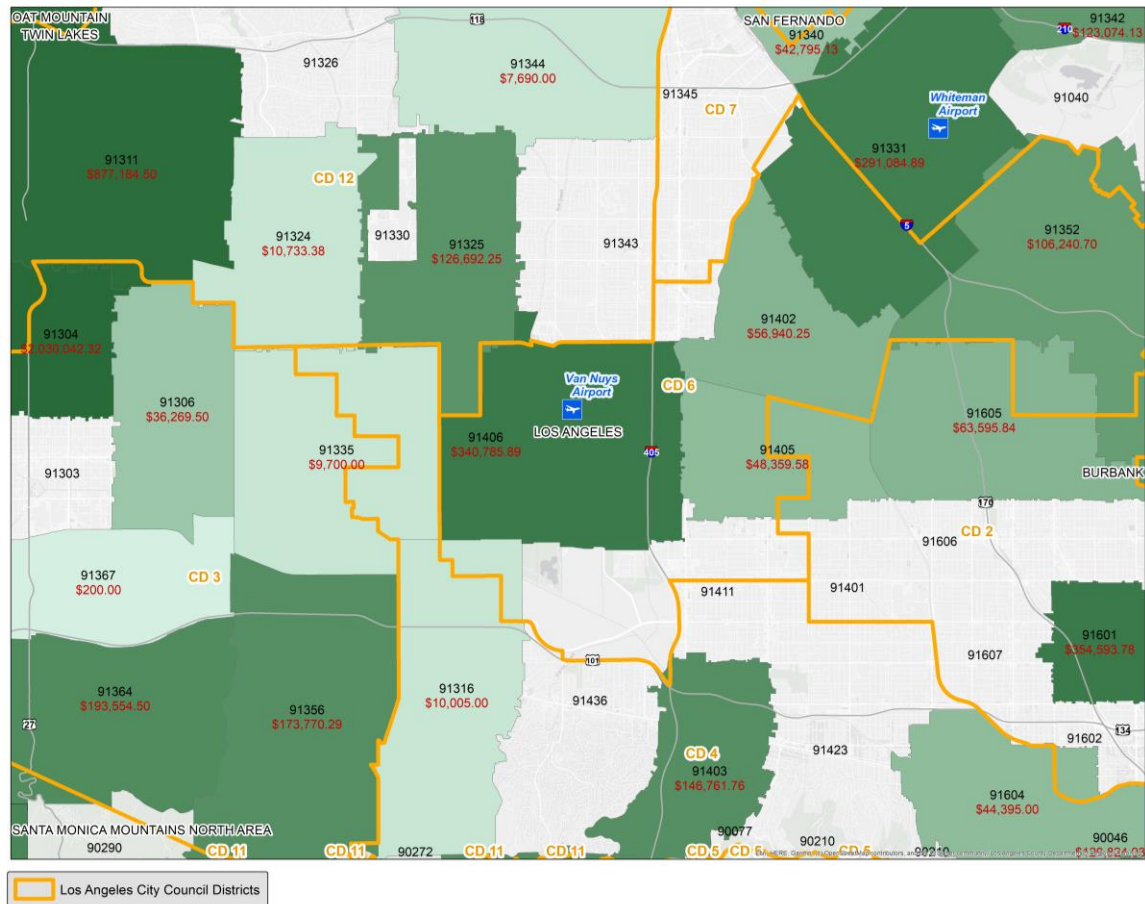
***Of the total expended amount by LAWA from 2017 to 2022, less than 1% (\$80.97 million) went to 161 vendors with an address in the mapped area around VNY.*** Similar to the area around LAX, the distribution of expended funds is uneven.

**Map 34. LAWA's Expended Funds around VNY with Overlay of Zip Codes and Council Districts (2017-2022)**



Similar patterns of uneven distribution emerge when mapping the *median* amount earned by zip code around VNY:

### Map 35 LAWA's Median Expended Funds around VNY with Overlay of Zip Codes and Council Districts (2017-2022)



[See Table 3 in the Appendix for procurement data by zip code.]

LAWA employees report that multiple mechanisms may be driving geographic disparities in procurement, including:

- The lack of bids from “qualified” primes who are located near LAX or VNY
- Lack of businesses, certified or not, in historically disadvantaged communities
- Lack of available qualified primes from historically disadvantaged communities when projects are being bid
- Competition with well-established and more cost-efficient primes outside of historically disadvantaged communities

Note: Business owners may establish businesses in areas where they do not reside; therefore, additional analyses on residential data of stakeholders would strengthen this analysis. Additional details are discussed in recommendations.



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***Certified businesses made up majority of contracted vendors located in Los Angeles County, around LAX, and around VNY.***

From 2017 to 2022, certified businesses made up the majority of contracted vendors located in Los Angeles County, around LAX, and around VNY; however, their geographical distribution was uneven. The Business Enterprise programs were meant to help small businesses primarily.

*“Los Angeles World Airports (LAWA) knows it must successfully partner with the consultant and contractor communities to meet our vision of ‘Gold Standard Airports – Delivered’... LAWA is committed to local, small, and disabled veteran Business Enterprise participation. As projects move through the definition process, specific participation goals are established based on sub-contracting opportunities.” – [LAWA’s PDG Procurement Outlook](#)*

## LOS ANGELES COUNTY – CERTIFIED BUSINESSES

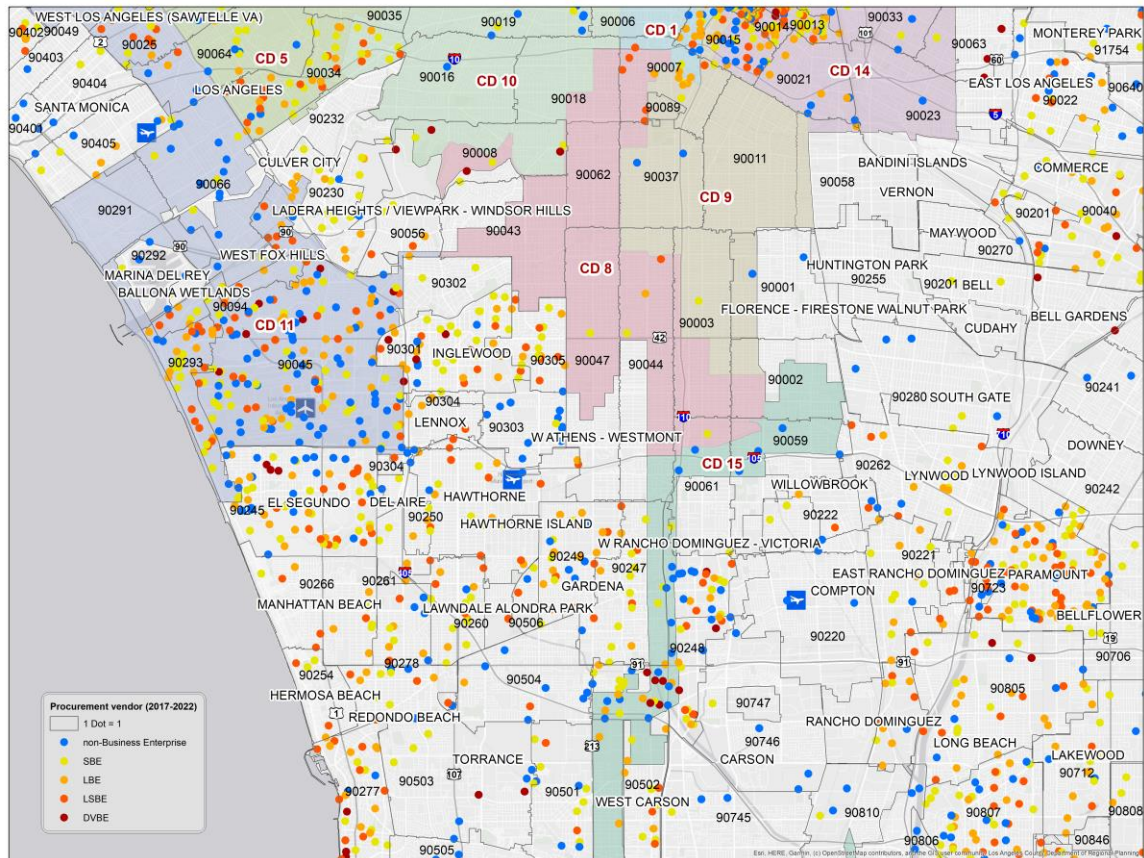
Of the 5,414 vendors contracted in procurements reviewed from 2017 to 2022, 46.9% (2,540) were certified businesses. ***Of the 2,335 total vendors located in Los Angeles County, 61.7% (1,440) were certified businesses.***

## AROUND LAX – CERTIFIED BUSINESSES

***Of the 1,206 total LAWA vendors located in the mapped area around LAX, 59.5% (717) were certified businesses.*** While there are concentrations of vendors in particular areas (e.g., CD 11), other areas do not have as many vendors contracted with LAWA (e.g., CD 8 and CD 9) from 2017 to 2022.

Note: Businesses can be certified in multiple Business Enterprise programs. Each certification (e.g., SBE, LSBE, DVBE) is represented separately on the following map. Dots represent businesses’ reported zip codes and not exact addresses.

**Map 36. Certified Businesses around LAX**



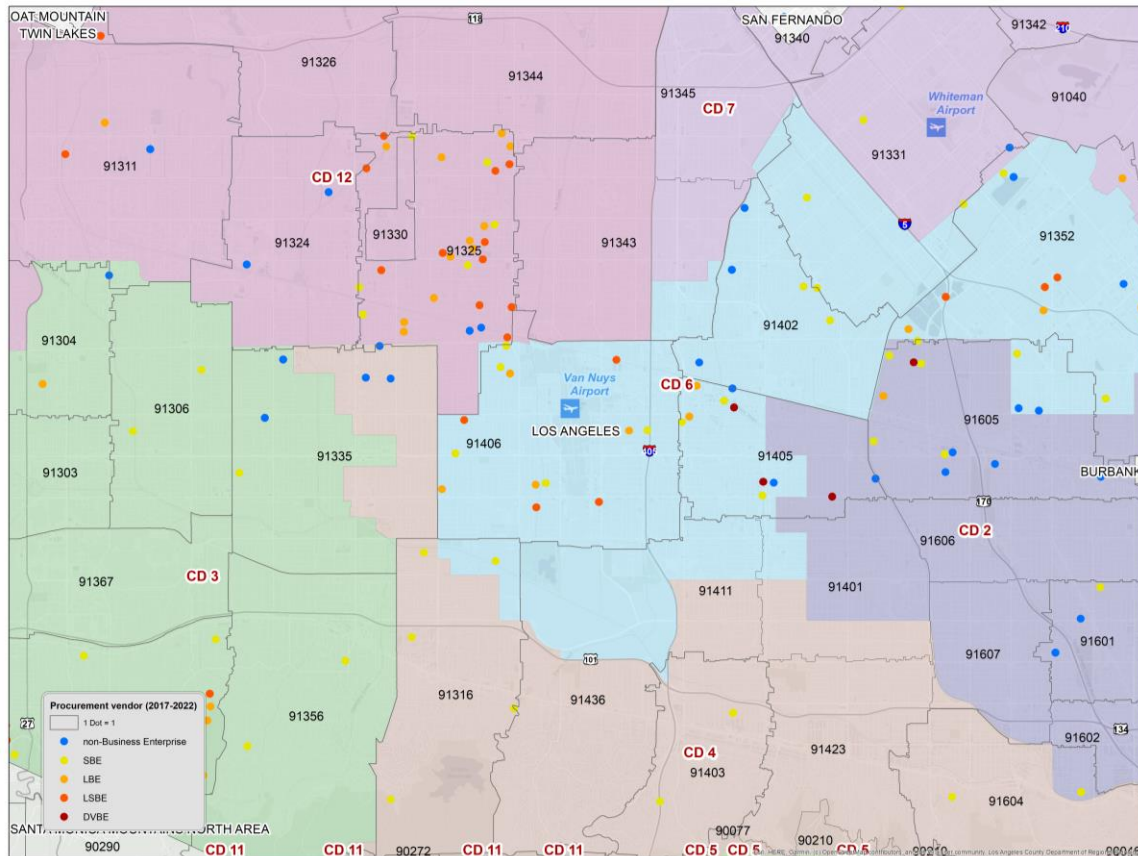
Note: Dots represent businesses' reported zip codes and not exact address.

[See Table 3 in the Appendix for procurement and certified business data by zip code.]

## AROUND VNY – CERTIFIED BUSINESSES

***Of the 161 total vendors receiving LAWA expenditures and located in the mapped area around VNY, 62.1% (100) were certified businesses.***

**Map 37. Certified Businesses around VNY**



Note: Dots represent businesses' reported zip codes and not exact address.

[See Table 3 in the Appendix for procurement and certified business data by zip code.]

***Although contracting with LAWA is advantageous to vendors, some businesses perceive doing business with government in general and LAWA in particular as challenging.***

LAWA employees perceived that it is difficult for businesses to be certified and difficult for them to contract with LAWA because of various barriers, including:

- Too much paperwork
- Insurance and bonding issues
- Fear of not getting paid in a timely manner or not at all

Business enterprise certifications help level the competitive field for small, local, and otherwise disadvantaged firms by creating incentives for contractors to use them on contracts. The primary incentive is that LAWA sets minimum levels at which contractors must use designated certified businesses on each contract. The secondary incentive is the ability for proposers to achieve higher scores in competitive procurements for superior inclusivity commitments and performance history.

LAWA reports that *“LAWA employees are engaged in ongoing efforts to eliminate or reduce actual and perceived barriers to contracting with LAWA.”*

***Subcontractor dollar amounts as a percent of total contract dollars awarded vary overall and by airport.***

By nature of being a subcontractor, firms will typically earn fewer contract dollars than their primes. The challenge is determining what is a reasonable differential of dollars awarded primes and contractors.

The percent of total contract dollars awarded to subcontractors by region vary, ranging from 15.5% (around LAX) to 91.3% (around VNY), as shown in Table II.2.

**Table II.2: Share of Vendors and Dollars Awarded to Subcontractors (2017 to 2022)**

	Percent of Vendors on LAWA Contracts who are Subcontractors	Percent of Contract Dollars Awarded to Subcontractors
Overall	77.9%	35.5%
Los Angeles County	79.7%	24.8%
Around LAX	73.4%	15.5%
Around VNY	91.3%	91.3%

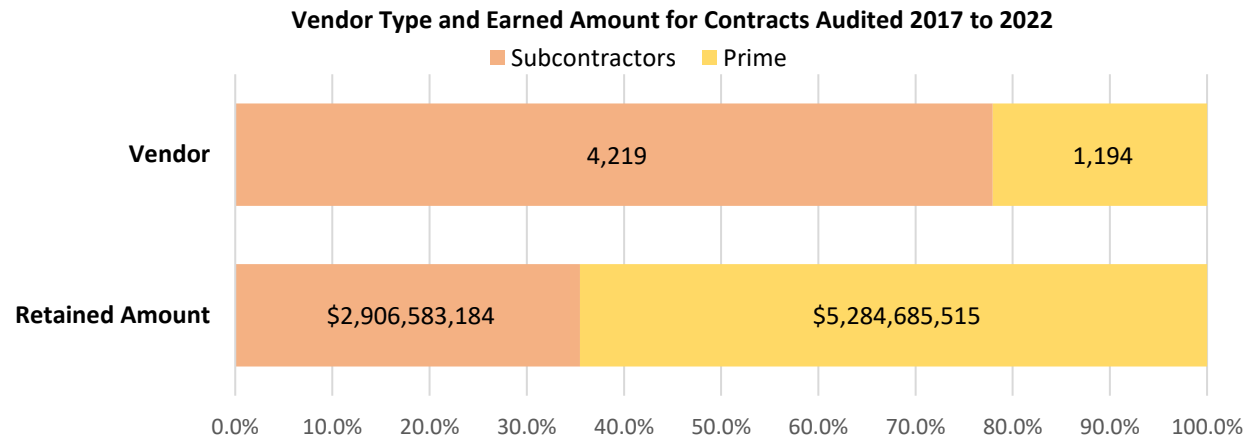
Note: One contract, valued at \$1,149,851,274.34 and located in zip code 90045, was omitted from this analysis because “there is no sub payment since this contract was approved by LAWA management to continue reporting on a monthly paper form (SUR), i.e., the sub payments are not in B2G, but the prime payments are.”



“Overall” includes all vendors who are subcontractors on LAWA contracts. We see a larger proportion of contract dollars awarded to subcontractors overall compared to Los Angeles County and around LAX.

#### OVERALL – SUBCONTRACTORS

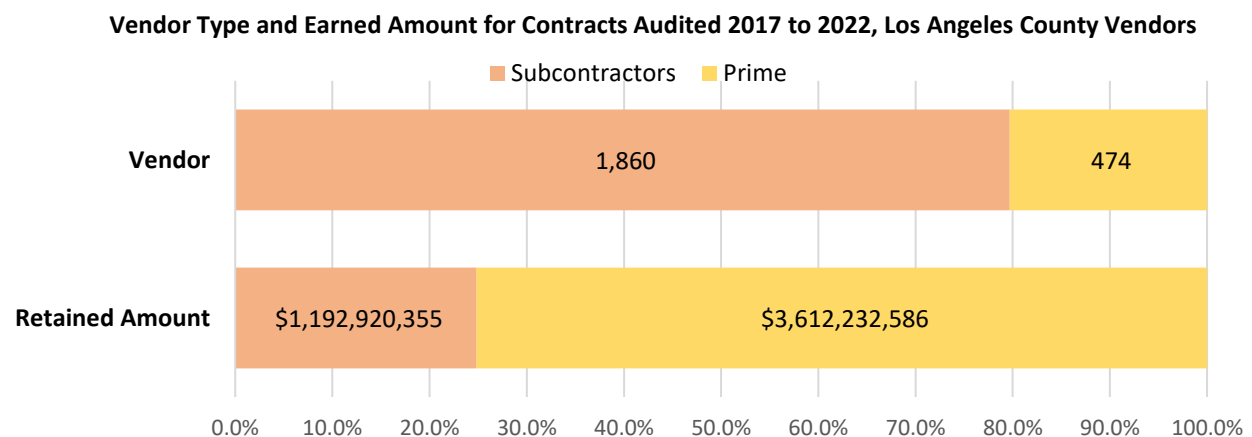
**Subcontractors made up 77.9% (4,219) of all vendors (5,413) contracted with LAWA from 2017 to 2022. Subcontractors earned 35.5% (\$2.9 billion) of expended funds:**



This contract dollar differential is expected since subcontractors may lack the scale and capacity to perform the tasks of primes. Subcontractors are paid for a smaller share of work than are primes.

#### LOS ANGELES COUNTY – SUBCONTRACTORS

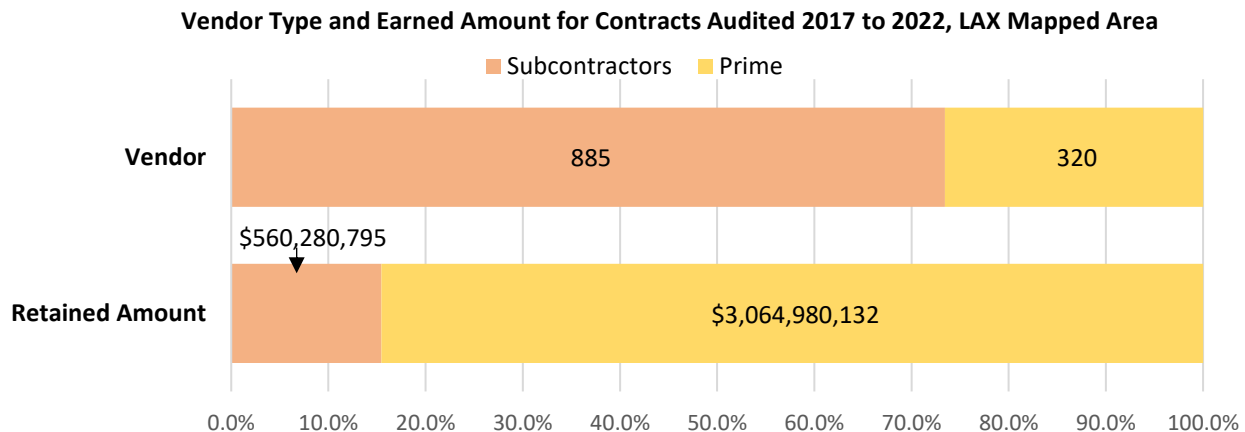
This differential is consistent when examining only vendors located in Los Angeles County. **Subcontractors made up 79.7% (1,860) of all Los Angeles County vendors (2,334) contracted with LAWA from 2017 to 2022. Subcontractors earned 24.8% (\$1.19 billion) of expended funds across all Los Angeles County vendors:**





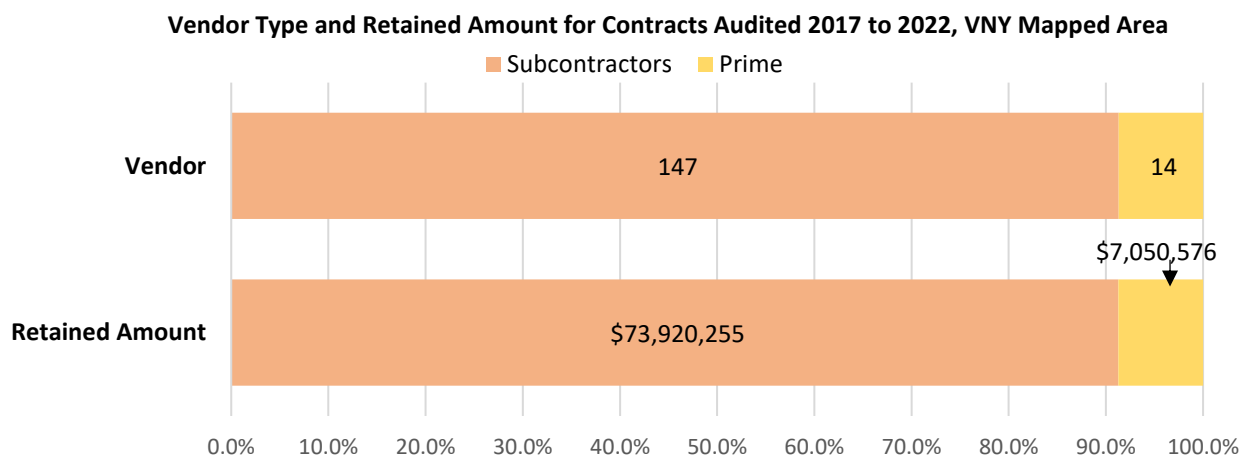
#### AROUND LAX – SUBCONTRACTORS

This remains true for vendors located in the mapped area around LAX. **Subcontractors made up 73.4% (885) of vendors located around LAX (1,205) and contracted with LAWA from 2017 to 2022. Subcontractors earned 15.5% (\$560.3 million) of expended funds across all vendors located in the mapped area around LAX:**



#### AROUND VNY – SUBCONTRACTORS

Among vendors located in the mapped area around VNY, subcontractors earned a proportionate amount. **Subcontractors made up 91.3% (147) of vendors located around VNY (161) and contracted with LAWA from 2017 to 2022. Subcontractors earned 91.3% (\$73.9 million) of expended funds across all vendors located in the mapped area around VNY:**



[See Table 4 in the Appendix for summarized data on procurement by vendor type.]

This situation differs from LAX and may be partially attributed to various factors:

- More subcontractors may live in the San Fernando Valley (around VNY).



- Primes may be focusing on managing the project and relying more on subcontractors in performing the work.
- Van Nuys may have vendors able to do the work of a type sought and performed by subcontractors.

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***Subcontractors face challenges that impact their earnings and likelihood to seek projects with LAWA.***

LAWA employees noted that subcontractors face challenges that impact their earnings and likelihood to seek another project with LAWA.

***Concerns about primes not paying.*** Among the complaints from subcontractors about primes is situations where the prime does not pay them. Although subcontractors have the option to request a “stop payment” from LAWA to the prime, such a request is seen as a last-ditch effort because subcontractors risk threatening working relationships with primes or getting blacklisted by the primes on future projects. This threat leads to many subcontractors, especially small vendors, to not go through with the “stop payment” request and accept the loss or significant delay of payment by the prime.

Subcontractors report to LAWA staff that the most common scenario resulting in delayed or missed payments is when they are deployed to perform “change work,” i.e., construction work resulting from a change in project scope or requirements. Project changes are often subject to dispute or additional negotiation between the agency and the prime contractor, resulting in delays to payment received for change work.

For Federally funded projects with vendors that are certified as DBE, the FAA requires LAWA to investigate non-payment claims.

***Lack of consequences for not using certified businesses at levels designated by the contract.***

LAWA employees shared that although LAWA has the ability to withhold payments to primes—10% of the difference between what was paid and what should have been paid to the designated category of certified businesses. Historically, LAWA has not implemented this consequence. LAWA expects contracted primes to meet all contractual obligations including to subcontractors.

Additionally, primes are not regularly held accountable to develop subcontractors, including SBEs; instead, they are only contracted and paid to meet minimum requirements set by LAWA. According to LAWA employees, this situation is a missed opportunity to develop small businesses to increase their competitive capacity and ability to deliver larger projects for LAWA.

***Certified businesses receive more contracts, but lower contract dollar amounts than non-certified businesses.***

Certified businesses tend to be smaller businesses that provide supporting work on airport projects. This differential may be an indication of the type of work sought and performed by certified businesses, and the differing roles they play in the market compared to large national or multi-national vendors. Again, the challenge is determining what is a reasonable differential of dollars awarded primes and contractors. The percent of certified businesses is between 46.9% and 62.1%, if summarized overall, Los Angeles County, LAX, or VNY. The percent of total contract dollars awarded vary, ranging from 15.7% (around LAX) to 69.9% (around VNY), as shown in Table II.3.

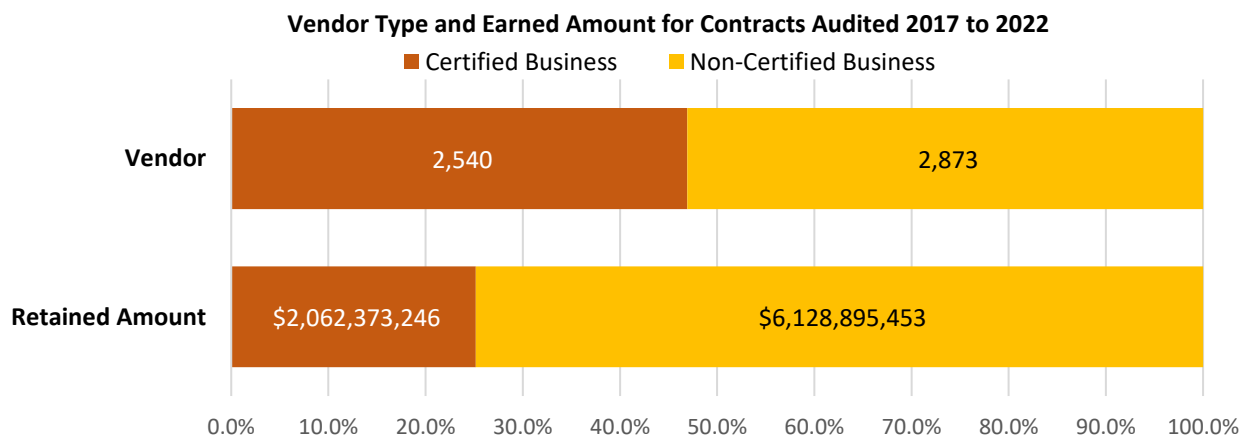
**Table II.3: Share of Vendors and Dollars Awarded to Certified Businesses (2017 to 2022)**

	Percent of Total Vendors on LAWA Contracts who are Certified	Percent of Total Contract Dollars Awarded to Certified Contractors
Overall	46.9%	25.2%
Los Angeles County	61.7%	24.7%
Around LAX	59.5%	15.7%
Around VNY	62.1%	69.9%

Note: One contract, valued at \$1,149,851,274.34 and located in zip code 90045, was omitted from this analysis because "...there is no sub payment since this contract was approved by LAWA management to continue reporting on a monthly paper form (SUR), i.e., the sub payments are not in B2G, but the prime payments are."

**OVERALL – CERTIFIED VERSUS NON-CERTIFIED BUSINESSES**

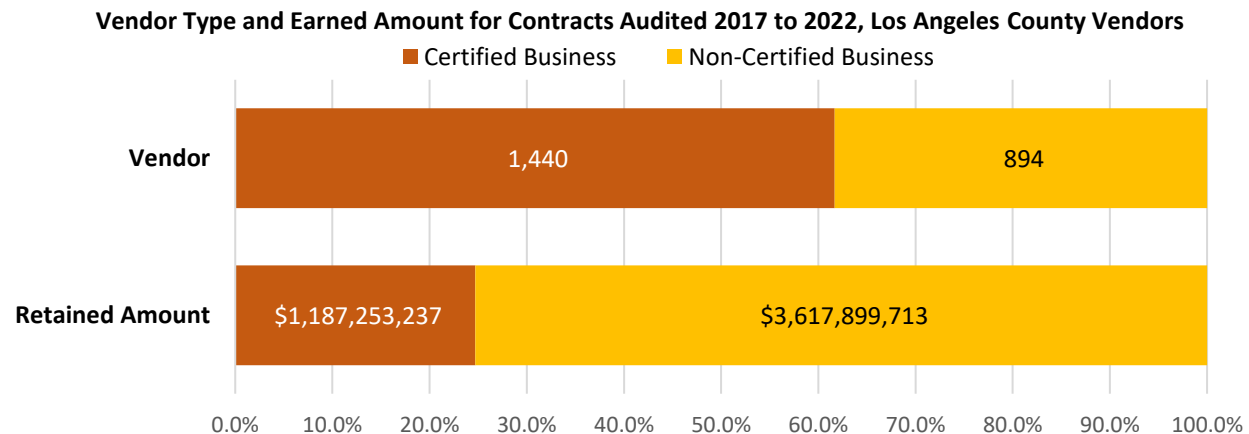
Although ***certified businesses made up 46.9% (2,540) of all businesses or vendors (5,413)*** contracted with LAWA from 2017 to 2022, ***they earned 25.2% (\$2.1 billion) of expended funds:***





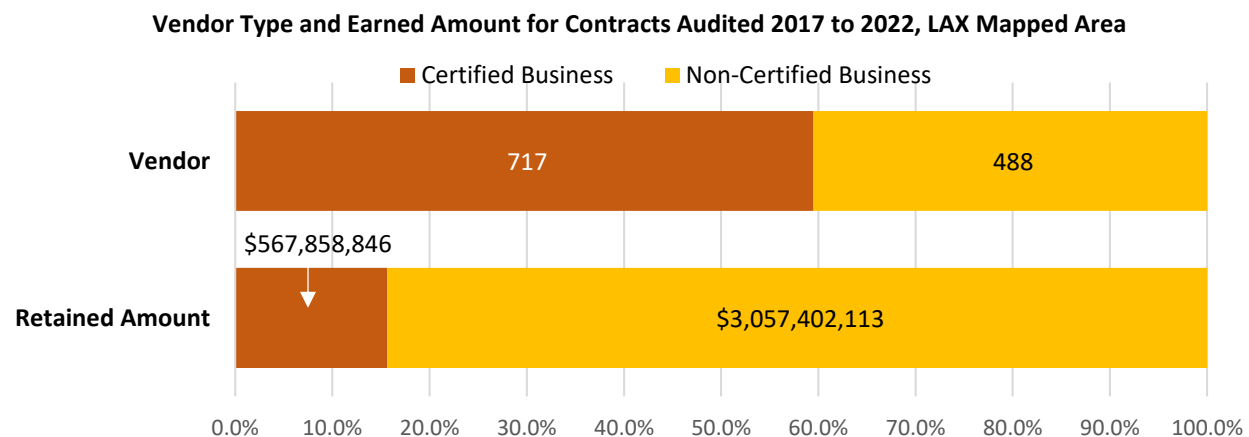
#### LOS ANGELES COUNTY – CERTIFIED VERSUS NON-CERTIFIED BUSINESSES

This differential is also evident when examining only vendors located in Los Angeles County. Although ***certified businesses made up 61.7% (1,440) of all Los Angeles County vendors (2,334)*** contracted with LAWA from 2017 to 2022, ***they earned 24.7% (\$1.2 billion) of expended funds*** across all Los Angeles County vendors:



#### AROUND LAX – CERTIFIED VERSUS NON-CERTIFIED BUSINESSES

This differential is also evident for vendors located in the mapped area around LAX. Although ***certified businesses made up 59.5% (717) of vendors located around LAX (1,205)*** and contracted with LAWA from 2017 to 2022, they ***earned 15.7% (\$567.9 million) of expended funds*** across all vendors located in the mapped area around LAX:

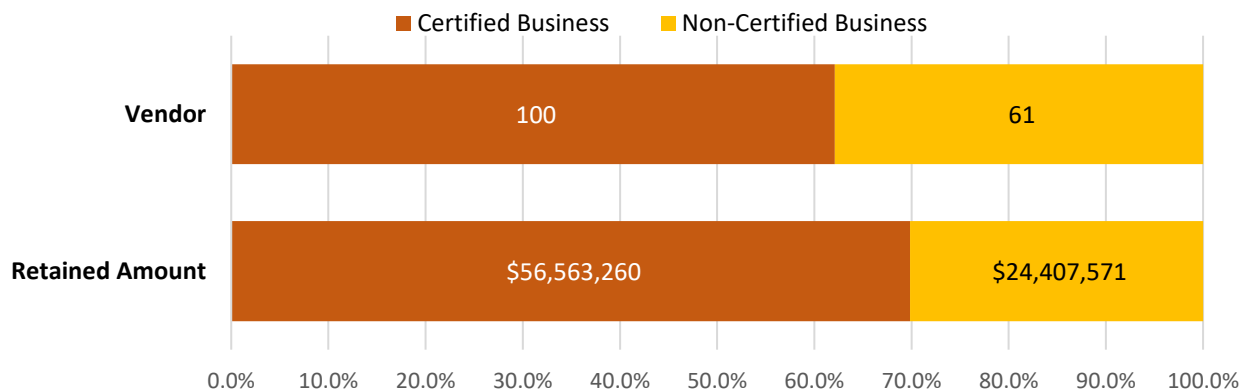


#### AROUND VNY – CERTIFIED VERSUS NON-CERTIFIED BUSINESSES

Among vendors located in the mapped area around VNY, certified businesses earned a greater proportional amount. ***Certified businesses made up 62.1% (100) of vendors located around VNY (161)*** and contracted with LAWA from 2017 to 2022, and ***they earned 69.9% (\$56.6 million) of expended funds across all vendors located in the mapped area around VNY:***



**Vendor Type and Earned Amount for Contracts Audited 2017 to 2022, VNY Mapped Area**



[See Table 4 in the Appendix for summarized data on procurement by vendor type.]

***Certified business subcontractors receive fewer contracts, but larger contract dollar amounts than non-certified business subcontractors.***

Certified business subcontractors received fewer contracts, but larger contract dollar amounts than non-certified business subcontractors, possibly reflecting advantages to subcontractors of becoming certified businesses. Given the scope of this undertaking, this analysis does not disaggregate which certification may see a greater advantage. Future analysis may provide more nuance to the analysis.

The percent of certified business subcontractors is between 56.2% and 74.8%, if summarized overall, Los Angeles County, LAX, or VNY. The percent of total contract dollars awarded vary, ranging from 63.7 (overall) to 92.7% (around LAX), as shown in Table II.4.

**Table II.4: Share of Subcontractors and Subcontractor Dollars Awarded to Certified Businesses (2017 to 2022)**

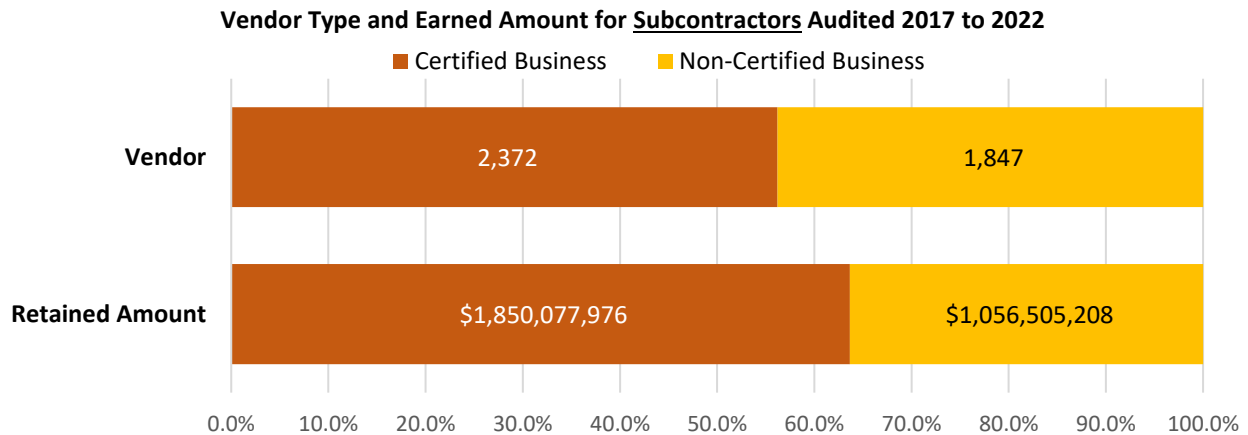
	Percent of Subcontractors on LAWA Contracts who are Certified	Percent of Subcontractor Dollars Earned by Certified Subcontractors
Overall	56.2%	63.7%
Los Angeles County	71.5%	88.4%
Around LAX	74.8%	92.7%
Around VNY	64.6%	74.0%

Note: One contract, valued at \$1,149,851,274.34 and located in zip code 90045, was omitted from this analysis because "...there is no sub payment since this contract was approved by LAWA management to continue reporting on a monthly paper form (SUR), i.e., the sub payments are not in B2G, but the prime payments are."



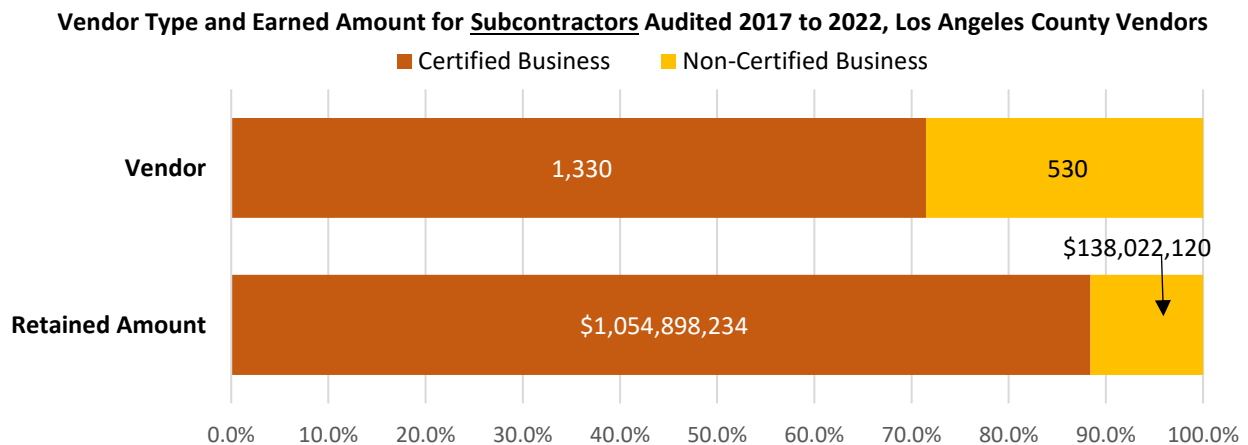
## OVERALL – SUBCONTRACTORS

**Among all subcontractors (4,219) that contracted with LAWA from 2017 to 2022, certified businesses made up 56.2% (2,372) and earned 63.7% (\$1.85 billion) of all funds expended across subcontractors:**



## LOS ANGELES COUNTY – SUBCONTRACTORS

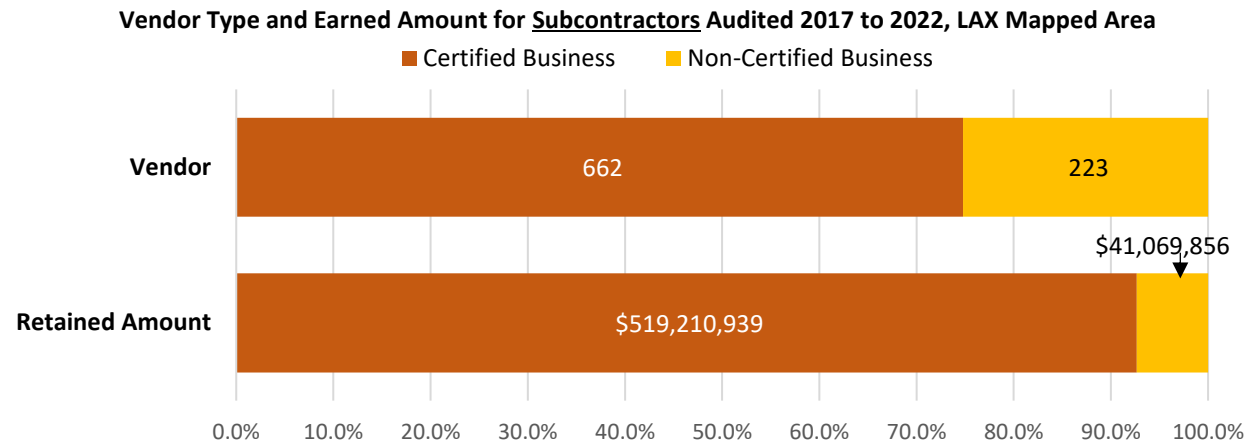
This pattern is evident also when examining subcontractors located in Los Angeles County. **Among subcontractors located in the County (1,860), certified businesses made up 71.5% (1,330) and earned 88.4% (\$1.05 billion) of all funds expended across subcontractors located in Los Angeles County:**





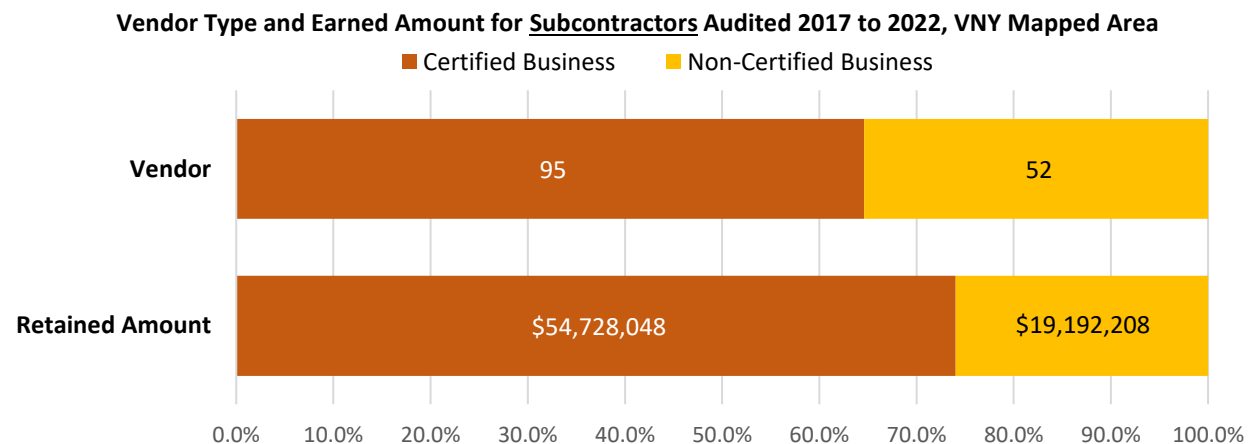
#### AROUND LAX – SUBCONTRACTORS

**Similarly, certified businesses made up 74.8% (662) of all subcontractors (885) located in the mapped area around LAX but earned 92.7% (\$519.2 million) of all funds expended across subcontractors in the area:**



#### AROUND VNY – SUBCONTRACTORS

**Certified vendors made up 64.6% (95) of all subcontractors (147) located in the mapped area around VNY but earned 74.0% (\$54.7 million) of all funds expended across subcontractors in the area:**



[See Table 4 in the Appendix for summarized data on procurement by vendor type.]



