

# CHAPTER EIGHT

## DEPARTMENT OF TRANSPORTATION ACT

### SECTION 4(f)/303(c) LANDS

#### INTRODUCTION

This chapter addresses the FAA's requirement under Section 4(f)/303(c) of the Department of Transportation Act (codified at 49 U.S.C. Section 303) to determine whether the development of a replacement airport in St. George, Utah would require the use of publicly owned land of a public park, recreation area, wildlife or waterfowl refuge, or land of an historic site of national, state, or local significance. A transportation project that involves such a use can be approved by the Department of Transportation and its agencies (including the FAA) only if (1) there is no prudent and feasible alternative to using that land, and (2) the project includes all possible planning to minimize harm to the affected land from the proposed use.

#### 8.1 SECTION 4(f)/303(c) REVIEW

Once the properties meeting the definition above are located for a particular project, use of the property is determined. If there is an actual physical occupation of the land, then there generally is a 4(f)/303(c) use. Early evaluations determined that there would be no physical takings of any 4(f)/303(c) properties for the replacement airport at St. George, Utah.

"Use" within the meaning of Section 4(f)/303(c) includes not only actual physical takings of such lands. A project that respects a park's territorial integrity may still substantially impair the park and take it in every practical sense. The FAA must also determine whether project-related impacts would substantially impair 4(f)/303(c) resources, thereby constituting a constructive use. Substantial impairment occurs only when the activities, features, or attributes of the 4(f)/303(c) resource that contribute to its significance or enjoyment are substantially diminished.

Although the concept of takings law is not binding under a 4(f)/303(c) analysis, the similarities between the two legal frameworks are instructive in evaluating Section 4(f)/303(c) constructive use matters. Under federal takings law, a permanent physical occupation of land by the government is a taking just as a physical appropriation of land under Section 4(f)/303(c) by a transportation agency is a use. Under both legal concepts, where there is no permanent physical occupation of land, there may still be a taking and/or use. When government action does not physically occupy the land but still affects or limits the use of the land there may be a taking or constructive use (*Pennsylvania Coal Co. v. Mahon*, 260 U.S. 393 (1922)). In general, where a regulation "denies all economically beneficial or productive use of land" compensation is required (*Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1015 (1992)). Similarly, a "project that respects a parks territorial integrity may still, by means of noise, air pollution, or

otherwise, dissipate the park's aesthetic value, harms its wildlife, defoliate its vegetation, and take it in every practical sense. For Section 4(f)/303(c) purposes, the impairment must be substantial. With respect to aircraft noise, for example, the noise must be at levels high enough to have negative consequences of a substantial nature that amount to a taking of a park or portion of a park for transportation purposes." FAA Order 1050.1E, Appendix A, S 6.2f.

## **8.2 BASIS FOR FAA SECTION 4(f)/303(c) DETERMINATION**

The impact that is of concern with respect to the consideration of constructive use for the proposed replacement airport at St. George is project-related aircraft noise. The FAA relies on land use compatibility guidelines in 14 C.F.R. Part 150 ("Part 150") to determine whether there is constructive use under Section 4(f) / 303(c) where the land uses specified in Part 150 are relevant to the value, significance, and enjoyment of the 4(f)/303(c) lands in question. These guidelines have been in existence and use for some time to determine noise impacts by relating land use type to certain airport noise levels. The Part 150 guidelines, which incorporate the day-night sound level (DNL) metric, may be relied upon in evaluating constructive use of lands devoted to traditional recreational activities, as categorized in Part 150. In urban areas, FAA typically relies on the DNL in Part 150 because DNL is the best measure of significant impact on the quality of the human environment, is the only noise metric with a substantial body of scientific data on the reaction of people to noise, and has been systematically related to Federal compatible land use guidelines.

The FAA also relies on Part 150 guidelines, as applicable, to evaluate 4(f)/303(c) constructive use with respect to noise impacts on historic sites. In addition, a historic property would not be used for Section 4(f)/303(c) purposes when there is a finding of no historic properties affected or no adverse effect under Section 106 of the National Historic Preservation Act (NHPA). Findings of adverse effect under Section 106 do not automatically trigger Section 4(f)/303(c) unless the effects substantially impair the affected resource's historical integrity. FAA is responsible for complying with Section 106 of the NHPA regardless of the disposition of Section 4(f)/303(c).

Part 150 guidelines do not adequately address the effects of noise on the expectations and purposes of people visiting areas within a national park or national wildlife refuge where other noise is very low and a quiet setting is a generally recognized purpose and attribute, or noise effects on wildlife. Likewise, Part 150 guidelines may not be sufficient to determine the noise impact on historic sites where a quiet setting is a generally recognized purpose and attribute. See FAA Order 1050.1E, Appendix A, Section 6, pp. A-20 and 21.

Because a quiet setting is a generally recognized purpose and attribute of some of the Section 4(f)/303(c) properties evaluated in this Draft Environmental Impact Statement (DEIS), the FAA is supplementing its reliance upon DNL and the Part 150 guidelines in making its constructive use determination. Paragraph 14.3 of

Appendix A of FAA Order 1050.1E specifically provides that special consideration be given to the evaluation of noise impacts on noise-sensitive areas within national parks and similar properties with attributes of quiet settings.

The FAA has approved the supplemental metrics used in this DEIS, with the caveat that such a supplemental noise analysis is not by itself a measure of adverse aircraft noise or significant aircraft noise impact. As explained in detail below, the FAA has conducted supplemental, extensive grid point analyses using a variety of metrics to evaluate the replacement airport's potential noise effects. Among these supplemental metrics is an evaluation of Percent Time Above Ambient (%TAA) at Zion National Park within the context of current National Park Service (NPS) soundscape goals for established "management zones" within the park, and subsequently, the proportion of each management zone that exceeds the soundscape TAA goal. The TAA metric is considered comparable to time audible, a metric which is in development by the FAA and NPS, but unavailable for this study.

In reaching its 4(f)/303(c) conclusions here, the FAA has considered the data resulting from all noise analyses described in this DEIS in order to better understand the relative nature and magnitude of project-related noise impacts in the overall context of noise and the values of the properties protected by Section 4(f)/303(c). The FAA's 4(f)/303(c) determination is based on whether the data supports the conclusion that project-related noise impacts would substantially impair the resources at issue, amounting to a taking of the 4(f)/303(c) property or part of the property for transportation purposes.

### **8.3 IDENTIFICATION OF ELIGIBLE SECTION 4(f)/303(c) PROPERTIES**

Under Section 4(f)/303(c), it is national policy that special effort be made to preserve the natural beauty of the countryside, public parks, recreation lands, wildlife and waterfowl refuges, and historic sites through additional scrutiny and the application of rigorous standards before the use of such properties in a transportation project can be approved. Coordination with the managing agencies of 4(f)/303(c) properties is a key component of this process. See **Appendix M, Coordination with Managing Agencies of Section 4(f)/303(c) Properties Located within the Initial Area of Investigation**, for a detailed accounting of this coordination.

As discussed in **Chapter Five, Section 5.1.4**, an initial area of investigation (IAI) was established in order to determine the impacts of the replacement airport at St. George on a variety of resources. The IAI, shown in **Exhibit 8.1**, covers approximately 9,200 square miles of portions of southwestern Utah, northwestern Arizona, and southeastern Nevada. The proposed replacement airport lies at the center of the IAI, which extends 88 nautical miles east to west and 80 nautical miles north to south. To evaluate aircraft noise levels on 4(f)/303(c) properties owned by state and Federal governments within the area, three separate 4(f)/303(c) property groups ultimately were evaluated within this area of investigation: Zion National Park, Little Black Mountain Petroglyph Site, and 42 other Federal and state 4(f)/303(c) sites.

