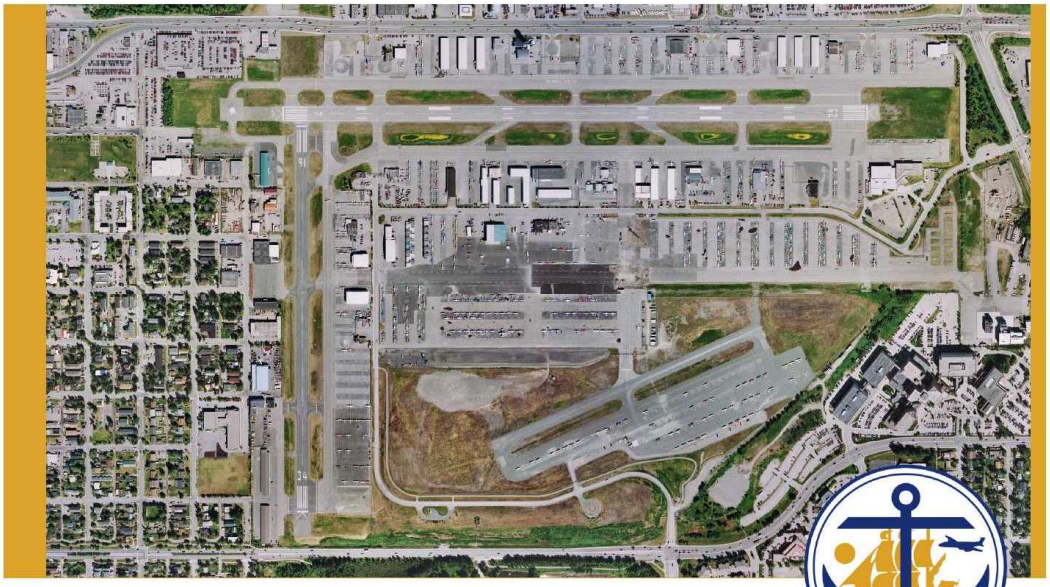
Noise Exposure Map Update
Merrill Field Airport

APPENDICES



Prepared for:

Municipality of Anchorage

Prepared by:

HARRIS MILLER MILLER & HANSON INC.

December 2013

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Noise Exposure Map Update

Merrill Field Airport

In Compliance with

14 CFR Part 150

APPENDICES

December 2013

Municipality of Anchorage

632 West 6th Ave
Anchorage, AK 99501

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Noise Exposure Map Update

Merrill Field Airport

Appendices

This is the second of two volumes for the Merrill Field Airport Noise Exposure Map Update (NEM). The Appendices which follow contain background and supporting material for the NEM update in accordance with the documentation requirements of Title 14 of the Code of Federal Regulations (CFR) Part 150 "Airport Noise Compatibility Planning." This is not a stand-alone document and should be used together with the first volume of the NEM update. The Appendices are provided under separate cover due to the magnitude of information contained herein and to provide an easier review of the information presented.

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Contents

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Appendix A Introduction to Noise Evaluation

This appendix introduces the acoustic metrics that provide a basis for evaluating and understanding a broad range of noise situations. Understanding these fundamental terms or metrics is helpful in explaining and comprehending the noise environment around an airport.

Noise is a complex physical quantity. To provide a basic reference, this appendix provides an introduction to fundamentals of acoustics and noise terminology (Section A.1), the effects of weather on outdoor sound propagation (Section A.2), and the effects of aircraft noise on people (Section A.3).

A.1 Introduction to Noise Terminology

To assist reviewers in interpreting the complex noise metrics used in evaluating airport noise, this appendix introduces the following acoustical descriptors of noise, roughly in increasing degree of complexity:

Decibel, dB
A-Weighted Decibel
Maximum A-Weighted Sound Level, Lmax
Sound Exposure Level, SEL
Equivalent A-Weighted Sound Level, Leq
Day-Night Average Sound Level, DNL or Ldn

A.1.1 Decibel, dB

All sounds come from a sound source -- a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source is transmitted through the air in sound waves -- tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear.

Our ears are sensitive to a wide range of sound pressures. Although the loudest sounds that we hear without pain have about one million times more energy than the quietest sounds we hear, our ears are incapable of detecting small differences among these pressures. Thus, to better match how we hear this sound energy, we compress the total range of sound pressures to a more meaningful range by introducing the concept of sound pressure level.

Sound pressure levels (SPL) are measured in decibels (or dB). SPL, as shown in the equation below, is a logarithmic quantity reflecting the ratio of the two pressures, the numerator being the pressure of the sound source of interest (P_{source}), and the denominator being a reference pressure ($P_{reference}$), which is the quietest sound we can hear:

$$Sound\ Pressure\ Level\ (SPL) = 20 * Log\left(\frac{P_{source}}{P_{reference}}\right) dB$$

The logarithmic conversion of sound pressure to SPL means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that we hear without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels on the order of 30 to 100 dB.

Because decibels are logarithmic quantities, combining decibels is unlike common arithmetic. For example, if two sound sources each produce 100 dB operating individually and they are then operated

together, they produce 103 dB -- not the 200 decibels we might expect. Four 100-dB sources operating simultaneously produce another three decibels of noise, resulting in a total SPL of 106 dB. For every doubling of the number of equal sources, the SPL goes up another three decibels. A tenfold increase in the number of sources makes the sound pressure level increase 10 dB.

If one noise source is much louder than another, the two sources operating together will produce virtually the same SPL (and sound to our ears) that the louder source would produce alone. For example, a 100 dB source plus an 80 dB source produce approximately 100 dB of noise when operating together (actually, 100.04 dB). The louder source "masks" the quieter one. But if the quieter source gets louder, it will have an increasing effect on the total SPL such that, when the two sources are equal, as described above, they produce a level three decibels above the sound of either one by itself.

People hear changes in sound level according to the following rules of thumb: (1) a 6 to 10 dB increase in the sound pressure level is sometime described to be about a doubling of loudness, and (2) changes in SPL of less than about three decibels are not readily detectable outside of a laboratory environment.

A.1.2 A-Weighted Decibel

An important characteristic of sound is its frequency, or "pitch". This is the per-second rate of repetition of the sound pressure oscillations as they reach our ear, expressed in units known as Hertz (Hz).

When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to determine how much is low-frequency noise, how much is middle-frequency noise, and how much is high-frequency noise. This breakdown is important for two reasons:

- Our ear is better equipped to hear mid and high frequencies and is less sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.
- Engineering solutions to a noise problem are different for different frequency ranges. Low-frequency noise is generally harder to control.

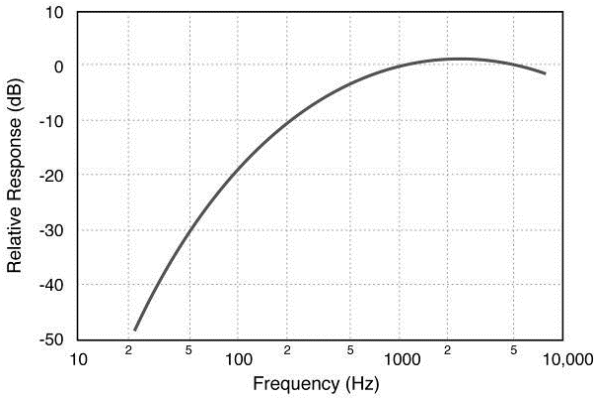
The normal frequency range of hearing for most people extends from a low of about 20 Hz to a high of about 10,000 to 15,000 Hz. People respond to sound most readily when the predominant frequency is in the range of normal conversation, typically around 1,000 to 2,000 Hz. The acoustical community has defined several “filters,” which approximate this sensitivity of our ear and thus, help us to judge the relative loudness of various sounds made up of many different frequencies.

The "A" filter (or “A weighting”) does this best for most environmental noise sources. A-weighted sound levels are measured in decibels, just like unweighted. To avoid ambiguity, A-weighted sound levels should be identified as such (e.g. "an A-weighted sound level of 85 dB") or stated up front that all noise levels presented in this document are A-weighted unless otherwise specified (as in this study).

Government agencies in the U.S (and most governments worldwide) recommend or require the use of A-weighted sound levels for measuring, modeling, describing, and assessing aircraft sound levels (and sound levels from most other transportation and environmental sources).

Figure A-1depicts A-weighting adjustments to sound from approximately 20 Hz to 10,000 Hz.

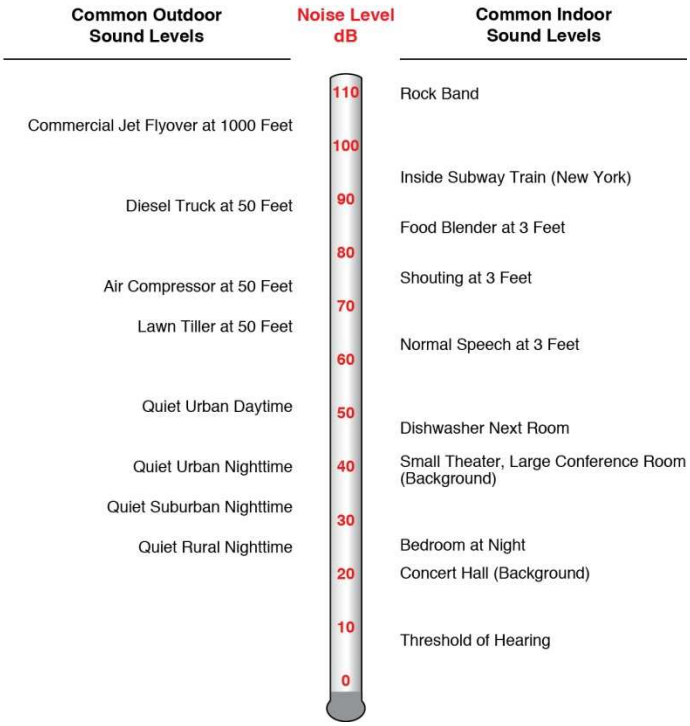
Figure A-1 A-Weighting Frequency Response
Source: HMMH



The A-weighted filter significantly de-emphasizes those parts of the total noise at lower and higher frequencies (below about 500 Hz and above about 10,000 Hz) where we do not hear as well. The filter has very little effect, or is nearly "flat", in the middle range of frequencies between 500 and 10,000 Hz where we hear quite easily. Because this filter generally matches our ears' sensitivity, sounds having higher A-weighted sound levels are usually judged to be louder than those with lower A-weighted sound levels. It is for this reason that acousticians normally use A-weighted sound levels to evaluate environmental noise sources.

Figure A-2 depicts representative sound levels for a variety of common sounds.

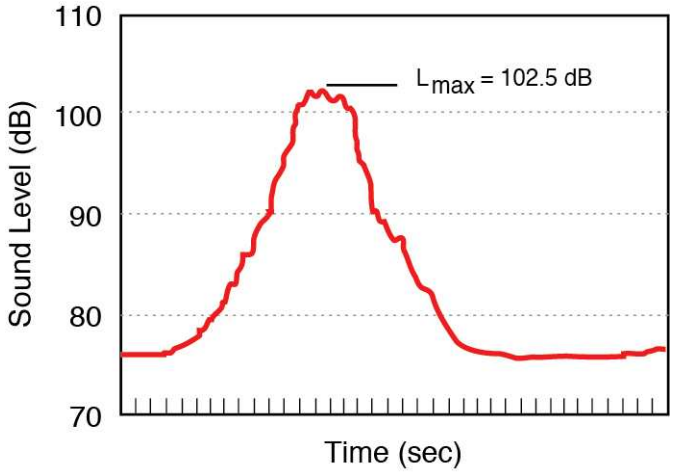
Figure A-2 Representative Sound Levels
Source: HMMH



A.1.3 Maximum Sound Level, Lmax

An additional dimension to environmental noise is that noise levels vary with time. For example, the sound level increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance (though even the background varies as birds chirp, the wind blows, or a vehicle passes by). This is illustrated in Figure A-3.

Figure A-3 Variation in the Sound Level over Time
Source: HMMH



Because of this variation, it is often convenient to describe a particular noise "event" by its maximum sound level, abbreviated as Lmax. In Figure A-3 the Lmax is approximately 102.5 dB.

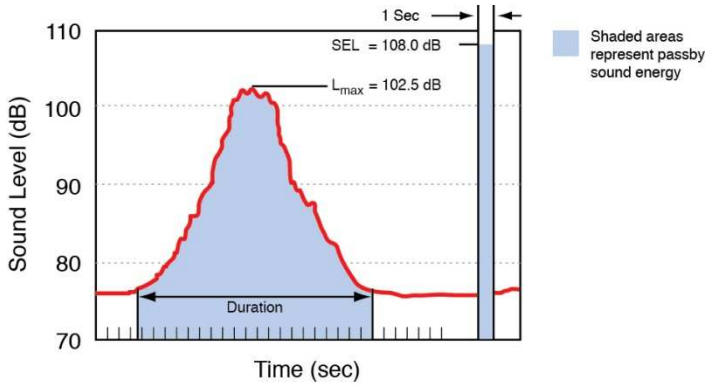
While the maximum level is easy to understand, it suffers from a serious drawback when used to describe the relative “noisiness” of an event such as an aircraft flyover; i.e., it describes only one dimension of the event and provides no information on the event’s overall, or cumulative, noise exposure. In fact, two events with identical maximum levels may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying. The next section introduces a measure that accounts for this concept of a noise "dose," or the cumulative exposure associated with an individual “noise event” such as an aircraft flyover.

A.1.4 Sound Exposure Level, SEL

The most commonly used measure of cumulative noise exposure for an individual noise event, such as an aircraft flyover, is the Sound Exposure Level, or SEL. SEL is a summation of the sound energy over the entire duration of a noise event. SEL expresses the accumulated energy in terms of the one-second-long steady-state sound level that would contain the same amount of energy as the actual time-varying level. In simple terms, SEL “compresses” the energy into a single second.

Figure A-4 depicts this compression.

Figure A-4 Graphical Depiction of Sound Exposure Level
Source: HMMH



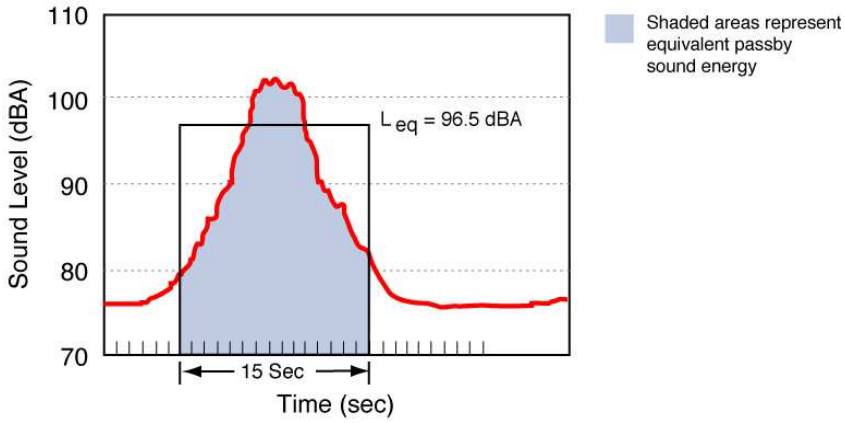
Note that because SEL is normalized to one second, it almost always will be a higher value than the event's Lmax. In fact, for most aircraft flyovers, SEL is on the order of 5 to 12 dB higher than Lmax. SEL provides a basis for comparing noise events that generally match our impression of their overall "noisiness," including the effects of both duration and level; the higher the SEL, the more annoying a noise event is likely to be.

A.1.5 Equivalent Sound Level, Leq

The Equivalent Sound Level, abbreviated Leq, is a measure of the exposure resulting from the accumulation of sound levels over a particular period of interest; e.g., an hour, an eight-hour school day, nighttime, or a full 24-hour day. The applicable period should always be identified or clearly understood when discussing the metric.

Leq may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. This is illustrated in Figure A-5.

Figure A-5 Example of a One-Minute Equivalent Sound Level
Source: HMMH



In airport noise applications, Leq is often presented for consecutive one-hour periods to illustrate how the hourly noise dose rises and falls throughout a 24-hour period as well as how certain hours may be significantly affected by only a few loud aircraft.

A.1.6 Day-Night Average Sound Level, DNL or Ldn

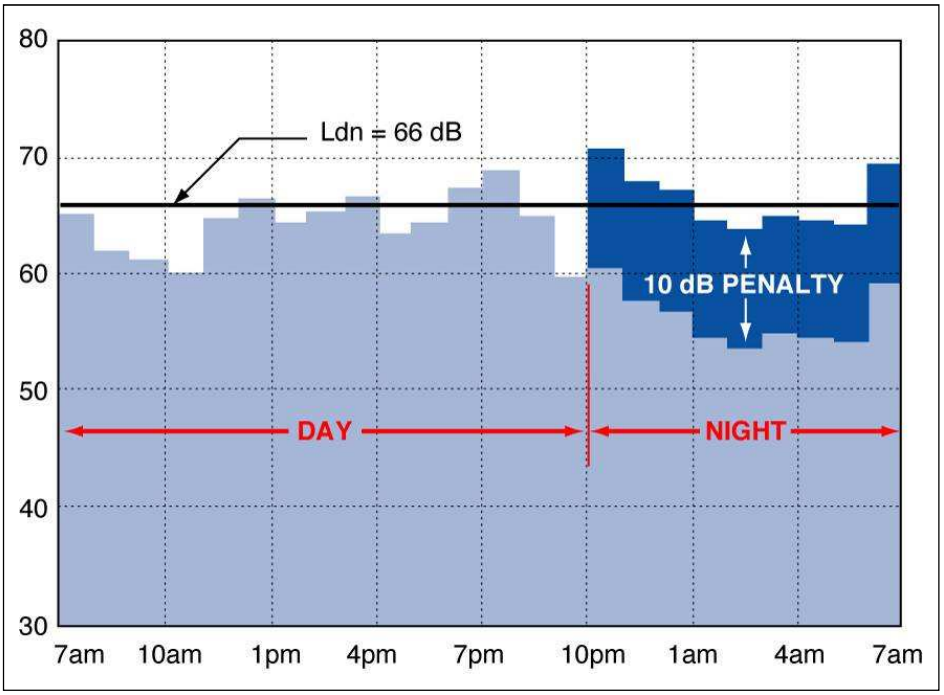
The previous sections address noise measures that account for short term fluctuations in levels as sound sources come and go affecting the overall noise environment. The FAA requires that airports use a more complex measure of noise exposure than either a single, peak event metric (Lmax) or a single event total energy metric (SEL). Therefore, the Day-Night Average Sound Level (DNL or Ldn) was developed to represent a 24-hour noise dose. DNL is essentially equal to the 24-hour Leq, with one important adjustment: noise occurring at night – from 10 pm through 7 am – is "factored up." The factoring up can be made in one of two ways:

- Weighting, by counting each nighttime noise contribution 10 times; e.g., if DNL is calculated by summing the SEL of aircraft operations over a 24-hour period, each nighttime operation is represented by 10 identical daytime operations.
- Penalizing, by adding 10 dB to all nighttime noise contributions; e.g., if DNL is calculated from the SEL of aircraft operations occurring over a 24-hour period, 10 dB are added to the SEL values for nighttime operations.

The 10 dB adjustment accounts for our greater sensitivity to nighttime noise and the fact lower ambient levels at night tend to make noise events, such as aircraft flyovers, more intrusive.

Figure A-6 depicts this adjustment graphically.

Figure A-6 Example of a Day-Night Average Sound Level Calculation
Source: HMMH



Most aircraft noise studies use computer-generated estimates of DNL, determined by adding up the energy from the SELs for each event, with the 10 dB adjustment applied to night operations. Computed values of DNL are often depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). The contours usually reflect long-term

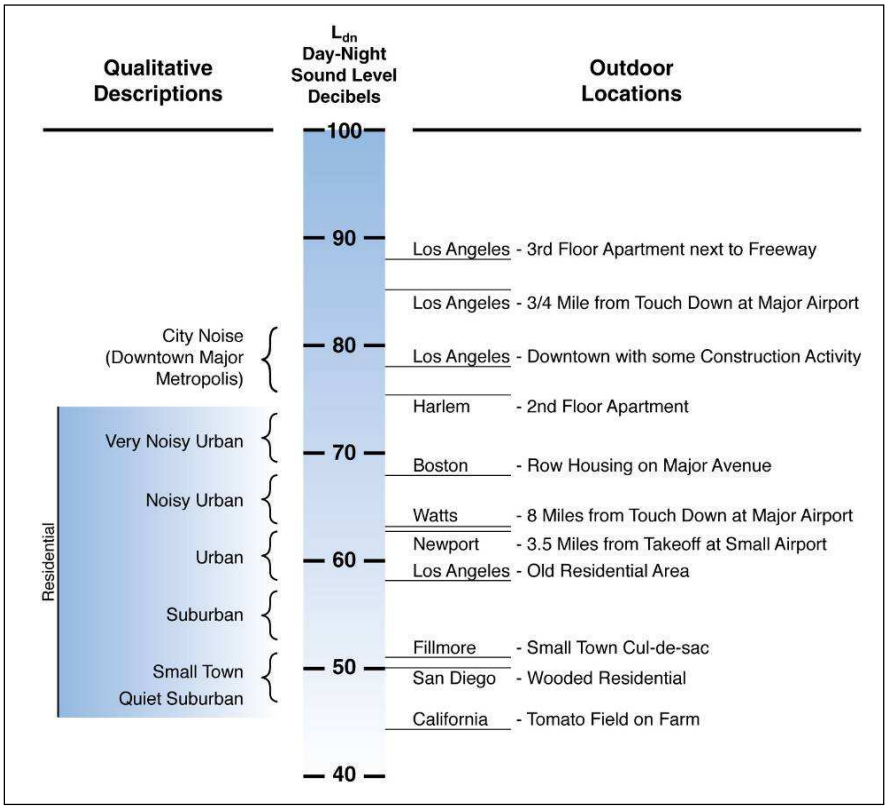
(annual average) operating conditions, taking into account the average flights per day, how often each runway is used throughout the year, and where over the surrounding communities aircraft normally fly. Alternative time frames may also be helpful in understanding shorter term aspects of a noise environment.

Why is DNL used to describe noise around airports? The U.S. Environmental Protection Agency identified DNL as the most appropriate measure of evaluating airport noise based on the following considerations:

- The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods of time.
- The measure should correlate well with known effects of the noise environment on the individual and the public.
- The measure should be simple, practical, and accurate. In principle, it should be useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics, should be commercially available.
- The measure should be closely related to existing methods currently in use.
- The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.
- The measure should lend itself to small, simple monitors which can be left unattended in public areas for long periods of time.

Representative values of DNL range from a low of 40 to 45 dB in extremely quiet, isolated locations, to highs of 80 or 85 dB immediately adjacent to a busy truck route. DNL would typically be in the range of 50 to 55 dB in a quiet residential community and 60 to 65 dB in an urban residential neighborhood. Figure A-7 presents representative outdoor DNL values measured at various U.S. locations.

Figure A-7 Examples of Measured Day-Night Average Sound Levels
Source: USEPA 1974, p.14.



A.2 Effects of Weather on Outdoor Sound Propagation

Atmospheric effects that can influence the propagation of sound include (in roughly increasing order of importance) humidity and precipitation, temperature and wind gradients, and turbulence (or gustiness). The effects of wind, and in particular, of turbulence, generally are of more importance than other factors, however, the importance of temperature gradients is enhanced under calm wind conditions, and, under unusual conditions, can be extreme. Attenuation caused by humidity is generally of small relative importance to the other effects.

Influence of Humidity and Precipitation

In general, humidity and precipitation have little effect on the propagation of sound. Attenuation due to humidity only becomes important with high-frequency noise under fairly calm wind conditions. Rain, snow, and fog also have little, if any noticeable effect on sound propagation. A substantial body of empirical data supports these conclusions[1].

[1]Ingard, Uno. "A Review of the Influence of Meteorological conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May 1953, p. 407.

Influence of Temperature

The velocity of sound in the atmosphere is dependent upon the air temperature[2], and if the temperature varies at different heights above the ground, the sound will travel in curved paths rather than straight lines. Normally, during the daytime, the temperature decreases with increasing height; this condition, characterized by a negative temperature gradient, is known as temperature lapse. In temperature lapse conditions, sound waves are refracted upwards and an acoustical shadow zone may exist at some distance from the noise source.

