

V. Environmental Consequences

This Chapter discusses the potential environmental impacts that could result from implementation of the retained alternatives on all environmental resource categories specified in FAA Order 1050.1E.

Two alternatives were retained for evaluation of environmental impacts:

- Proposed Action—under which the FAA would optimize the air traffic routes serving the EA Airports, also referred to as the LAS Optimization Alternative. The primary components of the Proposed Action include:
 - New terminal airspace entry points and independent LAS RNAV STARs that are separated from VGT and HND RNAV STARs. RNAV STARs would include runway transitions to final approaches to runway ends at the EA Airports.
 - New terminal airspace exit points and independent LAS RNAV SIDs that are separated from VGT and HND RNAV SIDs, with new RNAV SIDs providing adequate segregation between arrival and departure procedures and including runway transitions from the EA Airport runway ends to the exit points.
- No Action Alternative—under which the FAA would not change air traffic routes serving the EA Airports.

Both the Proposed Action and No Action Alternative were evaluated for conditions in 2012, the year in which FAA proposes to begin implementation of the Proposed Action, and 2017, a five-year look-ahead.

As neither the Proposed Action nor the No Action Alternative would involve land acquisition or other shifts in population or communities, physical changes such as ground disturbance or facility development, or construction activities, neither alternative would result in impacts to the following environmental resource categories:

- Coastal Resources
- Construction Impacts
- Farmlands
- Floodplains
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Secondary (Induced) Impacts
- Socioeconomic Impacts
- Water Quality
- Wetlands
- Wild and Scenic Rivers

Implementation of the Proposed Action and the No Action Alternative have the potential to result in direct impacts to avian and bat species when in flight due to changes in air traffic routes that aircraft follow, as well as indirect environmental impacts associated with changes in air traffic routes. The indirect effects resulting from changes in air traffic routes may include changes in areas exposed to aircraft noise, changes in fuel consumption and fuel burn that could change aircraft emissions, and changes in areas exposed to light emissions and visual exposure to aircraft. **Table V-1** provides a summary of the applicable environmental impact categories related to these potential direct and indirect effects, thresholds defined to evaluate the significance of the impacts, and the findings of the impact assessment. These summary findings are discussed in greater detail in the remainder of this section, along with consideration of cumulative impacts.

Table V-1

Summary of Potential Environmental Impacts of Implementing the Proposed Action (2012 and 2017)

Environmental Impact Category	Threshold of Significance	2012	2017
Aircraft Noise	Would the Proposed Action, in comparison to the No Action Alternative, result in a DNL 1.5 dB increase in areas exposed to aircraft noise at or above DNL 65?	No	No
Compatible Land Use	Would compatible land use be converted to incompatible land use?	No	No
Department of Transportation Act, Section 4(f)	Would the Project result in a direct effect on Section 4(f) resources?	No	No
	Would a constructive use of Section 4(f) resources occur due to the project?	No	No
Historical, Architectural, Archaeological, and Cultural Resources	Would aircraft noise, light emissions, or visual effects affect the historical or cultural characteristics of historic resources or tribal lands?	No	No
Environmental Justice, and Children's Environmental Health and Safety Risks	Would the alternative affect low income or minority populations at a disproportionately higher level than other population segments?	No	No
	Would the alternative disproportionately affect children?	No	No
Fish, Wildlife, and Plants	Would the alternative increase the probability of aircraft strikes to migratory birds?	No	No
	Would the alternative result in an increase in noise that would have the potential to adversely affect the long-term survival of any species?	No	No
Natural Resources and Energy Supply	Would the alternative have a measurable effect on local supplies of energy?	No	No
Air Quality	Would the alternative cause air quality impacts?	No	No
Greenhouse Gas Emissions and Climate Change	Would the Proposed Action increase greenhouse gas emissions in comparison to the No Action Alternative?	No	No
Light Emissions and Visual Impacts	Would aircraft on the revised routes be visually intrusive to normal activities on the ground surface?	No	No

Note:

– indicates that the threshold of significance is not applicable to the No Action Alternative because the threshold is based on the change resulting from implementation of the Proposed Action compared with the No Action Alternative.

Source: Ricondo & Associates, Inc., February 2012.

Prepared by: Ricondo & Associates, Inc., February 2012.

5.1 Aircraft Noise

This section presents a summary of the analysis of aircraft noise exposure under the Proposed Action and the No Action Alternative. Appendix E presents additional information on this analysis. For comparison purposes, a discussion of existing aircraft noise exposure in the GSA is presented in Section 4.3.1.

5.1.1 Overview of Impacts

Aircraft noise exposure was modeled for 2012 and 2017 conditions for both the Proposed Action and the No Action Alternative (considering only IFR operations at the EA Airports). A noise change analysis, based on FAA's established thresholds of significance and disclosure, demonstrates that noise exposure resulting from implementation of the Proposed Action would not significantly affect the Las Vegas area population.

5.1.2 Methodology

An analysis of community exposure to aircraft noise within the GSA generated by aircraft projected to be operating IFR-filed flights between the surface and 10,000 feet AGL was conducted based on a forecast of IFR aircraft activity for the years 2012 and 2017 and modeled for conditions under both the No Action Alternative and Proposed Action. As described in Appendix E, noise that is sufficiently loud or frequent in occurrence may interfere with various human activities and/or be considered non-compatible with noise-sensitive land uses.

Section 4.3.1 describes the existing (2009) noise exposure levels in the GSA. This section describes future noise exposure associated with the Proposed Action and the No Action Alternative and compares the differences to determine if implementing the Proposed Action would result in a significant noise impact. The analysis shows how noise exposure levels in future years would vary between the Proposed Action and the No Action Alternative. If the Proposed Action is approved, FAA expects to implement the Proposed Action in 2012; therefore, aircraft noise modeling was completed for 2012 and five years later (2017) as required by FAA Order 1050.1E.

The noise modeling methodology, defined by FAA guidance and requirements for the assessment of aircraft noise in order to comply with NEPA requirements, was defined in Section 4.3.1.1 and Appendix E. Following this methodology, detailed information on IFR-filed aircraft operations within the GSA was assembled for input into the FAA's noise model, NIRS.¹ The information assembled included:

- Average annual day IFR flight schedules for 2012 and 2017
- Flight tracks (or trajectories)
- Runway use

For a given year, the Proposed Action and the No Action Alternative have the same flight schedule. Therefore, the noise change analysis evaluates the change in noise exposure due to the proposed

¹ Per U.S. Department of Transportation, Federal Aviation Administration, FAA Order 1050.1E, Change 1, Guidance Memo #4 (Subject: Guidance on Using AEDT 2a to Conduct Environmental Modeling for FAA Air Traffic Airspace and Procedure Actions, March 21, 2012), the FAA designated Aviation Environmental Design Tool (AEDT) 2a as the replacement model for NIRS and requires use of AEDT for aircraft noise modeling, fuel burn, and emissions modeling for FAA air traffic airspace and procedure actions. However, the guidance memo states that use of AEDT 2a is not required for projects whose environmental analysis began before March 1, 2012. The LAS Optimization EA environmental analysis began in 2010; thus, the LAS Optimization EA is exempt from this requirement.

changes in aircraft routings (i.e., flight tracks) and assumed changes in runway use in the Proposed Action compared to the No Action Alternative.

A detailed discussion of the development of the 2012 and 2017 average annual day flight schedules is provided in Appendix F.2. The future year schedules identify arrival and departure times, aircraft types, and origin/destination information for IFR aircraft operations on an average annual day in 2012 and in 2017.

The modeled flight tracks (i.e., the route and altitude profile of an aircraft's flight) were based on radar data collected for the existing conditions (2009) analysis and collaboration with FAA ATC personnel. Exhibits III-1 through III-48 provide graphic depictions of the routings under the No Action Alternative and Proposed Action, respectively. For the Proposed Action, flight tracks were developed from the aircraft procedures created by the LAS Optimization Airspace Design Team using the Terminal Area Route Generation, Evaluation, Traffic and Simulation (TARGETS) program.

The NIRS model was used to compute DNL values for 2012 and 2017 conditions at three sets of data points throughout the GSA: (1) census block centroids, (2) a uniform 1.5-nautical mile grid throughout the GSA to calculate DNL values at potential Section 4(f) resources, and (3) unique points representing small potential Section 4(f) resources (i.e., county and municipal parks) and historic sites not captured with the 1.5-nautical mile grid. Located within the GSA are a total of 22,417 census block centroids (of which 12,249 centroids represent areas with population and the remaining 10,158 centroids represent areas with zero population), 2,807 uniform grid points, and 337 unique points (refer to Section 4.3.1.1).

As discussed in Section 4.3.1.1, the FAA has developed specific guidance and requirements for the assessment of potential aircraft noise impacts on people. This guidance, described in FAA Order 1050.1E, requires analysis of aircraft noise in terms of the DNL metric. Additionally, the Order defines the threshold levels above which a change in aircraft noise is considered to cause a significant impact on people. In noise sensitive areas (residences, schools, etc.), the Order defines a significant impact as an increase of DNL 1.5 dB at a noise sensitive land use exposed to aircraft noise of DNL 65 and higher.

In 1990, FAA issued a noise screening procedure to evaluate whether certain airspace actions above 3,000 feet AGL might increase DNL levels by DNL 5 dB or more. The procedure served as a response to FAA experience that increases in noise of DNL 5 dB or more at cumulative levels well below DNL 65 could be disturbing to people and become a source of public concern. In 1992, the Federal Interagency Committee on Noise (FICON) recommended that in instances where there are increases of DNL 1.5 dB or more at noise sensitive locations in areas exposed to aircraft noise of DNL 65 and higher, that noise increases of DNL 3 dB or more in areas exposed to aircraft noise from DNL 60 to 65 should also be evaluated and disclosed. Increases of DNL 3 dB in areas exposed to aircraft noise below DNL 65 are not considered "significant impacts" but are to receive consideration in the environmental evaluation of a proposed project. FAA has adopted FICON's recommendation in FAA Order 1050.1E. The Order also stipulates that changes in exposure of DNL 5 dB or greater in areas exposed to aircraft noise from DNL 45 to 60 should be considered for airspace actions, such as changes to air traffic routes.

In the evaluation of the Proposed Action, the criteria listed in **Table V-2** are considered when determining the impact of changes in aircraft noise. The potential for a noise impact would be further assessed if the noise change analysis identifies an increase in noise exposure over noise sensitive land uses (represented by data points at census block centroids in the GSA) for the

Proposed Action as compared with the No Action Alternative that meets one or more of the criteria listed in the table.

Table V-2

Criteria for Determining Impact of Changes in Aircraft Noise

DNL Noise Exposure under Proposed Action	Increase in DNL with Proposed Action	Aircraft Noise Exposure Change Consideration
DNL 65 and higher	DNL 1.5 dB or greater ^{1/}	Exceeds Threshold of Significance
DNL 60 to 65	DNL 3.0 dB or greater ^{2/}	Considered When Evaluating Air Traffic Actions
DNL 45 to 60	DNL 5.0 dB or greater ^{3/}	Information Disclosed When Evaluating Air Traffic Actions

Notes:

- 1/ Source FAA, Order 1050.1E, Appendix A, Paragraph 14.3; Title 14 CFR Part 150.21 (2)(d); and Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Issues*, August 1992.
- 2/ Source FAA Order 1050.1E, Appendix A, Paragraphs 14.4c and 14.5e; and Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Issues*, August 1992.
- 3/ Source FAA Order 1050.1E, Appendix A, Paragraph 14.5e.

Sources: See Notes 1–3.

Prepared by: Ricondo & Associates, Inc., January 2012.

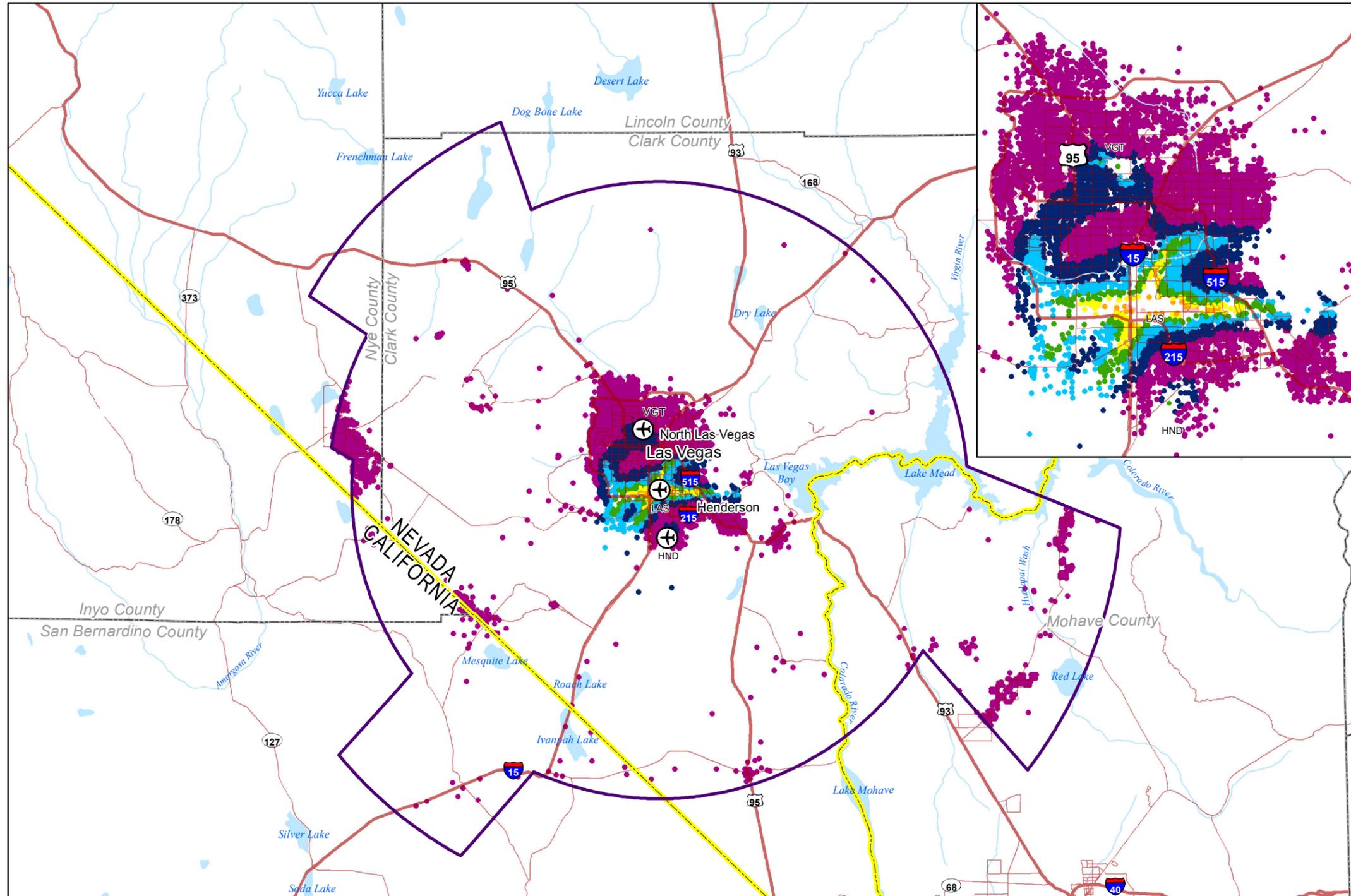
This section reports noise levels on population, as represented by the 12,249 census block centroids defined in the GSA. Potential noise impacts to Section 4(f) resources and historic resources (represented by the 2,807 grid points and 337 unique points) are discussed in Sections 5.3 and 5.4, respectively.

