October 16, 2018

CALL AND NOTICE OF A SPECIAL MEETING OF THE
OPERATIONS AND DEVELOPMENT COMMITTEE
OF THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY

NOTICE is hereby given that a special meeting of the Operations and Development Committee will be held Thursday, October 18, 2018, at 6:00 p.m., in the Buena Vista Meeting Room of the Burbank Public Library, 300 N. Buena Vista Street, Burbank, California 91505.

Terri Williams, Board Secretary
Burbank-Glendale-Pasadena Airport Authority

SPECIAL MEETING

OF THE

OPERATIONS AND DEVELOPMENT COMMITTEE

Buena Vista Meeting Room

of the

Burbank Public Library

300 N. Buena Vista Street

Burbank, California 91505

Thursday, October 18, 2018

6:00 P.M.

***Members of the public are requested to observe the following decorum:***

- ***Turn off cellular telephones and pagers.***
- ***Refrain from disorderly or boisterous conduct, including loud, threatening, profane, or abusive language, clapping, whistling, stamping, or other acts that disrupt or otherwise render unfeasible the orderly conduct of the meeting.***
- ***If you desire to address the Committee, fill out a speaker request card and present it to the Board Secretary.***
- ***Confine remarks to the agenda item.***
- ***Limit comments to five minutes or to such other period of time as may be specified by the presiding officer.***

▼ ▼ ▼

***The following activities are prohibited:***

- ***Allocation of speaker time to another person.***
- ***Video presentations requiring use of Authority equipment.***

▼ ▼ ▼

***In accordance with the Americans with Disabilities Act of 1990, if you require a disability-related modification or accommodation to attend or participate in this meeting, including auxiliary aids or services, please call the Board Secretary at (818) 840-8840 at least 48 hours prior to the meeting.***

SPECIAL MEETING

OF THE

OPERATIONS AND DEVELOPMENT COMMITTEE

Buena Vista Meeting Room

of the

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300 N. Buena Vista Street

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Thursday, October 18, 2018

6:00 P.M.

# AGENDA

1. Items for Discussion

   a. Landrum & Brown "Flight Path Analysis, Final Report" Regarding NextGen Impact

      - ***No staff report attached. Landrum & Brown Inc. (Aviation Consultant) will present findings on impacts of FAA's NextGen implementation. Following the presentation, comments on the findings will be received from Burbank residents and other members of the public.***

2. Remarks by the Honorable Brad Sherman, Member of Congress, United States Congress

3. Public Comment

4. Adjournment

Hollywood Burbank Airport

# Hollywood Burbank Airport

## Flight Path Analysis | Final Report

October 2018

PREPARED BY
Landrum & Brown, Incorporated

# Hollywood Burbank Airport
## Flight Path Analysis

## EXECUTIVE SUMMARY

On March 29, 2018, Hollywood Burbank Airport (BUR) management held a public meeting at the Buena Vista Branch Library where community members provided comments relative to their own personal experiences with aircraft noise and the recent Southern California (SoCal) Metroplex flight path changes. Additionally, airport management informed the public that Landrum & Brown (L&B) would begin a process to respond to community concerns, and conduct an in-depth analysis of the issues raised during the meeting and perform a comparison of BUR flights that have occurred before and after the SoCal Metroplex implementation in March 2017.

Comments made by community members during the March 29, 2018 meeting, additional April 12, 2018 meetings, e-mails, and phone conversations include:

- Noticeable increase of flights over residences south of the airport.
- Before the Metroplex implementation, departures remained north of the 101 Freeway.
- Aircraft flight altitudes have been lower since the implementation of Metroplex.
- The frequency of overflights have increased since the implementation of Metroplex.
- Flights are more concentrated over the same geographic area than in the past.
- Aircraft are getting louder.

Based on the community comments above, this analysis showed that during the past 10 years, the highest number of monthly BUR air carrier (large jet) flights occurred in July 2008 with 5,145. The number of monthly air carrier flights gradually declined after 2008 and reached the lowest number in February 2015 with 2,900. The number of monthly air carrier flights gradually increased after 2015 and reached the most recent peak number of flights in August 2017 with 4,680.

The climbing performance of aircraft is affected by atmospheric conditions including temperature. Generally, aircraft can gain altitude quicker during cold temperature conditions than during hot temperatures conditions. During the winter months, aircraft are at higher altitudes than during the summer months. The average yearly temperatures began to increase in 2012 shifting the location where aircraft reached 3,000 feet of altitude above sea level, which is the location where Federal Aviation Administration (FAA) air traffic controllers instruct pilots to turn north.

Based on flight data collected over the past 10 years, the departure path corridor has remained generally similar. However, the most frequently used path or concentrated path has shifted south over time partly due to an increase in Southern California regional aircraft operations, an increase in average yearly temperatures, and the implementation of Metroplex Area Navigation (RNAV) departure procedures.

Relative to the frequency of flights, the average number of departures per hour have remained consistent over the past 10 years. During this period, the 7:00 a.m. hour was the busiest hour of the day peaking at 10.8 air carrier departures per hour in 2011. Between 2016 and 2017, the number of average hourly departures during the 7:00 a.m. hour were 9.20 and 9.45, respectively. However, due to the southern shift of the departure path, there has been a greater proportional increase of flights and an increase in the frequency of flights per hour over areas south of the 101 Freeway, especially between 2016 and 2017.

The cumulative (day-average) noise levels at the Noise Monitoring Terminals (NMT) located under or near the departure path have remained consistent over the past five (5) years. Between the 2nd Quarter 2016 and 2nd Quarter 2017, the cumulative noise levels increased by an average of approximately 2.4%, and flights increased by 17.8%. The increase in flights to and from the airport is a result of an expanding aviation market and not the Metroplex implementation. However, the increase in flights over the areas south of the 101 Freeway are attributed to Metroplex and the use of the RNAV departure procedures.

Based on this analysis, no direct connection was found between the implementation of Metroplex in March 2017 and the change in the number and frequency of flights to and from the airport, the change in noise levels at the airport noise monitors, or aircraft departure altitude. However, a connection was found between the Metroplex (RNAV) implementation and the increase in number of flights over areas south of the 101 Freeway.

The changes described above are attributed to the interaction of three (3) primary stakeholders: The FAA, which has the exclusive authority over the safe and efficient movement of aircraft in flight and on the ground, the assignment of runway use and flight paths, and the development and enforcement of air traffic and environmental guidelines and regulations; BUR, which provides a safe, efficient, and financially sustainable facility for airlines, general aviation users, tenants, and the traveling public while striving to be a good neighbor to nearby communities and address community concerns regarding airport facilities and aircraft operations; and Airlines are responsible for the transport of people and cargo to and from the area in a safe, comfortable, and financially profitable way. Airlines schedule their flights according to market demand and their business models as well as the selection of appropriate aircraft. Airlines must comply with FAA air traffic control instructions and comply with airport voluntary noise abatement procedures when feasible.

# 1. INTRODUCTION

Hollywood Burbank Airport (BUR) is located approximately three (3) miles northwest of the downtown area of the City of Burbank, in Los Angeles County, California. Serving the northern Greater Los Angeles region, BUR is part of the Southern California air space and air traffic system. In March 2017, the Federal Aviation Administration (FAA) Southern California (SoCal) Metroplex[1] project was implemented. Since the project's implementation, airport staff have received numerous comments from community members that the BUR arrival and departure flight paths have changed causing adverse noise and overflight impacts.

On March 29, 2018, airport management held a public meeting where community members provided comments relative to their own personal experiences with the recent Metroplex flight path changes. Additionally, airport management informed the public that Landrum & Brown (L&B) would begin a process to respond to community concerns and conduct an in-depth analysis of the issues raised during the meeting, and perform a comparison of BUR flight operations that have occurred before and after the SoCal Metroplex implementation.

This report represents the findings of the Flight Path Analysis, which includes the sections listed below:

1. Introduction
2. Community Input
3. Number of Operations over Time
4. Flight Corridor and Concentration
5. Frequency of Flights
6. Noise Monitor Levels
7. Altitude Analysis
8. FAA Comments
9. Roles and Responsibilities
10. Recent Legal Decisions
11. Conclusions

[1] The FAA SoCal Metroplex project improved the efficiency of airspace in the Southern California metropolitan region by optimizing aircraft and departure procedures used at airports within the project area, which included BUR. For more information about the SoCal Metroplex, please visit:
http://metroplexenvironmental.com/socal_metroplex/socal_introduction.html

# 2. COMMUNITY INPUT

During the public comment period of the March 29, 2018 meeting held at the Buena Vista Branch Library, community members shared their concerns and experiences relative the impact of overflights. Community members described over 20 different overflight comments and concerns including the following:

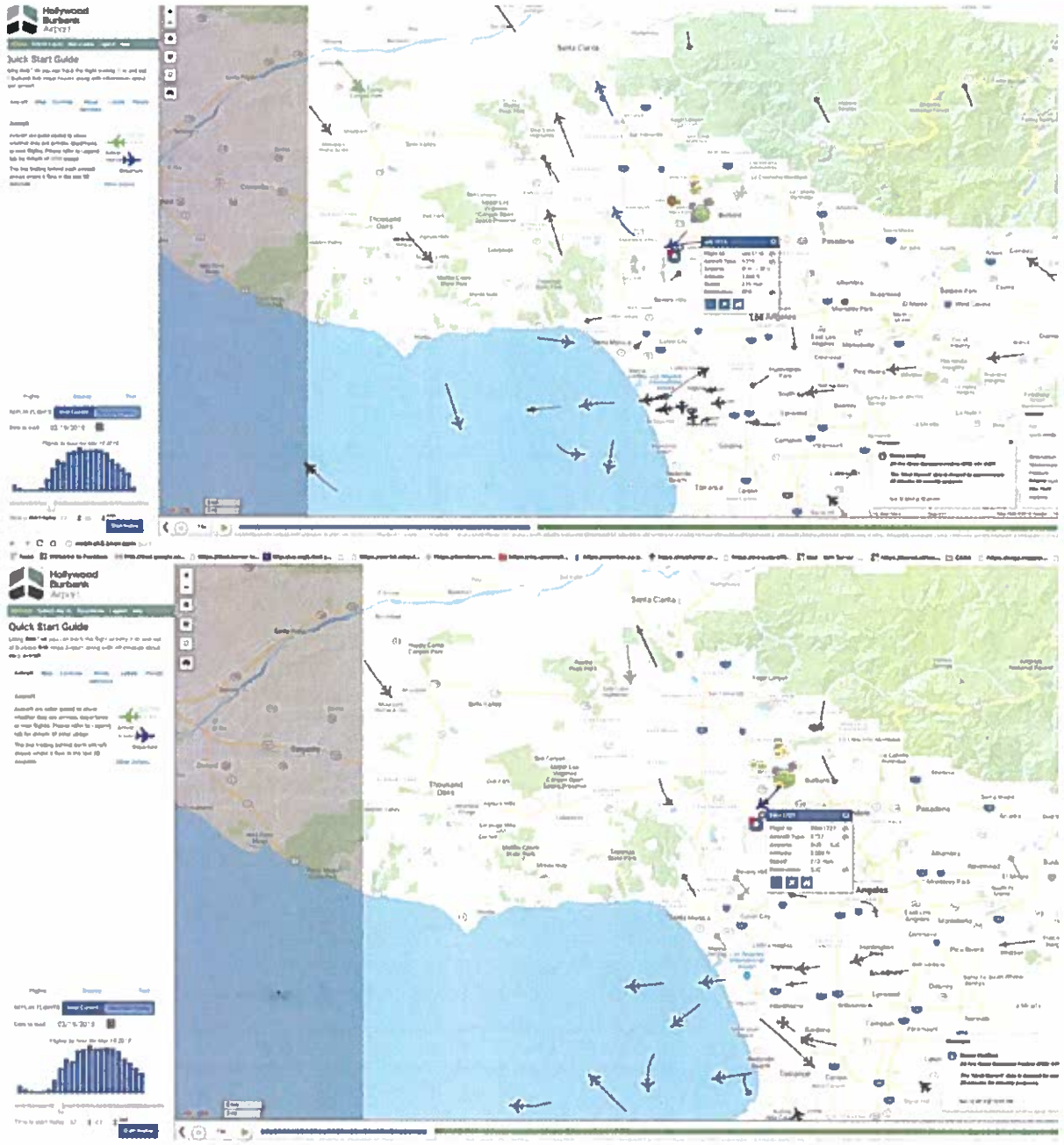
**Figure 1**
**Community Members Summarized Comments**

| Community Members Summarized Comments |
|---|
| Frequency of flights and flight track locations |
| Altitudes are very low |
| Concerned about impact on property values |
| Not just a Burbank issue, but also a Studio City issue |
| Concerned about air quality/health effects |
| Not able to enjoy outdoor space |
| Since March 2017 noise has gotten worse |
| Overnight flights have become an issue since Metroplex (March 2017) |
| Request that L&B to come out to see aircraft events |
| Concerned about continued growth at the airport |
| Activity to/from Van Nuys Airport is part of the problem |
| Contacted FAA but received no answers/response |
| Concern about the 90-day filing window against FAA decisions |
| More concentration of departures over the same area |
| Lack of Metroplex notices for areas other than Burbank |
| Request noise levels from noise monitors to be presented in number of events above a certain level |
| The mountains create a canyon effect with noise bouncing from side to side |
| Concerns about safety and allowable distances between departures |

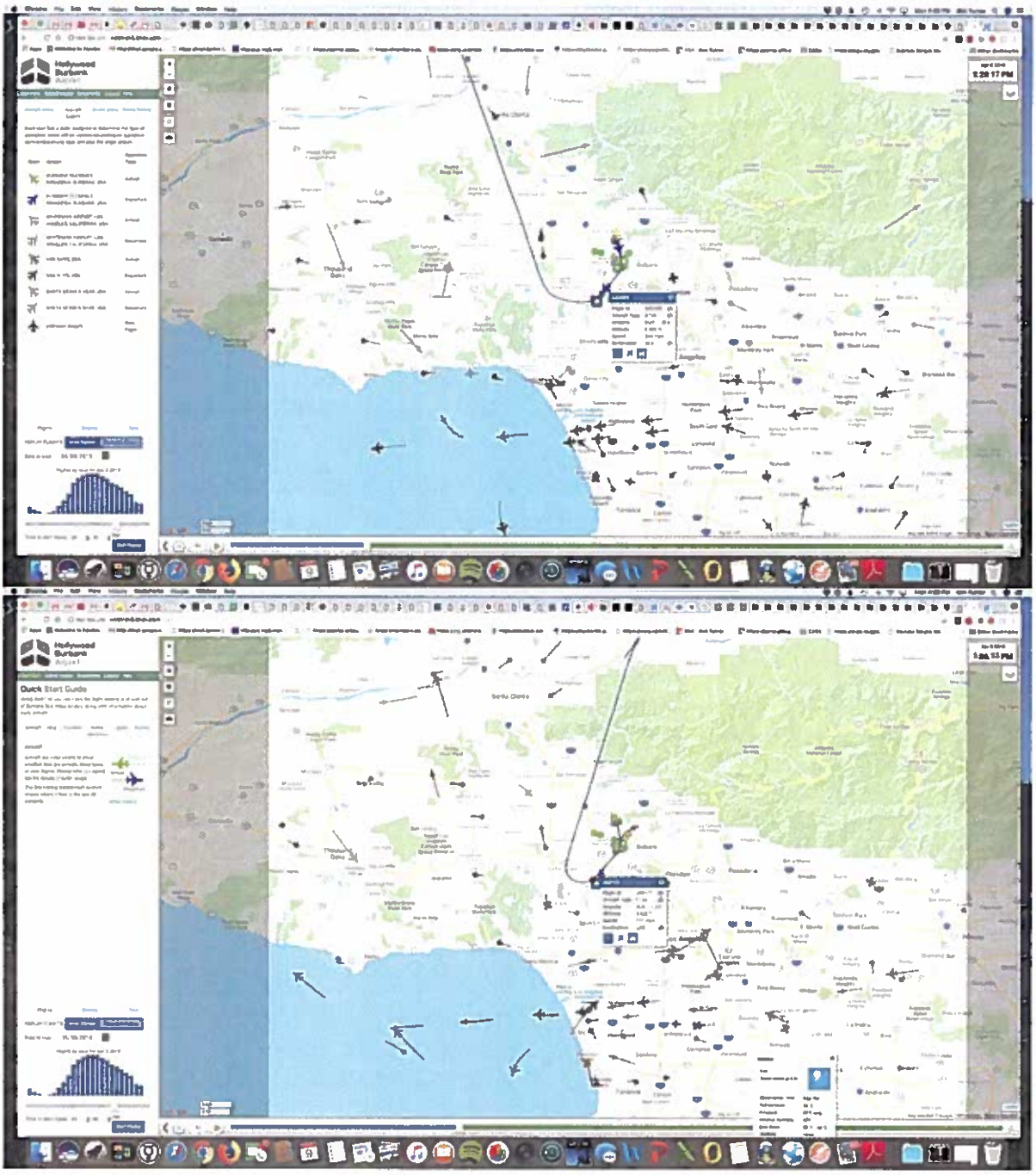
Some community members began collecting flight and noise data from late 2016 when they received notice that the Metroplex project would be implemented in March 2017. Additionally, a group of community members collected "screen shots" of what they

viewed on the airport's WebTrak website[2]. L&B gathered and reviewed this information and samples are provided below:

**Figure 2**
**WebTrak Screen Shots (set of four)**



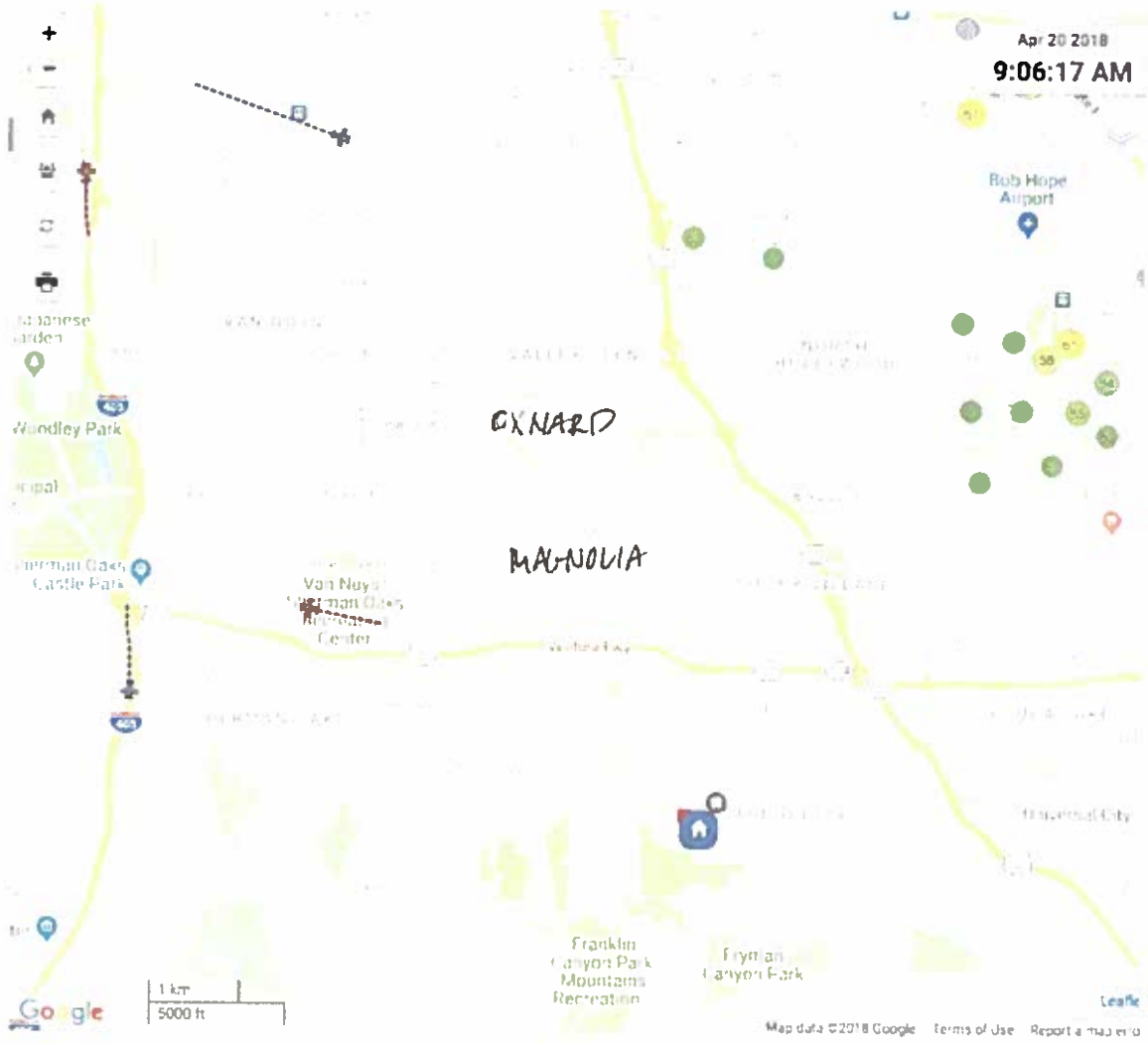

[2] WebTrak is a flight tracking website provided by the airport for the public to view flight activity over nearby communities. For more information, please visit: http://webtrak5.bksv.com/bur1