Under certain weather conditions, a layer of cool air may be trapped beneath a layer of warmer air. This condition, known as a temperature inversion, is prevalent throughout many regions in the evening, at night, and early in the morning when heat absorbed by the ground during the day is released into the night sky through radiation[3]. The effect of an inversion is just the opposite of lapse conditions; sound propagating through the atmosphere refracts downward. Under inversion conditions, no shadow zones can be formed, and, barring effects due to terrain or other obstructions, sound levels at observer locations are not affected.

Often, however, the downward refraction caused by temperature inversions allows sound rays with originally upward-sloping paths to bypass obstructions and ground effects. As a result, audibility of distant sounds is often somewhat better at night (during the most common time for temperature inversions) than in the daytime[4]. Under extreme conditions, one study found that noise from ground-borne aircraft may be amplified 15 to 20 dB by a temperature inversion. In a similar study, noise caused by an aircraft on the ground registered a higher level at an observer location 1.8 miles away than at a second observer location only 0.2 miles from the aircraft[5].

Influence of Wind

Just as there is a temperature gradient in the atmosphere, there is also a wind gradient; typically, higher wind speeds exist at greater heights above the ground. The wind gradient affects sound propagation similarly to the temperature gradient by causing upward or downward refraction of sound. Because temperature is a scalar quantity (i.e., described by magnitude alone with no regard for direction), the refraction of sound caused by variations in the vertical gradient is the same in all horizontal (compass) directions[6]. Wind, on the other hand, is a vector quantity (described by both magnitude and direction) and affects sound propagation differently in various directions. Wind results in downward refraction downwind and upward refraction upwind with a shadow zone formed in the upwind direction. Receivers in a predominately downwind direction will experience higher sound levels, and those upwind will experience lower sound levels. Sound propagating perpendicular to the wind direction will not be affected.

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[2]In dry air, the approximate velocity of sound can be obtained from the relationship:
$c = 331 + 0.6T_c$ (c in meters per second, T_c in degrees Celsius). Pierce, Allan D., *Acoustics: An Introduction to its Physical Principles and Applications.* McGraw-Hill. 1981. p. 29.
[3]Embleton, T.F.W., G.J. Thiessen, and J.E. Piercy, "Propagation in an inversion and reflections at the ground," *Journal of the Acoustical Society of America*, Vol. 59, No. 2, February 1976, p. 278.
[4]Ingard, p. 407.
[5]Dickinson, P.J., "Temperature Inversion Effects on Aircraft Noise Propagation," (Letters to the Editor) *Journal of Sound and Vibration.* Vol. 47, No. 3, 1976, p. 442.
[6]Piercy, J.E. and T.F.W. Embleton, "Review of noise propagation in the atmosphere," *Journal of the Acoustical Society of America*, Vol. 61, No. 6, June 1977, p. 141.

The refraction caused by vertical gradients of wind is additive to the refraction due to temperature gradients[7]. One study suggests that for frequencies greater than 500 Hz, the combined effects of these gradients tends towards two extreme values: approximately 0 dB in conditions of downward refraction (inversion or downwind propagation) and -20 dB in upward refraction conditions (lapse or upwind propagation). At lower frequencies, the effects of refraction due to wind and temperature gradients are less pronounced[8].

The preceding discussion of the influence of wind is somewhat idealized due to the assumption of laminar conditions (i.e., the assumption of no turbulence). In reality, a wind is generally "gusty," and sound levels heard at remote receiver locations will fluctuate with gustiness. In addition, gustiness can cause considerable attenuation of sound through the effects of eddies traveling with the wind. The attenuation due to eddies is essentially the same in all directions, with or against the flow of the wind, and can often mask the refractive effects discussed above[9].

A.3 The Effects of Aircraft Noise on People

To residents around airports, aircraft noise can be an annoyance and a nuisance. It can interfere with conversation and listening to television, it can disrupt classroom activities in schools, and it can disrupt sleep. Relating these effects to specific noise metrics helps in the understanding of how and why people react to their noise environment.

A.3.1 Speech interference

A primary effect of aircraft noise is its tendency to drown out or "mask" speech, making it difficult to carry on a normal conversation. The sound level of speech decreases as the distance between a talker and listener increases. As the background sound level increases, it becomes harder to hear speech. Figure A-8 presents typical distances between talker and listener for satisfactory outdoor conversations, in the presence of different steady A-weighted background noise levels for raised, normal, and relaxed voice effort. As the background level increases, the talker must raise his/her voice, or the individuals must get closer together to continue talking.

As indicated in the figure, "satisfactory conversation" does not always require hearing every word; 95% intelligibility is acceptable for many conversations. Listeners can infer a few unheard words when they occur in a familiar context. However, in relaxed conversation, we have higher expectations of hearing speech and generally require closer to 100% intelligibility. Any combination of talker-listener distances and background noise that falls below the bottom line in Figure A-8 (thus assuring 100% intelligibility) represents an ideal environment for outdoor speech communication and is considered necessary for acceptable indoor conversation as well.

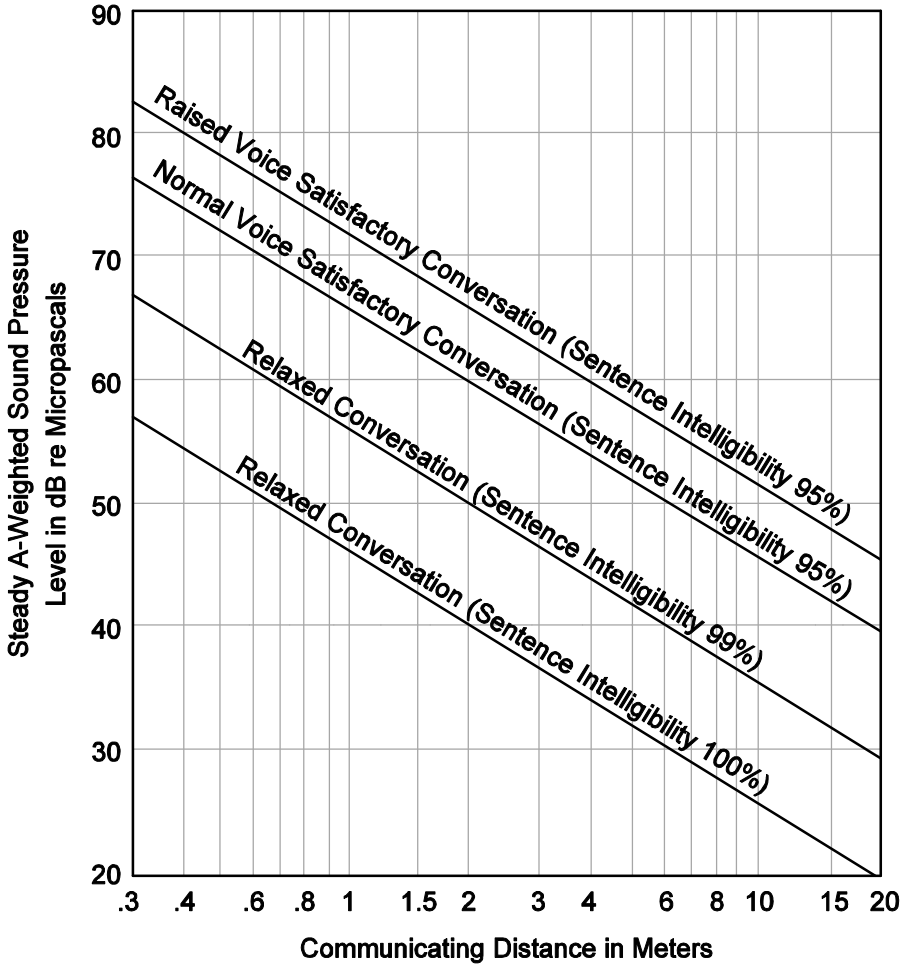
One implication of the relationships in Figure A-8 is that for typical communication distances of 3 or 4 feet (1 to 1.5 meters), acceptable outdoor conversations can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dB. If the noise exceeds this level, as might occur when

[7]Piercy and Embleton, p. 1412. Note, in addition, that as a result of the scalar nature of temperature and the vector nature of wind, the following is true: under lapse conditions, the refractive effects of wind and temperature add in the upwind direction and cancel each other in the downwind direction. Under inversion conditions, the opposite is true.
[8]Piercy and Embleton, p. 1413.
[9]Ingard, pp. 409-410.

an aircraft passes overhead, intelligibility would be lost unless vocal effort increased or communication distance decreased.

Indoors, typical distances, voice levels, and intelligibility expectations generally require a background level less than 45 dB. With windows partly open, housing generally provides about 10 to 15 dB of interior-to-exterior noise level reduction. Thus, if the outdoor sound level is 60 dB or less, there is a reasonable chance that the resulting indoor sound level will afford acceptable conversation inside. With windows closed, 25 dB of attenuation is typical.

Figure A-8 Outdoor Speech Intelligibility
Source: United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. D-5



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A.3.2 Sleep interference

Research on sleep disruption from noise has led to widely varying observations. In part, this is because (1) sleep can be disturbed without awakening, (2) the deeper the sleep the more noise it takes to cause arousal, (3) the tendency to awaken increases with age, and other factors.

Figure A-9 shows a summary of findings on the topic.

Figure A-9 Recommended Sleep Disturbance Dose-Response Relationship
Source: Federal Interagency Committee on Aviation Noise (FICAN), "Effects of Aviation Noise on Awakenings from Sleep", June 1997, page 5

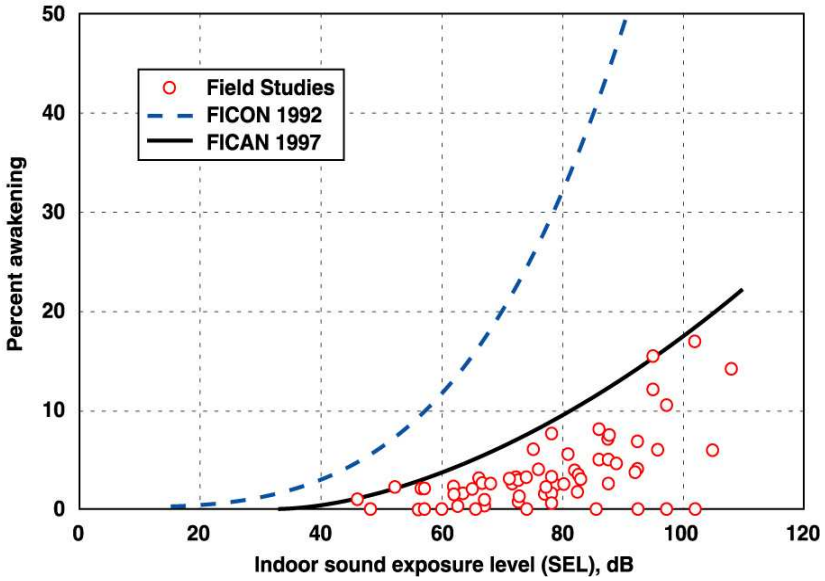


Figure A-9 uses indoor SEL as the measure of noise exposure; recent work supports the use of this metric in assessing sleep disruption. However, awakening data presented in the form of Figure A-9 apply to only one noise event; it says nothing about what happens with a full night of noise events of different levels. The American National Standards Institute (ANSI) has published a standard that provides a method for estimating the number of people awakened at least once from a full night of noise events: ANSI/ASA S12.9-2008 / Part 6, "Quantities and Procedures for Description and Measurement of Environmental Sound – Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes." This method can use the information on single events computed by a program such as the FAA's Integrated Noise Model, to compute awakenings.

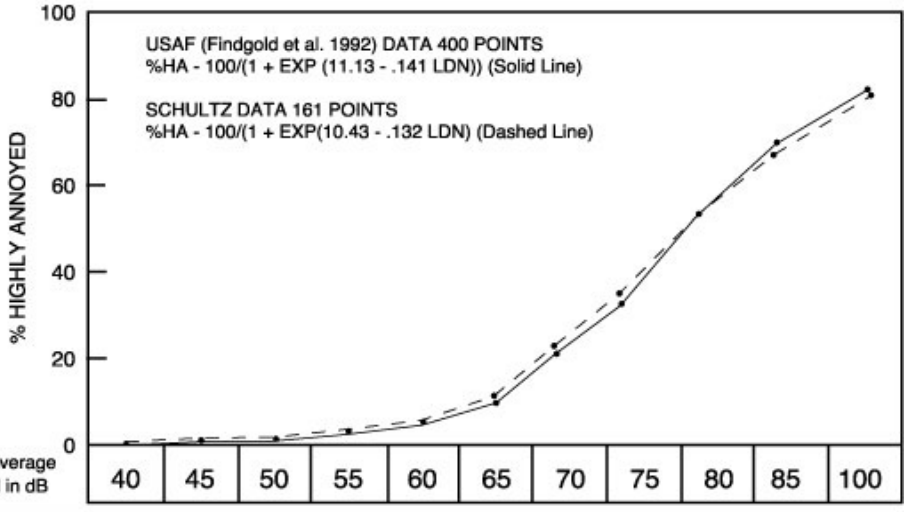
A.4 Community Annoyance

Numerous psychoacoustic surveys provide substantial evidence that individual reactions to noise vary widely for a given noise exposure level. However, since the early 1970's, researchers have determined (and subsequently confirmed) that a community's aggregate response is generally predictable and relates reasonably well to measures of cumulative noise exposure such as DNL.

Figure A-10 shows the widely recognized relationship between environmental noise and the percentage of people "highly annoyed," with annoyance being the key indicator of community response usually cited in this body of research.

Figure A-10 Percentage of People Highly Annoyed

Source: Federal Interagency Committee on Noise, Vol. 2, Technical Report. "Federal Agency Review of Selected Airport Noise Analysis Issues". August 1992. (From data provided by USAF Armstrong Laboratory). pp. 3-6.

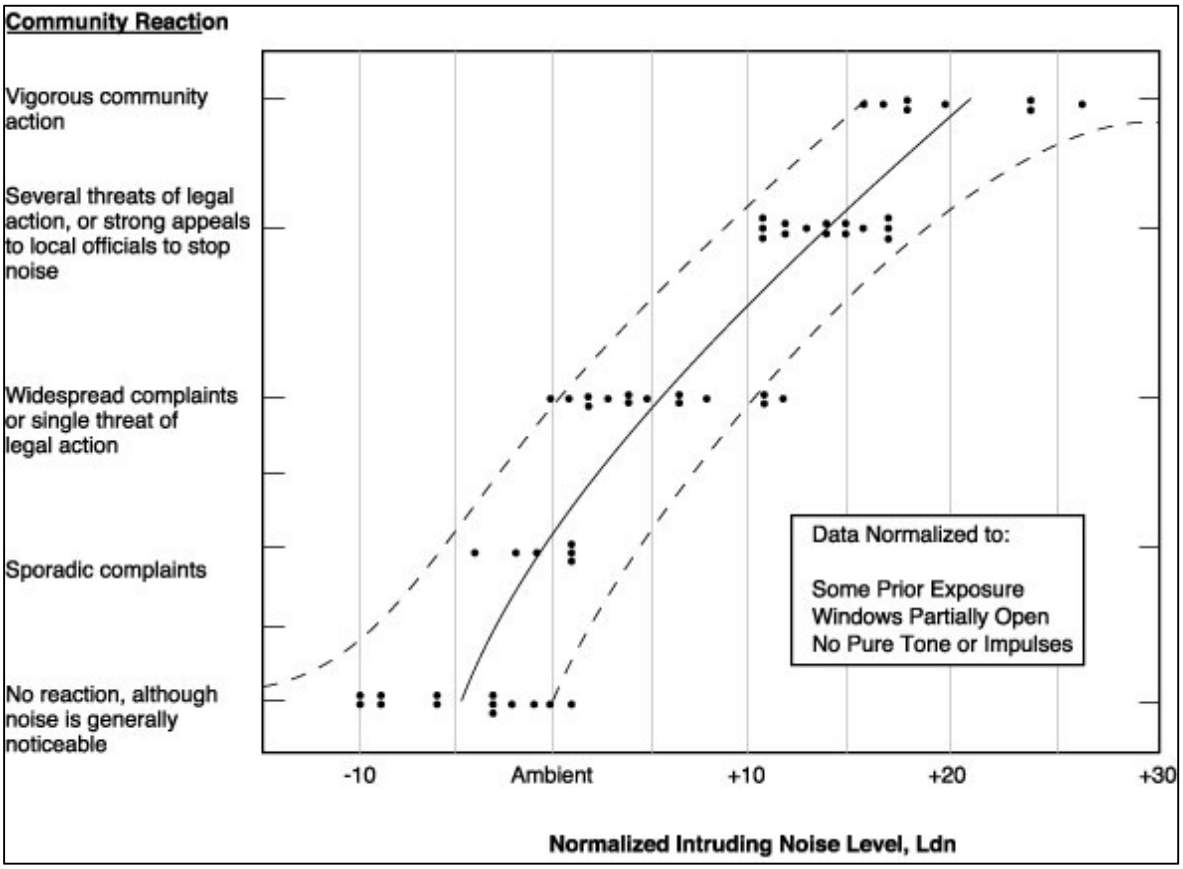


Calculated %HA Points	40	45	50	55	60	65	70	75	80	85	100
USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Based on data from 18 surveys conducted worldwide, the curve indicates that at levels as low as DNL 55 dB, something on the order of 3 to 4 percent of the persons would be highly annoyed, whereas this percentage of persons annoyed increases more rapidly as exposure increases above DNL 65 dB.

Separate work by the EPA has shown that overall community reaction to a noise environment is also dependent on DNL. This relationship is shown in Figure A-11. Levels have been normalized to the same set of exposure conditions to permit valid comparisons between ambient noise environments. Data summarized in Figure A-11 suggest that little reaction would be expected for intrusive noise levels five decibels below the ambient, while widespread complaints can be expected as intruding noise exceeds background levels by about five decibels. Vigorous action is likely when the background is exceeded by 20 dB.

Figure A-11 Community Reaction as a Function of Normalized Outdoor DNL
Source: U.S. EPA, "Community Noise," NTID300.3, December 1971, derived from Figure 25, page 63.



A.5 Land Use Compatibility

The Federal Aviation Administration Part 150 Airport Noise Compatibility Planning guidelines provide the following:

1. A basis for comparing existing noise conditions to the effects of noise abatement procedures and/or forecast changes in airport activity.
2. A quantitative basis for identifying potential noise impacts.

Both of these functions require the application of objective criteria for evaluating noise impacts. 14 CFR Part 150 provides the FAA's recommended guidelines for noise-land use compatibility evaluation. Table A-1 reproduces the FAA guidelines.

These guidelines represent a compilation of the results of extensive scientific research into noise-related activity interference and attitudinal response. However, reviewers should recognize the highly subjective nature of response to noise, and that special circumstances can affect individuals' tolerance. For example, a high non-aircraft background noise level can reduce the significance of aircraft noise, such as in areas

constantly exposed to relatively high levels of traffic noise. Alternatively, residents of areas with unusually low background levels may find relatively low levels of aircraft noise annoying.

Response may also be affected by expectation and experience. People may get used to a level of exposure that guidelines indicate may be unacceptable, and changes in exposure may generate response that is far greater than that which the guidelines might suggest.

The cumulative nature of DNL means that the same level of noise exposure can be achieved in an essentially infinite number of ways. For example, a reduction in a small number of relatively noisy operations may be counterbalanced by a much greater increase in the number of relatively quiet flights, with no net change in DNL. Residents of the area may be highly annoyed by the increased frequency of operations, despite the seeming maintenance of the noise status quo.

With these cautions in mind, the Part 150 guidelines can be applied to the DNL contours to identify the potential types, degrees and locations of incompatibility. Measurement of the land areas involved can provide a quantitative measure of impact that allows a comparison of at least the gross effects of existing or forecast operations.

14 CFR Part 150 guidelines indicate that all land uses normally are compatible with aircraft noise at exposure levels below 65 DNL. This limit is supported in a formal way by standards adopted by the U. S. Department of Housing and Urban Development (HUD). The HUD standards address whether sites are eligible for Federal funding support. These standards, set forth in Part 51 of the Code of Federal Regulations, define areas with DNL exposure not exceeding 65 dB as acceptable for funding. Areas exposed to noise levels between DNL 65 and 75 are "normally unacceptable," and require special abatement measures and review. Those at 75 and above are "unacceptable" except under very limited circumstances.

14 CFR Part 150 permits airports and local land use control jurisdictions to adopt land use compatibility criteria that differ from the guidelines reproduced in Table A-1.

Table A-1 14 CFR Part 150 Noise / Land Use Compatibility Guidelines
Source: 14 CFR Part 150, Appendix A, Table 1

	Yearly Day-Night Average Sound Level, DNL, in Decibels (Key and notes on following page)					
Land Use	**<65**	**65-70**	**70-75**	**75-80**	**80-85**	**>85**
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade--general	Y	Y	Y(2)	Y(3)	Y(4)	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Key to Table A-1
SLUCM: Standard Land Use Coding Manual.
Y (Yes): Land use and related structures compatible without restrictions.
N (No): Land use and related structures are not compatible and should be prohibited.
NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35: Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes for Table A-1
The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often started as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
5) Land use compatible provided special sound reinforcement systems are installed.
6) Residential buildings require an NLR of 25.
7) Residential buildings require an NLR of 30
8) Residential buildings not permitted.

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Appendix B FAA Notification of Compliance for 1988 Noise Exposure Maps

U.S. Department of Transportation
Federal Aviation Administration

Alaskan Region

222 W. 7th Avenue #14
Anchorage, Alaska
99513-7587

JAN. 16 1992

1992

Mr. Joe C. Fouts, Manager
Merrill Field Airport
800 Merrill Field Drive
Anchorage, Alaska 99501-4129

Dear Mr. Fouts:

Merrill Field Noise Exposure Maps (NEM's)

This is to notify you that the Federal Aviation Administration (FAA) has evaluated your final submission of the Noise Exposure Maps and supporting documentation transmitted by your letter of June 13, 1991, in accordance with Section 103(a)(1) of the Aviation Safety and Noise Abatement Act of 1979 (ASNA) and has determined that they are in compliance with applicable requirements of 14 CFR Part 150. Further, we have determined that exhibits 5-3 and 5-4, identified as Merrill Field Airport FAR Part 150 Year 1988 and 1993 Day-Night Levels respectively, fulfill the requirements for the current and the 5-year noise exposure maps

The FAA's determination that your Noise Exposure Maps are in compliance is limited to a finding that the maps were developed in accordance with the procedures contained in Appendix A of FAR Part 150. Such determination does not constitute approval of your data, information, or plans.

Should questions arise concerning the precise relationship of specific properties to noise exposure contours depicted on your Noise Exposure Maps, you should note that the FAA will not be involved in any way in determining the relative locations of specific properties with regard to the depicted noise contours or in interpreting the maps to resolve questions concerning, for example, which properties should be covered by the provisions of Section 107 of the Act. These functions are inseparable from the ultimate land use control and planning responsibilities of local government. These local responsibilities are not changed in any way under Part 150 or through the FAA's determination relative to your Noise Exposure Maps. Therefore, the responsibility for the detailed overlaying of noise exposure contours onto the maps depicting properties on the surface rests exclusively with you, the airport operator, or with those public agencies and planning agencies with which consultation is required under Section 103 of the Act. The FAA relies on the certification by you, under 150.21 of FAR Part 150, that the statutorily required consultation has been accomplished.

The FAA will publish a notice, copy enclosed, in the Federal Register announcing its determination on the Noise Exposure Maps for Merrill Field Airport.

Appendix -11-

Your notice of this determination and the availability of the Noise Exposure Maps, when published at least three times in a newspaper of general circulation in the community where affected properties are located, will satisfy the requirements of Section 107 of the ASNA Act.

Your attention is called to the requirements of section 150.21(d) of FAR Part 150, involving the prompt preparation and submission of revisions to these maps if any actual or proposed change in the operation of Merrill Field might create any substantial, new, noncompatible use in any areas depicted on the maps.

Thank you for your continued interest in noise compatibility planning.