5.1.3 Potential 2012 Impacts

Although aircraft noise is often the most noticeable environmental effect associated with air traffic projects, changes in air traffic routes at higher altitudes do not always result in significant noise impacts. The noise analysis presented in this section confirms that the Proposed Action would not result in a significant change in noise exposure compared with the No Action Alternative.

Exhibits V-1 and V-2 show the calculated noise exposure levels at census block centroids expected in 2012 with the air traffic routes under the No Action Alternative and the changes in air traffic routes under the Proposed Action, respectively. **Table V-3** shows that approximately 3,000 people within the GSA would be exposed to aircraft noise of DNL 65 and higher in 2012 under the Proposed Action, compared with 3,124 people under the No Action Alternative. Therefore, 106 (or 3.4 percent) fewer people would be exposed to aircraft noise of DNL 65 and higher under the Proposed Action compared with the No Action Alternative. Similarly, fewer people would be exposed to aircraft noise from DNL 60 to 65 and from DNL 45 to 60 (1,048 and 98,686 fewer, respectively) under the Proposed Action compared with the No Action Alternative.

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LEGEND

- ⊕ EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Noise Exposure Levels

- Less than 45 DNL
- 45 to less than 50 DNL
- 50 to less than 55 DNL
- 55 to less than 60 DNL
- 60 to less than 65 DNL
- 65 to less than 70 DNL
- 70 to less than 75 DNL
- 75 to less than 80 DNL
- Greater than or equal to 80 DNL

Notes:
 EA - Environmental Assessment
 LAS - McCarran International Airport
 VGT - North Las Vegas Airport
 HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

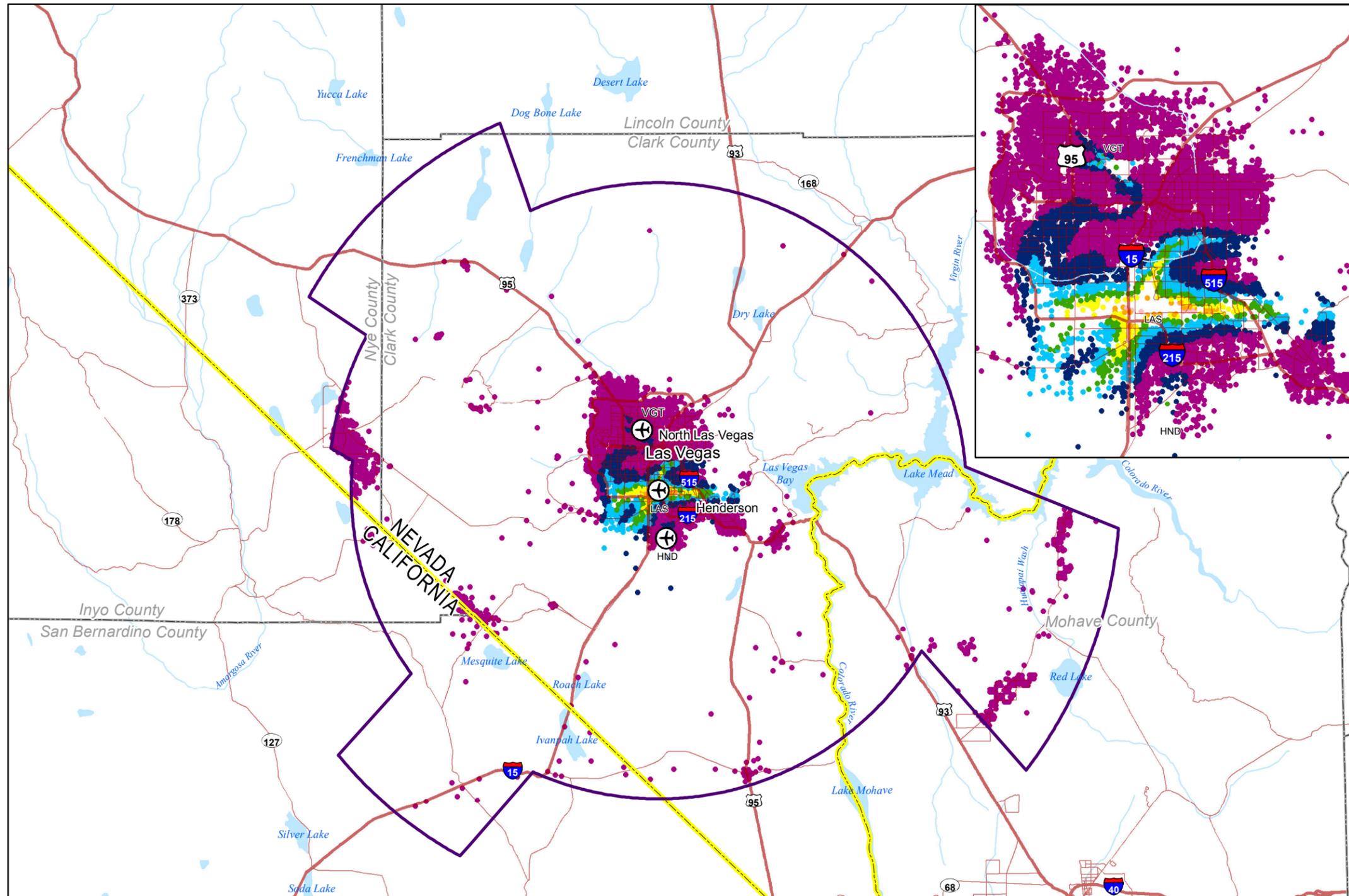
Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit V-1



2012 No Action – Population DNL Noise Exposure Levels

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LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Noise Exposure Levels

- Less than 45 DNL
- 45 to less than 50 DNL
- 50 to less than 55 DNL
- 55 to less than 60 DNL
- 60 to less than 65 DNL
- 65 to less than 70 DNL
- 70 to less than 75 DNL
- 75 to less than 80 DNL
- Greater than or equal to 80 DNL

Notes:
 EA - Environmental Assessment
 LAS - McCarran International Airport
 VGT - North Las Vegas Airport
 HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit V-2



2012 Proposed Action – Population DNL Noise Exposure Levels

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Table V-3

Comparison of Potential Population Exposed to Aircraft Noise, 2012

DNL Noise Exposure Level	No Action Alternative	Proposed Action	Percent Change
DNL 65 and higher	3,124	3,018	-3.4%
DNL 60 to 65	19,905	18,857	-5.3%
DNL 45 to 60	756,157	657,471	-13.1%
Total above DNL 45	779,186	679,346	-12.8%

Sources: Metron Aviation, March 21, 2012.

Prepared by: Ricondo & Associates, Inc., April 2012.

Although fewer persons are exposed to DNL 65 and higher under the Proposed Action than under the No Action Alternative, a noise change analysis was conducted to determine the significance of the changes in noise exposure associated with the Proposed Action compared with the No Action Alternative. **Table V-4** presents a summary of the population impact results of this analysis. As indicated in the table, no changes in noise exposure under the Proposed Action would be large enough to meet any of the FAA criteria for evaluating aircraft noise effects. These results indicate that the Proposed Action would not result in significant noise exposure effects on population or noise exposure changes at other levels the FAA considers when evaluating noise impacts on population associated with air traffic actions. **Exhibit V-3** graphically presents the results of the noise change analysis. The exhibit illustrates those population centroids that either were removed from or added to the area exposed to DNL 65 and higher under the Proposed Action when compared with the No Action Alternative. Although some population centroids were added to the area exposed to DNL 65 and higher, none would experience a significant increase (DNL 1.5 dB or greater).

Table V-4

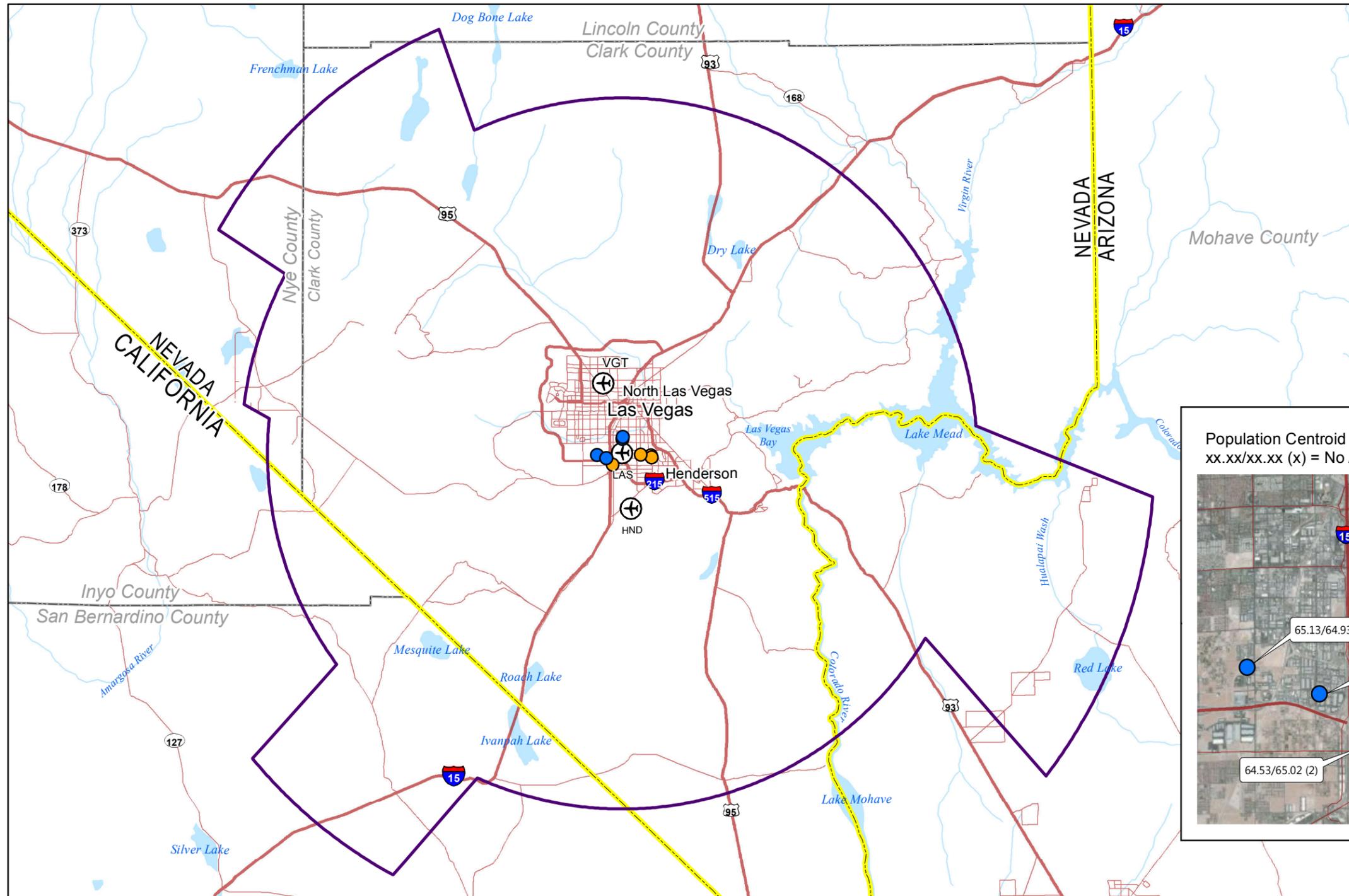
Change of Potential Population Exposed to Aircraft Noise, 2012

DNL Noise Exposure Level under Proposed Action	Increase in DNL with Proposed Action	Change of Exposure (DNL)			Population Exposed to Threshold Increase
		Greatest Increase	Greatest Decrease	Average	
DNL 65 and higher	DNL 1.5 dB or greater	DNL 0.6 dB	DNL 1.0 dB	DNL 0.1 dB	0
DNL 60 to 65	DNL 3.0 dB or greater	DNL 2.9 dB	DNL 3.4 dB	DNL 0.1 dB	0
DNL 45 to 60	DNL 5.0 dB or greater	DNL 4.7 dB	DNL 0.4 dB	DNL -0.4 dB	0

Sources: Ricondo & Associates, Inc., based on Metron Aviation, March 21, 2012.

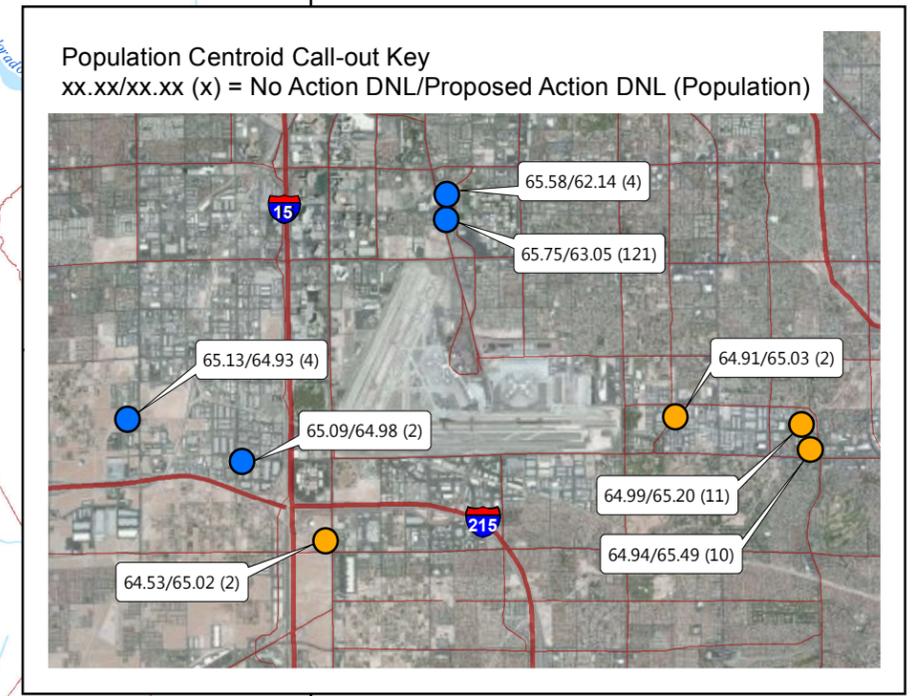
Prepared by: Ricondo & Associates, Inc., April 2012.