The other 42 sites evaluated within the IAI included:

- Four National Monuments
- Eight Wilderness Areas
- Twenty Wilderness Study Areas
- Six State Parks
- Two National Forests
- One National Recreation Area
- One Instant Study Area

### **8.3.1 DESCRIPTION OF THE SECTION 4(f)/303(c) PROPERTY GROUPS**

#### **8.3.1.1 Zion National Park**

Zion National Park, located at the junction of the Colorado Plateau, Great Basin, and Mojave Desert provinces in southwestern Utah, is dominated by a dramatic landscape of sculptured canyons and soaring cliffs. Its 146,598 acres provided varied recreational experiences for 2,672,995 visitors in 2004. In addition to more than 80 miles of hiking trails, three visitor centers, and 33 miles of scenic drives, Zion National Park provides opportunities for camping, bicycling, climbing, and horseback riding. Zion National Park features stunning scenery, sandstone cliffs among the highest in the world, diverse plant and animal communities, and Ancestral Puebloan, Paiute, and Mormon pioneer history.

According to the NPS, resource manager for the property, over 90 percent of the park was recommended to Congress as wilderness in 1978. NPS policy requires the park to manage these lands as follows:

*"The NPS will take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. Until that time management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation."* NPS Management Policies 2001 – 6.3.1, *General Policy*.

*"In evaluating environmental impacts, the National Park Service will take into account wilderness characteristics and values, including the primeval character and influence of the wilderness; the preservation of natural conditions (including the lack of man-made noise); and assurances that there will be outstanding opportunities for solitude, that the public will be provided with a primitive and unconfined type of recreational experience, and that wilderness will be preserved and used in an unimpaired condition."* NPS Management Policies 2001 – 6.3.4.3, *Environmental Compliance*.

In 2001, Zion National Park completed its General Management Plan (GMP) for the next twenty years. The GMP outlines the purposes and significance of the park which range from preservation of the dynamic natural process of canyon formation and the scenic beauty of the park to providing a variety of opportunities and a

range of experiences at the park from solitude to high use. See **Appendix M, Attachment M-1**, the September 16, 2004 letter from Jock Whitworth, NPS, to Dennis Ossenkop, FAA.

The GMP developed a number of strategies to achieve the desired conditions mentioned above. Of particular interest, the NPS planned to work with the FAA and other aviation interests to minimize noise and visual impacts of aviation on the park. One method discussed by the GMP was to encourage aircraft to fly outside the park in light of a study reported to Congress titled *Report on Effects of Aircraft Overflights on the National Park System (1995)*. The study had noted that Zion National Park was "an immediate priority area for maintaining or restoring natural quiet." See **Appendix M, Attachment M-1**, the September 16, 2004 letter from Jock Whitworth, NPS, to Dennis Ossenkop, FAA.

### **8.3.1.2 Little Black Mountain Petroglyph Site**

The Little Black Mountain Petroglyph Site is located approximately 1.5 miles southeast of the proposed airport site. Little Black Mountain is approximately 200 acres in size and rises approximately 750 feet above the valley floor. The lower slopes of Little Black Mountain are part of the Moenkopi Formation and are highly erodible. The higher rocky ledges are part of the Shinarump Member of the Chinle Formation. Large blocks of this sandstone layer have broken off and tumbled down the mountain.

The rock art area features approximately 50 boulders containing 800 petroglyphs carved by people of several past native cultures of the Great Basin, Western Anasazi, and Lower Colorado River. Some of the representations of turtles, lizards, and bear paws may be symbols with social or religious meanings now lost in time.

The 200-acre rock art site was designated in the Bureau of Land Management (BLM) Arizona Strip District Resource Management Plan (1992) as an Area of Critical Environmental Concern (ACEC) and as a Public Use Site because of its significant cultural resources. See **Appendix M, Attachment M-1**, December 10, 2004 letter from Roger Taylor, BLM, to Dennis Ossenkop, FAA. The BLM, the managing resource agency, has managed this ACEC as a public use site for the interpretation of these cultural resources.

The site is accessed by a local dirt road. The BLM has constructed a parking lot, restroom, surfaced trails, and protective fencing. The primary activity within this protective fencing is viewing of the rock art. Some visitors have noted that they appreciate the cultural resources as well as the solitude, natural quiet, and remote setting of the site. However, the majority of the remainder of the property is used for off-road recreational vehicles, which can be heard from the rock art area. BLM visitor records show that 1,181 people visited the site in 2003. See **Chapter Five, Section 5.7.1.3, Traditional Cultural Properties**, for additional information.

### 8.3.1.3 Other Federal/State Section 4(f)/303(c) Sites

The 42 other designated 4(f)/303(c) sites fall into a range of public land designations including national monuments, wilderness areas, wilderness study areas, state parks, national forests, national recreation areas, and an instant study area. The lead agencies for these lands include individual Indian tribes for reservation lands, the BLM, the NPS, the U.S. Forest Service, the State of Utah, the State of Arizona, and the State of Nevada. A brief overview of each of the 4(f)/303(c) sites is found below. For more detailed information about the different public lands and Indian reservations in the IAI, see **Chapter Five, Table 5.2 and Table 5.3**, and **Section 5.3.1 through Section 5.3.8** of this DEIS. See also **Exhibit 5.1** for a map of the public lands in the investigation area and **Appendix M through Appendix O** for coordination information with management agencies.

National Monuments – National Monuments are managed by the NPS. There are four monuments within the investigation area: Cedar Breaks National Monument in Utah, and Pipe Spring National Monument and Grand Canyon-Parashant National Monument (2 units) in Arizona. Cedar Breaks is the most widely visited of the four national monuments listed with 514,046 visitors in 2004. The area provides for hiking, interpretative programs, camping and various winter sports. Of special importance are the cliffs and canyons found within the monument. In 1977, 4,830 acres within the monument were recommended to Congress for wilderness designation. Cedar Breaks is listed as one of the top ten locations in the U.S. for viewing the night sky. Part of its attraction is the natural quiet which is generally free from low altitude aircraft. See **Appendix M, Attachment M-1**, the September 16, 2004 letter from Jock Whitworth, NPS, to Dennis Ossenkop, FAA.

Both units of Grand Canyon-Parashant are very remote and undeveloped. There are no paved roads into or within the monument and no on-site visitor services. This monument encompasses over 1,054,000 acres and is jointly managed by the NPS and BLM. Both agencies manage a large portion of the landmass as wilderness areas (BLM) or recommended wilderness (NPS). The agencies are currently preparing a 20-year management plan. The draft significance and mission statements include the protection of natural quiet as an integral part of protecting the remote and primitive nature of this monument. The Parashant is considered one of the last great undeveloped and isolated landscapes in the continental U.S. See **Appendix M, Attachment M-1**, the September 16, 2004 letter from Jock Whitworth, NPS, to Dennis Ossenkop, FAA.

Pipe Spring had 57,840 visitors in 2004 and has a short trail and multiple “living history” demonstrations. The monument is 80 miles east of St. George and is 40 acres in size. The monument is completely enclosed by the Kaibab Indian Reservation and is in an area that has limited development surrounding it. There is an historic district on the monument site. The NPS entered into an agreement with the Air Force in the 1990’s to limit the military training flights that flew over the monument. The NPS is interested in maintaining the isolation and serenity of this setting in light of the historical context of the site. See **Appendix M**,

**Attachment M-1**, the September 16, 2004 letter from Jock Whitworth, NPS, to Dennis Ossenkop, FAA. See **Chapter Five, Section 5.3.4** for additional information on all of these national monuments.