Sincerely,

Russel S. Hathaway
Manager, Airports Division

Enclosure

Appendix C Documentation for Noise Abatement Program

C.1 Fly Friendly Guidelines[10]

"Fly Friendly" Guidelines

What pilots can do to help reduce aircraft noise over residential neighborhoods

Merrill Field Management and the FAA Air Traffic Control Tower, along with our Fairview and Airport Heights neighborhoods, have been working together with the aviation community in our continuing effort to "Fly Friendly". We believe these efforts have made a positive affect in reducing the number of aircraft noise complaints that result from aircraft operations at Merrill Field Airport.

After reviewing low flying aircraft and excessively loud aircraft noise complaints, and having discussions with complainants, we have determined that aircraft noise can be greatly minimized by adhering to the following guidelines. We also recommend that you frequently refer to the Merrill Field ATCT Letter to Airmen No. 11-01: Runway 7/25 Traffic Pattern at Merrill Field.

Utilize the entire length of the runway; do not request intersection departures.

Typically an aircraft can reach an altitude that minimizes the noise impact to the surrounding residential areas by using the entire length of the runway for departures (most of the noise stays on the airport).

Follow the established traffic pattern; do not make an early cross wind turn on departure.

Aircraft that remain in the established traffic pattern during departure typically reach an altitude (before the cross wind turn) that will minimize the noise impact to the surrounding residential areas.

Maintain the lowest propeller RPM setting necessary for safe flight; do not over power your aircraft.

Flying with the lowest practical RPM setting will reduce the aircraft's noise level substantially, especially when conducting training flights.

Plan training activity during daytime hours; do not conduct training activities (touch & goes) during late night hours.

Plan touch & goes during daytime hours; late night arrivals or departures are one-time events and do not have the constant noise impact as compared to closed traffic.

By following these guidelines, aircraft noise over the adjoining residential neighborhoods will be effectively reduced. The Airport is not suggesting the use of any unsafe practices but encourages a more conscious effort to help Merrill Field Airport be a good neighbor.

[10] http://www.muni.org/Departments/merrill_field/Pages/NoiseAwareness.aspx

C.2 Merrill Field ATC Tower Letter to Airmen No. 11-01, "Runway 7/25 Traffic Pattern at Merrill Field"

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
MERRILL FIELD AIRPORT TRAFFIC CONTROL TOWER
1950 East 5th Avenue
ANCHORAGE, ALASKA 99501

ISSUE: 07/13/2011 EFFECTIVE: 07/13/2011

MERRILL ATCT LETTER TO AIRMEN NO. 11-01

SUBJECT: Runway 7/25 Traffic Pattern at Merrill Field

CANCELLATION:

Merrill Field Airport Management and Merrill Tower wishes to remind all pilots of the long established traffic pattern which provides efficient air traffic routes and reduces noise exposure to the surrounding communities. The primary touch and go runway will be Runway 7/25 when the cross-wind component does not exceed 9 knots. The calm wind (less than 3 knots) runway will be Runway 25.

When operations are being conducted on Runway 25, aircraft should turn crosswind between Gamble and Ingra Street, keep downwind over or inside 15th Avenue, and turn base at Bragaw Street. The opposite should be applied when Runway 7 is in use. Aircraft should turn crosswind at Bragaw Street, keep right downwind over or inside 15th Avenue, and turn base at Ingra Street. A crosswind turn between Gamble and Ingra Street will help prevent traffic confliction with base to final traffic landing Runway 34 or 4 and Runway 16 or 22 departing traffic.

Recommended pattern altitude for aircraft at a speed of more than 105 knots is at least 1,200 feet MSL. Aircraft at a speed of 105 knots or less shall operate at an altitude of at least 900 feet MSL. These altitudes apply until maneuvering for a safe landing requires descent. Aircraft are also required to comply with FAR Part 93 special air traffic rules which prohibit flight over the Knik Arm between 600 and 2000 MSL, without prior approval from ATC.

Runway 04/22 will not be used for pattern work for fixed wing aircraft due to noise impact on the surrounding community. Departing Runway 04, pilots should join the Runway 7 departure pattern. Departing Runway 22 pilots should turn south as if departing Runway 16 then on course. Straight out departures off Runway 22 are not recommended due to noise impact.

Pilots departing Merrill Field can help reduce noise by maintaining the lowest propeller RPM setting necessary for safe flight, remaining at the recommended pattern altitude as long as possible over residential areas, and following the depicted traffic pattern until transitioning to the appropriate VFR departure route. Deviations from these procedures will occasionally be issued with alternate instructions given for traffic complexity or pilot operational requirements. In this event, do your best to keep noise to a minimum while complying with ATC instructions.

Please do everything you can safely do to reduce aircraft noise over populated areas. By working together, we can enjoy the benefits of flying and be "a good neighbor". If you have any suggestions or questions, please feel free to stop by the airport office or call the control tower manager.

Gordon Edmiston
Air Traffic Manager, Merrill ATCT

C.3 MRI Letter to Pilots, "Help Reduce Aircraft Noise", June 7, 2010

MUNICIPALITY OF ANCHORAGE

Merrill Field Airport — Ph. 907-343-6303

June 7, 2010 — *Mayor Dan Sullivan*

Subject: **Help Reduce Aircraft Noise**

Dear Local Pilot:

Merrill Field Management and the FAA Air Traffic Control Tower, along with our Fairview and Airport Heights neighborhoods, have been working with the aviation community in our continuing effort to "Fly Friendly". We believe these efforts have made a positive affect in reducing the number of aircraft noise complaints that result from aircraft operations at Merrill Field Airport.

After reviewing low flying aircraft and excessively loud aircraft noise complaints, and having discussions with complainants, we have determined that aircraft noise can be greatly minimized by adhering to the following guidelines:

- **Utilize the entire length of the runway**. Typically an aircraft can reach an altitude that minimizes the noise impact to the surrounding residential areas by using the entire length of the runway for departures. Do not request intersection departures.
- **Follow all established traffic patterns; do not make an early crosswind turn on departure.** Aircraft that remain in the established traffic pattern during departure typically reach an altitude (before the cross wind turn) that will minimize the noise impact to the surrounding residential areas.
- **Depart RWY 22 by following RWY 16 Chester Creek Departure Route.** This route is intended to reduce noise in residential neighborhoods by moving aircraft away from populated areas.
- **Maintain the lowest propeller RPM setting necessary for safe flight.** Flying with the lowest practical RPM setting will reduce the aircraft's noise level substantially, especially when conducting training flights.
- **Conduct training activities (touch & goes) during daytime hours.** Late night arrivals or departures are one time events and do not have the constant noise impact as closed traffic.

We ask that you "Fly Friendly" by helping us reduce aircraft noise over adjacent airport neighborhoods and by following all published Merrill Field Airport VFR Procedures. Local VFR procedures for Merrill Field can be found online by entering 'Anchorage Terminal Area Information' in your favorite search engine. Thank you for your assistance and cooperation.

Sincerely,

David A. Lundeby, Manager
Merrill Field Airport

800 Merrill Field Drive • Anchorage, AK 99501-4129 • http://www.muni.org

G:\Merrill Field\incidents-all types\noise\Coorespondence\Letters on Noise Awareness\help reduce noise 060710.doc

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Appendix D Noise Measurements

This section provides a brief site-by-site discussion of each monitoring location. Measurement results reported for each location include noise levels associated with individual aircraft operations. Single-event noise levels were recorded in terms of their maximum sound levels, or L_{max}. The L_{max} measurements provide one of the easier bases for comparing the loudest sound levels produced by aircraft and non-aircraft sources at any given site, and for comparing single-event levels among sites.

Noise measurements were conducted during two periods or seasons – late spring measurements from June 7 to June 18, 2012 and late fall measurements from November 29 to December 7, 2012. Two sites were setup and monitored data for the entire 11-12 day measurement period in June while the other five sites were short-term measurement sites of up to approximately two days at each site. The same two "long-term" sites in June were setup in November-December to monitor data for the seven complete-day measurement period. During visits to each site, observers calibrated the instrumentation; checked and changed batteries, as needed; and logged and reviewed activities occurring during the measurement periods to aid in identifying aircraft and community noise sources.

Each site discussion includes figures that graphically present hourly equivalent sound level (L_{eq}) results for the measurement period. Sites 1 and 2 collected data for both measurement periods and therefore have figures for each measurement period. The hours indicated on the figures represent the starting time of the measurement interval; e.g., hour 6 is the hour starting at 6 a.m. The figures use a 24-hour clock, where the hour starting at 1 p.m. is hour 13; 2 p.m. is hour 14, through the hour starting at 11 p.m., which is hour 23. Hour 0 begins at midnight.

The monitors were set to automatically identify a "noise event" – regardless of source – when the measured level exceeded a preset noise level threshold for at least five seconds. The thresholds were selected to capture as many noise events as feasible; i.e., as low as possible without being so low that background noise would cause events to merge together. The decibel threshold was set at 65 dB at all sites. Therefore, only noise events over 65 dB were stored in the noise monitor memory for later downloading.

For each measurement location, the ranges of L_{max} values for all noise sources are discussed and can be compared to the various sources presented in Appendix A, Figure A-2. The reported noise levels start at set threshold of 65 dB, which is about the level that would interfere with normal outdoor conversation with the speaker and listener about 3 feet apart. Exterior noise levels around 75 dB could start to interfere with an indoor conversation if the windows are open. Finally, exterior noise levels at and above 85 dB could interfere with indoor conversations with windows closed, although this is very dependent on the level of sound reduction provided by the structure.

The measurement units operated on a 24-hour basis during each measurement session, with breaks for battery changes, calibration, basic maintenance requirements, and moving the equipment to a new site. In several instances at Sites 1 and 2, some measurement data were lost due to loose battery connections and during periods of adverse weather (heavy rains in June and cold temperatures in November-December) that affected battery life. The approximate monitoring and data collection times are provided in the discussion for each site. The site graphics show the time periods of missing data.

D.1 Site 1: On Airport at West End of Runway 7/25

Site 1 was located on the airport at the west end of Runway 7/25 to capture most of the aircraft operations from the primary runway and to provide a gauge for comparing modeled to measured noise levels. The monitor was situated along the west fence line approximately 600 feet off the end of the runway and 100 feet south of runway centerline. The objective for this site was to primarily provide a count and noise level of aircraft departures from Runway 25, arrivals to Runway 7, and start of takeoff for departures on Runway 16. Additional sound sources were from aircraft landing at Elmendorf and traffic along 5th Ave.

Approximately 264 hours of monitoring (collecting 262 hours of data) were conducted at Site 1during the June measurement period and 191 hours of monitoring (collecting 186 hours of data) during the November-December measurement period. As shown in Figure D-1, the late spring average daily variation in hourly L_{eq} ranged from approximately 40 to 77 dB and, as shown in Figure D-2, the late fall variation ranged from approximately 43 to 73 dB. The estimated DNL value for this site from all noise sources was 66 dB for the ten full days of the late spring measurements and 65 dB for the seven full days of the late fall measurements. The estimated aircraft DNL for the late spring time period was 66 dB with an estimated 197 aircraft events daily ranging from 68 dB to 107 dB in terms of Lmax. For the late fall time period the estimated aircraft DNL was 63 dB with an estimated 113 aircraft events daily ranging from an Lmax of 65 dB (the set noise event threshold level) to 102 dB. Figure D-1 and Figure D-2 show the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-1 Site 1 Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements

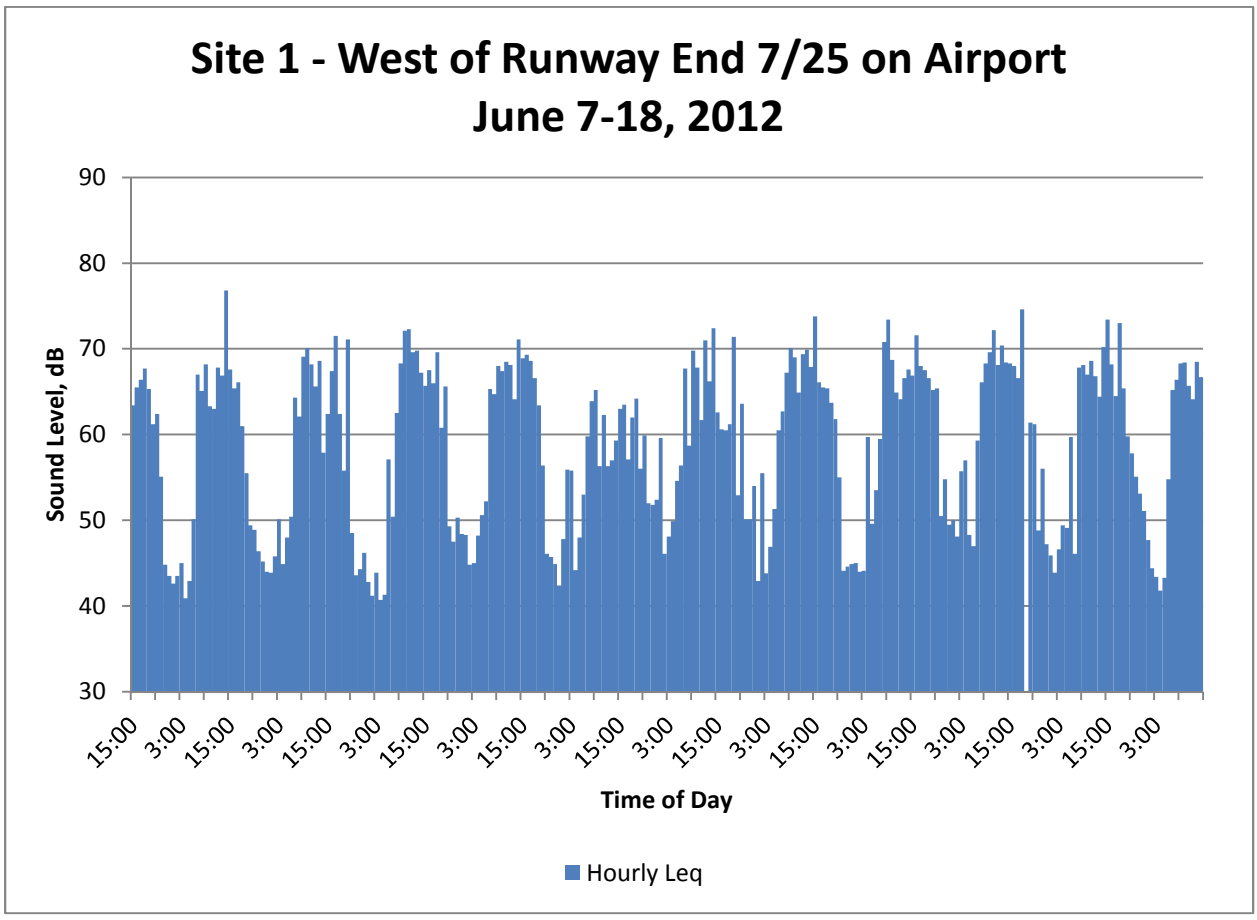
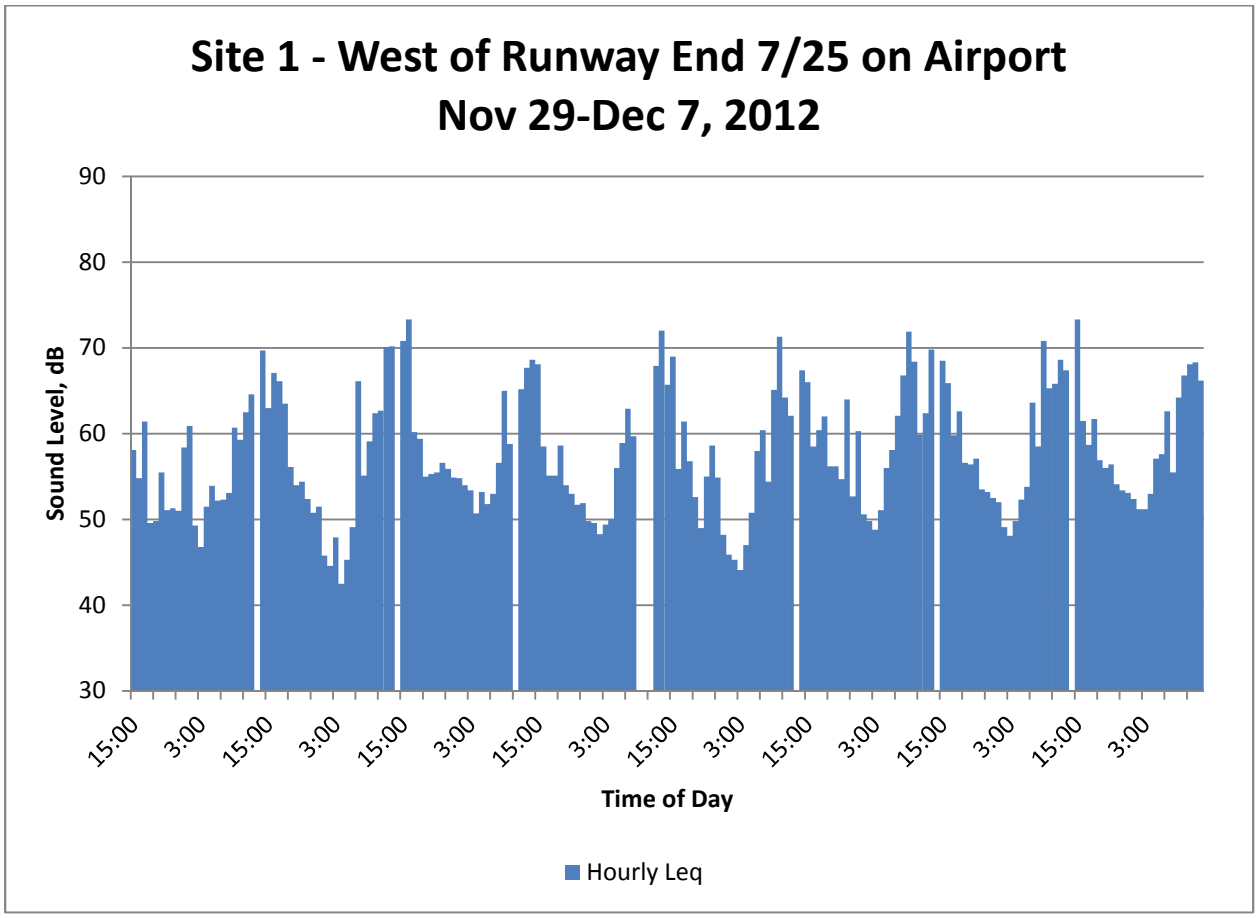


Figure D-2 Site 1 Hourly Variation of Sound over Time
Source: November-December 2012 Noise Measurements



D.2 Site 2: 1200 Block of Medfra St. Fairview

Site 2 was located in the rear yard of a residence a few blocks west of Runway 16/34. A history of complaints were registered from this location primarily due to aircraft overflying or nearly overflying the site due to aircraft not following the prescribed departures for Runway 25 (early left turns) or Runway 23 (straight-out departures or right turns over community). The objective for this site was to measure primarily aircraft variances from the prescribed routes and accompanying sound levels. Additional sound sources were from street traffic, and neighborhood home repair/construction.

Approximately 257 hours of monitoring (collecting 254 hours of data) were conducted at Site 2 during the June and192 hours of monitoring (collecting 176 hours of data) during Nov-Dec. As shown in Figure D-3, the June average daily variation in hourly L_{eq} ranged from approximately 38 to 67 dB and, as shown in Figure D-4, the Nov-Dec variation ranged from approximately 35 to 65 dB. The estimated DNL value for this site from all noise sources for both measurement periods was 56 dB. The number of aircraft events and resulting sound levels are more difficult to determine at this site due to other community sound sources such as street traffic and construction at the neighboring residence. Therefore, a conservative estimate of the aircraft DNL for the June period was 50 dB with an estimated 75 aircraft events daily ranging from 65 dB (the set noise event threshold) to 82 dB maximum sound level (average 71 dB). For the Nov-Dec period the estimated aircraft DNL was 46 dB with an estimated 30 aircraft events daily ranging from 65 dB to 84 dB maximum sound level (average 71 dB). Figure D-3 and Figure D-4 show the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-3 Site 2 Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements

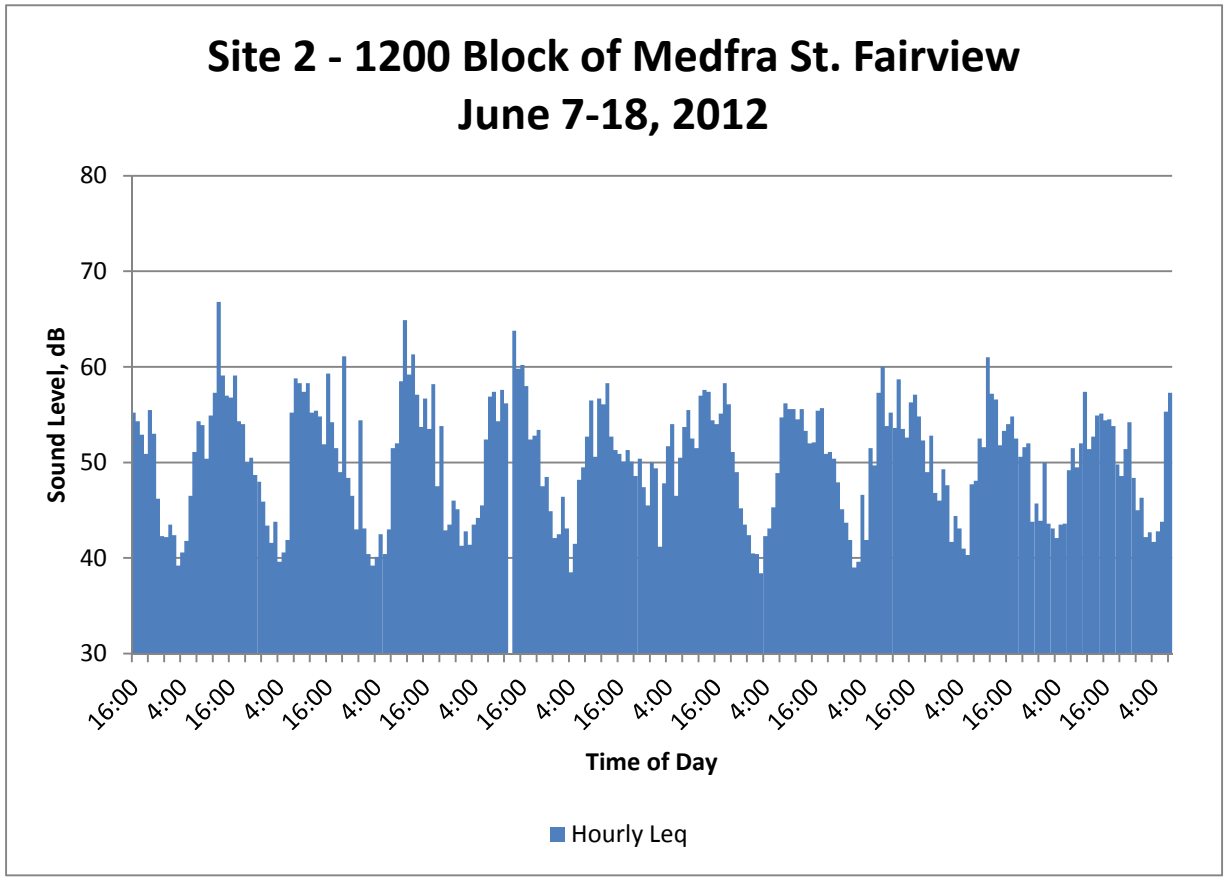
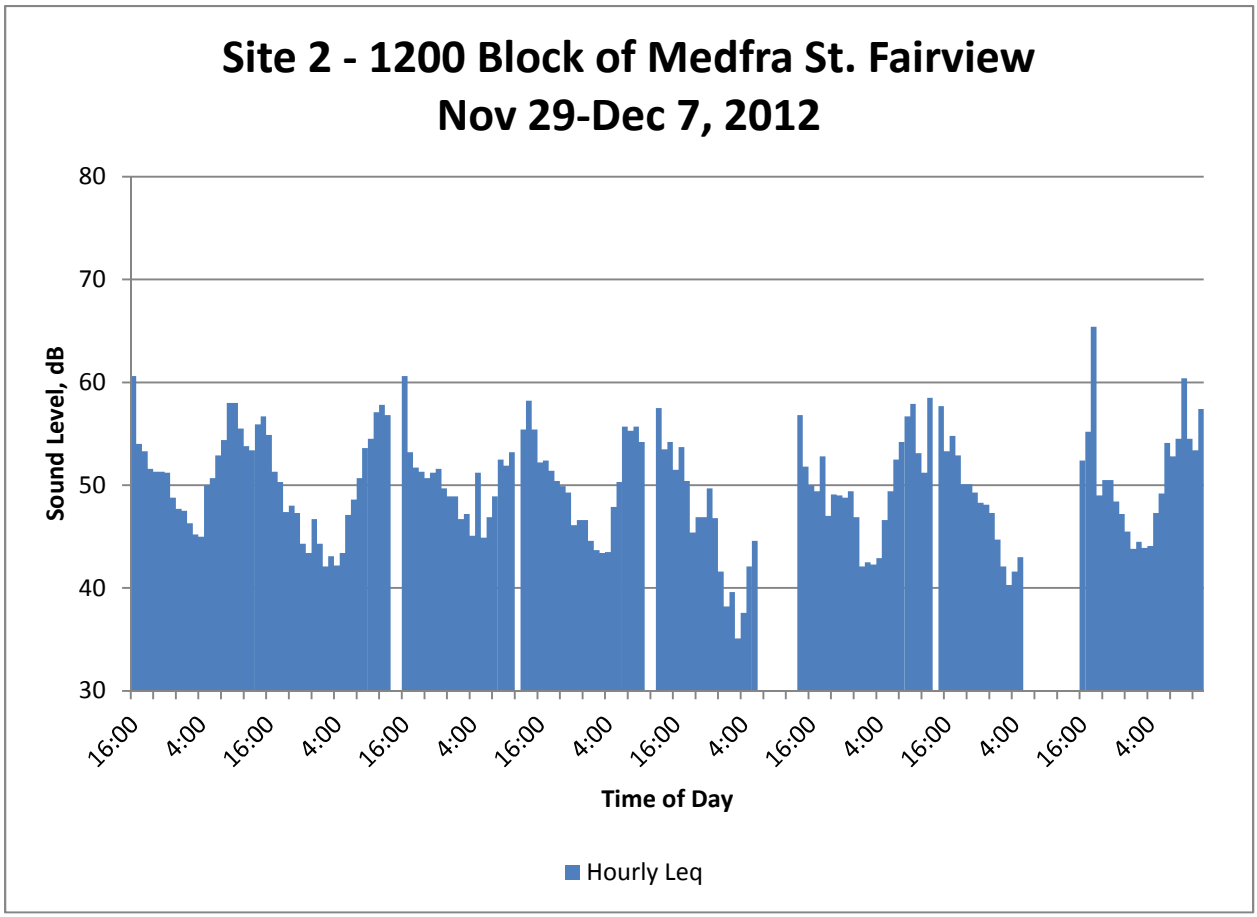