## Figure 3
## FLIGHT ALTITUDE - SAMPLE

| Date | Day of Week | Time | DB Reading | Arrival / Departure | Flight ID: | Airline | Aircraft Type: | Airports | PCA Point of Closest Approach |
|---|---|---|---|---|---|---|---|---|---|
| 12/18/2016 | | | | | | | | | |
| 12/18/2016 | Sunday | 7:23 AM | 67 | Departure | SKW101A | Sky West | CRJ2 | BUR - SLC | 1919 |
| 12/18/2016 | Sunday | 7:44 AM | 85 | Departure | ASA531 | Alaska | B738 | BUR - SEA | 1671 |
| 12/18/2016 | Sunday | 8:25 AM | 81 | Departure | SWA3278 | South West | B737 | BUR - PHX | 1682 |
| 12/18/2016 | Sunday | 8:35 AM | 79 | Departure | SWA3072 | South West | B737 | BUR - PDX | 1934 |
| 12/18/2016 | Sunday | 8:46 AM | 82 | Departure | SWA888 | South West | B737 | BUR - OAK | 1799 |
| 12/18/2016 | Sunday | 8:59 AM | 82 | Departure | Not Listed | N/A | N/A | BUR - MMSL | 1800 |
| 12/18/2016 | Sunday | 9:30 AM | 79 | Departure | N462CB | Private | PRM1 | BUR - SLC | 1634 |
| 6/30/2017 | Friday | 7:08 AM | 81 | Departure | SKW5241 | SkyWest Alaska | E75L | BUR - DEN | 1939 |
| 6/30/2017 | Friday | 7:17 AM | 85 | Departure | SWA459 | SouthWest | B737 | BUR - DEN | 1928 |
| 6/30/2017 | Friday | 7:20 AM | 83 | Departure | N/A | N/A | N/A | BUR - DAL | 2026 |
| 6/30/2017 | Friday | 7:21 AM | 83 | Departure | SWA1800 | SouthWest | B737 | BUR - SJC | 1737 |
| 6/30/2017 | Friday | 7:22 AM | 74 | Departure | SKW4672 | SkyWest/Alaska | CRJ9 | BUR - SLC | 2187 |
| 6/30/2017 | Friday | 7:26 AM | 84 | Departure | SWA461 | SouthWest | B737 | BUR - LAS | 1782 |
| 6/30/2017 | Friday | 7:29 AM | 84 | Departure | SWA1717 | SouthWest | B737 | BUR - SLC | 1760 |
| 6/30/2017 | Friday | 7:44 AM | 78 | Departure | SWA2001 | SouthWest | B737 | BUR - SFO | 1807 |
| 6/30/2017 | Friday | 7:47 AM | 74 | Departure | LXJ545 | Private | CL30 | BUR - VNY | 2170 |
| 6/30/2017 | Friday | 7:52 AM | 86 | Departure | UAL743 | United | B738 | BUR - SFO | 1483 |

**Figure 4**
**DRAWING OF PRE-METROPLEX (pre-March 2017) DEPARTURE PATH**




Additionally, L&B staff visited the home of a Studio City resident on April 12, 2018 between 6:45 a.m. and 9:00 a.m. to observe overflights and the "7 a.m. launch" of frequent morning Runway 15[3] departures. Approximately 10 residents visited the Studio City home to share their recent observations. Some residents expressed that they had not experienced any overflights prior to the Metroplex implementation, and others expressed that if they had experienced overflights in previous years, the overflights were very rare and that most of the air traffic remained north of the 101 Freeway (similar to drawing above).

On April 12, 2018, L&B staff met with airport management and two (2) community members to discuss airport noise issues associated with the Metroplex implementation. According to these community members, noticeable departure flight path changes

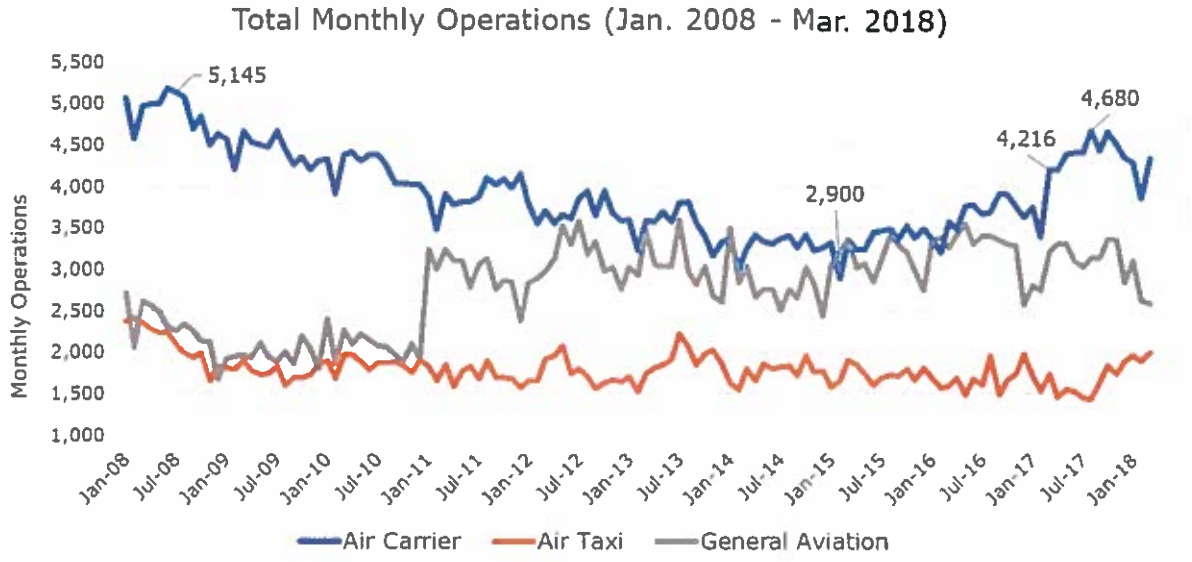
[3] Runway 15 is oriented in a north to south configuration. Departures from Runway 15 fly in a southern direction initially then turn west and continue north.

occurred on March 2017. L&B staff included the community members' comments, observations, snapshots, and data to develop this flight path analysis.

# 3. NUMBER OF OPERATIONS OVER TIME

To compare the BUR number of arrivals and departures (operations) over the last 10 years, information from the FAA Air Traffic Activity System (ATADS) was gathered and displayed in the chart below. The ATADS collected information provided by FAA Air Traffic Control Towers (ATCT) relative to air carrier, air taxi and general aviation[4] aircraft operations. The highest number of monthly air carrier operations during the last 10 years occurred on July 2008 with 5,145 operations. The number of monthly air carrier operations declined after 2008 reaching the lowest number of operations, 2,900, on February 2015. The number of monthly operations increased after 2015 until reaching the most recent peak number of operations in August 2017 with 4,680 operations. When Metroplex was implemented in March 2017, BUR air carrier operations reached a monthly total of 4,216.

**Figure 5**
**TOTAL MONTHLY OPERATIONS**




[4] Definitions – Air Carrier: An aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo.
Air Taxi: An aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo.
General Aviation: all civil aircraft, except those classified as air carriers or air taxis.

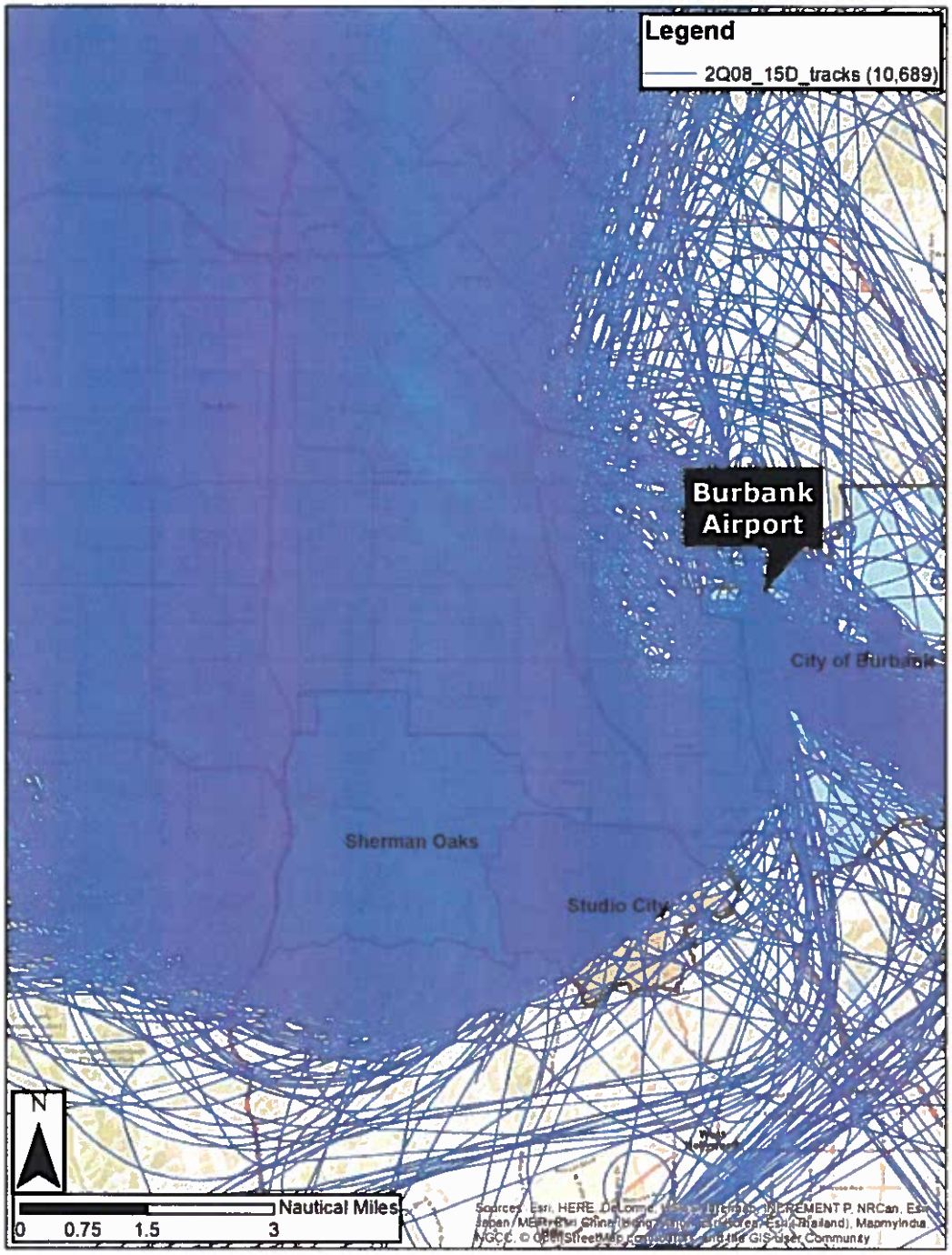
# 4. FLIGHT CORRIDOR AND CONCENTRATION

To compare the location of the Runway 15 departure flight corridor and flight concentration changes over time, flight tracks were collected from the BUR Airport Noise and Operations Monitoring System (ANOMS) from January 2008 until March 2018. The following figures illustrate the comparison of the flight path corridor and flight concentration that occurred before and after the implementation of Metroplex in March 2017. **Figure 6** shows a map of the Hollywood Burbank Airport area. As geographic references, annotations are located over the City of Burbank, and the neighborhoods of Sherman Oaks, and Studio City. The 101 Freeway is located adjacent to the east edge of Studio City and continues adjacent to the north edge of Studio City and through Sherman Oaks. Each of the maps represent three (3) months of flight activity.

**Figure 6**
**HOLLYWOOD BURBANK AIRPORT AREA**

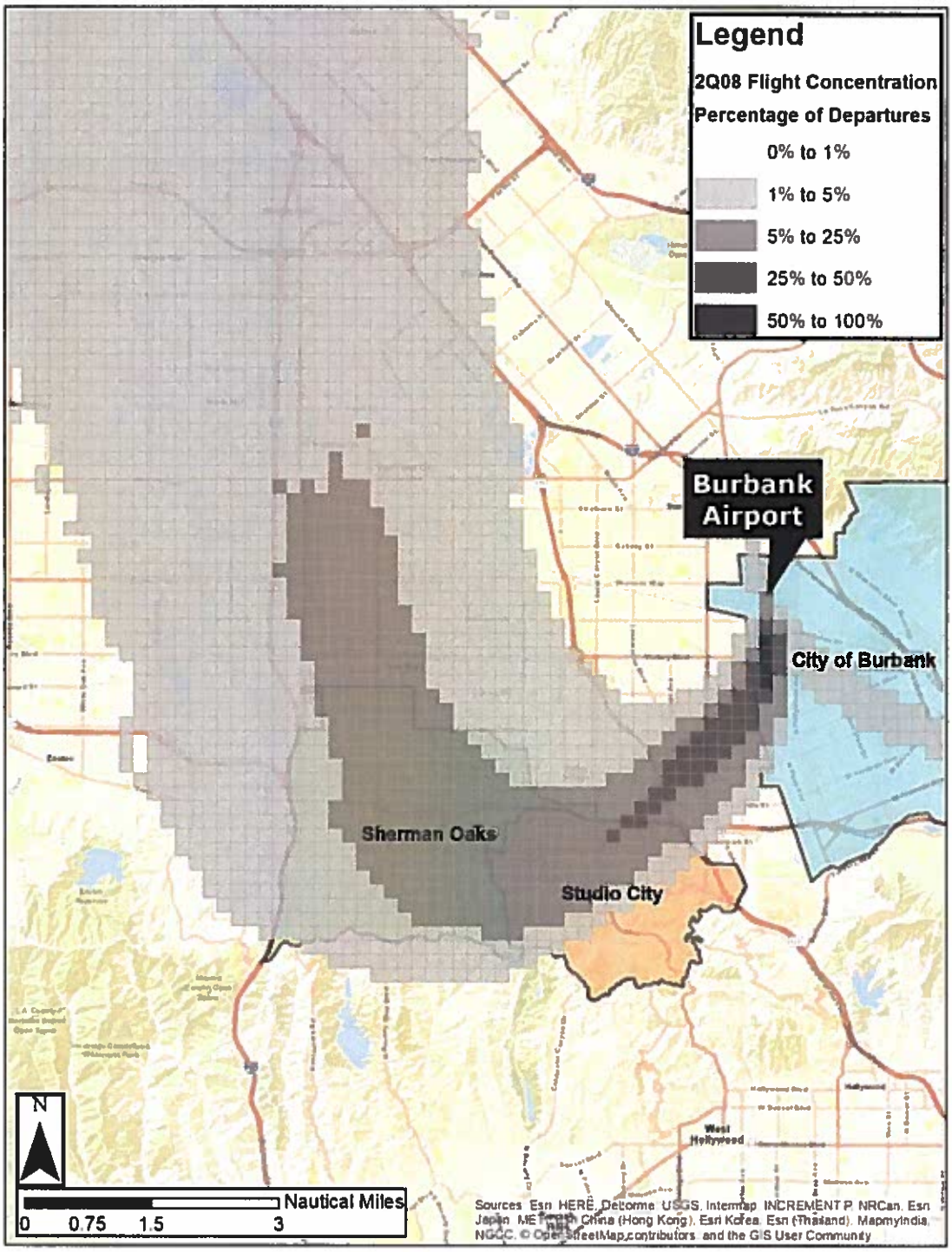
**Figure 7** shows 10,689 Runway 15 departures flight tracks that occurred during the 2nd Quarter 2008 (April through June). The departure corridor covered a wide area including areas in the City of Burbank, in the Sherman Oaks and Studio City neighborhoods, and areas north of these locations as well.

**Figure 7**
**FLIGHT TRACKS - 2nd QUARTER 2008**



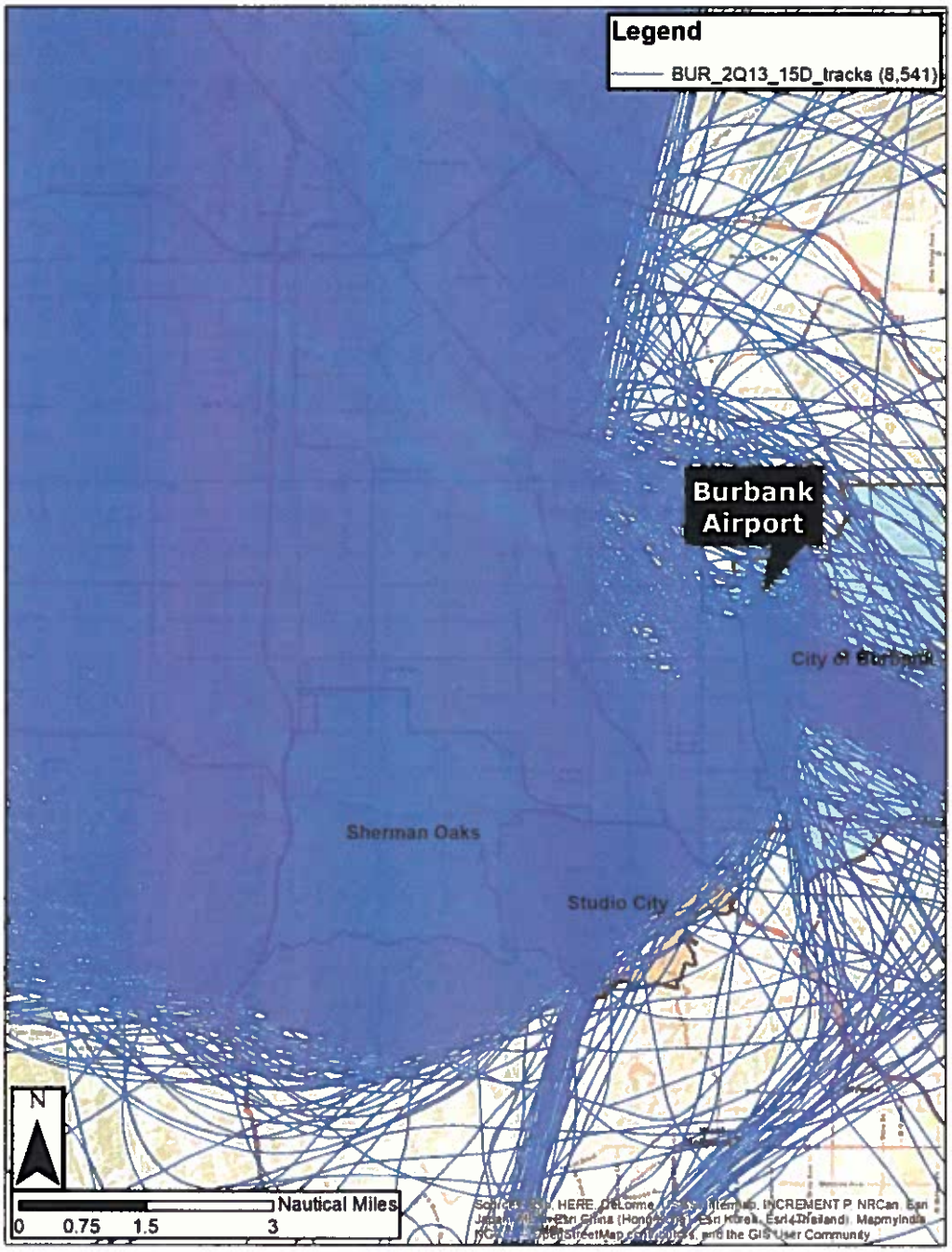
The location of the most frequently used or concentrated path during the 2nd Quarter 2008 is shown below on **Figure 8**.