Wilderness Areas – In 1964, the Wilderness Act was signed into law which declared U.S. policy *“to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.”* In 1976, BLM was authorized to include wilderness within its framework of “multiple-use management.” There are eight wilderness areas within the investigation area: Grand Wash Cliffs, Mount Trumbull, Paiute, Kanab Creek, and Cottonwood Point in Arizona; and Pine Valley Mountain, Ashdown Gorge, and Beaver Dam located in Utah. All of these sites are administered by the BLM except Pine Valley Mountain which is managed by the Forest Service.

Visitor uses in these areas revolve around backcountry activities such as hiking, backpacking, and rock climbing. All statutorily designated wilderness areas and administratively designated wilderness study areas have legal and policy mandates to protect these areas’ naturalness and outstanding opportunities for solitude and primitive, unconfined recreation. See, **Appendix M, Attachment M-1**, the September 2, 2004 letter from the BLM-Arizona Strip Field Office to Dennis Ossenkop, FAA. According to the BLM, *“natural quiet is a fundamental component of maintaining solitude in wilderness areas and in providing the remote, primitive character called for in the Monument Proclamations.”* *Id.* For additional information on each site, see **Chapter Five, Section 5.3.3**.

Wilderness Study Areas – Wilderness Study Areas are designated as proposed wilderness pending resolution of area-specific management, boundary, and specialty issues. Generally these areas are more remote and are managed as wilderness areas in anticipation of official designation. These properties must contain at least 5,000 acres of Federal land, be in generally natural condition, have outstanding opportunities for solitude or primitive types of recreation in at least part of the area, and contain features of ecological, geological or other features of scientific, scenic, or historical value. See **Chapter Five, Section 5.3.7** and **Table 5.3**. Like Wilderness Areas, Wilderness Study Areas have legal and policy mandates to protect these areas’ naturalness and outstanding opportunities for solitude and primitive, unconfined recreation.

There are 20 wilderness study areas in the IAI: Bear Trap Canyon, Canaan Mountain, Clover Mountain, Cottonwood Canyon, Cougar Canyon, Deep Creek, Goose Creek, LaVerkin Creek Canyon, Lime Canyon, Moquith Mountain, Mormon Mountain, North Fork Virgin River, Orderville Canyon, Parunuweap, Red Butte, Red Mountain, Spring Creek Canyon, Taylor Creek Canyon, Tunnel Spring, and The Watchman.

State Parks – Within the IAI, there are six state parks located in Utah and one state park located in Nevada. The Utah parks are Coral Pink Sand Dunes, Gunlock, Iron Mission State Park and Museum, Quail Creek State Park and Reservoir, Sand

Hollow, and Snow Canyon. The State of Utah and the FAA are in agreement that Sand Hollow State Park is not a 4(f)/303(c) property. The Nevada park is Beaver Dam State Park. See **Chapter Five, Section 5.3.5** for additional information regarding use.

National Forests – There are two national forests, Dixie National Forest in Utah and Kaibab National Forest in Arizona, within the IAI. The U.S. Forest Service manages national forests under a multiple use management philosophy for the sustained yield of renewable resources such as water, forage, wildlife, wood, and recreation. Dixie National Forest experienced 773,789 visitors in 2002-2003 while Kaibab documented approximately 560,000 visitors in 2000. In both forests, visitors participated in various recreational activities ranging from hiking and trail rides to skiing and mountain biking. For additional information, see **Chapter Five, Table 5.2** and **Section 5.3.2**.

National Recreation Areas – The Lake Mead National Recreation Area is administered by the NPS. Lake Mead is known for its recreational opportunities including boating, fishing, waterskiing, swimming, kayaking, and hiking. Several paved roads wind through the recreation area. This area had approximately 7,829,475 visitors in 2003. For additional information, see **Chapter Five, Section 5.3.4**.

Instant Study Area – An Instant Study Area (ISA) is a type of Wilderness Study Area that has been identified specifically because it is an outstanding natural resource as identified by the BLM in the Interim Management Policy (IMP) for lands under wilderness review. An ISA has many of the same attributes as a Wilderness Study Area and is managed the same way. There is one ISA for this project: The Joshua Tree ISA. Therefore, the Joshua Tree ISA qualifies for legal and policy mandates to protect the area's naturalness and outstanding opportunities for solitude and primitive, unconfined recreation. See **Chapter Five, Section 5.3.7**.

## **8.4 NOISE ANALYSIS OF 4(f)/303(c) PROPERTIES**

During the course of the evaluations conducted for the EIS, an extensive noise assessment was completed for the three groups of Section 4(f)/303(c) properties: Zion National Park, Little Black Mountain Petroglyph Site, and the other 42 Federal and state 4(f)/303(c) sites within the IAI described in **Section 8.3** above.

### **8.4.1 NOISE SCREENING ANALYSIS**

The analysis was conducted in two stages. A Screening Analysis was conducted first to determine approximate airport-related and cumulative aviation noise effects on numerous potential 4(f)/303(c) properties. The analysis was conducted for all such known properties within the IAI as described above.

Each of the sites was assigned one or more overlying matrices of evaluation points called grid points. In some cases, one set of grid points was used to address more than one 4(f)/303(c) site, if those sites were in close proximity and both sites were



covered by the physical layout of the grid. These grid points were designed to be regularly spaced at intervals of 1.5 nautical miles so that the area within the grid sets fully covered the associated property. This process is explained in **Chapter Six, Section 6.6, and Appendix B.**

In addition to the 4(f)/303(c) sites that were assessed during the Screening Analysis, five additional grid sets were developed to estimate noise levels along the eastern and southeastern borders of the IAI, under flight paths leading toward Bryce and Grand Canyon National Parks, respectively. It was assumed that any effects of noise indicated within these "gateway" grid sets would be the same or greater than the effects of St. George Airport traffic on any 4(f)/303(c) sites, including Bryce Canyon and Grand Canyon, located beyond the IAI where traffic would be at higher altitudes and more laterally dispersed than within the IAI.

The Screening Analysis was conducted to consider and compare the projected future aviation noise associated with traffic to and from the St. George existing and replacement airports, as well as other aviation noise sources known to be present within the IAI, including: enroute overflights, arrivals to and departures from Las Vegas area airports, flights to and from other airports within the IAI, military traffic, and flights operated by air tour operators. The combination of these aviation types constitute the cumulative aviation noise environment used for this assessment for future years.

The Screening Analysis used a broad series of supplemental metrics or descriptors to examine potential changes to the sound environment due to the project.<sup>1</sup> The analysis was designed to capture several different factors that could potentially cause noise disturbance, including cumulative exposure, loudness, and/or the amount of time that aircraft could be heard. While all numerical values were analyzed, the focus of the analysis was on increases or decreases of 5 dBA for cumulative exposure (DNL and Leq)<sup>2</sup>, 3 dBA for single event maximum loudness (L<sub>Amax</sub>),<sup>3</sup> and absolute increases or decreases in aircraft time and number of events above the ambient sound environment.

Overall, the Screening Analysis found that, at nearly all 4(f)/303(c) locations within the IAI, noise generated by aircraft operating from either the existing or replacement St. George Airport made minor contributions to the aviation noise levels already present within the IAI.

The Screening Analysis found that overflights and traffic to and from the area airports contribute the majority of the cumulative effect of aviation noise at nearly all grid points covering the 4(f)/303(c) sites, largely as a function of their volume of traffic. However, the Screening Analysis also found that the replacement airport

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<sup>1</sup> FAA Order 1050.1E, App. A, Section 14.5.

<sup>2</sup> FAA Order 1050.1E, App. A, Section 14.5(d) and (e), FICON, Vol. 2, Section 3.3.1.1, p.3-17 (August 1992).