Figure D-4 Site 2 Hourly Variation of Sound over Time
Source: November-December 2012 Noise Measurements

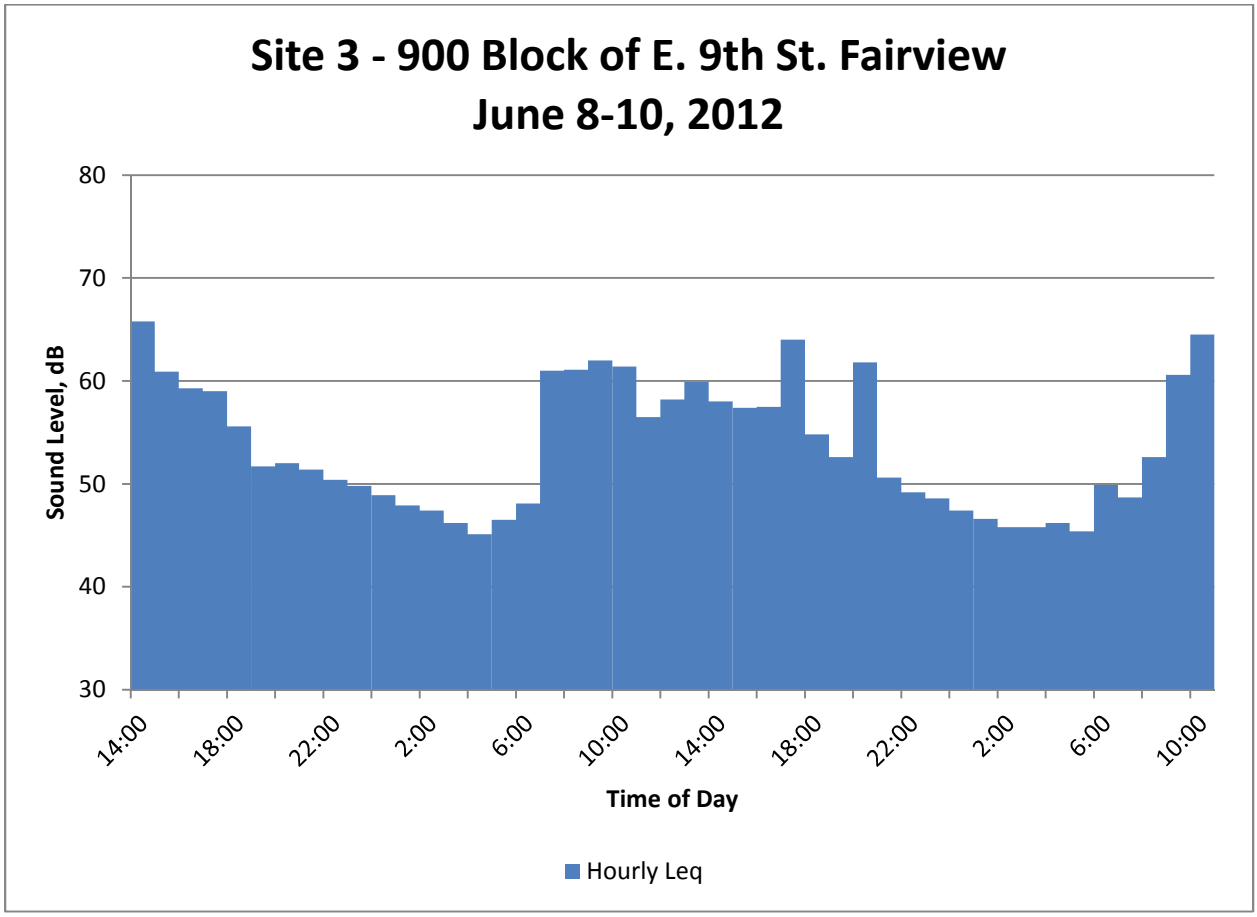


D.3 Site 3: 900 Block of E. 9th Ave. Fairview

Site 3 is located on the steps leading from the rear parking area to the deck and rear door of the residence. This location was chosen as it was just inside the initial left turn after takeoff from Runway 25 for the prescribed traffic pattern. There were complaints that aircraft were cutting the corner short and turning before Ingra Street thereby flying over residential area rather than the commercial area between Ingra and Gambell Streets. Additional sound sources were primarily from street traffic on Ingra St.

Approximately 45 hours of monitoring and data collection were conducted at Site 3. As shown in Figure D-5, the average daily variation in hourly L_{eq} ranged from approximately 45 to 66 dB. The estimated DNL value for this site from all noise sources was 59 dB for the time period of the measurements. The estimated number of aircraft events and resulting sound levels at this site were correlated with aircraft events measured at Site 1. A conservative estimate of the aircraft DNL for this time period was 56 dB with 93 estimated aircraft events on the one full day of measurements. The aircraft event maximum sound levels ranged from 65 dB (the set noise event threshold level) to 92 dB. Figure D-5 shows the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-5 Site 3 Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements

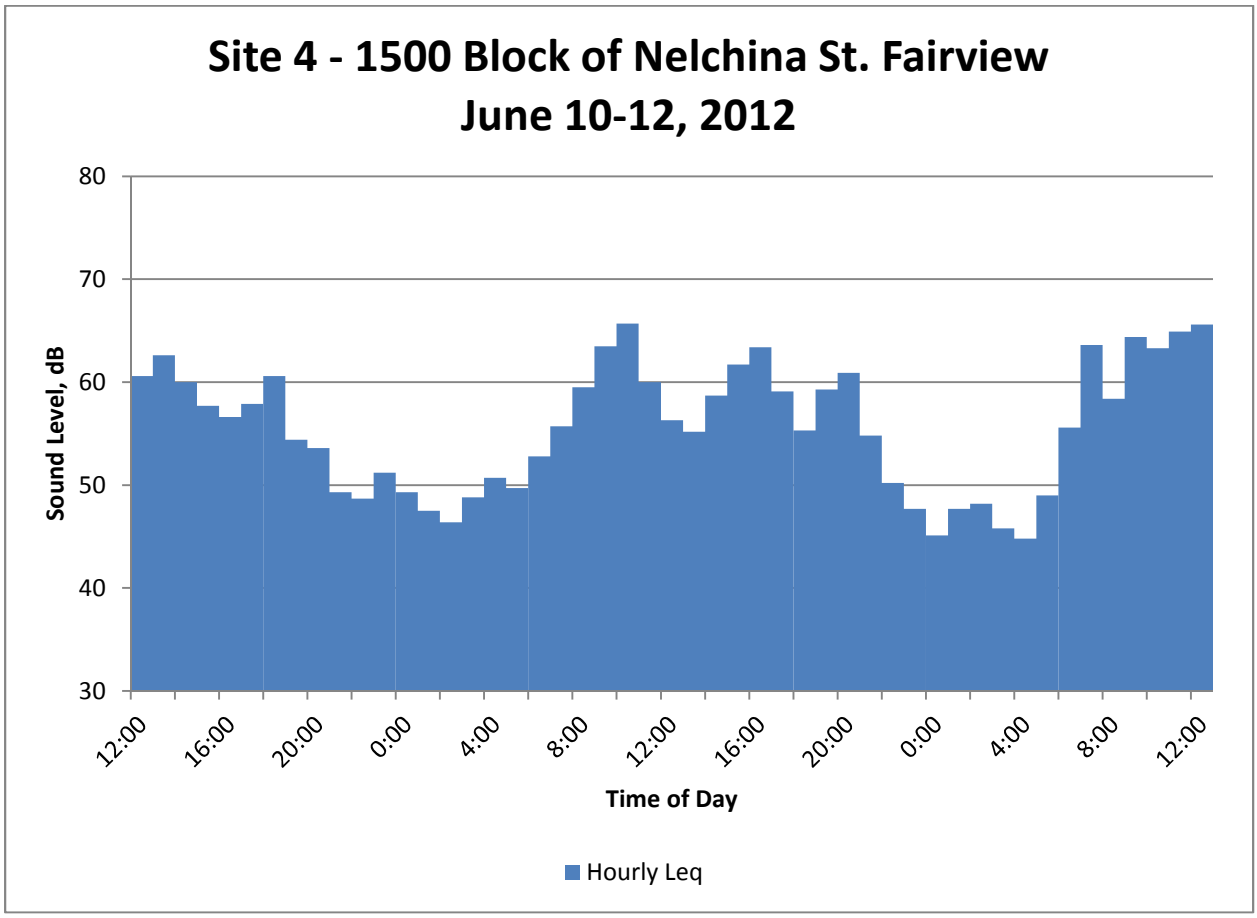


D.4 Site 4: 1500 Block of Nelchina St. Fairview

Site 4 is located at a residence just west of the extended centerline of Runway 16/34, approximately 800 feet south from the start of takeoff for Runway 34. The monitor was situated on the deck of the residence overlooking the green area south of the runway. The objective for this site was to measure aircraft arrivals to Runway 34, and departures from Runways 16 and 23. Additional sound sources were primarily from street traffic on 15th Ave.

Approximately 48 hours of monitoring and data collection were conducted at Site 4. As shown in Figure D-6, the average daily variation in hourly L_{eq} ranged from approximately 45 to 66 dB. The estimated DNL value for this site from all noise sources was 60 dB for the time period of the measurements. The number of aircraft events and resulting sound levels are more difficult to determine at this site due to other community sound sources such as street traffic. Therefore, a conservative estimate of the aircraft DNL for this time period was 54 dB with estimated 85 aircraft events on the one full day of measurements. The aircraft event maximum sound levels ranged from 65 dB (the set noise event threshold level) to 93 dB. Figure D-6 shows the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-6 Site 4 Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements

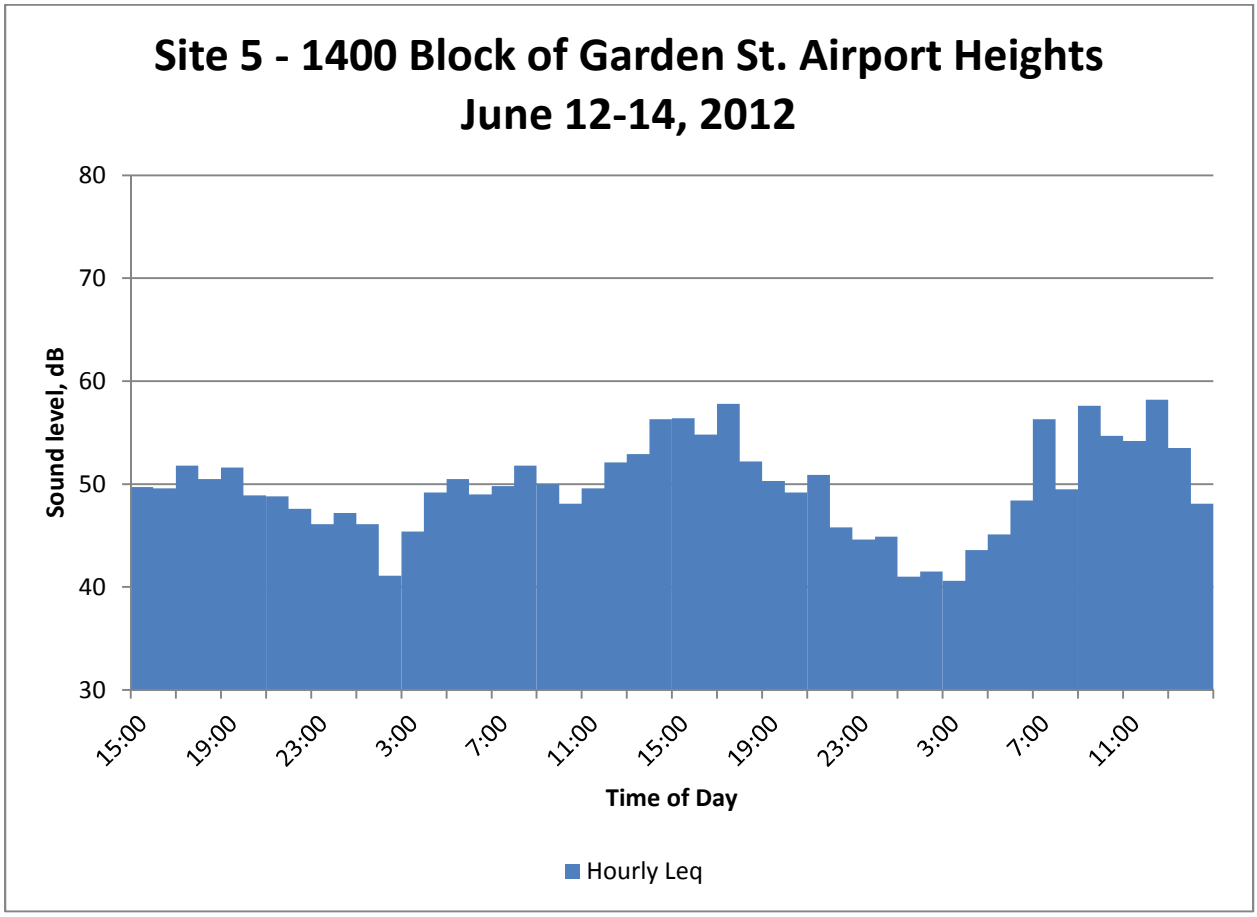


D.5 Site 5: 1400 Block of Garden St. Airport Heights

Site 5 is located south of the airport under the aircraft traffic pattern for Runway 7/25. The monitor was situated in the back yard of the residence with a common alley running behind the houses. The objective for this site was to measure aircraft in the traffic pattern and any aircraft that might take a short cut along Airport Heights Drive. Additional sound sources were primarily from street traffic on Debarr Road and the alley.

Approximately 48 hours of monitoring and data collection were conducted at Site 5. As shown in Figure D-7, the average daily variation in hourly L_{eq} ranged from approximately 41 to 58 dB. The estimated DNL value for this site from all noise sources was 55 dB for the time period of the measurements. The number of aircraft events and resulting sound levels are more difficult to determine at this site due to other community sound sources such as street traffic. Therefore, a conservative estimate of the aircraft DNL for this time period was 46 dB with estimated 27 aircraft events on the one full day of measurements. The aircraft event maximum sound levels ranged from 65 dB (the set noise event threshold level) to 79 dB. Figure D-7 shows the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-7 Site 5 Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements

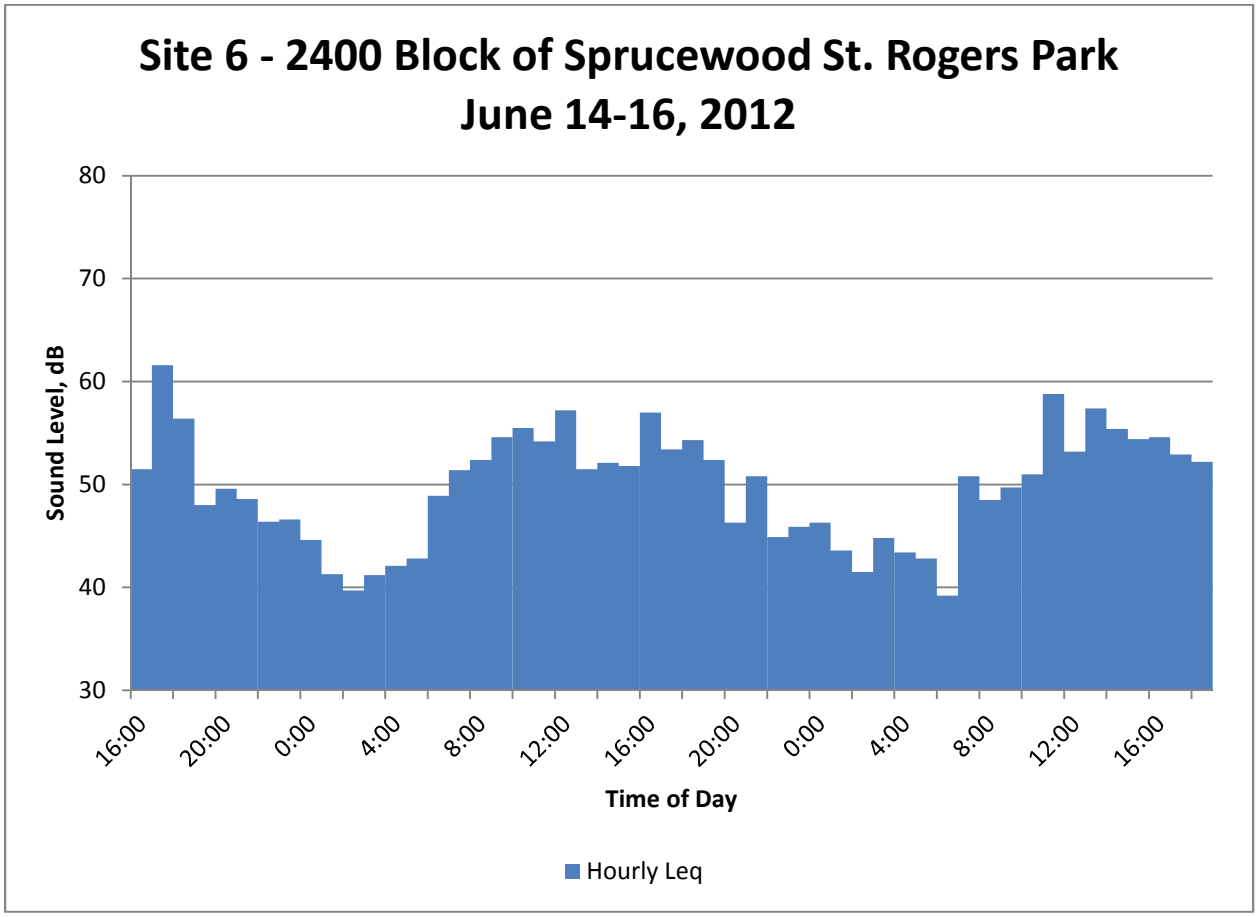


D.6 Site 6: 2400 Block of Sprucewood St. Rogers Park

Site 6 is located south of the airport and south of the green belt used for aircraft flying to the southeast or along Chester Creek. The monitor was situated in the front yard of the residence. The objective for this site was to measure aircraft flying along the green belt after departing Runway 16 or during arrival to Runway 34. Additional sound sources were primarily from street traffic on Sprucewood St.

Approximately 51 hours of monitoring and data collection were conducted at Site 6. As shown in Figure D-8, the average daily variation in hourly L_{eq} ranged from approximately 39 to 62 dB. The estimated DNL value for this site from all noise sources was 54 dB for the time period of the measurements. The number of aircraft events and resulting sound levels are difficult to determine at this site due to other community sound sources such as street traffic. Therefore, a conservative estimate of the aircraft DNL for this time period was 49 dB with estimated 28 aircraft events on the one full day of measurements. The aircraft event maximum sound levels ranged from 65 dB (the set noise event threshold level) to 82 dB. Figure D-8 shows the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-8 Site 6 Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements

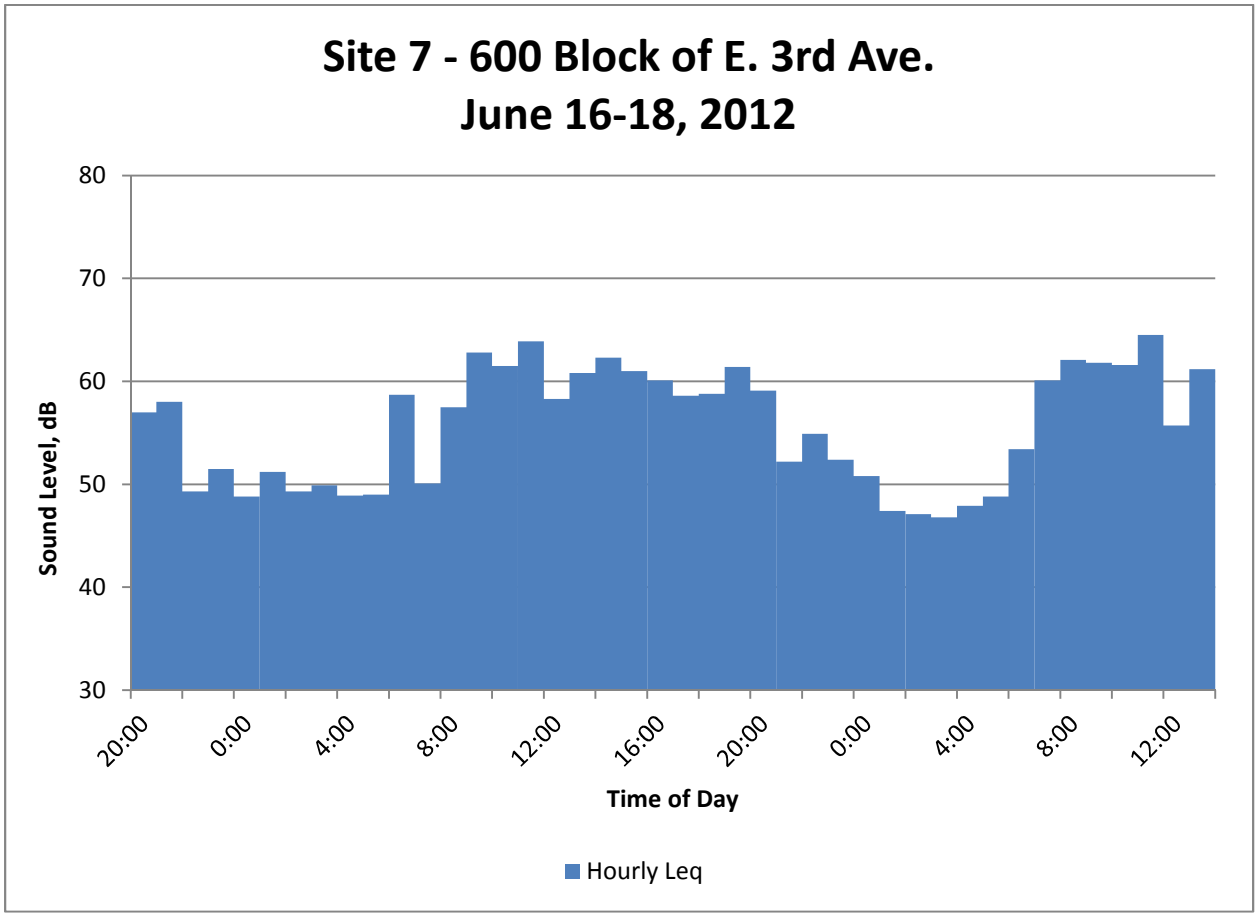


D.7 Site 7: 600 Block of E. 3rd Ave.