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LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Runways
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Population Centroid Removed from DNL 65 and Higher under the Proposed Action
- Population Centroid Added to DNL 65 and Higher under the Proposed Action



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2012.

Exhibit V-3



Change in Aircraft Noise Exposure (2012)

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5.1.4 Potential 2017 Impacts

As with the 2012 evaluation presented in Section 5.1.3, a similar evaluation of potential 2017 impacts was developed, employing the same methodology and criteria as used in the potential 2012 impact analysis.

Exhibits V-4 and V-5 show the calculated noise exposure levels at census block centroids expected in 2017 with the air traffic routes under the No Action Alternative and the changes in air traffic routes under the Proposed Action, respectively. **Table V-5** shows that 3,200 people within the GSA would be exposed to aircraft noise of DNL 65 and higher in 2017 under the Proposed Action, compared with 3,313 people under the No Action Alternative. Therefore, it is expected that 108 (or 3.3 percent) fewer people would be exposed to aircraft noise of DNL 65 and higher under the Proposed Action compared with the No Action Alternative in the same year. Similarly, fewer people would be exposed to aircraft noise from DNL 60 to 65 and from DNL 45 to 60 (6,018 and 81,754 fewer, respectively) under the Proposed Action compared with the No Action Alternative.

Table V-5

Comparison of Potential Population Exposed to Aircraft Noise, 2017

DNL Noise Exposure Level	No Action Alternative	Proposed Action	Percent Change
DNL 65 and higher	3,313	3,205	-3.3%
DNL 60 to 65	27,667	21,649	-21.8%
DNL 45 to 60	840,133	758,379	-9.7%
Total above DNL 45	871,113	783,233	-10.1%

Sources: Metron Aviation, March 21, 2012.

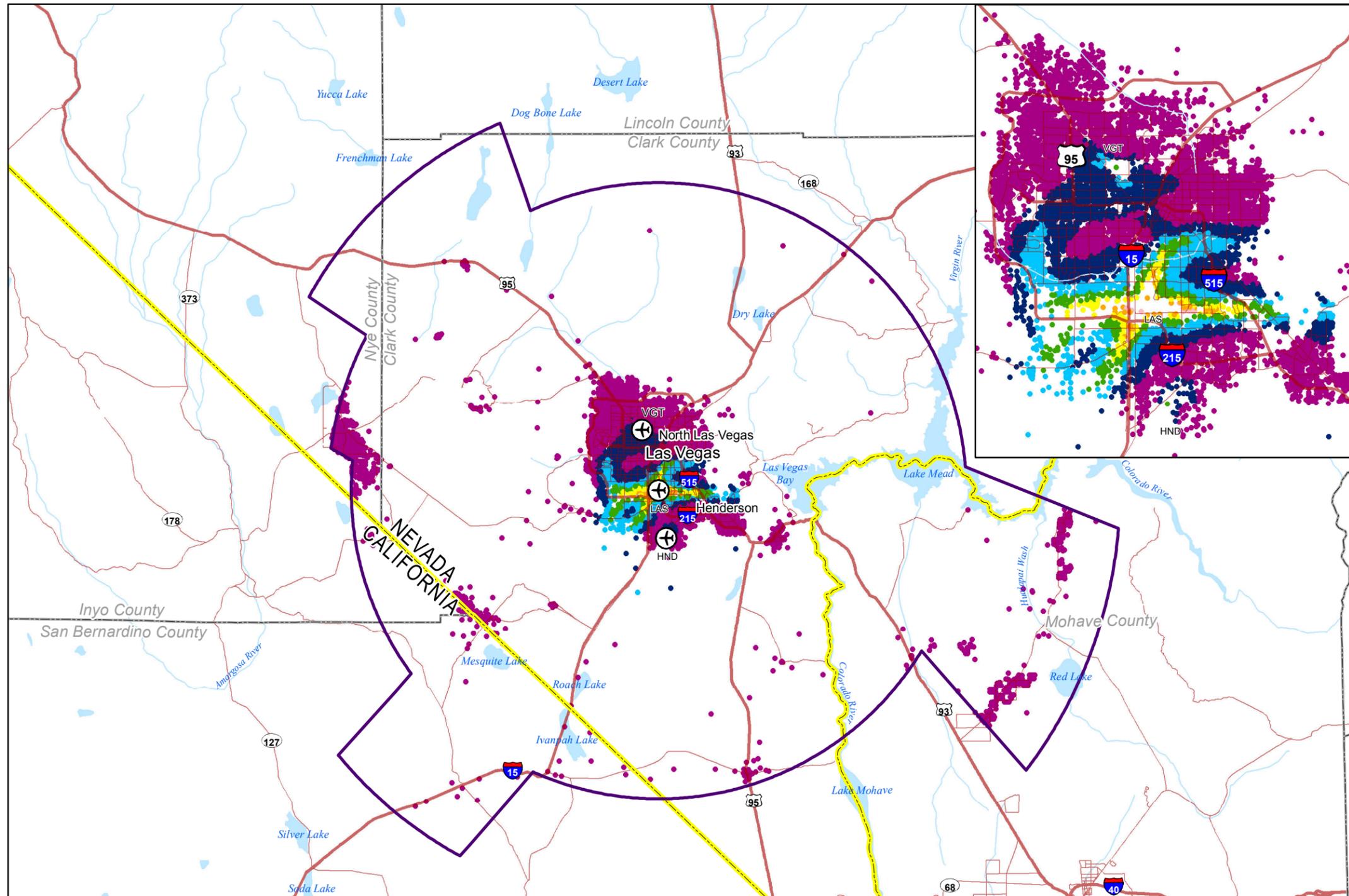
Prepared by: Ricondo & Associates, Inc., April 2012.

Although fewer persons are exposed to DNL 65 and higher under the Proposed Action than under the No Action Alternative, a noise change analysis was conducted to determine the significance of the changes in noise exposure associated with the Proposed Action compared with the No Action Alternative. **Table V-6** presents a summary of the population impact results of the noise change analysis for 2017. As shown in the table, analysis of aircraft noise exposure indicates that seven people at one census block centroid exposed to DNL 60 to 65 would be exposed to changes in noise levels that are DNL 3 dB or greater under the Proposed Action compared with the No Action Alternative. These seven people are associated with two census block centroids that represent census blocks that are developed in hotel and commercial uses (retail and restaurants). No single- or multi-family residential properties were identified on either census block.² These results indicate that the Proposed Action would not result in significant noise exposure effects on population or noise exposure changes at other levels the FAA considers when evaluating noise impacts on population associated with air traffic actions.

Exhibit V-6 graphically presents the results of the noise change analysis. The exhibit illustrates those population centroids that either were removed from or added to the area exposed to DNL 65 and higher under the Proposed Action when compared with the No Action Alternative. Although some population centroids were added to the area exposed to DNL 65 and higher, none would experience a significant increase (DNL 1.5 dB or greater). Exhibit V-6 also presents the two population centroids that would be exposed to a DNL 3 dB increase in the area exposed to DNL 60 to 65.

² Ricondo & Associates, Inc., Site Visit, July 23, 2012.

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LEGEND

- ⊕ EA Airports
- State Boundaries
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- Highways
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- Water Bodies
- Generalized Study Area Boundary

Noise Exposure Levels

- Less than 45 DNL
- 45 to less than 50 DNL
- 50 to less than 55 DNL
- 55 to less than 60 DNL
- 60 to less than 65 DNL
- 65 to less than 70 DNL
- 70 to less than 75 DNL
- 75 to less than 80 DNL
- Greater than or equal to 80 DNL

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Projection: State Plane, Nevada East Zone

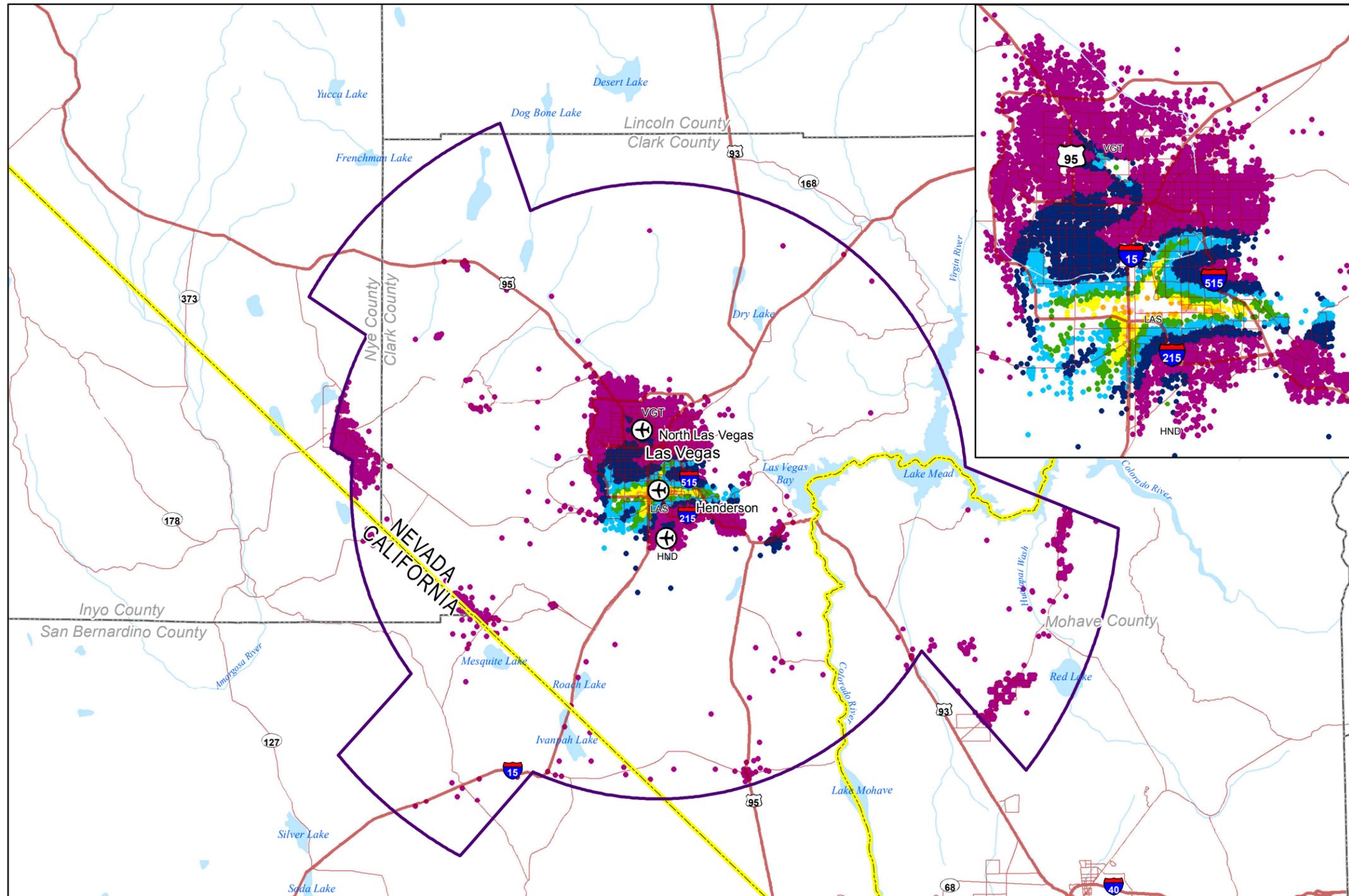
Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit V-4



2017 No Action – Population DNL Noise Exposure Levels

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LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

Noise Exposure Levels

- Less than 45 DNL
- 45 to less than 50 DNL
- 50 to less than 55 DNL
- 55 to less than 60 DNL
- 60 to less than 65 DNL
- 65 to less than 70 DNL
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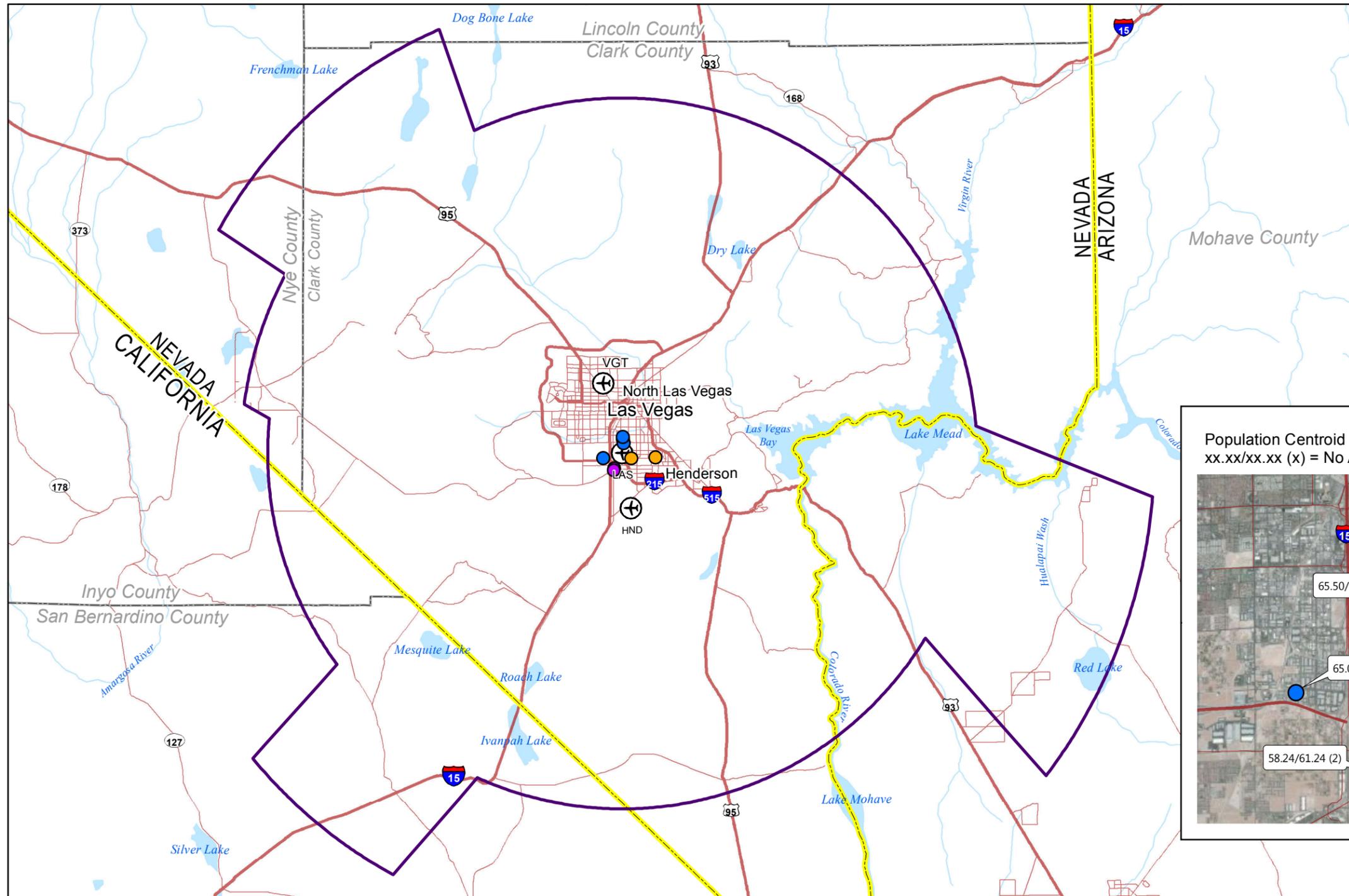
Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit V-5