**Figure 8**
**FLIGHT TRACK CONCENTRATION - 2nd QUARTER 2008**



Approximately 99% of all of Runway 15 departure flight tracks during this period are shown shaded in gray. The darker shades of gray illustrate a greater concentration of overflights. Similar to **Figure 7**, **Figure 9** shows 8,541 Runway 15 departure flight tracks that occurred during the 2nd Quarter 2013 (April through June). The departure corridor covered a wide area similar to that shown during 2nd Quarter 2008.

**Figure 9**
**FLIGHT TRACKS - 2nd QUARTER 2013**



The location of the concentrated path during the 2nd Quarter 2013 is shown below in **Figure 10**.

**Figure 10**
**FLIGHT TRACK CONCENTRATION - 2nd QUARTER 2013**

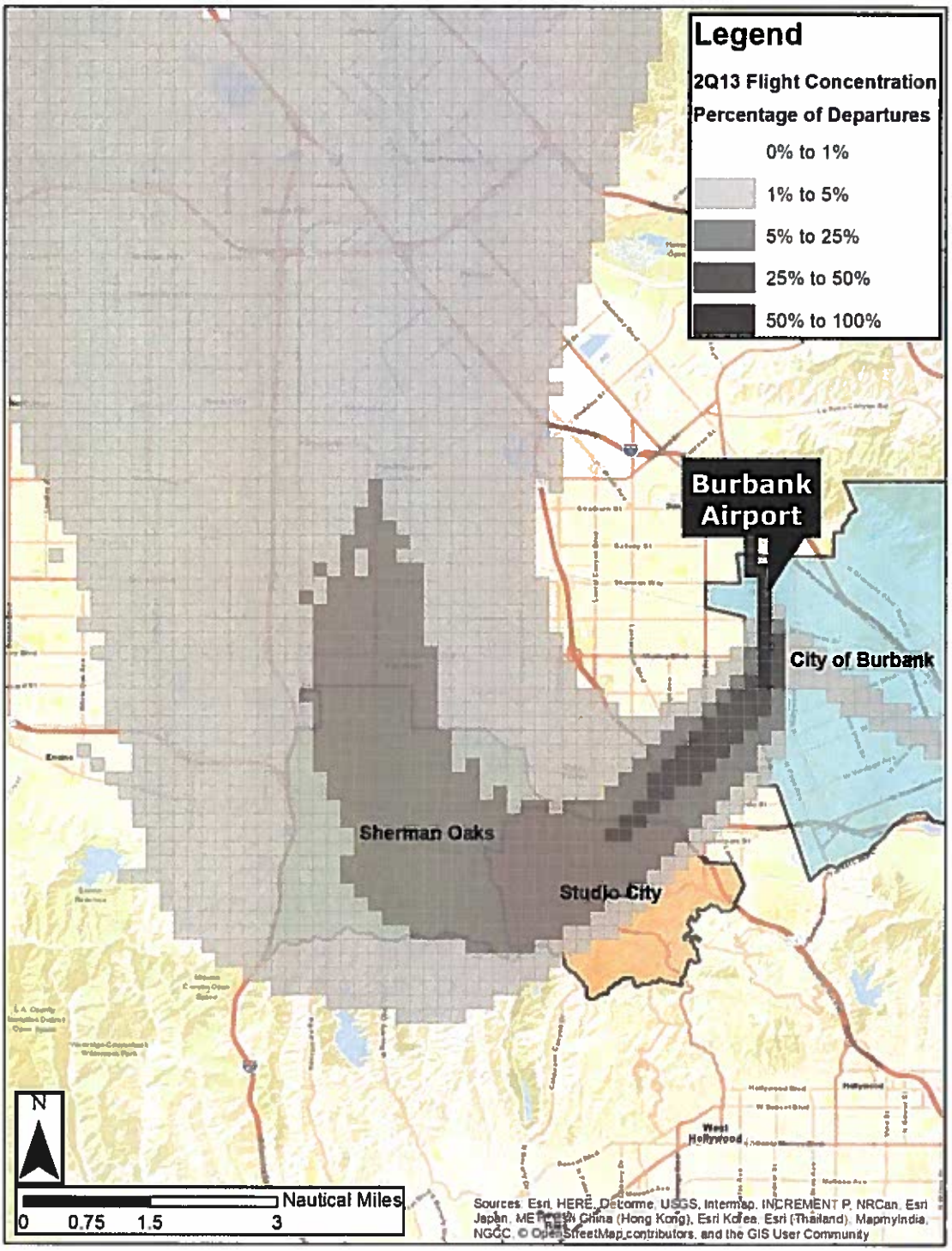


**Figure 11** shows 9,148 Runway 15 departure flight tracks that occurred during the 4th Quarter 2016 (October through December), and **Figure 12** shows the concentrated path for the same period.

**Figure 11**
**FLIGHT TRACKS – 4th QUARTER 2016**

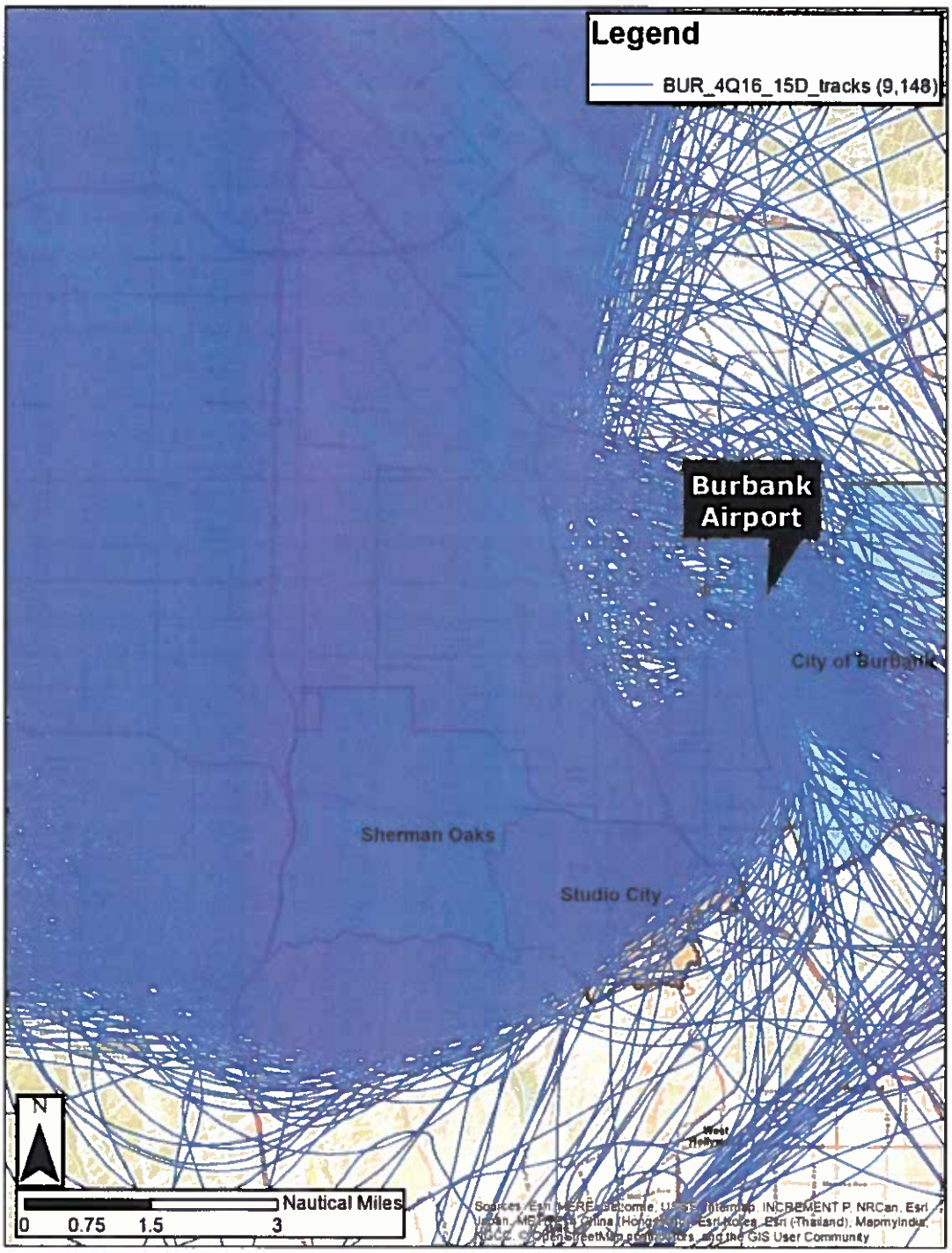
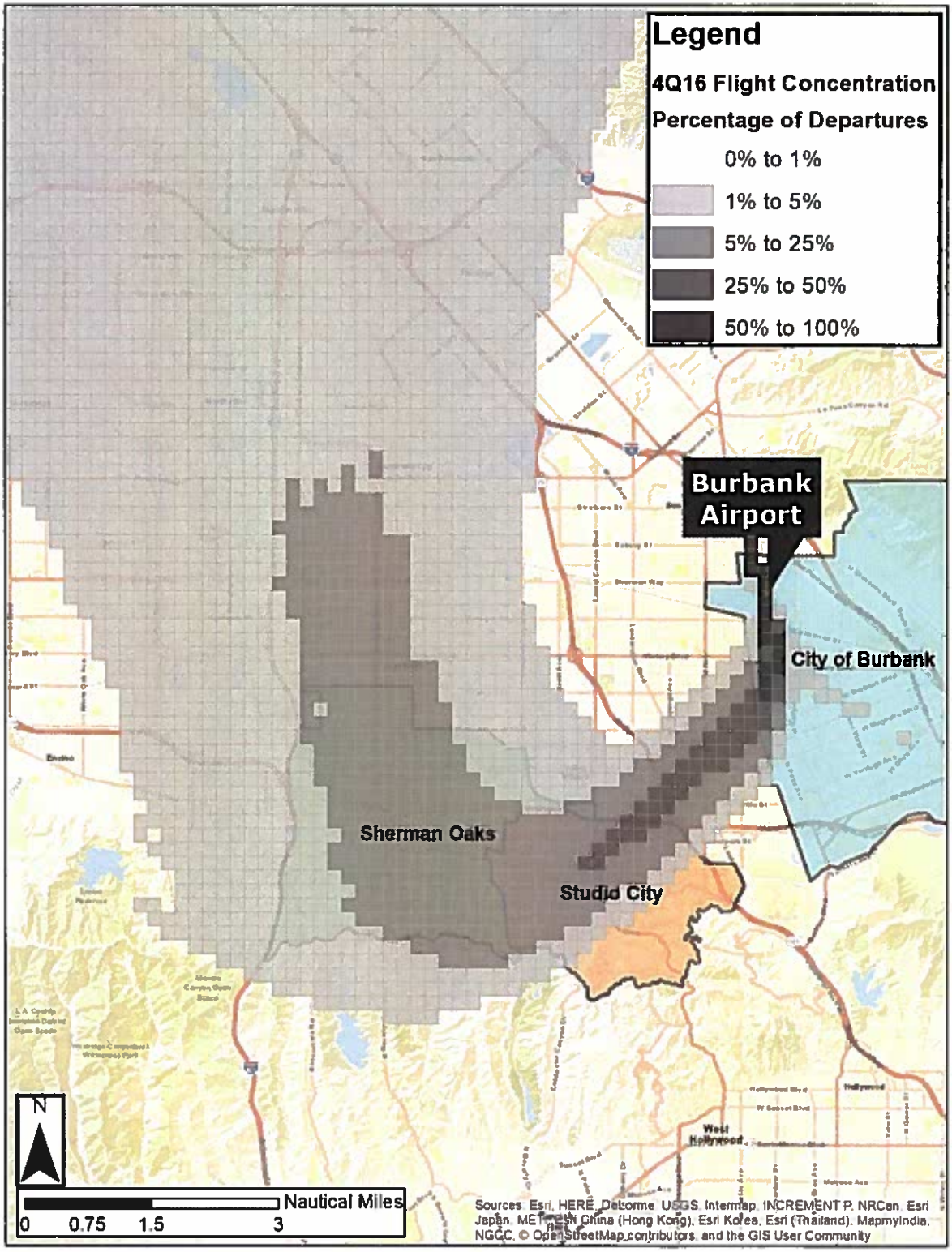


**Figure 12**
**FLIGHT TRACK CONCENTRATION – 4th QUARTER 2016**



Figures 7 through 12 represent Runway 15 departures that occurred prior to the Metroplex implementation in March 2017. The following figures illustrate flights that occurred after Metroplex was implemented. **Figure 13** shows 9,591 Runway 15 departures that occurred during the 2nd Quarter 2017, and **Figure 14** shows the concentrated path for the same time period.

**Figure 13**
**FLIGHT TRACKS – 2nd QUARTER 2017**

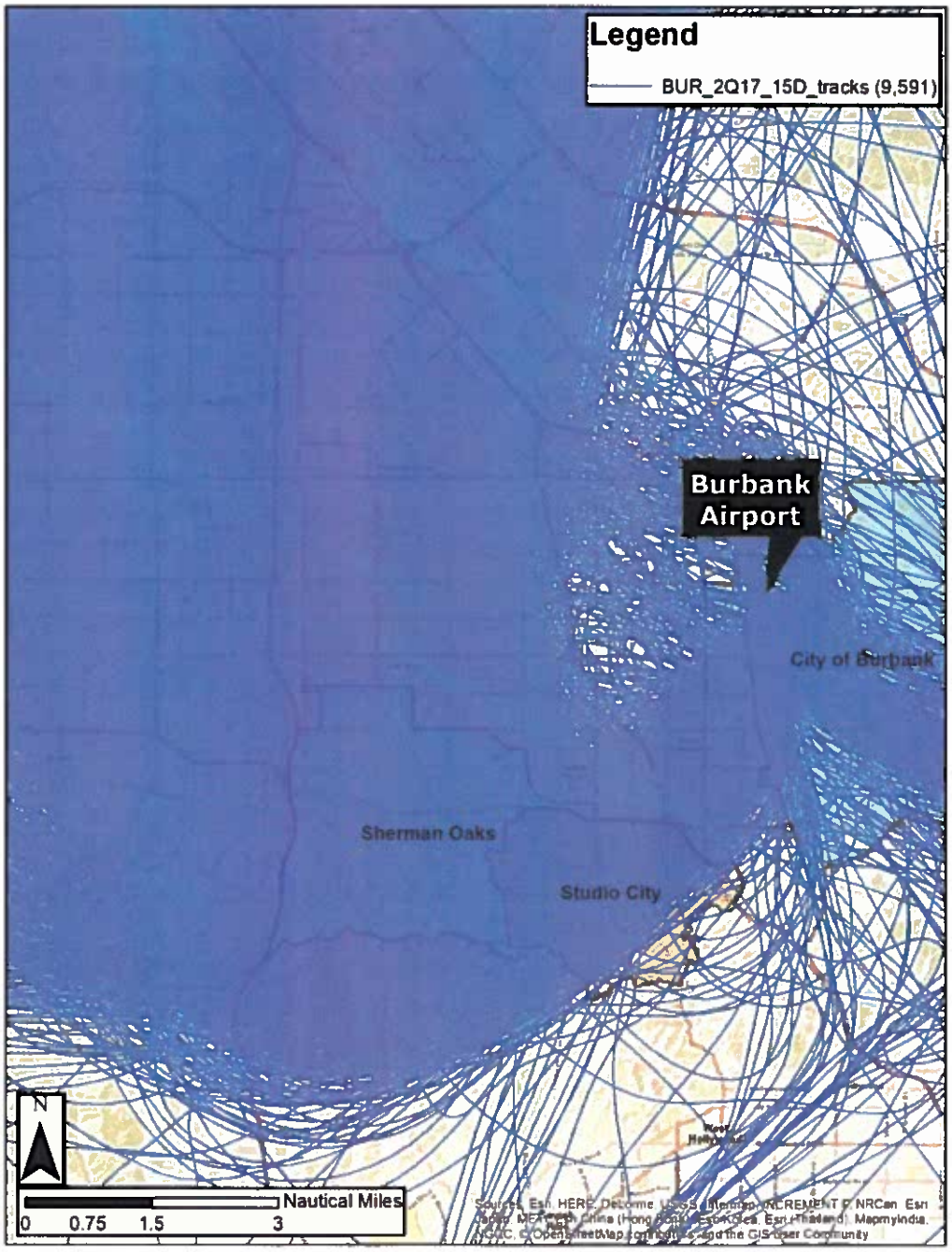


**Figure 14**
**FLIGHT TRACK CONCENTRATION – 2nd QUARTER 2017**

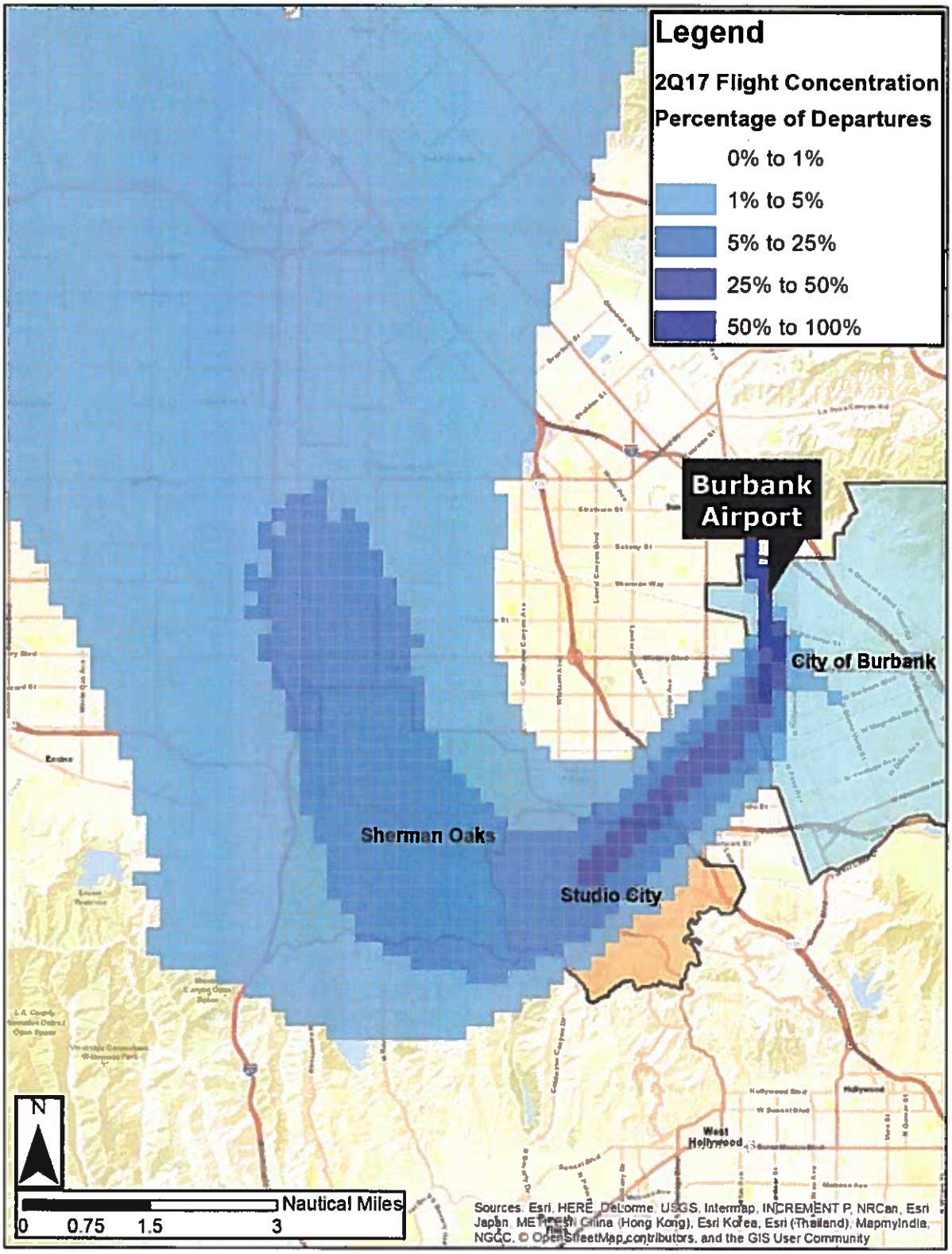


**Figure 15** shows 10,035 Runway 15 departures that occurred during the 1st Quarter 2018, and **Figure 16** shows the concentrated path for the same time period.