Site 7 is located west of the airport generally under the aircraft turn after departure on Runway 25 heading to Ship Creek. The monitor was situated in the back yard of the residence with a common alley running behind the houses. The objective for this site was to measure aircraft on the departure leg to Ship Creek. Additional sound sources were primarily from street traffic on East 3rd Ave. and the alley.

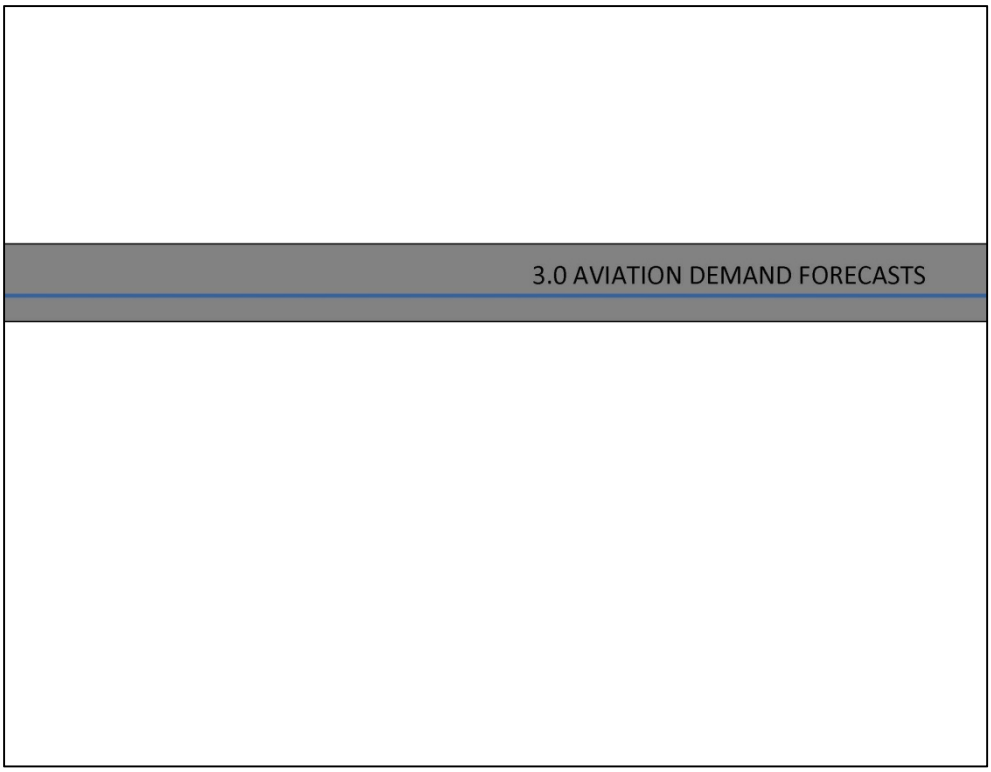
Approximately 43 hours of monitoring and data collection were conducted at Site 7. As shown in Figure D-9, the average daily variation in hourly L_{eq} ranged from approximately 47 to 65 dB. The estimated DNL value for this site from all noise sources was 62 dB for the time period of the measurements. The number of aircraft events and resulting sound levels at this site were correlated with aircraft events measured at Site 1. A conservative estimate of the aircraft DNL for this time period was 59 dB with estimated 62 aircraft events on the one full day of measurements. The aircraft event maximum sound levels ranged from 65 dB (the set noise event threshold level) to 96 dB. Figure D-9 shows the hourly variation of noise from all noise sources during the period of the noise measurements.

Figure D-9 Site 7: Hourly Variation of Sound over Time
Source: June 2012 Noise Measurements



Appendix E Master Plan Forecast of Aviation Activity and FAA Approval

Reference: Aviation Demand Forecasts from Merrill Field Airport Master Plan and Noise Study, Draft March 2013



3.1 Introduction

Aviation demand forecasts are a primary master planning tool to help determine if existing MRI facilities are adequate to meet future demand. This chapter will present a 5-, 10-, and 20-year aviation forecast for the MRI using 2013 as the base year based on the forecast process described in FAA AC 150/5070-6B.

3.2 Industry Trends

3.2.1 National Trends

National aviation trends often are not directly applicable in Alaska because many communities rely on air travel as their primary mode of transportation. As Merrill Field is located in an urban area in Alaska's largest city and has a variety of users, national trends may be more relevant.

The *FAA Aerospace Forecast Fiscal Years FY 2012– 2032* identifies national aviation trends. The 20-year forecast is relatively optimistic with passenger and operations totals expected to rise as the economy continues to recover. The main aviation sector that affects MRI is general aviation (GA). On the national level, the GA industry struggled in 2010 with the third consecutive year of decline in new aircraft shipments. Operations showed mixed results with traffic at towered airports and consolidated facilities declining while rising at FAA en route centers. Overall, the general aviation segment is expected to increase in the future due largely to increased use of business jets and new products like light sport aircraft.

The forecast indicates that enplanements are expected to grow with regional carriers (similar to those at MRI) growing faster than mainline carriers.

In recent years, cargo activity has been impacted by changes such as security regulations and the increased use of mail substitutes (e.g. emails and faxes). The forecast expects revenue ton miles to increase over the forecast period in response to economic growth.

3.2.2 State Trends

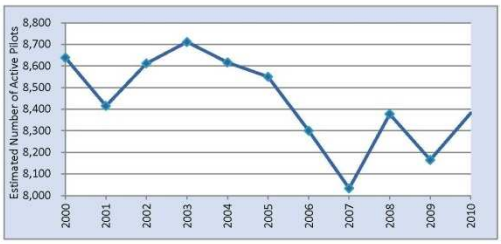
In Alaska, there are 255 airports owned by the Alaska Department of Transportation and Public Facilities (DOT&PF) and an additional 140 public airports owned by other entities such as the City of Kenai's Kenai Municipal

Airport and the City and Borough of Juneau's Juneau International Airport.

While population and income levels have increased over the past decade (see Section 3.6.2), 10-year historic trends in the number of total active pilots in Alaska has decreased. Between 2000 and 2010, the number of total active pilots in Alaska decreased from 8,638 to 8,382 (see Figure 3–1). This is an average annual decline of 0.30 percent.

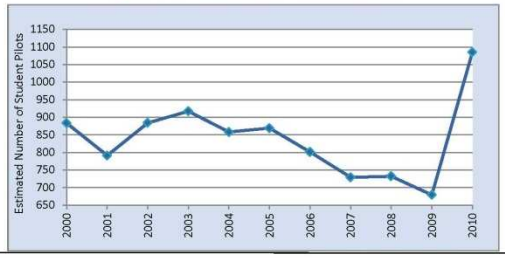
The historic trend for number of student pilots in Alaska has also declined (Figure 3–2). However, in 2010, the FAA increased the length of time the student pilot certificate was valid from 36 to 60 months. This resulted in more people retaining the student status, which contributed to a substantial increase in the 2010 number. As a result, data for 2010 and later is not directly comparable to previous years because of the difference in reporting.

Figure 3–2 Estimated Number of Active Pilots in Alaska, 2000–2010



Source: FAA U.S. Civil Airmen Statistics. Accessed on March 1, 2012 at http://www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics/ . Data are from multiple years.

Figure 3–1 Student Pilots in Alaska, 2000–2010



A query of the FAA Airmen Certification Registration Database in March 2012 showed the total number of registered pilots in Alaska as 9,336[1]. From that number HDR removed the number of people listed with no medical certification[2] (3,321). As a result, there are approximately 6,015 registered pilots in Alaska (with current medical certificates). Of this number, 2,777 (approximately 46%) of the registered pilots in Alaska have a Municipality of Anchorage (MOA) address.

3.2.3 Local Trends

MRI serves as the general aviation link between Anchorage and other Southcentral Alaskan communities. It provides many services including aircraft fuel, hangar rental, flightseeing, flight and ground school instruction, rentals, college courses for aviation degree-seeking students, and a direct taxiway connection to Alaska Regional Hospital.

Activity at Anchorage area airports has been declining over the past 20 years for a variety of reasons including high fuel prices, lack of new pilots, shortage of affordable aircraft, fewer flight schools, and changing economic conditions.

Some local trends that support aviation activity include improved weather reporting, availability of better avionics, more availability of tiedown spaces, ski strip at MRI will allows better access by planes with tundra tires/skis, and no increase in the MOA personal tax on aircraft.

[1] The actual number of registered pilots is likely to be higher as people can opt out of having their information included in the database.
[2] Pilots without a valid medical may be considered a sport pilot (which does not require a FAA medical certificate) or are not allowed to fly.

3.3 Forecast Methodology

The proposed methodology for the MRI air traffic forecast update is based on the process recommended in FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans* Chapter 7 (May 2007) and *Forecasting Aviation Activity by Airport* (FAA 2001). These documents provide national guidance for the preparation of AMPs and are recommended for use in preparing individual AMP forecasts. The AC has been the primary guidance in the preparation of master plans since enactment of the Airport and Airways Development Act of 1970. FAA recommends a seven-step process for the development of aviation forecasts. The recommended steps are:

Step 1. Identify aviation activity measures
Step 2. Review previous airport forecasts
Step 3. Gather data
Step 4. Select forecast methods
Step 5. Apply forecast methods and evaluate results
Step 6. Compare forecast results with FAA's Terminal Area Forecasts
Step 7. Obtain approval of the forecasts

3.4 Step 1 - Identify Aviation Activity Parameters and Measures to Forecast

The type and level of aviation activity anticipated at an airport identifies the parameters and measures to be forecast. At MRI, the majority of the activity is general aviation

This forecast will focus on the following parameters:

- Based aircraft
- Aircraft operations – air taxi and general aviation
- Passenger enplanements
- Air cargo – freight and mail

3.5 Step 2 - Collect and Review Previous Airport Forecasts

This step recommends reviewing existing FAA and other related forecasts for MRI and the area as these forecasts can provide insight into aircraft demand in the area. Relevant forecasts to be reviewed are:

- Merrill Field FAA Terminal Area Forecast (2012)
- Merrill Field AMP (2000)
- 2011–2015 National Plan of Integrated Airport Systems (NPIAS)

3.5.1 Merrill Field FAA Terminal Area Forecast (2012)

The FAA TAF is the official forecast of aviation activity at FAA facilities. The TAF reports passenger enplanements, aircraft operations, and based operations for four major user groups: air carriers, air taxis and commuters, GA, and the military. A further division is made between local and itinerant aircraft operations.

Table 3–1 shows the air traffic forecast for MRI for fiscal years 1990 to 2040.

AVIATION DEMAND FORECAST

Table 3–1 2012 FAA Terminal Area Forecast for MRI, 1990–2032

	Passenger Enplanements			Aircraft Operations							
				Itinerant Ops				Local Ops.			
Year	Air Carrier	Commuter	Total	Air Carrier	Commuter/Air Taxi	GA	Military	Civil	Military	Total Ops	Based Aircraft
1990	0	734	734	0	9,615	79,778	0	126,424	14	215,831	965
1991	0	0	0	0	13,139	84,363	16	156,148	31	253,697	965
1992	0	0	0	0	11,459	79,106	299	134,795	54	225,713	965
1993	0	0	0	0	12,484	80,048	126	137,494	4	230,156	0
1994	0	0	0	0	11,737	78,779	315	117,138	2,288	210,257	965
1995	0	0	0	0	11,053	67,657	560	98,619	70	177,959	965
1996	0	192	192	0	10,248	74,149	413	96,156	45	181,011	965
1997	0	193	193	0	10,342	74,015	23	101,626	0	186,006	966
1998	0	0	0	0	10,607	73,295	17	112,926	10	196,855	966
1999	0	0	0	0	9,090	77,624	19	120,694	4	207,431	966
2000	0	0	0	0	9,387	74,172	4	104,990	2	188,555	966
2001	0	67	67	0	10,517	74,394	171	102,718	473	188,273	966
2002	0	15	15	0	9,929	74,737	34	90,165	2	174,867	966
2003	0	7,470	7,470	0	12,872	80,829	53	110,904	38	204,696	966
2004	0	6,228	6,228	0	14,270	79,992	36	99,676	2	193,976	966
2005	0	5,626	5,626	0	14,756	72,006	97	101,078	4	187,941	966
2006	0	6,896	6,896	0	17,238	70,005	496	96,113	350	184,202	966
2007	0	6,768	6,768	2	16,910	66,892	73	95,505	724	180,106	966
2008	0	6,102	6,102	0	15,744	61,024	845	94,311	1178	173,102	966
2009	0	6,222	6,222	0	15,658	59,840	600	92,341	268	168,707	966
2010	0	5,837	5,837	2	15,100	55,362	128	72,945	924	144,461	965
2011	0	5,983	5,983	1	12,980	58,801	30	64,649	230	136,691	982
2012	0	6,031	6,031	1	13,058	57,516	30	57,186	230	128,021	998
2013	0	6,079	6,079	1	13,136	57,754	30	57,444	230	128,595	1016
2014	0	6,128	6,128	1	13,215	57,993	30	57,703	230	129,172	1033

AVIATION DEMAND FORECAST

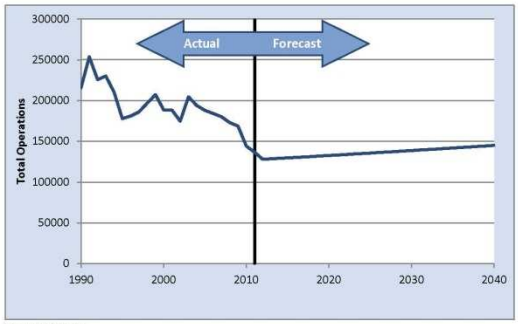
2015	0	6,177	6,177	1	13,294	58,233	30	57,963	230	129,751	1050
2016	0	6,227	6,227	1	13,374	58,474	30	58,224	230	130,333	1068
2017	0	6,277	6,277	1	13,455	58,716	30	58,485	230	130,917	1086
2018	0	6,328	6,328	1	13,536	58,958	30	58,748	230	131,503	1104
2019	0	6,379	6,379	1	13,617	59,201	30	59,012	230	132,091	1124
2020	0	6,430	6,430	1	13,698	59,445	30	59,277	230	132,681	1143
2021	0	6,482	6,482	1	13,780	59,690	30	59,544	230	133,275	1162
2022	0	6,534	6,534	1	13,862	59,936	30	59,812	230	133,871	1182
2023	0	6,587	6,587	1	13,945	60,183	30	60,081	230	134,470	1201
2024	0	6,640	6,640	1	14,028	60,431	30	60,351	230	135,071	1223
2025	0	6,694	6,694	1	14,111	60,681	30	60,623	230	135,676	1243
2026	0	6,748	6,748	1	14,195	60,932	30	60,896	230	136,284	1263
2027	0	6,802	6,802	1	14,279	61,184	30	61,170	230	136,894	1284
2028	0	6,857	6,857	1	14,364	61,437	30	61,446	230	137,508	1305
2029	0	6,912	6,912	1	14,450	61,691	30	61,722	230	138,124	1326
2030	0	6,968	6,968	1	14,536	61,946	30	62,000	230	138,743	1348
2031	0	7,024	7,024	1	14,623	62,202	30	62,279	230	139,365	1370
2032	0	7,081	7,081	1	14,710	62,459	30	62,559	230	139,989	1393
2033	0	7,138	7,138	1	14,798	62,717	30	62,840	230	140,616	1416
2034	0	7,196	7,196	1	14,887	62,976	30	63,123	230	141,247	1439
2035	0	7,254	7,254	1	14,976	63,237	30	63,407	230	141,881	1463
2036	0	7,312	7,312	1	15,066	63,499	30	63,693	230	142,519	1487
2037	0	7,371	7,371	1	15,156	63,762	30	63,980	230	143,159	1512
2038	0	7,430	7,430	1	15,247	64,026	30	64,269	230	143,803	1537
2039	0	7,490	7,490	1	15,338	64,291	30	64,558	230	144,448	1562
2040	0	7,550	7,550	1	15,429	64,557	30	64,849	230	145,096	1588

Source: FAA TAF

AVIATION DEMAND FORECAST

As shown on Figure 3–3, total operations were highest in the early 1990s and have declined since then. The TAF indicates that total operations will be at its lowest in 2012 (128,021). From 2013 to 2040, total operations are expected to gradually increase but will not reach the number of total operations seen in the 1990s and early 2000s.

Figure 3–3 2012 FAA Terminal Area Forecast for MRI Total Operations, 1990–2040



Source: FAA TAF

AVIATION DEMAND FORECAST

3.5.2 Merrill Field AMP (2000)

The most recent AMP for MRI was completed in 2000. Table 3–2 shows the aviation demand forecast from the 2000 AMP.

Table 3–2 2000 MRI AMP Aviation Demand Forecast, 1997–2020

	Base Year	Forecast				
	1997	2000	2005	2010	2015	2020
Annual Air Taxi Enplanements	23,000	24,000	29,000	34,000	39,000	44,000
Air Cargo and Mail (tons)	1,850	1,950	2,150	2,400	2,650	2,900
Based Aircraft						
Single-Engine	853	868	900	935	970	1,010
Multiengine	34	36	42	50	58	66
Helicopter	14	16	18	20	22	24
Additional Gravel/Ski	0	0	60	64	68	72
Total Based Aircraft	901	920	1,020	1,069	1,118	1,172
Aircraft Operations						
Air Taxi	10,370	15,700	17,300	19,100	21,100	23,300
General Aviation – Local	103,268	113,500	118,000	128,000	135,800	148,500
General Aviation - Itinerant	73,552	76,200	84,600	89,000	94,300	99,000
Subtotal General Aviation	176,820	189,700	202, 600	217,000	230,100	247,500
Additional Gravel/Ski	0	0	14,600	15,000	16.000	16,000
Total Aircraft Operations	187,190	205,400	233,900	251,100	267,200	286,800
Annual Instrument Operations	1,080	2,500	2,800	3,300	3,900	4,400
Peak Hour Aircraft Operations	90	92	104	112	119	127
Operations per Based Aircraft	218	223	229	235	239	245

Source: 2000 MRI AMP

AVIATION DEMAND FORECAST

3.5.3 Birchwood Airport Planning Study Update (2011)

The DOT&PF updated the forecast for Birchwood Airport in December 2011. It was an update of the 2005 AMP. Table 3–3 presents the based aircraft forecast for low-, medium-, and high-growth scenarios.

Table 3–3 Birchwood Airport Based Aircraft Forecast Scenarios (2011–2031)

Year	Low	Medium	High
2011	469	469	469
2016	467	489	497
2021	473	509	526
2031	516	553	590

Source: Birchwood Airport Planning Study Update Forecast Memorandum

3.5.4 Lake Hood and ANC General Aviation Master Plan (2006)

The DOT&PF completed an AMP for Lake Hood and Anchorage International Airport in September 2006. Table 3–4 lists the air traffic forecast from this AMP.

Table 3–4 Forecast of GA Operations at ANC and Lake Hood

Year	Lake Hood Operations Regression Approach	Lake Hood Operations Based Aircraft Approach	ANC GA Operations
2003	58,354	70,723	70,723
2008	63,789	79,242	79,242
2013	65,048	89,173	89,173
2023	67,231	114,442	114,442

Source: Lake Hood and ANC General Aviation Master Plan

3.5.5 2011–2015 National Plan of Integrated Airport Systems (NPIAS)

The NPIAS presents a five-year forecast for enplaned passengers and based aircraft for MRI. Table 3–5 shows the 2011 forecast for the year 2015.

Table 3–5 National Plan of Integrated Airport Systems Passenger Enplanement Forecast for 2015

Passenger Enplanements	15,206
Based Aircraft	965
Hub Type	Non Hub[1]
Role	Commercial Service - Primary

Source: NPIAS

AVIATION DEMAND FORECAST

3.5.6 Alaska Aviation System Plan Final Forecasts (2011)

The DOT&PF is developing an Alaska Aviation System Plan. While the plan is still in progress, a forecast was published in June 2011. The purpose of the forecast was to provide updated information for the NPIAS airports. Table 3–6 lists the forecast from this report.

Table 3–6 MRI Alaska Aviation System Plan Forecast (2008–2030)

	2008	2015	2020	2030
Passenger Forecast (Enplanements)	6,186	6,908	7,626	9,221
Cargo Forecast (tons)	721	793	890	1,140

Source: Alaska Aviation System Plan Final Forecasts Memo

3.6 Step 3 - Gather Data

3.6.1 Data Requirements

The FAA requires the number of aircraft operations for various categories of aircraft be incorporated into the forecast. Passenger enplanement data, cargo, mail, and freight data are also required data sets, if available. FAA also specifies that population, employment rates, and socioeconomic factors such as personal income be included.

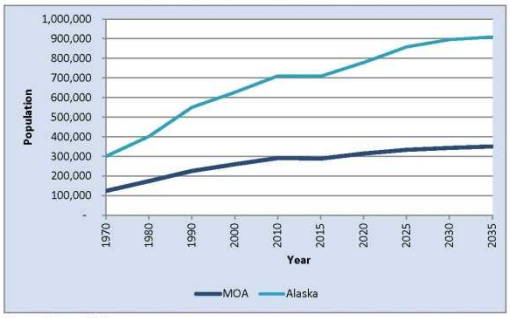
3.6.2 Socioeconomic Trends

The FAA AMP process requires an analysis of socioeconomic factors, as socioeconomics may have a significant impact on the future demand for air travel and air traffic activity. This section presents information on population, employment, per capita income, and a general economic overview for the MOA.

3.6.2.1 Population

Population size and anticipated growth are often key components of forecasting air transportation needs. A community's historic population trends are often helpful in indentifying air traffic demand. As shown in Figure 3–4, the population for the State of Alaska and the MOA has grown over the past 40 years and is expected to continue to increase. By 2035, the population of the MOA is expected to be approximately 351,300. The Institute of Social and Economic Research (ISER) expects the State of Alaska's population to grow at a slightly faster rate. Between 2010 and 2035, they expect the State to have an annual average population growth rate of 1.11 percent while the MOA's growth rate was expected to be 0.78 percent.

Figure 3–4 Historical and Projected Population

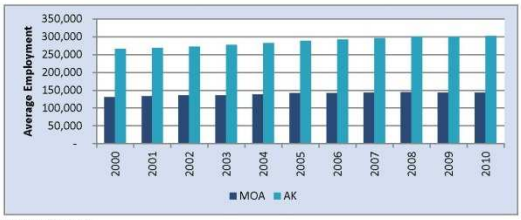


Source: Census, ISER

3.6.2.2 Employment

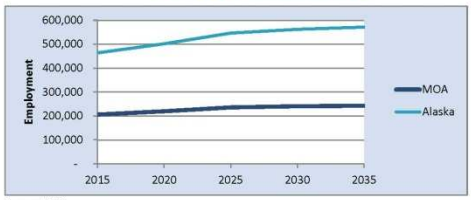
Employment characteristics of an area can be an indicator of its economic development and the area's potential for generating air traffic. Employment in Alaska and the MOA has grown over the past 10 years and is expected to continue to grow. Figure 3–5 shows the average quarterly employment in the MOA and Alaska according to the Census Bureau's Quarterly Workforce Indicators. According to the Department of Labor and Workforce Development (DOL&WD), some of the MOA's biggest employers are the Anchorage School District, the State of Alaska (excluding the University of Alaska), Providence Hospital, the MOA, and Safeway (DOL&WD). By 2035, ISER expects the total employment[3] in the MOA to be approximately 243,100. Alaska's employment is also expected to increase, but at a slightly faster rate (Figure 3–6).