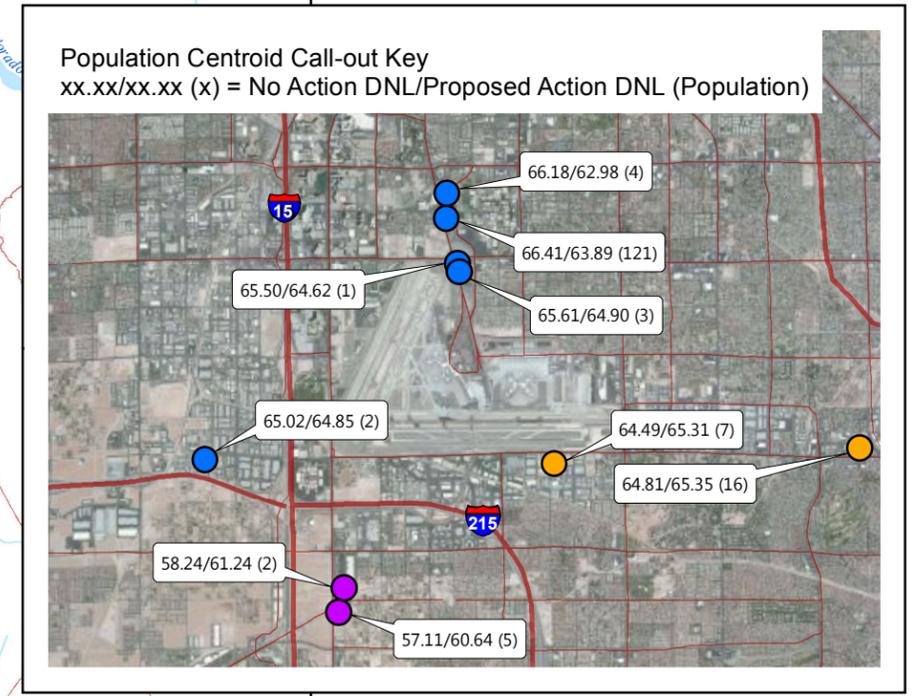
2017 Proposed Action – Population DNL Noise Exposure Levels

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LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Runways
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Population Centroid Removed from DNL 65 and Higher under the Proposed Action
- Population Centroid Added to DNL 65 and Higher under the Proposed Action
- Population Centroid Exposed to DNL 3.0 dB Increase in DNL 60-65 under the Proposed Action



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2012.

Exhibit V-6



Change in Aircraft Noise Exposure (2017)

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Table V-6

Change of Potential Population Exposed to Aircraft Noise, 2017

DNL Noise Exposure Level under Proposed Action	Increase in DNL with Proposed Action	Change of Exposure (DNL)			Population Exposed to Threshold Increase
		Greatest Increase	Greatest Decrease	Average	
DNL 65 and higher	DNL 1.5 dB or greater	DNL 0.8 dB	DNL 1.1 dB	DNL 0.2 dB	0
DNL 60 to 65	DNL 3.0 dB or greater	DNL 3.5 dB	DNL 3.2 dB	DNL 0.2 dB	7
DNL 45 to 60	DNL 5.0 dB or greater	DNL 4.9 dB	DNL 4.6 dB	DNL -0.4 dB	0

Sources: Ricondo & Associates, Inc., based on Metron Aviation, March 21, 2012.

Prepared by: Ricondo & Associates, Inc., April 2012.

5.2 Compatible Land Use

This section presents a summary of the potential impacts to compatible land use under the Proposed Action and the No Action Alternative.

5.2.1 Overview of Impacts

Under the Proposed Action, no land acquisition, construction, or other ground disturbance activities would occur. In addition, potential aircraft noise impacts associated with the Proposed Action, in comparison to the No Action Alternative, would not cause changes in aircraft noise exposure that meet any of FAA's significance criteria for noise impacts on people (refer to Section 5.1). Therefore, the Proposed Action would not result in compatible land use impacts.

Under the No Action Alternative, no land acquisition, construction, or other ground disturbance activities would occur. Furthermore, no changes in air traffic routes, which could cause changes in aircraft noise exposure, would occur. Therefore, the No Action Alternative would not result in compatible land use impacts.

5.2.2 Methodology

Since there would be no land acquisition, construction, or other ground disturbance activities under the Proposed Action or the No Action Alternative, changes in aircraft noise exposure resulting from implementation of the Proposed Action, if they were to occur, would be the primary source of potential impact. The compatible land use analysis relies on the changes in aircraft noise exposure between the Proposed Action and the No Action Alternative, as presented in Section 5.1, as the basis for determining compatible land use impacts within the GSA.

5.2.3 Potential 2012 and 2017 Impacts

No land acquisition, construction, or other ground disturbance activities would occur under the Proposed Action or the No Action Alternative; therefore, neither alternative would directly affect land uses within the GSA in 2012 and 2017.

Changes in aircraft noise exposure resulting from changes in air traffic routing in the Las Vegas area under the Proposed Action were identified to determine if the changes may result in exposing land uses not compatible with aircraft noise to significant levels of aircraft noise. As stated in Section 5.1, the Proposed Action, when compared with the No Action Alternative, would not result in changes in aircraft noise exposure that would exceed FAA's significance thresholds for noise impacts on people in 2012 or 2017. Therefore, the Proposed Action would not cause compatible land use impacts.

Under the No Action Alternative, there would be no changes to air traffic routing in the Las Vegas area, so changes in aircraft noise exposure would not occur in either 2012 or 2017. Therefore, the No Action Alternative would not cause compatible land use impacts.

5.3 Department of Transportation Act, Section 4(f) Resources

This section presents a summary of the analysis of impacts on Section 4(f) resources under the Proposed Action and No Action Alternative. Information on potential Section 4(f) resources within the GSA is provided in Section 4.3.3, and the potential Section 4(f) resources are depicted on Exhibit IV-4. Both direct impacts to potential Section 4(f) resources (such as an impact that may result from land acquisition, construction, or other ground disturbance activities) and indirect impacts, which are referred to as “constructive use,” are considered in this evaluation. Constructive use may occur when impacts substantially impair those activities, features, or attributes within the resource that contribute to its significance or enjoyment in terms of its environmental, recreational, ecological, or historic significance. Generally, constructive use associated with air traffic actions would only occur as the result of noise impacts or visual intrusion.

5.3.1 Overview of Impacts

No land acquisition, construction, or other ground disturbance activities would occur under either the Proposed Action or the No Action Alternative; therefore, neither alternative would directly affect any Section 4(f) resources. Therefore, the focus of the evaluation of potential Section 4(f) resources was on indirect effects and their potential to produce a constructive use effect.

With the Proposed Action, the aircraft noise exposure analysis indicates that the proposed changes in air traffic routes would not substantially change the noise environment at any potential Section 4(f) resource compared with the No Action Alternative. Furthermore, changes in aircraft overflight patterns are expected to be at altitudes and distances from viewers that would not substantially impair the primary vista or setting of the Section 4(f) resources. The potential Section 4(f) resources have uses that are compatible with the existing and anticipated aircraft noise exposure with and without the Proposed Action. Therefore, the project related effects are not expected to raise to the level of being a constructive use of Section 4(f) resources.

Under the No Action Alternative, no changes in air traffic routes in the Las Vegas area would occur, so no changes to aircraft noise exposure or changes in aircraft overflight patterns would occur over Section 4(f) resources.

5.3.2 Methodology

Section 4.3.3 identifies properties within the GSA for which conditions indicate that the property may constitute a resource protected by the provisions of DOT Section 4(f). The potential Section 4(f) resources were evaluated to determine if a direct impact of the Proposed Action would occur or an indirect impact of the Proposed Action would rise to the level of being a constructive impact.

With regard to Land and Water Conservation Fund resources, FAA Order 1050.1E stipulates that replacement satisfactory to the Secretary of the Interior is specifically required for recreation lands aided by the Department of Interior’s Land and Water Conservation Fund in cases where such a resource is “used” by a transportation project. Therefore, these resources are considered as a part of the Section 4(f) impact analysis process.

Since there would be no land acquisition, construction, or other ground disturbance activities under the Proposed Action or the No Action Alternative, neither alternative would directly impact Section 4(f) resources; therefore, this analysis focused on consideration of indirect effects on potential

Section 4(f) resources. The FAA has developed several criteria to determine indirect impacts to Section 4(f) resources, which are referred to as “constructive use.”

In the evaluation of the Proposed Action, the criteria listed in **Table V-7** are considered when determining the impact of changes in aircraft noise on potential Section 4(f) resources. The potential for a noise impact would be further assessed if the noise change analysis indicates an increase in noise exposure over potential Section 4(f) resources for the Proposed Action as compared with the No Action Alternative that meets one or more of the criteria listed in the table.

Table V-7

Criteria for Determining Impact of Changes in Aircraft Noise on Potential Section 4(f) Resources

DNL Noise Exposure under Proposed Action	Increase in DNL with Proposed Action
DNL 65 and higher	DNL 1.5 dB or greater
DNL 60 to 65	DNL 3.0 dB or greater
DNL 45 to 60	DNL 5.0 dB or greater

Source: Federal Aviation Administration, Order 1050.1E, Appendix A, Paragraph 14.3; Title 14 CFR Part 150.21 (2)(d) and Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Issues*, August 1992 (DNL 65 and higher criteria); Federal Aviation Administration Order 1050.1E, Appendix A, Paragraphs 14.4c and 14.5e and Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Issues*, August 1992 (DNL 60 to 65 criteria); and Federal Aviation Administration FAA Order 1050.1E, Appendix A, Paragraph 14.5e (DNL 45 to 65 criteria).

Prepared by: Ricondo & Associates, Inc., January 2012.

If an effect based on the criteria identified in Table V-7 is identified, the potential Section 4(f) resource would be evaluated further to determine if the project-related effects would rise to the level of being a constructive use. Further evaluation may include confirming that the property is in fact a Section 4(f) resource as well as identifying the specific attributes for which the property is managed (e.g., for traditional recreational uses or for quiet setting). FAA Order 1050.1E, Appendix A, requires that additional factors be weighed in determining whether to apply the thresholds listed in Table V-7 to determine the significance of noise impacts on noise sensitive areas within national parks, national wildlife refuges, and historic sites including traditional cultural properties.

As part of the noise modeling analysis for this EA (refer to Appendix E), aircraft noise exposure levels were calculated for the Proposed Action and No Action Alternative at grid points spaced at 1.5 nautical mile by 1.5 nautical mile intervals through the GSA as well as at unique points throughout the GSA at potential Section 4(f) resource sites too small to be captured in the 1.5 nautical mile grid. The resulting changes in noise exposure at the grid points and unique points were evaluated against the criteria defined in Section 5.3.2.1 to determine the potential for indirect impacts resulting from changes in aircraft noise exposure to Section 4(f) resources.

To evaluate the potential for indirect impacts resulting from changes in aircraft routings and visual intrusion, the general altitudes at which aircraft route changes occur beyond the immediate environs of the EA Airports, which experience overflights on a routine basis, are considered to evaluate the potential for light emissions and visual impacts.

5.3.3 Potential 2012 and 2017 Impacts

No land acquisition or physical disturbance would occur under the Proposed Action or the No Action Alternative; therefore, public parks and recreation areas, wildlife refuges, and historic sites of national, state, or local significance would not be directly affected by the proposed project.

Therefore, there would be no direct taking or “constructive use” of any resource under the Proposed Action or the No Action Alternative.

The summary results of the noise exposure analysis for the grid points and unique points are presented in **Tables V-8** and **V-9** for 2012 and 2017, respectively. As noted in Tables V-8 and V-9, only values of DNL 40 and higher are reported.³ Of the 2,046 points associated with potential Section 4(f) resources, no changes in noise level were found that met the criteria established in FAA Order 1050.1E for evaluating the potential noise effect of a proposed action in 2012 or 2017.

The Proposed Action does not involve changes to ground-based light sources, thus it is unlikely to cause adverse light effects on Section 4(f) resources that would result in annoyance or interference with normal human activities. According to FAA Order 1050.1E, Appendix A, the visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact.⁴ Changes in aircraft routes associated with the Proposed Action would generally occur at altitudes above 3,000 feet AGL; therefore, the visual sight of aircraft and aircraft lights would not be considered intrusive over potential Section 4(f) resources. Consequently, the Proposed Action would not result in significant visual impacts.

Therefore, the Proposed Action would not result in a direct or constructive use of potential Section 4(f) resources in 2012 or 2017.

The No Action Alternative would not change air traffic routes in the Las Vegas area; therefore, no effects related to changes in aircraft noise exposure or visual intrusion are expected. The No Action Alternative would not result in a direct or constructive use of potential Section 4(f) resources.

5.4 Historical, Architectural, and Cultural Resources

This section presents a summary of the analysis of impacts to historical resources and tribal lands under the Proposed Action and the No Action Alternative. Information on historic resources and tribal lands within the GSA is provided in Section 4.3.4. FAA, in accordance with Section 106 of the National Historic Preservation Act of 1966 and implementing regulations 36 CFR Part 800, has initiated consultation with the appropriate State Historic Preservation Officer.