<sup>3</sup> A change in L<sub>Amax</sub> (also referred to as L<sub>max</sub>) of less than 3 dBA is "barely perceptible," FICON, Vol. 2, Section 3.2.1, p. 3-1, and Section 3.3.1, p. 3-15 (August 1992); *Guide on Evaluation and Attenuation of Traffic Noise*, American Association of State Highway and Transportation Officials, Task Force for Environmental Design, Section 2.6, p. 6, 1974.

would add more noise at the Little Black Mountain Petroglyph Site than would the existing airport. Because of this, the FAA decided to conduct an additional noise measurement program at that site.

The Screening Analysis conducted at the other 42 Section 4(f)/303(c) sites found no substantial change in noise impacts from operation of the replacement airport. These noise evaluations, coupled with the existence of noise measurement data taken at Zion National Park, indicated that no additional measurements were warranted elsewhere. The Screening Analysis results also did not suggest that an enlargement of the IAI would provide additional data of substance.

#### 8.4.2 NOISE EFFECTS ANALYSIS

Subsequent to the Screening Analysis, aviation noise effects were evaluated for three separate property groups: Zion National Park, Little Black Mountain Petroglyph Site, and the 42 other 4(f)/303(c) sites. All of the available noise metrics contained in the FAA's Integrated Noise Model (INM) version 6.1 were computed in the Screening Analysis. Consequently, for purposes of the noise analyses in **Chapter Six** and **Chapter Seven**, the assessments conducted during the Screening Analysis were modified only to make minor corrections to flight track locations near the airport, climb and descent profiles for enroute aircraft, and to operations on flight tracks for portions of the data as a result of information discovered subsequent to preparation of the Screening Analysis. These "tweaks" to the data consisted of track input corrections, profile input definitions for enroute traffic, and operational assignments to enroute traffic. The data for each grid point was then recomputed and presented in this analysis. Little difference was noted between the Screening Analysis and final analysis results. The subsequent paragraphs summarize the results of the grid analysis for each of the three property groups. Acoustic results presented in the following paragraphs are all rounded to the nearest tenth of a decibel (dBA) and time above or numbers of events are rounded to the nearest whole minute or operation (if more than one) for discussion purposes.

#### 8.5 ZION NATIONAL PARK NOISE EFFECTS ANALYSIS

Detailed computations of cumulative aviation noise effects on Zion National Park are presented in **Appendix B** and summarized in **Chapter Seven**. Within the park, noise effects were evaluated against both  $L50_{(existing)}$  and  $L50_{(natural)}$  ambient noise levels.

The results of the analyses for energy average summary metrics (DNL,  $Leq_{(24)}$ ,  $Leq_{(day)}$ , and Time Above) as shown in **Table 8.1, Zion National Park – Noise Effects** indicate that, on average among the 95 grid points evaluated in the park, there would be no difference between cumulative aviation noise levels with the existing and with the replacement airport in the two future year scenarios (2010 and 2020).

**DNL**

Using the DNL metric (see **Glossary**), the expected range of cumulative noise across the park is, in 2010, 31.3 to 34.1 dBA for the existing and 31.3 to 34.2 for the replacement airport, and in 2020, 32.8 to 35.6 dBA for both the existing and replacement airport conditions. The range of change across the gridpoints associated with the replacement airport is a decrease of 0.2 dBA to an increase of 0.3 dBA in 2010, and from a decrease of 0.2 dBA to an increase of 0.4 dBA in 2020. While the increase in DNL from 2010 to 2020 is the result of increasing traffic levels across the park from all aircraft sources, the range of change is associated specifically with the replacement airport construction.

**Table 8.1**  
**ZION NATIONAL PARK – NOISE EFFECTS**

DNL	2010	2020
Existing Airport Range	31.3 - 34.1	32.8 - 35.6
Replacement Airport Range	31.3 - 34.2	32.8 - 35.6
Change with Replacement Airport	-0.2 - 0.3	-0.2 - 0.4

<b>Leq<sub>(24)</sub></b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	30.0 - 32.8	31.5 - 34.3
Replacement Airport Range	30.0 - 32.8	31.5 - 34.3
Change with Replacement Airport	-0.3 - 0.3	-0.9 - 0.3

<b>TAA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	1.5 - 295.5	2.3 - 404.4
Replacement Airport Range	1.5 - 296.7	2.3 - 406.7
Change with Replacement Airport	-0.1 - 1.7	0.0 - 4.1

<b>Leq<sub>(day)</sub></b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	31.9 - 34.7	33.4 - 36.2
Replacement Airport Range	31.9 - 34.7	33.4 - 36.2
Change with Replacement Airport	-0.3 - 0.3	-0.9 - 0.3

<b>Number of Events – Range</b>						
<b>Noise Level</b>	<b>2010</b>			<b>2020</b>		
	<b>Existing</b>	<b>Replacement</b>	<b>Change</b>	<b>Existing</b>	<b>Replacement</b>	<b>Change</b>
20dBA	241.0-333.1	236.0-332.5	-6.2-1.2	330.7-455.9	323.4-456.1	-8.6-2.8
25dBA	170.4-265.0	168.1-265.6	-6.8-1.8	234.7-363.0	233.9-364.8	-9.4-3.2
35dBA	64.6-137.7	65.4-137.7	-5.5-1.3	89.4-189.5	90.8-190.2	-7.2-2.2
45dBA	9.2-34.3	9.2-34.2	-2.7-0.9	13.0-46.0	13.0-46.0	-3.8-1.6
55dBA	1.5-4.6	1.5-4.6	-0.1-0.3	2.2-6.4	2.2-6.3	-0.2-0.3
60dBA	0.7-1.5	0.7-1.5	-0.1-0.3	0.9-2.1	0.9-2.1	-0.1-0.3

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflects the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

### Leq<sub>(24)</sub>

Utilizing the Leq<sub>(24)</sub> metric (see **Glossary**) the expected range of cumulative noise is, in 2010, 30.0 to 32.8 for both the existing and replacement airport, and in 2020, 31.5 to 34.3 dBA for both the existing and replacement airport conditions. The range of change across the gridpoints associated with the replacement airport is a decrease of 0.3 dBA to an increase of 0.3 dBA in 2010, and from a decrease of 0.9 dBA to an increase of 0.3 dBA in 2020. While the increase in Leq<sub>(24)</sub> from 2010 to 2020 is the result of increasing traffic levels across the park from all aircraft sources, the range of change is associated specifically with the replacement airport construction.

### Leq<sub>(day)</sub>

Using the Leq<sub>(day)</sub> metric (see **Glossary**) the expected range of cumulative noise is, in 2010, 31.9 to 34.7 for both the existing and replacement airport, and in 2020, 33.4 to 36.2 dBA for both the existing and replacement airport conditions. The range of change across the gridpoints associated with the replacement airport is a decrease of 0.3 dBA to an increase of 0.3 dBA in 2010, and from a decrease of 0.9 dBA to an increase of 0.3 dBA in 2020. While the increase in Leq<sub>(day)</sub> from 2010 to 2020 is the result of increasing traffic levels across the park from all aircraft sources, the range of change is associated specifically with the replacement airport construction.