**Figure 15**
**FLIGHT TRACKS – 1ST QUARTER 2018**

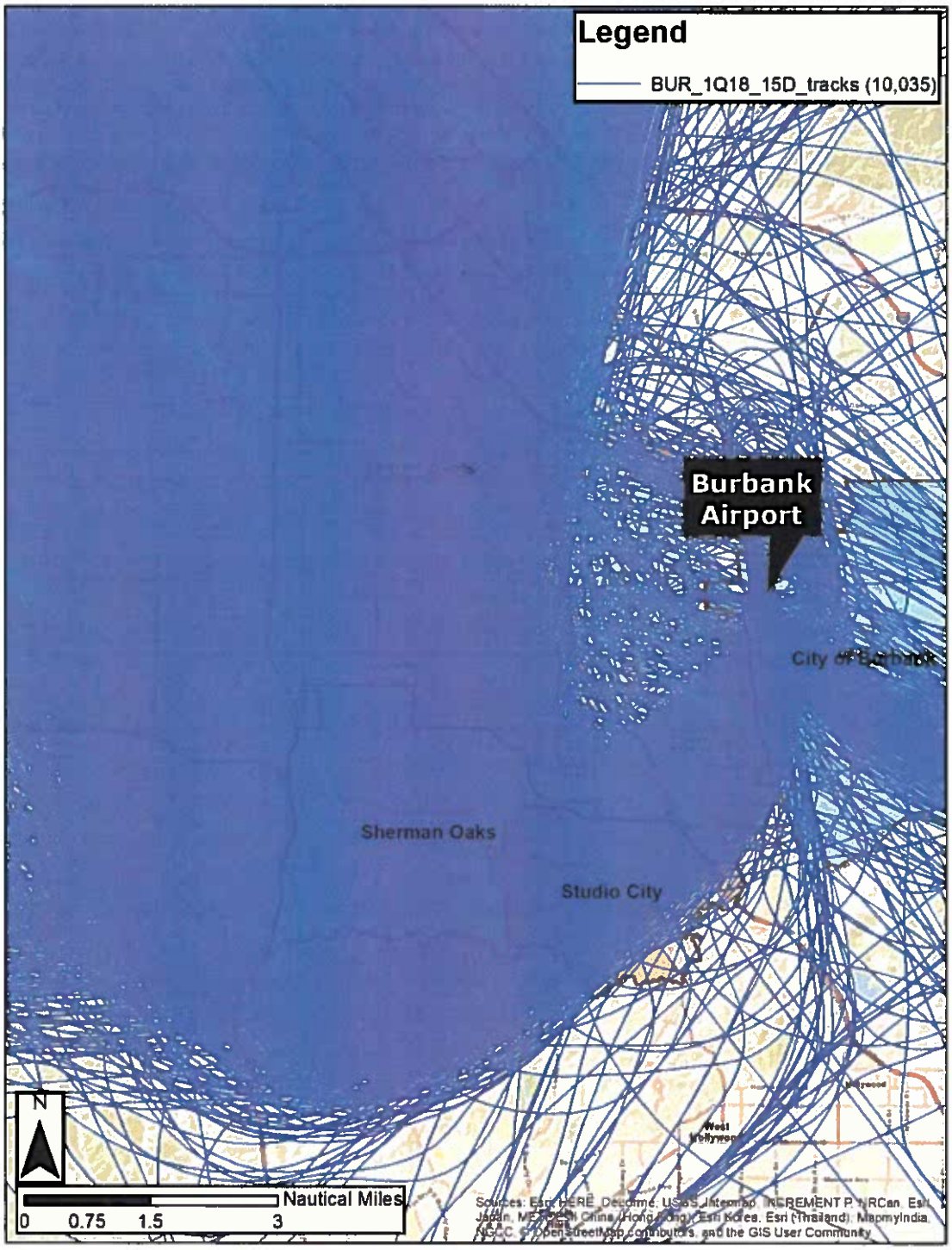
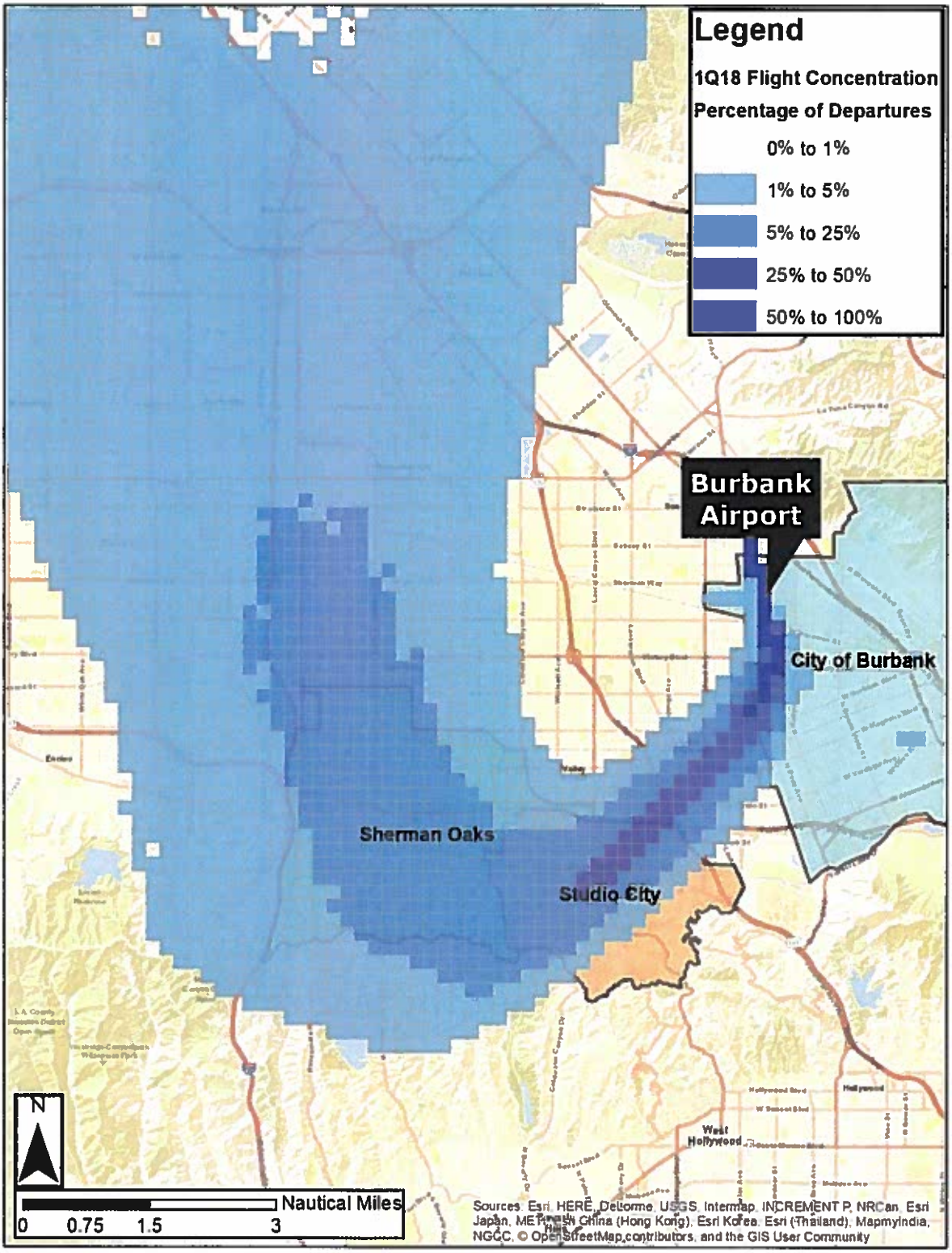
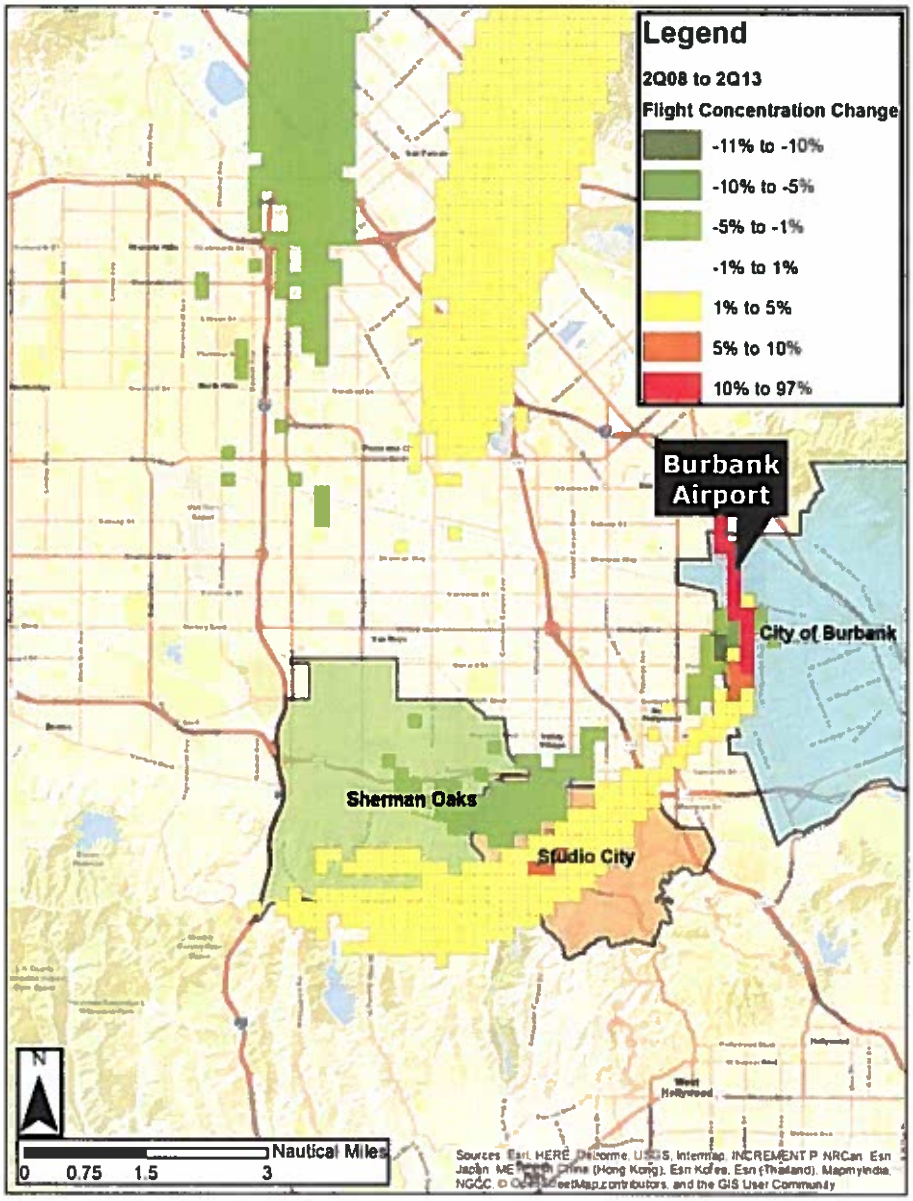


**Figure 16**
**FLIGHT TRACK CONCENTRATION – 1ST QUARTER 2018**



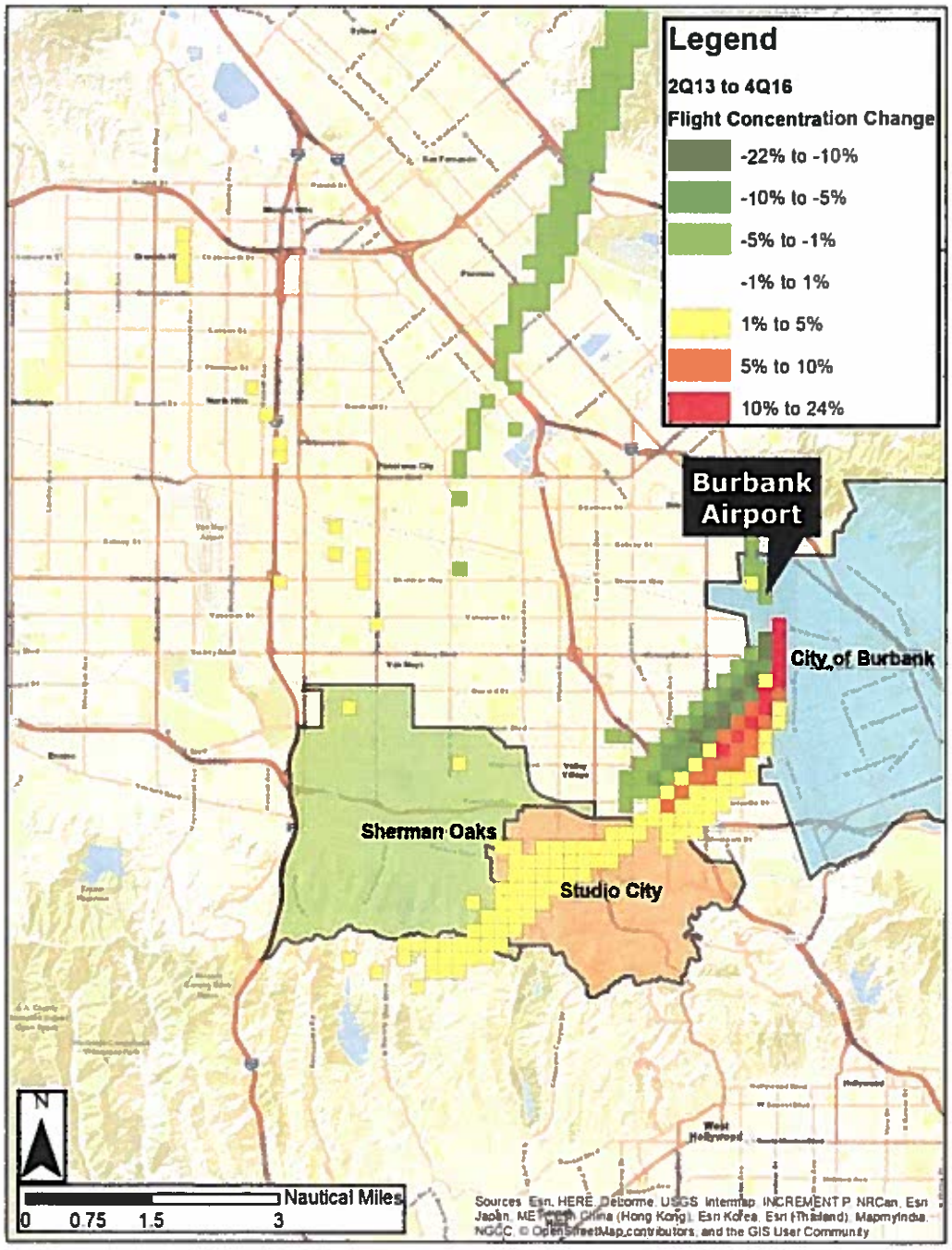
When comparing the Runway 15 departures over time, the flight corridors have remained generally similar. However, the departure track concentration has shifted south over time. To quantify this shift, the following illustrations show the percentage change in flight concentration between the periods shown in Figures 7 through 16. Areas shaded in green represent areas with an overflight decrease, and areas shaded in red/yellow represent areas with an overflight increase. Areas with an overflight change between -1% and 1% are not shown. **Figure 17** shows the percentage change in flight concentration between 2nd Quarter 2008 and 2nd Quarter 2013.

**Figure 17**
**FLIGHT CONCENTRATION CHANGE - FROM 2nd QUARTER 2008 TO 2ND QUARTER 2013**



The high percentage increase shown on **Figure 17** near the runway is due to improvements made to the noise monitoring system track-to-runway matching and does not affect this analysis. **Figure 18** shows the percentage change in flight concentration between 2nd Quarter 2013 and 4th Quarter 2016.

**Figure 18**
**FLIGHT CONCENTRATION CHANGE - FROM 2nd QUARTER 2013 TO 4th QUARTER 2016**



**Figures 17 and 18** represent the flight concentration changes prior to the implementation of the Metroplex. **Figure 19** below compares the last full quarter of operations before Metroplex implementation and the first full quarter after Metroplex implementation.

**Figure 19**
**FLIGHT CONCENTRATION CHANGE - FROM 4th QUARTER 2016 TO 2ND QUARTER 2017**

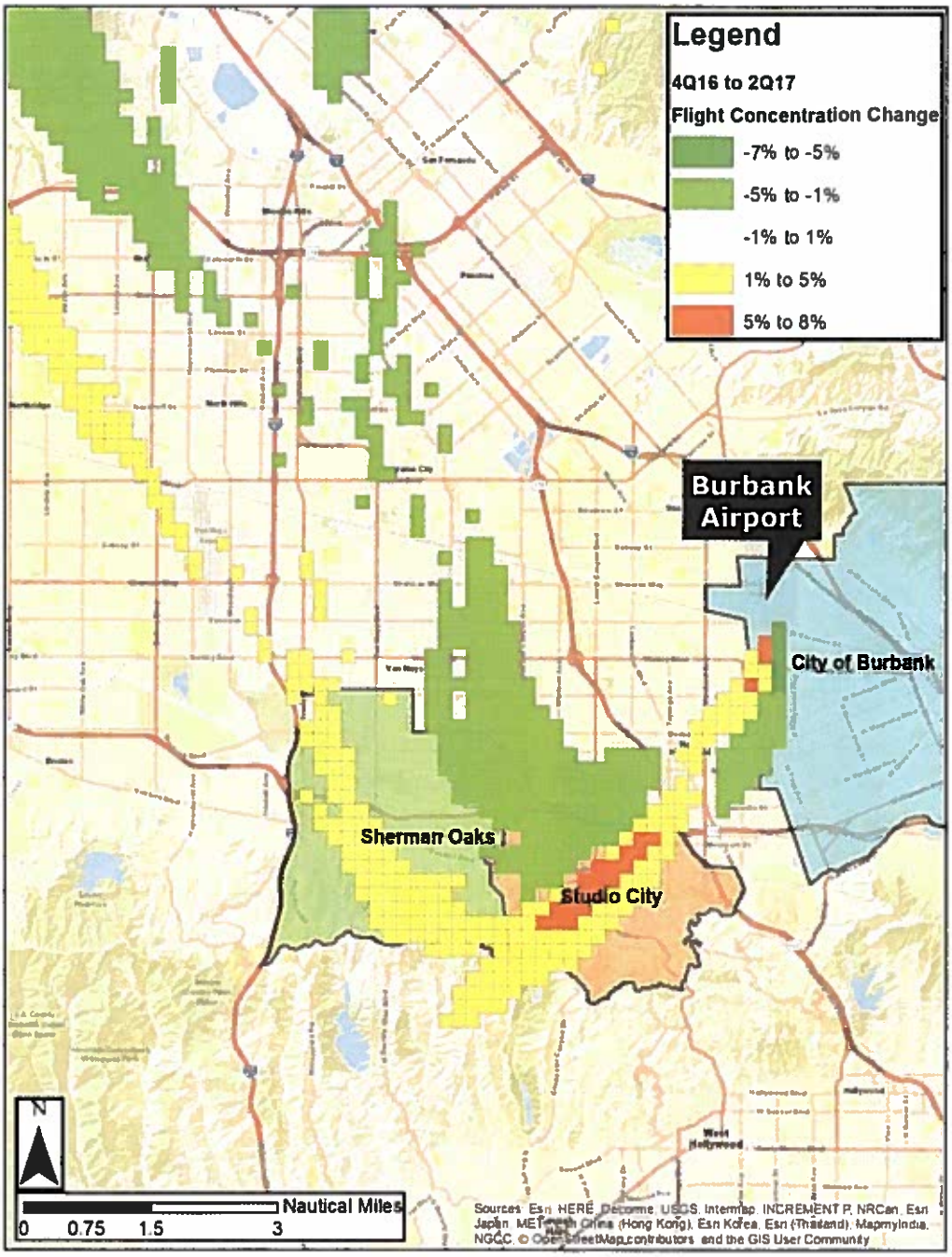
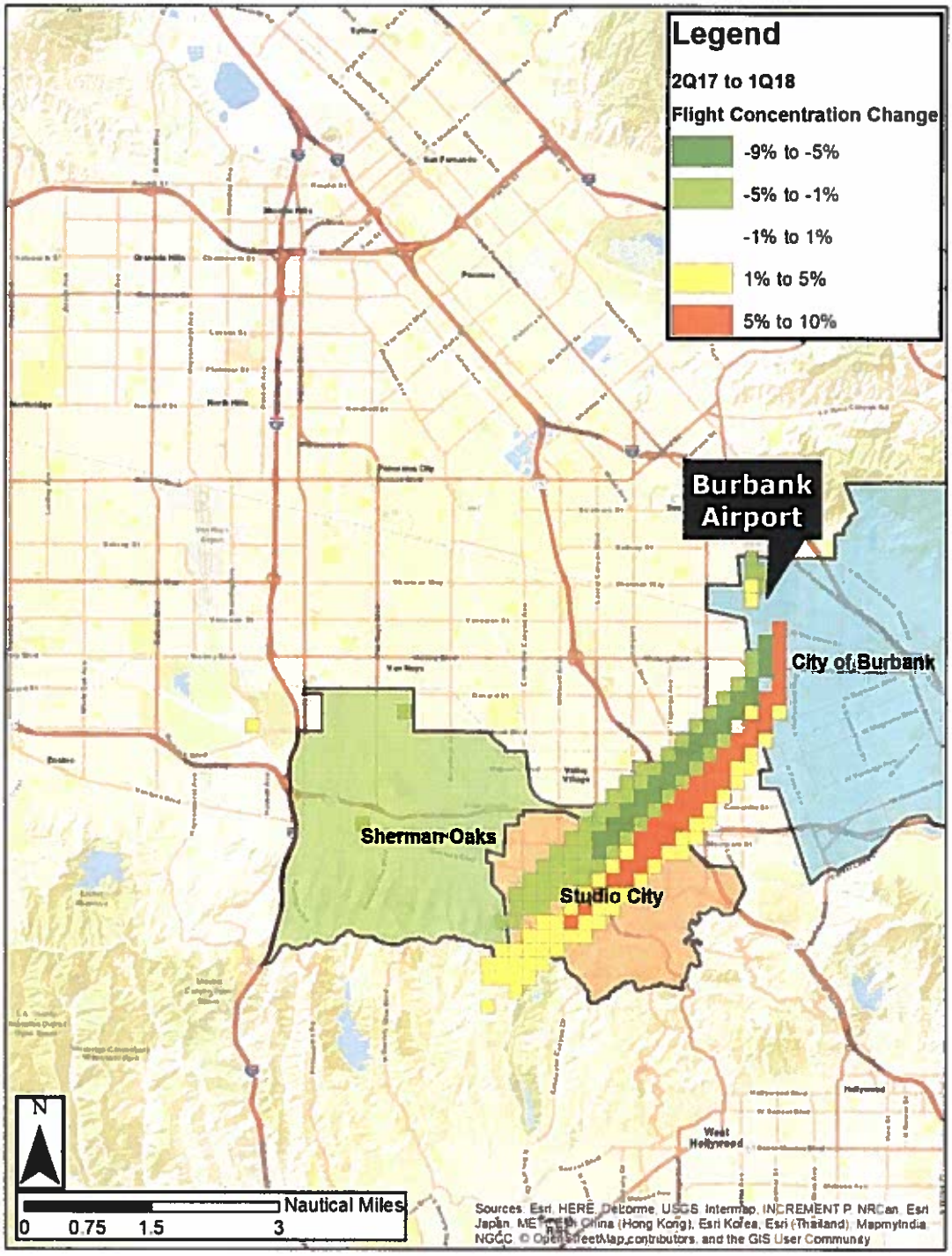