***Certified primes receive disproportionately fewer funds through LAWA contracts than non-certified primes.***

Certified primes receive disproportionately fewer contracts and dollar amounts through LAWA contracts than non-certified primes. The percent of primes who are certified vary by region. Across Los Angeles County, 23.2% of all contracts awarded went to certified primes who received 3.7% of contract dollars. In contrast, among contracts awarded to primes located in the mapped area around LAX, 17.2% went to certified primes who received 1.6% of LAX area's contract dollars. The percent of total contract dollars awarded to certified business primes vary, ranging from 1.6% (around LAX) to 26.0% (around VNY), as shown in Table II.5.

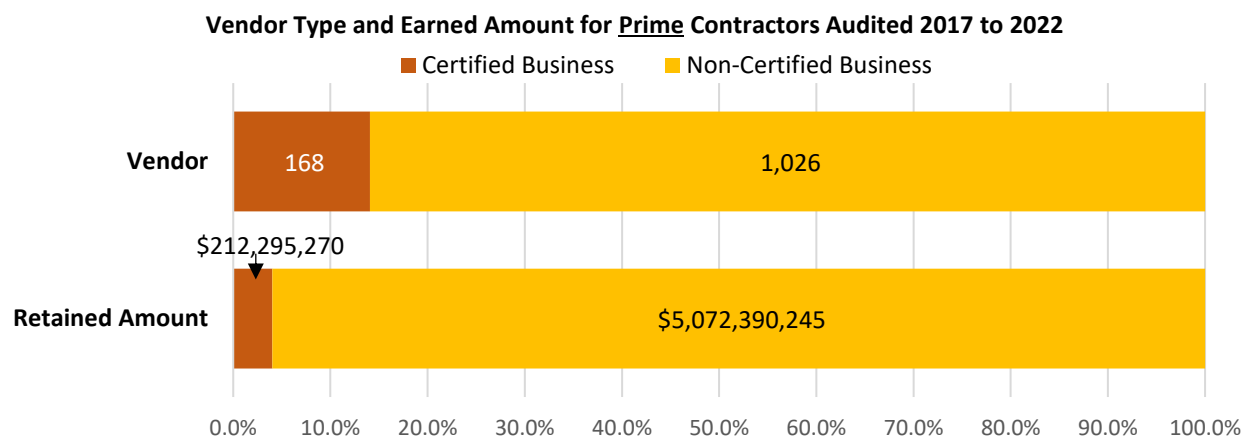
**Table II.5: Share of Primes and Prime Dollars Awarded to Certified Businesses (2017 to 2022)**

	Percent of Primes on LAWA Contracts who are Certified	Percent of Prime Dollars Awarded to Certified Primes
Overall	14.1%	4.0%
Los Angeles County	23.2%	3.7%
Around LAX	17.2%	1.6%
Around VNY	35.7%	26.0%

Note: One contract, valued at \$1,149,851,274.34 and located in zip code 90045, was omitted from this analysis because "...there is no sub payment since this contract was approved by LAWA management to continue reporting on a monthly paper form (SUR), i.e., the sub payments are not in B2G, but the prime payments are."

**OVERALL – CERTIFIED BUSINESSES AS PRIMES**

***Among all primes (1,194) contracted with LAWA from 2017 to 2022, certified businesses made up 14.1% (168) and earned 4.0% (\$212.3 million) of all funds expended across primes:***

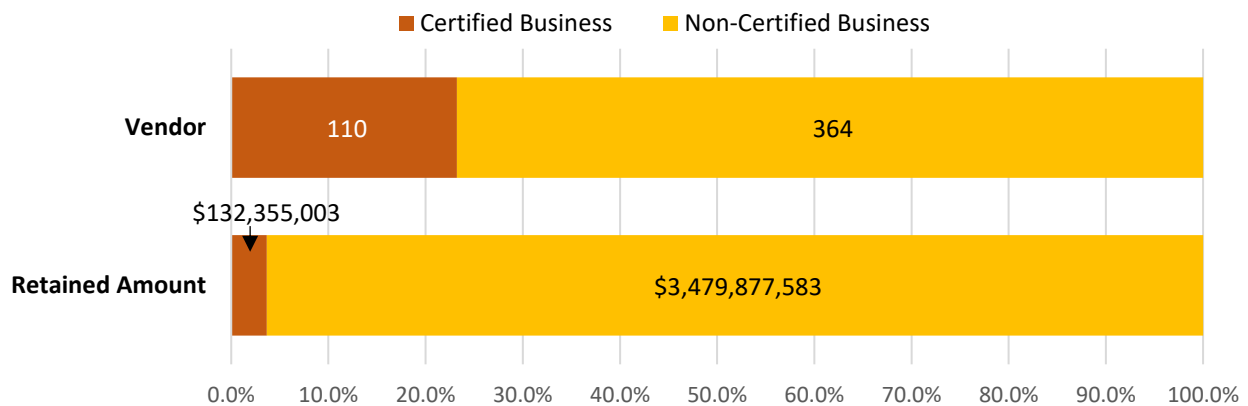




## LOS ANGELES COUNTY – CERTIFIED BUSINESSES AS PRIMES

This differential is evident also when examining primes located in Los Angeles County. ***Among primes located in the County (474), certified businesses made up 23.2% (110) and earned 3.7% (\$132.4 million) of all funds expended across primes located in Los Angeles County:***

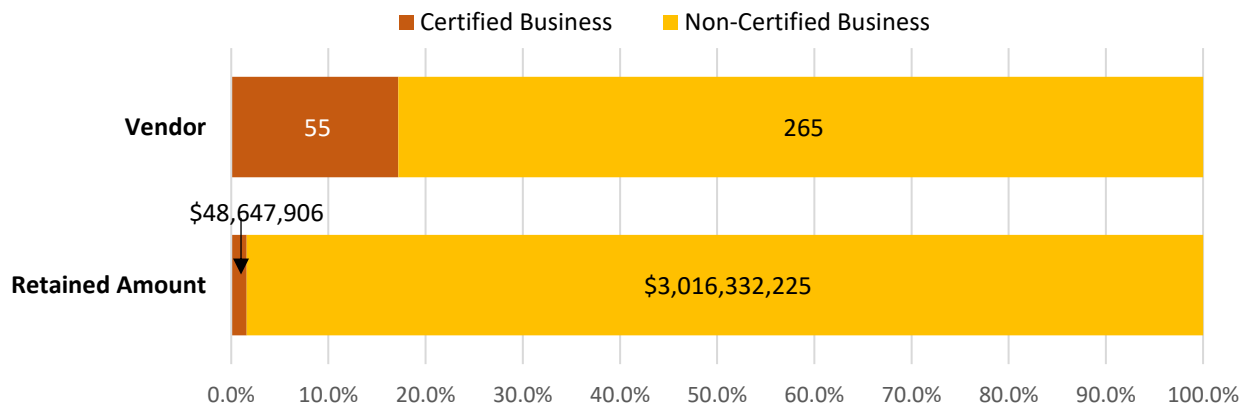
Vendor Type and Earned Amount for Prime Contractors Audited 2017 to 2022, Los Angeles County Vendors



## AROUND LAX – CERTIFIED BUSINESSES AS PRIMES

Similarly, ***certified businesses made up 17.2% (55) of all primes (320) located in the mapped area around LAX but earned 1.6% (\$48.6 million) of all funds expended across primes in the area:***

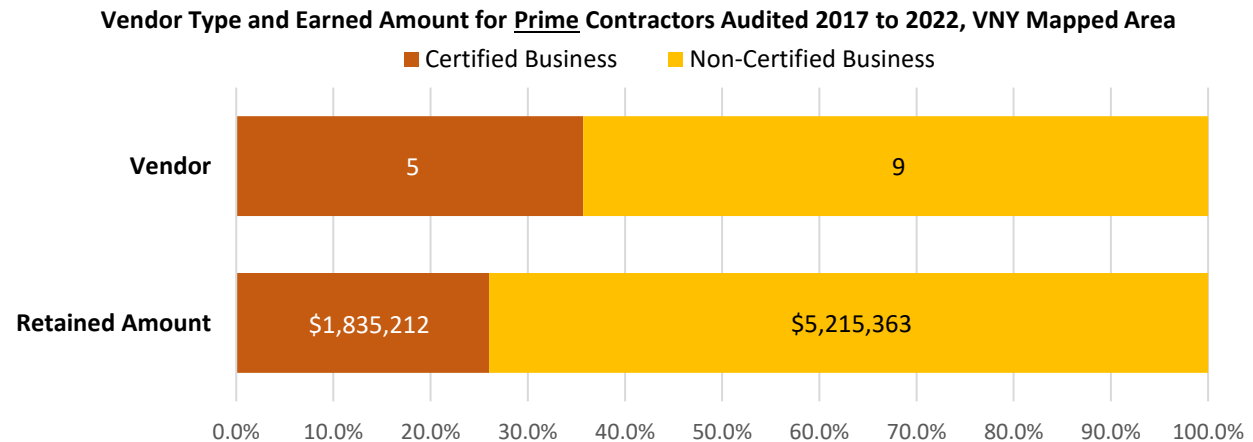
Vendor Type and Earned Amount for Prime Contractors Audited 2017 to 2022, LAX Mapped Area





## AROUND VNY – CERTIFIED BUSINESSES AS PRIMES

***Certified vendors made up 35.7% (5) of all primes (14) located in the mapped area around VNY but earned 26% (\$1.8 million) of all funds expended across primes in the area:***



[See Table 4 in the Appendix for summarized data on procurement by vendor type.]

***Vendors certified in the Disadvantaged Business Enterprise (DBE) program received \$478 million in LAWA contracts funded through Federal funding since 2017.***

Vendors certified in the DBE program are certified, for-profit, small businesses where socially and economically disadvantaged individuals own at least a 51% interest and control management and daily business operations. According to USDOT:

*“African Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian Americans, and women are presumed to be socially and economically disadvantaged. Other individuals can also qualify as socially and economically disadvantaged on a case-by-case basis.” (More information available here: [USDOT DBE](#))*

To qualify:

- An individual must have a personal net worth that does not exceed \$1.32 million.
- The business must meet the small business criteria and size, established by the U.S. Small Business Administration.
- Its average annual gross receipts for the previous 3 years are not in excess of the DBE size limit (\$28.48 million). Size limits for the airport concessions DBE program are higher (Airport Concession DBE (ACDBE) program under 49 CFR part 23).

According to USDOT, certified vendors in the DBE program working on FAA contracts are only subject to the SBA size standards.

Certified vendors in the DBE program are used by many agencies (e.g., LAWA, Caltrans, L.A. Metro) because they can be used for different services, such as:



- Airports for facilities, runways, and taxiway improvements
- Highway and road construction and improvements
- Mass transit projects

Note: LAWA can only consider DBE certification when contracts are fully or partially funded with Federal funds.

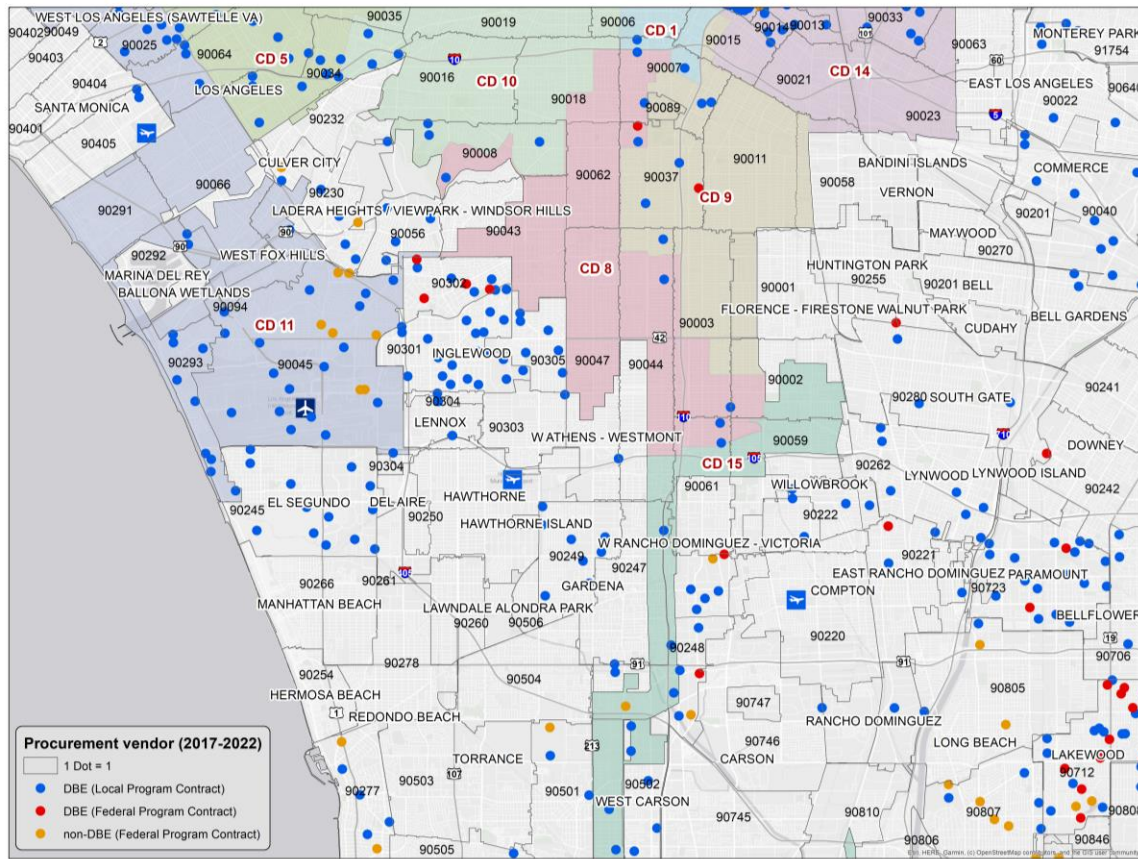
#### LAWA OVERALL

For procurement contracts since 2017, certified vendors in the DBE program earned \$478,904,542.70 from local program projects. Of these 1,452 contracts, 1,400 (96.4%) are also certified in at least one other Business Enterprise program (i.e., SBE, LBE, LSBE, DVBE). Since 2017, 488 vendors were contracted via the DBE Federal Program and earned a total of \$431,856,606.60. Of these 488 vendors, 213 (43.6%) are certified in the DBE program and earned \$33,328,580.57, 7.8% of the earned amount from DBE Federal Program contracts.

#### AROUND LAX

In the mapped area around LAX, 374 vendors certified in the DBE program have contracted with LAWA on local program projects since 2017. Within the same area, 64 vendors were contracted via DBE Federal Program contracts since 2017, 27 of which are certified in the DBE program.

**Map 38. Procurement Contracts Awarded to Certified DBEs around LAX Since 2017**

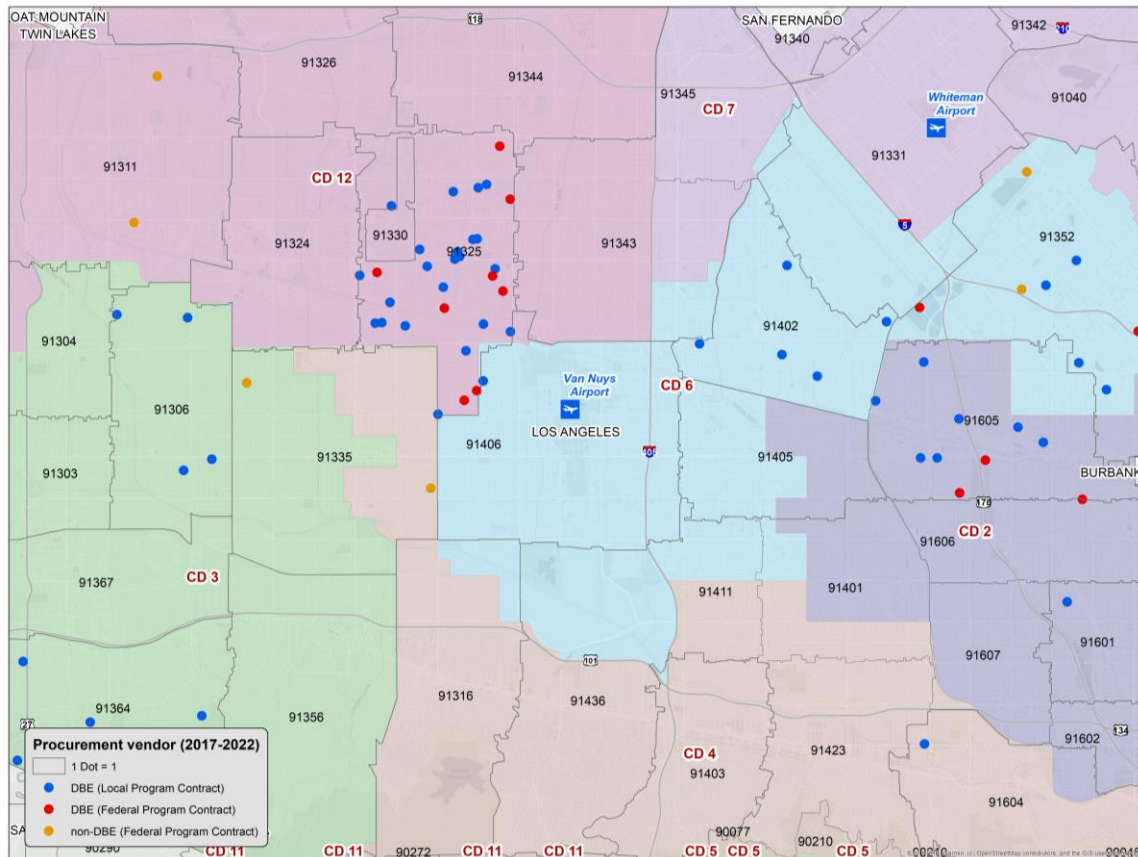


Note: Dots represent businesses' reported zip codes and not exact address.

## AROUND VNY

In the mapped area around VNY, 59 vendors certified in the DBE program contracted with LAWA on local program projects since 2017. Within the same area, 28 vendors were contracted via DBE Federal Program contracts since 2017, 16 of which are certified in the DBE program.

**Map 39. Procurement Contracts Awarded to Certified DBEs around VNY Since 2017**



Note: Dots represent businesses' reported zip codes and not exact address.





## Economic (Prosperity) – LAWA Employment

***Mapping out the workers employed by LAWA by their zip code shows that a significant share resides in areas surrounding the airports.***

LAWA was unable to provide complete data on LAWA employees and non-LAWA employees working at LAX. According to LAWA, the City Attorney’s position is that LAWA cannot obtain salary or hiring information on badged employees. Such limitations make some of the economic benefits analysis of employment at LAX not possible.

***There were limitations in the data available for LAWA employees.*** Some of the limitations in the data available for LAWA employees include:

- LAWA has information from the time a badge is renewed but lacks information regarding the year hired and length of time at LAWA in the badging system.
  - LAWA’s HR system contains hire dates for LAWA employees but matching the badging data with HR data was beyond the scope of the IEA Survey.
  - Hire dates of badged employees of airlines, contractors, and concessionaires are not available.
- Many zip codes were inaccurate (e.g., Airport Police Officers frequently use the mailing addresses and zip codes of LAWA police stations as their home addresses).
  - Because the Airport Police workforce comprises more than 15% of LAWA employees (475 of 3,035), the maps may show more LAWA employees living at LAX than is the actual fact.

LAWA issues badges to all these employees. Badged employees include all workers who have clearance to work at LAX, not only those individuals employed directly by LAWA. In addition to the 3,035 LAWA employees, almost 47,000 other employees who work for:

- Airlines and contracted services (e.g., baggage handlers, catering services, and other ground crew)
- Air Traffic Control
- TSA and CBP
- Constructions crews working on LAMP and other capital projects
- Los Angeles Police Department (LAPD) and Los Angeles Fire Department (LAFD)

***LAWA was unable to provide complete and accurate salary information for these badged employees working for vendors or concessionaires at LAX and VNY, which could show greater economic benefit for the region.*** Without complete data, KH is unable to provide a full analysis on LAWA’s economic impact in the region, including economic benefits through jobs.

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***LAWA employees living in communities around LAX and VNY earn a significant share of combined salaries paid, but earning disparities exist by zip code.***

One of LAWA's core missions is to maximize job opportunities in local communities, thereby offering local communities a fair share of LAWA's economic benefits. Through local hiring initiatives and requirements in LAWA's contracting practices, a significant share of LAWA's workforce is from local communities.

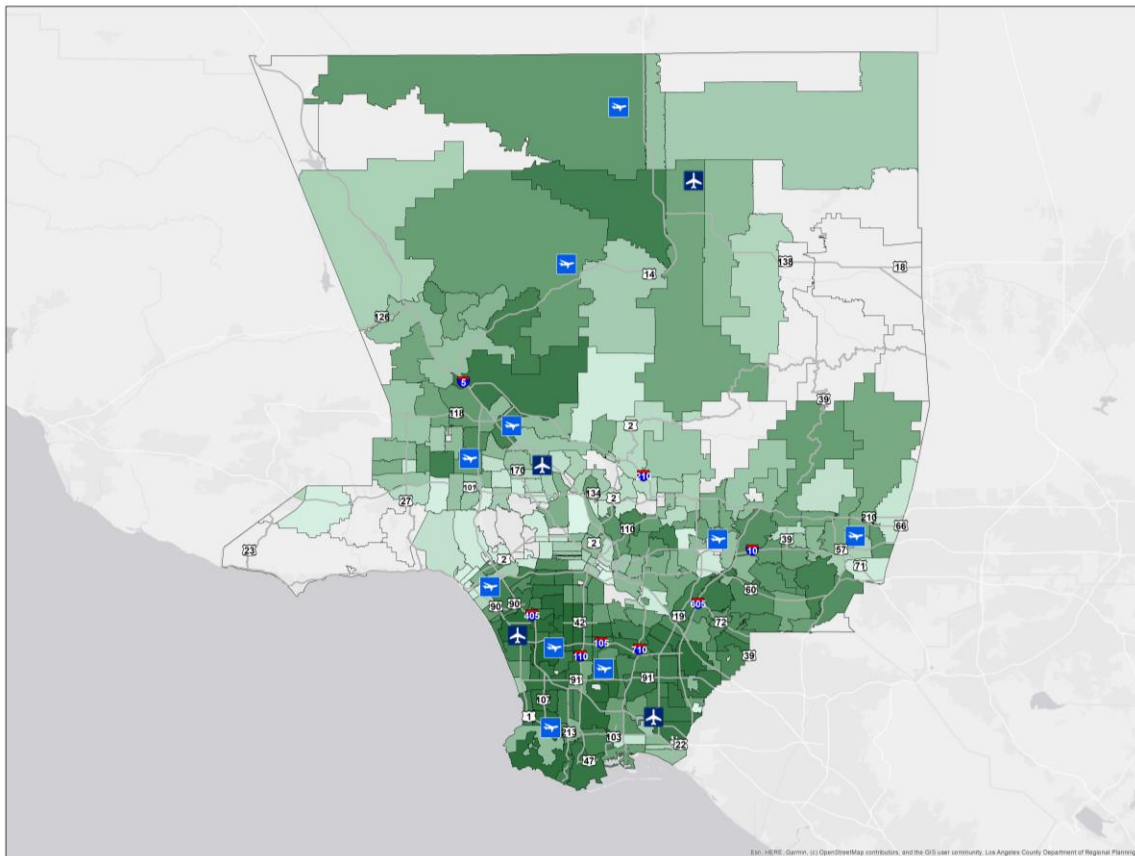
In addition, a large number of LAWA employees reside near LAX, including parts of the City of Los Angeles (e.g., Council District (CD) 8), surrounding cities (e.g., Inglewood), and unincorporated areas (e.g., West Athens). There is a high concentration of LAWA employees of color who reside to the east of LAX. A smaller share of LAWA employees reside around VNY, which is to be expected considering the comparative size of VNY; commute time would be a disincentive for LAWA staff working at LAX to reside near VNY (or in the San Fernando Valley).

***Among LAWA's workforce, employees living in communities surrounding the airports earn a significant share of total salary paid to LAWA employees.*** This pattern is due to the higher presence of workers living in those areas. When examining the median salary by zip code, areas that are predominantly non-white have a much lower salary than zip codes in more affluent and white areas. ***Across LAWA's workforce of 3,035, the combined salary is \$272.7 million with a median of \$80,000 (rounded).***

#### LOS ANGELES COUNTY – LAWA WORKFORCE

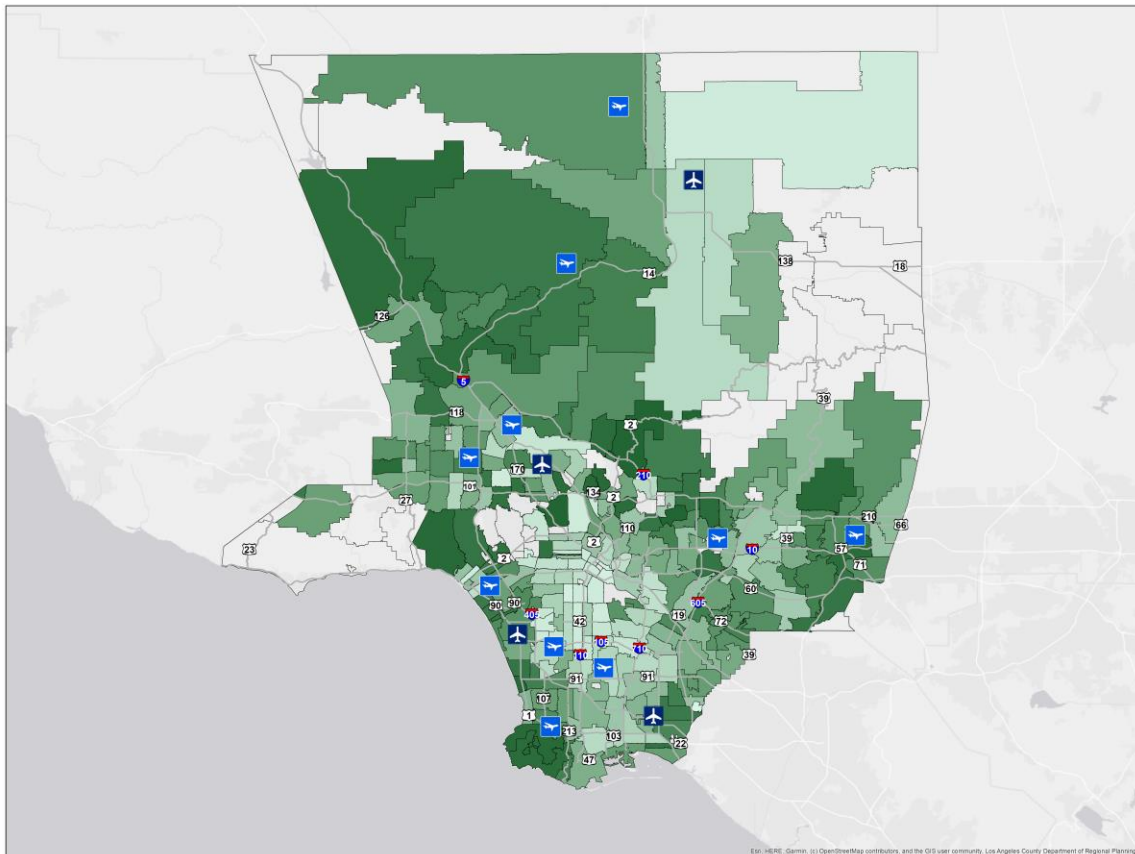
***Among LAWA's workforce of 3,035, 2,626 employees have addresses in Los Angeles County. These employees have a combined annual salary of \$231.5 million.*** Map 40 of Los Angeles County visualizes the combined salary by zip code with the **darker shade of green indicating larger sums.**

### Map 400. Salaries of LAWA Workforce, By Zip Code, in Los Angeles County



***Among LAWA employees living in Los Angeles County, there are distinct disparities in salary earnings by zip code. When examining the median salary of LAWA employees by zip code, values range from \$38,000 to \$198,000 (rounded). Map 41 of Los Angeles County visualizes the median salary of LAWA employees by zip code with the darker shade of green indicating a greater median salary.***

**Map 411. LAWA Workforce’s Median Salaries, by Zip Code, in Los Angeles County**





When aggregating employees' annual salaries by zip code, zip code's total salary ranges from approximately \$41,700 to \$4.2 million. We observed higher salaries in zip codes when there is either 1) a greater number of employees residing in that zip code, 2) higher salaries, or 3) both. By zip code, the median annual salary earnings range from approximately \$41,700 to \$173,500. Zip codes with a greater value in total salary but a relatively lower value in median salary is a result of a higher concentration of LAWA employees with lower wage earnings.

This particular trend is most apparent in the maps for regions east of LAX, including Lennox, Inglewood, West Athens, South Los Angeles, and zip codes within CD 8 and CD 9. Employee data provided by LAWA show that these zip codes are residing areas to a higher concentration of LAWA employees of color.

Table II.6 presents how total salary and median salary are distributed across zip codes. For example, a zip code in the bottom 1% has a median salary of approximately \$42,000, compared to a zip code in the top 1% which has a median salary of approximately \$174,000 :

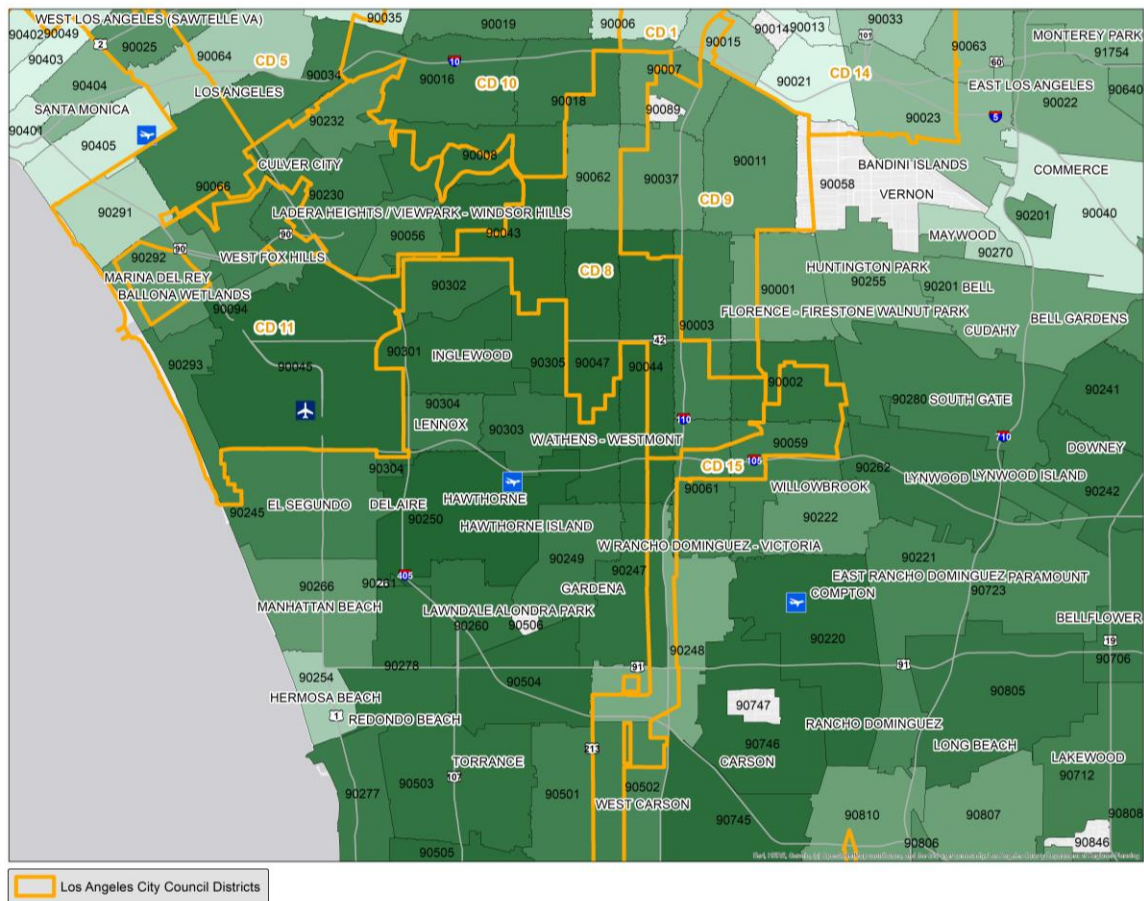
**Table II.6: Percentiles of Total Salary and Median Salary, by Zip Code (\$000s)**

Percentiles	Total Salary by Zip Code	Median Salary by Zip Code
1 <sup>st</sup>	\$ 41.7	\$41.7
5 <sup>th</sup>	\$67.4	\$54.7
10 <sup>th</sup>	\$89.3	\$58.8
25 <sup>th</sup>	\$151.8	\$74.0
50 <sup>th</sup>	\$401.6	\$93.8
75 <sup>th</sup>	\$832.9	\$114.5
90 <sup>th</sup>	\$1,627.7	\$133.4
95 <sup>th</sup>	\$2,183.6	\$143.0
99 <sup>th</sup>	\$4,159.9	\$173.5

## AROUND LAX – LAWA WORKFORCE

Across LAWA’s core workforce, **1,607 employees reside in the mapped area around LAX with a combined salary of \$129.9 million.**

**Map 422. Total Salaries of LAWA Workforce Residing in Zip Codes around LAX**

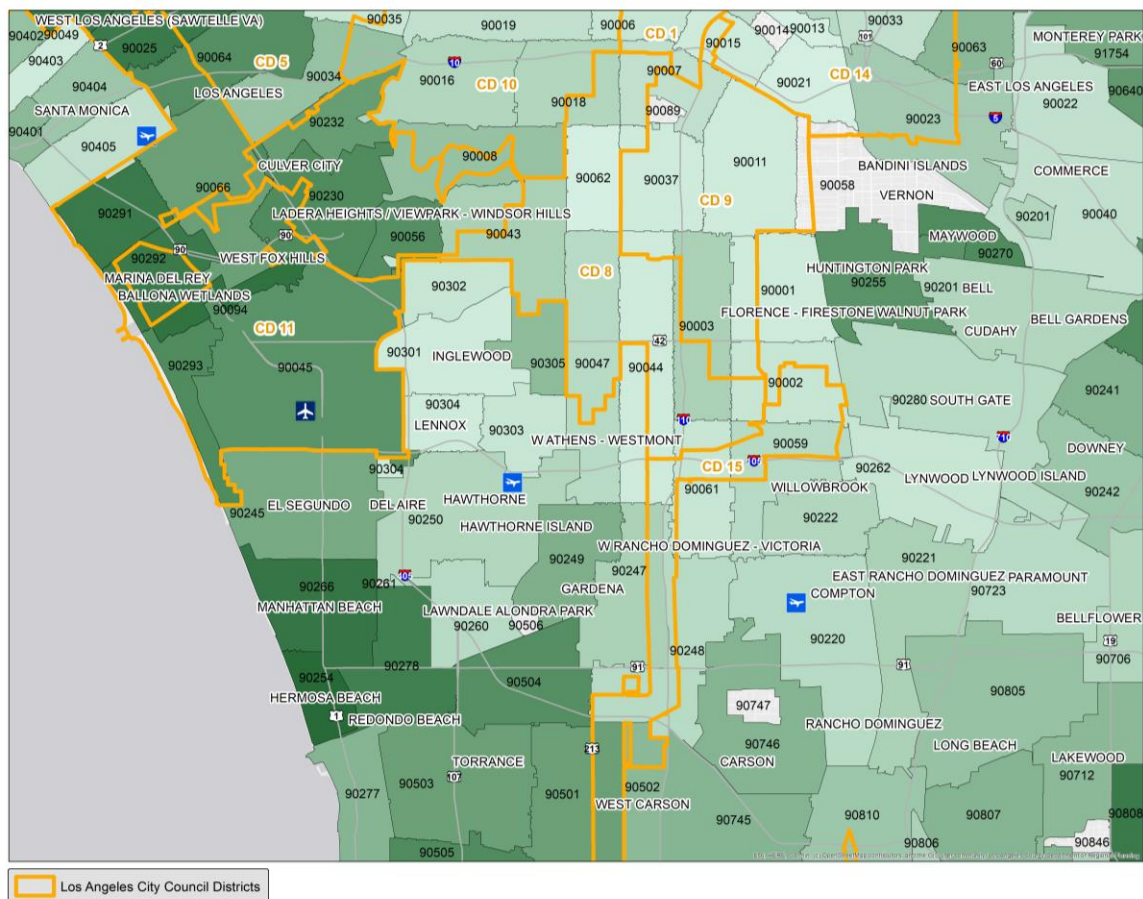


Note: The green shading indicates the amount of total LAWA salaries in that zip code, ranging from least (light green) to most (dark green).



***When examining the median salary by zip code in the mapped area around LAX, values range from \$42,000 to \$165,000 (rounded).*** The spatial pattern shows lower individual earnings among LAWA employees living in the identified disadvantaged communities, including Lennox, Inglewood, West Athens, CD 8, and CD 9. For example, the median salary in a historically disadvantaged community east of LAX is less than \$52,000 compared to the median salary of more than \$165,000 in one of the beachside communities.

**Map 433. LAWA Workforce's Median Salaries, by Zip Code, around LAX**

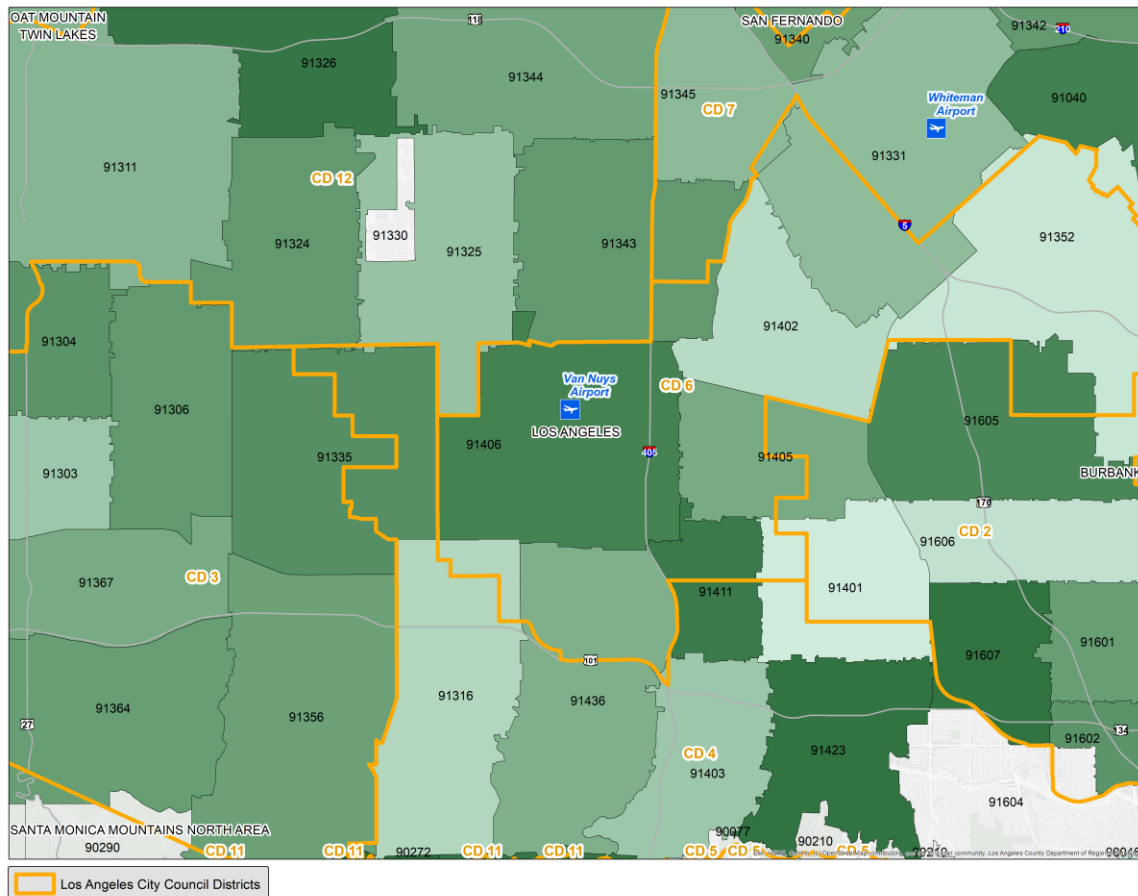


Note: The green shading indicates the median LAWA salaries in that zip code, ranging from least (light green) to most (dark green).



***When examining the median salary by zip code in the mapped area around VNY, values range from \$55,000 to \$168,000 (rounded).*** Although there is less of a differential in LAWA employee individual salary earnings across zip codes around VNY compared to LAX, there are noticeable differences.