### Time Above Ambient

Ambient noise levels within Zion National Park were established by application of measured data collected by National Park Service contractors in 2000/2001 at 13 separate locations representing a variety of soundscapes within the Park. The measured data were used by acousticians at the Volpe National Transportation Systems Center to prepare a map of L50<sub>(existing)</sub> ambient levels within the park by applying measured levels to equivalent use/vegetation/wind regimes. (See **Glossary**.) The measured acoustical data was assessed in conjunction with observer logs of each site recorded during the measurement period to estimate the amount of measured noise energy that was associated with transient human activity. With the exception of noise from permanent roadways through the Park, human-related noise was removed from the measured noise energy to result in a series of L50<sub>(natural)</sub> noise levels for the measured points. The natural ambient levels were also mapped by extrapolating the data to similar locations within the park.<sup>4</sup> The time that aircraft noise from cumulative aviation sources is expected to exceed the existing and natural ambient L50 noise levels with the existing and replacement airport was computed at the gridpoints used to evaluate all other metrics. Comparisons between the time results with the two airport locations in 2010 and 2020 were summarized in **Chapter Seven** and presented in detail in **Appendix B**.

At the average grid point within the park, the replacement airport would increase the amount of time aviation noise is experienced above the existing or natural ambient levels by approximately one percent from that which would be experienced

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<sup>4</sup> The process used to develop mapping of existing and natural L50 ambient levels is detailed in **Attachment B-1 of Appendix B**.

with the existing airport. In 2010, with the existing airport location, the various grid points within Zion National Park would be exposed to cumulative aviation noise above existing ambient levels between 1 and 296 minutes per day (132 minutes on average), and above natural ambient levels to between 1 and 400 minutes per day (169 minutes on average). The construction of the replacement airport would add, on average, less than one minute per day above existing and natural ambient noise to these totals. The range of change associated with the replacement airport in 2010 above existing ambient levels is a decrease of 0.1 to an increase of 1.7 minutes per day, while the range of change above natural ambient levels is a decrease of 0.3 to an increase of 2.0 minutes per day.

In 2020, with the existing airport location, the various grid points within Zion National Park would be exposed to cumulative aviation noise above existing ambient levels between 2 and 404 minutes per day (182 minutes on average), and above natural ambient levels to between 2 and 546 minutes per day (averaging 232 minutes). In 2020, the construction of the replacement airport would add, on average, approximately 2 minutes per day above both existing and natural ambient noise to these totals. The range of change in 2020 above existing ambient levels is no change to an increase of 4.1 minutes per day, while the range of change above natural ambient levels is a decrease of 0.1 to an increase of 5.1 minutes per day.

### Number of Events

The cumulative Number of Events Above selected thresholds were evaluated to determine the worst case that could be expected throughout the 95 grid points within the park. The data presented in **Chapter Seven** and in **Appendix B** indicate that the greatest number of cumulative average daily events to which any grid point within the park would be exposed from either the existing or replacement airport in 2010 is approximately 333 above 20 dBA, 265 above 25 dBA, 137 above 35 dBA, 34 above 45 dBA, 4 above 55 dBA, and 1 above 60 dBA. Of greater interest may be the degree of change associated with the replacement airport compared to the existing airport. The maximum increase in the number of events above various noise levels at any site within the park resulting from the replacement airport in 2010 was: 1.2 above 20 dBA, 1.8 above 25 dBA, 1.3 above 35 dBA, 0.9 above 45 dBA, 0.3 above 55 dBA, and 0.3 above 60 dBA.

By 2020, the greatest number of cumulative average daily events to which any grid point within the park would be exposed from either the existing or replacement airport is approximately 456 above 20 dBA, 364 above 25 dBA, 190 above 35 dBA, 46 above 45 dBA, 6 above 55 dBA, and 2 above 65 dBA. The maximum increase in the number of events above various noise levels resulting from the replacement airport in 2020 was: 2.8 above 20 dBA, 3.2 above 25 dBA, 2.2 above 35 dBA, 1.6 above 45 dBA, 0.3 above 55 dBA, and 0.3 above 65 dBA. On average the replacement airport would result in an increase of less than one percent in the cumulative number of events experienced at the Zion National Park grid points in 2010 or 2020.

### 8.5.1 ZION NATIONAL PARK – SECTION 4(f)/303(c) DETERMINATION

In accordance with FAA Order 1050.1E, special consideration was given to the evaluation of Zion National Park due to the potential for significant noise impacts on the noise-sensitive areas within the park. In light of the extensive noise modeling detailed above, the FAA finds no substantial impairment of any activity, feature, or attribute of Zion National Park that contributes to the park's significance or enjoyment.

Zion National Park, with the replacement airport in place at the proposed site, generally would experience average 24-hour aircraft noise levels that remain below both the Existing Ambient and Natural Ambient noise levels mapped throughout the property. In other words, there would be no change in cumulative aircraft noise above ambient noise levels. In addition, the property would experience only slight increases in the time above ambient noise levels resulting from the development of the replacement airport. The cumulative DNL level would increase a maximum of 0.4 dBA by 2020 while both  $Leq_{(24)}$  and  $Leq_{(day)}$  would increase by no more than 0.3 dBA in 2020.

In regards to number of events above various noise level thresholds, the average change associated with the replacement airport tends to reduce the number of events at the lower noise levels with only slight or no increases at the higher noise levels. The cumulative amount of time that aviation noise would be above the existing or natural ambient levels would increase by one percent. In 2010, the change would be an increase of less than one minute a day and in 2020, the change would be approximately two minutes a day. None of these increases would result in a substantial incremental change in aircraft related noise impacts to Zion National Park and would not substantially impair any resource of the park.

The noise environment resulting from aviation activity is comprised of operations at the existing or proposed replacement airport, operations in the en route environment (high altitude overflights), activity to and from other airports, and operations by general aviation, military, and commercial users that may operate at any altitude, to the extent that these flights can be quantified. These additional aircraft operations projected for the replacement airport would result in minor incremental changes in noise at various locations, but the negligible increase in noise, incrementally and cumulatively, would not rise to the level of a substantial impairment.

The FAA has concluded, using any reasonable measure, the above-referenced quantitative data, reflecting, at most, de minimis increases in cumulative noise, do not approach a substantial impairment of the values of this 4(f)/303(c) property. The projected minor increases in project-related overflight noise reflected by this quantitative data do not amount to a "taking" of these properties for transportation purposes. Therefore, the FAA finds no constructive use under Section 4(f)/303(c).

## 8.6 LITTLE BLACK MOUNTAIN PETROGLYPH SITE NOISE EFFECTS ANALYSIS

As suggested by the Screening Analysis results, a noise measurement program was conducted at the Little Black Mountain Petroglyph Site. Results indicated that summary noise metrics (DNL,  $Leq_{(24)}$ ,  $Leq_{(day)}$ , and Time Above) were elevated at the site relative to existing L50 ambient levels, owing to activity during the measurement period by all-terrain vehicles and motorbikes. These average levels are significantly influenced by the noise energy associated with high dBA events by these recreational vehicles, which occasionally exceeded a L<sub>Amax</sub> of 90 dBA. Because summary noise metrics are based on a logarithmically derived energy average, a limited number of very high events can drive a summary average noise level well above the level actually heard most of the time at the site. The measured L50<sub>(existing)</sub> level at the site was approximately 20 dBA for the winter measurement period, a level even lower than the measured existing and natural ambient levels at Zion National Park. Measurements during other periods of the year might, as was the case at Zion National Park, result in greater average L50 ambient levels.

Using the summary noise metrics (DNL,  $Leq_{(24)}$ ,  $Leq_{(day)}$ , and Time Above), **Table 8.2, Little Black Mountain – Noise Effects**, presents the noise changes anticipated to occur with the replacement airport at the Little Black Mountain Petroglyph Site in the years 2010 and 2020.