**Figure 20** below compares the first full quarter after Metroplex implementation and the most recent full quarter of airport operations.

**Figure 20**
**FLIGHT CONCENTRATION CHANGE - FROM 2nd QUARTER 2017 TO 1ST QUARTER 2018**



Figures 17 to 20 showed that the Runway 15 departure flight track concentration continuously shifted south during periods prior to and after the Metroplex implementation in March 2017. Based on the above flight track concentration analysis two (2) conclusions can be made: 1) the most frequently used Runway 15 flight path has gradually changed (shifted south) over the last 10 years, and 2) flight path changes cannot definitively be attributed to the Metroplex implementation in March 2017.

# 5. FREQUENCY OF FLIGHTS

Airport operational data from ANOMS was used to quantify the frequency of Runway 15 departures between 2008 through 2017. The following figures are divided into two sections: 1) departures performed by all aircraft types, and 2) departures performed by air carrier aircraft only.

The figures illustrate the average number of departures per hour during the morning (7:00 a.m. to 12:00 p.m.), afternoon (12:00 p.m. to 5:00 p.m.), evening (5:00 p.m. to 10:00 p.m.), and nighttime (10:00 p.m. to 7:00 a.m.) periods. The vertical axis labels on the "All Aircraft" and "Air Carrier" charts are a maximum of 14 and 12 hourly departures, respectively.

## 5.1 ALL AIRCRAFT TYPE FLIGHT FREQUENCY

**Figure 21**
**AVERAGE HOURLY DEPARTURES – ALL AIRCRAFT (7 a.m. to 12 p.m.)**

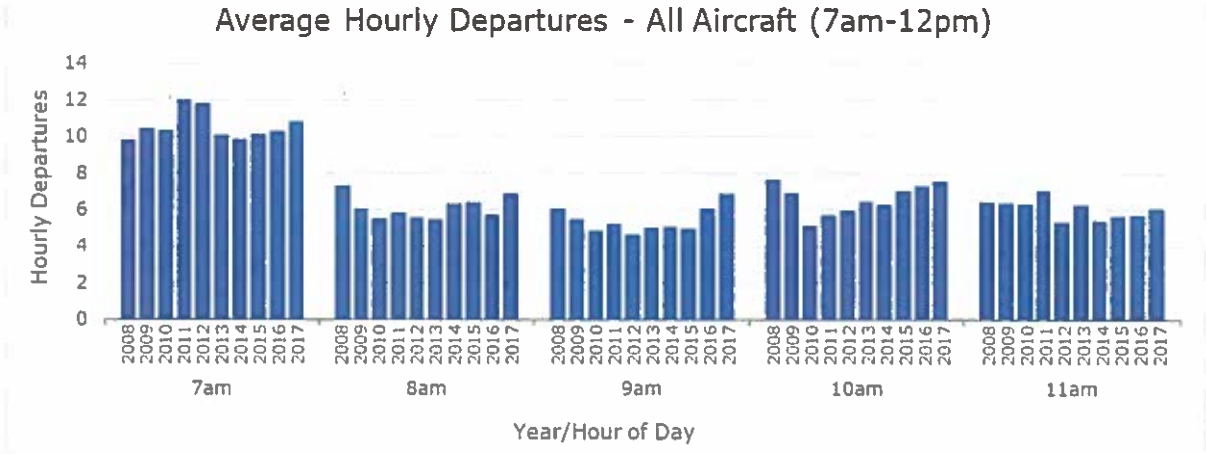


**Figure 22**
**AVERAGE HOURLY DEPARTURES – ALL AIRCRAFT (12 p.m. to 5 p.m.)**

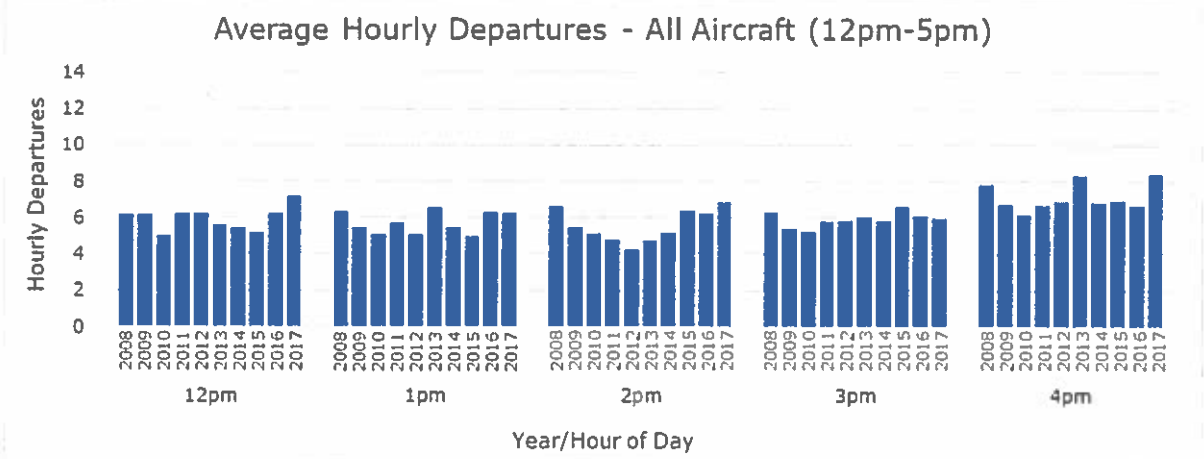



**Figure 23**
**AVERAGE HOURLY DEPARTURES – ALL AIRCRAFT (5 p.m. to 10 p.m.)**

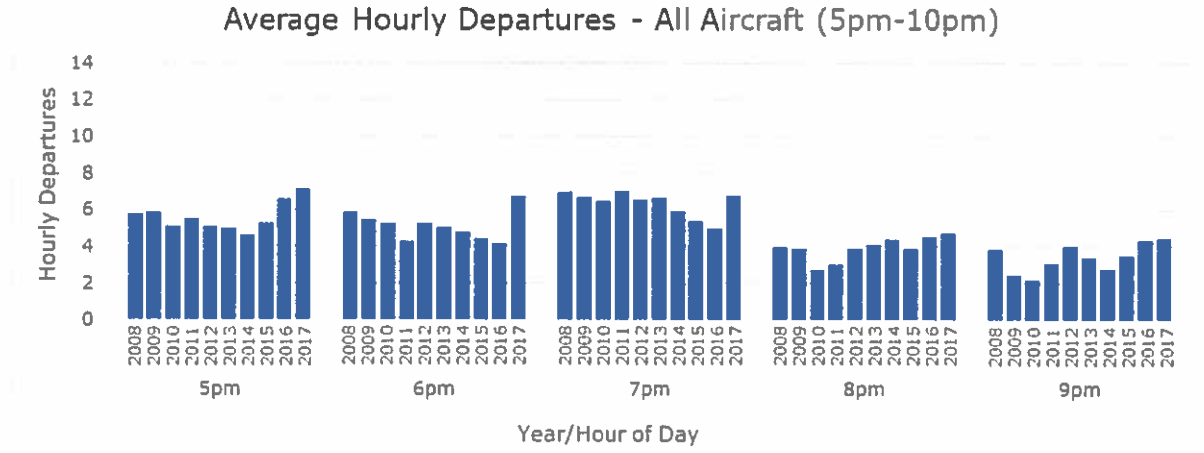
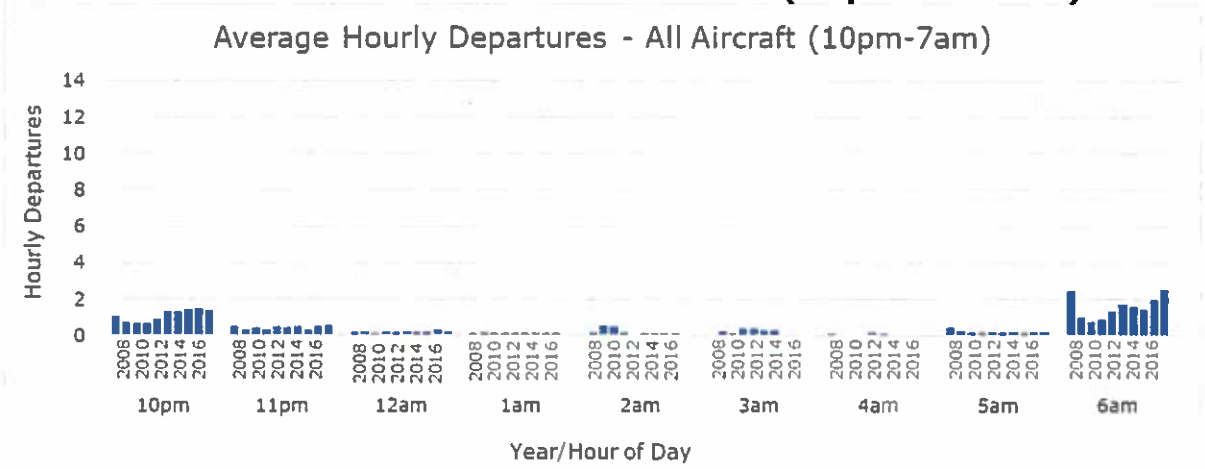


**Figure 24**
**AVERAGE HOURLY DEPARTURES – ALL AIRCRAFT (10 p.m. to 7 a.m.)**




## 5.2 AIR CARRIER FLIGHT FREQUENCY

**Figure 25**
**AVERAGE HOURLY DEPARTURES – AIR CARRIER (7 a.m. to 12 p.m.)**

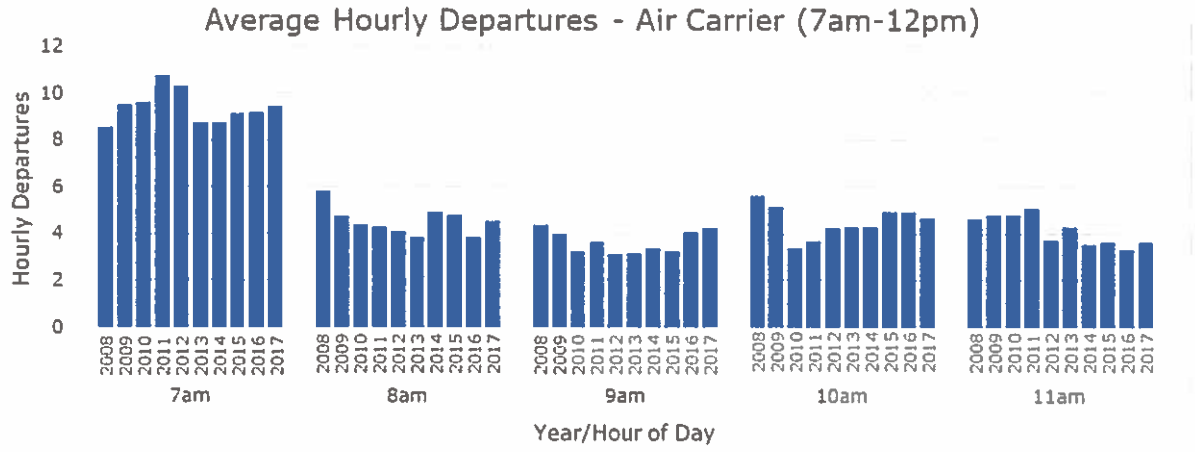


**Figure 26**
**AVERAGE HOURLY DEPARTURES – AIR CARRIER (12 p.m. to 5 p.m.)**

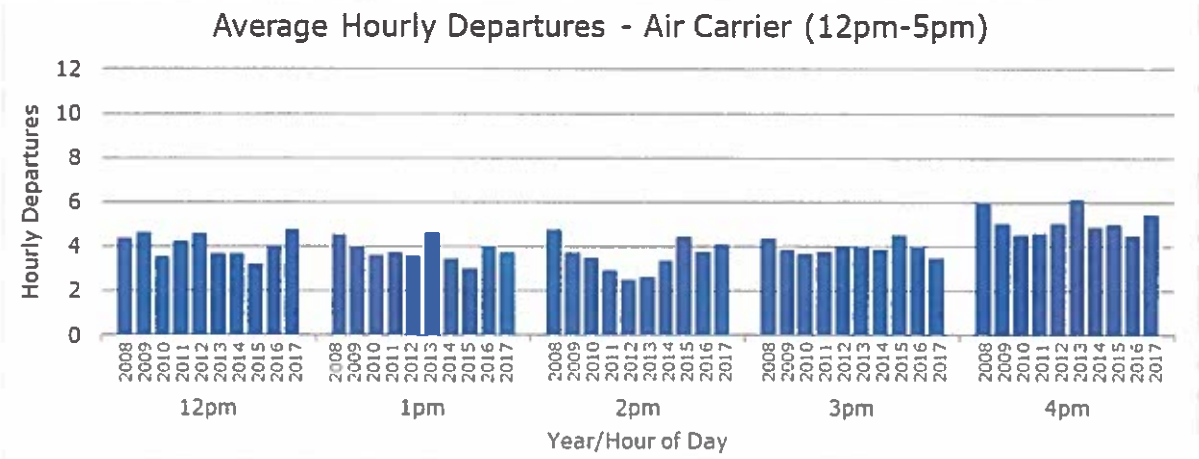



**Figure 27**
**AVERAGE HOURLY DEPARTURES – AIR CARRIER (5 p.m. to 10 p.m.)**

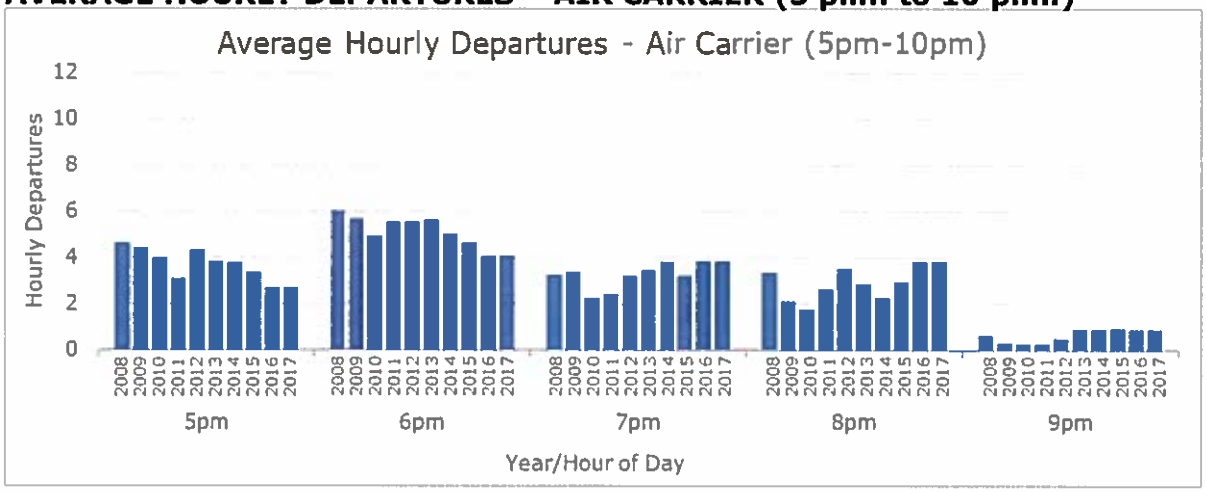
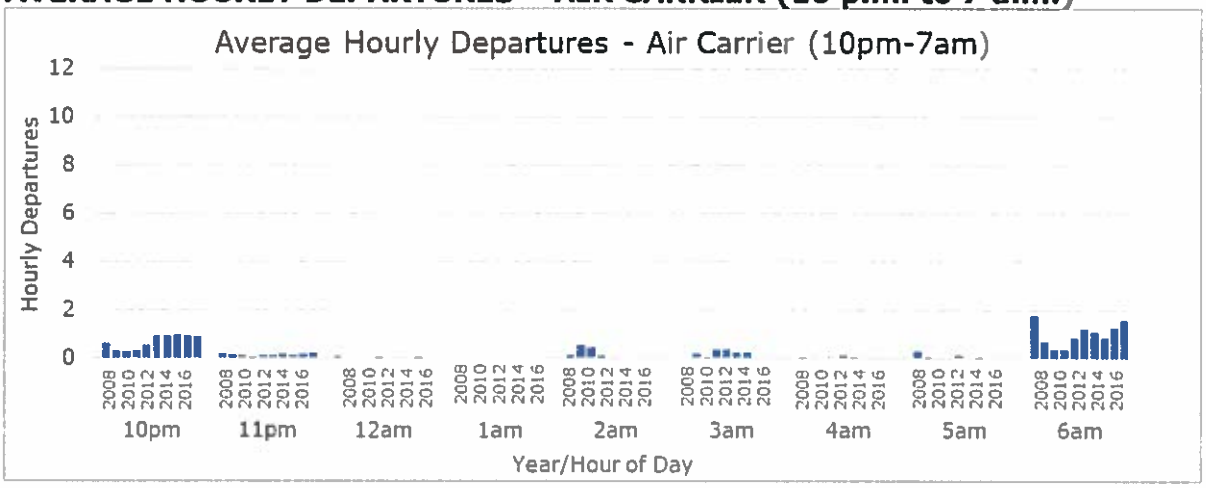