Figure 3–5 Historical Employment



Source: DOL&WD

Figure 3–6 Projected Employment



Source: ISER

[3] The employment statistics are not directly comparable as the Census Bureau's QWI excludes some categories of worker including self employment and independent contractors.

3.6.2.3 Per Capita Income

The personal income available to residents can be an indicator of their financial ability to travel and participate in general aviation activities. Typically, higher income levels are associated with higher than average spending on leisure activities, including aviation activity. Low income levels tend to be associated with lower than average spending.

Since 2000, per capita income in the MOA has been higher than for the state (Figure 3–7). This suggests that MOA residents have more disposable income than people living elsewhere in Alaska. In the MOA, per capita income has risen from $34,359 in 2000 to $48,993 in 2010. This is a 43 percent increase. During the same time frame, per capita income in Alaska has grown by approximately 45 percent.

Figure 3–7 Historic Per Capita Income

Source: Bureau of Economic Analysis

3.6.2.4 Economic Outlook

According to the *Municipality of Anchorage, 2012–2017 Six Year Fiscal Program*, Anchorage has been partially sheltered from the economic troubles affecting the rest of the country in recent years. One exception to this was 2009 when seven of the eight Anchorage Economic Development Corporation's economic indicators were negative. The economy recovered in 2010, however, with only one indicator remaining negative. This economic growth is expected to continue as long as oil prices remain high. Employment gains are expected, with most of the growth occurring in the health care, professional and business services, and leisure and hospitality fields. Health care and health care-related construction in particular are expected to be growth areas for the MOA. This growth is expected to continue through 2014 as the Baby Boomers enter their senior years and Providence Alaska Medical

Center continues its $150 million "Generations" project.

Anchorage has two challenges: the reduction in federal spending and the decline in oil production. While both of these are expected to have a negative impact on the MOA's economy, the timing of these events is uncertain.

3.6.3 Historical Aviation Activity

This section presents a historical overview of air traffic activity at MRI and in the Anchorage area. Topics to be addressed include aircraft registered in the MOA, MRI-based aircraft, and MRI operations.

3.6.3.1 General Aviation

General aviation refers to aviation that is not military aviation, scheduled commercial aviation or air taxi service. General aviation covers a wide range of activities including recreational flying, flight training, medical evacuation, aerial photography, crop dusting, etc.

3.6.3.2 Aircraft Registrations in the MOA

As of May 3, 2012, there were 364,295 aircraft registered in the U.S. according to FAA's Aircraft Registration Master File. Of these, 11,008 (or 3 percent) were registered in Alaska. There were 4,083 aircraft registered in the MOA. Approximately 37 percent of all aircraft registered in Alaska are within the MOA.

3.6.3.3 MRI Based Aircraft

Based aircraft refers to those aircraft that are hangared or on tiedowns at MRI and include those that are based at one of the commercial aviation/fixed base operators or other leaseholder sites. Table 3–7 presents the number of MRI-based aircraft since 1986. Since then, the number of aircraft based at MRI has averaged 926. In 2011, the number of based aircraft (880) was 46 below the average for the time period. In 2012, the number of based aircraft (827) was 99 below the average.

Table 3–7 MRI-Based Aircraft (1986–2012)

Year	Based Aircraft
1986	1,079
1987	1,022
1988	1,009
1989	950
1990	1,003
1991	1,008
1992	943
1993	916
1994	910
1995	905
1996	907
1997	901
1998	907
1999	880
2000	884
2001	869
2002	918
2003	913
2004	910
2005	933
2006	943
2007	910
2008	892
2009	902
2010	887
2011	880
2012	827

Source: 2000 AMP and MRI Annual Aircraft Inventory

AVIATION DEMAND FORECAST

3.6.3.4 Aircraft Operations

An aircraft take-off or landing is counted as one aircraft operation. Historical aircraft operations at MRI from 1980 to 2011 are shown in Table 3–8 and Figure 3–8. The FAA Air Traffic Control Tower records do not include the operations that occur while the tower is closed. Currently, the tower operates between the hours of 7 AM and midnight from May 1 to August 31 and between the hours of 7 AM to 10 PM from September 1 to April 30.

According to FAA Air Traffic Control Tower personnel, the number of aircraft operations that occur when the tower is closed is minimal and will not be accounted for separately in this forecast.

According to FAA Air Traffic Control Records, total airport operations at MRI have varied over the past 25 years with a high of 259,632 in 1990 and a low of 127,632 in 2011. This is a decline of approximately 50.8 percent in operations during that time.

Table 3–8 Annual Airport Operations (1980–2011)

	Itinerant			Local	Total
Year	Air Taxi	General Aviation	Subtotal	General Aviation	Operations
1980	4,584	101,437	106,021	175,094	281,115
1981	4,874	103,506	112,247	197,980	310,227
1982	8,462	100,811	109,273	193,482	302,755
1983	9,795	113,066	122,861	212,698	335,559
1984	12,015	124,624	136,639	247,675	384,314
1985	12,376	114,454	126,830	195,125	321,955
1986	16,708	104,110	120,830	175,577	296,394
1987	14.946	99,030	113,976	155,591	269,394
1988	10,797	92,458	103,255	143,598	246,853
1989	10,126	85,073	95,199	134,632	229,831
1990	12,436	93,088	105,524	154,086	259,632
1991	12,618	82,233	94,851	156,921	251,817
1992	11,194	77,758	88,952	127,051	216,461
1993	12,682	80,734	93,416	138,891	232,614
1994	11,351	76,851	88,202	113,490	204,029
1995	11,284	72,217	83,501	100,630	184,759
1996	10,117	70,692	80,809	92,464	173,711
1997	10,370	73,529	83,899	103,268	187,190
1998	10,412	77,570	87,982	119,002	207,028
1999	9,236	76,662	85,898	115,151	201,057
2000	9,418	73,544	82,962	106,944	190,527
2001	10,627	73,033	83,660	95,525	179,217
2002	10,381	76,972	87,353	97,284	184,670
2003	12,935	81,132	94,067	108,092	202,278
2004	14,877	77,730	92,607	98,895	191,516

AVIATION DEMAND FORECAST

Table 3–8 Annual Airport Operations (1980–2011) cont.

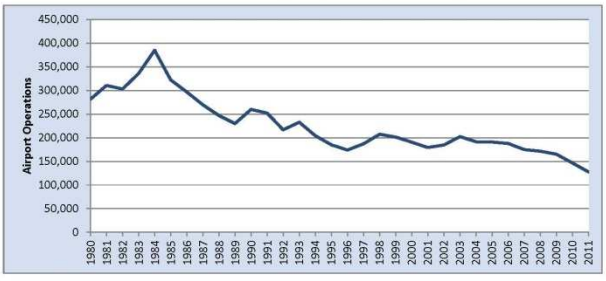
	Itinerant			Local	Total
Year	Air Taxi	General Aviation	Subtotal	General Aviation	Operations
2005	15,080	73,762	88,842	101,607	190,816
2006	17,333	69,856	87,189	99,773	187,798
2007	16,617	65,874	82,491	91,785	174,848
2008	15,893	59,380	75,273	93,900	171,396
2009	15,336	59,739	75,075	89,164	165,133
2010	15,119	56,534	71,653	74,089	146,547
2011	12,508	55,746	68,254	59,102	127,632

Source: FAA and 2000 AMP

Merrill Field has the highest number of aircraft operations between May and August and the fewest number of aircraft operations in December.

Air taxi and general aviation are the two main categories of airport operations at MRI. In addition, there are a small number of military operations each year.

Figure 3–8 Annual Airport Operations (1980–2011)



3.6.3.5 Air Taxi Operations

An air taxi operation refers to the unscheduled operations of "for hire" air taxis. Over the past 25 years, air taxi operations have ranged from a high of 17,333 in 2006 to a low of 9,236 in 1999 (see Figure 3–9). An operation is recorded as an air taxi operation if it is conducted by a Federal Aviation Regulations (FAR) Part 135 operator with an air taxi identifier.

Air taxi operations generally account for between 5 and 10 percent of total operations. Since 2006, air taxi operations have accounted for approximately 9 to 10 percent of the total airport operations.

3.6.3.6 General Aviation Operations

General aviation operations refer to all civil aircraft operations that are not categorized as air carrier, air taxi, or military. General aviation operations have generally declined over the past 25 years. According to FAA Tower Count records, in 1990 there were approximately 247,174 general aviation operations compared to only 114,848 in 2011. In 1990, general aviation operations accounted for approximately 95 percent of all airport operations. This has declined to approximately 90 percent in 2011.

General aviation operations can be considered itinerant (the operation arrives from outside the traffic pattern or departs the traffic pattern) or local (the operation stays within the traffic pattern airspace). At Merrill Field, the percentage of operations that are itinerant has been increasing. In 2011, itinerant operations made up approximately 53.5 percent of all aircraft operations. In 1990, itinerant operations made up approximately 40.6 percent of all operations.

Figure 3–9 MRI Air Taxi Operations, 1990–2011

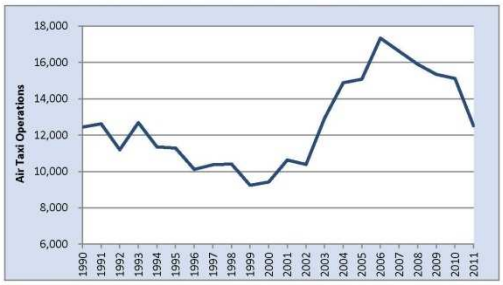
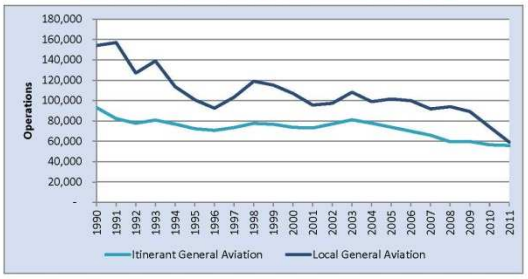


Table 3–9 Annual MRI Air Taxi and General Aviation Operations (1990–2011)

		Itinerant		Local	Total
Year	Air Taxi	General Aviation	Subtotal	General Aviation (Civilian)	GA Operations
1990	12,436	93,088	105,524	154,086	247,174
1991	12,618	82,233	94,851	156,921	239,154
1992	11,194	77,758	88,952	127,051	204,809
1993	12,682	80,734	93,416	138,891	219,625
1994	11,351	76,851	88,202	113,490	190,341
1995	11,284	72,217	83,501	100,630	172,847
1996	10,117	70,692	80,809	92,464	163,156
1997	10,370	73,529	83,899	103,268	176,797
1998	10,412	77,570	87,982	119,002	196,572
1999	9,236	76,662	85,898	115,151	191,813
2000	9,418	73,544	82,962	106,944	180,488
2001	10,627	73,033	83,660	95,525	168,558
2002	10,381	76,972	87,353	97,284	174,256
2003	12,935	81,132	94,067	108,092	189,224
2004	14,877	77,730	92,607	98,895	176,625
2005	15,080	73,762	88,842	101,607	175,369
2006	17,333	69,856	87,189	99,773	169,629
2007	16,617	65,874	82,491	91,785	157,659
2008	15,893	59,380	75,273	93,900	153,280
2009	15,336	59,739	75,075	89,164	148,903
2010	15,119	56,534	71,653	74,089	130,623
2011	12,508	55,746	68,254	59,102	114,848

Source: FAA

Figure 3–10 MRI General Aviation Operations, 1990–2011



3.6.4 Military Operations

Military operations account for a very small percentage of total airport operations at MRI (typically less than 1%). In 2010, there were only 263 military operations. These were primarily training-related.

3.6.5 Enplanements

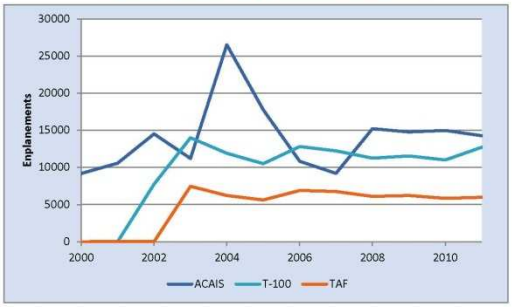
Enplanements reported to the ACAIS are used to allocate FAA Airport Improvement Program Funding. Table 3–10 presents passenger enplanements as reported by the FAA ACAIS, the T-100 data from the DOT Bureau of Transportation Statistics, and the FAA TAF (see Figure 3–11). It is important to note that ACAIS and T-100 report enplanements for a calendar year while the TAF reports enplanements for a fiscal year. The T-100 data represent scheduled air carriers only, so the T-100 data for any given year should be lower than the

Table 3–10 MRI Historic Passenger Enplanements

Year	ACAIS	T-100	TAF
1992	N/A	N/A	0
1993	N/A	N/A	0
1994	N/A	N/A	0
1995	202	0	0
1996	143	0	192
1997	193	0	193
1998	N/A	0	0
1999	2,240	0	0
2000	9,173	0	0
2001	10,572	0	67
2002	14,511	7,751	15
2003	11,211	13,988	7,470
2004	26,504	11,899	6,228
2005	17,745	10,508	5,626
2006	10,820	12,816	6,896
2007	9,204	12,235	6,768
2008	15,206	11,236	6,102
2009	14,769	11,551	6,222
2010	14,972	11,013	5,837
2011	14,261	12,708	5,983

Source: FAA

Figure 3–11 MRI Historic Enplanements, 2001–2011



Source: FAA and the US DOT Bureau of Transportation Statistics

TAF or ACAIS values, as these include non-scheduled flights. In addition, while scheduled air carriers are required to report enplanements, non-scheduled air carrier submittals are voluntary. As a result, the ACAIS value likely underreports the number of enplanements.

3.6.6 Cargo and Mail Activity

Air cargo service provides rural communities with a means of importing and exporting goods in a timely manner. The amount of cargo and mail flown in Alaska can be difficult to quantify, but the T-100 reports provide a trend line for this type of service.

The U.S. Postal Service (USPS) provides priority and other classes of mail service to rural Alaska, and in locations where the community is not on the highway system, the mail travels by air. A 1985 special provision in federal law permits and subsidizes the delivery of fourth-class mail at rates that are significantly lower than freight rates. Stores or businesses that ship large quantities of goods such as groceries and other consumer goods palletize their loads and deliver them directly to an air cargo shipper, bypassing the Post Office. Thus the term "bypass mail" is used for these shipments. A postal official at the air carrier facility accepts the pallet on behalf of the Post Office, and bills for the fourth-class postage. The air carrier is responsible for delivery of the goods to the recipient in the destination community. Individuals can also ship goods by fourth-class mail, but those packages must be taken to a Post Office. Approximately 75 percent of the fourth class mail to rural Alaska is

transported as bypass mail. Hazardous materials and construction materials are not accepted by the Post Office as fourth-class mail, and must be shipped by air freight. Delivery of mail by air at these favorable rates has facilitated a better flow of goods to rural Alaska.

The Rural Air Service Improvement Act (RSIA; Public Law 107-206, Sec. 3002, 2002) changed the freight, mail, and passenger service in rural Alaska, including freight and mail reporting requirements for air carriers. Essentially, beginning in 2002, air carriers were required to report all freight and mail on form T-100 to the Federal BTS. The BTS implemented a system to facilitate all air carriers to submit their data on a Web-based system. Prior to this 2002 change in the law, only the largest air carriers reported their data. Very little information about the volume of cargo and mail shipped through MRI prior to 2002 is available. Table 3–11 shows historic cargo and mail activity at MRI between 2001 and 2011.

Table 3–11 Historic Cargo and Mail Activity at MRI, 2002–2011

Year	Freight (Pounds)	Mail (Pounds)
2002	395,428	17,456
2003	788,518	23,799
2004	841,514	20,881
2005	1,335,394	65,895
2006	1,629,081	71,124
2007	1,582,478	77,018
2008	1,445,050	69,131
2009	1,483,854	56,168
2010	1,186,056	51,685
2011	1,737,228	55,759

Source: US DOT

3.7 Step 4 - Select Forecasting Methods

General aviation activity is determined largely by local population and income levels, the cost of flying, and the number of based aircraft at the airport (*Forecasting Aviation Activity by Airport,* FAA 2001*).* Due to the uncertainty associated with developing forecasts, it was decided that three growth scenarios (low, medium, and high) would be calculated. The resulting trends are more important than the actual numbers.

Forecast scenarios were developed for **based aircraft** using the following:

- Trend analysis projecting MRI's based aircraft growth into the future based on a 25-year trend
- Trend analysis projecting MRI's based aircraft growth into the future based on a 10-year trend
- Applying the FAA's Average Annual GA fleet growth rate for 2011–2032 to the MRI-based aircraft

Forecast scenarios were developed for **aircraft operations** using the following methods:

- Trend analysis projecting MRI's operations growth into the future based on a 25-year trend
- Applying the FAA's national active GA hours flown growth rate (per the FAA Aerospace Forecast) to MRI operations

- Applying the MOA population forecast annual average growth rate to MRI operations

Forecast scenarios were developed for **enplanements** using:

- Trend analysis projecting MRI's operations growth into the future based on a 25-year trend
- Applying MRI's change in operations to enplanements
- Applying the MOA population forecast annual average growth rate to MRI enplanements

Forecast scenarios were developed for **cargo and mail** using:

- Trend analysis projecting MRI's cargo and mail into the future based on an annual average (based on the last five years of data)
- Applying the Rest of Alaska (Alaska excluding the MOA and MSB) population forecast annual average growth rate to MRI cargo and mail
- Trend analysis projecting growth based on change in operations at MRI in the past five years.

3.8 Step 5 – Apply Forecast Methods and Evaluation Results

This section presents three scenarios for based aircraft, aircraft operations, and enplanements for MRI. Table 3–15 at the end of this section summarizes the forecasts and growth rates.

3.8.1 General Assumptions

The following general assumptions were made in the development of this forecast.

- The population and employment estimates are adequate for preparing an aviation demand forecast.
- No policies that constrain aviation activity would be imposed on MRI.
- General aviation activity remain the dominant type of use at MRI.
- Military operations will continue to be approximately 1 percent of total aircraft operations.

3.8.1.1 Based Aircraft

The three based aircraft scenarios use a base year estimate of 827. Each scenario assumes that no substantial changes to the fleet mix will occur. However, based on stakeholder input, it is assumed that helicopters will grow from approximately four percent of the based aircraft to five percent over the next 20 years. The results of each forecast are summarized in Table 3–12 and on Figure 3–12. Each forecast is

Table 3–12 MRI Based Aircraft Forecast Scenarios, 2013–2033

Year	Low Growth (-0.9%)	Medium Growth (0.6%)	High Growth (0.78%)
2013	819	832	833
2018	782	857	866
2023	746	883	901
2028	712	910	936
2033	679	938	974

discussed in more detail below.

Low Growth Forecast

This forecast scenario assumes the same rate of change in based aircraft between 1986 and 2012 at MRI. Using the number of based aircraft in 1986 (1,079) and 2012 (827), this was an average annual decrease of -0.9 percent.

This scenario represents a continued decline in aviation activity and aircraft being based at airports other than MRI.

Based on this approach, MRI would be expected to have 679 based aircraft in 2033 (148 fewer aircraft than in 2012).

Medium Growth Forecast

This forecast scenario assumes the number of based aircraft at MRI would grow similar to the national active GA aircraft growth as forecasted by FAA in the FAA Aerospace Forecast Fiscal Years 2012–2032 report and detailed in Table 28 Active General Aviation and Air Taxi Aircraft.

Using Table 28, HDR applied the national annual growth rate for the total general aviation fleet over the next 20 years to the MRI based aircraft. The average annual growth for this scenario is 0.6 percent.

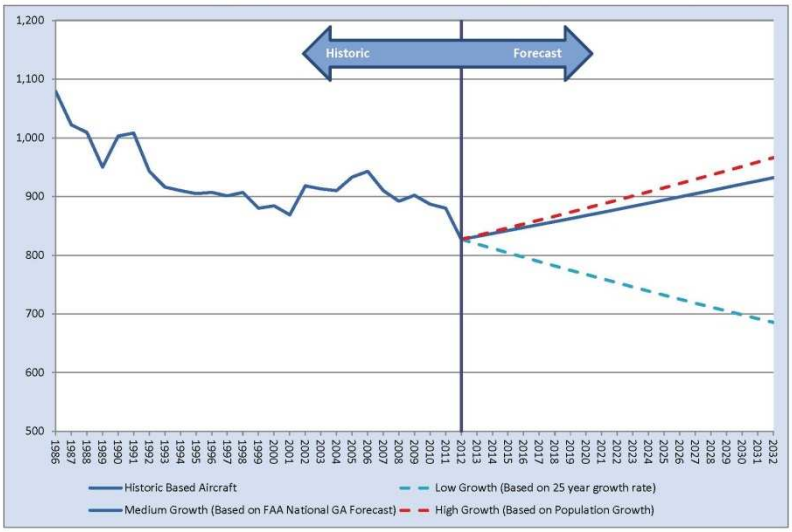
This scenario has the number of based aircraft at MRI increasing to 938 by the year 2033. This is an increase of 111 aircraft in the next 20 years.

High Growth Forecast

The high-growth forecast scenario assumes that the number of based aircraft will grow at a rate similar to the population growth rate in MOA. According to ISER, the population in the MOA is expected to grow by 0.78 percent annually between 2010 and 2035.

This scenario assumes aviation activity will occur at similar levels. In this scenario, MRI would be expected to have 974 based aircraft in 2033. This is an increase of 147 aircraft.

Figure 3–12 MRI Based Aircraft Forecast Scenarios, 2013–2033



3.8.1.2 Aircraft Operations

The three aircraft operations scenarios use a base year estimate of 128,628[4]. The results of each forecast are summarized in Table 3–13 and on Figure 3–13. Each forecast is discussed in more detail below.

Table 3–13 MRI Operation Forecast Scenarios, 2013–2033

Year	Low Growth (-2.4%)	Medium Growth (0.78%)	High Growth (1.7%)
2013	125,513	129,631	130,814
2018	111,038	134,766	142,318
2023	98,232	140,104	154,833
2028	86,903	145,654	168,449
2033	76,881	151,424	183,263

[4] The base year estimate was derived by adjusting the 2011 total operations to 2012 following the medium growth methodology.

Low Growth Forecast

The low growth forecast assumes the same rate of change in the number of total aircraft operations at MRI between 1991 and 2011. Using the numbers of total operations in 1990 (259,632) and 2011 (127,632), this resulted in an annual average growth rate of -2.4 percent. This growth rate is similar to the growth rate between 2001 and 2011 (-2.9%).

In this scenario, total aircraft operations are expected to decrease to 76,881. This is approximately 51,747 fewer operations than in 2012. This is a 41 percent reduction in activity levels.

Medium Growth Forecast

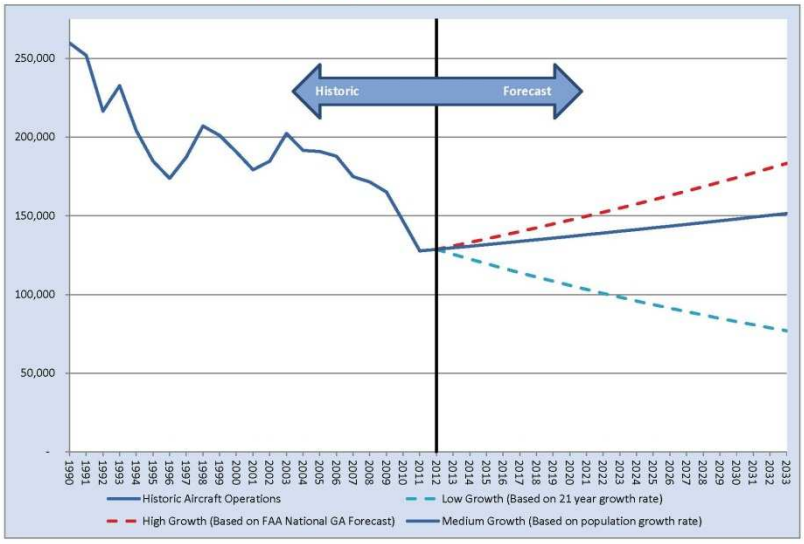
The medium growth forecast scenario assumes that the number of total operations will grow at a rate similar to the population growth rate in MOA. According to ISER, the population in the MOA is expected to grow by 0.78 percent annually between 2010 and 2035.