### DNL

The 2+ dBA changes represent an increase in acoustic energy from aviation sources by approximately 60 percent. The growth of the cumulative aircraft DNL would be the result of substantially more aircraft operations in close proximity to the site than are now present, largely conducted at noise levels of 25 to 65 dBA L<sub>Amax</sub>. The replacement airport aircraft events are not as loud as the recreational vehicles that are now, and are expected to continue to be, present at the site, and would likely have little effect on the cumulative average noise levels at the site from all sources (including those from both aviation and non-aviation activity).

### $Leq_{(24)}$

In 2020, the 1.7 dBA increase in  $Leq_{(24)}$  represents a 50 percent increase in aviation acoustic energy, all of which would be associated with the construction of the replacement airport. However, measured  $Leq_{(24)}$  values at the site ranged from 38.9 to 49.5 dBA from a combination of both non-aviation and aviation sources, or between 5.2 and 14 dBA more than the projected cumulative aircraft  $Leq_{(24)}$  levels at the site.

**Table 8.2**  
**LITTLE BLACK MOUNTAIN PETROGLYPH SITE – NOISE EFFECTS**

DNL	2010	2020
Existing Airport Range	33.7	35.0
Replacement Airport Range	36.0	37.0
Change with Replacement Airport	2.3	2.0

Leq <sub>(24)</sub>	2010	2020
Existing Airport Range	34.2	33.7
Replacement Airport Range	34.3	35.5
Change with Replacement Airport	0.1	1.7

Leq <sub>(day)</sub>	2010	2020
Existing Airport Range	34.2	35.6
Replacement Airport Range	36.1	37.0
Change with Replacement Airport	1.9	1.4

TAA	2010	2020
Existing Airport Range	354.1	473.5
Replacement Airport Range	507.2	647.9
Change with Replacement Airport	153.1	174.4

Number of Events						
Noise Level	2010			2020		
	Existing	Replacement	Change*	Existing	Replacement	Change*
20 dBA	425	441	16	564	583	19
25 dBA	290	310	19	381	403	22
35 dBA	74	134	60	102	169	67
45 dBA	11	34	23	15	41	26
55 dBA	3	4	2	4	8	4
65 dBA	0.7	0.7	0	1	1.5	0.4

\* Degree of change may not exactly compute due to rounding.

Note: Owing to the small area of the Little Black Mountain Petroglyph Site, a single grid point was established to allow estimation of aircraft noise levels for the site.

### Leq<sub>(Day)</sub>

The cumulative aviation Leq<sub>(day)</sub> level at the site is projected to increase by 1.9 dBA in 2010 and in 2020, by 1.4 dBA. These increases represent, respectively, additions of 38 percent and 51 percent to the amount of acoustic energy present from aviation activity – all of which is associated with the replacement airport facility. In contrast, the average Leq<sub>(day)</sub> recorded during the measurement of the site was between 40.9 and 51.5 dBA from both non-aviation and aviation sources at the three locations assessed.

### Time Above Ambient

The amount of time to which the Little Black Mountain Petroglyph Site is exposed to cumulative aircraft noise above existing L50 ambient levels (20 dBA) is projected to increase by approximately 2.5 hours per day in 2010 and by approximately



2.9 hours per day in 2020 if the replacement airport is constructed. With continuation of the existing airport location, the time of total exposure to aircraft noise above the existing ambient is projected to be approximately 5.9 hours in 2010 and approximately 7.9 hours in 2020, while with the replacement airport in place, the time increases to 8.5 and 10.8 hours per average day for the two years, respectively. These changes with the replacement airport represent an increase of 44 percent for 2010 and 37 percent for 2020 in the amount of time the site is exposed to noise above the existing L50 ambient level by aviation noise.

### Number of Events

The number of events over the Little Black Mountain Petroglyph Site is expected to increase if the proposed replacement airport is constructed. The total number of events, indicated in **Table 8.1**, is cumulative (i.e., the number of events at each successively lower noise level includes the events indicated at all higher levels).

While the cumulative number of events above 20 dBA of L<sub>Amax</sub> in each year is very similar for the airport in its existing or replacement location, there is a noticeable shift in the number of events at slightly higher levels with the replacement airport than the existing airport. The cumulative number of events falling between 35 and 45 dBA and between 45 and 55 dBA increase substantially with the replacement airport, while decreasing at the levels less than 35 dBA of L<sub>Amax</sub>.

#### 8.6.1 LITTLE BLACK MOUNTAIN PETROGLYPH SITE – SECTION 4(f)/303(c) DETERMINATION

As stated above, the primary purpose in visiting the petroglyph site itself is to view the historically and culturally important rock art. Although some visitors have stated that they appreciate the quiet and solitude of the petroglyph site, the remainder of the area is used for loud off-road recreational vehicles which can clearly be heard while standing at the rock art. The presence of these vehicles would appear to contradict any claim that this is a particularly noise sensitive area.

The noise analysis revealed that the existing noise levels at Little Black Mountain are generally louder than the forecast replacement airport related noise levels. The exception to this is found in the Time Above metrics that show an increase of approximately two hours where airplane noise would be heard at the site. However, in light of the primary purpose of the site and the existing noise from motorized vehicles, the FAA finds that the additional noise from the replacement airport project would not substantially diminish any activities, features, or attributes of Little Black Mountain that contribute to its significance or enjoyment, and thus would not result in a constructive use of the property.

In addition, under FAA Order 1050.1E, “a historic property would not be used for Section 4(f)/303(c) purposes when FAA issues a finding of. . . No Adverse Effect under Section 106 of the National Historic Preservation Act.” FAA Order 1050.1E, Appendix A, p. A-21. Early consultation with the Arizona State Historic Preservation Officer (SHPO) and the BLM concluded that the Little Black Mountain site is within

the "Area of Potential Effect" potentially impacted by operation of the replacement airport. The FAA also concluded that the site was eligible for inclusion on the National Register for Historic Places under three of the four evaluation criteria.

On June 22, 2005, the FAA made a No Adverse Effect finding for the entire Little Black Mountain site. This determination has been submitted to the Arizona SHPO and the 22 tribal contacts for review. See **Appendix I**. On July 20, 2005, the BLM concurred with the FAA's finding of No Adverse Effect and submitted this concurrence to the Arizona SHPO. Therefore, in addition to the noise analysis above, based upon the FAA's Section 106 determination that the replacement airport would not adversely affect this historic property, the FAA finds that there would not be a constructive use of the Little Black Mountain Petroglyph Site.

It is important to note, in any event, that steps have been taken to lessen the overflights over this important resource. A "Fly Friendly" practice is assumed in the development of noise patterns near this property. Flight tracks developed for the proposed replacement airport were designed to route flights around Little Black Mountain. Airport signage and notices to airmen would also be used to inform pilots to avoid direct overflight by turning on departure north of the mountain or to extend the takeoff courses straight out along the extended centerline until beyond the mountain before turning on course. The measures are reflected in the noise analysis. See **Chapter Six, Exhibit 6.5, Exhibit 6.6, and Exhibit 6.7**.

## **8.7 OTHER FEDERAL/STATE 4(f)/303(c) SITES – NOISE EFFECTS ANALYSIS**

The cumulative noise levels for each of the 42 other 4(f)/303(c) sites within the IAI were evaluated for each summary metric, as well as the amount of time experienced above the average existing L50 level measured in Zion National Park by the NPS contractor, and the number of cumulative aircraft events above 20, 25, 35, 45, 55, and 65 dBA of L<sub>Amax</sub>. As previously discussed, grid matrices were overlaid so that each noise sensitive federal or state property was assessed with one or more grid points. Details of cumulative noise effects are summarized in **Chapter Seven**, presented in tables in **Chapter Six, Section 6.6**, and detailed in both text and tables in **Appendix B**. Maps of the degree of change between the existing and replacement airport cumulative noise levels are presented in **Appendix B**.