**Map 455. LAWA Workforce’s Median Salaries, by Zip Code, around VNY**



Note: The green shading indicates the median LAWA salaries in that zip code, ranging from least (light green) to most (dark green).

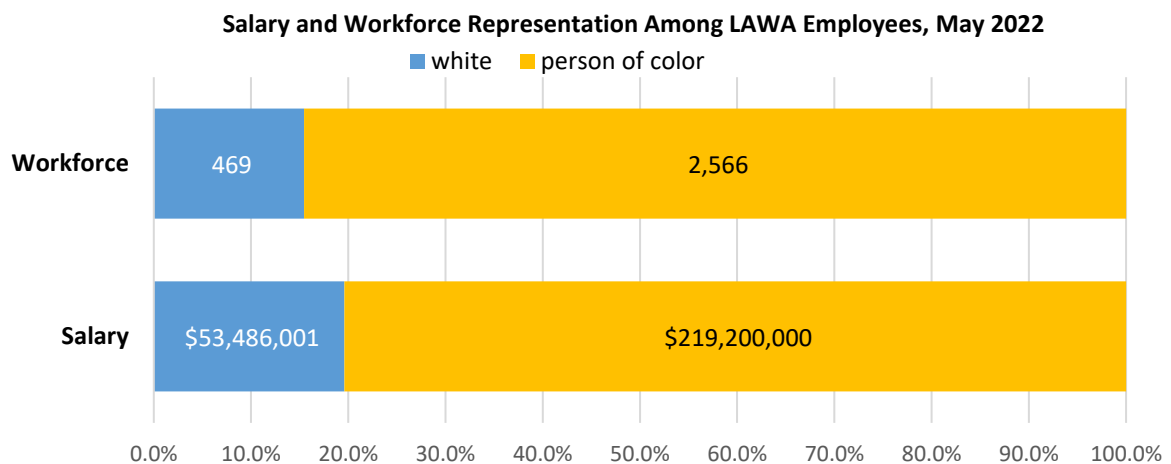
LAWA employees shared concerns that local hiring initiatives (e.g., Targeted Local Hiring) to employment with LAWA focus on low-wage jobs. Although these entry-level jobs may be a starting point for career advancement, there is limited evidence regarding the number of these employees who move into better paying jobs. As noted by some LAWA employees, recruiting and retaining talent may be related to red tape and Civil Service System regulations. Zip codes



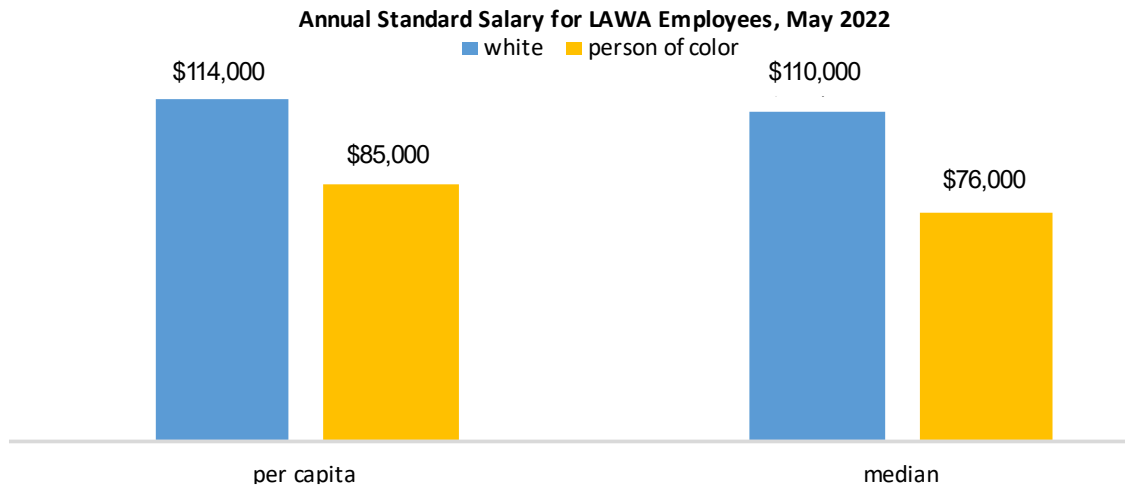
that qualify for local hire do not include all disadvantaged communities impacted by LAX and VNY, such as zip codes in the Compton community.

Among LAWA's workforce, Hispanic/Latinx and Black employees make up a larger share but, in aggregate, earn disproportionately less than white, Asian, and Filipino employees. As of May 6, 2022, there are aggregate wage-earning differences along racial/ethnic lines. In aggregate, Black/African American and Hispanic/Latinx LAWA employees are the most likely to earn a smaller proportion of total salaries than would be expected from their representation in the LAWA workforce. This finding is corroborated by the [Controller's Diversity with Equity Report](#) and does not necessarily mean that individuals of different race/ethnicity are not paid equally in the same positions. A wage disparity study would further evaluate this situation.

***Among LAWA's workforce, people of color make up 84.5% (2,566) of the workforce but receive 80.4% (\$219.2 million) of the combined salary paid to LAWA employees.***



***LAWA employees of color earn 25.1% less per capita than white LAWA employees and 20.9% less by the median:***



Disaggregated, the Black/African American and Hispanic/Latinx groups experience the greatest representation-to-salary disparities (i.e., a lower share of combined salary earnings than the percentage represented in LAWA’s workforce), as displayed in Table II.7.

**Table II.7: LAWA Workforce Representation and Salary Earnings  
by Race and Ethnicity, May 2022**

Race/Ethnicity	Workforce Representation			Salary Earnings			
	Frequency	Percent	Cumulative Percent	Combined Total (\$millions)	Percent	Cumulative Percent	Median (Rounded)
Hispanic/Latinx	1,207	39.8	39.8	\$97.0	35.6	35.6	\$69,000
Black	864	28.5	68.3	\$70.0	25.7	61.3	\$73,000
White	469	15.4	83.7	\$53.5	19.6	80.9	\$110,000
Asian	314	10.4	94.1	\$34.1	12.5	93.4	\$108,000
Filipino	146	4.8	98.9	\$15.2	5.6	99.0	\$107,000
Other/Mixed-Race*	35	1.1	100.0	\$ 2.8	1.0	100.0	\$80,000
<b>Total</b>	<b>3,035</b>	<b>100.0</b>		<b>\$272.6</b>	<b>100.0</b>		<b>\$80,000</b>

\*Note: Other/Mixed-Race is inclusive of employees who self-identify as Other, American Indian or Alaskan Native, Two or More Races, and Pacific Islander. Due to small group size, this aggregation was done to protect the identity of employees.

Multiple factors likely shape aggregate wage-earning differences, including racial over-representation in particular employee job classifications at the upper and lower tiers of the income spectrum, age/years of experience, and classifications that earn overtime pay. Nonetheless, aggregate wage differences do exist when examining workforce representation and salary earnings by race and ethnicity. To determine whether these differences exist because of potential wage discrimination, lack of racial representation in higher-wage positions, or other reasons, LAWA would need to do further analyses with more comprehensive data (e.g., multivariate regression models controlling for confounding factors).

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART E – ENGAGEMENT (POWER)



**8,000+**  
STUDENTS



**90**  
SCHOOLS



**31,019**  
STAKEHOLDERS





## E – ENGAGEMENT (POWER)

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Engagement (power) pertains to more than community relations or community engagement. In terms of social equity, engagement involves an authentic sense of community belonging where those individuals and communities affected by LAWA feel included and heard, particularly regarding environmental justice and other issues. Through such engagement, LAWA can prioritize the benefits to those communities with the greatest needs, especially historically disadvantaged communities.

### E.1 FINDINGS

***LAWA continues to strengthen its stakeholder relationships through events, conversations, and briefings with community organizations.***

According to the LAX Community Relations Team, which is made up of 5 members, more than 240 individual community connections and unique conversations occur annually. LAWA holds a series of community relations programs to engage the local community, including [We Fly As One](#), [Network for Teaching Entrepreneurship \(NFTE\) LAX](#), [Read Across America](#), [Aviation Careers Education \(ACE\) Academy](#), [Aviation Career Day](#), [Santa Fly-In](#), [Airfield Community Tours](#), [Job Shadow Day at VNY](#), and “Monthly Doing Business with LAWA” meetings. LAWA also attends community events, such as the Hawthorne Business Expo, to show support, make connections with the community, and be available to answer stakeholder questions.

According to the LAX Community Relations Team, this is the first year of building a database that tracks conversations with the community. The team has begun quantifying the number of community conversations. Individual community connections and unique conversations may not be the most appropriate metrics to measure the quality of community engagement, but they are a start. LAWA provided these metrics.

Additionally, LAWA shares information through internal (employee-focused) and external newsletters on what is happening at the airports.

LAWA also engages the community through the [Los Angeles Area Advisory Committee](#)—established by BOAC and approved by the City Council in 1975. This Committee is comprised of representatives from local communities around LAX, appointed by elected officials. This committee makes recommendations to BOAC, Mayor’s Office, City Council, and other agencies.

LAWA plans to reintroduce community programs, including [Team LAWA](#), [Speakers Bureau](#), and [LAXceptional Students Program](#), now that COVID-19 restrictions are being lifted. Some of these community programs may also serve as growth and development opportunities for LAWA employees.

LAWA has also undertaken more targeted engagement as it relates to Airfield and Terminal Modernization Project (ATMP), including its potential impact. According to data provided by the ATMP Meeting Tracker Database, from August 27, 2018, to June 18, 2021, there have been approximately 150 environmental meetings and briefings with community stakeholders [see Table 1 in the Appendix for details].

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***It is unclear if community members have meaningful or equitable participation and input into LAWA’s decisions that affect them.***

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In achieving equity, one of LAWA’s objectives is to enable equitable participation. The metrics that are proposed in the draft Strategic Plan “Refresh” are strictly economic participation. One example is xBE participation (vendors certified in any of the Business Enterprise programs recognized by LAWA). Other examples include local hire percentages, job training participation rates, and workforce representation. None of them captures meaningful participation that includes the ability to affect change at LAWA.

CEO Erbacci notes in a message to the LAWA community on February 5, 2021, that the City of Los Angeles—and by extension, LAWA— is a “...proud member of the Local and Regional Chapters of Government Alliance of Race & Equity, also known as GARE [(Government Alliance on Race & Equity)].” According to [GARE’s guidelines for Racial Equity Actions Plans](#):

*“Engaging residents of color—along with employees of color—as subject matter experts in the process can improve the process and the final product in myriad ways; from more accurate analysis of institutional barriers to identification of more effective strategies and greater community buy-in during implementation. Robust community engagement throughout your process will be critical to your success... Community bodies formed with decision-making authority and specific planning responsibilities are most effective” (p. 12).*

Currently, LAWA has not developed specific steps and strategies to:

- Define and ensure equitable participation from disadvantaged communities, including integration of the public’s voices and concerns into the decision-making process
- Establish criteria and accountability measurements to ensure equitable participation
- Document the most underrepresented groups and implement strategies to give them more power to impact change within LAWA

As discussed in Volume I, Part D, the development of the last Strategic Plan involved internal stakeholders (LAWA employees) but had little external stakeholder input from the community. The Draft Strategic Plan “Refresh” is still in its formative stages and, thus, still has the ability to involve local residents, community organizations, partners (airlines, TSA, CBP, etc.) and employees at LAWA. Early input will be important before finalizing strategic priorities and defining desired strategic outcomes.

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**LAWA lacks metrics to measure effectiveness and quality of community engagement.**

GARE emphasizes the need to integrate racial equity into routine decision-making processes through the development and implementation of measurable actions. [GARE's Racial Equity Toolkit](#) notes that:

*"...appropriate performance measures allow monitoring of the success of implementation of actions that have a reasonable chance of influencing indicators and contributing to results. Performance measures respond to three distinct levels:"*

- *"Quantity—how much did we do?"*
- *"Quality—how well did we do it?"*
- *"Is anyone better off?"*

Although some data are available that quantify community engagement, LAWA does not have comprehensive data to measure the quality of engagement. For example:

- The number of meetings and briefings are quantified, but LAWA has not provided other measures indicating the quality of engagement, including whether LAWA is taking and integrating public input or simply presenting information to the public.
- It is unclear whether the meetings and briefings associated with Airfield and Terminal Modernization Project (ATMP) provide the public and community stakeholders the ability to engage with LAWA in a meaningful way.

Moreover, there is a lack of data and tools to better understand whose voices are heard and to what extent, specifically from communities who are often underrepresented. As a result, it is challenging to determine whether public meetings and other forms of community engagement are skewed toward members of the public who have the resources and capacity to attend public meetings or provide input (e.g., online noise comments form).

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**LAWA's Community Benefits Agreement (CBA) focused on the needs and concerns from disadvantaged communities and has expired.**

LAWA's CBA has expired and there is disagreement among LAWA employees regarding its relevance to today's world. Some LAWA staff feel the CBA has less relevancy due to LAWA's adoption of key CBA provisions as policy and standard practices. For example, prior to the CBA's expiration in 2020, LAWA executives adopted a policy to maintain participation in the First Source Hiring Program (FSHP), which was first established under the aegis of the CBA as an ongoing requirement for LAWA's contractors. FSHP participation is incorporated into each LAWA's construction contracts with its vendors as a contract requirement.

The CBA offered a platform for more equitable community engagement and bargaining power for local residents who lacked the resources and capacity to voice their needs and concerns.

Local residents' concerns and needs were represented by community organizations (e.g., Los Angeles Alliance for a New Economy). The CBA was approved in 2004:

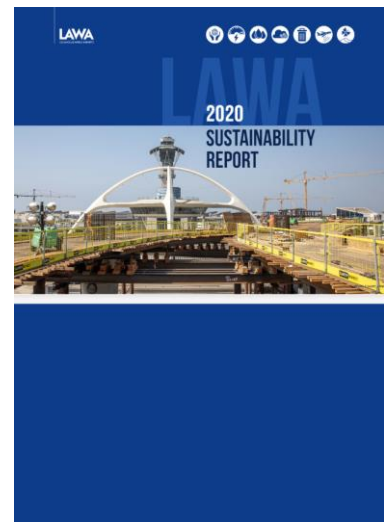
*"On December 6, 2004, the BOAC approved a Cooperation Agreement between LAWA and the LAX Coalition for Economic, Environmental and Educational Justice (Coalition). The CBA is an attachment to the Cooperation Agreement. The CBA includes measures to mitigate noise, pollutant emissions, and traffic impacts of the LAX Master Plan, as well as community benefits such as job training and hiring programs for eligible residents of the Project Impact Area (PIA) and the City of Los Angeles (LA)"*

Considering demographic shifts and evolving social issues, including environmental justice, gentrification, and COVID-19, stipulations in the 2004 CBA may no longer fully reflect the needs of the around the airports today.

***LAWA reports on its sustainability efforts, but the bulk of its communication with the public is mostly one-way.***

In 2016, the Sustainability Report was distributed as a hard copy. Today, Sustainability Reports are available online, with a limited number of printed editions, which is a more sustainable approach. LAWA continues to prepare and distribute these high-quality Sustainability Reports online annually to multiple stakeholders.<sup>12</sup> Stakeholders include the Mayor, City Attorney, City Council, and interest groups.

LAWA began establishing more two-way communications with the public regarding its Sustainability Plan and efforts before COVID-19. LAWA rolled out its 2019 Sustainability Plan with an event attended by about 200 interested stakeholders. As LAWA emerges from COVID-19, the LAWA team is devising ways to re-establish communications with the public. For example, in honor of Earth Month, LAWA reengaged with its partners by hosting a virtual event, "Greening the Earth and Skies with LAWA," a roundtable discussion about aviation sustainability. Featured panelists discussed their organization's sustainability efforts and practices and provided insight on collaborating with LAWA to meet shared sustainability goals. Measuring whether these events are equitable and reaching all communities around the airports is challenging due to the lack of data.



<sup>12</sup> Its most current one is at: <https://cloud1lawa.app.box.com/s/jtngbwebdu27dky8r2yu3ygytgr3s18c>

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) PART F – RECOMMENDATIONS



## F – RECOMMENDATIONS

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### F.1 OVERALL

***Rec. II-1. LAWA should standardize the definition of equity and the criteria for ‘historically disadvantaged communities’ at LAWA.***

LAWA should define what equity means at LAWA and develop criteria for how to apply it within historically disadvantaged communities and across LAWA teams. LAWA’s mission includes the statements “...serving global customers and local communities” and “enriching [the] quality of life for individual travelers, the community, [and] the region.” LAWA has been exploring in its strategic-planning discussions what might be meant by more **equitable** economic growth and sustainability in our region. As equity becomes a central value for LAWA, there should be clearer definitions of equity and historically disadvantaged communities across LAWA teams.

To promote equity across LAWA’s impact on the surrounding community and the region, LAWA needs to first determine which areas are disadvantaged and disproportionately impacted by LAX and VNY. Identifying affected areas that are home to historically disadvantaged communities would allow LAWA to be more effective in fostering equitable economic growth and sustainability by investing more resources in those areas.

***LAWA is a member of the Government Alliance on Race & Equity (GARE).*** In defining equity and identifying the criteria for historically disadvantage communities, LAWA should consider GARE guidelines for racial equity:

- [Racial Equity Toolkit: An Opportunity to Operationalize Equity](#)
- [Advancing Racial Equity and Transforming Government: A Resource Guide to Put Ideas into Action](#)
- [Racial Equity Action Plans: A How-to Manual](#)
- [Racial Equity: Getting to Results](#)

GARE encourages public entities:

“...to be clear about the desired end conditions in the community and to emphasize those areas where you have the most direct influence...To ultimately impact community conditions, government must partner with other institutions and the community.”

GARE discusses the importance of data and stakeholder input (e.g., local communities) to identify who benefits from or are burdened by policies, practices, or programs.

Under the guidance of LAWA’s Chief Human Capital and Equity Officer, the Chief Sustainability and Revenue Management Officer, and the Chief Airport Affairs Officer, LAWA should form a team of community members, experts, and employees who are representative of LAWA’s different divisions to:





- Define equity within the scope of LAWA's work
- Identify the communities inequitably impacted by LAX and VNY

This team should include representatives from LAWA's recently formed local chapter of the Airport Minority Advisory Council (AMAC). LAWA should then:

- Publicize the definition of equity within LAWA
- Ask divisions to identify opportunities to include on the AMAC agenda to solicit stakeholder input
- Design strategic plan goals and objectives specifically intending to impact identified communities
- Include the initiatives on its website.

This approach will help to ensure LAWA integrates equity into its programs, policies, and impact assessments.

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***Rec. II-2. LAWA should leverage data to identify internal and external inequities, promote equitable strategies, and track progress.***

In achieving equity, GARE discusses the importance of data to *"measure the success of specific programmatic and policy changes...to develop baselines, set goals, and measure progress towards community goals."* Specifically, GARE notes the following elements:

- *"Set and monitor goals for achieving racial equity"*
- *"Clearly document and track community conditions over time, including racial inequities"*
- *"Set goals for improving results and eliminating racial inequities, along with mechanisms for tracking progress towards goals over time"*

To build the necessary infrastructure and capacity to collect, analyze, and integrate data, LAWA should:

- Invest additional resources (e.g., data scientists as outlined in Volume I, Part D)
- Establish an internal Office of Program Evaluation and Data reporting to the CEO and possibly combined with the proposed Audit Division, described in the recommendations in Volume I, Part D, under "Audit."

These skill sets will help to better streamline data availability and evaluations across division and ensure better transparency and distribution of data to the local community and stakeholders.

In determining which metrics and indicators are important to track, KH has expanded GARE's recommended three levels to recognize that some stakeholders may be better off while others may be worse off, particularly regarding actions that might perpetuate harm against historically disadvantaged communities to the benefit of other groups. Understanding the "winners" and "losers" will provide more meaningful analyses and discussions on how to foster equitable

growth. With these indicators, LAWA can evaluate whether the benefits to those better off outweigh the costs to those worse off:

- **Purpose:** What did we do? Why did we do it?
- **Quantity:** How much/many did we do? For how long? With how many stakeholders?
- **Quality:** How well did we do it? How engaged did stakeholders report feeling? Did they report feeling heard?
- **Positive Impact:** Is anyone is better off? If so, who?
- **Unintended Consequences Impact:** Is anyone is worse off? If so, who?

To effectively track LAWA’s impact on the region and local communities, metrics should also include geographic indicators and data disaggregation. Data disaggregation (e.g., employee microdata that measure multiple social identities, such as race/ethnicity, socioeconomic status, location, or gender) will allow LAWA to produce more nuanced analyses that uplift intersectionality and advance equity.

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***Rec. II-3. LAWA should expand the resources and roles of the Racial Equity Core Team in LAWA’s programs and policies.***

LAWA has a Racial Equity Core Team comprised of 30 volunteers, “whose purpose is to assess systemic issues impacting recruitment and advancement at LAWA.” Its Racial Equity Core Team formulates:

*“...new policy recommendations and changes to support racial equity across [LAWA’s] entire department divisions, along with supporting airport employers, community members and small and minority businesses.”*

GARE states that:

*“Successfully implementing a plan will require well-resourced stewardship, strong accountability structures, and clear communications with all partners during the rollout and beyond. An organizational body, with authority to remove barriers during implementation and monitor progress, is critical infrastructure over the life of the plan. Regular tracking of performance and reporting on progress provides a level of accountability to follow through on the jurisdiction’s commitment to action.”*

To build organizational capacity and to ensure equity is at the forefront of LAWA’s policies, programs, LAWA should invest more resources (e.g., positions, funding for research or consulting support, or compensation for volunteers) and develop an approach to hold LAWA divisions accountable to its mission and goals of equity. The Racial Equity Core Team, if effectively supported, can play a role in advising how to track, evaluate, and update LAWA stakeholders on LAWA’s progress on goals and programs, outlined in LAWA’s Racial Equity Action Plan.

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***Rec. II-4. LAWA should expand, annually update, and publicize the Racial Equity Action Plan.***

LAWA, in accordance with the Mayoral Executive Directive 27, submitted a Racial Equity Action Plan to the City for FY 2020-2021. LAWA has not made it available on its website. Some of these circumstances have since changed and, thus, it is important to update the Racial Equity Action Plan to reflect current conditions. In addition, given the challenges of the COVID-19 pandemic, much of LAWA's Racial Equity Action Plan outline had indeterminate launch dates, target completion dates, and undefined resources. Action plans should outline actionable and measurable objectives toward racial equity in each division's workforce, operations, and services.

GARE recommends annual updating of the Racial Equity Action Plan to help track and report on the progress. Updating the Racial Equity Action Plan will help to:

- Determine what obstacles are affecting progress toward racial equity, allowing appropriate resources and strategies to address those issues
- Share best practices with others, including other public agencies and community organizations
- Create greater transparency about LAWA's process and progress, which will foster trust from stakeholders and the public

Other departments in the City (e.g., [LADWP](#)) and other airports (e.g., San Francisco International Airport ([SFO](#))) have made their Racial Equity Action Plan(s) easy to access and more engaging to the public. LAWA can follow these examples and invest more in publishing (i.e., public-facing designed report) and publicizing its Racial Equity Action Plan, as an annually updated report or dashboard.

## **F.2 ENVIRONMENTAL**

These next recommendations build on the steady strides that LAWA has made in addressing environmental issues and sustainability. Today, every city department has a Chief Sustainability Officer. These officials meet routinely to discuss areas in need of improvements and share practices, such as LADWP's Environmentally Preferred Purchasing Program (EPP). LAWA participates in the City's Electric Vehicle (EV) Task Force; all City departments purchasing EVs join a monthly call to share and gather information. LAWA also collaborates with many commercial airports on air quality programs, focusing extensively on ground transportation. LAWA works with the airlines – producers of the lion's share of the air pollution – to reduce emissions (e.g., use of auxiliary power units at gates). All of these efforts are important in moving LAX and VNY toward meeting the demands air travel in an environmentally sustainable way.

## Noise

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***Rec. II-5. LAWA should explore and engage community partners on why some areas report more noise complaints, especially those areas outside of noise contours.***

LAWA is seeing disproportionate noise comments and complaints from specific areas surrounding LAX and VNY. LAWA should investigate these reports to:

- Determine whether noise complaints are substantiated and substantial enough to pose harms and risks to the communities
- Build a trusting relationship with community members attuned to the noise impact from LAX and VNY

These investigations should be documented and made publicly available to show the local communities that LAWA is proactively engaged in hearing and addressing noise concerns.

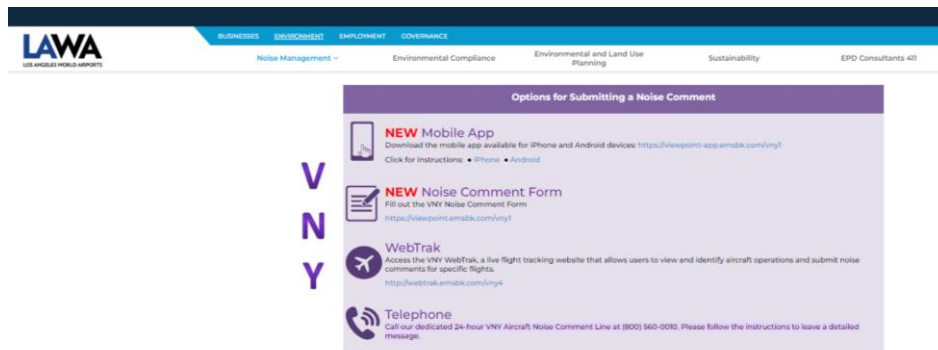
LAWA could reimplement portable noise monitors that would allow LAWA to work with interested stakeholders on identifying potential noise dangers. Portable noise monitors are currently in use at other airports (e.g., [SFO](#)) and have been used in the past by [LAWA](#) to respond to community concerns. In some cases, the local jurisdictions might help fund the installation of permanent noise monitors to address their residents' concerns.

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***Rec. II-6. LAWA should improve accessibility and functionality of its noise reporting application and tools.***

Transparent community engagement will help LAWA gain community trust and meaningful insight on how to manage noise around LAX and VNY. At present, LAWA offers community members multiple ways to submit noise comments:

- [Mobile app](#), which accesses the web noise comment form saved onto a user's phone home screen
- Interactive [noise portal](#)
- A noise comment form via web browser, which is objectively limited in its functionality as users can only submit noise comments and view comment history.
- Telephone



Although LANA offers different approaches to submit noise comments and for users to access noise information, LANA should invest more in developing a mobile app that integrates the information and tools found on its webpage. LANA's current "mobile app" is functionally a bookmark of its webpage form. A mobile app, designed with user experience as a priority, will yield a comprehensive noise reporting mobile app that would allow residents to easily:

- Report noise
- View airport noise emission data and maps
- View noise reports describing long-term indicators
- Explore live flight-path information
- View existing noise complaint information (aggregated geographically and timeframes)
- Learn about and apply for sound insulation

With a more user-friendly app, LANA would be able to gather more data and triangulate the different data from the different sources for a more accurate understanding of which communities are impacted.

Further enhancements regarding noise information and metrics on this web app should be customized to meet the needs and expectations of different groups of users with different language needs and levels of digital sophistication.

In their peer-reviewed research analyzing how different airports communicate noise data to local residents, Gasco, Asensio, and deArcas<sup>13</sup> write that:

*"...airports have no legal obligation to communicate real-time information to citizens, but many have provided access to these data using online applications to improve the efficacy of their communication strategy."*

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<sup>13</sup> Gasco, L., Asensio, C., & de Arcas, G. (2017). Communicating airport noise emission data to the general public. *Science of the total environment*, 586, 836-848.

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***Rec. II-7. LAWA can partner with other public entities to expand access to the residential sound insulation program.***

LAWA has worked with the County and local cities, including the Cities of Los Angeles, Inglewood, and El Segundo, to fund sound insulation programs. Both the City of Inglewood and County of Los Angeles are responsible for administering their own sound insulation programs. LAWA has started a second chance program for the City of Los Angeles and restarted the program that had been terminated by the City of El Segundo to provide sound insulation to homes. In 2021, [FAA announced more than \\$20 million to soundproof](#) more homes around LAX. Strict FAA requirements have led to inequitable outcomes. For example, Inglewood has been found to “...[have spent the money for soundproofing disproportionately in middle-class—and primarily single-family—neighborhoods on the east side of \[Inglewood\], farthest from the airport.](#)”

Other equity concerns have also arisen. Because properties must comply with building and permitting zoning rules to be eligible for sound proofing, many properties, especially in low-income neighborhoods near LAX (e.g., unincorporated Lennox and West Athens), are not eligible. Property owners may be reluctant in keeping rental properties up to building code; renters may be reluctant to push the building owners for compliance in fear that their rents will go up and they will be displaced. Furthermore, LAWA reports that many of these cases are more than minor upgrades; they involve residences that had fire or life safety violations that need to be addressed to be brought into compliance.

LAWA should seek opportunities through partnerships with local cities and the County of Los Angeles:

- LAWA should pursue and secure additional funding and grants beyond the FAA to expand the residential sound insulation program to help residences currently not qualified under FAA regulations. These residences would typically fall within the noise exposure maps and are still impacted by elevated noise levels but are not up to building codes.
- LAWA should work with the City Council and Mayor to ensure that rental properties that are insulated with such funding or grant dollars remain as affordable rental properties for a designated time period.

In addition, [following SFO’s lead](#), LAWA should consider a Sound Insulation Program Replacement Initiative to offer local residents who may have sound insulation that is declining in quality and efficacy to apply for replacements or renewals.



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***Rec. II-8. LAWA should take advantage of FAA regulations that permit sound insulating homes in more areas.***

According to the current regulations and guidelines, LAWA is permitted to use funds for sound insulation when a dwelling unit falls in a noise impact area as defined by the quarterly noise contours, but not in a noise impacted area as defined in the noise exposure map submitted to the FAA. It is important to note that quarterly noise contours are seen as more accurate because of a more consistent noise statistical modeling. The KH team could not find evidence that LAWA made such submissions to the FAA.

LAWA and local government partners should make this information and option more publicly available on its website and public-facing newsletter. For example, the [City of South San Francisco](#) provides information and options for homeowners whose property fall near the qualified noise exposure map boundary to submit an application for consideration on a case-by-case basis.

### **Air Quality**

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***Rec. II-9. LAWA should continue to expand solar energy generation at LAX and conduct an updated solar panel feasibility study.***

As discussed in Volume I, Part C on “Capital Projects,” LAWA is installing solar electrical generation panels as part of ConRAC and APM’s Maintenance and Storage Facility (MSF). In addition, LAWA is releasing RFPs for expanded solar capacity. Efforts to expand the use of solar are noteworthy and should be continued.

On a larger scale, solarizing LAX would both power the airport and also potentially export energy to the California Independent System Operator power grid —further benefiting state by adding to the supply of affordable clean energy.<sup>14</sup> There is also a strong financial benefit for the installation of solar panels. LEAN Engineering conducted an LAX Solar Feasibility Study conducted in 2017; the study noted:

*“In general, the average internal rate of return for the existing sites and the LAMP sites averages approximately 11%. Therefore, solar implementation at the sites detailed in this report is both feasible and profitable for an investor. Consequently, there is a strong financial case for implementation of solar at LAX, and it is recommended that the airport proceed to the next stage of the process by developing a procurement methodology for each site.”*

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<sup>14</sup> Teofilo, A., Radosevic, N., Tao, Y., Iringan, J., & Liu, C. (2021). Investigating potential rooftop solar energy generated by Leased Federal Airports in Australia: Framework and implications. *Journal of Building Engineering*, 41, 102390.

**LAWA should integrate solar panel installation into capital planning wherever glare has been determined not to be an issue for aircraft.** In 2021, LAWA completed the first solar project at LAX (located at the Airport Police Facility) and seven additional solar projects at VNY. Despite the impressive integration of solar panels at VNY, LAWA has had challenges in installing solar panels at LAX at the same rate. In interviews, LAWA staff cited concerns that glare would impact safe airplane operations as a significant barrier.

In the 2017 LAX Solar Feasibility Study, LEAN Engineering found that only 9 (6.9%) of the 130 potential sites were considered not feasible because of glare. The majority (61.5%) of the 130 sites did not meet requirements for further solar panel installation development because they were designated for future land use. Glare was not an issue.

LAWA should reconsider these sites when the future land uses – likely associated with the multi-billion-dollar construction program currently being completed – are finished. Furthermore, LAWA should include solar panel installations into new construction plans wherever feasible for all locations, where glare and structural obstruction are not issues.

**LAWA should conduct a new solar panel feasibility study to determine the costs, benefits, and risks of solar panel projects at LAX.** According to the 2017 LAX Solar Feasibility Study, *“the FAA software [was] scheduled to be updated in 2017, and the calculations used to analyze the glare may change in the near future.”* This would suggest that the conclusions from that study will need to be updated. A new solar feasibility study would be beneficial and more relevant for today’s context:

- An updated Solar Feasibility Study could explore best practices in logistics and planning processes to ensure efficient and effective integration of solar panels into new projects.
- LAWA could assess what other major airports have done to observe best practices, including Denver International Airport (DIA). DIA had strong support from city and county government and leadership, which helped paved the way for it to become a leading airport in solar use.<sup>15</sup> Although DIA operates in a region with greater land mass available for solarizing than LAX, LAWA can learn from DIA and how its institutional arrangements with stakeholders facilitated solar panel adoption.
- LAWA should evaluate new research and technology that have been developed to minimize the aircraft issues related to glare.

Recent [National Renewable Energy Laboratory \(NREL\)](#) studies include:

- [A Study of the Hazardous Glare Potential to Aviators from Utility-Scale Flat-Plate Photovoltaic Systems](#): *“The results show that the potential for hazardous glare from flat-plate PV systems is similar to that of smooth water and not expected to be a hazard to air navigation”*

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15 Kim, S. Y. (2020). Institutional arrangements and airport solar PV. *Energy Policy*, 143, 111536.

- [U.S. Department of Energy Solar PV and Glare Fact Sheet](#): *“Modern PV panels reflect as little as two percent of incoming sunlight, about the same as water and less than soil or even wood shingles. Much of the misperception surround solar and glare is likely due to confusion between solar PV and concentrated solar power (CSP), which use a system of large mirrors to direct sunlight.”*
- [General Design Procedures for Airport-Based Solar Photovoltaic Systems](#): *“The reflection off a solar PV panel from most near normal angles is less than 3% and represents no risk to air traffic”*
- [Clean Energy Results: Questions & Answers Ground-Mounted Solar Photovoltaic Systems](#): *“Most solar panels are designed with anti-reflective glass front surfaces and only reflect about 2 percent of incoming light. United Kingdom and U.S. aircraft databases contain no cases of accidents in which glare caused by a solar energy facility was cited as a factor.”*

Given these findings and data, LAWA should conduct a new solar panel feasibility study to determine the costs, benefits, and risks of solar panel projects at LAX. Such a study would support LAWA’s efforts to have their airports become zero-emission facilities and could increase LAWA’s power supply and resiliency.

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***Rec. II-10. LAWA should prepare for easier and increased use of Sustainable Aviation Fuel (SAF).***

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LAWA points out that it currently does not control what fuel airlines purchase; however, it can influence and facilitate the use of SAF in going forward. Multiple airlines have committed to the use of SAF. Given that, it would be an appropriate response for LAWA to facilitate its use at LAX and VNY.

SAF is often cited as an important piece of long-term strategies to reduce Greenhouse Gas (GHG) from commercial aviation. Airports across the country have been working with airlines and other stakeholders to increase SAF adoption to reach goals set forth by airports, cities, and the United States. Notably, the U.S. Federal government is working with the private sector to help the airport sector reach full decarbonization by 2050. With greater attention to the consequences from climate change, there is more political and public support for increased SAF use. For example, with the introduction of H.R.741 (Sustainable Aviation Fuel Act) and the recent passage of the U.S. Inflation Reduction Act, there is potential for more incentives, Federal funding, and cost-sharing agreements for building capacity (e.g., production, transportation, blending) to increase adoption of sustainable aviation fuel.

To ensure LAWA can effectively adapt and accommodate quickly to changes in supply and standards, LAWA can:

- Explore and share best practices in the use of SAF at other airports. LAX, having recently witnessed the use of its existing fuel pipeline system to transport SAF from offshore barges, may have demonstrated a best practice itself.

- Monitor trends of SAF use among airlines and publicly encourage those who make commitments to SAF
- Ensure LAX and VNY operations facilitate the use of SAF by airlines as it becomes increasingly available

Currently, blended fuel (SAF and Jet A) that is used at LAX is produced offsite and delivered by truck, which is viable “...due to the low volumes, availability of Jet A nearby, and the proximity to the airport,” according to LAWA officials. In a [recent technical report from the National Renewable Energy Laboratory on U.S. Airport Infrastructure and Sustainable Aviation Fuel](#), other options to produce, transport, and blend SAF may need to be considered to accommodate higher volumes, including a pipeline that would offer fewer constraints than trucking. The recent use of offshore barges using the LAX fuel pipeline system to transport SAF, as reported in *Simple Flying*, may be an example.

LAWA should explore and consider the findings in the [recently published report by Airports Council International \(ACI\) and Aerospace Technology Institute \(ATI\) on the Integration of Sustainable Aviation Fuels into the Air Transport System](#). The report outlines the advantages, disadvantages, and limitations of different blending locations and transportation methods, recognizing that current SAF production and planned facilities will need to quickly scale up to reduce emissions at levels meeting decarbonization goals and roadmaps. The report also discusses strategies to implement and scale up SAF, including case studies and best practices, such as SFO.

Improving SAF use and adoption will require a collaboration across stakeholders. ACI and ATI write that:

*“...while most airports are not part of the fuel value chain, they do play a role in facilitating the exchange and interaction between the different parties involved and can act to facilitate the introduction of SAF. Some airports have gone further by organizing SAF flights and/or by playing a leading role in regional and national policy setting as well as international advocacy.”*

ACI and ATI further call on airports and airlines to “...work together to identify mechanisms to close the price gap between SAF and CAF,” listing the following considerations:

- Sustainable aircraft energy credits or vouchers sold to corporate customers or passengers to reduce the price premium
- Coordinated requests for government support and investments, including government fleet commitments, research and development grants, or corporate partnerships
- Investments in alternative fuel providers or pilot plants
- Participation in establishing globally consistent, robust, and transparent sustainability criteria
- Actively contribute to establishing the legal framework for 100% SAF to be transported and stored

- Socializing SAF benefits to customers

Increasing SAF adoption will reduce the environmental impact that LAX and VNY will have on LAWA's surrounding communities – communities that are often vulnerable, low-income, and of color. If LAWA has a social responsibility to be stewards of environmental sustainability for the local region in which it operates, LAWA will need to proactively engage in multiple strategies and partnerships to:

- Increase supply and distribution channels
- Promote increased SAF adoption by airlines
- Reduce barriers (e.g., transportation) to SAF adoption, especially for airlines with limited capacity

LAWA can benefit in other ways by going beyond the minimal responsibility and commitment to SAF. By expanding SAF capacity and emphasizing its institutional social responsibility to the environment and local regions, LAWA would be able to attract young talent and industries who [prioritize equity and social justice issues](#). In addition, LAWA would be mitigating damages to the basin and its infrastructure, affect both current and future costs.

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***Rec. II-11. LAWA should assess and make more transparent the impact of airport-related pollutants on neighboring communities.***

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As part of its capital improvement projects, LAWA produces:

- Environmental Impact Reports (EIR), most recently for its Airfield and Terminal Modernization Project (ATMP) on air quality impact
- Its annual inventory and Air Quality Improvement Plan updates to the Air Quality Management District (AQMD) with updated information on air quality pollutants

LAWA operates its airports in environmentally vulnerable regions, with disproportionate risks to low-income households and communities of color. Impact on the environment directly and indirectly related to construction and operations at LAWA airports may exacerbate current situations and cause additional harms to the local communities and its own infrastructure. One of the intended benefits of LAMP is to reduce CTA congestion and VMT in and around the airport. As it tracks the measurable impact of those and other programs, it can also report reduced impact. For example, in its most recent [environment, social and governance \(ESG\) report](#), American Airlines listed LAX as one of twelve airports at risk of flooding caused by climate change. There are several sources contributing to the local regions' environmental vulnerabilities, although peer-review research identifies airports as some of the largest sources of air pollution in the United States.<sup>16</sup>

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<sup>16</sup> Schlenker, W., & Walker, W. R. (2016). Airports, air pollution, and contemporaneous health. *The Review of Economic Studies*, 83(2), 768-809.

**LAWA should collaborate on an updated, comprehensive study of airport-related pollutants.**

Extrapolating LAWA's environmental impact, specifically air pollutants, is challenging without more research and consistent monitoring to measure direct environmental impact of LAX and VNY on the region.

#### DATED 2013 LAX AIR QUALITY AND SOURCE APPORTIONMENT STUDY

Limited resources have been invested in determining LAWA's direct environmental impact. The most recent LAWA-sponsored study (LAX Air Quality and Source Apportionment Study) was completed in 2013. The findings from the study may no longer be accurate nor relevant considering changes in airport operations and environmental conditions during the last ten years. The results of that study do raise questions that should be answered with an updated review. For example, the 2013 study noted that:

*"...the concentrations of most measured pollutants were higher east of LAX compared to monitoring locations north or south of the airport" in part because of the "...higher UFP [(ultrafine particle)] number concentrations at the CE [(Community East)] site [that] were associated with jet exhaust."*

Although the 2013 study noted that:

*"...the evidence linking UFP number concentrations with adverse health effects has not been sufficiently definitive to support a separate health-based ambient air quality standard for UFP," and that "...the expectations for the effects of UFP is based upon their potential to carry toxic material deep into the lungs."*

LAWA reports that it did not find that study particularly useful because it was *"...complicated, quite costly, and indicated that LAX was actually not the main cause of air pollution in the area based on all the other contributors (other stationary sources, roadways, freeways, etc.)."* As a result, LAWA should ensure that future studies are useful and lead to identifying actions that LAWA can take.

#### RECENT STUDIES AND AQMD INVENTORY REPORT

A recent 2020 peer-reviewed study finds:

*"...emissions from aircraft play an etiologic role in PTBs [(preterm births)], independent of noise and traffic-related air pollution exposures. These findings are of public health concern because UFP exposures downwind of airfields are common and may affect large, densely populated residential areas," namely historically disadvantaged communities.<sup>17</sup>*

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17 Wing, S. E., Larson, T. V., Hudda, N., Boonyarattaphan, S., Fruin, S., & Ritz, B. (2020). Preterm birth among infants exposed to in utero ultrafine particles from aircraft emissions. *Environmental Health Perspectives*, 128(4), 047002.