In this scenario, total aircraft operations are expected to increase to 151,424 by 2033.This is an increase of 22,797 operations, representing an 18 percent increase over the next 20 years.

High Growth Forecast

This forecast scenario assumes the number of annual operations at MRI would grow at a rate equal to the FAA nationwide forecast for GA hours flown (1.7%). The FAA nationwide forecast was obtained from *Table 29* Active General Aviation and Air Taxi Hours Flown as part of the FAA publication *Aerospace Forecast Fiscal Years 2012–2032*. The FAA growth rate was taken from *Table 29* and is the actual FAA year to year percent change. The average annual growth for this scenario is 1.7 percent.

Figure 3–13 MRI Operations Forecast Scenarios, 2013–2033



In this scenario, operations would increase to 183,263 in 2032. This is an increase of 54,635 operations (43%) from 2012 levels.

3.8.1.3 Enplanements

The three enplanement scenarios use a base year estimate of 14,261.[5] The results of each forecast are summarized in Table 3–14 and Figure 3–14. Each forecast is discussed in more detail below.

Table 3–14 MRI Enplanement Forecast Scenarios, 2013–2033

Year	Low Growth (-2.4%)	Medium Growth (0.78%)	High Growth (3.5%)
2013	13,919	14,372	14,759
2018	12,327	14,942	17,520
2023	10,917	15,533	20,797
2028	9,668	16,149	24,688
2033	8,562	16,789	29,307

[5] The base year estimate was derived by adjusting the preliminary 2011 ACAIS enplanement figure to 2012 following the medium growth methodology.

Low Growth Forecast

The low growth forecast assumes the number of enplanements varies at same rate of change as the number of total aircraft operations at MRI between 1991 and 2011 (an annual average growth rate of -2.4%).

In this scenario, total enplanements are expected to decrease to 8,562 by 2033. This is a decrease of 5,699 enplanements representing a 40 percent decrease over the next 20 years.

Medium Growth Forecast

The medium growth forecast scenario assumes that the number of total enplanements will grow at a rate similar to the population growth rate in MOA. According to ISER, the population in the MOA is expected to grow by 0.78 percent annually between 2010 and 2035.

In this scenario, total enplanements are expected to increase to 16,789 by 2033.This is an increase of 22,797 enplanements representing an 18 percent increase over the next 20 years.

High Growth Forecast

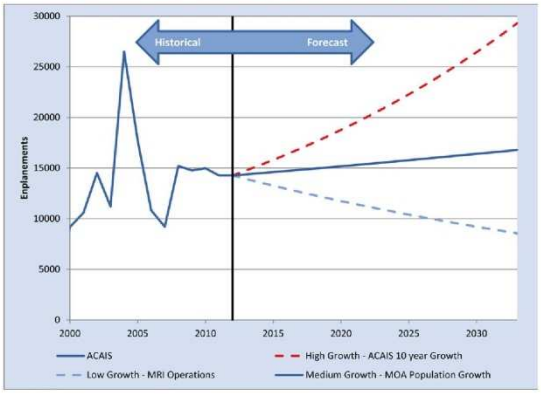
The high growth forecast scenario assumes that the number of enplanements will change at a rate similar to the change in ACAIS enplanements between 2001 and 2011. Using the numbers of ACAIS enplanements in 2001 (10,572) and 2011 (14,261), this resulted in an annual average growth rate of 3.5 percent.

In this scenario, the number of enplanements is expected to increase to 15,046 by 2033 representing a 106 percent increase over the next 20 years.

3.8.1.4 Air Taxi Activity

Based on the interviews conducted as part of the AMP Update, air taxi activity is likely to remain relatively constant at approximately 10 percent of total operations.

Figure 3–14 Merrill Field Historical and Forecasted Enplanements



3.8.1.5 Local/Itinerant Operations

Based on stakeholder interviews, the number of local operations (which are typically associated with flight training) are difficult to forecast. If economic conditions remain the same, stakeholders felt that that training activity would increase which would increase the percentage of local operations at MRI. If economic conditions improve, then MRI could see an increase in training related activity.

For this assessment, it was assumed that the percentage of local operations at MRI would remain at approximately 46.5 percent of total operations.

3.8.1.6 Gravel/Ski Runway Operations

Based on the interviews conducted as part of the AMP Update, no significant changes to the fleet mix are anticipated. As a result, usage of the gravel/ski strip is expected to remain

at approximately 2 percent of total operations.

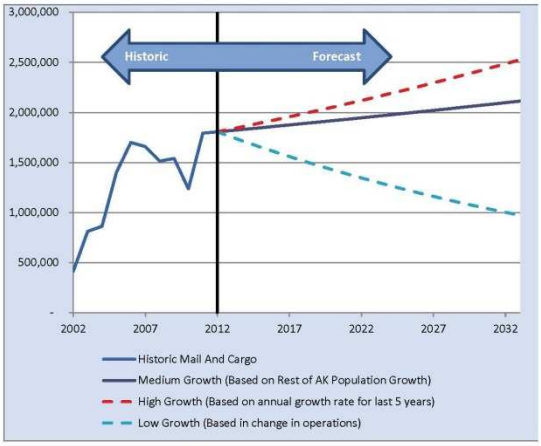
3.8.1.7 Mail/Cargo Operations

Historical records of air cargo and mail activity at MRI are limited. Based on discussions related to mail/cargo, there appears to be a shift from mail to cargo. Over the last 5 years, outgoing cargo has increased by 11 percent, while outgoing mail has decreased by approximately 26 percent. Overall, the amount of mail/cargo going through MRI has increased though. This trend is likely to continue as on-line shopping continues to increase in popularity. Goods ordered on-line are often shipped via FedEx or UPS, which are counted as cargo. In addition, cargo is likely to continue increasing due to oil and gas exploration in the state.

Currently, approximately 83 percent of mail/cargo is enplaned (flown from MRI) and approximately 17 percent is deplaned (flown to MRI).

The total amount of air cargo and mail (both enplaned and deplaned) is forecast to increase from an estimated 1.8 million pounds to 2.1 million pounds in 2033.

Figure 3–15 Merrill Field Historic and Forecast Mail and Cargo



3.8.1.8 Helicopter Operations

Helicopter operations are included as part of the general aviation operations and are not recorded separately by the FAA. Published information about the percentage of existing operations that are helicopters was not available for this forecast. However, stakeholders have indicated that helicopter operations have increased over the past few months and sometimes exceed the number of fixed wing aircraft operations. In the future, the number of helicopter operations is expected to vary based on resource exploration activity, private helicopter ownership, the availability of funding for training purposes (such as the G.I. Bill), and interest in civilian training.

3.8.1.9 Annual Airport Instrument Operations

Between 1990 and 2011, approximately 2 percent of all itinerant operations were IFR operations. During that time frame, the percent of IFR operations ranged from a low of 1.2 percent to a high of 8.5 percent. The fleet mix is not expected to change significantly during the next 20 years so IFR operations are likely to be approximately 2 percent of itinerant operations. Another reason the number of IFR operations is also unlikely to change is because pilots have experienced trouble obtaining timely clearances for departure.

3.8.1.10 Peak Hour Aviation Activity

The peak hour forecast is intended for use in the demand-capacity analysis and in determining requirements for future airport facilities. Based on FAA Air Traffic Control Tower records between 2005 and 2011, about 11 percent of the annual aircraft operations occur in June, which is typically the peak month. Peak hour operations are assumed to remain at approximately 11.5 percent of the average daily operations in the peak month. Assuming the same percentages in the future, peak hour operations will increase from 1,640 in 2013 to 1,916 in 2033 (Table 3–15). The number of peak hour operations per day is expected to increase from 4.5 in 2012 to 5.2 in 2033.

3.8.1.11 Operations per Based Aircraft

Operations per based aircraft are expected to increase from 156 operations in 2012 to 161 in 2033, as shown in Table 3–15.

Figure 3–16 Merrill Field Operations per Based Aircraft

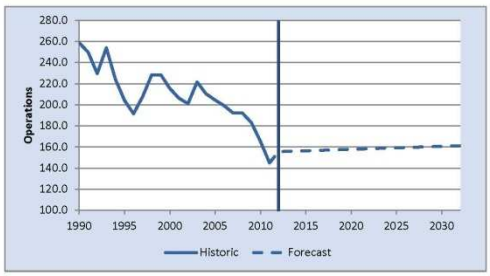


Table 3–15 MRI 20-Year Air Traffic Forecast Levels and Growth Rates

	Base Year		Forecast				Average Annual Compound Growth Rates				
	2012	Base Year +1 (2013)	Base Year +5 (2018)	Base Year +10 (2023)	Base Year +15 (2028)	Base Year +20 (2033)	Base Year +1 (2013)	Base Year +5 (2018)	Base Year +10 (2023)	Base Year +15 (2028)	Base Year +20 (2033)
Annual Enplanements	14,261	14,372	14,942	15,533	16,149	16,789	0.8%	0.9%	0.9%	0.8%	0.8%
Air Cargo and Mail	1,729,987	1,819,983	1,889,253	1,961,182	2,035,837	2,113,335	1.5%	1.1%	0.9%	0.9%	0.8%
Based Aircraft											
Single Engine	744	749	770	790	812	835	0.6%	0.7%	0.6%	0.6%	0.6%
Multi Engine	50	50	51	53	55	56	0.0%	0.4%	0.6%	0.6%	0.6%
Helicopter	33	33	36	40	43	47	0.8%	2.0%	1.9%	1.8%	1.8%
Total Based Aircraft	827	832	857	883	910	938	0.6%	0.7%	0.7%	0.6%	0.6%
Aircraft Operations											
Air Taxi	12,863	12,963	13,477	14,010	14,565	15,142	0.8%	0.9%	0.9%	0.8%	0.8%
Local General Aviation	59,812	60,278	62,666	65,148	67,729	70,412	0.8%	0.9%	0.9%	0.8%	0.8%
Itinerant General Aviation	68,816	69,353	72,100	74,956	77,925	81,012	0.8%	0.9%	0.9%	0.8%	0.8%
Gravel/Ski	2,573	2,593	2,695	2,802	2,913	3,028	0.8%	0.9%	0.9%	0.8%	0.8%
Total Aircraft Operations	128,628	129,631	134,766	140,104	145,654	151,424	0.8%	0.9%	0.9%	0.8%	0.8%
Annual Instrument Operations	2,573	2,593	2,695	2,802	2,913	3,028	0.8%	0.9%	0.9%	0.8%	0.8%
Peak Hour Operations	1,627	1,640	1,705	1,772	1,843	1,916	0.8%	0.9%	0.9%	0.8%	0.8%
Operations per Based Aircraft	156	156	157	159	160	161	0.3%	0.2%	0.2%	0.2%	0.2%

3.9 Step 6 – Compare Forecast Results with FAA's Terminal Area Forecast

FAA AC 150/5070-6B (May 2007) recommends the forecast results be compared with those contained in the most recent TAF. To facilitate this, FAA recommends using the template found in Appendix C of the document titled *Forecasting Aviation Activity by Airport* (FAA 2001).

The most recent TAF indicates there were 965 based aircraft and 136,691 operations at MRI in 2011 (Table 3-32). Based on actual based aircraft counts and FAA Tower Count Records, the TAF appears to overestimate the number of based aircraft. The TAF appears to slightly underestimate the number of total operations for 2011 but has a similar estimate of operations for 2012. This indicates that the TAF is likely to be similar to the actual conditions at MRI.

3.10 Step 7 - Obtain Forecast Approval

The FAA is responsible for reviewing aviation forecasts that are submitted to the administration in conjunction with airport planning activities including AMPS. FAA reviews these forecasts with the purpose of including them in the TAF and the NPIAS. The forecasts are also an important input in the benefit-cost analysis associated with airport development. FAA reviews the BCA when evaluating funding requests.

The forecasts are to be realistic, based on the latest available information, reflect the existing airport conditions, be supported by information in the study, and provide a reasonable justification for airport planning and development.

While the forecast is a method to develop quantifiable results, forecasters need to use professional judgment to determine what is reasonable as recommended in AC

Table 3–16 Comparision of Airport Operations Forecast to TAF

	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Base year	2013	129,631	128,595	0.8%
Base year + 5 years	2018	134,766	131,503	2.5%
Base year + 10 years	2023	140,104	134,470	4.2%
Base year + 15 years	2028	145,654	137,508	5.9%
Base year + 20 years	2033	151,424	140,616	7.7%

150/5070-7, The Airport System Planning Process, paragraph 506.

As MRI is a non-hub commercial service airport, generally the FAA will find a forecast acceptable if the 5-year forecast is within 10 percent of the TAF and within 15 percent in the 10-year period (AC 150/5070-6B, section 704. If the forecast exceeds the TAF by more than 10 percent and is considered valid by the FAA when they complete their review, the forecast will be incorporated into the TAF and NPIAS.

The project team believes the forecast presented here is a realistic outlook based on the existing information and reflects the existing conditions at MRI. The medium growth scenarios are within 10 percent of the TAF, so additional consultation with FAA to review the results prior to the forecast being submitted was not required. To ensure the accuracy of the forecast, the forecast was reviewed by representatives of MRI and the AMP's advisory committee prior to it being submitted to the FAA for approval.

FAA Approval of Forecast, Email June 18, 2013

From: Mike.Edelmann@faa.gov [mailto:Mike.Edelmann@faa.gov]
Sent: Tuesday, June 18, 2013 2:27 PM
To: Jumao-as, Alex B.; Bowers, Paul D.
Cc: McPherson, John; Cummings, Laurie; Mike.Edelmann@faa.gov
Subject: re: AIP-54 - FAA Comments on Forecast Chapter -- FAA Approval

Paul, Alex, et al:

The FAA has reviewed the aviation forecast as presented in the March 2013 Draft Merrill Field Master Plan Update and Noise Study and has no comments on the forecast as written.

The FAA approves the forecast as presented. Please proceed to the next phases of the master plan update and noise study.

If there are any questions or comments on the above, please feel free to give me a call at the number below.

Thank you;
Mike E.
907-271-5026

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Appendix F Nonstandard Modeling Substitution Request Letter

MUNICIPALITY OF ANCHORAGE

Merrill Field Airport Ph. 907-343-6303

Mayor Dan Sullivan

July 16, 2012

Ms. Patti Sullivan
Environmental Manager
Federal Aviation Administration
Alaskan Region Airports Division (AAL-600)
222 W. 7th Avenue, M/S #14
Anchorage, AK 99513

Subject: Request for INM 7.0c Aircraft Type Substitutions

Reference: Merrill Field Airport Part 150 NEM Update – AIP No. 3-02-0015-054-2011

Dear Ms. Sullivan:

As part of the Part 150 Noise Exposure Map (NEM) Update for Merrill Field Airport (MRI), our consultant, Harris Miller Miller & Hanson Inc. (HMMH), has identified several aircraft operating at MRI that are not included in the database of Version 7.0c of the Integrated Noise Model (INM). An effort has been made to identify appropriate INM substitutes for these aircraft types in the attachment to this letter. Each aircraft is listed with a proposed substitute INM standard aircraft along with a short description or rationale for selecting this aircraft type for modeling.

Consistent with Federal Aviation Administration (FAA) policies and procedures, the Airport requests the FAA review and approve the proposed INM substitutions provided on the attached list. I understand this request will be forwarded ultimately to the FAA Office of Environment and Energy, Noise Division (AEE-100) for review and approval.

Please contact me if you have any questions. If you or AEE-100 have technical questions in regards to the proposed substitutions, I recommend contacting Robert Behr at HMMH directly to expedite the approval process. Mr. Behr's phone number is (916) 368-0707 x2226 and his email is rbehr@hmmh.com.

Thank you for your assistance.

Sincerely yours,

for David Lundeby
Airport Manager
Merrill Field Airport

Attachment:

Request for INM Aircraft Type Substitutions - MRI NEM Update 2012, dated July 16, 2012

g:\merrill field\grants\aip 54_2011 master plan phase 1\correspondence\faa\faa a_c substitution ltr_071612.doc

800 Merrill Field Drive • Anchorage, AK 99501-4129 • http://www.muni.org

HARRIS MILLER MILLER & HANSON INC.
8880 Cal Center Drive, Suite 430
Sacramento, California 95826
T 916.368.0707
F 916.368.1201
www.hmmh.com

MEMORANDUM

To: Mr. David Lundeby
Airport Manager, Merril Field Airport
800 Merrill Field Drive
Anchorage, AK 99501-4129

Mr. John McPherson
HDR Alaska
2525 C Street, Suite 305
Anchorage, AK 99503-2632

From: Robert Behr
Senior Consultant

Date: July 16, 2012

Subject: Request for INM Aircraft Type Substitutions - MRI NEM Update 2012

Reference: HMMH Job No.305320.000

The purpose of this memorandum is to provide a recommended list of aircraft substitutions for modeling aircraft operations at Merrill Field Airport (MRI) using the FAA's Integrated Noise Model version 7.0c to prepare the Noise Exposure Map (NEM) Update. During our review of existing and forecast operations at MRI, we have determined a number of aircraft types that are currently not represented within the INM 7.0c database.

Consistent with FAA policies and procedures, the Airport needs to request the FAA review and approve the proposed INM substitutions prior to generating the noise exposure contours for the NEM Update. Our experience indicates that ultimately the substitution request will be forwarded to the FAA Office of Environment and Energy, Noise Division (AEE-100) for review and approval. Based on our conversation with Ms. Patti Sullivan, Lead Environmental Manager, we recommend you submit the substitution request through her at the FAA's Alaska Region Office-Airports Division.

The recommended INM aircraft substitutions are provided on the following pages. Each aircraft is listed with a proposed substitute INM standard aircraft along with a short description or rationale for selecting this aircraft type.

HARRIS MILLER MILLER & HANSON INC.

Request for INM Aircraft Type Substitutions - MRI NEM Update 2012
July 16, 2012
Page 3

1. Grumman G-44

We propose to model the Grumman G-44 Widgeon with the INM Type BEC58P.

The G-44 Widgeon is a twin-engine piston propeller aircraft designed for amphibious operations. Powered by Continental IO-470 series engines, the G-44 would be best modeled with the BEC55 which has the standard INM substitution of the BEC58P.

2. Cubcrafters CC-11-160

We propose to model the Cubcrafters Carbon Cub with the INM Type CNA172.

The Carbon Cub is a single-engine aircraft powered by a Continental O-200A engine similar to that used on the Cessna 150. The CNA172 is the INM substitution aircraft for the Cessna 150.

3. Cessna 162

We propose to model the Cessna 162 Skycatcher with the INM Type CNA172.

The Cessna 162 Skycatcher is a single-engine Cessna aircraft with a Continental O-200D engine which is similar to that in the Cessna 150. The CNA172 is the INM substitution aircraft for the Cessna 150.

4. Cessna A188B

We propose to model the Cessna A188B AGWagon with the INM Type CNA206.

The Cessna A188B AGWagon is a single-engine propeller aircraft powered by a Continental IO-520D engine rated at 285 hp. The engine is the same or very similar to the engine on the Cessna 185. The Cessna 185 has a standard INM substitution of the CNA206.

5. Maule Aircraft Variants (M-4-210C/220C, M-5-210C/235C, M-6-235)

We propose to model these Maule variants with the INM type M7235C.

The M7235C is the INM standard aircraft type for the Maule M-7-235C which is similar in maximum gross takeoff and landing weights (2,500 pounds), engine type (Lycoming o-540 -J1A5D, and variable pitch propeller type with the M-5 and M-6 variants. The flyover noise level for these aircraft are also comparable (in the range of 72.6 - 74.7) based on Advisory Circular (AC) 36-1H, Appendix 7 (11/15/2001) [1]. The M-4 variants have engine types similar to the M-5 -180C model which has a comparable flyover noise level of 72.3 dB.

6. Lake LA-250

We propose to model the Lake LA-250 Renegade with the INM Type CNA182FLT.

The LA-250 is a single-engine piston propeller amphibious aircraft with the engine mounted above the center of the fuselage. The engine is a variant of the Lycoming IO-540 series similar to the engine on the Cessna 182S with amphibious floats which is the standard INM aircraft type CNA182FLT.

[1] http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2036-1H.pdf, Appendix 7 (November 15, 2001).

7. Enstrom F-28F

We propose to model the Enstrom F-28F helicopter with the INM Type SC300C.

The Enstrom F-28F Falcon is a small, lightweight helicopter powered by a Lycoming HIO-360 series piston engine. The Schweizer 300C (INM standard aircraft SC300C) is a few pounds lighter with a similar Lycoming engine.

8. Cessna 120/140

We propose to model the Cessna 120/140 operations with INM type GASEPF.

These aircraft are both single-engine propeller aircraft that preceded the Cessna 150. Both aircraft have the Continental C-85 or -90 piston engines. The Cessna 150 has a slightly more powerful engine, Continental O-200.

9. Bellanca 7GCBC

We propose to model the Bellanca 7GCBC with the INM Type GASEPF.

This single-engine propeller aircraft is a version of the Champion Citabria aircraft which was acquired by Bellanca. The aircraft is powered by Lycoming O-320 engine with fixed-pitch propeller. The Bellanca Champuion Citabria (BLCH10) has the GASEPF as an INM standard substitution.

10. Aeronca 7AC, 11BC, 15AC

We propose to model the Aeronca 7AC Champion, 11BC Chief, and 15AC Sedan aircraft with the INM Type GASEPF.

All three aircraft have fixed-pitch propellers. The Champion and Chief both have 65 hp Continental A-65-8 engines and MTOW of approximately 1,200 pounds. The Sedan has a 145 hp Continental 145-2 engine with a MTOW of approximately 2,000 pounds.

11. Piper PA11, PA12, and PA14

We propose to model the Piper PA11 Cub, Piper PA12 Super Cruiser, and Piper PA14 Family Cruiser with the INM Type GASEPF.

The Piper Cub is a single-engine piston aircraft powered by a Continental A65-series engine rated at 65 hp. MTOW is approximately 1,200 pounds. The Piper Super Cruiser has a single engine Lycoming 235-series rated at 100 hp and MTOW approximately 1,750 pounds. The Piper Family Cruiser is slightly larger than the Super Cruiser in rated hp (115) and MTOW (1,850 pounds).

12. Piper PA20

We propose to model the Piper PA20 Pacer with the INM Type GASEPF.

The Piper Pacer is a variant of the Piper PA17 Vagabond with a Lycoming O-290-series engine. The PA17 is mapped to the GASEPF INM type.

13. Stinson 108-3

We propose to model the Stinson 108-3 with the INM Type GASEPF.

The Stinson 108-3 is a variant of the Stinson 108 single-engine propeller aircraft. It is powered by a Franklin 6A4 engine rated at 165 hp.

14. Luscombe 8F

We propose to model the Luscombe 8F Silvaire with the INM Type GASEPF.

The Luscombe 8F Silvaire is a single-engine propeller aircraft powered by a Continental C90 engine rated at 90 hp. It has a two-bladed fixed-pitch propeller.

15. Republic RC-3

We propose to model the Republic RC-3 Seabee with the INM Type GASEPF.

The republic RC-3 Seabee is a single engine propeller aircraft where the propeller is mounted above the fuselage allowing the aircraft to operate in amphibious mode. The engine is a Lycoming GO-480 series powerplant.

16. Interstate S-1B1

We propose to model the Interstate Cadet with the INM Type GASEPF.

The Interstate Cadet is a single-engine aircraft powered by the Lycoming O-320 engine (per N-number registration). With the similar engine type as the Bellanca 7GCBC, the GASEPF provides the best representation for this aircraft type.

17. Diamond DA-20

We propose to model the Diamond DA-20 with the INM Type GASEPF.

The Diamond DA-20 is a single-engine propeller aircraft powered by a Continental IO-240 series engine with a fixed-pitch propeller.