5.4.1 Overview of Impacts

No land acquisition, construction, or other ground disturbance activities would occur under either the Proposed Action or the No Action Alternative; therefore, neither alternative would directly affect any historic resources or tribal lands.

Under the Proposed Action, the assessment of aircraft noise impacts indicates that this alternative would not substantially change the noise environment at any historic resource or tribal land compared with the No Action Alternative. Furthermore, changes in aircraft overflight patterns are expected to occur at altitudes and distances from viewers that would not substantially impair the view or setting of historic resources or tribal lands. Therefore, the Proposed Action would not result in adverse indirect impacts to historic resources or tribal lands in 2012 or 2017.

³ Only values of DNL 40 and higher were reported, because the lowest threshold to indicate a significant impact is a DNL increase of 5 dB or more at a point exposed to DNL 45 and higher.

⁴ U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Change 1, Appendix A, Paragraph 12.2b.

Table V-8

Summary of Noise Exposure at Potential Section 4(f) Resources in the GSA (2012)

Property Name	No Action			Proposed Action		
	Lowest DNL	Highest DNL	Average DNL	Lowest DNL	Highest DNL	Average DNL
Lake Mead National Recreational Area	–	45.1	–	–	46.5	–
Black Canyon Wilderness	–	42.5	–	–	41.9	–
Eldorado Wilderness	–	42.6	–	–	–	–
Ireteba Peaks Wilderness	–	–	–	–	–	–
Jimbilnan Wilderness	–	40.4	–	–	–	–
Muddy Mountains Wilderness	–	40.3	–	–	–	–
Pinto Valley Wilderness	–	43.3	40.0	–	–	–
Five Wilderness Study Areas	–	43.5	–	–	42.4	–
Grand Canyon National Park ^{1/}	–	–	–	–	–	–
Toiyabe National Forest, Spring Mountain National Rec. Area	–	41.6	–	–	–	–
La Madre Mountain Wilderness	–	–	–	–	–	–
Mount Charleston Wilderness	–	–	–	–	–	–
Rainbow Mountain Wilderness	–	–	–	–	–	–
Mount Stirling Wilderness Study Area	–	–	–	–	–	–
Camp Lee Canyon	–	–	–	–	–	–
Camp Potosi	–	–	–	–	–	–
Mojave National Preserve	–	–	–	–	–	–
Mojave Wilderness Areas	–	–	–	–	–	–
Red Rock Canyon National Conservation Area ^{2/}	–	50.1	–	–	51.3	–
La Madre Mountain Wilderness	–	40.8	–	–	–	–
Rainbow Mountain Wilderness	–	–	–	–	–	–
Sloan Canyon National Conservation Area	–	47.9	43.9	–	47.0	43.1
North McCullough Wilderness	44.5	46.8	45.8	44.5	46.7	45.6
Jean/Roach Dry Lakes Special Recreation Management Area	–	50.7	–	–	49.6	40.2
Desert National Wildlife Refuge	–	–	–	–	–	–
Valley of Fire State Park	–	–	–	–	–	–
Designated Wilderness Areas (BLM)						
Arrow Canyon Wilderness	–	–	–	–	–	–
Kingston Range Wilderness	–	–	–	–	–	–
Mesquite Wilderness	–	–	–	–	–	–
Mount Tipton Wilderness	–	–	–	–	–	–
Mount Wilson Wilderness	–	41.0	–	–	41.1	–
North Mesquite Mountains Wilderness	–	–	–	–	–	–
Pahrump Valley Wilderness	–	43.5	–	–	44.2	–
South McCullough Wilderness	–	–	–	–	–	–
Stateline Wilderness	–	–	–	–	–	–
Wee Thump Joshua Tree Wilderness	–	–	–	–	–	–
Wilderness Study Areas (BLM)						
Nellis A, B, C Wilderness Study Areas	–	–	–	–	–	–
Fish and Wildlife No. 1, 2, 3 Wilderness Study Areas	–	–	–	–	–	–
Quail Springs Wilderness Study Area	–	–	–	–	–	–
County and Municipal Parks	–	64.6	42.0	–	64.2	40.9

Notes:

– Indicates noise exposure levels below DNL 40.

1/ Only a small portion of the Grand Canyon National Park is located within the GSA, and the portion of the National Park was not captured by the 1.5 nautical mile by 1.5 nautical mile grid overlay of the GSA. Thus, the reported noise exposure levels for grid points are the nearest grid points.

2/ Includes Spring Mountain Ranch State Park.

Sources: Metron Aviation, calculated using NIRS Version 6.1 and data described in Appendix E, August 2010 (existing noise exposure).
Prepared by: Ricondo & Associates, Inc. May 2012.

Table V-9

Summary of Noise Exposure at Potential Section 4(f) Resources in the GSA (2017)

Property Name	No Action			Proposed Action		
	Lowest DNL	Highest DNL	Average DNL	Lowest DNL	Highest DNL	Average DNL
Lake Mead National Recreational Area	–	46.2	–	–	47.5	–
Black Canyon Wilderness	–	43.3	40.5	–	43.1	–
Eldorado Wilderness	–	43.7	–	–	40.4	–
Ireteba Peaks Wilderness	–	–	–	–	–	–
Jimbilnan Wilderness	–	41.3	–	–	40.4	–
Muddy Mountains Wilderness	–	41.2	–	–	–	–
Pinto Valley Wilderness	–	42.1	40.9	–	–	–
Five Wilderness Study Areas	–	44.3	–	–	43.9	–
Grand Canyon National Park ^{1/}	–	–	–	–	–	–
Toiyabe National Forest, Spring Mountain National Rec. Area	–	42.1	–	–	–	–
La Madre Mountain Wilderness	–	–	–	–	–	–
Mount Charleston Wilderness	–	–	–	–	–	–
Rainbow Mountain Wilderness	–	–	–	–	–	–
Mount Stirling Wilderness Study Area	–	–	–	–	–	–
Camp Lee Canyon	–	–	–	–	–	–
Camp Potosi	–	–	–	–	–	–
Mojave National Preserve	–	–	–	–	–	–
Mojave Wilderness Areas	–	–	–	–	–	–
Red Rock Canyon National Conservation Area ^{2/}	–	50.5	–	–	51.7	–
La Madre Mountain Wilderness	–	41.1	–	–	–	–
Rainbow Mountain Wilderness	–	–	–	–	–	–
Sloan Canyon National Conservation Area	–	48.5	44.7	–	48.2	44.0
North McCullough Wilderness	45.3	47.8	46.6	45.7	47.9	46.7
Jean/Roach Dry Lakes Special Recreation Management Area	–	51.6	–	–	50.5	40.6
Desert National Wildlife Refuge	–	–	–	–	–	–
Valley of Fire State Park	–	–	–	–	–	–
Designated Wilderness Areas (BLM)						
Arrow Canyon Wilderness	–	–	–	–	–	–
Kingston Range Wilderness	–	–	–	–	–	–
Mesquite Wilderness	–	–	–	–	–	–
Mount Tipton Wilderness	–	–	–	–	–	–
Mount Wilson Wilderness	–	41.9	–	–	42.4	–
North Mesquite Mountains Wilderness	–	–	–	–	–	–
Pahrump Valley Wilderness	–	44.0	–	–	44.9	–
South McCullough Wilderness	–	–	–	–	–	–
Stateline Wilderness	–	–	–	–	–	–
Wee Thump Joshua Tree Wilderness	–	–	–	–	–	–
Wilderness Study Areas (BLM)						
Nellis A, B, C Wilderness Study Areas	–	–	–	–	–	–
Fish and Wildlife No. 1, 2, 3 Wilderness Study Areas	–	–	–	–	–	–
Quail Springs Wilderness Study Area	–	–	–	–	–	–
County and Municipal Parks	–	65.3	42.6	–	64.9	41.6

Notes:

– Indicates noise exposure levels below DNL 40.

1/ Only a small portion of the Grand Canyon National Park is located within the GSA, and the portion of the National Park was not captured by the 1.5 nautical mile by 1.5 nautical mile grid overlay of the GSA. Thus, the reported noise exposure levels for grid points are the nearest grid points.

2/ Includes Spring Mountain Ranch State Park.

Sources: Metron Aviation, calculated using NIRS Version 6.1 and data described in Appendix E, August 2010 (existing noise exposure).
 Prepared by: Ricondo & Associates, Inc. May 2012.

Under the No Action Alternative, no changes in air traffic routes in the Las Vegas area would occur, so no changes to aircraft noise exposure or changes in aircraft overflight patterns would occur over historic resources or tribal lands. Therefore, historic resources or tribal lands would not be indirectly affected by aircraft noise nor would viewers at historic resources or tribal lands experience visual impacts under the No Action Alternative in 2012 or 2017.

The FAA conducted Section 106 consultation with the Nevada State Historic Preservation Officer (SHPO). The Nevada SHPO reviewed information on the FAA's Proposed Action and concurred with the FAA's determination that historic resources would not result in indirect impacts on historic resources. The correspondence documenting this consultation is provided in Appendix A.

5.4.2 Methodology

The National Historic Preservation Act of 1966 requires the FAA to consider the effects of its undertakings on properties listed or eligible for listing in the NRHP. In assessing whether an undertaking, such as the Proposed Action, affects a property listed or eligible for listing on the NRHP, FAA must consider both direct and indirect effects. Direct effects include the physical removal or alteration of an historic resource. Indirect effects include changes in the environment of the historic resource that could substantially interfere with the use or character of the property. Such changes could include changes in noise exposure and visual impacts.

To assess the potential indirect effects of the Proposed Action on historic resources, an area of potential effect (APE) was defined. Federal regulations define the APE as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.⁵

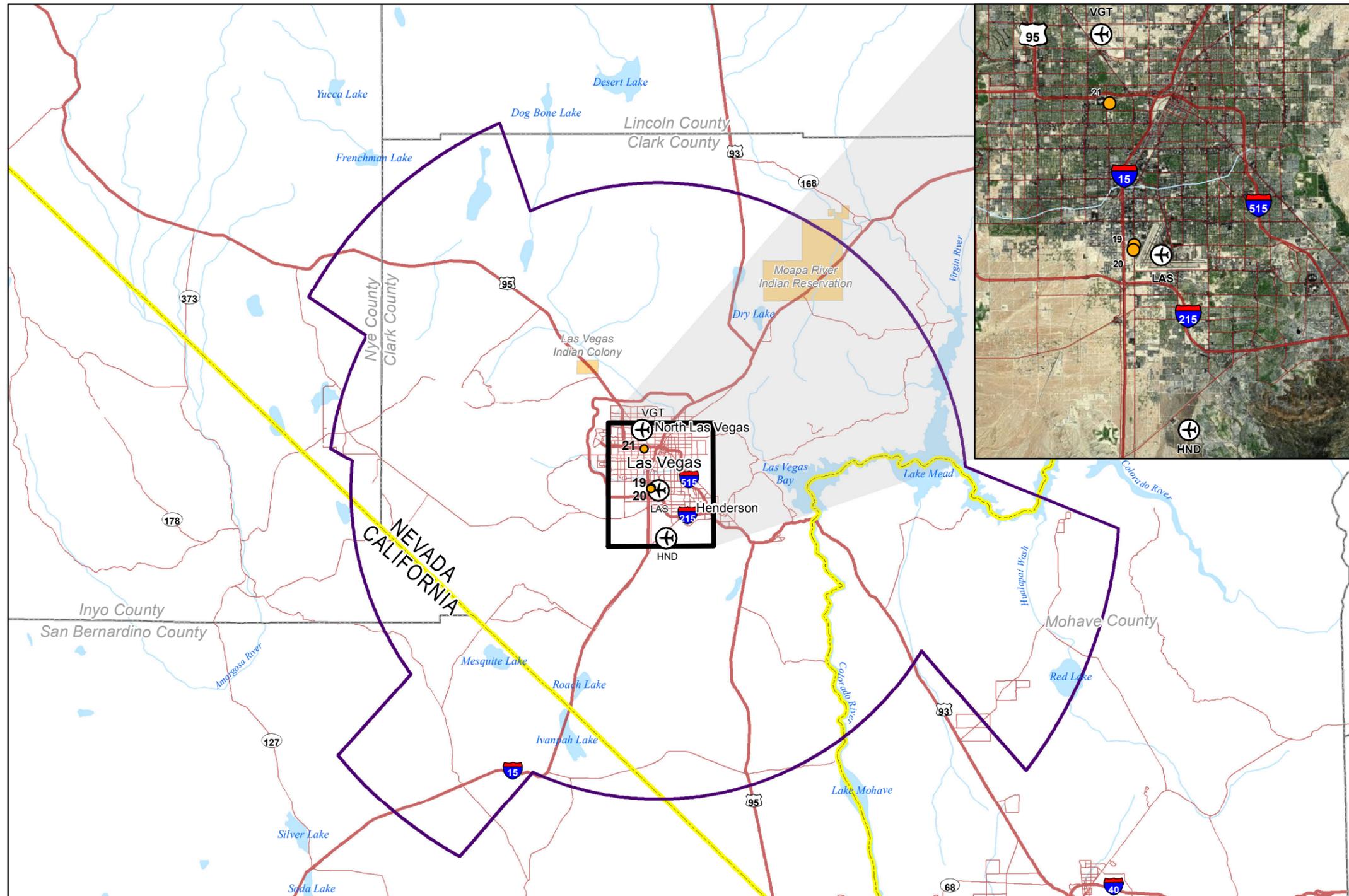
As discussed in Section 5.10, the Proposed Action is not expected to result in visual or light emissions effects; therefore, the APE was defined based on potential noise effects on historic resources. Noise exposure levels were calculated at points within the GSA representing historic properties (the unique points referenced in Section 5.1.2). The APE for historic resources was then defined as the specific areas encompassing the historic resource properties within the GSA that would be exposed to DNL 45 and higher under the Proposed Action (either in 2012 or 2017). Those properties comprising the APE are identified on **Exhibit V-7** (Exhibit IV-5 depicts all historic resources identified in the GSA).

In the evaluation of the Proposed Action, the criteria listed in **Table V-10** are considered when determining the impact of changes in aircraft noise on historic resources. The potential for a noise impact would be further assessed if the noise change analysis identifies the an increase in noise exposure over historic resources for the Proposed Action as compared with the No Action Alternative that meets one or more of the criteria listed in the table.

The analysis of potential noise impacts to tribal lands considered both Indian Reservations and lands identified as having special significance to tribes during review of resource management plans for potential Section 4(f) resources within the GSA. The assessment of noise effects on tribal resources considers the same change in noise exposure levels when comparing the Proposed Action to the No Action Alternative, as considered for historic properties.