**Figure 28**
**AVERAGE HOURLY DEPARTURES – AIR CARRIER (10 p.m. to 7 a.m.)**



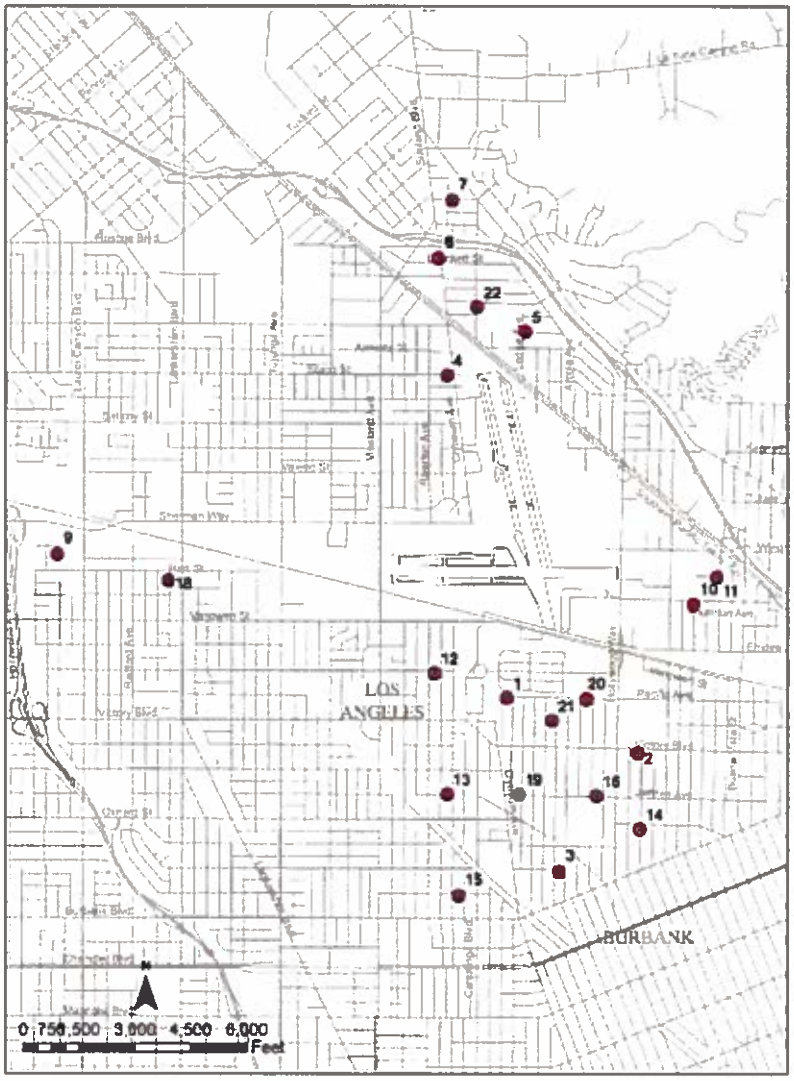

Figures 21 through 28 show the average number of hourly departures which have fluctuated over the past 10 years. During this period of time, the hour of the day with the highest average number of hourly departures was the 7:00 a.m. hour. According to community members, the number of large jet (air carriers) departures that occurred during the 7:00 a.m. hour increased noticeably after the Metroplex implementation in March 2017. Based on **Figure 25**, the average hourly departures during the 7:00 a.m. hour increased from 9.20 in 2016 to 9.45 in 2017. Over the past 10 years, the highest number of average hourly departures during the 7:00 a.m. hour was 10.8 in 2011.

Additionally, community members expressed a concern about air carrier departures during the airport's voluntary curfew, which requests that air carriers refrain from scheduling flights between 10:00 p.m. and 7:00 a.m. Based on **Figure 28**, the average hourly air carrier departures during the nighttime hours has been less that two (2) per hour over the past 10 years, and increased from 1.26 in 2016 to 1.56 in 2017 during the 6:00 a.m. hour.

# 6. NOISE MONITOR LEVELS

The airport currently operates 20 Noise Monitoring Terminals (NMTs) located at various sites around the airport. **Figure 29** shows a map of the NMTs.

**Figure 29**
**NMT MAP**

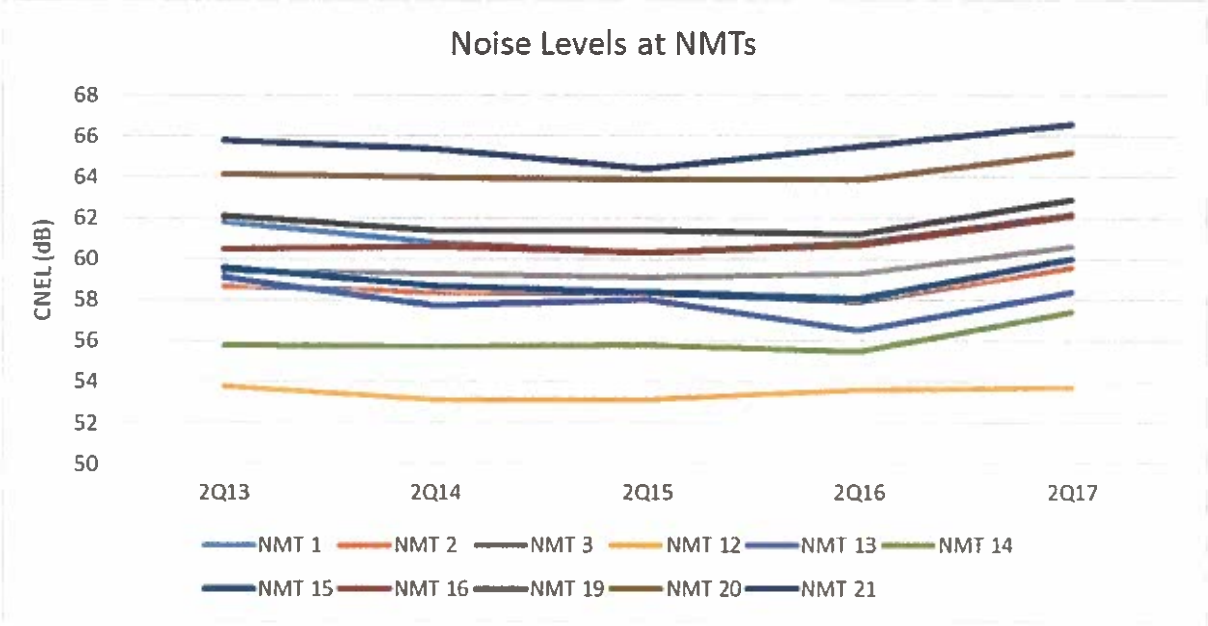



BURBANK AIRPORT - NOISE MONITOR LOCATIONS

These NMTs collected noise data produced by any noise source. Aircraft noise was correlated to aircraft operations to develop sound exposure levels at various metrics including single event levels and cumulative (average) noise levels. The Community Noise Equivalent Level (CNEL) is a cumulative noise level that is calculated by the NMTs and reported by the airport noise abatement office every three (3) months.

Eleven NMTs are located south of the airport and near the Runway 15 departure path. **Figure 22** shows the CNEL summary noise levels in decibels (dB) at these NMTs during the 2nd Quarter of each of the last five (5) years.

**Figure 22**
**SOUTH OF AIRPORT NMT - CNEL**




The noise levels remained constant over the past 5 years and showed an average increase between the 2nd Quarter 2016 and 2nd Quarter 2017 of approximately 2.4%. As shown on **Figure 5**, the number of operations increase by 17.8% between the 2nd Quarter 2016 and 2nd Quarter 2017. Therefore, the increase in CNEL at the NMTs located south of the airport is due to an increase in operations and not a result of the Metroplex implementation.

# 7. ALTITUDE ANALYSIS

To compare the altitude of Runway 15 (BUR field elevation is 778 feet above sea level) jet aircraft departures over time, four (4) flight corridor gates[5] were created and positioned to capture approximately all of the departures along the departure corridor over nearby cities. **Figure 23** shows a maps of the following gates:

**Victory Gate –** This gate is located along W. Victory Blvd in the City of Burbank in an east to west direction. The left end of the gate is located at N. Niagara St. and the right end of the gate is located at Craner Ave. The center of the gate is located at approximately Evergreen St.

**North Hollywood Gate –** This gate is located over North Hollywood in a southeast to northwest direction. The left end of the gate is located at the Lakeside Golf Club and the right end of the gate is located near the corner of Erwin St. and Gentry Ave. The center of the gate is located near the corner of Vineland Ave. and Magnolia Blvd.

**North of 101 Gate –** This gate is located over Valley Village on Laurel Canyon Blvd. in a south to north direction. The left end of the gate is located at the 101 Freeway and the right end of the gate is located near Erwin St. The center of the gate is located near Chandler Blvd.

**South of 101 Gate –** This gate is located over Studio City and Beverly Hills in a south to north direction. The left end of the gate is located near Cherokee Ln. in Beverly Hills and the right end of the gate is located at the 101 Freeway. The center of the gate is located near Iredell St. in Studio City.

**Figure 24** shows the flight corridor gates and three (3) days of Runway 15 departure tracks.

[5] A flight corridor gate is a two-dimensional vertical cross section created in ANOMS to analyze flight attributes as aircraft pass through (penetrate) the gate. These attributes include aircraft altitude in feet above field level, time of penetration, and distance in feet from the center of the gate. The direction of the gate is similar to the direction of the flight path and it is identified by an arrow that extends from the center of gate. The distance from the center of the gate is quantified by positive numbers to the right side of the gate and negative numbers to the left side of the gate.

**Figure 23**
**FLIGHT CORRIDOR GATES**

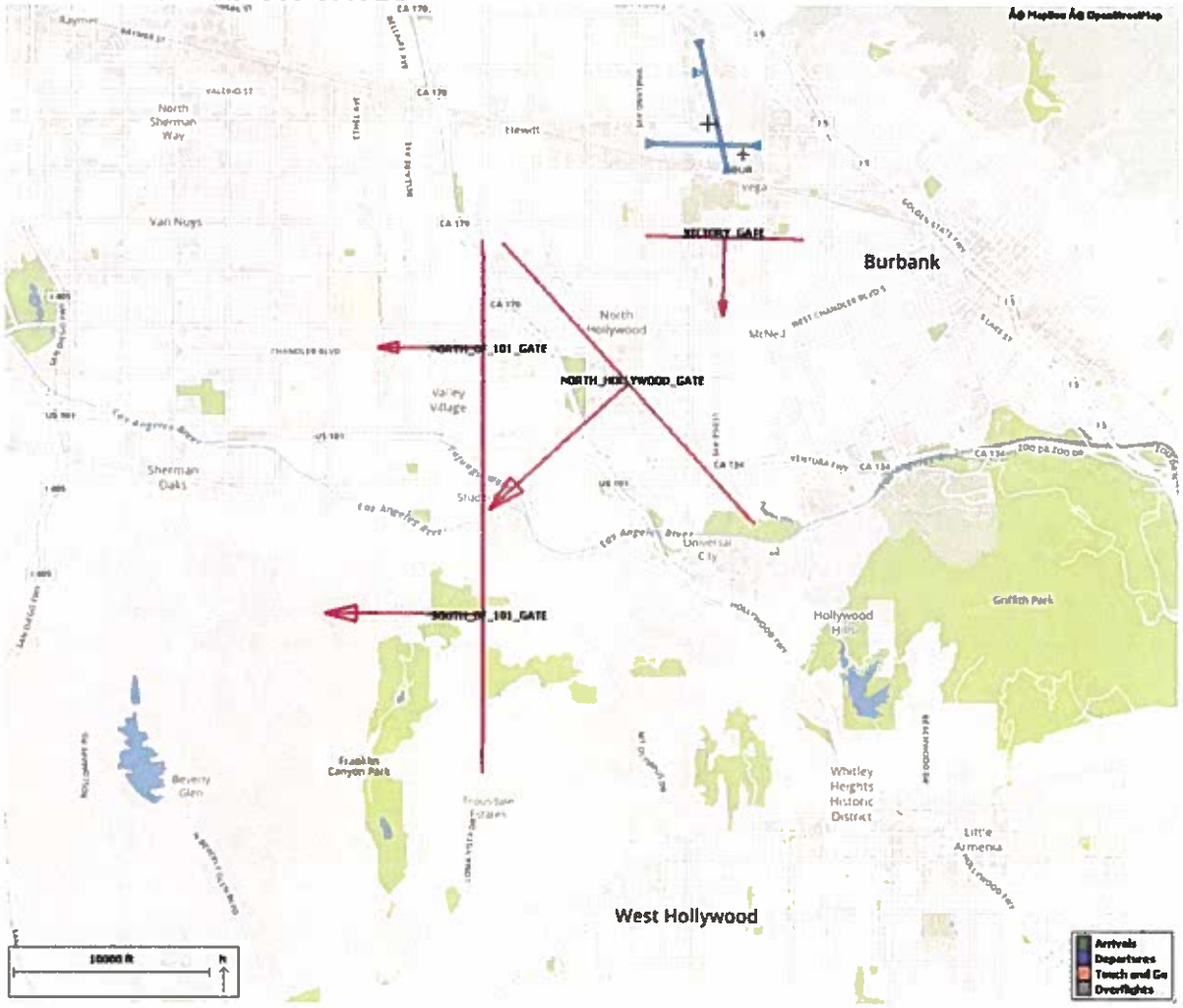
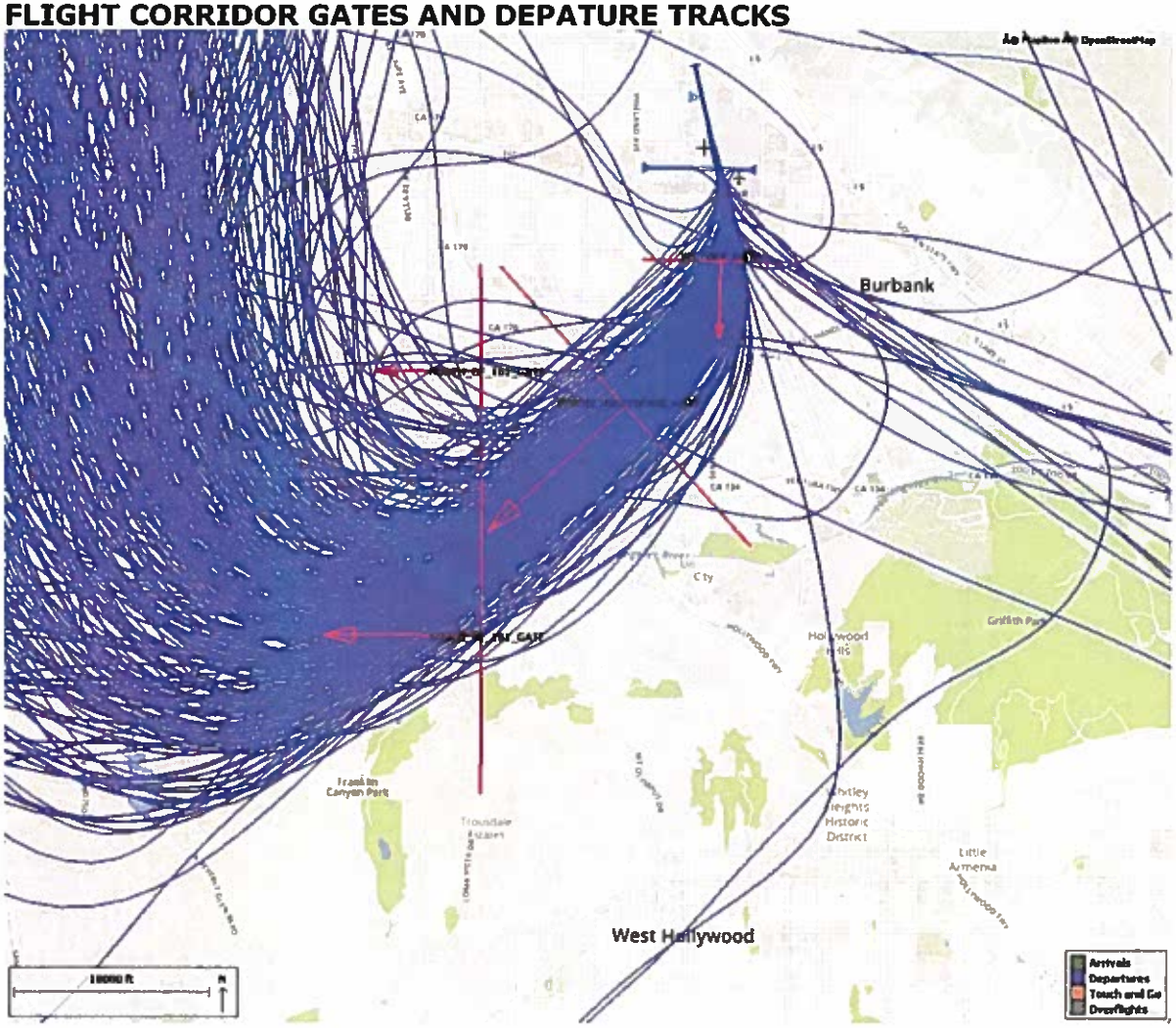


**Figure 24**
**FLIGHT CORRIDOR GATES AND DEPATURE TRACKS**



## 7.1 ALTITUDE AT GATES

As aircraft pass through a gate, the altitude is identified by the noise monitoring system. The following figures show the average monthly altitudes at each gate of Runway 15 departures that occurred during the 10-year period between 2008 and 2017. The y-axis represents the average altitude above field level in feet, and the x-axis represents the months and years.