Furthermore, AQMD has stated in their [revised draft 2022 AQMD Aircraft Emissions Inventory Report](#) that NOx emissions “...increases in 2031 and 2037 are driven by changes in the fleet mix. Some newer aircraft, despite being more fuel efficient, produce greater NOx emission.”

#### BENEFITS AND NEXT STEPS

With these more recent studies and trends, LAWA and the local community would benefit in understanding the current problem in depth to identify the best solutions to protect the environment and people.

LAWA has come to an agreement with SEIU to do a health and exposure study “...if SEIU can find funds to do the study.” LAWA stated that the 2013 study was costly. Given the state of climate change and a collective responsibility to protect the environment, there may be additional opportunities to fund this study. Partnerships with airlines, research institutions, community organizations, Federal funding (e.g., [Airport Improvement Program \(AIP\)](#)), and local public agencies can provide LAWA the necessary resources and talent to collaborate on an updated comprehensive study of airport-related pollutants. For example, American Airlines has already recognized the significant impact that climate change has had on the region. Regardless of the source of funding, LAWA’s cooperation and stewardship of this study is imperative to ensure a transparent and accurate study of pollutants coming from LAX and VNY. Such proactivity and transparency from LAWA will help aid in building trust from the local community, especially at a time when [significant community pushback is highlighted in the media](#). LAWA would be wise to participate in future studies as a stakeholder, and not a subject.

In determining which metrics (e.g., radiative forcing) and methods (e.g., compound method vs. aggregate method) to rely on to measure the airports’ environmental impact, LAWA can look to peer-reviewed and tested approaches.<sup>18,19</sup> Based on best practices outlined by FAA, this updated study should also include meaningful community outreach (e.g., public hearings, focus groups, and workshops) to collect testimonials and qualitative evidence from local residents likely impacted by LAX and VNY. In operating in the region, LAWA should consider equitable ways to engage in meaningful community outreach, including lowering barriers to participation (e.g., transportation to public hearings). Some additional ideas are outlined later under the recommendations pertaining to “Engagement.”

An updated comprehensive study of airport-related pollutants, its sources, and its impact on the local region would provide key insights on problem areas that LAWA can work to address in the short- and long-term, including excess airplane idling due to network delays originating in

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<sup>18</sup> Gössling, S., & Upham, P. (Eds.). (2009). Climate change and aviation: Issues, challenges and solutions.

<sup>19</sup> Dessens, O., Köhler, M. O., Rogers, H. L., Jones, R. L., & Pyle, J. A. (2014). Aviation and climate change. *Transport Policy*, 34, 14-20.

the continental east coast. These findings would provide evidence to inform relevant sustainability goals, strategies, and initiatives.

Once completed, best practices also dictate the importance of distributing and making publicly available the report and findings to all stakeholders, including community members, to ensure transparency and good community relationships. These updated studies would also show the public the progress that LAWA is making and give LAWA the opportunity to refute any of the findings or methodology it deems inaccurate from peer-reviewed research.

Note: LAWA management indicated that it did not find the 2013 study useful. It was expensive, took ten years to complete, contained no recommendations, and never intended to have recommendations. Its purpose was to determine what fraction of the pollution in the neighboring communities was attributed to LAX versus other sources (e.g., ports, refineries, manufacturing, or traffic.)

LAWA cites traffic as the major contributing factor as per AQMD as well as weather. Since 2013, LAWA has made significant progress in shifting to more environmentally friendly equipment and vehicles. The Landside Access Modernization Program (LAMP) with ConRAC (consolidated rental car facility) and the Automated People Mover (APM), discussed in Volume I, Part C, are intended to further reduce air pollution.

***LAWA should provide transparent, digestible, and synthesized information to the public on environmental impact that is already provided to AQMD.*** LAWA already prepares [annual sustainability reports](#) on its environmental successes, which are clear and visually appealing. Finding funding and implementing comprehensive studies can be time consuming. Thus, in the short term:

- LAWA can prepare and disseminate digestible information, synthesizing documents already submitted to AQMD.
- [Its EIRs](#) and some of these documents are already publicly available but arguably inaccessible to the general public because of its technical jargon. Therefore, synopses of the key points would be useful.
- The [annual sustainability reports](#) can be expanded to include important information to keep the public informed (e.g., [emissions inventory and trends from aircrafts](#)).

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***Rec. II-12. LAWA should continue to explore and invest in more pollution mitigation technology, products, and solutions.***

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LAWA has made extensive investments in its electric ground fleets, strategies to reduce traffic around the Central Terminal Area (CTA), noise insulation program, ConRAC, and the Automated People Mover serving a new L.A. Metro stop. Given the threats of global warming to the airport and Los Angeles, LAWA must continue to identify more ways to both:

- Offset pollution produced by airport operations
-

- Protect the health of local community members and LAWA employees

LAWA has made progress in mitigating exposure to air and noise pollution by:

- Continuing to work with the FAA to evaluate the impact of modified airport departure and arrival operations
- Offering sound insulation to qualified homes
- Pursuing sound insulation that also addresses ultrafine particulate insulation, which may require collaborating with public and private stakeholders to invest in
- Offering to local communities opportunities for seals and effective filtration systems that will mitigate exposure to ultrafine particulate from aircraft emissions, particularly particulates found to be linked with detrimental health outcomes<sup>20</sup>

LAWA will need to develop, with equity in mind, criteria for installing building sealants and filtration systems. Homes that fall within noise-impacted areas qualify for the installation of air-conditioning or ventilation systems. Boundaries of ultrafine particulate air pollution that impact the local community may not overlap with these noise-impacted areas. Because residents may be at home for longer periods of time due to their work shift or more hybrid and remote work schedules, high-efficiency filtration systems and sealed buildings will significantly reduce long-term exposure to both PM2.5 and ultrafine particulate.<sup>21,22</sup>

In addition, LAWA should work with the City of Los Angeles, neighboring cities (Inglewood, El Segundo), and the County of Los Angeles (unincorporated areas) to plan for more green space, such as coniferous tree coverage in communities around LAX and VNY. Such tree coverage can help reduce concentration of particulate matter, while offering additional environmental and health benefits to local residents.<sup>23,24</sup>

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20 Wing, S. E., Larson, T. V., Hudda, N., Boonyarattaphan, S., Fruin, S., & Ritz, B. (2020). Preterm birth among infants exposed to in utero ultrafine particles from aircraft emissions. *Environmental Health Perspectives*, 128(4), 047002.

21 Azimi, P., Zhao, D., & Stephens, B. (2014). Estimates of HVAC filtration efficiency for fine and ultrafine particles of outdoor origin. *Atmospheric Environment*, 98, 337-346.

22 Spilak, M. P., Frederiksen, M., Kolarik, B., & Gunnarsen, L. (2014). Exposure to ultrafine particles in relation to indoor events and dwelling characteristics. *Building and Environment*, 74, 65-74.

23 Escobedo, F., Varela, S., Zhao, M., Wagner, J. E., & Zipperer, W. (2010). Analyzing the efficacy of subtropical urban forests in offsetting carbon emissions from cities. *Environmental Science & Policy*, 13(5), 362-372.

24 Chen, M., Dai, F., Yang, B., & Zhu, S. (2019). Effects of neighborhood green space on PM2.5 mitigation: Evidence from five megacities in China. *Building and Environment*, 156, 33-45.

### F.3 ECONOMIC

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***Rec. II-13. LAWA should expand its ongoing analyses to determine whether some vendor demographics are consistently less competitive in securing LAWA contracts.***

Becoming certified is a complex process, requiring extensive documentation regarding the businesses' bylaws, ownership, and financial statements, among other documentation. Not all businesses that apply qualify. LAWA faces challenges in finding qualified, certified SBEs in specific fields that are needed for its procurement needs.

LAWA should expand its ongoing analyses on bids, proposals, and awards to determine whether some vendor characteristics (e.g., certification, location, minority-owned) are more frequently associated with lower rates of bidding/proposals and securing contracting opportunities with LAWA.

In August 2022, Mayor Eric Garcetti signed an Executive Directive designed to make the contracting and procurement process more equitable in the City of Los Angeles and:

- Provide the needed data and evidence for charter amendments that would potentially improve small business inclusion in the procurement process
- Expedite payments to contractors
- Provide subcontractors resources
- Streamline business support and outreach

The Executive Directive will have City departments collect data regarding the procurement process for City contracts, such as business demographics. These data will be helpful to:

- Supplement the findings on procurement in this IEA Survey Report
- Expand on the analyses that BJSR is currently completing on procurement

To supplement the quantitative data required by the Executive Directive, LAWA should invest in resources to collect qualitative data and anecdotal evidence from in-depth interviews and focus groups with current and potential bidders, building on information gleaned in previous outreach efforts. This qualitative approach will provide LAWA with more nuanced findings on the challenges businesses may be facing in bidding/proposing and securing contracting opportunities with LAWA. This can be done in conjunction with the analysis performed in Volume I, Part D, "Procurement."

In alignment with the goals of the Executive Directive, LAWA has objectives to:

- Increase economic benefits
- Enable equitable participation

The proposed expanded analyses on bidding/proposing and award trends will provide LAWA with pertinent information to refine existing programs and processes so that they are more equitable. For example:

- *Example 1.* Additional analyses may show that vendors with DVBE certifications are consistently losing bids/proposals. Such a finding may then prompt LAWA to identify challenges specific to businesses with DVBE certifications and offer appropriate remedies to equitably improve participation from these vendors.
- *Example 2.* The analyses may show how small businesses, including those owned by minorities and women, may be faring in bidding/proposal opportunities. If the analyses uncover inequitable trends in bidding/proposals and awarding rates associated with certain business characteristics (e.g., minority and women-owned small businesses disproportionately bidding or submitting proposals less frequently than other small businesses), it can prompt LAWA to explore solutions like teaming and mentorship opportunities among minority and women-owned businesses of varying experiences.

These analyses will support the BJSR team, perhaps identifying the need for more resources to expand their ongoing data-driven procurement analysis of economic outcomes associated to business owner demographics.

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***Rec. II-14. LAWA should expand its analyses to determine whether geographic disparities in procurement are linked to other factors.***

Our analysis finds that there are geographic disparities in the utilization of primes and subcontractors on LAWA contracts, leading to gaps in contract dollars awarded to primes and earned by subcontractors by zip code. Our aggregated results show uneven distributions to certain historically disadvantaged communities around LAX and VNY (e.g., South L.A.) of LAWA procurement contracts, and earned dollar amounts. Additional analyses would provide greater clarity and insight as to whether such disparities are due to factors beyond LAWA's control, such as the lack of available businesses in zip codes that may be predominantly residential. Given LAWA's interest in increasing economic benefits to the region and equitable participation from local residents, expanded analyses will provide LAWA with important information on geographic locations that could benefit from more targeted and focused outreach – both for business development or for bidding and proposal opportunities.

Other geographic and market factors that LAWA should explore in this analysis of procurement involve identification of:

- Types of available businesses in different zip codes and communities
- Rate of successful and unsuccessful responses to RFBs and RFPs
- Marketplace conditions of the areas – predominantly residential, retail, business, etc.

Analysis of these procurement trends will also allow LAWA to:

- Develop more focused collaborations with leaders (e.g., Los Angeles City Councilmembers and neighboring city officials) to invest resources to grow the communities and constituents they represent



- Develop more meaningful partnership with the City of Los Angeles, the County of Los Angeles (unincorporated areas), and other cities to develop vendors around LAX, so that they are more competitive in bids and proposals
- Refine strategies to strengthen economic benefits to the region
- Improve equitable participation from local residents and businesses

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***Rec. II-15. LAWA should expand its resources to help subcontractors and small businesses develop their ability to become primes.***

Subcontractors and certified businesses make up a larger share of participating vendors at LAWA but earn smaller shares of total contract awards. One means to change this mix is to strengthen the ability of these vendors to be competitive and win bids or proposals as primes. LAWA has tried to help LSBEs compete for contracts by dividing work into smaller bundles, but even that approach has its limitations. Some of LAWA's prime contractors are multinational corporations that serve the world's aviation industry. Few local, small businesses are likely to grow to that stature – unless, of course, they are purchased by one of the large corporations.

Despite these challenges in obtaining the work, there are many benefits that accrue to prime contractors. For example, as our analysis shows, primes tend to earn more from contracts than subcontractors because they have opportunities and autonomy to do more of the work outlined in the contract. Subcontractors and businesses certified as SBE or LSBE make up a smaller number of vendors on LAWA contracts; nevertheless, they earn disproportionately less than their share would indicate, as they oftentimes do more specialized and smaller share of the contracted work.

Businesses certified as SBE or LSBE are more likely to be subcontractors than primes because of a variety of factors, including capacity and competitiveness in the bidding and proposal process compared to larger and more experienced firms. Without the opportunities and tools, small businesses may be limited to subcontracting work and may find it difficult to gain the necessary experiences to become primes.

From an equity perspective and in line with the goals of the City to improve small business inclusion in the procurement process, LAWA can do more to provide small businesses in the communities surrounding LAX and VNY—many of which are minority- and women-owned—a pathway to more opportunities to be primes on contracts. These firms may require help to gain resources, capital, and experience so that they are more competitive for future work as primes. LAWA already has some measures in place (e.g., subcontracting minimums and the business certification program). The expanded analyses on quantitative and qualitative data from the previous recommendations will help LAWA better determine appropriate resources to invest in small businesses to effectively help them grow them into primes.





LAWA should also review its qualification prerequisites (e.g., number of previous similar contract or number of years in business) to ensure that they do not unnecessarily limit the ability of small businesses to bid as primes. LAWA can also explore the following options based on strategies outlined by the U.S. Small Business Administration (SBA):

- **Structured joint venture opportunities:** LAWA should allow and encourage small businesses to compete together for contracts as primes. Through joint ventures, small businesses can collaborate and benefit by sharing costs and resources, leveraging the other partners' experience and market share, and take advantage of collective representation of past performance. Joint ventures also offer mentorship opportunities among small businesses, allowing less experienced businesses to learn from similar firms who have more experience successfully competing for and completing contracts as primes. To help facilitate these relationships, LAWA can provide the avenues for small businesses to network online and in-person. To encourage participation, LAWA can incentivize small businesses on past and current contracts to participate and share their experiences with interested small businesses. BuildLAX Academy is a good model for LAWA to amplify for other types of vendors.
- **Customized coaching:** LAWA currently offers some support to small businesses through the LAX Business Navigation and Support Office and such programs as the BuildLAX Academy, one-on-one coaching, and business development assistance. Assistance and coaching that is more specialized to the participant can lead to better outcomes for small businesses, particularly businesses that are disadvantaged or lacking experience in government contracting. This coaching may also connect small businesses with procurement and compliance experts who can assist participants in understanding regulations, business growth, finance, and government contracting. There are a variety of organizations that can be potential partners in helping participants be more competitive for LAWA and other City contracts:
  - The City of Los Angeles Economic Workforce Development Department (EWDD) offers business services through its 10 BusinessSource Centers in its 4 regions.
  - The [SBA's Business Development program](#) focuses on aiding firms to grow in capacity and accomplish their business objectives
  - SBA offers counseling through Service Core of Retired Executives (SCORE)
  - In the Los Angeles County Department of Consumer and Business Affairs is the [Procurement Technical Assistance Center \(PTAC\)](#), and an economic development program that provides one-on-one technical assistance, information, and training to small businesses in Los Angeles County to help them compete more effectively on Federal, State, and local government contracts at no cost.
  - California State University campuses have [Small Business Development Centers](#) (SBDC), funded partially through SBA, a grant with the Governor's Office of Business and



Economic Development (GO-Biz), and local and regional dollars. The SBDC network provides free business consulting, advice, and resources. SBDC host sites in greater Los Angeles are:

- Long Beach Community College District, 4900 E. Conant St., Bldg. 02, Long Beach, CA 90808 (telephone: 1-866-588-SBDC)
  - Pacific Coast Regional, 3255 Wilshire Blvd., Suite 1501, Los Angeles CA 90010
  - El Camino College, 13430 Hawthorne Blvd., El Camino College Business Training Center, Hawthorne CA 90250
  - College of the Canyons, 26455 Rockwell Canyon Road, Santa Clarita CA 91355
  - East Los Angeles Initiative, 4716 E Cesar E Chavez Maravilla Center Building B, Los Angeles CA 90022
- ***Institutionalized follow-up interviews with firms that lost on bids or proposals:*** LAWA offers follow-up interviews and sessions with businesses who do not win bids or proposals to discuss why. These follow-up sessions, however, are only fulfilled when businesses request them. LAWA should institutionalize follow-up interview opportunities for all businesses who do not win bids, prioritizing small businesses who can benefit more from these sessions. When businesses are contacted to let them know they did not win the bid or proposal, LAWA should explicitly provide them with an opportunity to sign up for a follow-up session with someone on the procurement team to discuss:
- Ways they can be more competitive for future bids and proposals
  - Connections to resources that will help them address shortcomings identified in the procurement process

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***Rec. II-16. LAWA should unbundle large contracts when feasible, so smaller businesses have more opportunities to participate.***

Another opportunity for LAWA to provide small businesses more equitable opportunities to participate in procurement would be to unbundle large contracts so that they are more manageable and meet the current capacity and skillset of small businesses. The size of contracts and concomitant prerequisites can be an impenetrable barrier for small businesses, many of which are also minority- and women-owned firms. LAWA should review contracts to identify opportunities to divide larger contracts into smaller tasks and deliverables, thereby increasing SBE and LSBEs' ability to compete and reducing incentives of large organizations that are less interested in bidding on smaller contracts. This practice will allow them more opportunities to build experience and capital.

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***Rec. II-17. LAWA should expand requirements and incentives for primes to subcontract with vendors in zip codes immediately surrounding LAX and VNY.***

LAWA has two ways to leverage participation of LSBE subcontractors with primes:

- **Proposal evaluation.** LAWA evaluates RFPs according to a pre-announced set of “points” that are awarded for a variety of items, including LSBE certifications, price, team, proposal, etc. BJSR worked with the LAMP team in designing the bids to require a **plan** to include LSBEs and local hires, and for awarding points for those plans.
- **Contracting.** LAMP contract documents include goals for LSBE and local hiring levels in its contract terms. For all contracts in which LSBE participation is of the evaluation process, LAWA now reports that they have such goals. Such contracting terms represent a best practice.

In addition to these two ways to increase LSBE participation, LAWA can explore the feasibility of implementing an incentive program to target vendors from certain zip codes surrounding LAX and VNY for subcontractors in proposals. This approach will capture those small local vendors that are not yet certified as LSBEs, especially those in historically disadvantaged communities directly east of LAX.

For example, since 1994, the U.S. Department of Housing and Urban Development (HUD) administers the Federal Empowerment Zone Program, which consists of Renewal Communities, Empowerment Zones, and Enterprise Communities that include “*highly distressed*” communities. These communities may be eligible for Federal grants, tax credits for businesses, bonding authority, and other benefits. LAWA might adapt a similar approach for designating historically disadvantaged communities around the airports and providing incentives for primes to use subcontractors from these designated communities.

To facilitate and encourage greater subcontracting with businesses from historically disadvantaged communities around LAX and VNY, LAWA can collaborate with relevant City departments, other local cities (e.g., Inglewood), and the County of Los Angeles to create, maintain, and make available an updated list of local vendors. Such a vendor resource would be similar to what is done for vendors in business certification programs, but in eligible zip codes. This resource would be beneficial for other government agencies operating in the area that are also hoping to improve equitable participation from businesses residing in historically disadvantaged communities.

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***Rec. II-18. LAWA should investigate L.A. Metro’s Small Business Set Aside program to determine whether it can be adapted for selected LAWA procurements.***

L.A. Metro has a [Small Business Prime Program](#) where small businesses compete only against other small businesses for contracts and projects up to \$5 million and informal projects awarding under \$100,000. L.A. Metro’s program applies to Federally funded and non-Federally



funded, competitively negotiated contracts, sealed bids, and public works projects. The City of Los Angeles only allow such a practice for Federally funded initiatives, but not others.

When the funding source of projects is Federal, LAWA can also consider eligibility requirements to boost participation from small businesses that are local or owned either by minorities or women.

Also, at the Federal level, there are [set-asides for government contracting programs](#) that benefit small businesses in certain socioeconomic categories, including:

- **Business development:** The Federal government makes a good faith effort to award at least 5% of all Federal contracting dollars to small, disadvantaged businesses each year.
- **HUBZone program:** The Federal government makes a good faith effort to award at least 3% of all Federal prime contracting dollars to small businesses certified in the HUBZone program—a program that encourages small business growth in historically underutilized business zones—each year.
- **Women-Owned Small Business:** The Federal government makes a good faith effort to award at least 5% of all Federal contracting dollars to women-owned small business each year.

Where permitted within local, State, and Federal law, LAWA should explore similar set-aside programs with the goal to increase the threshold (i.e., percent of contract dollars set aside) each fiscal year to improve equitable participation from local small businesses operating in historically disadvantaged communities impacted by LAX and VNY, aiming for meaningful progress.

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***Rec. II-19. LAWA should conduct a more in-depth wage disparity analysis among LAWA and, if found, remedy potential gaps.***

KH's findings show wage gaps between racial/ethnic groups when aggregated, specifically showing Black and Latinx employees making up a larger share of LAWA's workforce than their share of all wages earned. LAWA should conduct a more in-depth wage disparity analysis to determine whether there are systematic disparities, based on racial/ethnic and geographic disparities among LAWA employees. If any area identified, LAWA should identify evidence-based approaches to remedy potential gaps.

[GARE](#) discusses several elements needed to achieve racial equity, such as:

*"...normalizing conversations about race, making sure we have a shared understanding of commonly held definitions of implicit bias and institutional and structural racism."*

In its resource guide, GARE highlights the importance of data to inform the development, implementation, and evaluation of policies, programs, and practices that advance racial equity, namely:

- *“Set and monitor goals for achieving racial equity.”*
- *“Clearly document and track community conditions over time, including racial inequities.”*
- *“Set goals for improving results and eliminating racial inequities, along with mechanisms for tracking progress towards goals over time.”*

Following GARE’s guidelines, LAWA should be consistently monitoring wage trends among its employees to ensure racial equity. Based on available time and scope of the IEA Survey, KH’s findings are aggregated and do not account for other factors that may impact pay differentials, such as job classification and years of experience. LAWA’s additional wage disparity analyses should include at least two components: race/ethnicity and geography. Due to confounding factors that may impact wage earnings, multivariate statistical analysis (e.g., [Oaxaca-Blinder decomposition method](#)) may be appropriate to isolate the impact of race/ethnicity and geography on wage earnings (see [Gender-Based Pay Disparity Study submitted to Women’s Bureau of U.S. Department of Labor](#) as an example). Additional descriptive analyses may include a comparison of the wage distribution of LAWA employees within an area (e.g., zip code) to the wage distribution of other City departments and industries. Moreover, LAWA might use payroll or personnel data for its employees’ zip codes, which might be more precise than what is currently available in the badging operations.

This analysis will help provide insight on how LAWA is faring compared to other employers. Internal promotional opportunities, including into the executive ranks, can also be reviewed.

With equity as a core value and improving the health of employees as an objective, LAWA should work toward understanding whether existing wage gaps are disproportionately and systematically impacting some groups over others. To track equity, GARE provides [racial equity scorecard metrics](#) that LAWA can either adopt or adapt. Under jobs/economic justice, GARE lists as a desired outcome:

*“...equity across race in employment—no racial disproportionality in access to living wage jobs, unemployment, career advancement and barriers to employment.”*

Before making recommendations on addressing potential racial and geographic inequities in pay and hiring, a wage disparity analysis would begin to identify any unjust gaps and its mechanisms that LAWA can address.

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***Rec. II-20. LAWA should gain a greater understanding of the economic impact on the region of non-LAWA employees who work at LAX and VNY.***

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KH was unable to analyze the economic benefits to the region of other badged employees (non-LAWA employees) who work at LAX and VNY for airlines, concessionaires, and others. The issue related to LAWA’s lack of data on non-LAWA employee’s’ zip codes. LAWA would need to use industry-specific average wage amounts, based on job classifications, to estimate potential earnings.

## F.4 ENGAGEMENT

Many organizations and government agencies agree that engagement with members of underserved communities is key in promoting equity and racial justice. These entities and their practices in engaging with the community can serve as models for LAWA, especially when their goals for equity align with LAWA's and the City's. For example, the U.S. Presidential "[Executive Order on Advancing Racial Equity and Support for Underserved Communities through the Federal Government](#)" (January 20, 2021) states that there are:

*"...converging economic, health, and climate crises that have exposed and exacerbated inequities, while a historic movement for justice has highlighted the unbearable human costs of systemic racism... the Federal Government should pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality... Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity."*

The Executive Order outlines the significance of engagement with members of underserved communities:

*"... agencies shall consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, Federal policies and programs. The head of each agency shall evaluate opportunities, consistent with applicable law, to increase coordination, communication, and engagement with community-based organizations and civil rights organizations."*

The following recommendations outline how LAWA can continue exploring and continue to:

- Adopt best practices to identify, track, monitor, and report community engagement, especially from hard-to-reach and historically underserved communities
- Promote more equitable engagement

In doing so, LAWA should continue to identify and expand its formation of relationships with community organizations, institutions, and agencies that work directly with these populations. Such collaboration would make community engagement more effective and equitable, positioning LAWA as a central node in the region's network.

Equitably improving community engagement will be beneficial for LAWA as it provides evidence of LAWA's commitment to procedural fairness. As discussed in the recently published book on [Aviation Noise Impact Management](#), Graeme Heyes and colleagues state that:

*"...procedural fairness is an extremely important indicator for a person to be an accepted and valued member of a group... [and] fulfils the need for belonging and self-esteem... airport management should apply procedures that are as fair as possible and recognized*



*as such by the public. The assumption that giving voice leads to increased perceived fairness and reduced annoyance due to noise exposure has already been shown in studies when people who could express their preference for a certain sound were significantly less annoyed than people who could not. However, annoyance was particularly high among people whose preference was actively ignored. A more recent study also showed that many opportunities to participate led to a higher acceptance of a fictitious airport expansion. It also showed that the focus on the jobs created by the airport expansion had no effect on acceptance.”<sup>25</sup>*

Although this discussion looks at community engagement in the context of aircraft noise, this conclusion can apply to other airport externalities. KH’s recommendations on community engagement recognize the disruption that COVID-19 caused in community engagement efforts, and LAWA’s challenges of filling vacancies in the public affairs and outreach teams. LAWA is currently recruiting for those vacancies and is poised to reinvigorate its community outreach activities.

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***Rec. II-21. LAWA should define equitable participation from disadvantaged communities and determine the necessary indicators to monitor progress.***

LAWA management discusses equitable participation within the context of procurement and hiring. LAWA does extensive outreach to the high schools in the historically disadvantaged communities for HireLAX.

For meaningful and measurable community engagement, LAWA should explicitly define equitable participation from the community as it relates to community input and relationships. LAWA’s next Strategic Plan should identify the criteria and accountability measures that will be implemented to ensure equitable participation from underserved and historically disadvantaged communities around LAX and VNY. These indicators should be shaped by LAWA’s goals and objectives to equitably improve how the public’s voices and concerns are meaningfully integrated into the decision-making process.

LAWA should form a community working group comprised of:

- Community organizations (e.g., groups and community leaders from the historically disadvantaged communities, many of whom may have had representation in the previous community benefits agreement)
- Community liaisons (e.g., Airport Minority Advisory Council)
- Community engagement, public relations, and government affairs teams at LAWA

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<sup>25</sup> Heyes, G., Hauptvogel, D., Benz, S., Schreckenberger, D., Hooper, P., & Aalmoes, R. (2022). Engaging communities in the Hard Quest for Consensus. In *Aviation Noise Impact Management* (pp. 219-239). Springer, Cham.

This community working group would discuss, identify, and agree on 1) a definition of equitable participation, 2) goals and objectives to improve equitable participation, and 3) key indicators to measure LAWA's progress on meeting said goals and objectives. This community working group should also reconvene on a semi-annual cadence to reevaluate LAWA's goal, objectives, measures, and progress for community engagement, particularly in the historically disadvantaged communities.

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***Rec. II-22. LAWA should ensure current outreach efforts are based on community engagement methods.***

LAWA can build on its current community outreach approach by expanding its community engagement methods. These methods will promote equity in LAWA's programs, policies, and practices with historically disadvantaged communities around LAX and VNY.

As discussed in [Aviation Noise Impact Management](#), Graeme Heyes and colleagues analyze multiple case studies and argue:

*"...methods for engagement [should] go beyond the mere dissemination of information as with pure communication, and involve more participatory methods such as consultation, focus groups, workshops or full collaborative and participative working groups. Hence communication and engagement can be seen as sitting on a spectrum, from the simple provision of information, through to more participatory levels that afford degrees of citizen empowerment through partnerships, delegation of control."*

More effortful, participatory and community engaged methods yield more effective engagement with local residents, empowering communities and building trust with the public.

***LAWA should broaden its approach by adopting community engagement methods and inclusionary practices designed with evidence-based research.*** The [Urban Institute](#), a nonprofit research organization using data and evidence to advance equity, has many examples on how they deploy community engaged methods. The Urban Institute highlights how:

*"...community engaged methods means prioritizing the leadership, participation, and active reflection of the people at the heart of the issues we study. This work rests on the understanding that lived experience is valuable expertise. Finding opportunities for lasting change requires a robust understanding of current challenges and opportunities, which can only be fully achieved through ongoing input, collaboration, and investment in the people closest to the issues."*

***LAWA should develop and integrate into its project planning a set of community engagement protocols.*** These protocols could involve a set of items and questions to consider (e.g., checklists) developed from evidence-based participatory and community engaged methods. LAWA can look at other organizations and agencies as models, adapting existing guidelines, checklists, and engagement plans so that they are more relevant to LAWA's goals of community engagement and the communities around LAX and VNY. [PolicyLink](#), [OxFam](#), and [coUrbanize](#)

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have extensive experience engaging with the community, while centering equity. Some example items LAWA should consider when making its checklist include:

- Have we updated a stakeholder analysis/assessment to identify different stakeholders, influencers, or vulnerable groups for this specific project, program, or outreach effort?
- Have we mapped the preferred communication and information chains for each group, noting which communication channels are used within communities, who has access, which channels are trusted, and what are the contact details for key community contacts?
- Have we adapted information to make it relevant and accessible to involved stakeholders?
- Do involved stakeholders know how to contact the appropriate LAWA members?
- Are we creating open forums for community members to safely voice needs and opinions?
- Are we asking communities and groups for their own solutions and acting as facilitators to help them realize these, rather than imposing our own solutions?
- Are we ensuring representatives from all groups within the community are participating in decision-making and have access to activities and information?
- Are we involving trusted community groups, non-governmental organizations (NGOs), coalitions, and partners who represent the interest of the community impacted?
- Are we collecting anonymized data to inform who is being engaged, including their interests, concerns, and potential challenges?
- Do we follow up with participants to inform them of efforts made on projects, policies, programs, or outreach efforts discussed?

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***Rec. II-23. LAWA should extend existing processes and tools to update stakeholder analyses and database systematically and regularly.***

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LAWA's community engagement team currently assesses stakeholders on a case-by-case cadence. This allows LAWA some understanding of who is engaged for specific projects. As part of LAWA's social responsibility to equitably engage all communities impacted by LAX and VNY, LAWA should extend these processes and tools to identify stakeholders, their interests and concerns, their influence, and challenges or preferences systematically and regularly in being reached out to. [SFO](#) is an example of their ongoing assessment of stakeholders identified as vulnerable populations. For different vulnerable populations (e.g., seniors and older adults, people with disabilities and medical conditions, and people with limited English proficiency), SFO defines engagement strategies, critical issues, and measurable activities.

A primary and ongoing analysis/assessment of all stakeholders generally impacted by LAX and VNY will provide a more comprehensive understanding of all communities who should be engaged, how they should be engaged, and when they should be engaged. This information on stakeholders should be stored and made accessible to the LAWA community in a sortable database, allowing for more streamlined and coordinated community engagement across

LAWA projects, activities, and divisions, such as those efforts required in Environmental Impact Reports (EIRs). A component of regularly updating stakeholder analyses and database will require LAWA to also revisit and reevaluate the stakeholders' involvement at the completion of each project. Sharing of this reevaluation with other LAWA members will help to obtain a deeper understanding of whose voices may still be lacking. This reevaluation would detail challenges with fairly engaging with hard-to-reach communities, such as:

- Ensuring parity with louder voices from those stakeholders with more money
- Addressing challenges with English language proficiency
- Developing new approaches for those with limited digital capacity

Regularly updated stakeholder analyses/reevaluations that consistently involve members of the community, such as the recently organized local chapter of the Airport Minority Advisory Council (AMAC), would be helpful in ensuring consistent and transparent engagement on issues that do not fall under specific projects and cases.

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***Rec. II-24. LAWA should measure the quality of community engagement, especially how well it listens to and implements community ideas.***

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LAWA has some data that quantify community engagement, including number of meetings and briefings, organizations met with, LAWA presenter, dates of meetings, and topic of presentation. LAWA's data to measure the quality of engagement is limited. An example of a quality of engagement metric is whether and how LAWA is taking and integrating public input. LAWA's Public Affairs program reports that they focused on disseminating an accurate, consistent, and thorough message of LAWA (e.g., benefits of aviation careers or current plans and programs in the community). While it has sought to inform airport management of common community concerns, there is no documentation of the integration of community input into LAWA decision-making, other than what is required in the development of EIRs.

As discussed in [Aviation Noise Impact Management](#), Graeme Heyes and colleagues highlight that engagement:

*"...refers not just to provision of information to stakeholders, but to establishing a dialogue... the objective is to embark on a conversation with stakeholders to explain things to them, but importantly, to also listen. The concept is rooted in the fact that residents are the experts on their own lived experiences and can offer important insight that may otherwise remain unknown, and that could play an important role in decision making... the process is rooted in deep engagement with stakeholders, including the use of multi-stakeholder design teams, collecting qualitative data to complement quantitative information, and understanding and addressing core challenges directly."*

***Rec. II-25. LAWA should assemble, analyze, and develop programs, using disaggregated data on engaged communities.***

Data are important in advancing equity as it reveals existing trends and gaps, providing key insights on strategies to equitably address shortcomings. As noted in the [“Executive Order on Advancing Racial Equity and Support for Underserved Communities through the Federal Government:”](#)

*“...lack of [disaggregated] data has cascading effects and impedes efforts to measure and advance equity. A first step to promoting equity in Government action is to gather the data necessary to inform that effort.”*

LAWA’s community engagement and public relations teams should form a data working group with personnel specializing in data management and analysis. This team should ensure meaningful data is collected, analyzed, and used to improve community relationships.

The FAA has distributed an advisory circular on community involvement which lists performance measures. LAWA measures but does not publicly report many of the data, especially those items that require effort to gather; this situation is understandable given the challenges of vacancies in the public affairs team. Table II.8 lists the sample measures included.

**Table II.8: Performance Measures from FAA Advisory Circular**

Level of Effort to Collect	Performance Measure
Low	<ul style="list-style-type: none"> <li>■ Number of Meetings</li> <li>■ Number of names on mailing list</li> <li>■ Range of media used for meeting notices and other project information</li> <li>■ Range of venues (location and time of day)</li> <li>■ Number of appearances at community events and meetings</li> <li>■ Availability of alternative transportation for outreach meetings</li> <li>■ Number of outreach meetings with specific groups/ neighborhoods (e.g., ethnic communities, resource agencies, homeowners associations, community leaders, neighborhood groups)</li> <li>■ Number of comments received</li> <li>■ Number of participants</li> <li>■ Number of followers on social media platforms</li> <li>■ Public participation plan modifications based on public input</li> </ul>
Medium	<ul style="list-style-type: none"> <li>■ Geographical distribution of outreach event attendees</li> <li>■ Percent of affected population (based on study area) that attend project-specific open houses/workshops/public hearings</li> <li>■ Diversity of stakeholder participation (representative of surrounding community)</li> <li>■ Number of page views, unique visitors, and returning visitors to a project webpage/website</li> </ul>

Level of Effort to Collect	Performance Measure
High	<ul style="list-style-type: none"> <li>■ Clarity and adequacy of project information</li> <li>■ Participants' feedback about the public participation process/event (survey results)</li> </ul>

LAWA reports that it does not regularly collect data that will permit an assessment of the race/ethnicity, gender, disability, income, veteran status, etc. of the community that it engages. If it were collected, disaggregated data could then be analyzed to determine whether some communities were being overlooked.

***In addition to the typical demographic information, LAWA should make an intentional effort to collect zip code data,*** which would help uncover the diversity of stakeholder participation and whether they are representative of surrounding communities. With zip code data, LAWA can ***spatially map participant neighborhood representation***, and where conversations are happening to identify the gaps on communities that are underrepresented. Zip codes, rather than just participants' cities, provide a more nuanced understanding of whether equitable participation is happening. Some cities and unincorporated areas are highly segregated (i.e., wealthy households cluster in certain zip codes separate from poorer households in the same city). Zip code data, compared to street addresses, is broad enough to also ensure participants' anonymity and privacy.

With disaggregated data, LAWA then can determine groups, neighborhoods, homeowners' associations, community leaders, and neighborhood groups that specifically serve and engage the underrepresented groups LAWA has identified in its community engagement analysis.

***Rec. II-26. LAWA should build on relationships with communities and advocacy groups involved in historically disadvantaged communities, HireLAX, TLH, FSHP, and the previous CBA.***

LAWA has been effective in engaging with certain populations of the community through its partnerships with schools, Chambers of Commerce, and Rotary Clubs. This organizational reach is likely limited to specific groups and overlooks outside members who are not parents of school-aged children, business owners who are members of Chambers of Commerce, and populations more likely to be part of the Rotary Clubs. As noted previously, ongoing and consistent stakeholder analyses would better inform LAWA of who is predominantly being engaged and who is still unheard.

LAWA also collaborates with other local agencies who deal with community engagement, including the Los Angeles' [City Planning's Community Liaison program](#) and the County Board of Supervisors' community outreach and engagement teams. LAWA relies on them to develop meaningful and complete stakeholder lists. These partnerships and agencies may also struggle



with identifying and reaching populations that are still often unheard (e.g., undocumented and mixed-status households). LAWA should expand existing networks and channels by improving collaborations with communities and advocacy groups who were involved in the previous [LAX Community Benefits Agreement \(CBA\)](#), especially those who were described to be advocates of the historically disadvantaged and part of the [LAX Coalition for Economic, Environmental, and Educational Justice](#).

These groups should be included in existing stakeholder analyses and outreach databases because they have a history and trusting relationship with underserved and historically disadvantaged groups. Some examples from the CBA include Coalition for Clean Air, Community Coalition, Los Angeles Alliance for a New Economy, Natural Resources Defense Council, and Physicians for Social Responsibility Los Angeles.

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***Rec. II-27. LAWA should continue to keep advisory council/committee meetings hybrid while exploring additional strategies to ensure accessibility to the public.***

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LAWA has improved community engagement efforts despite the challenges of the COVID-19 pandemic, including making public meetings hybrid. This hybrid structure allows greater flexibility and safety for participants with the digital resources and skills to join. LAWA should continue:

- Offering this hybrid structure to allow greater participation from the public
- Exploring supplemental strategies to ensure continued accessibility to the public

Catalyst California (formerly the Advancement Project), working with EmpowerLA and community-based organizations that serve low-income communities of color, interviewed and surveyed residents in the City of Los Angeles to share their experiences engaging with local government and agencies. In their report, “[Making Public Participation Equitable: Recommendations for an Office of Civic Engagement in Los Angeles](#),” they reported that:

*“...various barriers make it difficult for residents from traditionally marginalized populations to access participation opportunities. These barriers include the times, dates, and locations of opportunities, transportation difficulties, and insufficient language support.”*

Among their sample of those who reported that they had never participated in civic engagement in some form or another (e.g., community meetings), they found that the most frequently reported reason was concerns and fears about interacting with public institutions and government. LAWA should consider these barriers when developing community engagement strategies that are more equitable and intentional in including marginalized groups. Investments in making public meetings and community workshops more accessible will also build trust among underserved communities, improving LAWA’s image among local residents.



***At a minimum, LAWA should make it standard practice to have Spanish interpreters at all public meetings even when it is not requested.*** Given the demographic makeup of the communities around LAX and VNY, lack of requests for Spanish interpreters is a sign that LAWA may need to improve outreach. Spanish is the most frequently spoken language aside from English among communities around LAX and VNY. By committing to providing Spanish interpreters, LAWA will make public meetings more accessible and attractive to the Spanish-speaking community, especially those with limited English proficiency. If meetings continue to be hybrid, technological resources allow interpreters to easily be on call and ready. LAWA should also make clearer in its outreach that they are able to provide interpretation services at public meetings, community workshops, and committee meetings in multiple languages and American Sign Language (ASL). LAWA can develop and provide a list of languages with readily available interpreters, similar to the [County of Los Angeles' threshold languages](#).

***To address the digital divide, LAWA should partner with community organizations to develop and facilitate the establishment and maintenance of digital hubs*** for those communities whose voices have been traditionally unheard because, in part, they suffer from a lack of access to digital devices, the internet, and digital skills to attend hybrid meetings. A needs-assessment should provide a roadmap to prioritize the effort. The needs-assessment can also identify some of the community assets that might serve as digital hubs (e.g., public libraries, faith-based organizations, park facilities, schools, or non-profit organizations), where community members could meet to virtually attend LAWA meetings.

Depending on the identified need, these digital hubs should be prioritized in historically disadvantaged communities that disproportionately suffer from the digital divide. An important advantage of having these digital hubs is that they provide safer and more comfortable spaces to gather community input, especially from participants who may have concerns or fears engaging with public institutions and government.

Building on LAWA's approach to local schools' participation in its community programs, these digital hubs should be designed to offer video-conferencing ability to hybrid public meetings and community workshops. LAWA representatives and community leaders should provide support for these digital hubs.

LAWA should also collaborate with community groups to help people who lack transportation to attend public meetings, digital hubs, and community workshops on airport-related issues. LAWA can partner with organizations to identify these groups and apply for grants that can help fund transportation.