Based on the noise analysis conducted, slight incremental noise increases would occur in nine of the 42 other 4(f)/303(c) resources; however these slight increases would not rise to the level of substantial impairment. These minute increases, individually or cumulatively, do not substantially impair any defining characteristic or attribute of any of these sites. The following sections describe the findings at these nine sites.

Wilderness Areas

**Beaver Dam Mountains Wilderness**, designated in 1984, straddles the Arizona-Utah border. Now containing 17,600 acres, approximately 15,000 acres of the site lie in Arizona and the remaining 2,600 acres lie in Utah. The BLM maintains and manages the site. Primary vegetation consists of Joshua trees and desert shrubs.

Increases in TAA of 0.2 minutes, DNL of 0.0 dBA, and 0.0 dBA in  $Leq_{(24)}$  or  $Leq_{(day)}$  do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use.

**Table 8.3**  
**BEAVER DAM MOUNTAIN WILDERNESS**

<b>DNL-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.3 - 36.1	34.4 - 37.3
Replacement Airport Range	32.0 - 35.8	33.4 - 37.1
Change with Replacement Airport	-2.0 - 0.0	-1.7 - 0.0

<b><math>Leq_{(24)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	31.7 - 34.5	32.7 - 35.7
Replacement Airport Range	30.4 - 34.3	31.7 - 35.5
Change with Replacement Airport	-2.0 - 0.0	-1.7 - 0.0

<b><math>Leq_{(day)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	34.0 - 36.4	34.6 - 37.6
Replacement Airport Range	33.0 - 36.2	33.6 - 37.4
Change with Replacement Airport	-1.3 - 0.0	-1.7 - 0.0

<b>TAA-Minutes</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	119.9 - 178.7	157.6 - 240.6
Replacement Airport Range	107.4 - 174.3	144.3 - 236.1
Change with Replacement Airport	-20.5 - 0.2	-21.7 - 0.2

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

**Cottonwood Point Wilderness** is located adjacent to the southeast boundary of Zion National Park and is considered by the BLM to be reminiscent of the landscapes of Zion. It is a very remote site with few visitors.

Increases in TAA of 1.1 minutes, DNL of 0.5 dBA, and 0.5 dBA in  $Leq_{(24)}$  or  $Leq_{(day)}$  do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use.

**Table 8.4**  
**COTTONWOOD POINT WILDERNESS**

<b>DNL-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.4 - 34.4	34.8 - 35.9
Replacement Airport Range	33.4 - 34.4	34.7 - 36.0
Change with Replacement Airport	-0.1 - 0.1	-0.1 - 0.5

<b><math>Leq_{(24)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	32.1 - 33.2	33.5 - 34.7
Replacement Airport Range	31.2 - 33.2	33.4 - 34.7
Change with Replacement Airport	0.0 - 0.1	-0.1 - 0.5

<b><math>Leq_{(Day)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	34.0 - 35.1	35.4 - 36.5
Replacement Airport Range	34.0 - 35.1	35.3 - 36.6
Change with Replacement Airport	0.0 - 0.1	-0.1 - 0.5

<b>TAA-Minutes</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	139.7 - 150.8	194.1 - 209.6
Replacement Airport Range	140.0 - 151.9	194.0 - 210.6
Change with Replacement Airport	0.3 - 1.4	-0.1 - 1.1

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

**Paiute Wilderness**, designated in 1984, now has a total of 87,900 acres in Arizona. The Virgin Mountains form the backbone of the wilderness. Vegetation includes pinon pine, Joshua trees, shrub oak, sagebrush and ponderosa pine.

Increases in TAA of 3.6 minutes, DNL of 0.1 dBA, and 0.7 dBA in  $Leq_{(24)}$  or  $Leq_{(day)}$  do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use.

**Table 8.5**  
**PAIUTE WILDERNESS**

<b>DNL</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	34.0 - 36.3	35.0 - 37.7
Replacement Airport Range	34.2 - 36.3	35.0 - 37.7
Change with Replacement Airport	-0.3 - 0.1	-0.3 - 0.1

<b>Leq<sub>(24)</sub></b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	32.0 - 34.7	33.3 - 36.1
Replacement Airport Range	32.0 - 34.7	33.4 - 36.1
Change with Replacement Airport	-0.3 - 0.2	-0.3 - 0.1

<b>Leq<sub>(Day)</sub></b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.7 - 36.6	35.9 - 38.0
Replacement Airport Range	33.8 - 36.5	35.9 - 38.0
Change with Replacement Airport	-0.3 - 0.2	-0.2 - 0.1

<b>TAA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	126.2 - 193.3	176.4 - 261.5
Replacement Airport Range	126.8 - 191.1	176.7 - 259.4
Change with Replacement Airport	-4.4 - 3.2	-4.5 - 3.6

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

**Pine Valley Mountain Wilderness** is readily accessible by visitors with more than 151 miles of recreational trails. This site is used primarily for hiking and scenic viewing.

Increases in TAA of 4.4 minutes, DNL 0.5 dBA, and no changes in  $Leq_{(24)}$  or  $Leq_{(day)}$  do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use.

**Table 8.6**  
**PINE VALLEY MOUNTAIN WILDERNESS**

<b>DNL-dBA</b>	2010	2020
Existing Airport Range	30.2 - 31.8	31.6 - 33.2
Replacement Airport Range	30.2 - 31.5	31.5 - 32.8
Change with Replacement Airport	-0.5 - 0.6	-0.7 - 0.5

<b><math>Leq_{(24)}</math>-dBA</b>	2010	2020
Existing Airport Range	29.1 - 30.3	29.6 - 31.6
Replacement Airport Range	29.1 - 29.8	29.6 - 31.2
Change with Replacement Airport	-0.6 - 0.0	-0.8 - 0.1

<b><math>Leq_{(Day)}</math>-dBA</b>	2010	2020
Existing Airport Range	30.0 - 32.2	31.4 - 33.5
Replacement Airport Range	30.0 - 31.6	31.3 - 32.9
Change with Replacement Airport	-0.7 - 0.2	-0.8 - 0.1

<b>TAA-Minutes</b>	2010	2020
Existing Airport Range	59.8 - 97.2	83.0 - 134.9
Replacement Airport Range	63.0 - 100.0	87.6 - 139.2
Change with Replacement Airport	-1.6 - 3.2	-1.0 - 4.4

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

Wilderness Study Areas

**Canaan Mountain Wilderness Study Area** is a 42,858 acre parcel adjacent to Zion National Park.

Although there are areas of this site that are valued for the natural quiet and solitude currently present, increases of TAA of 1.6 minutes, DNL 0.7 dBA,  $Leq_{(24)}$  of 0.7 dBA, or  $Leq_{(day)}$  of 0.7 dBA do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use. Under FAA Order 1050.1E, a substantial impairment would only occur when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. As such impairment does not exist here, there is no constructive use.