**Figure 25**
**ALTITUDE AT VICTORY GATE**

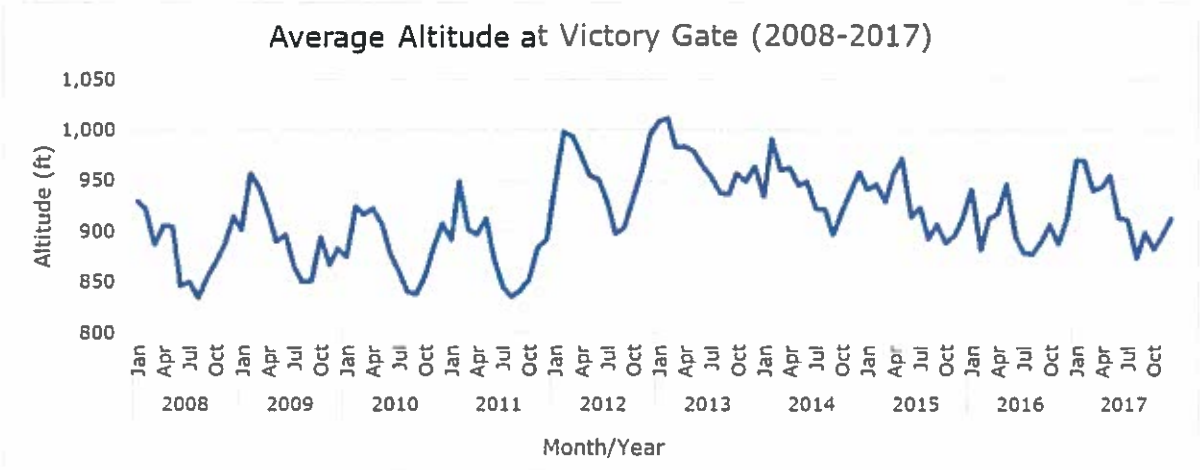



**Figure 26**
**ALTITUDE AT NORTH HOLLYWOOD GATE**

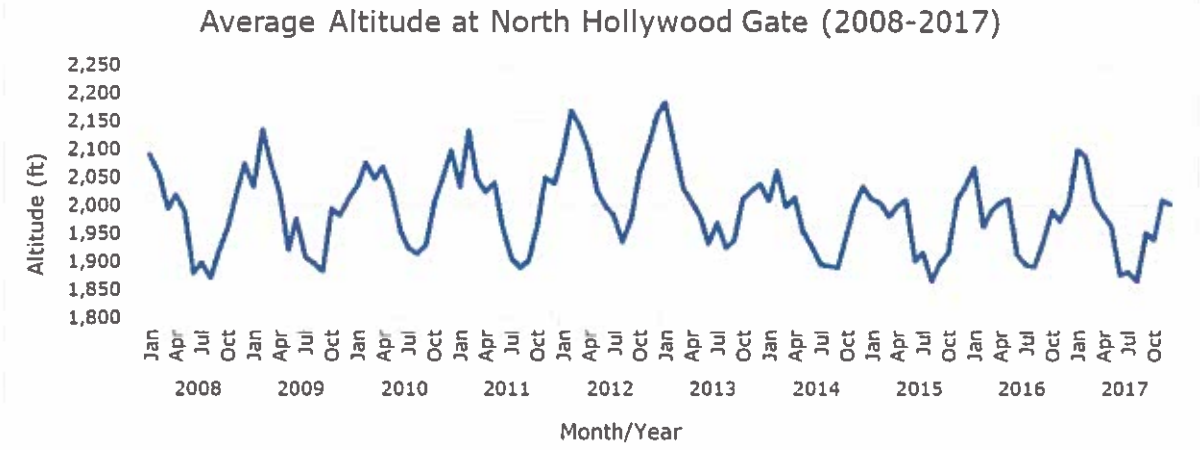


**Figure 27**
**ALTITUDE AT NORTH OF 101 GATE**

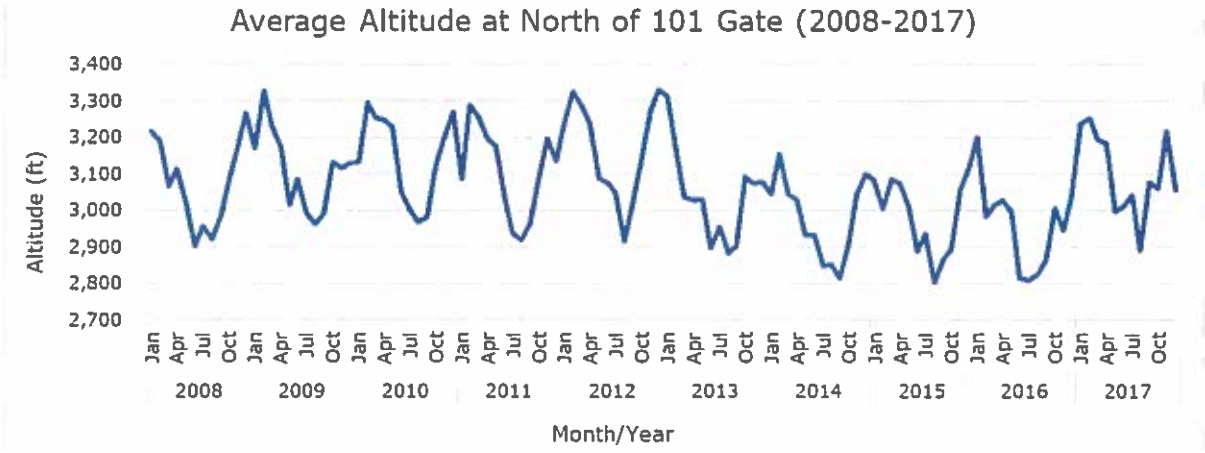
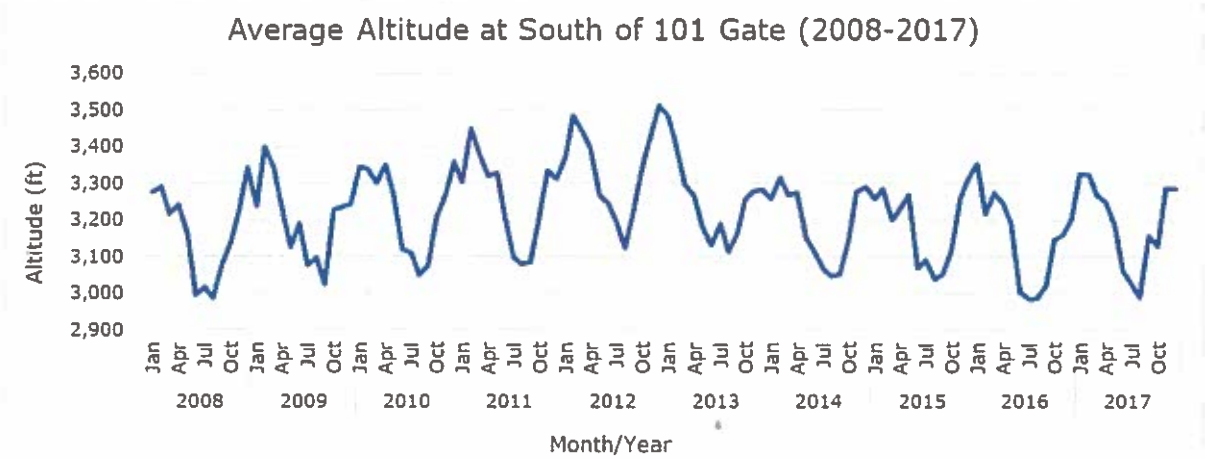



**Figure 28**
**ALTITUDE AT SOUTH OF 101 GATE**




## 7.2 TEMPERATURE

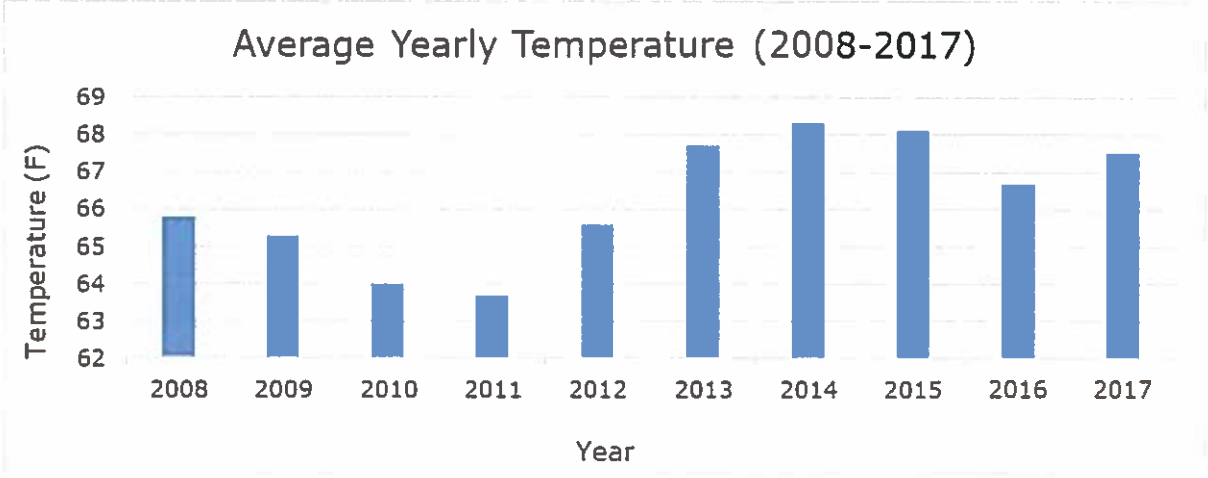
An aircraft's ability to climb is impacted by atmospheric conditions including temperature. Generally, aircraft can gain altitude quicker during cold temperature conditions than during hot temperatures conditions. **Figures 25 through 28** show that aircraft altitudes fluctuate seasonally. During the winter months, aircraft are at higher altitudes than during the summer months. This seasonal average altitude fluctuation ranges from approximately 150 feet at the Victory Gate to approximately 400 feet at the North of 101 and South of 101 Gates. Given that these are average altitudes, the range between the maximum and minimum altitudes of individual departures would be greater.

The average altitudes for the 10-year period at the Victory Gate was 907 feet. The average altitude at the North Hollywood Gate was 1,984 feet from 2008 to 2013. However, as shown on **Figure 29,** the average yearly temperatures[6] began to increase in 2012 lowering the average altitude to 1,957 feet from 2013 to 2017. A similar effect can be observed on the North of 101 and South of 101 Gates.

The average altitude at the North of 101 Gate from 2008 to 2013 was 3,053 feet and from 2013 to 2017 was 2,932 feet.

The average altitude at the South of 101 Gate from 2008 to 2013 was 3,205 feet and from 2013 to 2017 was 3,159 feet.

**Figure 29**
**AVERAGE YEARLY TEMPERATURE AT BURBANK AIRPORT**




## 7.3 DEVIATION FROM THE CENTER OF GATES

In addition to identifying where departures pass through the gate on the y-axis to capture a flight's altitude, the noise monitoring system can identify where departures pass through the gate relative to its center on the x-axis. This location is referred to as the deviation from center. The following figures show the average monthly deviation from center at each gate of Runway 15 departures that occurred during the 10-year period between 2008 and 2017. The y-axis represents the average deviation from center in feet, and the x-axis represents the months and years. Zero (0) on the y-axis represents the center of the gate. Negative values represent the deviation distance left of center and positive values represent the deviation distance right of center.

[6] The temperature sources was the National Oceanic and Atmospheric Administration (NOAA) at the BUR location.

**Figure 30**
**DEVIATION FROM CENTER OF VICTORY GATE**

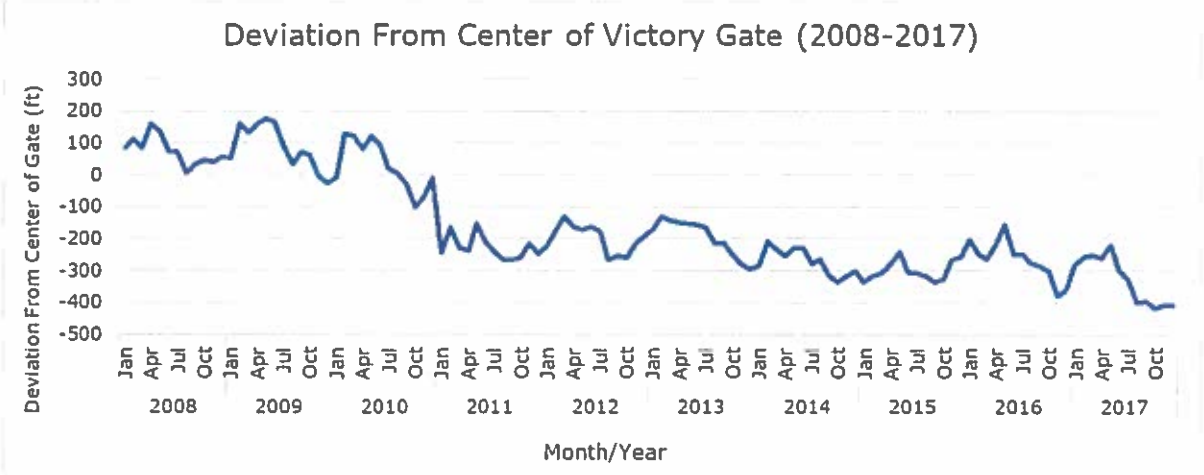



**Figure 31**
**DEVIATION FROM CENTER OF NORTH HOLLYWOOD GATE**

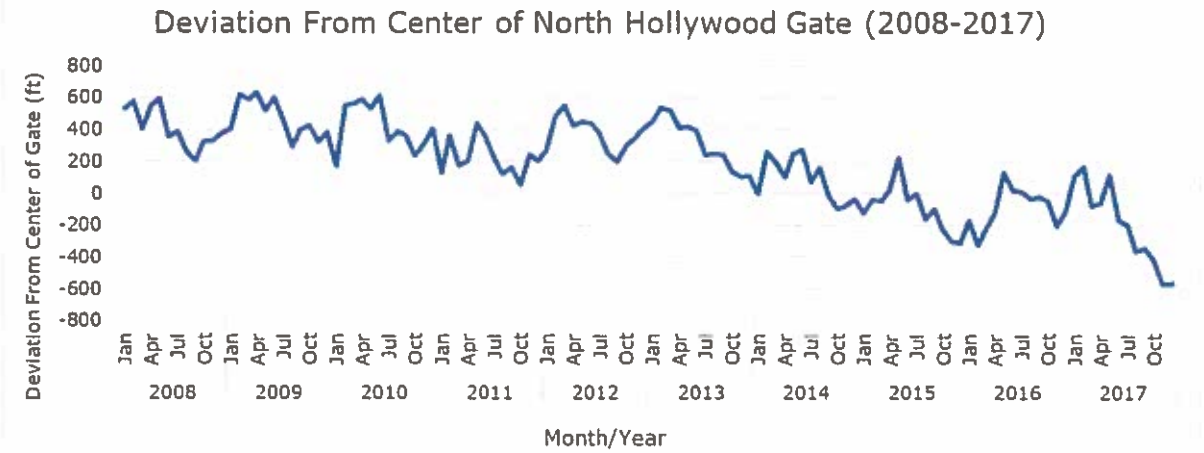


**Figure 32**
**DEVIATION FROM CENTER OF NORTH OF 101 GATE**

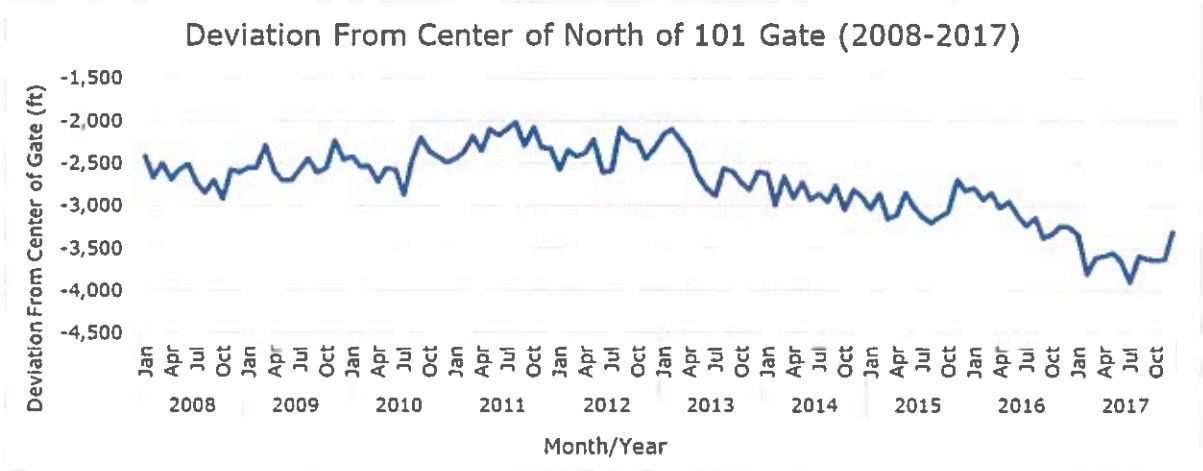
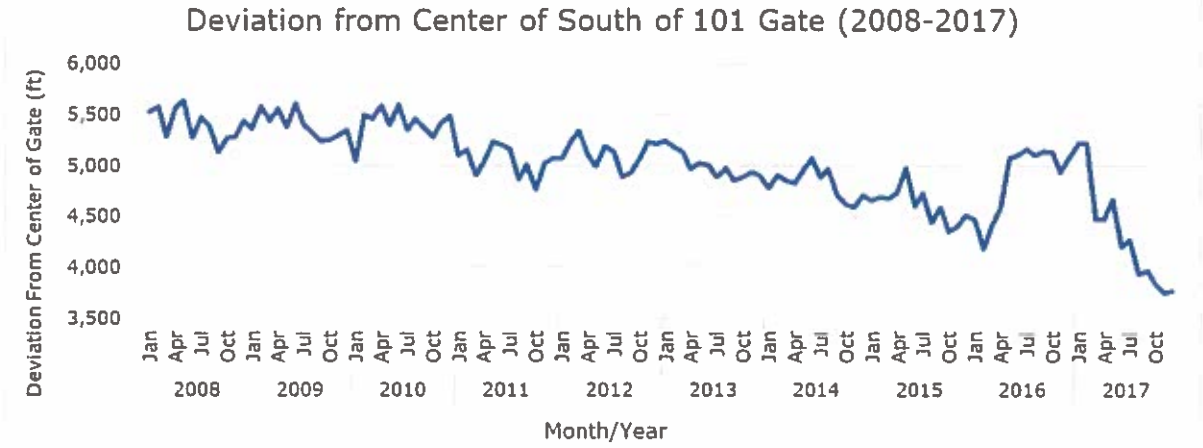



**Figure 33**
**DEVIATION FROM CENTER OF SOUTH OF 101 GATE**




**Figures 30 through 33** show that the average deviation from center at each gate has increased over time. This means that the average departure track has moved from right to left at each gate.

**Section 4** shows that the concentrated flight path for Runway 15 departures has shifted south over time. Similarly, **Figures 30 through 33** show that the average departure track has shifted east at the Victory Gate and shifted south at the North Hollywood, North of 101, and South of 101 gates.

## 7.3 FREQUENCY OF DEPARTURES AT GATES

**Section 5** shows that the average number of Runway 15 departures (from the runway) per each hour of the day have remained consistent over time with slight increases due to the overall increase in jet aircraft operations. A similar consistency is observed at the Victory and North Hollywood gates because essentially all of the departures go through these two gates. However, a detailed evaluation of the North of 101 and the South of 101 Gates shows that the frequency of flights through the South 101 Gate has increased at a higher rate than shown in **Section 5**.

**Figure 34** shows the number of yearly departures through the North 101 and South 101 Gates between 2008 and 2017 and shows that the proportion of departures through the South 101 Gate has increased from 70% in 2009 to 92% in 2017. The values for the 2016 and 2017 columns are shown for reference.

**Figure 34**
**YEARLY DEPARTURES THROUGH NORTH 101 AND SOUTH 101 GATES**

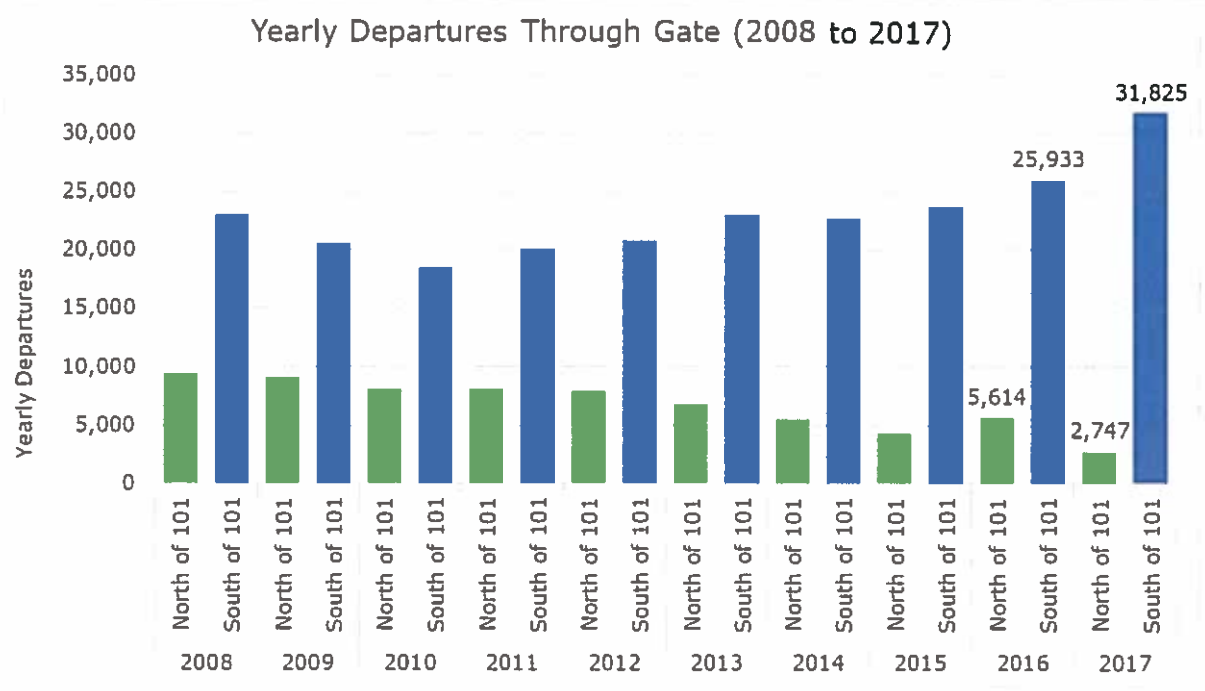


**Figure 35**
**MONTHLY DEPARTURES THROUGH NORTH 101 AND SOUTH 101 GATES**

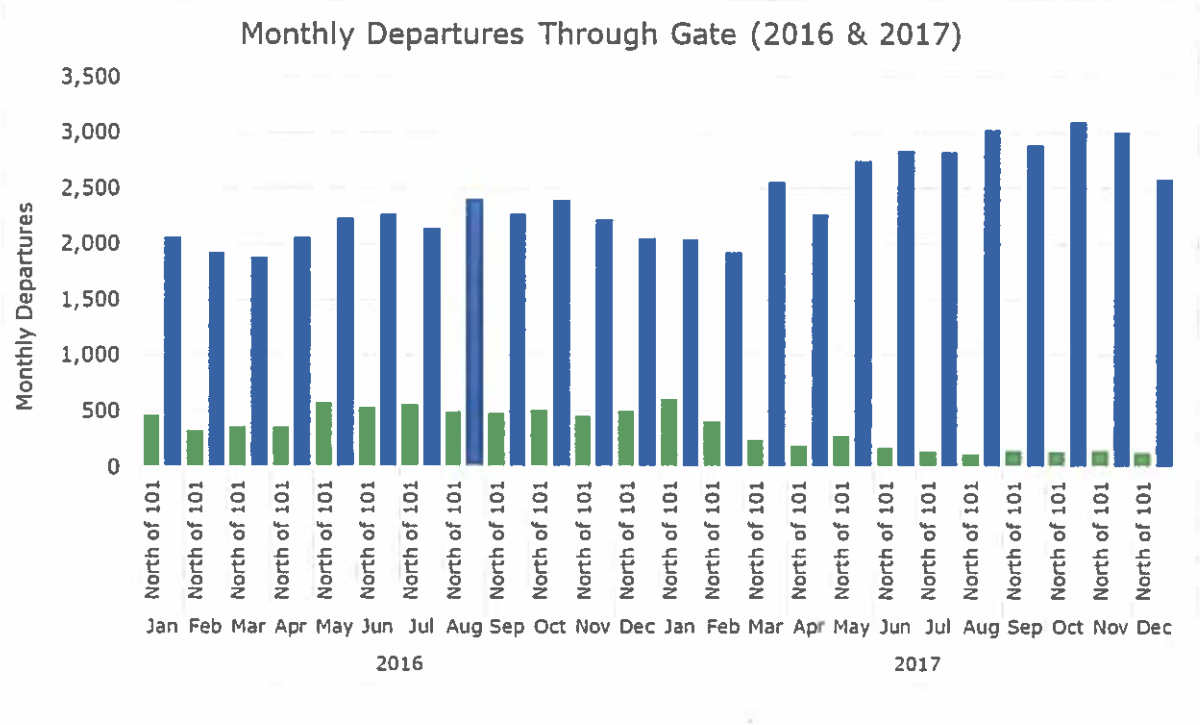



**Figure 35** shows that the proportion of departures through the South 101 Gate has increased from 82% in January 2016 to 95% in December 2017. The proportion of departures increased from 83% in February 2017 to 91% in March 2017, or an 8% increase. However, the proportion increased from 91% in March 2017 to 92% in April 2017, or a 1% increase. Since June 2017 the proportion for departures through the South of 101 gate has stabilized at approximately 95%.