⁵ Title 36 CFR Part 800.16(d).

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LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Indian Reservation
- Historic Properties - Area of Potential Effects

List of Properties

19	Little Church of the West
20	The "Welcome to Fabulous Las Vegas" Sign
21	Las Vegas Springs

Notes:
 EA - Environmental Assessment
 LAS - McCarran International Airport
 VGT - North Las Vegas Airport
 HND - Henderson Executive Airport
 *Old Spanish Trail passes through the GSA and central Las Vegas. Not shown on map.

Projection: State Plane, Nevada East Zone

Sources: U.S. Department of the Interior, National Park Service, National Register of Historic Places, 2007 (historic resources); Nevada State Historic Preservation Office, 1998, 1999, 2001, 2007 (historic resources); Metron Aviation, July 2010 (generalized study area boundary); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
 Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit V-7



Historic Properties - Area of Potential Effects

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Table V-10**Criteria for Determining Impact of Changes in Aircraft Noise on Historic Resources**

DNL Noise Exposure under Proposed Action	Increase in DNL with Proposed Action
DNL 65 and higher	DNL 1.5 dB or greater
DNL 60 to 65	DNL 3.0 dB or greater
DNL 45 to 60	DNL 5.0 dB or greater

Source: Federal Aviation Administration, Order 1050.1E, Appendix A, Paragraph 14.3; Title 14 CFR Part 150.21 (2)(d) and Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Issues*, August 1992 (DNL 65 and higher criteria); Federal Aviation Administration Order 1050.1E, Appendix A, Paragraphs 14.4c and 14.5e and Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Issues*, August 1992 (DNL 60 to 65 criteria); and Federal Aviation Administration FAA Order 1050.1E, Appendix A, Paragraph 14.5e (DNL 45 to 65 criteria.)

Prepared by: Ricondo & Associates, Inc., January 2012.

5.4.3 Potential 2012 Impacts

Neither the Proposed Action nor the No Action Alternative include any ground disturbance, construction, or land acquisition; therefore, neither would have direct effects on historic resources or tribal lands in 2012.

As indicated in **Table V-11**, no changes in noise levels at historic properties comprising the APE were found that would affect historic resources; thus, no aircraft noise exposure impacts to historic properties would result from implementation of the Proposed Action.

Table V-11**Change of Aircraft Noise Exposure at Historic Properties in the Area of Potential Effects, 2012**

Historic Property	DNL		
	No Action	Proposed Action	Change
19 Little Church of the West	62.2	62.3	0.1
20 The "Welcome to Fabulous Las Vegas" Sign	65.3	65.5	0.2
21 Las Vegas Springs	45.3	44.5	-0.8

Sources: Ricondo & Associates, Inc., based on Metron Aviation, March 21, 2012.

Prepared by: Ricondo & Associates, Inc., April 2012.

The Proposed Action does not involve changes to ground-based light sources, thus it is unlikely to cause adverse light effects on historic resources that would result in annoyance or interference with normal human activities. According to FAA Order 1050.1E, Appendix A, the visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact.⁶ Changes in aircraft routes associated with the Proposed Action would generally occur at altitudes above 3,000 feet AGL; therefore, the visual sight of aircraft and aircraft lights would not be considered intrusive over historic resources. Consequently, the Proposed Action would not result in significant visual impacts.

In terms of the two Indian Reservations in the GSA (the Moapa Indian Reservation and the Las Vegas Indian Colony), noise modeling results indicate that noise levels for the grid points representing these reservations would all be below DNL 45 under both the Proposed Action and the

⁶ U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Change 1, Appendix A, Paragraph 12.2b.

No Action Alternative, and the highest change in noise exposure, when comparing the Proposed Action with the No Action Alternative, would be less than DNL 1 dB.

Other lands in the GSA known to have special significance to tribes in the area include several lands also identified as potential Section 4(f) resources (Sloan Canyon National Conservation Area, Desert National Wildlife Range, Grand Canyon National Park, the Mojave National Preserve, and Valley of Fire State Park). The noise exposure levels for these properties in 2012 are reported in Table V-8, and demonstrate that no changes in noise exposure under the Proposed Action would be large enough to meet any of the FAA criteria for evaluating noise effects.

5.4.4 Potential 2017 Impacts

Neither the Proposed Action nor the No Action Alternative include any ground disturbance, construction, or land acquisition; therefore, neither would have direct effects on historic resources or tribal lands in 2017.

As indicated in **Table V-12**, no changes in noise levels at historic properties were found that would affect historic resources; thus, no aircraft noise exposure impacts to historic properties would result from implementation of the Proposed Action.

Table V-12

Change of Aircraft Noise Exposure at Historic Properties in the Area of Potential Effects, 2017

	Historic Property	DNL		
		No Action	Proposed Action	Change
19	Little Church of the West	62.9	63.0	0.1
20	The "Welcome to Fabulous Las Vegas" Sign	66.0	66.1	0.2
21	Las Vegas Springs	45.8	45.0	-0.9

Note: DNL values and the changes in DNL values are calculated to more than one decimal place and have been rounded for presentation in this table. Therefore, the calculations of changes may appear to be incorrect due to rounding.

Sources: Ricondo & Associates, Inc., based on Metron Aviation, March 21, 2012.

Prepared by: Ricondo & Associates, Inc., April 2012.

The Proposed Action does not involve changes to ground-based light sources, thus it is unlikely to cause adverse light effects on historic resources that would result in annoyance or interference with normal human activities. According to FAA Order 1050.1E, Appendix A, the visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact.⁷ Changes in aircraft routes associated with the Proposed Action would generally occur at altitudes above 3,000 feet AGL; therefore, the visual sight of aircraft and aircraft lights would not be considered intrusive over historic resources. Consequently, the Proposed Action would not result in significant visual impacts.

In terms of the two Indian Reservations in the GSA (the Moapa Indian Reservation and the Las Vegas Indian Colony), noise modeling results indicate that noise levels for the grid points representing these reservations would all be below DNL 45 under both the Proposed Action and the No Action Alternative, and the highest change in noise exposure, when comparing the Proposed Action with the No Action Alternative, would be less than DNL 1 dB.

⁷ U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Change 1, Appendix A, Paragraph 12.2b.

Other lands in the GSA known to have special significance to tribes in the area include several lands also identified as potential Section 4(f) resources (Sloan Canyon National Conservation Area, Desert National Wildlife Range, Grand Canyon National Park, the Mojave National Preserve, and Valley of Fire State Park). The noise exposure levels for these properties in 2017 are reported in Table V-8, and demonstrate that no changes in noise exposure under the Proposed Action compared with the No Action Alternative would be large enough to meet any of the FAA criteria for evaluating noise effects.

5.5 Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks

This section presents a summary of the analysis of socioeconomic impacts, environmental justice, and children's environmental health and safety risks under the Proposed Action and the No Action Alternative.

5.5.1 Overview of Impacts

Neither the Proposed Action nor the No Action Alternative would displace people or businesses; therefore, implementation of the Proposed Action and No Action Alternative would not result in direct impacts in this category.

No areas within the GSA would experience a change in noise exposure in excess of any FAA threshold of significance for noise on people; therefore, no disproportionately high and adverse effects to children, minority populations, or low-income populations would occur under the Proposed Action or the No Action Alternative.

5.5.2 Methodology

The Proposed Action and No Action Alternative do not include land acquisition, construction, ground disturbance activities; therefore, the following evaluation criteria were excluded from potential impact assessment:

- Residential and business acquisitions and relocations,
- Division or disruption of established communities,
- Alteration of surface transportation patterns,
- Disruption of orderly planned development, and
- Environmental health and safety risks to children.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that federal agencies include environmental justice as part of their mission by identifying and addressing as appropriate, the potential for disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations, low-income populations, and Native American tribes. Environmental justice applies to all environmental resources. Therefore, a disproportionately high and adverse human health or environmental effect on minority and low-income populations may represent a significant impact.

5.5.3 Potential 2012 and 2017 Impacts

Under the Proposed Action, neither people nor businesses would be displaced. As discussed in Section 5.1, under the Proposed Action, no census block centroids in the GSA would experience a change in noise exposure in 2012 or 2017 that exceeds any of FAA's thresholds defining noise impacts on people; thus, no adverse direct or indirect effects would occur on any environmental

justice populations within the GSA. Therefore, the Proposed Action would not result in disproportionately high or adverse human health or environmental effects on minority and low-income populations in 2012 or 2017.

Under the No Action Alternative, neither people nor businesses would be displaced. Furthermore, air traffic routes would not be changed, so there would be no change in aircraft noise exposure in 2012 or 2017 that could result in an indirect impact. Therefore, the No Action Alternative would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.

5.6 Fish, Wildlife, and Plants (Avian and Bat Species)

This section presents a summary of the analysis of avian species impacts under the Proposed Action and the No Action Alternative.

5.6.1 Overview of Impacts

The Proposed Action would not involve acquisition, construction, or other ground disturbance activities; therefore, no impacts to fish or plants would occur. The Proposed Action would not increase the number of aircraft operations at the EA Airports compared with the No Action Alternative. The greatest potential for impacts to wildlife species would be noise effects and wildlife strikes on avian and bat species. Changes in noise exposure from the Proposed Action would be less than significant, and noise levels would decrease within the Desert National Wildlife Refuge and Mojave National Preserve. No adverse impacts to wildlife species from noise would occur under No Action Alternative or the Proposed Action. Changes to air traffic flows would primarily occur above 3,000 feet AGL; thus there would be no significant changes in impacts to avian and bat species under the Proposed Action compared with the No Action Alternative below this elevation. Changes to air traffic flows above 3,000 feet AGL are not likely to negatively affect avian and bat species (including listed species), or the Desert NWR compared with No Action Alternative. The Proposed Action may benefit populations of the Brazilian free-tailed bat (*Tadarida brasiliensis*), a BLM listed species, compared with No Action Alternative. Based on available FAA bird strike data, the changes to air traffic flows under the Proposed Action do not appear to pose a significant increase in the potential for wildlife or bird strikes compared with No Action Alternative.

The No Action Alternative would not involve changes to air traffic flows, land acquisition, construction, or other ground disturbance activities; therefore, no impacts to fish, wildlife, or plants would occur.

5.6.2 Methodology

Changes in flight paths have the potential to affect wildlife populations through noise and wildlife strikes on avian and bat species. Therefore, noise data, FAA bird strike data, flight tracks, flight corridors, and flight track elevations were analyzed in conjunction with existing data on these wildlife populations.

Noise modeling results (see Table V-8) were reviewed and evaluated with regard to impacts to wildlife (including listed species) and to wildlife refuge areas, specifically the Desert NWR and the Mojave National Preserve. This analysis was completed to determine the potential for impacts to wildlife and wildlife refuges due to a change in noise associated with the Proposed Action.

Flight tracks and corridors were reviewed for the No Action Alternative and the Proposed Action for arrivals and departures for VGT, HND, and LAS. Additionally, elevations of flight tracks above and below 3,500 feet AGL were reviewed, because research has documented that 93 percent of all

wildlife strikes nationwide occur below 3,500 feet AGL.⁸ The flight track review was completed with consideration of impacts on wildlife and wildlife habitats from changes in noise as well as impacts related to wildlife strikes.

As documented in Section 4.3.5, the FAA Wildlife Strike Database was reviewed for the time period from 1990 through March 2010. This database was used to segregate strikes by general aircraft operating phases (i.e., arrivals, departures, and taxi). The results of this data sorting were then considered in conjunction with flight tracks for the No Action Alternative and Proposed Action for the three EA Airports. Due to the volume of strikes associated with LAS arrivals, additional consideration of potential impacts due to changes in arrival flight tracks was given.

5.6.3 Potential 2012 and 2017 Impacts

The number of aircraft operations would not differ between the No Action Alternative and the Proposed Action, therefore, the assessment of the potential impacts focuses on changes to flight paths and the potential for impact due to noise and wildlife strikes.

5.6.3.1 Aircraft Noise

As discussed in Sections 5.1 and 5.3, changes in noise exposure resulting from the Proposed Action would be less than significant at census block centroids and over potential Section 4(f) resources (see presentation of aircraft noise exposure levels in Table V-8 for potential Section 4(f) resources in the GSA). Decreased noise is predicted for points near and within two major wildlife preserve areas: the Desert National Wildlife Refuge and the Mojave National Preserve. The Proposed Action would have a slight beneficial impact relative to noise in these areas. Therefore, no adverse impacts to wildlife species and habitats from increased noise would occur under either No Action Alternative or the Proposed Action in 2012 or 2017.

5.6.3.2 Wildlife Strikes

Limitations in the data within the FAA Wildlife Strike Database restrict the evaluation of wildlife strikes as they relate to changes in flight corridors and flight track elevations. As documented in Section 4.3.5, 84 percent of the recorded bird strikes for EA Airports from 1990 through March 2010 were to unidentified species. Without the species identification of a significant number of the bird strikes, information necessary to determine whether these birds are migratory, what habitats they are using, and what possible travel routes they are using, is not available. Therefore, assessment of wildlife strike data can only focus on the known species, which represent a fraction of the total strikes. Additionally, 24 percent of the strikes do not have a height associated with the record, which precludes evaluation of changes to flight patterns and elevations for this portion of the data.

In general, the changes to the arrival and departure corridors above 3,000 AGL would not substantially alter flight paths. Therefore, it is unlikely that the Proposed Action would increase impacts to avian wildlife, including listed species, compared with the No Action Alternative. As documented in Section 4.3.5, from 1990 through March of 2010, there has been only one documented wildlife strike that identified a listed species (peregrine falcon, a recently delisted federal species but a state and BLM listed species) at the EA Airports. This occurred at LAS in March of 2010. At LAS, the EA airport with the majority of reported wildlife strikes, narrower arrival and departure corridors are anticipated with implementation of the Proposed Action given the predictability associated with RNAV procedures. Given the high numbers of unknown species strikes, it is not possible to determine the effects of the Proposed Action on these species. Based on

⁸ Dolbeer, Richard A., *Height Distribution of Birds Recorded by Collisions with Civil Aircraft*, prepared for the U.S. Department of Agriculture, Wildlife Services, University of Nebraska, Lincoln, 2006.

the strikes of known species, the Proposed Action is not likely to negatively affect avian wildlife compared with the No Action Alternative.