**Table 8.7**  
**CANAAN MOUNTAIN WILDERNESS STUDY AREA**

<b>DNL-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	32.2 - 35.0	33.7 - 36.4
Replacement Airport Range	32.3 - 34.9	33.7 - 36.1
Change with Replacement Airport	-0.4 - 0.9	-0.7 - 0.7

<b><math>Leq_{(24)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	31.1 - 33.7	32.6 - 35.1
Replacement Airport Range	31.1 - 33.6	32.6 - 35.5
Change with Replacement Airport	-0.4 - 0.9	-0.6 - 0.7

<b><math>Leq_{(Day)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.1 - 35.6	34.6 - 37.0
Replacement Airport Range	33.1 - 35.5	34.6 - 36.7
Change with Replacement Airport	-0.4 - 0.9	-0.6 - 0.7

<b>TAA-Minutes</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	138.3 - 165.9	191.8 - 226.2
Replacement Airport Range	138.0 - 166.0	190.4 - 227.3
Change with Replacement Airport	-0.8 - 0.9	-1.2 - 1.6

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

**Cottonwood Wilderness Study Area** is an 11,330 acre parcel adjacent to Dixie National Forest.

Although there are areas of this site that are valued for the natural quiet and solitude currently present, increases of TAA of 5.1 minutes, DNL 0.5 dBA,  $Leq_{(24)}$  of 0.4 dBA, or  $Leq_{(day)}$  of 0.4 dBA do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use. Under FAA Order 1050.1E, a substantial impairment would only occur when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. As such impairment does not exist here, there is no constructive use.

**Table 8.8**  
**COTTONWOOD WILDERNESS STUDY AREA**

<b>DNL-dBA</b>	2010	2020
Existing Airport Range	30.7 - 35.0	32.0 - 35.8
Replacement Airport Range	31.2 - 34.3	32.4 - 35.3
Change with Replacement Airport	-1.0 - 0.7	-0.8 - 0.5

<b><math>Leq_{(24)}</math>-dBA</b>	2010	2020
Existing Airport Range	29.2 - 33.3	30.3 - 32.5
Replacement Airport Range	29.3 - 32.6	30.5 - 33.5
Change with Replacement Airport	-0.8 - 0.5	-1.1 - 0.4

<b><math>Leq_{(Day)}</math>-dBA</b>	2010	2020
Existing Airport Range	30.8 - 35.1	32.1 - 36.0
Replacement Airport Range	31.1 - 34.4	32.3 - 35.3
Change with Replacement Airport	-0.8 - 0.5	-0.7 - 0.4

<b>TAA-Minutes</b>	2010	2020
Existing Airport Range	66.8 - 90.1	89.0 - 113.1
Replacement Airport Range	66.3 - 93.2	88.9 - 112.4
Change with Replacement Airport	-11.5 - 3.1	-12.2 - 5.1

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.



**Moquith Mountains Wilderness Study Area** is a 14,830 acre parcel consisting of riparian communities, ponderosa pine, canyons, large alcoves, and hanging gardens.

The decrease in noise of TAA of 0.1 minutes, increase of DNL 1.0 dBA,  $Leq_{(24)}$  of 0.9 dBA, or  $Leq_{(day)}$  of 0.9 dBA cannot be considered to substantially impair resource of this site. Therefore, the FAA finds that no constructive use would occur.

**Table 8.9**  
**MOQUITH MOUNTAINS WILDERNESS STUDY AREA**

<b>DNL-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	31.1 - 33.8	32.6 - 34.6
Replacement Airport Range	31.1 - 33.5	32.6 - 34.9
Change with Replacement Airport	-0.3 - 0.0	-0.2 - 1.0

<b><math>Leq_{(24)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	30.0 - 32.5	31.5 - 33.7
Replacement Airport Range	30.0 - 32.2	31.5 - 33.5
Change with Replacement Airport	-0.3 - 0.0	-0.2 - 0.9

<b><math>Leq_{(day)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	32.0 - 34.3	33.4 - 35.6
Replacement Airport Range	32.0 - 34.0	33.4 - 35.4
Change with Replacement Airport	-0.3 - 0.0	-0.2 - 0.9

<b>TAA-Minutes</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	96.6 - 115.8	134.3 - 160.3
Replacement Airport Range	96.4 - 115.4	133.2 - 158.8
Change with Replacement Airport	-0.9 - -0.1	-1.6 - -0.2

- \* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

**Orderville Canyon Wilderness Study Area** is a 5,330 acre parcel composed of steep canyons and drainages and is adjacent to Zion National Park.

The slight increase in aircraft noise that would be heard at this site TAA of 0.8 minutes, DNL 0.0 dBA,  $Leq_{(24)}$  of 0.0 dBA, or  $Leq_{(day)}$  of 0.0 dBA does not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use of this site.

**Table 8.10**  
**ORDERVILLE CANYON WILDERNESS STUDY AREA**

<b>DNL-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	32.8 - 33.2	34.2 - 34.7
Replacement Airport Range	32.8 - 33.3	34.2 - 34.7
Change with Replacement Airport	0.0 - 0.5	0.0 - 0.0

<b><math>Leq_{(24)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	31.5 - 32.0	32.9 - 33.5
Replacement Airport Range	31.5 - 32.0	32.9 - 33.5
Change with Replacement Airport	0.0 - 0.4	0.0 - 0.0

<b><math>Leq_{(Day)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.4 - 33.9	34.8 - 35.4
Replacement Airport Range	33.4 - 33.9	34.8 - 35.4
Change with Replacement Airport	0.0 - 0.4	0.0 - 0.0

<b>TAA-Minutes</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	93.5 - 101.0	129.2 - 138.7
Replacement Airport Range	94.6 - 102.3	129.7 - 139.4
Change with Replacement Airport	1.1 - 1.6	0.5 - 0.8

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

### State Parks

**Quail Creek State Park and Reservoir** was completed in 1985 to provide irrigation and culinary water to the St. George area. The Creek itself is stocked with several species of game fish. There is no indication that a quiet setting is generally recognized feature or attribute of this park's significance or is necessary for the functions of this park.

Increases in TAA of up to 6.6 minutes, DNL 0.3 dBA,  $Leq_{(24)}$  0.3 dBA, or  $Leq_{(day)}$  0.3 dBA do not substantially impair any defining characteristic or attribute of this site. Therefore, the FAA does not find any constructive use.

**Table 8.11**  
**QUAIL CREEK STATE PARK AND RESERVOIR**

<b>DNL-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.4 - 33.9	34.6 - 34.8
Replacement Airport Range	33.4 - 33.9	34.4 - 34.9
Change with Replacement Airport	-0.5 - 0.4	-0.4 - 0.3

<b><math>Leq_{(24)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	31.9 - 32.2	33.0 - 33.2
Replacement Airport Range	31.7 - 32.2	32.7 - 33.3
Change with Replacement Airport	-0.5 - 0.3	-0.4 - 0.3

<b><math>Leq_{(Day)}</math>-dBA</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	33.7 - 34.1	34.8 - 35.0
Replacement Airport Range	34.0 - 33.5	34.6 - 35.1
Change with Replacement Airport	-0.5 - 0.3	-0.4 - 0.3

<b>TAA-Minutes</b>	<b>2010</b>	<b>2020</b>
Existing Airport Range	86.1 - 90.1	111.4 - 116.5
Replacement Airport Range	87.3 - 94.0	114.5 - 123.1
Change with Replacement Airport	1.2 - 3.9	3.1 - 6.6

\* Note that the change with the replacement airport indicates a range within a large group of grid points, while the noise range reflect the maximum and minimum noise levels of this metric within the same group of grid points. The greatest degree of changes does not necessarily occur at the points with the maximum or minimum noise level.

### **8.7.1 OTHER FEDERAL/STATE 4(f)/303(c) SITES – SECTION 4(f)/303(c) DETERMINATION**

Although many of these properties are geographically distant from the project, due to the inclusion of Zion National Park because of its special significance, these other properties were added to the IAI. As explained above and in the text of the Draft EIS, these properties fulfill a range of needs and utilize a myriad of resources.

Based on the noise analysis conducted, the slight incremental noise increases that the proposed replacement airport would cause in the nine resources discussed in the preceding section do not rise to the level of substantial impairment. These minute increases, individually or cumulatively, do not substantially impair any defining characteristic or attribute of any of these sites.