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***Rec. II-28. LAWA can expand its official relationships with local universities to develop partnerships, research, practicum opportunities, internships, and fellowships.***

There are multiple benefits to partnerships with higher education in the Los Angeles area:

- Building community relations
- Involving institutional pillars already working in historically disadvantaged communities
- Attracting and retaining talent
- Facilitating mutually beneficial partnerships
- Conducting research on areas of interest to LAWA

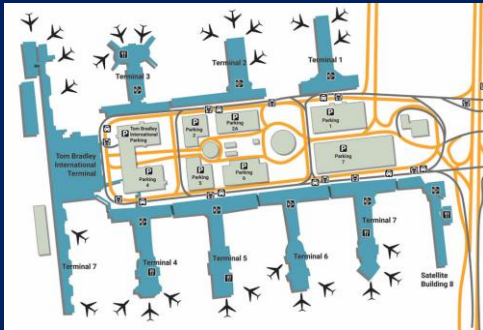
LAWA currently has relationships with Otis, Loyola Marymount University (LMU), Southwestern College, and West Los Angeles College (WLAC). LAWA should continue to develop relationships with these institutions and build relationships with other local universities and colleges, including Occidental College, Los Angeles Trade-Technical College, University of California at Los Angeles (UCLA), and University of Southern California (USC), among others.

As we have noted, there are numerous areas of research that will help LAWA improve its work with historically disadvantaged groups. Partnerships with universities and colleges can lead to:

- Access to universities, colleges, and associated research centers and community groups that engage local communities (e.g., co-facilitating community meetings or contributing to community engagement plans backed by evidence-based research)
- Recruitment of academics with expertise and research skills to design and implement research that will advance LAWA's interest in equity
- Development of student internships and practicum opportunities to help build their experience and training, while exposing students to potential careers at LAWA

# 2022

## Industrial, Economic, and Administrative (IEA) Survey of Los Angeles World Airports (LAWA) APPENDICES





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## APPENDIX – ACRONYMS

Acronym	Description or Definition
9/11	September 11, 2001, terrorist attacks
A380	Airbus 380
AA/EEO	Affirmative Action/Equal Employment Opportunity
ACH	Automated Clearing House
ACI	Airport Council International
ADA	Americans with Disabilities Act
AFE	Authority of Expenditures
AIP Grants	Airport Improvement Program Grant fund established by the Airport and Airways Improvement Act (AAIA) of 1982. Airport Improvement Program (AIP) grants are funded by Federal aviation user taxes. Grant monies can be either discretionary or entitlement grants depending on the use and restrictions.
Airside	The airfield, gates, jet ways, and other facilities associated with the movement of aircraft. “Airside” often refers to all facilities beyond the passenger security screen although the distinction differs from airport to airport.
ALPA	Air Line Pilots Association, International
ALUC	Airport Land Use Commission
AMC	Airport Metro Connector
AOC	Airport Operations Center
APM	Automated People Mover, a new light rail system LAWA plans to build
apron	The paved area leading from the terminals to the taxiways and runways. For purposes of our report, the terms “ramp” and “apron” are used interchangeably.
AQMP	Air Quality Management Plan
ARB	State of California Air Resource Board
ARFF	Airport Rescue and Firefighting
ATA	Air Transport Association
ATC	Airport Transit Connector
ATMP	Airfield and Terminal Modernization Project.
AVI	Automatic Vehicle Identification
aviation revenue	Revenues generated from landing fees and related aircraft, cargo, or passenger fees.
AVR	Average Vehicle Ridership
BAGS	Baggage Airline Guest Services
BJSR	Business, Jobs & Social Responsibility
BOAC	Board of Airport Commissioners. LAWA operates under the management and control of a five-member (seven under the new City Charter) Board of Airport Commissioners, who are appointed by the Mayor and approved by the City Council.
BOAC Commissioners	Those individuals who serve on the Board of Airport Commissioners.
BOAC President	President of the Board of Airport Commissioners
BSC	Balanced Scorecard
CAC	Citizen Advisory Council
CALM	Construction & Logistics Management team at LAX
CalOSHA	California Division of Occupational Safety and Health
Caltrans	State of California, Department of Transportation





Acronym	Description or Definition
CAO	Los Angeles City Administrative Officer. The CAO is the chief financial advisor to the Mayor and the City Council and reports directly to both.
CBA	Community Benefits Agreement
CBP	United States Customs Service – Customs Border Patrol
CCT	Closed-Circuit Television
CDC	Centers for Disease Control and Prevention
CDG	Commercial Development Group at LAX
CEQA	California Environmental Quality Act
CFO	Chief Financial Officer
CFR	Code of Federal Regulations
CIO	Chief Information Officer
CIP	Capital Improvement Plan
City (the)	City of Los Angeles
City Attorney	The City Attorney is attorney and legal advisor to the City of Los Angeles, a municipal corporation, and the City Council, all officers, boards, and departments. The City Attorney provides LAX with Legal Services that are housed at and paid for by LAX.
City Controller	The City's chief accounting and auditing officer.
City Council	City Council of Los Angeles
City Personnel Department	Centralized human resources services for the City of Los Angeles. LAX is subject to all Personnel Department policies and programs, including Civil Service rules.
City Treasurer	The custodian of all funds of the City and affiliated entities, including LAX.
CLA	Los Angeles Chief Legislative Analyst. The Office of the CLA provides staff support to the City Council and its various committees.
CNEL	Community Noise Equivalent Level
CNG	Compressed Natural Gas
commercial air carriers	Private companies licensed by the U.S. Government to operate aircraft between cities to carry passengers and freight for profit.
Compensatory Landing Fees	Rate-making methodology based on recovery of costs allocable to the particular facilities occupied or used.
connecting traffic	The number of airport enplanements or percentage thereof, who pass through the airport to a separate destination, and thus use the airport as a transfer point to change planes. See also: hub airport.
ConRAC	Consolidated Rent-a-Car Center, a new facility that LAX plans to build
COO	Chief Operating Officer
CTA	Central Terminal Area at LAX
CUP	Central Utility Plant at LAX
CUTE	Common Use Terminal Equipment
CY	Calendar Year
dB	decibels
DBB	Design-Bid-Build
DBFOM	Design-Build-Finance-Operate-Maintain
debt per enplaned passenger	Net funded debt divided by total enplaned passengers. A measure of leverage and relative indebtedness.
Discretionary AIP Grants	AIP grant monies available on a project-specific basis. Generally, carry fewer restrictions than entitlement grants.

Acronym	Description or Definition
discretionary funds	Leftover revenues to be used by the airport authority at their discretion. Discretionary funds can be considered the authority's "profit."
DOA	City of Los Angeles Department of Airports, a proprietary department of the City (also known as Los Angeles World Airports (LAWA))
DOC	Department Operations Center, LAWA's emergency operations center
dominant carrier	The air carrier handling the highest percentage of total enplanements at a particular airport.
dotted-line reporting	The secondary (higher-level) supervisor to whom an
EDS	Explosive Detection Systems
EEO/AA	Equal Employment Opportunity/Affirmative Action
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
enplanements	A measure of airport utilization based upon the total number of revenue passengers boarding an aircraft at a given airport.
enterprise or proprietary agency	A governmental agency, which is predominantly fee supported. Examples include airports, harbors, water utilities, etc.
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency. This Federal agency is charged to protect human health and safeguard the natural environment – air, water, and land.
EPAX	Enplaned Passengers
FAA	The Federal Aviation Administration, an agency of the U.S. Department of Transportation. The FAA was created by the Federal Aviation Act of 1958 and its mandates include aviation safety, navigational aids, and air traffic control. Through its sizable grant programs and regulatory authority, the FAA exercises considerable influence over the planning and development of individual airports.
FAMIS	Finance, Accounting, and Management Information System, LAWA's term for the SAP application installed in 2001
FAR	Federal Aviation Regulation
FBO	Fixed Base Operation. A ground-based operation, such as a hangar, fueling facility, catering kitchen, etc.
FEIR	Final Environmental Impact Report
FTE	Full-Time Equivalent
GARB	General Airport Revenue Bond, the most common form of airport authority indebtedness.
GDP	Gross Domestic Product
GENPS	Goods, Equipment, and Non-Professional Services
GHG	Greenhouse Gas
GIS	Geographic Information System
GPI	Genuine Progress Indicators
GTC	Ground Transportation Center
guest	A passenger or an individual who is meeting or dropping off a passenger at LAX (also referred to as "meeters and greeters")
Harbor Department	The port operations in the City of Los Angeles
HAZMAT	Hazardous materials
HR	human resources
HRD	Human Resources Division at LAWA



Acronym	Description or Definition
hub airport	A hub airport predominantly handles connecting passengers rather than Origination and Destination (O&D) traffic. LAX is not a domestic hub airport, although it serves as a critical connection for trans-Pacific flights.
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IEA Survey	Industrial, Economic, and Administrative Survey, a performance review mandated by City Charter (this study)
IP	Internet Protocol
IT	Information technology
ITC	Intermodal Transportation Center
itinerant carrier	A seasonally operated airline or an infrequent user of an airport.
Joint-Administrators	The IEA Survey is joint administered by representatives from the Offices of the Mayor, Chief Legislative Analyst (CLA), and City Controller.
KH	KH Consulting Group, a Los Angeles-based management consulting firm; the prime contractor for this IEA Survey
KH Team	Includes all the KH and subcontractor consultants who worked on the IEA Survey.
KPI	Key Performance Indicator. KPIs are the critical measurements of success: financial performance, process improvement, or customer satisfaction.
L.A.	Los Angeles
L.A. Metro	Los Angeles County Metropolitan Transit Authority. This Authority is the primary provider of transit-related services for the Southern California region.
LABVN	Los Angeles Business Virtual Network
LACDPH	Los Angeles County Department of Public Health
LADOT	Los Angeles City, Department of Transportation
LADWP	Department of Water and Power in the City of Los Angeles
LAFD	Los Angeles Fire Department. LAFD provides crash, fire, and rescue (CFR) services to LAWA at LAX and VNY.
LAMP	Landside Access Modernization Program
landed ton	A landed ton is <u>one</u> thousand pounds of aircraft landing at an airport. Landing fees are generally calculated based on landed tons as determined by the certified landing weight of each type of aircraft.
landside	That portion of airport facilities devoted to the main terminal complex, ground transportation, and movement of passengers and baggage away from aircraft areas. Although the distinction differs from airport to airport, landside is often considered as all the terminal facilities up to the passenger security screen.
LAPD	Los Angeles Police Department
LACDPH	Los Angeles County Department of Public Health
LAUSD	Los Angeles Unified School District
LAWA	Los Angeles World Airports (also known as the City of Los Angeles Department of Airports (DOA), a proprietary department of the City). DOA owns and manages four airports: Los Angeles International (LAX), Ontario International (ONT), Van Nuys Airport (VNY), and Palmdale Airport (PMD).
LAWA - CUP	Central Utility Plant
LAWA – ELUP	Environmental & Land Use Planning
LAWA – FMUG	Facilities Maintenance & Utilities Group
LAWA – IMTG	LAWA’s Information Management & Technology Group

Acronym	Description or Definition
LAX	Los Angeles International Airport (IATA airport code)
LAX Modernization Program	The first comprehensive modernization plan for LAX, launched after 2000; it included such projects as the Midfield Satellite Concourse, adapted gates at TBIT for wide-body A380 aircraft, and related projects, such as taxiways, tunnels, aircraft ramp areas, utility improvements, etc.
LAXAAC	Los Angeles International Airport Area Advisory Committee – a citizen advisory group for LAX
LEA	Law Enforcement Agency
LEA Assist	Law Enforcement Agency assistance, i.e., could include almost any action, such as backing up a City police unit on a vehicle stop, transporting a prisoner and escort to an aircraft for extradition, etc.
LEED	Leadership in Energy and Environmental Design
LOA	Leave of Absence
load factors	Percentage of passenger seats filled
LOI	Letter of Intent
LRT	Light Rail Transit
LSBE	Local Small Business Enterprise
LUMP	Land-Use Mitigation Program
MAP	Million Annual Passengers (enplaning + deplaning)
Maximo	Maintenance software used at LAWA
MBE	Minority Business Enterprise
meeters and greeters	Individuals who meet or drop off passengers at LAX
MMRP	Mitigation Monitoring and Reporting Program
MOA	Memorandum of Agreement
Moody's	A bond rating agency
MoS	Memorandum of Support
MOU	Memorandum of Understanding
MPC	Mobile Passport Control app
NA	Not applicable
NCP	Noise Compatibility Program
NEPA	National Environmental Policy Act
NIGP	National Institute of Government Purchasing
NLAMP	New Los Angeles Marketing Partnership
non-aviation revenue	Revenue generated from concessions, parking, terminal services, etc.
NOP	Notice of Preparation
O&D	Origination and Destination (O&D) traffic consists of an airport's passengers, which begin or end a journey at that airport (as opposed to connecting passengers). LAX is predominantly an O&D airport.
O&M	Operations and Maintenance at LAWA
OCIP	Owner-Controlled Insurance Program
Office of the Mayor	As the executive officer of the City, the Mayor exercises supervision over all City affairs. In addition to appointing the Airport Commissioners, the Mayor has additional responsibilities for overseeing LAWA.
ONT	Ontario International Airport (IATA airport code); also referred to as LA/ONT in LAWA marketing materials

Acronym	Description or Definition
operating agreement	An agreement between an airport and an airline which establishes rates and fees, and the rights and duties of each party. Airlines which sign operating agreements are referred to as “signatory airlines” or “signatories.”
OSHA	Occupational Safety and Health Administration in the U.S. Department of Labor
PANY&NJ	Port Authority of New York and New Jersey, which owns and operates JFK, LGA, and EWR among other transportation services in the region
PARCS	Parking Access Revenue Control System
PAX	Passenger
PC	Personal Computer
Personnel Department	The Personnel Department provides resources services in accordance with the Civil Service system for the City of Los Angeles
PFC	Passenger Facility Charges (PFCs) are a per passenger assessment levied by individual airports. PFCs are a relatively recent financing innovation approved by the FAA on an airport-by-airport basis.
PIP	Procurement Improvement Plan, prepared by SSD (procurement and contracting)
Planning Department	The City Planning Department guides the City’s land use development and infrastructure financing decisions by a series of planning documents, which address population distribution, traffic circulation, public facilities, location of housing, commercial and industrial facilities, protection of the natural environment, and the health, welfare, and safety of the general public.
PMD	Palmdale Regional Airport (IATA airport code); also referred to as LA/PMD in LAWA marketing materials.
Port of Los Angeles	Harbor Department in the City of Los Angeles
PPE	Personnel Protective Equipment
PPRR Model	Prevention, Preparedness, Response, and Recovery in the Emergency Management Cycle
PSD	LAWA’s Procurement Services Division, which was replaced by a Strategic Sourcing Division during the IEA Survey
PTS	Procurement Tracking System
QBHS	CDC’s Quarantine and Border Health Services (QBHS), which manages the CDC field offices at airports and other localities
RAIC	Regional Airport Improvement Corporation. A consortium of airlines which finance airport infrastructure through issuance of special facility lease revenue bonds. Six of the eight terminals at LAX are financed by RAICs.
ramp	The area where aircraft are serviced immediately adjacent to the terminal. For purposes of our report, the terms “ramp” and “apron” are used interchangeably.
RAMS	Revenue Asset Management System
refunding	A procedure whereby a bond issuer refinances an outstanding bond issued by issuing new bonds.
Residual landing fees	Rates based on recovery of net cost of a cost center or an airport as a whole, after allowing credit for concession and other non-airline revenues.
RFB	Request for Bid
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Qualification
ROI	Return on Investment



Acronym	Description or Definition
ROW	Right of Way
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
S&P	Standard and Poor's, a bond rating agency
SAIP	South Airfield Improvement Project
SAP	Financial software used at LAWA. SAP is the corporate name for what was formerly Systems Applications and Products. SAP provides LAWA's accounting, financial reporting, materials management, and human resources software.
SARS	Severe Acute Respiratory Syndrome (SARS)
SBE	Small Business Enterprise
SCAG	Southern California Association of Governments. This organization is a regional planning agency and a Council of Governments comprised of 184 cities in six counties, which promote growth, personal well-being, and livable communities for all Southern Californians.
SCAQMD	South Coast Air Quality Management District. This district is responsible for air pollution control for the four-county region, including Los Angeles and Orange counties and parts of Riverside and San Bernardino counties.
SEIR	Supplemental Environmental Impact Report
signatory airline	An airline which has signed an operating agreement at a particular airport. Most large carriers are "signatories."
SLBE	Small Local Business Enterprise
solid-line reporting relationship	Primary supervisor for day-to-day management
SPARTA	Service Providers and Artisan Tradesman Activities
SPAS	Specific Plan Amendment Study
SPIMS	Sustainability Performance Improvement Management System
SSD	LAWA's Strategic Sourcing Division, which replaces Procurement Services Division
T-#	Terminal number (as in Terminal 5 = T-5)
TBIT	Tom Bradley International Terminal
TBITEC	Tom Bradley International Terminal Equipment Company, Inc., a California not-for-profit organization of the member airlines at LAX
TSA	Transportation Security Administration
UPS	United Parcel Services
USCS	United States Customs Service
USDOL	United States Department of Labor
USDOT	United States Department of Transportation. The Aviation Consumer Protection Division of the U.S. Department of Transportation processes consumer concerns and complaints pertaining to air carriers.
USGBC	United States Green Building Council
UTAHS	Underground Tanks and Hazardous Substances
VC, HO	Payroll Codes: (Vacation, Holiday)
VMT	Vehicle Miles Driven
VNY	Van Nuys Airport (IATA airport code); also referred to as LA/VNY in LAWA marketing materials.
WBE	Woman Business Enterprise



## APPENDIX – IATA AIRPORT CODES

IATA Codes	Airports
AMS	Amsterdam Airport
ATL	Atlanta Hartsfield-Jackson Airport
BOS	Boston Logan International Airport
BUR	Burbank-Glendale-Pasadena Airport (Bob Hope)
BWI	Baltimore/Washington International Thurgood Marshall Airport
CDG	Paris Charles de Gaulle Airport
DCA	Ronald Reagan Washington International Airport
DEN	Denver International Airport
DFW	Dallas/Fort Worth Airport
DTW	Detroit Airport
EWR	Newark Airport
EWR	Newark (NJ) Liberty International Airport
FRA	Frankfurt Airport
HKG	Hong Kong International Airport
HND	Tokyo Haneda International Airport
IAD	Dulles International Airport
IAH	Houston George Bush Intercontinental Airport
JFK	New York John F. Kennedy International
LAX	Los Angeles International Airport
LGA	La Guardia Airport – New York City, NY
LGB	Long Beach Airport
LHR	London Heathrow Airport
MIA	Miami International Airport
MSP	Minneapolis Saint Paul International Airport
OAK	Oakland (CA) International Airport
ONT	Ontario (CA) International Airport
ORD	Chicago O’Hare Airport
PHX	Sky Harbor International Airport – Phoenix, AZ
PIT	Pittsburgh International Airport
PMD	Palmdale Regional Airport
SEA	Seattle/Tacoma International Airport
SFO	San Francisco International Airport
SIN	Changi Airport – Singapore
VNY	Van Nuys Airport

## APPENDIX – VOLUME II: STATISTICS FOR GIS MAPPING

**Appendix Table 1: ATMP Meeting Tracker Database (Source: LAWA)**

Date	Organization	Env. Meeting Type
8/27/2018	City of El Segundo General Manager	NOP/IS (Pre-Release)
12/6/2018	City of Los Angeles - Mayor's Office	NOP/IS (Pre-Release)
12/11/2018	Southwest & United Airlines - Joint Meeting	Agency Briefing
1/8/2019	Caltrans	Agency Briefing
1/10/2019	City of Los Angeles - Council District 11	NOP/IS (Pre-Release)
1/23/2019	Alliance for a Regional Solution to Airport Congestion (ARSAC)	NOP/IS (Pre-Release)
1/29/2019	LAWA Executive Steering Committee	LAWA Briefing
2/5/2019	LAX Coastal Chamber of Commerce; Air Forwarders Association	NOP/IS (Pre-Release)
2/19/2019	Federal Aviation Administration (FAA)	Agency Briefing
2/19/2019	Mercury Air Cargo	NOP/IS (Pre-Release)
2/20/2019	Federal Aviation Administration (FAA)	Executive Coordination Meeting - FAA/LAWA
2/21/2019	Board of Airport Commissioners (BOAC)	NOP/IS (Pre-Release)
2/26/2019	Neighborhood Council of Westchester/Playa	NOP/IS (Pre-Release)
2/26/2019	Gateway BID	NOP/IS (Pre-Release)
2/27/2019	Los Angeles Area Chamber of Commerce	NOP/IS (Pre-Release)
2/28/2019	City of El Segundo	NOP/IS (Pre-Release)
2/28/2019	El Segundo Commissioners	NOP/IS (Pre-Release)
2/28/2019	Street Lighting Data	NOP/IS (Pre-Release)
3/13/2019	City of Inglewood	NOP/IS (Pre-Release)
3/14/2019	LAX Area Advisory Committee	NOP/IS (Pre-Release)
3/19/2019	Caltrans	Agency Briefing
3/20/2019	South Coast Air Quality Management District	Agency Briefing
3/22/2019	City of Los Angeles - Mayor's Office	NOP/IS (Pre-Release)
3/26/2019	United Airlines	NOP/IS (Pre-Release)
3/27/2019	AV Air Pro	NOP/IS (Pre-Release)
3/28/2019	Park and Fly	NOP/IS (Pre-Release)
4/2/2019	Southwest Airlines	Status Update
4/4/2019	LAWA (Internal)	NOP/IS (Pre-Release)
4/12/2019	LAWA External Affairs Office	LAWA PR ATMP Meeting
4/12/2019	LAWA (Internal)	NOP/IS (Post-Release)
4/15/2019	El Segundo Chamber of Commerce	NOP/IS (Post-Release)
4/16/2019	Building Trade Union/ Los Angeles/ Orange County	Agency Briefing; #NOP/IS (Post-Release)
4/16/2019	Caltrans	Agency Briefing; #Technical Meeting
4/18/2019	Building and Construction Trades Council	NOP/IS (Post-Release)
4/18/2019	City of Los Angeles - Council District 15	
4/30/2019	Southern California Association of Governments	Agency Briefing; #NOP/IS (Post-Release)
5/2/2019	LAX Coastal Chamber of Commerce	NOP/IS (Post-Release)
5/7/2019	Los Angeles Department of City Planning	NOP/IS (Post-Release)
5/7/2019	City of Los Angeles - Council District 2	NOP/IS (Post-Release)
5/7/2019	Gateway BID	NOP/IS (Post-Release)
5/7/2019	Neighborhood Council of Westchester/Playa	Q&A
5/8/2019	LA Tourism & Convention	NOP/IS (Pre-Release)
5/9/2019	City of Los Angeles - Council District 15	NOP/IS (Post-Release)
5/9/2019	City of Los Angeles - Council District 10	NOP/IS (Post-Release)
5/15/2019	Inglewood Aviation Commission	NOP/IS (Post-Release)
5/22/2019	District Directors of Local, State, and Federal Elected Official Offices	NOP/IS (Post-Release)
6/3/2019	Los Angeles County Supervisory District 4	NOP/IS (Post-Release)
6/3/2019	Los Angeles County - Supervisor District 2	NOP/IS (Post-Release)
6/3/2019	LAWA - Guest Experience Partners Council	NOP/IS (Post-Release)
6/4/2019	Neighborhood Council of Westchester/Playa	



Date	Organization	Env. Meeting Type
7/3/2019	LAWA - ATMP Steering Committee	
7/9/2019	Los Angeles Department of Transportation	Agency Briefing
7/10/2019	South Coast Air Quality Management District	NOP/IS (Post-Release)
7/19/2019	South Coast Air Quality Management District	Agency Briefing; #CEQA AQ Modeling Protocol Review
7/25/2019	South Bay Cities Council of Governments	NOP/IS (Post-Release)
7/25/2019	California State Senate - 26th District (Senator Ben Allen)	Agency Briefing; #NOP/IS (Post-Release); #NEPA Scoping (Post Release)
7/25/2019	LAWA (Internal)	NOP/IS (Post-Release)
8/6/2019	LAWA - ATMP Steering Committee	
8/6/2019	Community Representative	NOP/IS (Post-Release)
8/6/2019	Los Angeles Department of City Planning	Agency Briefing; #NOP/IS (Post-Release)
8/9/2019	Los Angeles County Metropolitan Transportation Authority (Metro)	NOP/IS (Post-Release); #Post NEPA Scoping
8/12/2019	City of Los Angeles - Council District 8	NOP/IS (Post-Release)
8/13/2019	Los Angeles County Metropolitan Transportation Authority (Metro)	NOP/IS (Post-Release); #Post NEPA Scoping
8/14/2019	City of El Segundo	NOP/IS (Post-Release)
9/5/2019	City of El Segundo General Manager	
9/10/2019	Neighborhood Council of Westchester/Playa	NOP/IS (Post-Release)
10/23/2019	Redondo Beach Chamber of Commerce	Outreach/Informational
11/7/2019	LAX Kiwanis	NOP/IS (Post-Release)
11/19/2019	Flight Path Museum & Learning Center - Board Members	NOP/IS (Post-Release)
11/20/2019	Manhattan Beach Chamber of Commerce	NOP/IS (Post-Release)
12/5/2019	City of Los Angeles - Council District 11	Agency Briefing; #NOP/IS (Post-Release)
12/18/2019	Other	Agency Briefing; #NOP/IS (Post-Release)
1/28/2020	Inglewood Rotary	NOP/IS (Post-Release)
2/2/2020	Alliance for a Regional Solution to Airport Congestion (ARSAC)	NOP/IS (Post-Release)
2/19/2020	El Segundo Economic Development Advisory Council (EDAC)	NOP/IS (Post-Release)
3/3/2020	Southwest Airlines	NOP/IS (Post-Release)
6/24/2020	AAAC	NOP/IS (Post-Release)
10/2/2020	Federal Aviation Administration (FAA)	Draft EIR Release (Pre-Release)
10/6/2020	Los Angeles Department of City Planning	Draft EIR Release (Pre-Release)
10/6/2020	Southern California Association of Governments	Draft EIR Release (Pre-Release)
10/8/2020	United Airlines	Draft EIR Release (Pre-Release)
10/13/2020	City of Los Angeles - Council District 11	Draft EIR Release (Pre-Release)
10/15/2020	City of Los Angeles - Mayor's Office	Draft EIR Release (Pre-Release)
10/19/2020	Southwest Airlines	Draft EIR Release (Pre-Release)
10/19/2020	Alliance for a Regional Solution to Airport Congestion (ARSAC)	Draft EIR Release (Pre-Release)
10/20/2020	Caltrans	Draft EIR Release (Pre-Release)
10/21/2020	City of Los Angeles - Council District 15	Draft EIR Release (Pre-Release)
10/22/2020	Neighborhood Council of Westchester/Playa	Draft EIR Release (Pre-Release)
10/26/2020	City Of Los Angeles Department of Transportation	Draft EIR Release (Pre-Release)
10/27/2020	LAX Coastal Chamber of Commerce	Draft EIR Release (Pre-Release)
10/27/2020	City of Los Angeles - Council District 2	Draft EIR Release (Pre-Release)
10/27/2020	Other	Draft EIR Release (Pre-Release)
10/28/2020	AAAC	Draft EIR Release (Pre-Release)
10/28/2020	Gateway BID	Draft EIR Release (Pre-Release)
10/28/2020	Olympic Mobility	Draft EIR Release (Pre-Release)
10/30/2020	South Coast Air Quality Management District	Draft EIR Release (Post-Release)
11/3/2020	South Bay Association of Chambers of Commerce	Draft EIR Release (Post-Release)
11/4/2020	LAX Recovery Working Group	Draft EIR Release (Post-Release)
11/5/2020	City of Inglewood	Draft EIR Release (Post-Release)
11/5/2020	City of El Segundo	Draft EIR Release (Post-Release)
11/5/2020	Neighborhood Council of Westchester/Playa	Draft EIR Release (Post-Release)
11/5/2020	LAX Coastal Chamber of Commerce	Draft EIR Release (Post-Release)
11/6/2020	South Bay Cities Council of Governments	Draft EIR Release (Post-Release)
11/12/2020	LAX Area Advisory Committee	Draft EIR Release (Post-Release)
11/12/2020	Building and Construction Trades Council	Draft EIR Release (Post-Release)
11/17/2020	Inglewood Airport Area Chamber of Commerce	Draft EIR Release (Post-Release)
11/18/2020	LAX Noise Roundtable	Draft EIR Release (Post-Release)



Date	Organization	Env. Meeting Type
11/18/2020	Manhattan Beach Chamber of Commerce	Draft EIR Release (Post-Release)
11/19/2020	LAX Kiwanis	Draft EIR Release (Post-Release)
12/4/2020	Flight Path Museum & Learning Center - Board Members	Draft EIR Release (Post-Release)
12/9/2020	Gateway BID	Draft EIR Release (Post-Release)
12/9/2020	Los Angeles County Supervisory District 4	Draft EIR Release (Post-Release)
12/9/2020	BJSR	Draft EIR Release (Post-Release)
12/11/2020	Metro Service Council South Bay Cities	Draft EIR Release (Post-Release)
12/11/2020	City of Los Angeles - Council District 5	Draft EIR Release (Post-Release)
12/14/2020	South Bay Cities Council of Governments	Draft EIR Release (Post-Release)
12/16/2020	California State Senate - 26th District (Senator Ben Allen)	Draft EIR Release (Post-Release)
12/16/2020	Los Angeles Department of City Planning	Draft EIR Release (Post-Release)
1/5/2021	Building Trade Union/ Los Angeles/ Orange County	Draft EIR Release (Post-Release)
1/11/2021	Service Employees International Union	Draft EIR Release (Post-Release)
1/12/2021	Los Angeles Area Chamber of Commerce	Draft EIR Release (Post-Release)
1/13/2021	Mercury Air Cargo	Draft EIR Release (Post-Release)
1/20/2021	Los Angeles County Economic Development Corporation (LAEDC)	Draft EIR Release (Post-Release)
1/20/2021	Federal Aviation Administration (FAA)	Agency Briefing
1/25/2021	El Segundo Chamber of Commerce	Draft EIR Release (Post-Release)
1/26/2021	Inglewood Rotary	Draft EIR Release (Post-Release)
1/27/2021	Westchester Rotary	Draft EIR Release (Post-Release)
1/27/2021	Central City Association	Draft EIR Release (Post-Release)
1/27/2021	City of Los Angeles - Council District 7	Draft EIR Release (Post-Release)
1/28/2021	South Bay Cities Council of Governments	Draft EIR Release (Post-Release)
2/1/2021	City of Los Angeles - Council District 12	Draft EIR Release (Post-Release)
2/10/2021	L.A. Rams and SoFi Stadium/Hollywood Park Partners	Draft EIR Release (Post-Release)
2/11/2021	Westside Cities Council of Governments	Draft EIR Release (Post-Release)
2/16/2021	HB Drollinger	Draft EIR Release (Post-Release)
2/16/2021	Neighborhood Council of Westchester/Playa	Draft EIR Release (Post-Release)
2/18/2021	Culver City Chamber of Commerce	Draft EIR Release (Post-Release)
2/22/2021	City of Hermosa Beach	Draft EIR Release (Post-Release)
2/23/2021	Hollywood Chamber of Commerce	Draft EIR Release (Post-Release)
2/24/2021	YMCA - Westchester	Draft EIR Release (Post-Release)
2/25/2021	City of Rancho Palos Verdes	Draft EIR Release (Post-Release)
3/2/2021	City of Manhattan Beach	Draft EIR Release (Post-Release)
3/3/2021	Playa Venice Rotary Club	Draft EIR Release (Post-Release)
3/8/2021	Federal Aviation Administration (FAA)	Draft EIR Release (Post-Release)
3/9/2021	Valley Industry & Commerce Association	Draft EIR Release (Post-Release)
3/11/2021	El Segundo Rotary Club	Draft EIR Release (Post-Release)
5/25/2021	Neighborhood Council of Westchester/Playa	Non-CEQA Transportation Briefing
6/18/2021	Other	Draft EA Release



**Appendix Table 2: 2021 Noise Data for Zip Codes Around LAX and VNY**

Zip Code	Number of Complainers	Number of Complaints	Average (Rounded)
90001	1	1	1
90003	2	57	29
90006	2	23	12
90008	5	1,622	324
90011	1	3	3
90016	5	1,403	281
90018	22	16,787	763
90019	1	950	950
90020	1	1	1
90024	1	1	1
90025	1	1	1
90026	2	5	3
90027	1	1	1
90028	1	1	1
90031	1	1	1
90034	2	40	20
90035	2	2	1
90037	1	2	2
90039	1	16	16
90042	3	79	26
90043	4	9	2
90044	9	14	2
90045	31	50	2
90046	3	29	10
90047	26	820	32
90049	9	7,582	842
90056	4	321	80
90061	1	1	1
90064	2	210	105
90066	8	699	87
90068	7	673	96
90077	12	3,021	252
90094	2	5	3
90201	1	3	3
90210	17	8,692	511
90222	1	3	3
90230	9	4,042	449
90232	8	4,136	517
90240	2	2	1
90241	1	1	1
90242	1	12,172	12,172
90245	40	68	2



Zip Code	Number of Complainers	Number of Complaints	Average (Rounded)
90247	1	2	2
90249	6	8	1
90250	18	212	12
90254	10	392	39
90255	1	1	1
90265	7	2,025	289
90266	16	54	3
90272	9	2,345	261
90274	2	2	1
90275	7	619	88
90277	27	57	2
90278	12	452	38
90290	4	78	20
90291	3	32	11
90292	4	5	1
90293	13	116	9
90301	17	25	1
90302	2	3	2
90303	15	91	6
90304	6	17	3
90305	24	1,256	52
90402	5	2,403	481
90403	1	2	2
90405	10	129	13
90501	1	1	1
90503	2	4	2
90504	3	3	1
90505	11	59	5
90602	1	105	105
90603	1	1	1
90604	1	1	1
90605	4	115	29
90631	1	6	6
90640	4	16	4
90712	1	1	1
90713	1	52	52
90715	1	3	3
90720	1	3	3
90723	1	1	1
90732	1	3	3
90803	2	23	12
90807	1	1	1
91001	1	1	1
91006	1	1	1





Zip Code	Number of Complainers	Number of Complaints	Average (Rounded)
91024	1	1	1
91040	2	1,469	735
91105	1	1	1
91106	1	1	1
91201	1	1	1
91250	1	4	4
91301	10	1,123	112
91302	27	15,796	585
91304	2	5	3
91307	3	7	2
91311	1	631	631
91316	23	15,604	678
91320	7	777	111
91321	4	549	137
91324	2	2	1
91325	12	136	11
91326	2	7	4
91331	1	1	1
91335	5	1,471	294
91342	1	1	1
91343	44	4,336	99
91344	25	8,871	355
91350	2	723	362
91352	2	2	1
91355	5	259	52
91356	2	16	8
91360	6	78	13
91361	2	351	176
91362	9	28,419	3,158
91364	5	5,348	1,070
91367	15	209	14
91369	1	2	2
91377	2	2	1
91387	1	7	7
91390	2	154	77
91401	10	2,772	277
91402	1	3	3
91403	180	153,541	853
91404	1	6,900	6,900
91405	3	177	59
91406	96	2,306	24
91411	7	163	23
91423	75	54,667	729
91436	133	69,310	521



Zip Code	Number of Complainers	Number of Complaints	Average (Rounded)
91453	1	1,249	1,249
91504	1	158	158
91505	2	3	2
91506	2	5	3
91601	7	12	2
91602	15	173	12
91604	97	38,475	397
91607	1	1	1
91695	1	1	1
91709	1	7	7
91741	1	2	2
91745	1	3	3
91748	1	2	2
91754	27	1,155	43
91755	19	1,349	71
91770	3	193	64
91789	2	5,502	2,751
92509	1	11	11
92592	1	4	4
92615	1	20	20
92618	1	3	3
92627	3	42	14
92629	1	1	1
92647	3	2,124	708
92648	8	666	83
92651	1	14	14
92656	1	1	1
92660	4	13	3
92661	1	69	69
92662	1	2	2
92676	2	2,506	1,253
92677	2	140	70
92679	2	60	30
93003	1	11	11
93012	1	32	32
93021	4	94	24
93063	1	55	55
93551	1	1	1
96007	1	1	1
"Van Nuys"	1	1	1
<b>Grand Total</b>	<b>1,475</b>	<b>504,639</b>	<b>342</b>



**Appendix Table 3: Procurement Data by Zip Code**

All				Business Enterprise			Non-Business Enterprise		
Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
<Blank>	17	\$ 7,414,696.00	\$ 99,680.00	0	\$ -	\$ -	17	\$ 7,414,696.00	\$ 99,680.00
00000	5	\$ 3,891,131.75	\$ 124,892.94	0	\$ -	\$ -	5	\$ 3,891,131.75	\$ 124,892.94
01803	12	\$ 1,311,746.38	\$ 73,017.50	5	\$ 580,049.50	\$ 67,555.00	7	\$ 731,696.88	\$ 78,480.00
01890	1	\$ 54,780.13	\$ 54,780.13	0	\$ -	\$ -	1	\$ 54,780.13	\$ 54,780.13
02021	9	\$ 5,369,807.00	\$ 576,337.22	0	\$ -	\$ -	9	\$ 5,369,807.00	\$ 576,337.25
02129	1	\$ 122,691.01	\$ 122,691.01	0	\$ -	\$ -	1	\$ 122,691.01	\$ 122,691.01
02141	3	\$ 3,616,256.75	\$ 1,414,618.95	0	\$ -	\$ -	3	\$ 3,616,256.75	\$ 1,414,619.00
02359	1	\$ 4,153.25	\$ 4,153.25	0	\$ -	\$ -	1	\$ 4,153.25	\$ 4,153.25
02451	4	\$ 76,112.73	\$ 16,743.05	0	\$ -	\$ -	4	\$ 76,112.73	\$ 16,743.04
02494	3	\$ 9,933,527.00	\$ 2,979,455.60	0	\$ -	\$ -	3	\$ 9,933,527.00	\$ 2,979,455.50
06002	7	\$ 20,028,866.00	\$ 2,245,694.82	0	\$ -	\$ -	7	\$ 20,028,866.00	\$ 2,245,694.75
06437	5	\$ 377,917.25	\$ 50,449.40	4	\$ 327,467.86	\$ 82,222.94	1	\$ 50,449.40	\$ 50,449.40
06492	5	\$ 2,140,584.50	\$ 312,949.03	0	\$ -	\$ -	5	\$ 2,140,584.50	\$ 312,949.03
06851	3	\$ 12,574.09	\$ 5,122.25	0	\$ -	\$ -	3	\$ 12,574.09	\$ 5,122.25
06902	7	\$ 902,212.19	\$ 13,812.66	5	\$ 57,467.67	\$ 6,755.00	2	\$ 844,744.50	\$ 422,372.25
07030	1	\$ 36,080.00	\$ 36,080.00	0	\$ -	\$ -	1	\$ 36,080.00	\$ 36,080.00
07094	6	\$ 5,438,870.50	\$ 150,651.36	0	\$ -	\$ -	6	\$ 5,438,870.50	\$ 150,651.36
07458	2	\$ 359,286.19	\$ 179,643.10	0	\$ -	\$ -	2	\$ 359,286.19	\$ 179,643.09
07645	5	\$ 2,250,233.25	\$ 434,379.61	0	\$ -	\$ -	5	\$ 2,250,233.25	\$ 434,379.63
07730	4	\$ 730,822.50	\$ 140,425.00	0	\$ -	\$ -	4	\$ 730,822.50	\$ 140,425.00
07960	3	\$ 36,062,408.00	\$ 11,147,873.95	0	\$ -	\$ -	3	\$ 36,062,408.00	\$ 11,147,874.00



All				Business Enterprise			Non-Business Enterprise		
Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
07962	1	\$ 23,395.00	\$ 23,395.00	0	\$ -	\$ -	1	\$ 23,395.00	\$ 23,395.00
08052	1	\$ 17,282.88	\$ 17,282.88	0	\$ -	\$ -	1	\$ 17,282.88	\$ 17,282.88
08401	2	\$ 404,596.81	\$ 202,298.41	0	\$ -	\$ -	2	\$ 404,596.81	\$ 202,298.41
08561	1	\$ 4,170.46	\$ 4,170.46	0	\$ -	\$ -	1	\$ 4,170.46	\$ 4,170.46
08816	3	\$ 657,402.75	\$ 57,611.14	0	\$ -	\$ -	3	\$ 657,402.75	\$ 57,611.14
08837	1	\$ 1,289.50	\$ 1,289.50	0	\$ -	\$ -	1	\$ 1,289.50	\$ 1,289.50
08876	3	\$ 1,330,292.75	\$ 207,506.75	0	\$ -	\$ -	3	\$ 1,330,292.75	\$ 207,506.75
10001	11	\$ 1,612,470.63	\$ 48,520.00	1	\$ 529,995.00	\$ 529,995.00	10	\$ 1,082,475.63	\$ 43,150.67
10003	1	\$ 557,367.06	\$ 557,367.08	0	\$ -	\$ -	1	\$ 557,367.06	\$ 557,367.06
10005	7	\$ 13,135,988.00	\$ 159,081.22	5	\$ 12,970,417.09	\$ 2,394,470.96	2	\$ 165,571.22	\$ 82,785.61
10013	1	\$ 49,506.91	\$ 49,506.91	0	\$ -	\$ -	1	\$ 49,506.91	\$ 49,506.91
10016	8	\$ 790,330.81	\$ 46,726.93	5	\$ 592,560.73	\$ 20,585.65	3	\$ 197,770.09	\$ 58,919.23
10017	1	\$ 9,000.00	\$ 9,000.00	1	\$ 9,000.00	\$ 9,000.00	0	\$ -	\$ -
10018	4	\$ 3,007,216.50	\$ 741,996.75	1	\$ 114,886.00	\$ 114,886.00	3	\$ 2,892,330.50	\$ 1,369,107.50
10020	5	\$ 1,352,082.50	\$ 167,177.76	5	\$ 1,352,082.53	\$ 167,177.76	0	\$ -	\$ -
10022	14	\$ 2,082,169.25	\$ 145,715.98	6	\$ 744,812.97	\$ 145,715.98	8	\$ 1,337,356.25	\$ 162,220.92
10036	6	\$ 7,617,309.00	\$ 238,610.93	5	\$ 7,588,810.48	\$ 261,756.86	1	\$ 28,498.44	\$ 28,498.44
10119	11	\$ 11,343,845.00	\$ 66,905.22	0	\$ -	\$ -	11	\$ 11,343,845.00	\$ 66,905.22
10169	3	\$ 22,327.50	\$ 6,257.50	3	\$ 22,327.50	\$ 6,257.50	0	\$ -	\$ -
10271	4	\$ 829,768.94	\$ 87,725.86	4	\$ 829,768.96	\$ 87,725.86	0	\$ -	\$ -
11040	1	\$ 1,737.12	\$ 1,737.12	0	\$ -	\$ -	1	\$ 1,737.12	\$ 1,737.12
11716	1	\$ 7,162.95	\$ 7,162.95	0	\$ -	\$ -	1	\$ 7,162.95	\$ 7,162.95
11779	1	\$ 3,487.50	\$ 3,487.50	0	\$ -	\$ -	1	\$ 3,487.50	\$ 3,487.50