The proportional increase in the number of departures through the South of 101 Gate is also observed by evaluating the average hourly departures as shown on **Figures 36 through 39**. The values for the 2016 and 2017 columns are shown for reference.

**Figure 36**
**AVERAGE HOURLY DEPARTURES (7 a.m. to 12 p.m.)**

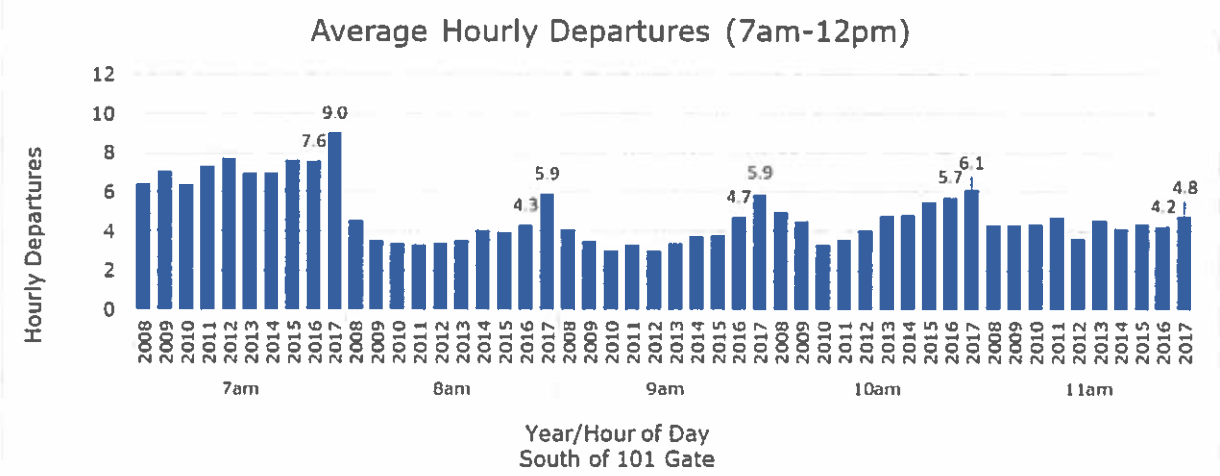



**Figure 37**
**AVERAGE HOURLY DEPARTURES (12 p.m. to 5 p.m.)**

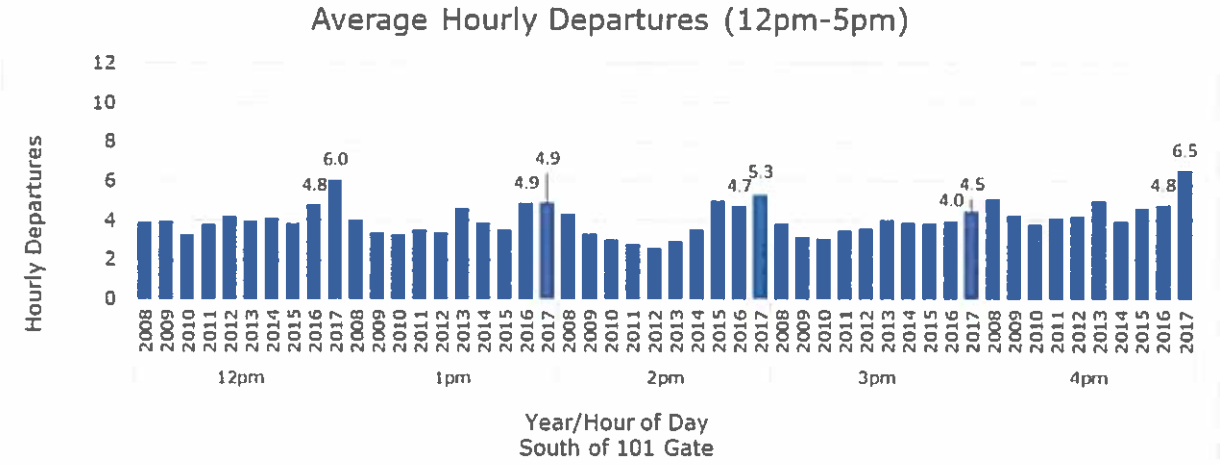


**Figure 38**
**AVERAGE HOURLY DEPARTURES (5 p.m. to 10 p.m.)**

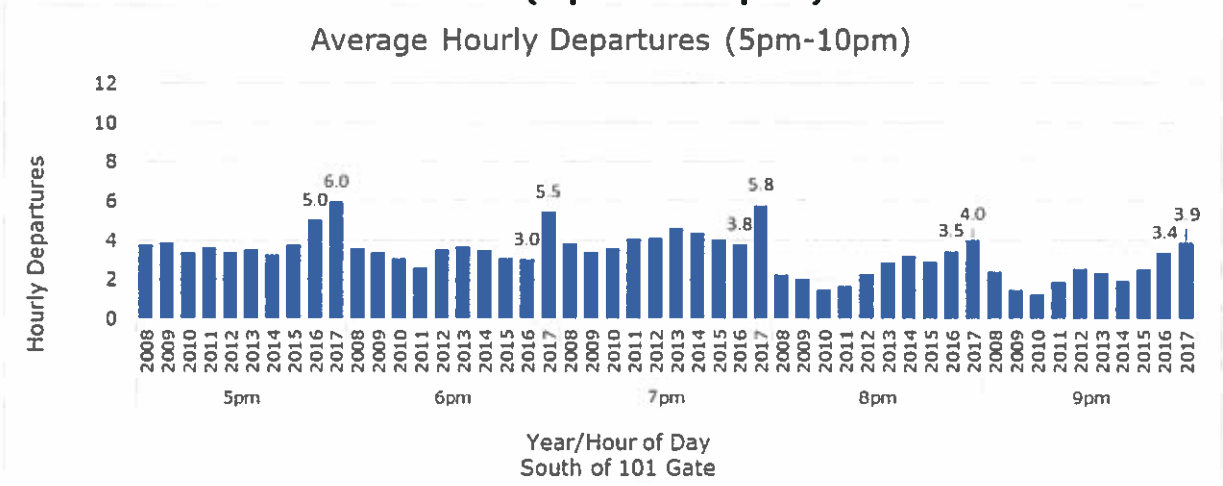
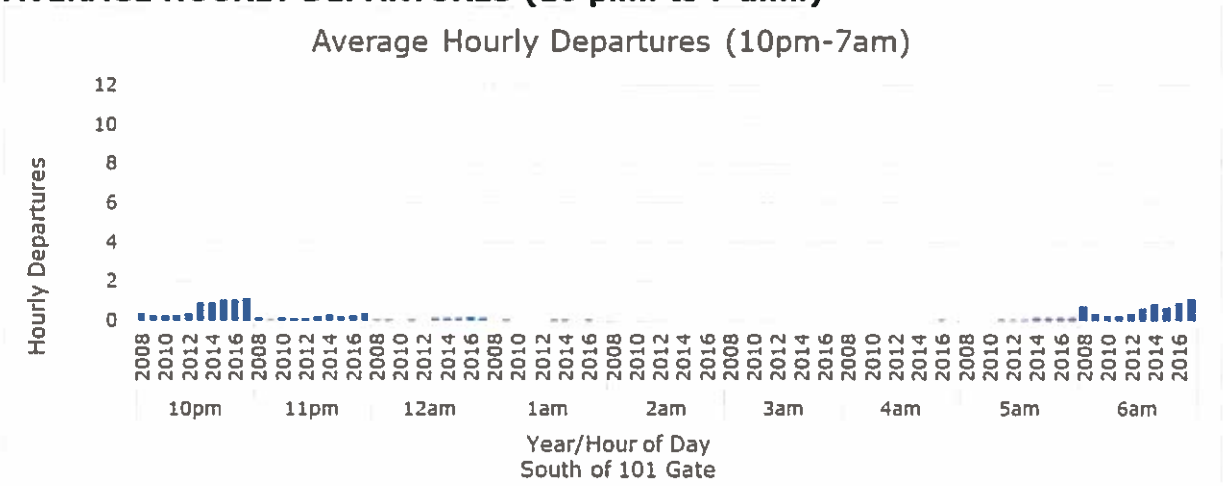



**Figure 39**
**AVERAGE HOURLY DEPARTURES (10 p.m. to 7 a.m.)**



# 8. FAA COMMENTS

As part of this analysis, L&B contacted FAA Air Traffic Control Tower (ATCT) personnel to provide information relative to BUR flight procedures on May 2 and June 13, 2018. Below is a summary of the discussions and findings:

- According to the FAA, the departure procedure has not changed. The first turn is to a 210 heading and the next turn north occurs once the aircraft has reached the Minimum Vectoring[7] Altitude (MVA) of 3,000 feet above sea level. Once the aircraft has reached 3,000 feet and the vectoring instructions are given, several seconds could pass before the pilot begins the turn and the aircraft actually begins to turn.
- Prior to Metroplex, which was implemented on March 2017, the departure shift to the south could be attributed to the overall year-over-year increase of flight operations in the regional airspace.
- The use of the aircraft's Flight Management System (FMS) could have also played a role given that a pilot could fly the aircraft or select the autopilot to fly the aircraft on the conventional Standard Instrument Departure (SID). The flight path of departures not using the FMS were generally more dispersed than departures using the FMS.
- Once the RNAV[8] procedure was published during Metroplex, the number of pilots who used the RNAV procedure gradually increased. When these pilots selected the FMS autopilot to fly the aircraft, the flight path became more concentrated when compared to the flight path of a conventional SID.
- VNY departures are independent of BUR departures. ATCT releases departures between VNY and BUR one at a time.

As described in **Section 7.2**, an aircraft's ability to climb is impacted by temperature. Generally as temperatures increase, aircraft fly a longer distance to reach the MVA of 3,000 feet and begin the turn north. As shown in **Figure 29**, the average yearly temperatures for 2008 and 2013 were 65.8 and 67.7 degrees, respectively. Although the MVA has not changed, this increase in temperature may have impacted the location at which the turn to the north occurred between 2nd Quarter 2008 and 2nd Quarter 2013 and contributed to the shift south of the departure flight path as shown on **Figure 17**. A similar temperature impact may have occurred between the years 2013 and 2015, and then again between the years 2016 and 2017.

[7] The term Vectoring means to turn an aircraft in flight to a specific magnetic heading. Vectoring instructions are given by FAA ATC to pilots.

[8] RNAV stands for Area Navigation. RNAV arrival and departure procedures rely on satellite-based navigation equipment are more precise than conventional procedures that rely on ground-based equipment. The FAA has been implementing RNAV procedures for many years across the U.S. However, the Runway 15 departure RNAV was implemented in March 2017 as part of the FAA Metroplex project.

# 9. ROLES AND RESPONSIBILITIES

The operation of aircraft involves numerous stakeholders who have different roles and responsibilities. Relative to this flight path analysis, three (3) stakeholders provide the greatest input to how aircraft operate at BUR. This section provides a description of these stakeholder's roles and responsibilities.

## Federal Aviation Administration

The FAA's mission is to provide the safest, most efficient aerospace system in the world. The FAA is an organization that employs thousands of individuals in multiple divisions. The FAA division of Air Traffic Organization (ATO) is responsible for safe and efficient flight activity. The ATO has sole authority over the controlling of aircraft in flight and on the ground, and assigns aircraft to runways for departures and arrivals at an airport based primarily on wind, weather, local runway use plans, and other operational factors. Additionally, the ATO modifies and/or develops new procedures at airports to improve the safety and efficiency of the National Airspace System (NAS). Most recently, the ATO developed new procedures through the NextGen initiative to modernize the NAS.

The FAA Airports Division (AD) ensures that the NAS is safe, efficient, and environmentally responsible and meets the needs of the traveling public. The AD works with airports to ensure that they meet FAA safety guidelines, to develop plans for future growth, and to address environmental impacts. Additionally, the AD provides funding through entitlements and grants to assist airports to maintain and improve facilities.

## Hollywood Burbank Airport

The airport's mission is to provide a safe, efficient, and financially sustainable facility for airlines, general aviation users, tenants, and the traveling public while striving to be a good neighbor to nearby communities and address community concerns regarding airport facilities and aircraft operations. Additionally, the airport complies with all FAA safety and operational guidelines, promotes continuing air service and generates continuous economic benefits for the community at large.

## Airlines

Airlines are responsible for the transport of people and cargo to and from an airport in a safe, comfortable, and financially profitable way. Airlines schedule their flights according to market demand and their business models, as well as select the appropriate aircraft. Airlines must comply with FAA air traffic control instructions and comply with airport voluntary noise abatement procedures when feasible.

# 10. RECENT LEGAL DECISIONS

The implementation of NextGen/Metroplex resulted in numerous lawsuits against the FAA. Two (2) recent legal actions relative to the implementation of new flight procedures are described below.

### Phoenix Sky Harbor International Airport

The FAA revised flight paths around the United States under the NextGen plan, which uses more precise, satellite-based navigation to save time, increase how many planes airports can handle and reduce fuel burn and emissions. In Phoenix, the FAA implemented NextGen through an airport-specific process, which focused primarily on Phoenix Sky Harbor International Airport (PHX) and the airspace within approximately 25 miles from PHX. The FAA prepared an environmental analysis to assess the environmental impacts and determined that no significant impacts would occur as a result of the procedure changes. The FAA did consult with staff at PHX, but did not conduct any public outreach concerning the proposed changes until a month after they were implemented (September 2014). The City of Phoenix, who owns and operates PHX, initially attempted to work with the FAA to have the procedure changes reversed or to identify alternative flight paths. Seeing no progress in those efforts, the City filed a lawsuit against the FAA. The court ultimately ruled against the FAA.

In the Court's written opinion, it agrees with the City and Neighborhoods' argument that FAA approval of the new flight routes in September 2014 was "arbitrary and capricious" and violated the National Historic Preservation Act, the National Environmental Policy Act, and the Department of Transportation Act. The court ruling states that "by keeping the public in the dark, the agency made it impossible for the public to submit views on the project's potential effects—views that the FAA is required to consider." The ruling goes on to say that "The FAA had several reasons to anticipate that the new flight routes would be highly controversial: The agency was changing routes that had been in place for a long time, on which the City had relied in setting its zoning policy and buying affected homes. The air traffic over some areas would increase by 300%—with 85% of that increase attributed to jets—when before only prop aircraft flew overhead. The FAA found a 'potential [for] controversy' but did not notify local citizens and community leaders of the proposed changes as the agency was obligated to, much less allow citizens and leaders to weigh in." The Court agreed that the FAA violated its duty to consult with the City in assessing whether the new routes would substantially impair the City's parks and historic sites and that the FAA did not have enough information to find that the routes would not substantially impair these protected areas. The Court opinion states that "The FAA never conveyed the proposed route changes to senior officials in the City's Aviation Department, local officials responsible for affected parks or historic districts, or elected city officials."

### Washington D.C. Metroplex

In Washington D.C., the FAA implemented NextGen through a Metroplex program where revised flight paths were developed for the entire Washington D.C. metropolitan area. The FAA prepared an Environmental Assessment (EA) to disclose potential environmental impacts of the changes in flight procedures. There were opportunities

for the public to participate in the process and the airports affected by Metroplex changes were notified of the process. Several lawsuits were filed, with the most recently decided case coming from the Georgetown area. In this case, residents from Georgetown and a handful of other Northwest neighborhoods filed their petition in 2015, while the FAA's "final order" came in late 2013. Those who filed the petition wanted the FAA to reconsider new flight patterns, saying the agency kept them in the dark when it made its changes. However, in March 2018 the three-judge panel of the U.S. Court of Appeals for the District of Columbia Circuit dismissed the case, saying "Federal law requires that petitions seeking review of FAA actions be filed within sixty days of the agency's final order. Because petitioners failed to challenge it within the 60 day statutory time limit and had no 'reasonable grounds' for the delay, we dismiss the petition as untimely."

**Relevance to the Southern California Metroplex**

Based on these two rulings it is apparent that, because the FAA allowed for public input during the Metroplex programs, it likely would be difficult to obtain court review of claims that were not filed within 60 days of the FAA's final order.

# 11. CONCLUSIONS

The focus of this analysis was to address the community's concerns that flight paths changed due to the Metroplex implementation in March 2017. Comments, observations, and data from community members was gathered to develop the approach of this analysis. Operational data for the last 10 years was collected from the FAA and from the airport to analyze the number of operations, flight paths, noise levels, and frequency of flights. Based on the collected information, the conclusions are as follows:

- The highest number of monthly air carrier operations during the last 10 years occurred on July 2008 with 5,145 operations. The number of air carrier operations declined after that reaching the lowest number of operations, 2,900, on February 2015. This number increased after that until reaching the most recent peak number of operations in August 2017 with 4,680 operations. Metroplex was not a factor in the change of the total number of airport operations. The increase in the number of air carrier operations is a result of an expanding aviation market and not the Metroplex implementation.

- According to the FAA, the Runway 15 departure procedure has not changed. However, the gradual increase in use of the RNAV procedure has resulted in a flight path that is more concentrated than in the past.

- Based on the flight track concentration analysis the most frequently used Runway 15 flight path has gradually changed (shifted south) prior to 2017, partly due to the increase in the average yearly temperatures since 2011. However, since the Metroplex implementation, a greater proportion of departures have flown south of the 101 Freeway than north of the 101 Freeway. Since Metroplex was implemented, a gradual increase of pilots have flown the RNAV departure procedure, which has concentrated the flight path over areas south of the 101 Freeway.

- The increase in CNEL at the NMTs located south of the airport is due to an increase in operations and not attributed to the Metroplex implementation.

- The average number of departures per hour from the airport have remained consistent with the total number of departures over the past 10 years. During this period, the 7:00 a.m. hour was the busiest hour of the day peaking at 10.8 air carrier departures per hour in 2011. Between 2016 and 2017, the number of average hourly departures during the 7:00 a.m. hour were 9.20 and 9.45, respectively. However, due to the shift in location of the departure path, the frequency of flights has gradually increased over time over areas south of the 101 Freeway, especially between 2016 and 2017.

- The altitude of Runway 15 departures along the flight path fluctuate in sync with seasonal temperature fluctuations. Overall, the average altitude/climb of departures have remained consistent over time.