Changes to arrival and departure corridors at HND would result in flight paths near areas of high bat occurrences. However, strike data indicate that bats are not currently a problem for the EA Airports. As documented in Section 4.3.5, from 1990 through March of 2010, there were no wildlife strikes involving bats at the EA Airports. Additionally, bats are typically regarded as low altitude flyers.⁹ Therefore, these populations should not be negatively affected by the Proposed Action. The Brazilian free-tailed bat, a BLM listed species, is noted to fly at higher altitudes.¹⁰ The majority of the known distribution of the Brazilian free-tailed bat is concentrated in western and southern Nevada.¹¹ Under the Proposed Action and the No Action Alternative for LAS and HND, flight corridors would not differ in a manner that would negatively affect these populations. Under the Proposed Action, flight departure corridors from VGT would avoid areas of known Brazilian free-tailed bat populations compared with the No Action Alternative. Therefore, the Proposed Action may benefit this listed species compared to the No Action Alternative. No other impacts to listed bat species are anticipated due to the Proposed Action.

Wildlife strikes were analyzed and segregated by phase (arrival, departure, and taxi) for the EA Airports as depicted in **Table V-13** below. For eight percent of the strikes, no phase was entered into the database. Only one strike (less than one percent) was recorded during taxi. Approximately 30 percent were recorded during the departure phase. The majority of reported strikes (i.e., approximately 62 percent) were recorded during the arrival phase.

Table V-13

Wildlife Strikes from 1990 through March 2010 by Airport and by Arrival/Departure

Phase	LAS	VGT	HND	Total	Percent of Total
Arrival	170	4	4	178	61.8%
Departure	84	2	0	86	29.9%
Unknown	21	1	1	23	8.9%
Taxi	1	0	0	1	0.4%
Total				288	100.0%

Source: CDM Smith, April 2012, analysis of the U.S. Department of Transportation, Federal Aviation Administration, FAA Wildlife Strike Database, <https://wildlife-mitigation.tc.faa.gov/wildlife/database.aspx>, (accessed July 31, 2010 and August 5, 2010).

Prepared by: CDM Smith, April 2012.

The flight tracks within the GSA for the Proposed Action and the No Action Alternative were reviewed (see depictions of Proposed Action and No Action Alternative flight corridors in Section III and flight tracks in Appendix E). For HND arrivals, the Proposed Action arrival flight tracks would be similar to the No Action Alternative arrival flight tracks, with a shift of one set of arrival flight tracks from the northeast. For HND departures, the Proposed Action flight tracks would be in similar corridors as they currently are, with an added southeast corridor over Lake Mead and another corridor heading west that would remain below 3,500 feet longer than it would under the No Action

⁹ Williams, TC, Ireland, LC, and Williams, JM. 1973. *High Altitude Flights of the Free-Tailed Bat, Tadarida Brasiliensis, Observed with Radar*. Journal of Mammalogy. Vol 54, no 4.

¹⁰ Williams, TC, Ireland, LC, and Williams, JM. 1973. *High Altitude Flights of the Free-Tailed Bat, Tadarida Brasiliensis, Observed with Radar*. Journal of Mammalogy. Vol 54, no 4.

¹¹ Bradley, PV, O'Farrell, MJ, Williams, JA, and Newmark, JE. 2006. *The Revised Nevada Bat Conservation Plan*. Nevada Bat Working Group. Reno, Nevada.

Alternative. For VGT, the Proposed Action arrival and departure flight tracks would be similar to the No Action Alternative, with new arrival flight tracks from the southeast through a new entry point and a new Victor Airway from the south, and new departure flight tracks to the southeast through a new exit point. For LAS, the Proposed Action and No Action Alternative arrival flight tracks would be similar over the Desert National Wildlife Refuge and the Mojave National Preserve. LAS departure flight tracks would generally be similar for the Proposed Action and No Action Alternative, with a new set of flight tracks to the southeast through a new exit point. Overall, the changes in Proposed Action flight tracks do not appear to pose a significant increase in the potential for wildlife or bird strikes.

Nationwide, 93 percent of wildlife strikes occur at 3,500 feet AGL or below. For the EA Airports from 1990 to March 2010, 42 percent were below 3,500 feet AGL while 34 percent occurred above 3,500 feet AGL (24 percent were unreported elevations). Since the proposed flight track changes would primarily occur above 3,000 feet AGL, the occurrence of strikes would not be expected to change significantly below 3,500 feet for the Proposed Action for any of the three EA Airports. Since VGT and HND have very low occurrences of wildlife strikes overall, that trend is expected to continue. The proposed changes for above 3,500 feet are not expected to significantly change the potential for bird strikes for LAS either. In some cases, the flight tracks would narrow and in some cases they would widen. In some cases, the tracks would be farther away from wildlife areas and, in other cases they would be closer to wildlife areas. From the analysis conducted, there does not appear to be a reason to think wildlife strikes would increase above 3,500 feet AGL as a result of implementation of the Proposed Action. If the EA Airports trend toward what is observed nationwide, it is possible that wildlife strikes might decrease above 3,500 feet AGL for the EA Airports in the future.

5.7 Natural Resources and Energy Supply

This section presents a summary of the analysis of whether changes in facilities or the movement of aircraft or ground vehicles would result in a measurable effect on local supplies of energy or natural resources under the Proposed Action and the No Action Alternative.

5.7.1 Overview of Impacts

The Proposed Action would not involve construction or other ground disturbance activities; therefore, implementation of the Proposed Action would not result in the depletion of natural resources. The Proposed Action would involve changes to air traffic flows; however, the optimized air traffic routes in the Proposed Action would improve the efficiency of aircraft routes, such as continuous climb-outs and optimized descents, where possible, which overall would be expected to reduce aircraft fuel consumption; therefore, the Proposed Action would not result in the depletion of local supplies of energy.

The No Action Alternative would not involve changes to air traffic flows, construction, or other ground disturbance activities; therefore, the No Action Alternative would not result in the depletion of local supplies of energy or natural resources.

5.7.2 Methodology

Neither the Proposed Action nor the No Action Alternative involve construction or ground disturbance activities; therefore, no effect on local supplies of natural resources would be expected and effects on natural resources was therefore not quantitatively evaluated.

The Proposed Action would not change the number of aircraft operations relative to the No Action Alternative, but it would involve changes to air traffic flows during the departure, decent, and

approach phases of flight. These changes affect both the route an aircraft may follow as well as the climb-out and descent profiles of the flight, which directly affect aircraft fuel burn (or fuel expended). Aircraft fuel burn is considered a proxy for whether the Proposed Action would have a measurable effort on local supplies of energy resources, aircraft fuel in this context, compared with the No Action Alternative.

The FAA's model, NIRS, calculates aircraft-related fuel burn as an output along with calculating aircraft noise exposure.¹² The inputs to NIRS to estimate aircraft-related fuel burn are the same as those used in the noise analysis, such as the average annual day flight schedules, flight tracks, and runway use. Refer to Sections 4.3.1 and 5.1 as well as Appendix E for a discussion of the noise exposure calculation methodology, inputs, and assumptions, which are also applicable to the fuel burn calculation methodology. Changes in fuel burn between alternatives can be used as an indicator of changes in fuel consumption resulting from implementation of the Proposed Action compared with the No Action Alternative.

5.7.3 Potential 2012 and 2017 Impacts

Table V-14 presents the results of the fuel burn analysis for the Proposed Action and No Action Alternative. Compared with the No Action Alternative, the Proposed Action would result in fewer kilograms of aircraft fuel burned: 68,626 fewer kilograms in 2012 and 76,634 fewer kilograms in 2017. Given the lower quantity of fuel burned under the Proposed Action for both 2012 and 2017, the Proposed Action would not result in significant changes in energy demands or natural resource consumption that would exceed available or future supplies of energy.

Table V-14

Comparison of Energy Consumption, 2012 and 2017

	2012		2017	
	No Action Alternative	Proposed Action	No Action Alternative	Proposed Action
Fuel Burn (kilograms)	751,802	683,176	892,588	815,954
Change (kilograms) (No Action Alternative-Proposed Action)		-68,626		-76,634

Source: Metron Aviation, March 21, 2012.

Prepared by: Ricondo & Associates, Inc., April, 2012.

5.8 Air Quality

This section presents a summary of the analysis of air quality impacts under the Proposed Action and the No Action Alternative.

¹² Per U.S. Department of Transportation, Federal Aviation Administration, FAA Order 1050.1E, Change 1, Guidance Memo #4 (Subject: Guidance on Using AEDT 2a to Conduct Environmental Modeling for FAA Air Traffic Airspace and Procedure Actions, March 21, 2012), the FAA designated Aviation Environmental Design Tool (AEDT) 2a as the replacement model for NIRS and requires use of AEDT for aircraft noise modeling, fuel burn, and emissions modeling for FAA air traffic airspace and procedure actions. However, the guidance memo states that use of AEDT 2a is not required for projects whose environmental analysis began before March 1, 2012. The LAS Optimization EA environmental analysis began in 2010; thus, the LAS Optimization EA is exempt from this requirement.

5.8.1 Overview of Impacts

The Proposed Action would not change the number of aircraft operations relative to the No Action Alternative. The operational efficiencies associated with implementation of the Proposed Action are expected to result in lower air pollutant emissions compared with the No Action Alternative.

The No Action Alternative would not change the number of aircraft operations or change air traffic routes, and therefore is not expected to change air pollutant emissions.

5.8.2 Methodology

An air quality analysis was not undertaken to assess the effects of the Proposed Action in comparison with the No Action Alternative because no significant air quality impacts would result from the implementation of the Proposed Action for several reasons. First, the total number of aircraft operations would not differ between the Proposed Action and the No Action Alternative. Second, the Purpose and Need for the Proposed Action includes increasing the efficiency of the air traffic routes serving the EA Airports. Qualitatively, the more efficient flight routes would serve to reduce fuel burn and thereby reduce air pollutant emissions. Therefore, the change in fuel burn with the implementation of the Proposed Action compared with the No Action Alternative was used as an indicator of changes in air pollutant emissions to validate the qualitative assumption that fewer emissions would result (commensurate with lower quantities of fuel used) with implementation of the Proposed Action.

5.8.3 Potential 2012 and 2017 Impacts

As shown in Table V-14, less fuel would be used with implementation of the Proposed Action compared with the No Action Alternative—68,626 fewer kilograms in 2012 and 76,634 fewer kilograms in 2017. With less fuel consumed, air pollutant emissions would be lower with implementation of the Proposed Action than with the No Action Alternative. Therefore, the Proposed Action would not cause a new violation, worsen an existing violation, or delay meeting the NAAQS.

Under the Proposed Action, no changes in air traffic routes would occur; therefore, the No Action Alternative would not change air pollutant emissions, cause a new violation, worsen an existing violation, or delay meeting the NAAQS.

5.9 Climate

Although there are no federal standards for aviation-related greenhouse gas emissions, it is well-established that greenhouse gas emissions can affect climate.¹³ The CEQ has indicated that climate should be considered in NEPA analyses. As noted by CEQ:

it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand.¹⁴

¹³ *Massachusetts v. E.P.A.*, 549 U.S. 497, 508-10, 521-23 (2007).

¹⁴ Nancy H. Sutley, Chair, Council on Environmental Quality, Memorandum for Heads of Federal Departments and Agencies, Subject: *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*, February 18, 2010. http://ceq.hss.doe.gov/nepa/regs/Consideration_of_Effects_of_GHG_Draft_NEPA_Guidance_FINAL_02182010.pdf (accessed February 21, 2012).

5.9.1 Overview of Impacts

The Proposed Action would not change the number of aircraft operations relative to the No Action Alternative. The operational efficiencies associated with implementation of the Proposed Action compared with the No Action Alternative are expected to result in lower aircraft fuel consumption. Since greenhouse gas emissions occur in direct proportion to fuel consumption, the Proposed Action is expected to reduce the production of greenhouse gases.

The No Action Alternative would not change the number of aircraft operations or change air traffic routes, and therefore is not expected to change aircraft fuel consumption or the production of greenhouse gases.

5.9.2 Methodology

Because the total number of aircraft operations would not differ between the Proposed Action and the No Action Alternative, and the Purpose and Need for the Proposed Action includes increasing the efficiency of the air traffic routes serving the EA Airports, qualitatively it is expected that the more efficient flight routes would serve to reduce fuel burn and thereby reduce greenhouse gas emissions.

Research has shown that there is a direct relationship between the amount of greenhouse gases emitted and fuel consumption. The Proposed Action would not induce additional aircraft operations over that which would occur with the No Action Alternative, as stated in Section 2.2. The Proposed Action would improve the efficiency of the air traffic routes serving the EA Airports, as demonstrated in the fuel consumption calculations for the Proposed Action and the No Action Alternative described in Section 5.7. Therefore, consistent with FAA guidance on considering greenhouse gases and climate under NEPA,¹⁵ the change in fuel burn with the implementation of the Proposed Action compared with the No Action Alternative was used as an indicator of changes in greenhouse gas emissions. FAA guidance also suggests that if fuel consumption is quantified, that a calculation of carbon dioxide equivalents (CO₂e) can be prepared by multiplying the gallons of fuel associated with each alternative by the CO₂e associated with each gallon of fuel burned (9.7438 kg of CO₂e).

5.9.3 Potential 2012 and 2017 Impacts

As shown in Table V-14, less fuel would be used with implementation of the Proposed Action compared with the No Action Alternative—68,626 fewer kilograms in 2012 and 76,634 fewer kilograms in 2017. The CO₂e emissions are shown in **Table V-15**. CO₂e emissions under the Proposed Action would be 216,517 kilograms, or 9.1 percent, lower than the No Action Alternative in 2012 and 241,781 kilograms, or 8.6 percent, lower in 2017. Because the Proposed Action would reduce fuel burn in comparison with the No Action Alternative, and thus reduce CO₂e emissions, no significant project-related effects are expected on the climate.

¹⁵ U.S. Department of Transportation, Federal Aviation Administration, FAA Order 1050.1E, Change 1, Guidance Memo #3, subject: “Considering Greenhouse Gases and Climate Under the National Environmental Policy Act (NEPA): Interim Guidance,” January 12, 2012.

Table V-15Comparison of CO₂ Equivalent Emissions, 2012 and 2017

	2012		2017	
	No Action Alternative	Proposed Action	No Action Alternative	Proposed Action
CO ₂ Equivalent Emissions (kilograms)	2,371,937	2,155,420	2,816,117	2,574,336
Change (kilograms) (No Action Alternative-Proposed Action)		-216,517		-241,781

Source: Metron Aviation, March 21, 2012.

Prepared by: Ricondo & Associates, Inc., April, 2012.

5.10 Light Emissions and Visual Impacts

This section presents a summary of the analysis of light emissions and visual impacts under the Proposed Action and the No Action Alternative.