All				Business Enterprise			Non-Business Enterprise		
Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
12203	4	\$ 1,009,685.88	\$ 39,242.66	4	\$ 1,009,685.85	\$ 39,242.66	0	\$ -	\$ -
12207	3	\$ 497,537.00	\$ 68,813.25	0	\$ -	\$ -	3	\$ 497,537.00	\$ 68,813.25
12404	6	\$ 3,609,260.75	\$ 685,234.91	0	\$ -	\$ -	6	\$ 3,609,260.75	\$ 685,234.94
13057	2	\$ 61,838.27	\$ 30,919.14	0	\$ -	\$ -	2	\$ 61,838.27	\$ 30,919.13
13212	6	\$ 1,139,068.00	\$ 193,994.04	0	\$ -	\$ -	6	\$ 1,139,068.00	\$ 193,994.03
14004	2	\$ 4,645,508.50	\$ 2,322,754.22	0	\$ -	\$ -	2	\$ 4,645,508.50	\$ 2,322,754.25
14623	9	\$ 6,089,062.00	\$ 427,702.23	0	\$ -	\$ -	9	\$ 6,089,062.00	\$ 427,702.22
15086	4	\$ 2,128,168.75	\$ 530,722.31	0	\$ -	\$ -	4	\$ 2,128,168.75	\$ 530,722.31
15146	3	\$ 350,645.41	\$ 70,026.11	0	\$ -	\$ -	3	\$ 350,645.41	\$ 70,026.11
15219	3	\$ 1,150,303.75	\$ 259,594.38	0	\$ -	\$ -	3	\$ 1,150,303.75	\$ 259,594.38
15250	3	\$ 868,728.69	\$ 280,418.02	0	\$ -	\$ -	3	\$ 868,728.69	\$ 280,418.03
17011	4	\$ 344,857.75	\$ 11,521.85	0	\$ -	\$ -	4	\$ 344,857.75	\$ 11,521.84
17106	4	\$ 788,754.63	\$ 181,562.58	0	\$ -	\$ -	4	\$ 788,754.63	\$ 181,562.58
17756	1	\$ 2,169.55	\$ 2,169.55	0	\$ -	\$ -	1	\$ 2,169.55	\$ 2,169.55
18106	2	\$ 400,313.34	\$ 200,156.67	0	\$ -	\$ -	2	\$ 400,313.34	\$ 200,156.67
19073	2	\$ 1,636,851.50	\$ 818,425.74	0	\$ -	\$ -	2	\$ 1,636,851.50	\$ 818,425.75
19087	3	\$ 11,605.39	\$ 4,645.91	0	\$ -	\$ -	3	\$ 11,605.39	\$ 4,645.91
19102	2	\$ 76,058.58	\$ 38,029.29	1	\$ 3,840.00	\$ 3,840.00	1	\$ 72,218.58	\$ 72,218.58
19103	18	\$ 9,148,826.00	\$ 200,323.21	6	\$ 5,687,741.17	\$ 677,534.75	12	\$ 3,461,085.00	\$ 124,775.24
19106	4	\$ 1,055,241.00	\$ 252,890.00	0	\$ -	\$ -	4	\$ 1,055,241.00	\$ 252,890.00
19127	3	\$ 83,515.36	\$ 4,915.33	0	\$ -	\$ -	3	\$ 83,515.36	\$ 4,915.33
19317	2	\$ 94,136.45	\$ 47,068.23	2	\$ 94,136.45	\$ 47,068.23	0	\$ -	\$ -
20002	3	\$ 325,000.00	\$ 90,000.00	0	\$ -	\$ -	3	\$ 325,000.00	\$ 90,000.00



All				Business Enterprise			Non-Business Enterprise		
Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
20003	1	\$ 260,000.00	\$ 260,000.00	0	\$ -	\$ -	1	\$ 260,000.00	\$ 260,000.00
20004	2	\$ 3,727,640.75	\$ 1,863,820.43	0	\$ -	\$ -	2	\$ 3,727,640.75	\$ 1,863,820.38
20005	1	\$ 8,365.50	\$ 8,365.50	0	\$ -	\$ -	1	\$ 8,365.50	\$ 8,365.50
20009	3	\$ 648,000.00	\$ 198,000.00	0	\$ -	\$ -	3	\$ 648,000.00	\$ 198,000.00
20012	3	\$ 48,970.75	\$ 21,884.75	2	\$ 27,086.00	\$ 13,543.00	1	\$ 21,884.75	\$ 21,884.75
20036	7	\$ 5,325,127.50	\$ 399,584.29	0	\$ -	\$ -	7	\$ 5,325,127.50	\$ 399,584.28
20147	5	\$ 1,390,917.38	\$ 331,823.10	0	\$ -	\$ -	5	\$ 1,390,917.38	\$ 331,823.09
20151	3	\$ 99,341.12	\$ 32,941.23	0	\$ -	\$ -	3	\$ 99,341.12	\$ 32,941.23
20155	2	\$ 284,288.84	\$ 142,144.42	0	\$ -	\$ -	2	\$ 284,288.84	\$ 142,144.42
20170	2	\$ 97,720.72	\$ 48,860.36	0	\$ -	\$ -	2	\$ 97,720.72	\$ 48,860.36
20190	5	\$ 2,560,605.50	\$ 555,215.43	0	\$ -	\$ -	5	\$ 2,560,605.50	\$ 555,215.44
20191	5	\$ 2,640,068.00	\$ 547,039.32	5	\$ 2,640,067.91	\$ 547,039.32	0	\$ -	\$ -
20910	2	\$ 494,536.19	\$ 247,268.10	0	\$ -	\$ -	2	\$ 494,536.19	\$ 247,268.09
21075	4	\$ 2,824,899.50	\$ 585,412.26	0	\$ -	\$ -	4	\$ 2,824,899.50	\$ 585,412.25
21076	2	\$ 436,852.97	\$ 218,426.49	2	\$ 436,852.97	\$ 218,426.49	0	\$ -	\$ -
21202	6	\$ 546,846.44	\$ 42,822.70	5	\$ 298,579.56	\$ 36,033.55	1	\$ 248,266.91	\$ 248,266.91
21227	5	\$ 1,804,196.38	\$ 160,517.00	0	\$ -	\$ -	5	\$ 1,804,196.38	\$ 160,517.00
21401	4	\$ 1,430,698.88	\$ 359,602.33	0	\$ -	\$ -	4	\$ 1,430,698.88	\$ 359,602.34
22031	6	\$ 2,684,512.50	\$ 433,387.28	0	\$ -	\$ -	6	\$ 2,684,512.50	\$ 433,387.28
22033	2	\$ 367,807.94	\$ 183,903.97	0	\$ -	\$ -	2	\$ 367,807.94	\$ 183,903.97
22102	5	\$ 1,915,420.50	\$ 362,089.00	5	\$ 1,915,420.56	\$ 362,089.00	0	\$ -	\$ -
22201	1	\$ 21,329.76	\$ 21,329.76	0	\$ -	\$ -	1	\$ 21,329.76	\$ 21,329.76
22202	5	\$ 642,027.50	\$ 72,301.96	0	\$ -	\$ -	5	\$ 642,027.50	\$ 72,301.96





All				Business Enterprise			Non-Business Enterprise		
Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
22203	1	\$ 30,306.25	\$ 30,306.25	0	\$ -	\$ -	1	\$ 30,306.25	\$ 30,306.25
22314	2	\$ 42,791.73	\$ 21,395.87	0	\$ -	\$ -	2	\$ 42,791.73	\$ 21,395.87
23462	5	\$ 1,425,460.75	\$ 235,178.66	0	\$ -	\$ -	5	\$ 1,425,460.75	\$ 235,178.66
27560	4	\$ 577,878.13	\$ 74,904.10	0	\$ -	\$ -	4	\$ 577,878.13	\$ 74,904.09
28203	1	\$ 70,000.00	\$ 70,000.00	0	\$ -	\$ -	1	\$ 70,000.00	\$ 70,000.00
28217	4	\$ 271,428.31	\$ 44,990.69	4	\$ 271,428.32	\$ 44,990.69	0	\$ -	\$ -
28272	1	\$ 692,833.38	\$ 692,833.39	0	\$ -	\$ -	1	\$ 692,833.38	\$ 692,833.38
28273	4	\$ 1,371,045.38	\$ 190,426.09	0	\$ -	\$ -	4	\$ 1,371,045.38	\$ 190,426.09
30005	1	\$ 212,620.00	\$ 212,620.00	0	\$ -	\$ -	1	\$ 212,620.00	\$ 212,620.00
30009	9	\$ 6,275,026.50	\$ 103,114.40	5	\$ 290,167.29	\$ 75,851.20	4	\$ 5,984,859.00	\$ 1,530,016.75
30057	2	\$ 1,909,432.50	\$ 954,716.22	0	\$ -	\$ -	2	\$ 1,909,432.50	\$ 954,716.25
30067	1	\$ 15,887.00	\$ 15,887.00	0	\$ -	\$ -	1	\$ 15,887.00	\$ 15,887.00
30080	1	\$ 50,740.00	\$ 50,740.00	1	\$ 50,740.00	\$ 50,740.00	0	\$ -	\$ -
30091	5	\$ 6,047,558.50	\$ 566,918.19	0	\$ -	\$ -	5	\$ 6,047,558.50	\$ 566,918.19
30092	2	\$ 53,558.21	\$ 26,779.11	0	\$ -	\$ -	2	\$ 53,558.21	\$ 26,779.11
30096	2	\$ 252,749.50	\$ 126,374.75	2	\$ 252,749.50	\$ 126,374.75	0	\$ -	\$ -
30152	3	\$ 1,788,065.50	\$ 327,839.54	0	\$ -	\$ -	3	\$ 1,788,065.50	\$ 327,839.53
30303	3	\$ 990,997.00	\$ 445,155.74	3	\$ 990,997.00	\$ 445,155.74	0	\$ -	\$ -
30308	1	\$ 132,995.59	\$ 132,995.59	0	\$ -	\$ -	1	\$ 132,995.59	\$ 132,995.59
30316	3	\$ 11,407,953.00	\$ 3,648,863.31	0	\$ -	\$ -	3	\$ 11,407,953.00	\$ 3,648,863.25
30319	4	\$ 62,272,348.00	\$ 8,351,712.39	0	\$ -	\$ -	4	\$ 62,272,348.00	\$ 8,351,712.50
30328	10	\$ 30,404,614.00	\$ 2,143,449.48	4	\$ 5,349,399.92	\$ 1,273,370.40	6	\$ 25,055,214.00	\$ 2,852,256.75
30339	8	\$ 40,112,972.00	\$ 3,963,150.35	0	\$ -	\$ -	8	\$ 40,112,972.00	\$ 3,963,150.25



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Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
30354	1	\$ 533,065.50	\$ 533,065.50	0	\$ -	\$ -	1	\$ 533,065.50	\$ 533,065.50
30368	1	\$ 65,451.09	\$ 65,451.09	0	\$ -	\$ -	1	\$ 65,451.09	\$ 65,451.09
32082	1	\$ 16,113.00	\$ 16,113.00	0	\$ -	\$ -	1	\$ 16,113.00	\$ 16,113.00
32801	10	\$ 3,158,174.50	\$ 202,607.71	2	\$ 138,000.00	\$ 69,000.00	8	\$ 3,020,174.50	\$ 337,543.16
32805	4	\$ 147,388.52	\$ 33,502.53	0	\$ -	\$ -	4	\$ 147,388.52	\$ 33,502.53
32811	3	\$ 1,415,222.75	\$ 44,109.95	0	\$ -	\$ -	3	\$ 1,415,222.75	\$ 44,109.95
32814	5	\$ 3,476,370.25	\$ 603,400.00	0	\$ -	\$ -	5	\$ 3,476,370.25	\$ 603,400.00
32817	2	\$ 123,136.25	\$ 61,568.13	0	\$ -	\$ -	2	\$ 123,136.25	\$ 61,568.13
32821	4	\$ 212,040.69	\$ 40,358.74	0	\$ -	\$ -	4	\$ 212,040.69	\$ 40,358.73
33016	2	\$ 5,685.00	\$ 2,842.50	0	\$ -	\$ -	2	\$ 5,685.00	\$ 2,842.50
33069	4	\$ 51,595,676.00	\$ 9,613,564.73	0	\$ -	\$ -	4	\$ 51,595,676.00	\$ 9,613,565.00
33073	1	\$ 30,695.80	\$ 30,695.80	0	\$ -	\$ -	1	\$ 30,695.80	\$ 30,695.80
33126	7	\$ 17,335,666.00	\$ 2,737,599.66	0	\$ -	\$ -	7	\$ 17,335,666.00	\$ 2,737,599.75
33134	16	\$ 7,777,794.50	\$ 327,091.25	9	\$ 4,974,892.17	\$ 324,000.00	7	\$ 2,802,902.50	\$ 330,182.50
33306	2	\$ 165,231.44	\$ 82,615.72	0	\$ -	\$ -	2	\$ 165,231.44	\$ 82,615.72
33314	5	\$ 353,300.75	\$ 71,632.48	0	\$ -	\$ -	5	\$ 353,300.75	\$ 71,632.48
33487	7	\$ 840,897.13	\$ 52,807.25	0	\$ -	\$ -	7	\$ 840,897.13	\$ 52,807.25
33496	5	\$ 1,476,990.88	\$ 169,799.69	0	\$ -	\$ -	5	\$ 1,476,990.88	\$ 169,799.69
33610	1	\$ 3,773,750.50	\$ 3,773,750.57	0	\$ -	\$ -	1	\$ 3,773,750.50	\$ 3,773,750.50
33624	2	\$ 124,704.00	\$ 62,352.00	2	\$ 124,704.00	\$ 62,352.00	0	\$ -	\$ -
33631	1	\$ 808.65	\$ 808.65	0	\$ -	\$ -	1	\$ 808.65	\$ 808.65
33634	1	\$ 9,120.00	\$ 9,120.00	0	\$ -	\$ -	1	\$ 9,120.00	\$ 9,120.00
33646	1	\$ 56,895.30	\$ 56,895.30	1	\$ 56,895.30	\$ 56,895.30	0	\$ -	\$ -



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33702	2	\$ 148,867.50	\$ 74,433.75	1	\$ 53,299.50	\$ 53,299.50	1	\$ 95,568.00	\$ 95,568.00
34134	5	\$ 4,541,718.00	\$ 864,699.49	1	\$ 2,462.72	\$ 2,462.72	4	\$ 4,539,255.50	\$ 1,221,047.88
34242	3	\$ 430,910.00	\$ 100,940.00	0	\$ -	\$ -	3	\$ 430,910.00	\$ 100,940.00
34997	1	\$ 736,865.69	\$ 736,865.69	0	\$ -	\$ -	1	\$ 736,865.69	\$ 736,865.69
37122	9	\$ 895,106.00	\$ 68,090.00	4	\$ 166,238.73	\$ 34,404.87	5	\$ 728,867.25	\$ 77,335.00
37201	3	\$ 847,801.88	\$ 251,656.65	0	\$ -	\$ -	3	\$ 847,801.88	\$ 251,656.66
37215	14	\$ 6,293,716.50	\$ 135,378.81	5	\$ 558,024.06	\$ 100,621.72	9	\$ 5,735,692.50	\$ 152,097.20
37831	3	\$ 411,470.31	\$ 99,519.52	0	\$ -	\$ -	3	\$ 411,470.31	\$ 99,519.52
38018	3	\$ 458,133.72	\$ 103,583.79	0	\$ -	\$ -	3	\$ 458,133.72	\$ 103,583.79
40203	2	\$ 365,931.59	\$ 182,965.79	0	\$ -	\$ -	2	\$ 365,931.59	\$ 182,965.80
40213	4	\$ 566,222.31	\$ 75,114.31	0	\$ -	\$ -	4	\$ 566,222.31	\$ 75,114.30
40223	3	\$ 306,590.63	\$ 100,240.93	0	\$ -	\$ -	3	\$ 306,590.63	\$ 100,240.93
40509	6	\$ 2,265,401.00	\$ 442,988.89	0	\$ -	\$ -	6	\$ 2,265,401.00	\$ 442,988.88
41075	1	\$ 23,000.00	\$ 23,000.00	0	\$ -	\$ -	1	\$ 23,000.00	\$ 23,000.00
43016	4	\$ 341,181.06	\$ 69,539.84	0	\$ -	\$ -	4	\$ 341,181.06	\$ 69,539.84
43212	4	\$ 66,168.50	\$ 16,586.76	1	\$ 21,470.00	\$ 21,470.00	3	\$ 44,698.50	\$ 11,703.51
43215	4	\$ 58,997,360.00	\$ 14,090,708.72	0	\$ -	\$ -	4	\$ 58,997,360.00	\$ 14,090,709.00
43260	3	\$ 858,140.00	\$ 103,574.00	0	\$ -	\$ -	3	\$ 858,140.00	\$ 103,574.00
43402	2	\$ 6,432.30	\$ 3,216.15	0	\$ -	\$ -	2	\$ 6,432.30	\$ 3,216.15
43623	3	\$ 25,275.00	\$ 6,175.00	0	\$ -	\$ -	3	\$ 25,275.00	\$ 6,175.00
44056	6	\$ 2,041,177.50	\$ 313,506.53	0	\$ -	\$ -	6	\$ 2,041,177.50	\$ 313,506.53
44720	4	\$ 34,285.80	\$ 6,254.15	0	\$ -	\$ -	4	\$ 34,285.80	\$ 6,254.15
45209	2	\$ 6,254.92	\$ 3,127.46	0	\$ -	\$ -	2	\$ 6,254.92	\$ 3,127.46



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45242	9	\$ 1,185,793.88	\$ 30,587.37	0	\$ -	\$ -	9	\$ 1,185,793.88	\$ 30,587.37
45342	3	\$ 6,245,595.50	\$ 2,107,377.29	0	\$ -	\$ -	3	\$ 6,245,595.50	\$ 2,107,377.25
46077	1	\$ 132,028.67	\$ 132,028.67	0	\$ -	\$ -	1	\$ 132,028.67	\$ 132,028.67
46112	2	\$ 89,925.79	\$ 44,962.90	0	\$ -	\$ -	2	\$ 89,925.79	\$ 44,962.89
46304	1	\$ 7,406.25	\$ 7,406.25	0	\$ -	\$ -	1	\$ 7,406.25	\$ 7,406.25
48083	3	\$ 1,579,701.13	\$ 351,858.90	0	\$ -	\$ -	3	\$ 1,579,701.13	\$ 351,858.91
48104	3	\$ 205,504.80	\$ 64,546.50	0	\$ -	\$ -	3	\$ 205,504.80	\$ 64,546.50
48168	1	\$ 25,022.00	\$ 25,022.00	0	\$ -	\$ -	1	\$ 25,022.00	\$ 25,022.00
48197	7	\$ 18,119,284.00	\$ 1,977,496.75	1	\$ 86,107.71	\$ 86,107.71	6	\$ 18,033,176.00	\$ 2,581,264.00
48226	2	\$ 79,296.75	\$ 39,648.38	0	\$ -	\$ -	2	\$ 79,296.75	\$ 39,648.38
48458	3	\$ 2,830,207.00	\$ 453,761.78	0	\$ -	\$ -	3	\$ 2,830,207.00	\$ 453,761.78
49423	3	\$ 5,116,604.50	\$ 536,541.10	0	\$ -	\$ -	3	\$ 5,116,604.50	\$ 536,541.13
53005	2	\$ 47,148.47	\$ 23,574.24	0	\$ -	\$ -	2	\$ 47,148.47	\$ 23,574.23
53006	3	\$ 10,835,532.00	\$ 2,461,965.56	0	\$ -	\$ -	3	\$ 10,835,532.00	\$ 2,461,965.50
53082	1	\$ 15,700.00	\$ 15,700.00	0	\$ -	\$ -	1	\$ 15,700.00	\$ 15,700.00
53186	3	\$ 15,396,356.00	\$ 6,029,968.47	0	\$ -	\$ -	3	\$ 15,396,356.00	\$ 6,029,968.50
53202	10	\$ 14,355,774.00	\$ 1,329,464.99	0	\$ -	\$ -	10	\$ 14,355,774.00	\$ 1,329,465.00
53214	1	\$ 133,428.03	\$ 133,428.03	0	\$ -	\$ -	1	\$ 133,428.03	\$ 133,428.03
54115	4	\$ 6,130,222.00	\$ 994,349.08	0	\$ -	\$ -	4	\$ 6,130,222.00	\$ 994,349.06
54409	4	\$ 133,572.02	\$ 16,042.90	0	\$ -	\$ -	4	\$ 133,572.02	\$ 16,042.90
54912	1	\$ 1,476,793.25	\$ 1,476,793.21	0	\$ -	\$ -	1	\$ 1,476,793.25	\$ 1,476,793.25
54915	3	\$ 330,498.78	\$ 104,377.55	0	\$ -	\$ -	3	\$ 330,498.78	\$ 104,377.55
54957	1	\$ 194.65	\$ 194.65	0	\$ -	\$ -	1	\$ 194.65	\$ 194.65



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55033	1	\$ 8,597.87	\$ 8,597.87	0	\$ -	\$ -	1	\$ 8,597.87	\$ 8,597.87
55110	2	\$ 22,031,138.00	\$ 11,015,569.36	0	\$ -	\$ -	2	\$ 22,031,138.00	\$ 11,015,569.00
55121	2	\$ 4,180,039.00	\$ 2,090,019.46	0	\$ -	\$ -	2	\$ 4,180,039.00	\$ 2,090,019.50
55402	6	\$ 1,522,375.00	\$ 211,710.19	0	\$ -	\$ -	6	\$ 1,522,375.00	\$ 211,710.19
56303	1	\$ 4,000.00	\$ 4,000.00	0	\$ -	\$ -	1	\$ 4,000.00	\$ 4,000.00
57013	2	\$ 412,316.22	\$ 206,158.11	0	\$ -	\$ -	2	\$ 412,316.22	\$ 206,158.11
59840	2	\$ 25,875.00	\$ 12,937.50	0	\$ -	\$ -	2	\$ 25,875.00	\$ 12,937.50
60018	3	\$ 410,325.03	\$ 93,345.05	0	\$ -	\$ -	3	\$ 410,325.03	\$ 93,345.05
60038	2	\$ 4,619.23	\$ 2,309.62	0	\$ -	\$ -	2	\$ 4,619.23	\$ 2,309.61
60045	2	\$ 1,432,229.38	\$ 716,114.68	0	\$ -	\$ -	2	\$ 1,432,229.38	\$ 716,114.69
60048	3	\$ 17,483,980.00	\$ 6,666,476.86	0	\$ -	\$ -	3	\$ 17,483,980.00	\$ 6,666,477.00
60054	2	\$ 60,447.50	\$ 30,223.75	0	\$ -	\$ -	2	\$ 60,447.50	\$ 30,223.75
60062	2	\$ 76,280.00	\$ 38,140.00	0	\$ -	\$ -	2	\$ 76,280.00	\$ 38,140.00
60069	3	\$ 8,810,317.00	\$ 2,561,854.90	0	\$ -	\$ -	3	\$ 8,810,317.00	\$ 2,561,855.00
60077	1	\$ 5,000.00	\$ 5,000.00	0	\$ -	\$ -	1	\$ 5,000.00	\$ 5,000.00
60085	1	\$ 8,719.22	\$ 8,719.22	0	\$ -	\$ -	1	\$ 8,719.22	\$ 8,719.22
60094	1	\$ 78,732.41	\$ 78,732.41	0	\$ -	\$ -	1	\$ 78,732.41	\$ 78,732.41
60173	4	\$ 7,647,581.00	\$ 1,816,754.99	0	\$ -	\$ -	4	\$ 7,647,581.00	\$ 1,816,755.00
60197	2	\$ 40,356.33	\$ 20,178.17	0	\$ -	\$ -	2	\$ 40,356.33	\$ 20,178.16
60429	4	\$ 100,763.95	\$ 13,715.59	4	\$ 100,763.95	\$ 13,715.59	0	\$ -	\$ -
60446	3	\$ 520,853.00	\$ 179,965.91	0	\$ -	\$ -	3	\$ 520,853.00	\$ 179,965.91
60515	3	\$ 1,755,508.75	\$ 714,925.30	0	\$ -	\$ -	3	\$ 1,755,508.75	\$ 714,925.31
60601	17	\$ 72,106,936.00	\$ 82,800.00	5	\$ (506,068.52)	\$ 53,501.62	12	\$ 72,613,008.00	\$ 188,017.83



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60602	13	\$ 17,840,886.00	\$ 626,698.49	0	\$ -	\$ -	13	\$ 17,840,886.00	\$ 626,698.50
60603	2	\$ 76,650.00	\$ 38,325.00	0	\$ -	\$ -	2	\$ 76,650.00	\$ 38,325.00
60604	10	\$ 13,965,622.00	\$ 651,873.03	6	\$ 10,159,626.15	\$ 1,136,435.54	4	\$ 3,805,995.50	\$ 382,879.41
60606	2	\$ 478,913.28	\$ 239,456.64	0	\$ -	\$ -	2	\$ 478,913.28	\$ 239,456.64
60610	2	\$ 131,985.00	\$ 65,992.50	0	\$ -	\$ -	2	\$ 131,985.00	\$ 65,992.50
61265	3	\$ 12,451,765.00	\$ 4,115,977.61	0	\$ -	\$ -	3	\$ 12,451,765.00	\$ 4,115,977.50
61629	1	\$ 1,404.47	\$ 1,404.47	0	\$ -	\$ -	1	\$ 1,404.47	\$ 1,404.47
61801	2	\$ 135,570.00	\$ 67,785.00	0	\$ -	\$ -	2	\$ 135,570.00	\$ 67,785.00
61820	1	\$ 15,510.00	\$ 15,510.00	0	\$ -	\$ -	1	\$ 15,510.00	\$ 15,510.00
62703	1	\$ 67,499.71	\$ 67,499.71	0	\$ -	\$ -	1	\$ 67,499.71	\$ 67,499.71
63017	6	\$ 613,456.50	\$ 97,638.45	0	\$ -	\$ -	6	\$ 613,456.50	\$ 97,638.45
63026	3	\$ 1,642,515.50	\$ 623,071.02	0	\$ -	\$ -	3	\$ 1,642,515.50	\$ 623,071.00
63119	10	\$ 2,545,594.75	\$ 107,943.56	0	\$ -	\$ -	10	\$ 2,545,594.75	\$ 107,943.55
63121	1	\$ 465.00	\$ 465.00	0	\$ -	\$ -	1	\$ 465.00	\$ 465.00
63146	5	\$ 32,288,570.00	\$ 32,001.09	0	\$ -	\$ -	5	\$ 32,288,570.00	\$ 32,001.09
64108	3	\$ 3,474,875.75	\$ 500,412.82	0	\$ -	\$ -	3	\$ 3,474,875.75	\$ 500,412.81
66206	1	\$ 5,362.50	\$ 5,362.50	0	\$ -	\$ -	1	\$ 5,362.50	\$ 5,362.50
67501	1	\$ 131,503.72	\$ 131,503.72	0	\$ -	\$ -	1	\$ 131,503.72	\$ 131,503.72
68102	1	\$ 59,140.00	\$ 59,140.00	0	\$ -	\$ -	1	\$ 59,140.00	\$ 59,140.00
68106	5	\$ 72,390,456.00	\$ 5,221,586.97	5	\$ 72,390,452.76	\$ 5,221,586.97	0	\$ -	\$ -
68701	2	\$ 1,852,446.88	\$ 926,223.44	0	\$ -	\$ -	2	\$ 1,852,446.88	\$ 926,223.44
71903	1	\$ 116.55	\$ 116.55	0	\$ -	\$ -	1	\$ 116.55	\$ 116.55
74105	3	\$ 692,601.44	\$ 312,330.00	3	\$ 692,601.42	\$ 312,330.00	0	\$ -	\$ -



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75002	1	\$ 157,360.50	\$ 157,360.50	0	\$ -	\$ -	1	\$ 157,360.50	\$ 157,360.50
75028	1	\$ 143,652.89	\$ 143,652.89	0	\$ -	\$ -	1	\$ 143,652.89	\$ 143,652.89
75041	9	\$ 3,368,557.00	\$ 276,557.07	0	\$ -	\$ -	9	\$ 3,368,557.00	\$ 276,557.06
75050	6	\$ 2,197,575.75	\$ 180,985.71	0	\$ -	\$ -	6	\$ 2,197,575.75	\$ 180,985.70
75063	8	\$ 1,410,122.13	\$ 97,857.20	4	\$ 150,092.00	\$ 19,580.50	4	\$ 1,260,030.13	\$ 333,739.09
75161	6	\$ 127,227,200.00	\$ 15,906,377.04	6	\$ 127,227,197.44	\$ 15,906,377.04	0	\$ -	\$ -
75201	16	\$ 41,440,816.00	\$ 1,047,457.39	0	\$ -	\$ -	16	\$ 41,440,816.00	\$ 1,047,457.38
75202	1	\$ 68,372.48	\$ 68,372.48	0	\$ -	\$ -	1	\$ 68,372.48	\$ 68,372.48
75204	10	\$ 117,093,320.00	\$ 8,408,588.54	0	\$ -	\$ -	10	\$ 117,093,320.00	\$ 8,408,589.00
75206	3	\$ 523,992.97	\$ 216,880.25	0	\$ -	\$ -	3	\$ 523,992.97	\$ 216,880.25
75207	5	\$ 636,902.81	\$ 164,556.50	5	\$ 636,902.82	\$ 164,556.50	0	\$ -	\$ -
75217	1	\$ 41,642.11	\$ 41,642.11	0	\$ -	\$ -	1	\$ 41,642.11	\$ 41,642.11
75229	4	\$ 879,902.75	\$ 223,538.78	4	\$ 879,902.73	\$ 223,538.78	0	\$ -	\$ -
75231	6	\$ 877,046.31	\$ 121,683.29	0	\$ -	\$ -	6	\$ 877,046.31	\$ 121,683.28
75247	7	\$ 5,637,547.00	\$ 1,084,850.17	6	\$ 5,645,103.48	\$ 1,088,078.88	1	\$ (7,556.48)	\$ (7,556.48)
75252	6	\$ 8,836,682.00	\$ 1,114,540.04	0	\$ -	\$ -	6	\$ 8,836,682.00	\$ 1,114,540.00
75261	2	\$ 20,328,724.00	\$ 10,164,362.21	0	\$ -	\$ -	2	\$ 20,328,724.00	\$ 10,164,362.00
75284	2	\$ 3,750,969.00	\$ 1,875,484.44	0	\$ -	\$ -	2	\$ 3,750,969.00	\$ 1,875,484.50
75703	1	\$ 1,650.00	\$ 1,650.00	0	\$ -	\$ -	1	\$ 1,650.00	\$ 1,650.00
76051	5	\$ 1,487,356.50	\$ 256,594.82	3	\$ 1,399,076.97	\$ 480,968.14	2	\$ 88,279.50	\$ 44,139.75
76102	20	\$ 19,855,256.00	\$ 430,883.89	6	\$ 7,724,785.02	\$ 1,434,254.49	14	\$ 12,130,470.00	\$ 174,682.09
76155	4	\$ 335,836.66	\$ 93,295.63	4	\$ 335,836.65	\$ 93,295.63	0	\$ -	\$ -
76513	3	\$ 2,483,102.00	\$ 1,094,497.88	0	\$ -	\$ -	3	\$ 2,483,102.00	\$ 1,094,497.88





All				Business Enterprise			Non-Business Enterprise		
Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
77002	1	\$ 68,000.00	\$ 68,000.00	0	\$ -	\$ -	1	\$ 68,000.00	\$ 68,000.00
77008	1	\$ 11,283.75	\$ 11,283.75	0	\$ -	\$ -	1	\$ 11,283.75	\$ 11,283.75
77010	2	\$ 10,097.00	\$ 5,048.50	0	\$ -	\$ -	2	\$ 10,097.00	\$ 5,048.50
77013	2	\$ 84,436.40	\$ 42,218.20	0	\$ -	\$ -	2	\$ 84,436.40	\$ 42,218.20
77020	4	\$ 1,021,548.69	\$ 255,281.52	0	\$ -	\$ -	4	\$ 1,021,548.69	\$ 255,281.52
77027	2	\$ 2,535,687.50	\$ 1,267,843.73	2	\$ 2,535,687.45	\$ 1,267,843.73	0	\$ -	\$ -
77032	5	\$ 84,297,896.00	\$ 17,894,913.10	0	\$ -	\$ -	5	\$ 84,297,896.00	\$ 17,894,914.00
77040	5	\$ 136,571.09	\$ 16,018.91	0	\$ -	\$ -	5	\$ 136,571.09	\$ 16,018.91
77042	5	\$ 18,540,900.00	\$ 2,114,480.32	0	\$ -	\$ -	5	\$ 18,540,900.00	\$ 2,114,480.25
77044	1	\$ 400,268.63	\$ 400,268.62	0	\$ -	\$ -	1	\$ 400,268.63	\$ 400,268.63
77060	2	\$ 3,358,826.25	\$ 1,679,413.13	0	\$ -	\$ -	2	\$ 3,358,826.25	\$ 1,679,413.13
77064	2	\$ 6,512,130.00	\$ 3,256,065.00	0	\$ -	\$ -	2	\$ 6,512,130.00	\$ 3,256,065.00
77077	4	\$ 170,559.88	\$ 39,844.64	0	\$ -	\$ -	4	\$ 170,559.88	\$ 39,844.64
77098	1	\$ 2,442,548.25	\$ 2,442,548.19	0	\$ -	\$ -	1	\$ 2,442,548.25	\$ 2,442,548.25
77469	1	\$ 261,634.72	\$ 261,634.72	1	\$ 261,634.72	\$ 261,634.72	0	\$ -	\$ -
77478	2	\$ 206,983.44	\$ 103,491.72	0	\$ -	\$ -	2	\$ 206,983.44	\$ 103,491.72
77536	1	\$ 1,006.25	\$ 1,006.25	0	\$ -	\$ -	1	\$ 1,006.25	\$ 1,006.25
77845	1	\$ 156,860.00	\$ 156,860.00	0	\$ -	\$ -	1	\$ 156,860.00	\$ 156,860.00
78006	5	\$ 10,232,193.00	\$ 1,153,874.93	0	\$ -	\$ -	5	\$ 10,232,193.00	\$ 1,153,874.88
78154	4	\$ 329,197.13	\$ 48,609.28	0	\$ -	\$ -	4	\$ 329,197.13	\$ 48,609.27
78217	4	\$ 725,027.44	\$ 91,183.11	0	\$ -	\$ -	4	\$ 725,027.44	\$ 91,183.10
78218	1	\$ 546.98	\$ 546.98	0	\$ -	\$ -	1	\$ 546.98	\$ 546.98
78222	2	\$ 4,970.22	\$ 2,485.11	0	\$ -	\$ -	2	\$ 4,970.22	\$ 2,485.11



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78249	6	\$ 6,960,429.50	\$ 965,698.77	0	\$ -	\$ -	6	\$ 6,960,429.50	\$ 965,698.75
78278	4	\$ 230,030.70	\$ 46,782.50	0	\$ -	\$ -	4	\$ 230,030.70	\$ 46,782.50
78620	2	\$ 140,048.00	\$ 70,024.00	0	\$ -	\$ -	2	\$ 140,048.00	\$ 70,024.00
78660	4	\$ 836,653.13	\$ 205,682.58	0	\$ -	\$ -	4	\$ 836,653.13	\$ 205,682.58
78731	1	\$ 5,599.00	\$ 5,599.00	0	\$ -	\$ -	1	\$ 5,599.00	\$ 5,599.00
78744	3	\$ 3,820,815.50	\$ 1,195,222.31	0	\$ -	\$ -	3	\$ 3,820,815.50	\$ 1,195,222.25
80011	4	\$ 4,612,231.50	\$ 780,297.93	0	\$ -	\$ -	4	\$ 4,612,231.50	\$ 780,297.94
80014	3	\$ 57,542.89	\$ 23,319.26	3	\$ 57,542.89	\$ 23,319.26	0	\$ -	\$ -
80020	5	\$ 964,375.50	\$ 186,054.42	0	\$ -	\$ -	5	\$ 964,375.50	\$ 186,054.42
80027	1	\$ 16,950.00	\$ 16,950.00	0	\$ -	\$ -	1	\$ 16,950.00	\$ 16,950.00
80033	1	\$ 10,084.38	\$ 10,084.38	0	\$ -	\$ -	1	\$ 10,084.38	\$ 10,084.38
80111	11	\$ 4,352,307.00	\$ 444,615.09	10	\$ 4,307,625.10	\$ 450,736.17	1	\$ 44,681.93	\$ 44,681.93
80202	11	\$ 1,638,337.13	\$ 121,626.00	2	\$ 214,241.58	\$ 107,120.79	9	\$ 1,424,095.50	\$ 121,626.00
80203	8	\$ 2,055,349.13	\$ 120,871.83	1	\$ 22,387.00	\$ 22,387.00	7	\$ 2,032,962.13	\$ 125,179.26
80215	4	\$ 1,354,421.75	\$ 233,059.27	0	\$ -	\$ -	4	\$ 1,354,421.75	\$ 233,059.27
80403	1	\$ 59,236.48	\$ 59,236.48	0	\$ -	\$ -	1	\$ 59,236.48	\$ 59,236.48
80524	1	\$ 39,705.46	\$ 39,705.46	0	\$ -	\$ -	1	\$ 39,705.46	\$ 39,705.46
80631	5	\$ 95,651,744.00	\$ 24,268,241.95	0	\$ -	\$ -	5	\$ 95,651,744.00	\$ 24,268,242.00
80640	2	\$ (73,595.61)	\$ (36,797.81)	0	\$ -	\$ -	2	\$ (73,595.61)	\$ (36,797.80)
83835	1	\$ 705,923.38	\$ 705,923.38	0	\$ -	\$ -	1	\$ 705,923.38	\$ 705,923.38
84020	3	\$ 69,022.90	\$ 24,710.00	0	\$ -	\$ -	3	\$ 69,022.90	\$ 24,710.00
84054	2	\$ 74,311.00	\$ 37,155.50	0	\$ -	\$ -	2	\$ 74,311.00	\$ 37,155.50
84104	1	\$ 33,093.25	\$ 33,093.25	0	\$ -	\$ -	1	\$ 33,093.25	\$ 33,093.25



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84302	2	\$ 3,746,512.25	\$ 1,873,256.12	0	\$ -	\$ -	2	\$ 3,746,512.25	\$ 1,873,256.13
84415	2	\$ 93,080.00	\$ 46,540.00	0	\$ -	\$ -	2	\$ 93,080.00	\$ 46,540.00
85004	3	\$ 325,387.16	\$ 80,377.57	0	\$ -	\$ -	3	\$ 325,387.16	\$ 80,377.57
85009	5	\$ 11,414,402.00	\$ 3,149,628.75	4	\$ 7,067,536.88	\$ 1,581,945.19	1	\$ 4,346,865.00	\$ 4,346,865.00
85016	5	\$ 1,901,777.50	\$ 424,167.60	5	\$ 1,901,777.44	\$ 424,167.60	0	\$ -	\$ -
85020	6	\$ 4,351,248.00	\$ 559,222.36	4	\$ 4,300,839.38	\$ 948,599.96	2	\$ 50,408.48	\$ 25,204.24
85023	2	\$ 117,205.34	\$ 58,602.67	0	\$ -	\$ -	2	\$ 117,205.34	\$ 58,602.67
85034	7	\$ 1,112,941.25	\$ 102,876.40	0	\$ -	\$ -	7	\$ 1,112,941.25	\$ 102,876.40
85040	4	\$ 178,751.41	\$ 21,283.24	0	\$ -	\$ -	4	\$ 178,751.41	\$ 21,283.24
85043	4	\$ 10,292,572.00	\$ 2,760,171.24	4	\$ 10,292,572.50	\$ 2,760,171.24	0	\$ -	\$ -
85053	1	\$ (4,950.00)	\$ (4,950.00)	0	\$ -	\$ -	1	\$ (4,950.00)	\$ (4,950.00)
85062	1	\$ 2,163.94	\$ 2,163.94	0	\$ -	\$ -	1	\$ 2,163.94	\$ 2,163.94
85225	2	\$ 330,553.88	\$ 165,276.94	2	\$ 330,553.87	\$ 165,276.94	0	\$ -	\$ -
85244	1	\$ 1,702,724.00	\$ 1,702,724.05	0	\$ -	\$ -	1	\$ 1,702,724.00	\$ 1,702,724.00
85250	1	\$ 22,792.37	\$ 22,792.37	1	\$ 22,792.37	\$ 22,792.37	0	\$ -	\$ -
85251	2	\$ 181,690.42	\$ 90,845.21	0	\$ -	\$ -	2	\$ 181,690.42	\$ 90,845.21
85258	1	\$ 11,481.05	\$ 11,481.05	0	\$ -	\$ -	1	\$ 11,481.05	\$ 11,481.05
85281	1	\$ 1,524.80	\$ 1,524.80	0	\$ -	\$ -	1	\$ 1,524.80	\$ 1,524.80
85282	7	\$ 11,592,684.00	\$ 1,553,752.43	6	\$ 11,514,004.08	\$ 2,080,334.74	1	\$ 78,680.00	\$ 78,680.00
85286	3	\$ 6,724.36	\$ 2,890.52	0	\$ -	\$ -	3	\$ 6,724.36	\$ 2,890.52
85306	1	\$ 8,416.06	\$ 8,416.06	0	\$ -	\$ -	1	\$ 8,416.06	\$ 8,416.06
85706	1	\$ 10,391.10	\$ 10,391.10	0	\$ -	\$ -	1	\$ 10,391.10	\$ 10,391.10
87102	2	\$ 405,313.59	\$ 202,656.80	0	\$ -	\$ -	2	\$ 405,313.59	\$ 202,656.80