5.10.1 Overview of Impacts

As stated in Section 2.3, implementation of the Proposed Action would not increase the number of aircraft operations at the EA Airports compared with the No Action Alternative. Changes in aircraft overflight patterns under the Proposed Action are expected to be at altitudes and distances from viewers that would not result in light emission or visual impacts.

Under the No Action Alternative, no changes in air traffic routes in the Las Vegas area would occur, so no changes in aircraft overflight patterns would occur and no new light sources would be introduced. Therefore, the No Action Alternative would not result in light emission or visual impacts.

5.10.2 Methodology

Visual, or aesthetic, impacts are more difficult to define and evaluate than light emissions because they are inherently subjective. Aesthetic impacts deal more broadly with the extent that the project contrasts with the existing environment and whether the community's jurisdictional agency considers this contrast objectionable. Visual impacts are normally related to the disturbance of the aesthetic integrity of an area caused by development, construction, or demolition, and thus, do not typically apply to airspace changes.

To evaluate the potential for indirect impacts resulting from changes in aircraft routings and visual intrusion, the general altitudes at which aircraft route changes occur beyond the immediate airport environs, which experiences overflights on a routine basis, are considered to evaluate the potential for light emissions impacts.

5.10.3 Potential 2012 and 2017 Impacts

The Proposed Action and the No Action Alternative do not include development, construction, or demolition of facilities; therefore, the Proposed Action and the No Action Alternative would not be expected to disturb the aesthetic integrity of an area or result in a visual contrast with the existing environment. Furthermore, the Proposed Action and the No Action Alternative do not involve changes to ground-based light sources, thus they are unlikely to cause adverse light effects that would result in annoyance or interference with normal human activities.

According to FAA Order 1050.1E, Appendix A, the visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed

to constitute an adverse impact.¹⁶ Changes in aircraft routes associated with the Proposed Action would generally occur at altitudes above 3,000 feet AGL; therefore, the visual sight of aircraft and aircraft lights would not be considered intrusive. Consequently, the Proposed Action would not result in significant visual impacts.

Air traffic routes under the No Action Alternative would not change, and therefore, would not result in changes in light emissions to people on the ground, so no significant impacts relating to light emissions would occur.

Therefore, the Proposed Action and the No Action Alternative would not likely create a visual impact of significance.

5.11 Cumulative Impacts

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action with other actions. CEQ regulations define cumulative impact as the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of the agency, federal or nonfederal, undertaking such actions and state that cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.¹⁷

5.11.1 Overview of Impacts

Based on the review of past, present, and reasonably foreseeable projects, the Proposed Action would not be expected to contribute to past, present, and reasonably foreseeable projects' effects on avian and bat species, effects related to changes in noise exposure, and effects related to light emissions that would cumulatively result in significant impacts.

The No Action Alternative does not involve a proposed project or action that could contribute to the effects of past, present, and reasonably foreseeable projects that would cumulatively result in significant impacts. Thus, the No Action Alternative is not discussed further in this section.

5.11.2 Methodology

Projects within the vicinity of the EA Airports were reviewed to evaluate the potential for cumulative impacts. A list of potential projects proposed on or near the EA Airports is provided in Table IV-15. Due to the nature of the resources affected by the Proposed Action, only projects with direct or indirect effects on aviation within the GSA were considered.

Potential impacts related to implementation of the Proposed Action, although demonstrated to not be significant in the preceding sections of this chapter, can be combined into two categories:

- **Aircraft Noise**—Effects related to changes in aircraft noise exposure, including potential impacts on populations in the GSA, compatible land use, potential Section 4(f) resources, historic properties, and tribal lands.
- **Visual Impact**—Effects related to visual impacts, including potential impacts in general in the GSA as well as specific impacts on Section 4(f) resources and historic properties resulting from the visual sight of aircraft, aircraft contrails, or aircraft lights at night.

Other categories of impacts considered in this EA, but demonstrated to not affect the resource, include:

¹⁶ U.S. Department of Transportation, Federal Aviation Administration, Order 1050.1E, Change 1, Appendix A, Paragraph 12.2b.

¹⁷ Council on Environmental Quality Regulations, Section 1508.7.

- **Fuel Burn**—The Proposed Action results in lower quantities of fuel burned and correspondingly lower amounts air pollutants and greenhouse gases emitted; therefore, the Proposed Action would not cumulatively contribute to potential effects on energy use, air pollutants emitted, and greenhouse gases emitted of other past, present, and reasonably foreseeable future projects.
- **Avian and Bat Species**—The Proposed Action is not expected to result in a change in the occurrence of wildlife strikes; therefore, the Proposed Action would not cumulatively contribute to potential effects on avian and bat species of other past, present, and reasonably foreseeable future projects.
- **Other Categories**—As the Proposed Action would not involve land acquisition or other shifts in population or communities, physical changes such as ground disturbance or facility development, or construction activities, it would not affect the other environmental resource categories specified in FAA Order 1050.1E, as listed in the introduction to this Chapter.

Therefore, only other past, present, and reasonably foreseeable proposed projects with the potential for impacts related to changes in aircraft noise exposure and changes in light emissions were considered. The projects identified in Table IV-15 were evaluated for their potential to collectively, with the Proposed Action, contribute to significant noise or light emissions impacts.

5.11.3 Potential 2012 and 2017 Impacts

Categories of past, present, and reasonably foreseeable projects were evaluated for their potential to contribute cumulatively to potential impacts resulting from implementation of the Proposed Action. This evaluation is presented in **Table V-16**. A discussion of potential cumulative impacts, by environmental resource category, follows.

Table V-16

Potential for Cumulative Impacts with the Proposed Action and the No Action Alternative

Past, Present, and Reasonably Foreseeable Future Action Project Category	General Project Description	Environmental Resource Category ^{1/}	
		Aircraft Noise	Visual Impacts
Projects at EA Airports	Construction of various airport facilities (e.g., new control tower, new terminal building, repaving ramp areas)	No	Potential
Other Regional Airport Projects	Construction of new airport and heliport facilities (e.g., new facility location, new runway locations)	Potential	Potential
Regional Airspace Projects	New and redesigned standard instrument procedures (e.g., STARs and SIDs)	Potential	Potential
Transportation-Related Regional Projects	Rail and highway projects	Potential	Potential

Notes:

1/ Categories of potential impacts related to implementation of the Proposed Action.

Potential = The category of past, present, and reasonably foreseeable projects has the potential to contribute cumulatively to potential effects resulting from implementation of the Proposed Action or the No Action Alternative.

No = The category of past, present, and reasonably foreseeable projects does not have the potential to contribute cumulatively to potential effects resulting from implementation of the Proposed Action or the No Action Alternative.

Source: Ricondo & Associates, Inc., February 2012.

Prepared by: Ricondo & Associates, Inc., February 2012.

5.11.3.1 Potential Cumulative Noise Impacts

Noise and noise-related impacts include changes in noise exposure for populations, compatible land use, potential Section 4(f) resources, historic properties, and tribal lands.

Implementation of the Proposed Action would not result in significant changes in noise exposure, as discussed in this Chapter. Three of the categories of past, present, and reasonably foreseeable projects have the potential to cumulatively contribute to the noise impacts of the Proposed Action:

- **Other Regional Airport Projects**—Three of the projects listed in this category in Table IV-15 are not reasonably foreseeable because the projects were on-hold at various stages of design and environmental review as of March 2012 (i.e., the Southern Nevada Regional Heliport, the Southern Nevada Supplemental Airport, and the Mesquite Airport). Because implementation of these projects is not reasonably foreseeable, the potential for cumulative impacts with the Proposed Action cannot be assessed at the time of this EA. The fourth project in this category in Table IV-15 is relocation of St. George Airport that occurred in January 2011. St. George Airport is located in southwestern Utah, outside of the GSA; therefore, changes in noise exposure resulting from the relocation of the airport would not cumulatively contribute to changes in noise exposure resulting from implementation of the Proposed Action.
- **Regional Airspace Projects**—The majority of projects listed in this category in Table IV-15 involve changes to or implementation of new STARs and SIDs in the Las Vegas area for which the FAA has issued Categorical Exclusion findings because the FAA did not anticipate that the projects would individually or cumulatively have a significant effect on the environment. Therefore, these projects would not contribute cumulatively to the noise effects of the Proposed Action. Three other projects in the regional airspace projects category include:
 - Four Corner-Post Plan—As described in Section 1.2 of this EA, the FAA implemented a hybrid four corner-post plan in the Las Vegas area in 2001, and modified the aircraft routes in 2006 to address needed changes to the routes. Existing conditions reflect the airspace established under the Four Corner-Post Plan and the No Action Alternative considered in this EA reflects that Plan, with some additional modifications (refer to implemented regional airspace projects in Table IV 14 of this EA). Implementation of the Proposed Action would result in a replacement of the Four Corner-Post Plan with the LAS Optimization Alternative. Therefore, the effects on noise exposure would not be considered cumulative and there would be no significant effects on noise exposure as discussed in Section 5.1.
 - Special Flight Rules Area in the Vicinity of Grand Canyon National Park—The purpose of this project was to address the impacts of aircraft noise on park resources and visitor experiences, and thus would not result in an increase in noise exposure that would cumulatively contribute to significant noise exposure in conjunction with the Proposed Action. As identified in Section 4.3.3, approximately 0.77 square miles of the 4,294 square miles of total land area underlying the SFRA is located within the GSA. The change in noise exposure analysis, presented in Section 5.3 and Table V-8, indicates that implementation of the Proposed Action would result in lower levels of noise exposure over the portion of the Grand Canyon National Park located within the GSA as compared with the No Action Alternative (ranging from DNL 4.2 to 5.9 dB lower in 2012 and DNL 2.9 to 5.4 dB lower in 2017). Thus, the Proposed Action would not cumulatively contribute to an increase in aircraft noise exposure over this resource.

- Las Vegas Area Class B Airspace—The FAA is considering a change to the Class B Airspace that serves the Las Vegas area. It is not known at this time whether such a change would result in further changes to aircraft routes. Therefore, it is not feasible to determine whether there would be a potential for cumulative effects. Any modifications to the Class B airspace would be subject to future environmental analysis, as appropriate.
- **Transportation-Related Regional Projects**—The projects listed in this category in Table IV-15 are not reasonably foreseeable because the timing of construction and implementation of the projects is unknown and thus not reasonably foreseeable (i.e., California-Nevada High-Speed Rail Project Proposals, Interstate 215 and Airport Connector Interchange Improvements, and Las Vegas Monorail System). Because implementation of these projects is not reasonably foreseeable, the potential for cumulative impacts with the Proposed Action cannot be assessed at the time of this EA.

Based on the review of past, present, and reasonably foreseeable projects, the Proposed Action would not be expected to contribute to changes in noise exposure that would cumulatively result in significant impacts.

5.11.3.2 Potential Cumulative Visual Impacts

Visual impacts related to the implementation of the Proposed Action are not expected to result from changes in the aircraft routes associated with the Proposed Action because the changes in routes would generally occur at altitudes above 3,000 feet AGL, and would therefore not be considered intrusive. All four the categories of past, present, and reasonably foreseeable projects have the potential to cumulatively contribute to visual impacts of the Proposed Action:

- **Projects at EA Airports**—Projects at EA Airports, identified in Table IV-15, include construction of a new control tower at LAS, construction of Terminal 3 at LAS, and repaving ramp areas at LAS. Of these projects, the new control tower and Terminal 3 at LAS have the potential to affect light emissions; however, these projects at LAS are located in an area of high-ambient light within the urban environs of Las Vegas. Furthermore, the changes in aircraft routes associated with the Proposed Action would occur beyond the immediate vicinities of the EA Airports, where any effects of the airport projects would occur. Therefore, visual effects resulting from changes in aircraft routing near LAS under the Proposed Action combined with these new airport facilities would not be expected to cumulatively contribute to visual effects, including light emissions impacts, in the high-ambient light environ of LAS.
- **Other Regional Airport Projects**—As described in Section 5.11.3.1, three of the projects listed in this category in Table IV-15 are not reasonably foreseeable; thus, the potential for cumulative impacts with the Proposed Action cannot be assessed at the time of this EA. The fourth project (relocation of St. George Airport) is outside of the GSA, so changes in the visual intrusion of aircraft resulting from the relocation of the airport would not cumulatively contribute to changes the visual effects resulting from implementation of the Proposed Action.
- **Regional Airspace Projects**—As described in Section 5.11.3.1, the majority of projects listed in this category in Table IV-15 have received Categorical Exclusion findings because the FAA did not anticipate that the projects would individually or cumulatively have a significant effect on the environment. Therefore, these projects would not contribute cumulatively to the visual effects of the Proposed Action. Three other projects in the regional airspace projects category include:

- Four Corner-Post Plan— As described in Section 1.2 of this EA, the FAA implemented a hybrid four corner-post plan in the Las Vegas area in 2001, and modified the aircraft routes in 2006 to address needed changes to the routes. Existing conditions reflect the airspace established under the Four Corner-Post Plan and the No Action Alternative considered in this EA reflects that Plan, with some additional modifications (refer to implemented regional airspace projects in Table IV-15 of this EA). Implementation of the Proposed Action would result in a replacement of the Four Corner-Post Plan with the LAS Optimization Alternative. Therefore, the visual impact would not be considered cumulative and there would be no significant visual impact as discussed in Section 5.10.
- Special Flight Rules Area in the Vicinity of Grand Canyon National Park—A component of this overflight plan is to establish at least one hour of quiet time before sunrise and after sunset, extending current restrictions on aircraft overflights during nighttime, thus implementation of this plan would reduce the visual intrusion of aircraft over the Special Flight Rules Area during sunrise and sunset hours. IFR operations under the Proposed Action would be subject to these restrictions and thus cumulatively the Proposed Action and the overflight plan would not increase the visual intrusion of aircraft in the Special Flight Rules Area.
- Las Vegas Area Class B Airspace—The FAA is considering a change to the Class B Airspace that serves the Las Vegas area. It is not known at this time whether such a change would result in further changes to aircraft routes. Therefore, it is not feasible to determine whether there would be a potential for cumulative effects. Any modifications to the Class B airspace would be subject to future environmental analysis, as appropriate.
- **Transportation-Related Regional Projects**—As described in Section 5.11.3.1, the projects listed in this category in Table IV-15 are not reasonably foreseeable, thus the potential for cumulative impacts with the Proposed Action cannot be assessed at the time of this EA.

Based on the review of past, present, and reasonably foreseeable projects, the Proposed Action would not be expected to cumulatively contribute to changes in visual impacts that would result in significant impacts.