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87108	3	\$ 695,778.44	\$ 238,211.40	0	\$ -	\$ -	3	\$ 695,778.44	\$ 238,211.41
87123	3	\$ 11,063.00	\$ 3,665.50	3	\$ 11,063.00	\$ 3,665.50	0	\$ -	\$ -
89011	7	\$ 19,910,268.00	\$ 789,685.61	3	\$ 1,448,486.38	\$ 655,676.02	4	\$ 18,461,782.00	\$ 2,617,025.25
89074	3	\$ 2,322,241.50	\$ 847,276.65	0	\$ -	\$ -	3	\$ 2,322,241.50	\$ 847,276.63
89102	1	\$ 75,000.00	\$ 75,000.00	0	\$ -	\$ -	1	\$ 75,000.00	\$ 75,000.00
89118	6	\$ 160,809.20	\$ 6,712.35	4	\$ 33,588.70	\$ 6,712.35	2	\$ 127,220.50	\$ 63,610.25
89127	1	\$ 7,227.00	\$ 7,227.00	1	\$ 7,227.00	\$ 7,227.00	0	\$ -	\$ -
89149	1	\$ 7,945.00	\$ 7,945.00	0	\$ -	\$ -	1	\$ 7,945.00	\$ 7,945.00
89431	5	\$ 645,318.44	\$ 63,486.90	0	\$ -	\$ -	5	\$ 645,318.44	\$ 63,486.90
89521	1	\$ 51,704.06	\$ 51,704.06	0	\$ -	\$ -	1	\$ 51,704.06	\$ 51,704.06
90001	2	\$ 24,230.50	\$ 12,115.25	0	\$ -	\$ -	2	\$ 24,230.50	\$ 12,115.25
90003	1	\$ 87,657.60	\$ 87,657.60	1	\$ 87,657.60	\$ 87,657.60	0	\$ -	\$ -
90005	1	\$ 29,939.44	\$ 29,939.44	0	\$ -	\$ -	1	\$ 29,939.44	\$ 29,939.44
90006	2	\$ 781,771.00	\$ 390,885.49	2	\$ 781,770.97	\$ 390,885.49	0	\$ -	\$ -
90007	6	\$ 2,132,571.50	\$ 151,576.37	6	\$ 2,132,571.42	\$ 151,576.37	0	\$ -	\$ -
90008	4	\$ 329,352.16	\$ 70,285.98	4	\$ 329,352.16	\$ 70,285.98	0	\$ -	\$ -
90010	12	\$ 11,120,114.00	\$ 175,083.41	5	\$ 4,805,929.68	\$ 728,642.80	7	\$ 6,314,184.50	\$ 139,601.05
90012	14	\$ 6,769,233.00	\$ 110,828.42	5	\$ 5,225,626.50	\$ 931,676.82	9	\$ 1,543,606.38	\$ 96,870.37
90013	23	\$ 14,649,915.00	\$ 102,440.00	20	\$ 13,972,794.19	\$ 76,318.66	3	\$ 677,121.00	\$ 230,000.00
90014	5	\$ 1,655,038.13	\$ 254,787.98	5	\$ 1,655,038.08	\$ 254,787.98	0	\$ -	\$ -
90015	31	\$ 158,591,776.00	\$ 341,884.00	15	\$ 4,632,679.04	\$ 110,114.40	16	\$ 153,959,104.00	\$ 755,652.75
90016	1	\$ 315,213.00	\$ 315,213.00	0	\$ -	\$ -	1	\$ 315,213.00	\$ 315,213.00
90017	112	\$ 181,895,056.00	\$ 293,082.94	60	\$ 52,750,966.45	\$ 483,594.89	52	\$ 129,144,096.00	\$ 191,784.91



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90019	12	\$ 4,207,831.50	\$ 97,531.96	2	\$ 14,829.95	\$ 7,414.98	10	\$ 4,193,001.75	\$ 339,707.28
90021	11	\$ 16,593,607.00	\$ 818,611.27	6	\$ 9,390,254.74	\$ 1,863,892.94	5	\$ 7,203,352.50	\$ 758,294.25
90022	16	\$ 19,017,060.00	\$ 277,708.19	7	\$ 1,621,996.38	\$ 86,730.04	9	\$ 17,395,064.00	\$ 422,116.44
90023	1	\$ 6,128.50	\$ 6,128.50	0	\$ -	\$ -	1	\$ 6,128.50	\$ 6,128.50
90024	6	\$ 420,135.31	\$ 55,162.96	2	\$ 133,290.34	\$ 66,645.17	4	\$ 286,844.97	\$ 55,162.95
90025	8	\$ 324,447.91	\$ 12,858.37	7	\$ 99,828.69	\$ 11,054.71	1	\$ 224,619.22	\$ 224,619.22
90026	5	\$ 1,543,325.75	\$ 249,498.00	5	\$ 1,543,325.70	\$ 249,498.00	0	\$ -	\$ -
90028	10	\$ 4,558,830.50	\$ 91,840.02	5	\$ 4,463,875.67	\$ 881,096.20	5	\$ 94,955.00	\$ 20,000.00
90029	2	\$ 42,000.00	\$ 21,000.00	0	\$ -	\$ -	2	\$ 42,000.00	\$ 21,000.00
90031	8	\$ 712,125.25	\$ 61,436.54	5	\$ 439,215.16	\$ 95,338.37	3	\$ 272,910.09	\$ 13,645.50
90032	2	\$ 55,159.00	\$ 27,579.50	2	\$ 55,159.00	\$ 27,579.50	0	\$ -	\$ -
90033	8	\$ 464,415.59	\$ 29,350.23	4	\$ 216,491.97	\$ 53,866.16	4	\$ 247,923.63	\$ 9,211.58
90034	22	\$ 6,667,911.50	\$ 52,045.12	20	\$ 6,502,562.04	\$ 52,045.12	2	\$ 165,349.63	\$ 82,674.81
90036	2	\$ 1,523,151.00	\$ 761,575.50	2	\$ 1,523,151.00	\$ 761,575.50	0	\$ -	\$ -
90037	2	\$ 86,016.00	\$ 43,008.00	0	\$ -	\$ -	2	\$ 86,016.00	\$ 43,008.00
90039	19	\$ 4,833,443.00	\$ 80,340.00	9	\$ 3,278,723.53	\$ 38,041.70	10	\$ 1,554,719.25	\$ 181,246.61
90040	25	\$ 6,149,787.50	\$ 77,622.33	22	\$ 5,819,902.88	\$ 91,077.67	3	\$ 329,884.81	\$ 49,220.25
90041	4	\$ 22,861,704.00	\$ 4,043,792.96	4	\$ 22,861,704.14	\$ 4,043,792.96	0	\$ -	\$ -
90042	1	\$ 36,405.00	\$ 36,405.00	0	\$ -	\$ -	1	\$ 36,405.00	\$ 36,405.00
90044	1	\$ 19,181.80	\$ 19,181.80	1	\$ 19,181.80	\$ 19,181.80	0	\$ -	\$ -
90045	104	\$ 3,637,392,896.00	\$ 417,330.31	42	\$ 17,654,861.81	\$ 376,057.35	62	\$ 3,619,738,112.00	\$ 676,722.88
90046	6	\$ 1,429,532.88	\$ 129,824.94	5	\$ 1,388,253.34	\$ 218,370.31	1	\$ 41,279.56	\$ 41,279.56
90047	1	\$ 1,806.52	\$ 1,806.52	1	\$ 1,806.52	\$ 1,806.52	0	\$ -	\$ -



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90048	19	\$ 4,943,827.50	\$ 132,484.28	16	\$ 4,264,202.20	\$ 146,429.10	3	\$ 679,625.06	\$ 106,034.81
90049	19	\$ 7,573,500.00	\$ 157,632.55	8	\$ 2,055,839.89	\$ 136,486.18	11	\$ 5,517,660.00	\$ 157,632.55
90051	2	\$ 409,905.16	\$ 204,952.58	0	\$ -	\$ -	2	\$ 409,905.16	\$ 204,952.58
90054	4	\$ 806,103.56	\$ 49,242.87	0	\$ -	\$ -	4	\$ 806,103.56	\$ 49,242.86
90056	4	\$ 238,340.80	\$ 73,433.47	4	\$ 238,340.79	\$ 73,433.47	0	\$ -	\$ -
90059	4	\$ 190,162.08	\$ 24,874.10	0	\$ -	\$ -	4	\$ 190,162.08	\$ 24,874.10
90061	4	\$ 422,797.00	\$ 88,960.35	2	\$ 405,581.68	\$ 202,790.84	2	\$ 17,215.33	\$ 8,607.67
90063	3	\$ 3,109,820.00	\$ 990,000.00	3	\$ 3,109,820.03	\$ 990,000.00	0	\$ -	\$ -
90064	13	\$ 1,892,452.00	\$ 151,870.32	6	\$ 922,666.63	\$ 171,589.54	7	\$ 969,785.38	\$ 124,124.63
90065	3	\$ 1,472,094.00	\$ 46,551.74	1	\$ 7,884.00	\$ 7,884.00	2	\$ 1,464,210.00	\$ 732,105.00
90066	16	\$ 1,390,284.88	\$ 45,818.40	5	\$ 226,223.44	\$ 52,395.00	11	\$ 1,164,061.38	\$ 39,241.80
90067	28	\$ 7,301,242.50	\$ 23,362.50	15	\$ 5,738,788.33	\$ 68,000.00	13	\$ 1,562,454.38	\$ 10,591.26
90071	73	\$ 102,993,032.00	\$ 250,480.87	43	\$ 63,357,481.74	\$ 196,109.42	30	\$ 39,635,552.00	\$ 481,072.56
90084	5	\$ 548,424.38	\$ 658.44	1	\$ 59,059.78	\$ 59,059.78	4	\$ 489,364.63	\$ 539.22
90086	1	\$ 100,000.00	\$ 100,000.00	0	\$ -	\$ -	1	\$ 100,000.00	\$ 100,000.00
90094	6	\$ 2,103,029.00	\$ 367,234.99	6	\$ 2,103,029.04	\$ 367,234.99	0	\$ -	\$ -
90201	2	\$ 210,453.41	\$ 105,226.71	2	\$ 210,453.41	\$ 105,226.71	0	\$ -	\$ -
90212	6	\$ 866,551.00	\$ 166,046.00	6	\$ 866,551.00	\$ 166,046.00	0	\$ -	\$ -
90220	2	\$ 1,185,342.00	\$ 592,670.97	0	\$ -	\$ -	2	\$ 1,185,342.00	\$ 592,671.00
90221	14	\$ 4,209,675.50	\$ 170,495.08	12	\$ 4,109,978.52	\$ 263,150.33	2	\$ 99,696.81	\$ 49,848.41
90222	7	\$ 6,697,928.50	\$ 909,814.89	2	\$ 2,770,486.75	\$ 1,385,243.38	5	\$ 3,927,441.75	\$ 581,903.69
90230	23	\$ 2,496,836.75	\$ 92,889.20	16	\$ 1,871,493.52	\$ 90,386.60	7	\$ 625,343.19	\$ 96,505.42
90241	4	\$ 826,720.94	\$ 230,938.88	0	\$ -	\$ -	4	\$ 826,720.94	\$ 230,938.88



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90245	38	\$ 37,748,920.00	\$ 279,626.41	18	\$ 6,695,687.65	\$ 145,400.14	20	\$ 31,053,234.00	\$ 549,578.75
90247	12	\$ 12,012,789.00	\$ 307,961.30	11	\$ 11,942,650.44	\$ 311,488.14	1	\$ 70,139.00	\$ 70,139.00
90248	48	\$ 68,580,224.00	\$ 185,491.41	24	\$ 58,246,884.34	\$ 348,143.14	24	\$ 10,333,340.00	\$ 56,584.00
90249	16	\$ 18,491,348.00	\$ 243,475.36	10	\$ 17,665,546.67	\$ 1,019,189.16	6	\$ 825,800.81	\$ 94,892.54
90250	13	\$ 18,874,726.00	\$ 1,261,149.20	12	\$ 15,311,590.83	\$ 1,040,292.91	1	\$ 3,563,134.50	\$ 3,563,134.50
90254	2	\$ 362,773.84	\$ 181,386.92	2	\$ 362,773.84	\$ 181,386.92	0	\$ -	\$ -
90260	8	\$ 341,786.06	\$ 32,108.02	7	\$ 258,424.54	\$ 26,796.30	1	\$ 83,361.51	\$ 83,361.51
90262	6	\$ 7,475,476.50	\$ 377,052.75	5	\$ 7,473,284.62	\$ 518,360.50	1	\$ 2,191.84	\$ 2,191.84
90265	2	\$ 37,820.00	\$ 18,910.00	2	\$ 37,820.00	\$ 18,910.00	0	\$ -	\$ -
90266	4	\$ 781,000.00	\$ 202,500.00	4	\$ 781,000.00	\$ 202,500.00	0	\$ -	\$ -
90271	2	\$ 56,760.00	\$ 28,380.00	0	\$ -	\$ -	2	\$ 56,760.00	\$ 28,380.00
90275	5	\$ 125,349.32	\$ 10,500.08	4	\$ 124,197.32	\$ 14,394.97	1	\$ 1,152.00	\$ 1,152.00
90277	15	\$ 26,137,896.00	\$ 242,880.00	13	\$ 25,819,045.46	\$ 242,880.00	2	\$ 318,850.00	\$ 159,425.00
90278	14	\$ 6,316,735.00	\$ 122,332.50	6	\$ 5,670,439.99	\$ 235,770.00	8	\$ 646,295.06	\$ 49,710.70
90280	7	\$ 2,629,646.75	\$ 251,758.75	2	\$ 1,564,879.95	\$ 782,439.98	5	\$ 1,064,766.75	\$ 192,925.50
90292	6	\$ 1,914,155.25	\$ 170,181.00	2	\$ 471,298.18	\$ 235,649.09	4	\$ 1,442,857.13	\$ 170,181.00
90293	17	\$ 5,438,654.00	\$ 173,568.00	13	\$ 4,215,937.23	\$ 143,769.60	4	\$ 1,222,717.00	\$ 236,582.06
90295	2	\$ 2,433.82	\$ 1,216.91	0	\$ -	\$ -	2	\$ 2,433.82	\$ 1,216.91
90301	27	\$ 22,389,604.00	\$ 199,918.52	22	\$ 22,188,433.94	\$ 284,394.04	5	\$ 201,170.88	\$ 12,156.82
90302	2	\$ 64,720.00	\$ 32,360.00	2	\$ 64,720.00	\$ 32,360.00	0	\$ -	\$ -
90303	12	\$ 140,994,608.00	\$ 117,003.25	1	\$ 5,153.33	\$ 5,153.33	11	\$ 140,989,456.00	\$ 118,577.77
90304	3	\$ 340,116.81	\$ 29,857.36	3	\$ 340,116.80	\$ 29,857.36	0	\$ -	\$ -
90305	7	\$ 482,706.41	\$ 18,151.00	6	\$ 456,482.65	\$ 16,719.63	1	\$ 26,223.75	\$ 26,223.75





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90401	5	\$ 216,966.91	\$ 43,188.00	0	\$ -	\$ -	5	\$ 216,966.91	\$ 43,188.00
90402	7	\$ 168,036.16	\$ 19,170.00	7	\$ 168,036.16	\$ 19,170.00	0	\$ -	\$ -
90403	1	\$ 45,778.75	\$ 45,778.75	0	\$ -	\$ -	1	\$ 45,778.75	\$ 45,778.75
90404	3	\$ 1,288,062.00	\$ 549,371.20	2	\$ 1,300,244.54	\$ 650,122.27	1	\$ (12,182.48)	\$ (12,182.48)
90405	10	\$ 107,995,056.00	\$ 10,276.10	7	\$ 107,818,862.70	\$ 11,720.94	3	\$ 176,192.94	\$ 8,831.25
90501	12	\$ 1,898,731.13	\$ 47,150.26	8	\$ 1,807,235.29	\$ 57,226.71	4	\$ 91,495.79	\$ 4,427.63
90502	6	\$ 1,332,832.75	\$ 149,163.38	6	\$ 1,332,832.76	\$ 149,163.38	0	\$ -	\$ -
90503	9	\$ 1,438,147.13	\$ 119,689.90	4	\$ 287,587.89	\$ 76,434.84	5	\$ 1,150,559.25	\$ 121,258.50
90504	7	\$ 1,469,863.00	\$ 246,750.00	1	\$ 1,300.00	\$ 1,300.00	6	\$ 1,468,563.00	\$ 266,902.84
90505	6	\$ 179,116.81	\$ 31,920.77	3	\$ 121,636.81	\$ 37,284.29	3	\$ 57,480.00	\$ 13,400.00
90601	3	\$ 1,902,646.88	\$ 207,277.86	2	\$ 1,695,369.00	\$ 847,684.50	1	\$ 207,277.86	\$ 207,277.86
90606	6	\$ 2,668,286.50	\$ 468,265.32	4	\$ 1,038,748.74	\$ 66,177.48	2	\$ 1,629,537.75	\$ 814,768.88
90620	3	\$ 153,041.28	\$ 18,754.00	2	\$ 23,564.00	\$ 11,782.00	1	\$ 129,477.29	\$ 129,477.29
90621	9	\$ 1,966,242.75	\$ 98,374.00	3	\$ 439,831.07	\$ 98,374.00	6	\$ 1,526,411.63	\$ 87,797.78
90630	14	\$ 8,442,985.00	\$ 313,975.61	14	\$ 8,442,985.22	\$ 313,975.61	0	\$ -	\$ -
90631	22	\$ 10,475,121.00	\$ 260,399.71	11	\$ 7,997,611.89	\$ 389,440.90	11	\$ 2,477,508.75	\$ 119,066.91
90638	6	\$ 1,351,407.00	\$ 219,479.06	3	\$ 877,479.33	\$ 352,494.90	3	\$ 473,927.72	\$ 113,545.22
90640	8	\$ 2,465,295.75	\$ 14,514.89	5	\$ 56,646.70	\$ 12,069.89	3	\$ 2,408,649.00	\$ 478,799.22
90650	15	\$ 5,570,123.00	\$ 228,078.93	5	\$ 796,376.75	\$ 82,084.70	10	\$ 4,773,746.50	\$ 412,611.84
90660	2	\$ 586,372.25	\$ 293,186.13	0	\$ -	\$ -	2	\$ 586,372.25	\$ 293,186.13
90670	69	\$ 45,591,948.00	\$ 116,827.48	39	\$ 40,127,402.84	\$ 223,240.45	30	\$ 5,464,543.50	\$ 90,749.34
90680	10	\$ 5,426,748.00	\$ 97,113.94	8	\$ 5,397,960.53	\$ 171,815.43	2	\$ 28,787.54	\$ 14,393.77
90701	12	\$ 7,063,704.00	\$ 688,563.47	11	\$ 6,974,604.19	\$ 735,473.92	1	\$ 89,100.00	\$ 89,100.00



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90703	30	\$ 22,504,070.00	\$ 250,980.93	17	\$ 18,553,662.76	\$ 348,256.34	13	\$ 3,950,407.75	\$ 203,884.73
90706	7	\$ 392,800.78	\$ 38,876.80	7	\$ 392,800.79	\$ 38,876.80	0	\$ -	\$ -
90710	10	\$ 2,307,833.75	\$ 166,671.75	7	\$ 2,093,663.16	\$ 278,177.75	3	\$ 214,170.69	\$ 15,000.00
90712	10	\$ 2,396,591.00	\$ 135,281.17	6	\$ 549,912.68	\$ 63,121.98	4	\$ 1,846,678.38	\$ 299,763.91
90713	1	\$ 213,962.00	\$ 213,962.00	0	\$ -	\$ -	1	\$ 213,962.00	\$ 213,962.00
90717	8	\$ 2,969,365.25	\$ 288,751.50	2	\$ 29,286.00	\$ 14,643.00	6	\$ 2,940,079.25	\$ 326,200.50
90720	11	\$ 4,834,885.50	\$ 72,758.00	5	\$ 4,074,986.91	\$ 959,423.87	6	\$ 759,898.63	\$ 64,014.54
90723	48	\$ 15,959,082.00	\$ 117,676.50	33	\$ 12,596,018.37	\$ 92,982.50	15	\$ 3,363,063.75	\$ 169,918.66
90731	15	\$ 6,658,580.00	\$ 120,800.00	15	\$ 6,658,579.98	\$ 120,800.00	0	\$ -	\$ -
90732	3	\$ 380,204.47	\$ 23,124.33	3	\$ 380,204.46	\$ 23,124.33	0	\$ -	\$ -
90740	2	\$ 16,438.21	\$ 8,219.11	2	\$ 16,438.21	\$ 8,219.11	0	\$ -	\$ -
90744	4	\$ 166,606.27	\$ 8,678.75	3	\$ 165,831.27	\$ 12,210.00	1	\$ 775.00	\$ 775.00
90745	5	\$ 1,330,075.00	\$ 45,900.08	2	\$ 974,787.77	\$ 487,393.89	3	\$ 355,287.28	\$ 37,018.60
90746	5	\$ 1,326,669.88	\$ 200,742.58	1	\$ 541.45	\$ 541.45	4	\$ 1,326,128.38	\$ 261,541.28
90748	1	\$ 71,934.71	\$ 71,934.71	0	\$ -	\$ -	1	\$ 71,934.71	\$ 71,934.71
90755	55	\$ 20,875,260.00	\$ 129,260.66	42	\$ 18,264,433.35	\$ 162,495.88	13	\$ 2,610,825.75	\$ 65,256.28
90802	12	\$ 16,318,873.00	\$ 461,402.59	9	\$ 15,885,627.65	\$ 697,702.88	3	\$ 433,245.41	\$ 77,953.14
90803	2	\$ 23,720.00	\$ 11,860.00	1	\$ 11,611.00	\$ 11,611.00	1	\$ 12,109.00	\$ 12,109.00
90804	13	\$ 1,669,540.88	\$ 44,715.00	6	\$ 603,292.99	\$ 85,144.64	7	\$ 1,066,247.88	\$ 32,014.10
90805	19	\$ 18,210,398.00	\$ 37,700.44	14	\$ 14,621,200.68	\$ 37,338.43	5	\$ 3,589,198.00	\$ 177,179.64
90806	21	\$ 4,360,164.00	\$ 75,667.20	16	\$ 2,254,247.75	\$ 70,648.38	5	\$ 2,105,916.25	\$ 360,500.22
90807	32	\$ 12,109,043.00	\$ 60,321.24	19	\$ 12,069,877.14	\$ 121,192.73	13	\$ 39,166.17	\$ 17,450.98
90808	15	\$ 2,695,485.25	\$ 87,953.74	7	\$ 1,916,890.30	\$ 109,573.43	8	\$ 778,595.06	\$ 52,749.37



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90810	8	\$ 936,544.69	\$ 39,242.87	2	\$ 565.00	\$ 282.50	6	\$ 935,979.69	\$ 72,171.40
90813	13	\$ 10,649,435.00	\$ 70,373.56	8	\$ 10,039,515.20	\$ 79,377.25	5	\$ 609,919.69	\$ 70,373.56
90815	8	\$ 2,047,382.75	\$ 129,030.25	7	\$ 2,037,966.88	\$ 171,778.81	1	\$ 9,415.89	\$ 9,415.89
90822	1	\$ 719,832.75	\$ 719,832.72	0	\$ -	\$ -	1	\$ 719,832.75	\$ 719,832.75
91001	7	\$ 1,604,937.88	\$ 139,494.93	7	\$ 1,604,937.86	\$ 139,494.93	0	\$ -	\$ -
91006	3	\$ 254,377.25	\$ 28,901.25	1	\$ 22,143.50	\$ 22,143.50	2	\$ 232,233.75	\$ 116,116.88
91011	3	\$ 197,409.95	\$ 88,734.95	3	\$ 197,409.95	\$ 88,734.95	0	\$ -	\$ -
91016	19	\$ 9,509,595.00	\$ 129,175.50	14	\$ 8,922,911.35	\$ 204,226.12	5	\$ 586,683.81	\$ 129,175.50
91017	12	\$ 42,488,892.00	\$ 1,685,950.74	8	\$ 23,514,062.26	\$ 2,406,449.41	4	\$ 18,974,830.00	\$ 1,323,373.50
91030	5	\$ 521,752.56	\$ 60,975.00	1	\$ 224,834.70	\$ 224,834.70	4	\$ 296,917.88	\$ 60,319.75
91042	1	\$ 43,032.46	\$ 43,032.46	1	\$ 43,032.46	\$ 43,032.46	0	\$ -	\$ -
91101	58	\$ 38,419,232.00	\$ 127,373.52	35	\$ 34,443,846.07	\$ 332,224.00	23	\$ 3,975,384.25	\$ 53,560.00
91103	5	\$ 794,160.50	\$ 195,032.50	0	\$ -	\$ -	5	\$ 794,160.50	\$ 195,032.50
91104	5	\$ 587,692.13	\$ 74,540.82	3	\$ 421,385.12	\$ 60,142.58	2	\$ 166,307.02	\$ 83,153.51
91105	29	\$ 4,712,030.00	\$ 45,668.50	22	\$ 4,376,700.46	\$ 54,823.95	7	\$ 335,329.53	\$ 20,205.25
91106	9	\$ 1,902,572.88	\$ 125,424.00	6	\$ 1,681,993.34	\$ 220,335.70	3	\$ 220,579.59	\$ 55,446.50
91107	16	\$ 5,185,950.50	\$ 64,684.11	10	\$ 549,958.56	\$ 47,465.75	6	\$ 4,635,992.00	\$ 430,760.00
91108	1	\$ 45,762.50	\$ 45,762.50	0	\$ -	\$ -	1	\$ 45,762.50	\$ 45,762.50
91109	3	\$ 1,313.42	\$ 340.00	0	\$ -	\$ -	3	\$ 1,313.42	\$ 340.00
91117	2	\$ 161,798.00	\$ 80,899.00	2	\$ 161,798.00	\$ 80,899.00	0	\$ -	\$ -
91124	9	\$ 63,269,448.00	\$ 4,291,040.58	0	\$ -	\$ -	9	\$ 63,269,448.00	\$ 4,291,040.50
91185	1	\$ 22,681.80	\$ 22,681.80	0	\$ -	\$ -	1	\$ 22,681.80	\$ 22,681.80
91189	6	\$ 324,732.94	\$ 17,245.33	0	\$ -	\$ -	6	\$ 324,732.94	\$ 17,245.32



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91201	8	\$ 2,981,234.00	\$ 159,095.32	6	\$ 1,072,409.16	\$ 155,521.16	2	\$ 1,908,824.88	\$ 954,412.44
91202	11	\$ 57,831,124.00	\$ 2,290,858.54	10	\$ 57,814,725.95	\$ 3,418,532.32	1	\$ 16,400.00	\$ 16,400.00
91203	12	\$ 313,053,440.00	\$ 50,852.00	7	\$ 251,504.80	\$ 31,265.00	5	\$ 312,801,920.00	\$ 57,681,720.00
91204	1	\$ 298,479.00	\$ 298,479.00	0	\$ -	\$ -	1	\$ 298,479.00	\$ 298,479.00
91214	3	\$ 76,895.04	\$ 35,996.01	1	\$ 1,125.00	\$ 1,125.00	2	\$ 75,770.04	\$ 37,885.02
91301	3	\$ 176,858.75	\$ 40,126.25	1	\$ 40,126.25	\$ 40,126.25	2	\$ 136,732.50	\$ 68,366.25
91302	4	\$ 1,411,276.75	\$ 198,176.50	3	\$ 1,197,742.76	\$ 182,818.99	1	\$ 213,534.00	\$ 213,534.00
91304	11	\$ 42,722,924.00	\$ 2,030,042.32	7	\$ 31,181,886.91	\$ 2,030,042.32	4	\$ 11,541,039.00	\$ 2,752,098.50
91306	2	\$ 72,539.00	\$ 36,269.50	2	\$ 72,539.00	\$ 36,269.50	0	\$ -	\$ -
91311	5	\$ 3,613,018.25	\$ 877,184.50	4	\$ 3,469,624.21	\$ 878,753.32	1	\$ 143,394.00	\$ 143,394.00
91316	5	\$ 50,125.00	\$ 10,005.00	5	\$ 50,125.00	\$ 10,005.00	0	\$ -	\$ -
91320	7	\$ 1,166,059.50	\$ 115,823.49	7	\$ 1,166,059.48	\$ 115,823.49	0	\$ -	\$ -
91321	2	\$ 9,696.98	\$ 4,848.49	2	\$ 9,696.98	\$ 4,848.49	0	\$ -	\$ -
91324	2	\$ 21,466.75	\$ 10,733.38	0	\$ -	\$ -	2	\$ 21,466.75	\$ 10,733.38
91325	13	\$ 2,411,241.00	\$ 126,692.25	11	\$ 2,291,819.61	\$ 132,669.26	2	\$ 119,421.40	\$ 59,710.70
91331	3	\$ 1,241,335.38	\$ 291,084.89	3	\$ 1,241,335.39	\$ 291,084.89	0	\$ -	\$ -
91335	6	\$ 1,291,942.75	\$ 9,700.00	1	\$ 577.95	\$ 577.95	5	\$ 1,291,364.75	\$ 11,200.00
91340	2	\$ 85,590.26	\$ 42,795.13	0	\$ -	\$ -	2	\$ 85,590.26	\$ 42,795.13
91342	7	\$ 1,192,568.75	\$ 123,074.13	3	\$ 638,530.23	\$ 78,221.28	4	\$ 554,038.50	\$ 132,523.92
91344	1	\$ 7,690.00	\$ 7,690.00	1	\$ 7,690.00	\$ 7,690.00	0	\$ -	\$ -
91351	1	\$ 9,917.53	\$ 9,917.53	0	\$ -	\$ -	1	\$ 9,917.53	\$ 9,917.53
91352	24	\$ 5,509,434.50	\$ 106,240.70	15	\$ 2,238,158.95	\$ 108,395.00	9	\$ 3,271,275.75	\$ 101,763.73
91355	6	\$ 14,325,187.00	\$ 444,011.63	1	\$ 40,365.14	\$ 40,365.14	5	\$ 14,284,822.00	\$ 847,658.13



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91356	2	\$ 347,540.59	\$ 173,770.29	2	\$ 347,540.58	\$ 173,770.29	0	\$ -	\$ -
91361	18	\$ 14,191,760.00	\$ 181,017.54	16	\$ 13,993,634.28	\$ 190,601.54	2	\$ 198,125.80	\$ 99,062.90
91362	6	\$ 922,492.00	\$ 126,910.00	5	\$ 879,617.00	\$ 133,820.00	1	\$ 42,875.00	\$ 42,875.00
91364	11	\$ 2,212,415.50	\$ 193,554.50	6	\$ 1,562,606.90	\$ 241,490.58	5	\$ 649,808.56	\$ 124,675.20
91367	1	\$ 200.00	\$ 200.00	0	\$ -	\$ -	1	\$ 200.00	\$ 200.00
91372	2	\$ 9,471.44	\$ 4,735.72	2	\$ 9,471.44	\$ 4,735.72	0	\$ -	\$ -
91377	1	\$ 1,668.00	\$ 1,668.00	0	\$ -	\$ -	1	\$ 1,668.00	\$ 1,668.00
91381	4	\$ 1,707,964.13	\$ 46,155.82	2	\$ 40,000.00	\$ 20,000.00	2	\$ 1,667,964.13	\$ 833,982.06
91384	1	\$ 241,388.92	\$ 241,388.92	1	\$ 241,388.92	\$ 241,388.92	0	\$ -	\$ -
91387	1	\$ 87,970.38	\$ 87,970.38	1	\$ 87,970.38	\$ 87,970.38	0	\$ -	\$ -
91402	6	\$ 332,202.25	\$ 56,940.25	3	\$ 51,608.00	\$ 14,674.03	3	\$ 280,594.25	\$ 86,596.68
91403	2	\$ 293,523.50	\$ 146,761.76	2	\$ 293,523.51	\$ 146,761.76	0	\$ -	\$ -
91405	11	\$ 4,309,265.00	\$ 48,359.58	8	\$ 4,190,019.79	\$ 111,427.05	3	\$ 119,245.00	\$ 20,871.00
91406	5	\$ 3,939,769.75	\$ 340,785.89	5	\$ 3,939,769.83	\$ 340,785.89	0	\$ -	\$ -
91413	3	\$ 564,274.25	\$ 234,075.75	0	\$ -	\$ -	3	\$ 564,274.25	\$ 234,075.75
91502	1	\$ 2,523.98	\$ 2,523.98	1	\$ 2,523.98	\$ 2,523.98	0	\$ -	\$ -
91504	2	\$ 11,861.35	\$ 5,930.68	1	\$ 11,719.00	\$ 11,719.00	1	\$ 142.35	\$ 142.35
91505	2	\$ 240,844.80	\$ 120,422.40	2	\$ 240,844.80	\$ 120,422.40	0	\$ -	\$ -
91506	10	\$ 5,210,754.00	\$ 420,279.75	10	\$ 5,210,754.20	\$ 420,279.75	0	\$ -	\$ -
91601	4	\$ 1,164,234.88	\$ 354,593.78	2	\$ 754,942.90	\$ 377,471.45	2	\$ 409,292.00	\$ 204,646.00
91604	2	\$ 88,790.00	\$ 44,395.00	2	\$ 88,790.00	\$ 44,395.00	0	\$ -	\$ -
91605	13	\$ 1,078,235.88	\$ 63,595.84	7	\$ 888,588.68	\$ 117,306.94	6	\$ 189,647.19	\$ 27,825.55
91701	5	\$ 9,487,834.00	\$ 214,875.00	0	\$ -	\$ -	5	\$ 9,487,834.00	\$ 214,875.00



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91702	15	\$ 4,118,990.50	\$ 78,925.00	13	\$ 3,970,348.67	\$ 78,925.00	2	\$ 148,641.94	\$ 74,320.97
91706	19	\$ 1,917,426.75	\$ 20,321.16	14	\$ 917,831.78	\$ 21,410.79	5	\$ 999,595.00	\$ 20,321.16
91708	3	\$ 2,164,667.50	\$ 474,843.90	3	\$ 2,164,667.38	\$ 474,843.90	0	\$ -	\$ -
91709	11	\$ 1,293,996.00	\$ 11,561.86	4	\$ 25,442.00	\$ 6,242.96	7	\$ 1,268,554.00	\$ 92,022.36
91710	33	\$ 7,465,153.00	\$ 84,960.00	22	\$ 5,768,290.10	\$ 84,823.35	11	\$ 1,696,863.13	\$ 137,313.00
91711	1	\$ 81,191.00	\$ 81,191.00	0	\$ -	\$ -	1	\$ 81,191.00	\$ 81,191.00
91723	9	\$ 2,992,116.75	\$ 287,300.36	2	\$ 10,061.40	\$ 5,030.70	7	\$ 2,982,055.25	\$ 297,582.50
91730	32	\$ 19,410,272.00	\$ 545,268.92	19	\$ 10,096,427.30	\$ 498,763.00	13	\$ 9,313,844.00	\$ 620,686.50
91731	7	\$ 1,039,859.31	\$ 39,260.64	3	\$ 987,933.68	\$ 428,055.46	4	\$ 51,925.64	\$ 5,335.00
91733	16	\$ 12,286,365.00	\$ 82,155.96	7	\$ 11,080,120.84	\$ 1,098,550.19	9	\$ 1,206,244.25	\$ 22,440.13
91737	8	\$ 1,478,472.25	\$ 57,238.75	8	\$ 1,478,472.23	\$ 57,238.75	0	\$ -	\$ -
91739	1	\$ 8,200.00	\$ 8,200.00	0	\$ -	\$ -	1	\$ 8,200.00	\$ 8,200.00
91740	27	\$ 23,264,528.00	\$ 104,953.75	20	\$ 18,619,647.54	\$ 157,234.19	7	\$ 4,644,880.50	\$ 32,092.85
91741	2	\$ 338,924.16	\$ 169,462.08	2	\$ 338,924.16	\$ 169,462.08	0	\$ -	\$ -
91744	7	\$ 3,355,120.50	\$ 84,501.80	3	\$ 292,618.36	\$ 120,114.04	4	\$ 3,062,502.25	\$ 52,047.90
91745	9	\$ 438,230.03	\$ 30,672.60	3	\$ 78,004.70	\$ 27,631.60	6	\$ 360,225.34	\$ 31,725.30
91746	14	\$ 4,528,207.50	\$ 116,785.99	3	\$ 955,100.67	\$ 435,977.96	11	\$ 3,573,106.75	\$ 94,379.00
91748	4	\$ 35,099.97	\$ 6,399.99	0	\$ -	\$ -	4	\$ 35,099.97	\$ 6,399.98
91750	12	\$ 1,489,649.50	\$ 62,647.78	11	\$ 1,132,832.57	\$ 47,694.23	1	\$ 356,816.94	\$ 356,816.94
91752	9	\$ 1,522,825.50	\$ 65,517.00	0	\$ -	\$ -	9	\$ 1,522,825.50	\$ 65,517.00
91754	10	\$ 3,219,594.25	\$ 378,579.64	6	\$ 1,625,189.83	\$ 177,841.03	4	\$ 1,594,404.50	\$ 458,157.47
91761	12	\$ 3,067,618.75	\$ 150,740.97	7	\$ 2,578,291.15	\$ 204,619.10	5	\$ 489,327.66	\$ 139,991.53
91762	6	\$ 1,967,680.25	\$ 215,584.87	3	\$ 1,428,682.53	\$ 510,960.46	3	\$ 538,997.75	\$ 170,005.72



All				Business Enterprise			Non-Business Enterprise		
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91763	4	\$ 4,575,070.00	\$ 1,084,987.17	4	\$ 4,575,069.87	\$ 1,084,987.17	0	\$ -	\$ -
91765	18	\$ 3,552,777.00	\$ 45,908.45	17	\$ 3,552,356.07	\$ 47,748.70	1	\$ 421.02	\$ 421.02
91766	4	\$ 1,677,783.88	\$ 218,308.83	3	\$ 1,609,793.85	\$ 368,627.66	1	\$ 67,990.00	\$ 67,990.00
91768	13	\$ 31,966,148.00	\$ 429,370.93	13	\$ 31,966,147.01	\$ 429,370.93	0	\$ -	\$ -
91769	2	\$ 23,456.75	\$ 11,728.38	1	\$ 4,043.70	\$ 4,043.70	1	\$ 19,413.05	\$ 19,413.05
91773	19	\$ 3,875,635.25	\$ 79,999.42	16	\$ 3,359,405.24	\$ 71,824.71	3	\$ 516,230.00	\$ 110,900.00
91784	4	\$ 562,808.50	\$ 144,981.75	4	\$ 562,808.50	\$ 144,981.75	0	\$ -	\$ -
91786	9	\$ 1,567,609.63	\$ 52,300.00	4	\$ 614,800.32	\$ 51,652.16	5	\$ 952,809.31	\$ 52,300.00
91788	2	\$ 187,575.19	\$ 93,787.59	2	\$ 187,575.18	\$ 93,787.59	0	\$ -	\$ -
91789	10	\$ 96,111,640.00	\$ 386,613.14	9	\$ 96,096,221.19	\$ 520,119.00	1	\$ 15,420.00	\$ 15,420.00
91790	6	\$ 108,852.00	\$ 13,578.00	0	\$ -	\$ -	6	\$ 108,852.00	\$ 13,578.00
91792	4	\$ 10,867,013.00	\$ 2,540,702.50	0	\$ -	\$ -	4	\$ 10,867,013.00	\$ 2,540,702.50
91793	1	\$ 634,804.63	\$ 634,804.60	0	\$ -	\$ -	1	\$ 634,804.63	\$ 634,804.63
91801	16	\$ 6,123,166.50	\$ 162,760.52	9	\$ 2,231,957.15	\$ 205,400.18	7	\$ 3,891,209.25	\$ 118,779.25
91803	12	\$ 7,343,860.00	\$ 427,917.05	11	\$ 7,275,265.52	\$ 461,277.54	1	\$ 68,594.50	\$ 68,594.50
91902	1	\$ 24,285.80	\$ 24,285.80	0	\$ -	\$ -	1	\$ 24,285.80	\$ 24,285.80
91910	3	\$ 714,102.00	\$ 285,091.13	3	\$ 714,101.99	\$ 285,091.13	0	\$ -	\$ -
91915	5	\$ 22,082,362.00	\$ 289,506.02	3	\$ 21,730,209.37	\$ 10,625,946.79	2	\$ 352,153.28	\$ 176,076.64
91941	4	\$ 104,652.52	\$ 23,875.00	4	\$ 104,652.52	\$ 23,875.00	0	\$ -	\$ -
91978	2	\$ 4,147.00	\$ 2,073.50	0	\$ -	\$ -	2	\$ 4,147.00	\$ 2,073.50
92008	6	\$ 413,296.50	\$ 15,538.75	6	\$ 413,296.50	\$ 15,538.75	0	\$ -	\$ -
92009	13	\$ 710,763.25	\$ 54,060.00	7	\$ 354,755.19	\$ 54,060.00	6	\$ 356,008.06	\$ 43,912.50
92020	1	\$ 450,346.00	\$ 450,346.00	1	\$ 450,346.00	\$ 450,346.00	0	\$ -	\$ -





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92021	1	\$ 4,800.00	\$ 4,800.00	0	\$ -	\$ -	1	\$ 4,800.00	\$ 4,800.00
92024	9	\$ 2,102,558.75	\$ 54,740.00	5	\$ 2,062,008.69	\$ 74,104.13	4	\$ 40,550.00	\$ 8,975.00
92028	1	\$ 150,441.50	\$ 150,441.50	1	\$ 150,441.50	\$ 150,441.50	0	\$ -	\$ -
92029	8	\$ 333,621.78	\$ 25,258.74	3	\$ 90,500.83	\$ 23,770.93	5	\$ 243,120.95	\$ 26,746.54
92054	4	\$ 685,602.31	\$ 203,910.33	4	\$ 685,602.33	\$ 203,910.33	0	\$ -	\$ -
92056	3	\$ 373,622.88	\$ 130,489.13	1	\$ 2,600.00	\$ 2,600.00	2	\$ 371,022.88	\$ 185,511.44
92064	7	\$ 573,313.31	\$ 49,305.79	3	\$ 81,433.29	\$ 29,972.50	4	\$ 491,880.00	\$ 119,368.90
92069	1	\$ 74,059.10	\$ 74,059.10	1	\$ 74,059.10	\$ 74,059.10	0	\$ -	\$ -
92071	3	\$ 6,922,304.00	\$ 587,613.50	0	\$ -	\$ -	3	\$ 6,922,304.00	\$ 587,613.50
92075	2	\$ 82,075.00	\$ 41,037.50	2	\$ 82,075.00	\$ 41,037.50	0	\$ -	\$ -
92078	4	\$ 425,509.34	\$ 40,810.92	2	\$ 46,752.56	\$ 23,376.28	2	\$ 378,756.78	\$ 189,378.39
92079	1	\$ 153,077.30	\$ 153,077.29	1	\$ 153,077.29	\$ 153,077.29	0	\$ -	\$ -
92081	6	\$ 2,917,644.00	\$ 304,858.18	5	\$ 1,649,362.94	\$ 255,498.44	1	\$ 1,268,281.00	\$ 1,268,281.00
92101	5	\$ 7,142,372.50	\$ 879,787.00	0	\$ -	\$ -	5	\$ 7,142,372.50	\$ 879,787.00
92104	4	\$ 78,767.23	\$ 19,367.29	4	\$ 78,767.23	\$ 19,367.29	0	\$ -	\$ -
92105	2	\$ 3,075.00	\$ 1,537.50	2	\$ 3,075.00	\$ 1,537.50	0	\$ -	\$ -
92107	10	\$ 805,546.25	\$ 43,626.25	4	\$ 366,614.77	\$ 57,494.25	6	\$ 438,931.50	\$ 37,716.00
92108	4	\$ 153,129.00	\$ 35,814.50	4	\$ 153,129.00	\$ 35,814.50	0	\$ -	\$ -
92109	2	\$ 37,622.66	\$ 18,811.33	2	\$ 37,622.66	\$ 18,811.33	0	\$ -	\$ -
92111	4	\$ 132,811.20	\$ 14,148.42	2	\$ 26,621.72	\$ 13,310.86	2	\$ 106,189.48	\$ 53,094.74
92115	3	\$ 1,062,357.50	\$ 217,827.95	3	\$ 1,062,357.47	\$ 217,827.95	0	\$ -	\$ -
92116	1	\$ 10,858.33	\$ 10,858.33	1	\$ 10,858.33	\$ 10,858.33	0	\$ -	\$ -
92120	2	\$ 961,795.06	\$ 480,897.53	2	\$ 961,795.06	\$ 480,897.53	0	\$ -	\$ -



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92121	11	\$ 3,624,653.75	\$ 25,297.72	8	\$ 3,586,523.63	\$ 45,595.82	3	\$ 38,130.02	\$ 8,659.75
92123	19	\$ 78,790,696.00	\$ 134,686.69	2	\$ 397,001.71	\$ 198,500.86	17	\$ 78,393,696.00	\$ 94,698.78
92126	6	\$ 112,776,288.00	\$ 6,174,695.86	1	\$ 84,945.08	\$ 84,945.08	5	\$ 112,691,344.00	\$ 12,254,625.00
92131	7	\$ 235,628.09	\$ 30,784.00	7	\$ 235,628.10	\$ 30,784.00	0	\$ -	\$ -
92253	2	\$ 8,017.50	\$ 4,008.75	2	\$ 8,017.50	\$ 4,008.75	0	\$ -	\$ -
92307	1	\$ 27,010.50	\$ 27,010.50	1	\$ 27,010.50	\$ 27,010.50	0	\$ -	\$ -
92308	2	\$ 593,205.00	\$ 296,602.50	2	\$ 593,205.00	\$ 296,602.50	0	\$ -	\$ -
92313	8	\$ 957,422.50	\$ 102,319.00	2	\$ 204,638.00	\$ 102,319.00	6	\$ 752,784.50	\$ 105,794.66
92316	5	\$ 2,402,629.75	\$ 88,030.00	1	\$ 12,618.69	\$ 12,618.69	4	\$ 2,390,011.00	\$ 282,931.59
92320	1	\$ 384,029.91	\$ 384,029.90	1	\$ 384,029.90	\$ 384,029.90	0	\$ -	\$ -
92324	16	\$ 2,778,302.50	\$ 76,793.13	7	\$ 1,640,358.44	\$ 32,468.46	9	\$ 1,137,944.00	\$ 82,920.00
92331	3	\$ 572,191.94	\$ 99,241.68	0	\$ -	\$ -	3	\$ 572,191.94	\$ 99,241.68
92335	11	\$ 1,285,981.88	\$ 19,548.63	8	\$ 1,242,896.48	\$ 58,444.85	3	\$ 43,085.41	\$ 12,337.86
92336	3	\$ 78,865.03	\$ 17,185.05	2	\$ 66,682.55	\$ 33,341.28	1	\$ 12,182.48	\$ 12,182.48
92337	8	\$ 5,185,346.00	\$ 221,365.91	0	\$ -	\$ -	8	\$ 5,185,346.00	\$ 221,365.91
92346	2	\$ 400,463.59	\$ 200,231.80	0	\$ -	\$ -	2	\$ 400,463.59	\$ 200,231.80
92373	4	\$ 341,917.50	\$ 26,491.75	3	\$ 339,487.50	\$ 46,416.00	1	\$ 2,430.00	\$ 2,430.00
92375	4	\$ 14,961,508.00	\$ 3,482,168.45	4	\$ 14,961,508.23	\$ 3,482,168.45	0	\$ -	\$ -
92377	4	\$ 519,905.25	\$ 83,247.35	4	\$ 519,905.24	\$ 83,247.35	0	\$ -	\$ -
92392	6	\$ 713,206.00	\$ 93,760.50	6	\$ 713,206.00	\$ 93,760.50	0	\$ -	\$ -
92399	7	\$ 991,946.13	\$ 102,329.07	5	\$ 574,895.13	\$ 102,329.07	2	\$ 417,051.00	\$ 208,525.50
92402	3	\$ 201,360.28	\$ 50,033.33	0	\$ -	\$ -	3	\$ 201,360.28	\$ 50,033.33
92408	1	\$ 431,013.66	\$ 431,013.65	0	\$ -	\$ -	1	\$ 431,013.66	\$ 431,013.66



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92415	1	\$ 163,567.59	\$ 163,567.60	0	\$ -	\$ -	1	\$ 163,567.59	\$ 163,567.59
92501	5	\$ 208,255.22	\$ 23,662.12	2	\$ 148,783.72	\$ 74,391.86	3	\$ 59,471.50	\$ 5,920.00
92503	6	\$ 7,563,157.50	\$ 79,828.75	6	\$ 7,563,157.28	\$ 79,828.75	0	\$ -	\$ -
92504	1	\$ 239,592.50	\$ 239,592.50	1	\$ 239,592.50	\$ 239,592.50	0	\$ -	\$ -
92505	3	\$ 1,238,824.63	\$ 159,774.03	0	\$ -	\$ -	3	\$ 1,238,824.63	\$ 159,774.03
92506	2	\$ 2,360.00	\$ 1,180.00	0	\$ -	\$ -	2	\$ 2,360.00	\$ 1,180.00
92507	8	\$ 9,724,724.00	\$ 513,119.51	6	\$ 9,660,316.03	\$ 768,725.81	2	\$ 64,407.50	\$ 32,203.75
92508	7	\$ 5,112,243.50	\$ 295,826.72	5	\$ 3,923,966.43	\$ 32,563.32	2	\$ 1,188,276.88	\$ 594,138.44
92509	9	\$ 37,549,980.00	\$ 71,240.85	5	\$ 1,420,445.52	\$ 71,240.85	4	\$ 36,129,536.00	\$ 4,637,628.50
92530	3	\$ 33,059.66	\$ 5,398.90	0	\$ -	\$ -	3	\$ 33,059.66	\$ 5,398.90
92532	5	\$ 593,378.63	\$ 30,500.00	3	\$ 66,948.61	\$ 19,373.61	2	\$ 526,430.00	\$ 263,215.00
92544	3	\$ 8,789,631.00	\$ 2,615,294.37	3	\$ 8,789,630.75	\$ 2,615,294.37	0	\$ -	\$ -
92553	3	\$ 892,223.69	\$ 241,261.74	3	\$ 892,223.68	\$ 241,261.74	0	\$ -	\$ -
92555	1	\$ 31,184.00	\$ 31,184.00	1	\$ 31,184.00	\$ 31,184.00	0	\$ -	\$ -
92563	7	\$ 1,325,040.00	\$ 62,955.00	5	\$ 439,608.00	\$ 62,955.00	2	\$ 885,431.94	\$ 442,715.97
92564	1	\$ 42,783.99	\$ 42,783.99	0	\$ -	\$ -	1	\$ 42,783.99	\$ 42,783.99
92570	16	\$ 3,346,746.75	\$ 92,555.79	8	\$ 2,889,653.05	\$ 179,438.72	8	\$ 457,093.78	\$ 38,042.00
92571	4	\$ 19,614,200.00	\$ 340,168.71	0	\$ -	\$ -	4	\$ 19,614,200.00	\$ 340,168.72
92590	3	\$ 237,422.55	\$ 70,490.00	3	\$ 237,422.54	\$ 70,490.00	0	\$ -	\$ -
92592	3	\$ 347,281.00	\$ 129,244.09	2	\$ 301,344.99	\$ 150,672.50	1	\$ 45,936.00	\$ 45,936.00
92595	3	\$ 151,760.00	\$ 9,960.00	0	\$ -	\$ -	3	\$ 151,760.00	\$ 9,960.00
92596	3	\$ 418,703.47	\$ 20,630.15	0	\$ -	\$ -	3	\$ 418,703.47	\$ 20,630.15
92604	1	\$ 39,857.00	\$ 39,857.00	1	\$ 39,857.00	\$ 39,857.00	0	\$ -	\$ -



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92606	28	\$ 35,040,276.00	\$ 242,014.67	22	\$ 14,435,479.73	\$ 158,662.31	6	\$ 20,604,798.00	\$ 791,143.13
92610	8	\$ 294,975.50	\$ 23,095.82	5	\$ 271,514.64	\$ 51,877.00	3	\$ 23,460.87	\$ 6,900.33
92612	21	\$ 20,765,936.00	\$ 255,721.62	9	\$ 2,585,677.20	\$ 219,841.30	12	\$ 18,180,258.00	\$ 295,987.66
92614	17	\$ 1,597,160.63	\$ 45,256.49	13	\$ 1,437,662.42	\$ 65,907.91	4	\$ 159,498.25	\$ 33,328.47
92618	53	\$ 111,537,712.00	\$ 197,911.70	27	\$ 39,350,940.67	\$ 197,911.70	26	\$ 72,186,768.00	\$ 207,158.75
92620	6	\$ 1,217,974.50	\$ 239,089.00	6	\$ 1,217,974.50	\$ 239,089.00	0	\$ -	\$ -
92625	3	\$ 1,721,159.13	\$ 244,885.45	0	\$ -	\$ -	3	\$ 1,721,159.13	\$ 244,885.45
92626	10	\$ 1,078,529.63	\$ 8,979.25	2	\$ 9,330.57	\$ 4,665.29	8	\$ 1,069,199.00	\$ 32,513.75
92627	1	\$ 39,352.00	\$ 39,352.00	1	\$ 39,352.00	\$ 39,352.00	0	\$ -	\$ -
92629	3	\$ 55,616.21	\$ 19,662.50	0	\$ -	\$ -	3	\$ 55,616.21	\$ 19,662.50
92630	15	\$ 11,201,499.00	\$ 63,952.50	5	\$ 265,320.40	\$ 18,255.60	10	\$ 10,936,179.00	\$ 142,260.00
92647	15	\$ 8,973,971.00	\$ 325,762.50	12	\$ 6,737,638.79	\$ 350,591.25	3	\$ 2,236,332.00	\$ 134,640.00
92648	10	\$ 3,601,118.00	\$ 96,604.95	5	\$ 3,537,440.96	\$ 634,347.50	5	\$ 63,677.00	\$ 4,674.00
92649	10	\$ 5,863,813.50	\$ 68,336.75	3	\$ 98,760.50	\$ 9,730.00	7	\$ 5,765,053.00	\$ 153,473.00
92653	9	\$ 398,715.00	\$ 48,240.00	4	\$ 267,446.00	\$ 49,797.66	5	\$ 131,269.00	\$ 11,400.00
92658	2	\$ 37,018.75	\$ 18,509.38	0	\$ -	\$ -	2	\$ 37,018.75	\$ 18,509.38
92660	18	\$ 11,097,860.00	\$ 331,923.33	7	\$ 1,231,628.32	\$ 137,054.94	11	\$ 9,866,232.00	\$ 1,030,252.56
92672	2	\$ 10,413.18	\$ 5,206.59	0	\$ -	\$ -	2	\$ 10,413.18	\$ 5,206.59
92673	1	\$ 6,160.78	\$ 6,160.78	0	\$ -	\$ -	1	\$ 6,160.78	\$ 6,160.78
92675	15	\$ 1,444,397.88	\$ 14,106.85	7	\$ 89,991.88	\$ 9,800.00	8	\$ 1,354,406.00	\$ 55,980.00
92679	3	\$ 94,494.00	\$ 26,403.00	2	\$ 38,940.00	\$ 19,470.00	1	\$ 55,554.00	\$ 55,554.00
92683	7	\$ 774,917.50	\$ 60,560.00	3	\$ 500,507.50	\$ 184,277.50	4	\$ 274,410.00	\$ 52,100.00
92688	11	\$ 317,641.97	\$ 6,600.00	1	\$ 161,284.00	\$ 161,284.00	10	\$ 156,357.97	\$ 5,940.00



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92691	3	\$ 14,519.08	\$ 6,367.23	3	\$ 14,519.08	\$ 6,367.23	0	\$ -	\$ -
92692	3	\$ 550,515.00	\$ 127,554.75	3	\$ 550,515.00	\$ 127,554.75	0	\$ -	\$ -
92694	2	\$ 1,664,523.38	\$ 832,261.71	2	\$ 1,664,523.42	\$ 832,261.71	0	\$ -	\$ -
92701	2	\$ 125,301.90	\$ 62,650.95	2	\$ 125,301.90	\$ 62,650.95	0	\$ -	\$ -
92703	3	\$ 384,154.66	\$ 133,487.60	0	\$ -	\$ -	3	\$ 384,154.66	\$ 133,487.59
92704	3	\$ 507,286.47	\$ 178,319.50	0	\$ -	\$ -	3	\$ 507,286.47	\$ 178,319.50
92705	35	\$ 7,683,105.00	\$ 122,779.00	23	\$ 6,769,747.92	\$ 168,275.82	12	\$ 913,356.94	\$ 67,223.42
92706	5	\$ 270,788.00	\$ 36,074.00	4	\$ 254,288.00	\$ 60,197.00	1	\$ 16,500.00	\$ 16,500.00
92707	5	\$ 485,576.84	\$ 24,613.55	4	\$ 418,007.50	\$ 22,183.28	1	\$ 67,569.35	\$ 67,569.35
92708	12	\$ 22,396,824.00	\$ 357,229.59	7	\$ 19,664,756.36	\$ 293,814.17	5	\$ 2,732,067.25	\$ 420,645.00
92711	2	\$ 102,117.52	\$ 51,058.76	0	\$ -	\$ -	2	\$ 102,117.52	\$ 51,058.76
92780	23	\$ 31,520,522.00	\$ 249,790.00	18	\$ 25,368,036.19	\$ 238,963.50	5	\$ 6,152,486.00	\$ 249,790.00
92801	8	\$ 6,787,449.00	\$ 708,234.27	4	\$ 3,215,670.76	\$ 708,234.27	4	\$ 3,571,778.25	\$ 700,286.50
92802	7	\$ 52,549,080.00	\$ 6,880,291.29	0	\$ -	\$ -	7	\$ 52,549,080.00	\$ 6,880,291.50
92804	1	\$ 9,585.50	\$ 9,585.50	1	\$ 9,585.50	\$ 9,585.50	0	\$ -	\$ -
92805	26	\$ 15,674,049.00	\$ 63,730.49	15	\$ 14,578,614.65	\$ 351,556.68	11	\$ 1,095,434.50	\$ 11,965.09
92806	31	\$ 8,884,698.00	\$ 63,072.43	17	\$ 7,184,367.15	\$ 93,635.91	14	\$ 1,700,330.63	\$ 60,875.83
92807	8	\$ 5,049,059.50	\$ 120,602.26	2	\$ 73,218.74	\$ 36,609.37	6	\$ 4,975,841.00	\$ 244,009.44
92808	1	\$ 31,099.00	\$ 31,099.00	0	\$ -	\$ -	1	\$ 31,099.00	\$ 31,099.00
92809	2	\$ 94,846.50	\$ 47,423.25	2	\$ 94,846.50	\$ 47,423.25	0	\$ -	\$ -
92812	3	\$ 160,869.38	\$ 41,048.73	1	\$ 7,060.37	\$ 7,060.37	2	\$ 153,809.00	\$ 76,904.50
92816	2	\$ 2,177,536.00	\$ 1,088,768.00	2	\$ 2,177,536.00	\$ 1,088,768.00	0	\$ -	\$ -
92817	1	\$ 72,325.00	\$ 72,325.00	1	\$ 72,325.00	\$ 72,325.00	0	\$ -	\$ -



All				Business Enterprise			Non-Business Enterprise		
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92821	53	\$ 170,017,312.00	\$ 573,782.00	22	\$ 43,578,941.13	\$ 402,343.35	31	\$ 126,438,368.00	\$ 848,200.88
92822	2	\$ 374,110.72	\$ 187,055.37	0	\$ -	\$ -	2	\$ 374,110.72	\$ 187,055.36
92831	1	\$ 637.18	\$ 637.18	0	\$ -	\$ -	1	\$ 637.18	\$ 637.18
92832	17	\$ 62,320,876.00	\$ 760,520.13	14	\$ 61,139,123.30	\$ 975,416.54	3	\$ 1,181,754.38	\$ 240,052.47
92833	4	\$ 536,932.50	\$ 104,597.67	4	\$ 536,932.48	\$ 104,597.67	0	\$ -	\$ -
92835	1	\$ 3,362.22	\$ 3,362.22	1	\$ 3,362.22	\$ 3,362.22	0	\$ -	\$ -
92841	12	\$ 30,870,232.00	\$ 449,363.32	3	\$ 250,048.85	\$ 82,953.93	9	\$ 30,620,184.00	\$ 1,499,326.63
92844	1	\$ 34,417.58	\$ 34,417.58	0	\$ -	\$ -	1	\$ 34,417.58	\$ 34,417.58
92860	4	\$ 53,943.50	\$ 3,572.55	0	\$ -	\$ -	4	\$ 53,943.50	\$ 3,572.55
92861	2	\$ 100,000.00	\$ 50,000.00	0	\$ -	\$ -	2	\$ 100,000.00	\$ 50,000.00
92863	9	\$ 3,019,336.00	\$ 228,981.00	5	\$ 453,833.70	\$ (0.71)	4	\$ 2,565,502.25	\$ 750,181.75
92865	33	\$ 41,260,580.00	\$ 120,314.66	12	\$ 16,103,539.76	\$ 46,248.75	21	\$ 25,157,040.00	\$ 131,550.00
92866	2	\$ 17,750.00	\$ 8,875.00	0	\$ -	\$ -	2	\$ 17,750.00	\$ 8,875.00
92867	23	\$ 13,303,912.00	\$ 35,600.63	10	\$ 942,767.78	\$ 28,802.88	13	\$ 12,361,144.00	\$ 135,887.95
92868	35	\$ 19,960,338.00	\$ 137,073.05	18	\$ 8,247,483.34	\$ 294,588.31	17	\$ 11,712,855.00	\$ 69,805.00
92869	5	\$ 1,887,360.88	\$ 281,172.41	4	\$ 1,014,926.67	\$ 252,458.21	1	\$ 872,434.19	\$ 872,434.19
92870	11	\$ 3,940,531.00	\$ 59,888.00	4	\$ 202,846.17	\$ 32,599.78	7	\$ 3,737,684.75	\$ 328,577.81
92878	10	\$ 6,149,487.50	\$ 221,931.12	1	\$ 4,726.32	\$ 4,726.32	9	\$ 6,144,761.00	\$ 322,307.25
92879	7	\$ 748,992.00	\$ 98,725.00	7	\$ 748,992.00	\$ 98,725.00	0	\$ -	\$ -
92880	25	\$ 47,752,004.00	\$ 52,941.23	19	\$ 47,397,530.64	\$ 186,432.00	6	\$ 354,473.59	\$ 27,414.35
92881	2	\$ 19,039.13	\$ 9,519.57	2	\$ 19,039.13	\$ 9,519.57	0	\$ -	\$ -
92882	13	\$ 2,044,699.25	\$ 71,590.62	2	\$ 12,621.20	\$ 6,310.60	11	\$ 2,032,078.00	\$ 100,898.77
92883	8	\$ 1,480,529.75	\$ 27,963.69	7	\$ 1,447,917.78	\$ 23,315.38	1	\$ 32,612.00	\$ 32,612.00



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92886	3	\$ 42,301.20	\$ 13,267.56	3	\$ 42,301.20	\$ 13,267.56	0	\$ -	\$ -
92887	2	\$ 2,058,930.63	\$ 1,029,465.33	2	\$ 2,058,930.65	\$ 1,029,465.33	0	\$ -	\$ -
93001	3	\$ 38,090.00	\$ 12,660.00	0	\$ -	\$ -	3	\$ 38,090.00	\$ 12,660.00
93003	13	\$ 9,285,465.00	\$ 99,055.09	5	\$ 2,289,661.13	\$ 116,690.00	8	\$ 6,995,804.00	\$ 89,083.13
93010	1	\$ 5,500.00	\$ 5,500.00	1	\$ 5,500.00	\$ 5,500.00	0	\$ -	\$ -
93012	13	\$ 6,669,585.50	\$ 204,682.00	4	\$ 535,310.00	\$ 115,127.00	9	\$ 6,134,275.50	\$ 370,073.00
93013	1	\$ 20,758.24	\$ 20,758.24	1	\$ 20,758.24	\$ 20,758.24	0	\$ -	\$ -
93015	1	\$ 120,018.00	\$ 120,018.00	0	\$ -	\$ -	1	\$ 120,018.00	\$ 120,018.00
93021	4	\$ 3,747,458.25	\$ 402,221.40	2	\$ 3,356,170.33	\$ 1,678,085.17	2	\$ 391,288.00	\$ 195,644.00
93022	8	\$ 9,093,532.00	\$ 932,568.67	5	\$ 7,824,846.59	\$ 1,395,190.69	3	\$ 1,268,685.25	\$ 128,425.55
93030	8	\$ 35,800,528.00	\$ 2,554,543.99	3	\$ 11,788,997.47	\$ 2,756,217.17	5	\$ 24,011,530.00	\$ 2,352,870.75
93036	2	\$ 41,900.00	\$ 20,950.00	2	\$ 41,900.00	\$ 20,950.00	0	\$ -	\$ -
93060	1	\$ 17,101.83	\$ 17,101.83	0	\$ -	\$ -	1	\$ 17,101.83	\$ 17,101.83
93063	3	\$ 61,797.50	\$ 7,560.00	3	\$ 61,797.50	\$ 7,560.00	0	\$ -	\$ -
93065	2	\$ 41,881.45	\$ 20,940.73	2	\$ 41,881.45	\$ 20,940.73	0	\$ -	\$ -
93105	1	\$ 34,519.49	\$ 34,519.49	0	\$ -	\$ -	1	\$ 34,519.49	\$ 34,519.49
93108	3	\$ 84,358.15	\$ 29,482.04	2	\$ 70,656.85	\$ 35,328.43	1	\$ 13,701.30	\$ 13,701.30
93212	4	\$ 3,485,150.25	\$ 338,458.51	1	\$ 222,491.76	\$ 222,491.76	3	\$ 3,262,658.50	\$ 454,425.25
93245	1	\$ 29,085.00	\$ 29,085.00	1	\$ 29,085.00	\$ 29,085.00	0	\$ -	\$ -
93263	3	\$ 9,465,840.00	\$ 926,815.23	0	\$ -	\$ -	3	\$ 9,465,840.00	\$ 926,815.25
93291	6	\$ 1,159,252.63	\$ 136,267.00	5	\$ 503,069.68	\$ 90,664.03	1	\$ 656,183.00	\$ 656,183.00
93308	3	\$ 214,182.14	\$ 82,987.67	3	\$ 214,182.14	\$ 82,987.67	0	\$ -	\$ -
93309	1	\$ 4,800.00	\$ 4,800.00	1	\$ 4,800.00	\$ 4,800.00	0	\$ -	\$ -





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93312	6	\$ 1,298,363.00	\$ 262,556.50	0	\$ -	\$ -	6	\$ 1,298,363.00	\$ 262,556.50
93313	5	\$ 165,012.86	\$ 35,899.60	0	\$ -	\$ -	5	\$ 165,012.86	\$ 35,899.60
93314	3	\$ 988,546.19	\$ 296,395.68	0	\$ -	\$ -	3	\$ 988,546.19	\$ 296,395.69
93380	3	\$ 271,944.63	\$ 79,129.30	0	\$ -	\$ -	3	\$ 271,944.63	\$ 79,129.30
93401	1	\$ 6,492.99	\$ 6,492.99	0	\$ -	\$ -	1	\$ 6,492.99	\$ 6,492.99
93438	5	\$ 390,960.00	\$ 69,795.00	0	\$ -	\$ -	5	\$ 390,960.00	\$ 69,795.00
93455	3	\$ 473,887.22	\$ 183,437.50	0	\$ -	\$ -	3	\$ 473,887.22	\$ 183,437.50
93510	4	\$ 365,325.06	\$ 14,073.75	4	\$ 365,325.06	\$ 14,073.75	0	\$ -	\$ -
93535	4	\$ 25,594,850.00	\$ 5,412,397.40	4	\$ 25,594,849.69	\$ 5,412,397.40	0	\$ -	\$ -
93536	3	\$ 825,365.00	\$ 111,534.38	3	\$ 825,364.97	\$ 111,534.38	0	\$ -	\$ -
93539	3	\$ 3,223,869.75	\$ 988,138.92	3	\$ 3,223,869.82	\$ 988,138.92	0	\$ -	\$ -
93551	5	\$ 1,752,921.13	\$ 416,914.36	4	\$ 1,721,916.10	\$ 447,211.37	1	\$ 31,005.00	\$ 31,005.00
93552	1	\$ 34,901.00	\$ 34,901.00	1	\$ 34,901.00	\$ 34,901.00	0	\$ -	\$ -
93611	1	\$ 1,500.00	\$ 1,500.00	0	\$ -	\$ -	1	\$ 1,500.00	\$ 1,500.00
93720	2	\$ 134,248.77	\$ 67,124.39	0	\$ -	\$ -	2	\$ 134,248.77	\$ 67,124.38
93725	6	\$ 155,980.31	\$ 8,957.55	4	\$ 94,149.88	\$ 7,362.33	2	\$ 61,830.43	\$ 30,915.21
93901	2	\$ 5,000.00	\$ 2,500.00	0	\$ -	\$ -	2	\$ 5,000.00	\$ 2,500.00
93933	2	\$ 14,993.00	\$ 7,496.50	0	\$ -	\$ -	2	\$ 14,993.00	\$ 7,496.50
94028	2	\$ 39,500.00	\$ 19,750.00	2	\$ 39,500.00	\$ 19,750.00	0	\$ -	\$ -
94080	4	\$ 1,952,157.25	\$ 302,225.33	0	\$ -	\$ -	4	\$ 1,952,157.25	\$ 302,225.34
94103	1	\$ 28,500.00	\$ 28,500.00	0	\$ -	\$ -	1	\$ 28,500.00	\$ 28,500.00
94104	12	\$ 21,328,508.00	\$ 1,583,537.04	1	\$ 36,632.50	\$ 36,632.50	11	\$ 21,291,876.00	\$ 2,043,157.38
94105	18	\$ 3,856,580.00	\$ 109,998.12	1	\$ 23,887.50	\$ 23,887.50	17	\$ 3,832,692.50	\$ 118,298.74



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94107	1	\$ 18,448.26	\$ 18,448.26	1	\$ 18,448.26	\$ 18,448.26	0	\$ -	\$ -
94108	13	\$ 3,685,717.25	\$ 145,390.50	7	\$ 1,681,218.18	\$ 145,390.50	6	\$ 2,004,499.00	\$ 203,976.14
94111	20	\$ 8,974,800.00	\$ 244,130.23	3	\$ 238,738.68	\$ 213.90	17	\$ 8,736,061.00	\$ 370,350.00
94114	3	\$ 444,885.00	\$ 137,605.00	0	\$ -	\$ -	3	\$ 444,885.00	\$ 137,605.00
94124	1	\$ 116,354.90	\$ 116,354.90	1	\$ 116,354.90	\$ 116,354.90	0	\$ -	\$ -
94160	2	\$ 11,183,711.00	\$ 5,591,855.40	0	\$ -	\$ -	2	\$ 11,183,711.00	\$ 5,591,855.50
94244	1	\$ 227,872.00	\$ 227,872.00	0	\$ -	\$ -	1	\$ 227,872.00	\$ 227,872.00
94501	4	\$ 1,006,583.88	\$ 286,219.57	2	\$ 434,144.72	\$ 217,072.36	2	\$ 572,439.13	\$ 286,219.56
94507	10	\$ 7,114,725.50	\$ 400,898.66	6	\$ 5,071,689.35	\$ 706,757.54	4	\$ 2,043,036.00	\$ 222,654.81
94509	2	\$ 491,437.56	\$ 245,718.78	0	\$ -	\$ -	2	\$ 491,437.56	\$ 245,718.78
94510	2	\$ 17,380.00	\$ 8,690.00	0	\$ -	\$ -	2	\$ 17,380.00	\$ 8,690.00
94520	6	\$ 14,938,688.00	\$ 144,957.47	0	\$ -	\$ -	6	\$ 14,938,688.00	\$ 144,957.47
94523	1	\$ 1,400.00	\$ 1,400.00	0	\$ -	\$ -	1	\$ 1,400.00	\$ 1,400.00
94531	6	\$ 3,951,525.75	\$ 257,554.98	6	\$ 3,951,525.81	\$ 257,554.98	0	\$ -	\$ -
94538	2	\$ 834,622.88	\$ 417,311.44	0	\$ -	\$ -	2	\$ 834,622.88	\$ 417,311.44
94544	1	\$ 425,241.50	\$ 425,241.51	1	\$ 425,241.51	\$ 425,241.51	0	\$ -	\$ -
94551	5	\$ 1,310,657.25	\$ 223,000.00	0	\$ -	\$ -	5	\$ 1,310,657.25	\$ 223,000.00
94560	3	\$ 3,007.33	\$ 1,187.01	0	\$ -	\$ -	3	\$ 3,007.33	\$ 1,187.01
94566	4	\$ 1,241,022.50	\$ 347,224.38	4	\$ 1,241,022.50	\$ 347,224.38	0	\$ -	\$ -
94578	2	\$ 147,074.89	\$ 73,537.45	0	\$ -	\$ -	2	\$ 147,074.89	\$ 73,537.45
94583	12	\$ 8,131,505.00	\$ 122,129.99	4	\$ 315,989.00	\$ 85,180.00	8	\$ 7,815,516.00	\$ 680,435.56
94596	6	\$ 1,417,944.38	\$ 223,461.22	6	\$ 1,417,944.41	\$ 223,461.22	0	\$ -	\$ -
94598	2	\$ 351,608.63	\$ 175,804.31	0	\$ -	\$ -	2	\$ 351,608.63	\$ 175,804.31



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94607	6	\$ 866,886.31	\$ 39,095.00	2	\$ 74,221.80	\$ 37,110.90	4	\$ 792,664.50	\$ 50,721.51
94608	9	\$ 3,065,109.00	\$ 214,177.30	4	\$ 2,250,011.16	\$ 479,542.95	5	\$ 815,097.81	\$ 72,434.00
94611	5	\$ 839,738.56	\$ 168,166.87	5	\$ 839,738.56	\$ 168,166.87	0	\$ -	\$ -
94612	5	\$ 152,865.50	\$ 33,088.50	3	\$ 59,474.00	\$ 5,633.00	2	\$ 93,391.50	\$ 46,695.75
94614	3	\$ 883,795.44	\$ 311,526.11	0	\$ -	\$ -	3	\$ 883,795.44	\$ 311,526.13
94703	3	\$ 525,480.38	\$ 225,384.58	3	\$ 525,480.38	\$ 225,384.58	0	\$ -	\$ -
94942	1	\$ 125,974.90	\$ 125,974.90	0	\$ -	\$ -	1	\$ 125,974.90	\$ 125,974.90
94945	3	\$ 54,613.60	\$ 16,592.70	0	\$ -	\$ -	3	\$ 54,613.60	\$ 16,592.70
94960	1	\$ 18,675.00	\$ 18,675.00	1	\$ 18,675.00	\$ 18,675.00	0	\$ -	\$ -
95051	3	\$ 1,879,932.75	\$ 14,097.00	0	\$ -	\$ -	3	\$ 1,879,932.75	\$ 14,097.00
95054	2	\$ 225,809.98	\$ 112,904.99	2	\$ 225,809.98	\$ 112,904.99	0	\$ -	\$ -
95076	4	\$ 8,640,907.00	\$ 1,706,409.36	0	\$ -	\$ -	4	\$ 8,640,907.00	\$ 1,706,409.38
95110	5	\$ 5,905,069.00	\$ 845,500.00	5	\$ 5,905,068.99	\$ 845,500.00	0	\$ -	\$ -
95112	2	\$ 3,511,071.50	\$ 1,755,535.73	0	\$ -	\$ -	2	\$ 3,511,071.50	\$ 1,755,535.75
95120	3	\$ 5,138,461.50	\$ 503,363.74	0	\$ -	\$ -	3	\$ 5,138,461.50	\$ 503,363.75
95126	3	\$ 259,371.30	\$ 58,345.00	1	\$ 1,150.00	\$ 1,150.00	2	\$ 258,221.30	\$ 129,110.65
95128	3	\$ 279,440.28	\$ 105,664.28	3	\$ 279,440.27	\$ 105,664.28	0	\$ -	\$ -
95134	4	\$ 669,058.19	\$ 153,952.26	0	\$ -	\$ -	4	\$ 669,058.19	\$ 153,952.27
95154	3	\$ 1,172,205.88	\$ 252,633.82	0	\$ -	\$ -	3	\$ 1,172,205.88	\$ 252,633.81
95206	2	\$ 735,326.38	\$ 367,663.18	2	\$ 735,326.35	\$ 367,663.18	0	\$ -	\$ -
95354	2	\$ 517,150.00	\$ 258,575.00	0	\$ -	\$ -	2	\$ 517,150.00	\$ 258,575.00
95405	2	\$ 9,978.50	\$ 4,989.25	0	\$ -	\$ -	2	\$ 9,978.50	\$ 4,989.25
95603	1	\$ 267,111.00	\$ 267,111.00	0	\$ -	\$ -	1	\$ 267,111.00	\$ 267,111.00



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95616	6	\$ 1,660,560.25	\$ 301,291.01	6	\$ 1,660,560.19	\$ 301,291.01	0	\$ -	\$ -
95620	2	\$ 82,645.27	\$ 41,322.64	0	\$ -	\$ -	2	\$ 82,645.27	\$ 41,322.64
95630	12	\$ 8,500,423.00	\$ 621,012.50	6	\$ 3,140,862.78	\$ 620,853.93	6	\$ 5,359,560.00	\$ 631,727.81
95652	1	\$ 20,066.74	\$ 20,066.74	0	\$ -	\$ -	1	\$ 20,066.74	\$ 20,066.74
95673	7	\$ 141,864.75	\$ 18,405.00	4	\$ 83,122.00	\$ 16,310.75	3	\$ 58,742.75	\$ 18,405.00
95678	9	\$ 6,403,963.50	\$ 298,453.10	5	\$ 5,989,050.16	\$ 1,454,882.50	4	\$ 414,913.19	\$ 104,457.73
95687	1	\$ 584,251.00	\$ 584,250.97	1	\$ 584,250.97	\$ 584,250.97	0	\$ -	\$ -
95713	2	\$ 1,938,493.13	\$ 969,246.59	0	\$ -	\$ -	2	\$ 1,938,493.13	\$ 969,246.56
95741	3	\$ 476,450.72	\$ 203,216.66	0	\$ -	\$ -	3	\$ 476,450.72	\$ 203,216.66
95742	1	\$ 332.33	\$ 332.33	0	\$ -	\$ -	1	\$ 332.33	\$ 332.33
95765	7	\$ 1,944,912.13	\$ 252,600.00	5	\$ 1,388,481.84	\$ 252,600.00	2	\$ 556,430.25	\$ 278,215.13
95814	21	\$ 2,573,369.00	\$ 66,177.50	0	\$ -	\$ -	21	\$ 2,573,369.00	\$ 66,177.50
95816	2	\$ 699,849.69	\$ 349,924.83	0	\$ -	\$ -	2	\$ 699,849.69	\$ 349,924.84
95820	5	\$ 14,243,609.00	\$ 1,951,753.86	0	\$ -	\$ -	5	\$ 14,243,609.00	\$ 1,951,753.88
95821	2	\$ 23,660.18	\$ 11,830.09	2	\$ 23,660.18	\$ 11,830.09	0	\$ -	\$ -
95825	3	\$ 817,394.44	\$ 281,224.48	0	\$ -	\$ -	3	\$ 817,394.44	\$ 281,224.47
95828	6	\$ 38,098,828.00	\$ 5,454,110.28	0	\$ -	\$ -	6	\$ 38,098,828.00	\$ 5,454,110.50
95831	3	\$ 1,179,712.63	\$ 292,735.39	3	\$ 1,179,712.60	\$ 292,735.39	0	\$ -	\$ -
95834	3	\$ 7,673,679.00	\$ 98,700.00	2	\$ 134,700.00	\$ 67,350.00	1	\$ 7,538,979.00	\$ 7,538,979.00
95838	4	\$ 348,536.38	\$ 47,226.86	0	\$ -	\$ -	4	\$ 348,536.38	\$ 47,226.86
95841	1	\$ 806.24	\$ 806.24	0	\$ -	\$ -	1	\$ 806.24	\$ 806.24
95973	1	\$ 230,465.00	\$ 230,465.00	1	\$ 230,465.00	\$ 230,465.00	0	\$ -	\$ -
97070	1	\$ 157,470.84	\$ 157,470.84	0	\$ -	\$ -	1	\$ 157,470.84	\$ 157,470.84



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Zip Code	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)	Vendors	Total Retained/ Earned (\$)	Median Retained/ Earned (\$)
97124	2	\$ 33,147.00	\$ 16,573.50	2	\$ 33,147.00	\$ 16,573.50	0	\$ -	\$ -
97201	6	\$ 691,723.50	\$ 122,076.26	0	\$ -	\$ -	6	\$ 691,723.50	\$ 122,076.26
97204	11	\$ 1,839,509.00	\$ 87,761.70	5	\$ 1,420,206.19	\$ 209,177.45	6	\$ 419,302.78	\$ 68,619.54
97222	1	\$ 9,793.35	\$ 9,793.35	0	\$ -	\$ -	1	\$ 9,793.35	\$ 9,793.35
97227	4	\$ 3,881,861.00	\$ 1,037,780.64	0	\$ -	\$ -	4	\$ 3,881,861.00	\$ 1,037,780.63
97229	1	\$ 230,478.31	\$ 230,478.32	0	\$ -	\$ -	1	\$ 230,478.31	\$ 230,478.31
97232	1	\$ 144,911.48	\$ 144,911.49	0	\$ -	\$ -	1	\$ 144,911.48	\$ 144,911.48
98001	12	\$ 52,541,120.00	\$ 644,463.51	0	\$ -	\$ -	12	\$ 52,541,120.00	\$ 644,463.50
98031	1	\$ 380,678.31	\$ 380,678.30	0	\$ -	\$ -	1	\$ 380,678.31	\$ 380,678.31
98052	3	\$ 3,575,996.75	\$ 950,923.96	0	\$ -	\$ -	3	\$ 3,575,996.75	\$ 950,923.94
98072	2	\$ 181,961.20	\$ 90,980.61	0	\$ -	\$ -	2	\$ 181,961.20	\$ 90,980.60
98101	1	\$ 31,521.25	\$ 31,521.25	1	\$ 31,521.25	\$ 31,521.25	0	\$ -	\$ -
98108	2	\$ 200,982.67	\$ 100,491.34	0	\$ -	\$ -	2	\$ 200,982.67	\$ 100,491.34
98116	6	\$ 232,195.91	\$ 12,847.13	1	\$ 65,725.00	\$ 65,725.00	5	\$ 166,470.91	\$ 2,368.00
98119	1	\$ 43,460.00	\$ 43,460.00	0	\$ -	\$ -	1	\$ 43,460.00	\$ 43,460.00
98133	1	\$ 9,274.65	\$ 9,274.65	0	\$ -	\$ -	1	\$ 9,274.65	\$ 9,274.65
98201	6	\$ 34,953,384.00	\$ 2,530,379.33	0	\$ -	\$ -	6	\$ 34,953,384.00	\$ 2,530,379.25
99999	1	\$ 873,026.19	\$ 873,026.16	0	\$ -	\$ -	1	\$ 873,026.19	\$ 873,026.19



**Appendix Table 4: Summarized Procurement Data by Vendor Type**

	LA County	LAX*	VNY*
ALL	Total Retained/Earned (\$)	\$5,955,004,142.54	\$ 4,775,112,136.20
	Total Vendors	2,335	1,206
	Top Median	\$5,412,397.40	\$ 1,261,149.20
	Lowest Median	\$200.00	\$1,806.52
PRIMES	Prime Retained/Earned (\$)	\$4,762,083,859.95	\$4,214,831,405.85
	Prime Vendors	475	321
	Prime BE Retained/Earned (\$)	\$132,355,003	\$48,647,906.43
	Prime BE Vendors	110	55
	Prime nBE Retained/Earned (\$)	\$4,629,728,857	\$4,166,183,499.41
	Prime nBE Vendors	365	266
SUBCONTRACTOR	Sub Retained/Earned (\$)	\$1,192,920,354.59	\$560,280,794.64
	Sub Vendors	1,860	885
	Sub BE Retained/Earned (\$)	\$1,054,898,234	\$519,210,939.05
	Sub BE Vendors	1,330	662
	Sub nBE Retained/Earned (\$)	\$138,022,120	\$41,069,855.59
	Sub nBE Vendors	530	223
BE	BE Retained/Earned (\$)	\$1,187,253,236.63	\$567,858,845.72
	BE Vendors	1,440	717
	Top Median	\$5,412,397.40	\$1,863,892.94
	Lowest Median	\$282.50	\$282.50
NBE	nBE Retained/Earned (\$)	\$4,767,750,987.38	\$4,207,253,387.67
	nBE Vendors	895	489
	Top Median	\$57,681,720.00	\$3,563,134.50
	Lowest Median	\$142.35	\$2,191.84

Note: BE means Business Enterprise; nBE means non-Business Enterprise

\*Includes only area within mapped frame