18. Grumman AA-1B

We propose to model the Grumman AA-1B Trainer with the INM Type GASEPF.

The AA-1B is a down-sized version of the Grumman/Gulfstream AA-5A Cheetah which has the standard INM substitution of the GASEPF.

19. Cessna 195

We propose to model the Cessna 195 operations with INM type GASEPV.

The Cessna 195 is a single-engine propeller aircraft with a 300 hp Jacobs R-755-A2 radial engine with a two-bladed constant speed propeller. This aircraft has a radial engine similar to the T-6 Texan which has the GASEPV as the INM standard substitution.

20. Bellanca 8GCBC

We propose to model the Bellanca 7GCBC with the INM Type GASEPV.

This single-engine propeller aircraft is a version of the Champion Scout aircraft which was acquired by Bellanca. The aircraft is powered by Lycoming O-360 engine with either a fixed-pitch or constant speed propeller. As it is uncertain which propeller type is in use at MRI, it was decided to be conservative and use the GASEPV INM aircraft type.

21. Ryan Navion A

We propose to model the Ryan Navion A with the INM Type GASEPV.

The single-engine Navion A aircraft is a civil variant of the military L-17. The aircraft is powered by a 285 hp Continental E-185 engine. It is unknown if the propeller is constant speed or fixed-pitch so assumed the GASEPV would best represent this aircraft type.

22. Vultee/Hops Stinson L-13A

We propose to model the Vultee/Hops Stinson L-13A with the INM Type GASEPV.

The L-13Ais powered by a single Lycoming R680 engine rated at 250 hp. With a MTOW of approximately 3,200 pounds and large engine, the GASEPV is the best representation for this aircraft type.

23. Howard DGA-15P

We propose to model the Howard DGA-15P with the INM Type GASEPV.

The DGA-15P is a single-engine propeller aircraft with a 450 hp Jacobs R-985 radial engine. This aircraft has a radial engine similar to the T-6 Texan which has the GASEPV as the INM standard substitution.

24. Aviat A-1B

We propose to model the Aviat A-1B Husky with the INM Type GASEPV.

The Aviat A-1B Husky is a single-engine propeller aircraft powered by a Lycoming O&OV -360 series engine with a two-bladed, constant speed propeller.

25. Harvard MK IV

We propose to model the Harvard MK IV with the INM Type GASEPV.

The Harvard MK IV is the Royal Air Force version of the AT-6 Texan. The T-6 Texan has a standard INM substitution of the GASEPV.

26. Diamond DA-40

We propose to model the Diamond DA-40 Diamond Star with the INM Type GASEPV.

The Diamond DA-40 is a single-engine propeller aircraft powered by a Continental IO-360 engine. For the Nashville Part 150 study, the GASEPV was approved as the INM substitute aircraft.

27. Helio Courier H-250/295

We propose to model the Helio Courier with the INM Type GASEPV.

The Helio Courier is a single-engine piston propeller aircraft with various engine types. The H-250 has the Lycoming O-540-A1A5 which is similar to that in the Rockwell Commander 114. The Rockwell Commander 114 has a standard INM substitution of GASEPV.

28. Various Kit Aircraft (e.g., Prostar PT-2, Ace Baby Ace, Thorp T-18, Lancair Legacy, Rutan Long-EZ, VAN's RV-6 and RV-7, Cirrus, SR-20, other Amateur Built Experimental)

We propose to model these kit aircraft types with the INM type GASEPV.

These aircraft types have a variety of different engine options and, as such, are difficult to characterize without having detailed specifications of the actual aircraft flying at MRI. Therefore, a conservative grouping of these types with the GASEPV INM aircraft type is made.

Appendix G FAA Record of Approval of Nonstandard Modeling Substitutions

U.S. Department of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

Date: August 28, 2012

Ms. Patti Sullivan
Environmental Manager
Alaskan Region Airports Division (AAL-600)
Federal Aviation Administration

Dear Ms. Sullivan:

The Office of Environment and Energy (AEE) has received your email dated July 20, 2012, requesting approval of modeling 28 aircraft/groups using surrogate aircraft in the Integrated Noise Model (INM). This request is to evaluate noise in support of the Part 150 Noise Exposure Map (NEM) update for Merrill Field Airport (MRI).

Harris Miller Miller & Hanson Inc. (HMMH) has assisted in the noise analysis. HMMH proposed an INM aircraft as surrogate for each of the 28 aircraft/groups that does not have a standard INM substitution.

AEE concurs with all but two of the proposed aircraft substitutions. In modeling the Grumman G-44 Widgeon which is designed for amphibious operations, AEE recommends that the Cessna 182 float plane, CNA182FLT, be used instead of the BEC58P as proposed. In modeling the Maule aircraft variants, AEE recommends that the COMSEP be used instead of the M7235C as proposed. Although the M7235 is currently listed in the INM, its database is limited to over-flight only. AEE concurs with all other proposed aircraft substitutions.

Please understand that this approval is limited to this project at MRI. Any additional projects or non-standard aircraft substitution will require separate approval.

Sincerely,

Rebecca Cointin, Manager of AEE-100/Noise Division

cc: Jim Byers (APP-400)

Attachment – Aircraft types and proposed substitutions for MRI Part 150 NEM update.

#	AC name	AC sub proposed	AEE review
1	Grumman G-44	BEC58P	**CNA182FLT**
2	Cubcrafters CC-11-160	CNA172	Concur
3	Cessna 162	CNA172	Concur
4	Cesnna A188B	CNA206	Concur
5	Maule Aircraft Variants	M7235C	**COMSEP**
6	Lake LA-250	CNA182FLT	Concur
7	Enstrom F-28F	SC300C	Concur
8	Cessna 120/140	GASEPF	Concur
9	Bellanca 7GCBC	GASEPF	Concur
10	Aeronca 7AC, 11BC, 15 AC	GASEPF	Concur
11	Piper PA11, PA12, PA14	GASEPF	Concur
12	Piper 20	GASEPF	Concur
13	Stinson 108-3	GASEPF	Concur
14	Luscombe 8F	GASEPF	Concur
15	Republic RC-3	GASEPF	Concur
16	Interstate S-1B1	GASEPF	Concur
17	Diamond DA-20	GASEPF	Concur
18	Grumman AA-1B	GASEPF	Concur
19	Cessna 195	GASEPV	Concur
20	Bellanca 8GCBC	GASEPV	Concur
21	Ryan Naviation A	GASEPV	Concur
22	Vultee/Hops Stinson L-13A	GASEPV	Concur
23	Howard DGA-15P	GASEPV	Concur
24	Aviat A-1B	GASEPV	Concur
25	Harvard MK IV	GASEPV	Concur
26	Diamond DA-40	GASEPV	Concur
27	Helio Courier H-250/295	GASEPV	Concur
28	Various Kit Aircraft	GASEPV	Concur

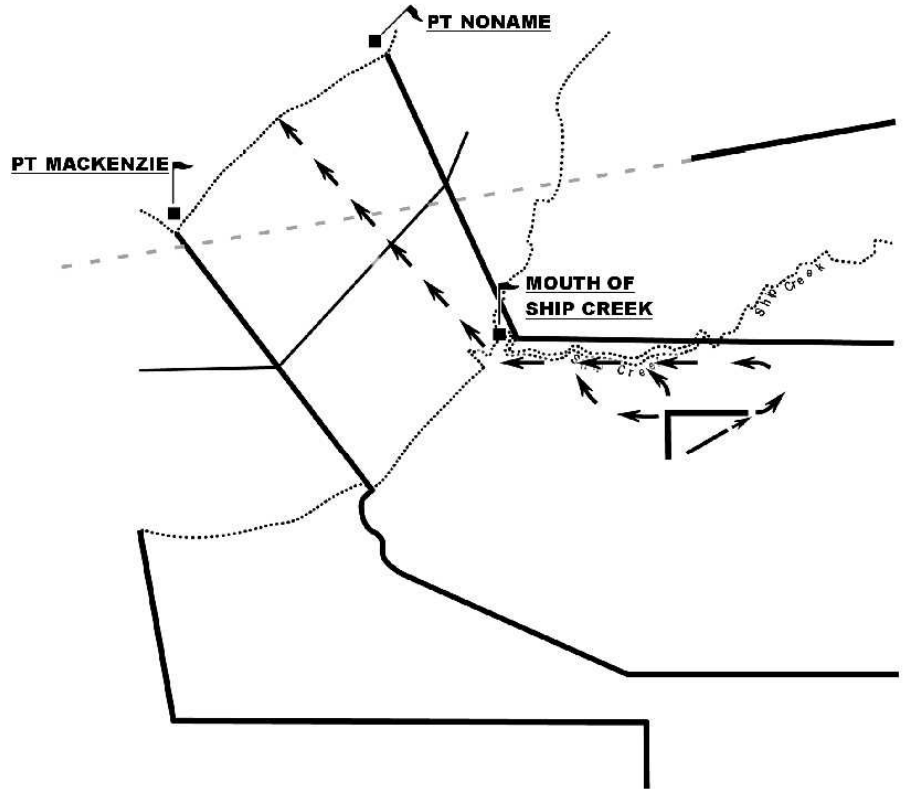
Appendix H Flight Track Routes and Procedures

The following figures represent the Visual Flight Rules (VFR) departure, arrival, and traffic pattern procedures used for aircraft operating at MRI. These are not to be used for navigation but represent the general routes for arriving and departing MRI. These depictions, visual observations, and discussions with the FAA, MRI staff, and the public were all used in developing the various flight tracks for input into the noise modeling process. References on these diagrams to Runway 4 and 22 refer to the designated Runways 5 and 23, respectively, due to updated changes to magnetic variation at MRI.

ANCHORAGE, ALASKA	VFR DEPARTURE PROCEDURE	**SHIP CREEK DEPARTURE** MERRILL FIELD

ROUTE PURPOSE:
The SHIP CREEK DEPARTURE is for aircraft departing Merrill Field to the west and northwest.

ATIS	GROUND CONTROL	MERRILL TOWER	DEPARTURE CONTROL
124.25	**121.7**	**126.0**	**119.1**



VFR PROCEDURE ONLY
CHART NOT TO SCALE -- NOT TO BE USED FOR NAVIGATION
MODE C TRANSPONDER REQUIRED IF AT OR ABOVE 1,400' MSL

ROUTE INSTRUCTIONS:

ALL AIRCRAFT: Cross Knik Arm at or below 600' MSL or at or above 2,200' MSL, except maintain at or below 2,500' MSL unless authorized by ATC. (If unable 2,200' MSL by mid-channel, advise ATC.) Remain within Merrill Class D airspace.

RUNWAY 25: Turn right, follow Ship Creek.

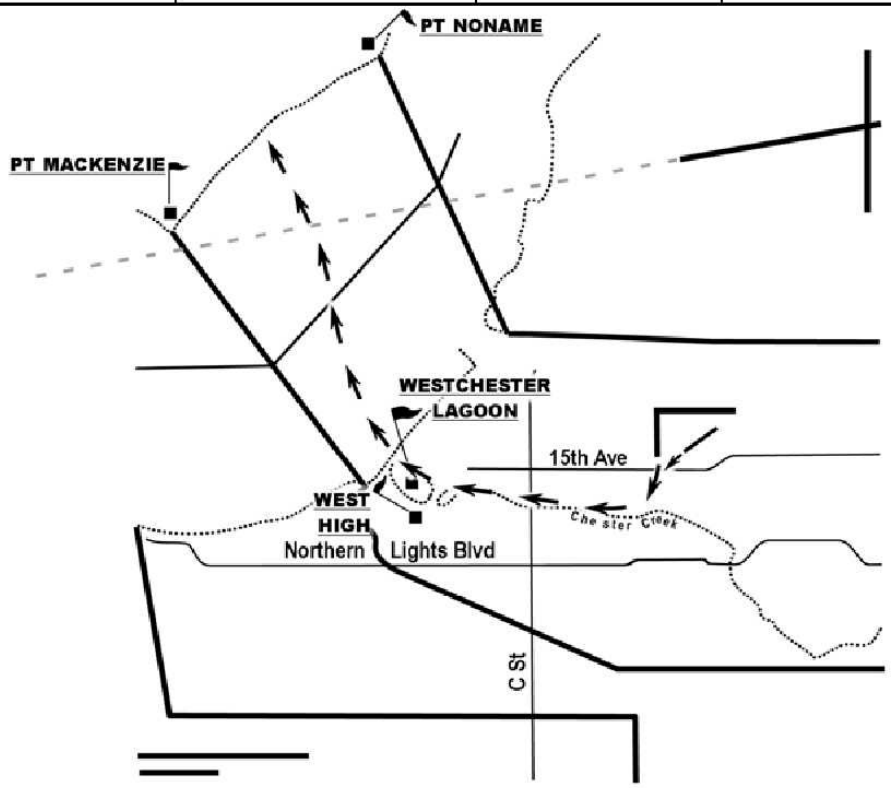
RUNWAY 4 or 7 or 34: Turn left, follow Ship Creek.

Go to www.alaska.faa.gov/ata for more information.

ANCHORAGE, ALASKA	VFR DEPARTURE PROCEDURE	**CHESTER CREEK DEPARTURE RUNWAYS 16 & 22** MERRILL FIELD

ROUTE PURPOSE: The CHESTER CREEK DEPARTURE is for aircraft departing Merrill Field to the west and northwest at or below 600' MSL. Pilots who intend to cross Knik Arm at or above 2,000' MSL must either obtain approval from ATC or request the CITY HIGH DEPARTURE.

ATIS	GROUND CONTROL	MERRILL TOWER	DEPARTURE CONTROL
124.25	**121.7**	**126.0**	**119.1**



VFR PROCEDURE ONLY
CHART NOT TO SCALE -- NOT TO BE USED FOR NAVIGATION

ROUTE INSTRUCTIONS:

ALL AIRCRAFT: Cross Knik Arm at or below 600' MSL in accordance with 14 CFR Part 93.

RUNWAY 16: Proceed to and turn right over Chester Creek. Follow the creek to Westchester Lagoon.

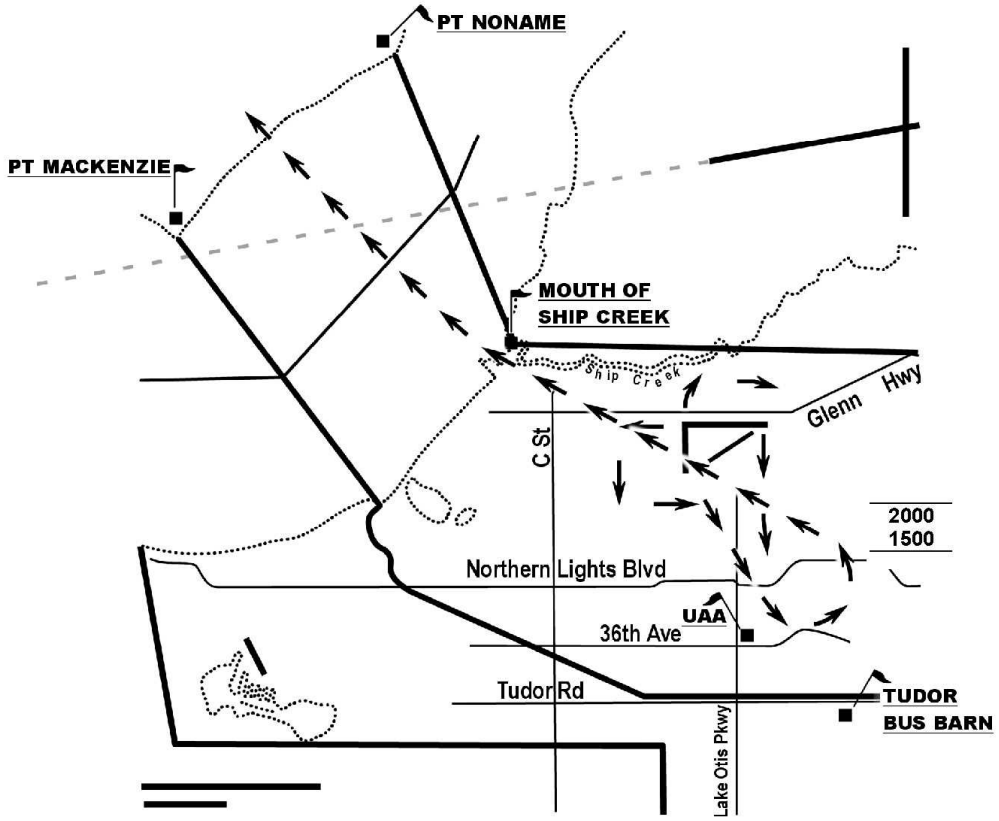
RUNWAY 22: Turn left to Chester Creek. Follow the creek to Westchester Lagoon.

Go to: www.alaska.faa.gov/ata for more information.

ANCHORAGE, ALASKA	VFR DEPARTURE PROCEDURE	**CITY HIGH DEPARTURE** **RUNWAYS 25 & 34** **MERRILL FIELD**

ROUTE PURPOSE:
The City High Departure is for aircraft departing Merrill Field to the west and northwest at or above 2,000' MSL.

ATIS	GROUND CONTROL	MERRILL TOWER	DEPARTURE CONTROL
124.25	**121.7**	**126.0**	**119.1**



VFR PROCEDURE ONLY
CHART NOT TO SCALE -- NOT TO BE USED FOR NAVIGATION
MODE C TRANSPONDER REQUIRED

ROUTE INSTRUCTIONS:

ALL AIRCRAFT: Cross Knik Arm at or above 2,200' MSL, except maintain at or below 2,500' MSL unless authorized by ATC. (If unable 2,200' MSL by mid-channel, advise ATC.) Remain within Merrill Class D airspace.

RUNWAY 25: Depart via left downwind. After passing centerline of Runway 34, turn right southeast bound then**...**

RUNWAY 34: Depart via right downwind. Climb southbound then**...**

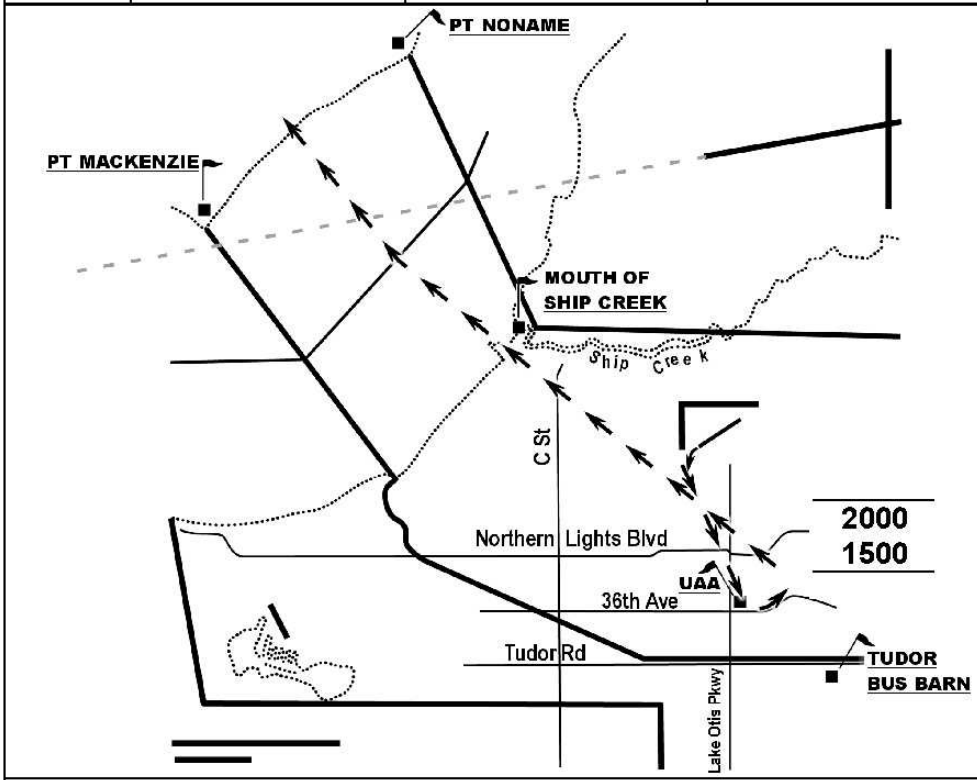
...crossing Northern Lights Blvd turn left northwest bound. Cross Northern Lights Blvd northwest bound between 1,500' and 2,000' MSL. Proceed direct to the mouth of Ship Creek.

Go to www.alaska.faa.gov/ata for more information.

ANCHORAGE, ALASKA	VFR DEPARTURE PROCEDURE	CITY HIGH DEPARTURE RUNWAYS 16 & 22 MERRILL FIELD

ROUTE PURPOSE:
The City High Departure is for aircraft departing Merrill Field to the west and northwest at or above 2,000' MSL.

ATIS	GROUND CONTROL	MERRILL TOWER	DEPARTURE CONTROL
124.25	121.7	126.0	119.1



VFR PROCEDURE ONLY
CHART NOT TO SCALE -- NOT TO BE USED FOR NAVIGATION
MODE C TRANSPONDER REQUIRED

ROUTE INSTRUCTIONS:

ALL AIRCRAFT: Cross Knik Arm at or above 2,200' MSL, except maintain at or below 2,500' MSL unless authorized by ATC. (If unable 2,200' MSL by mid-channel, advise ATC.) Remain within Merrill Class D airspace.

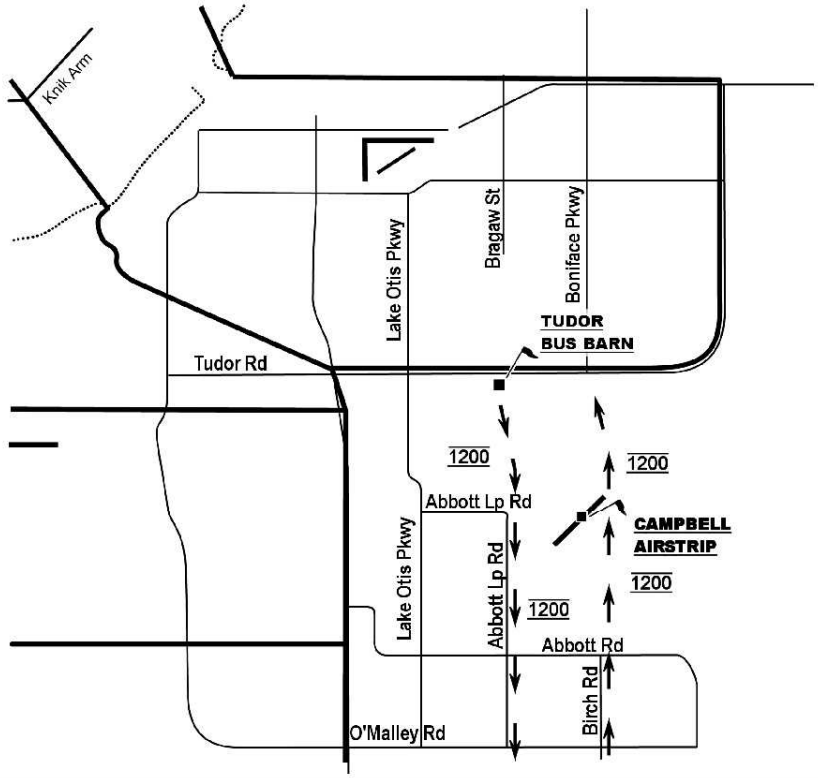
RUNWAY 16 or 22: Turn left and proceed direct to the University of Alaska (UAA). Remain below 700' MSL until south of Northern Lights Blvd. After UAA, climb and turn northwest bound. Cross Northern Lights Blvd northwest bound between 1,500' and 2,000' MSL. Proceed direct to the mouth of Ship Creek.

Go to www.alaska.faa.gov/ata for more information.

ANCHORAGE, ALASKA	VFR ARRIVAL / DEPARTURE PROCEDURE	CAMPBELL ARRIVAL / DEPARTURE MERRILL FIELD

ROUTE PURPOSE:
The CAMPBELL ARRIVAL/DEPARTURE is for aircraft operating to or from Merrill Field from the south. This route significantly reduces the potential for wake turbulence encounters from large and heavy aircraft using the east/west runways at Ted Stevens Anchorage International Airport.

ATIS	GROUND CONTROL	MERRILL TOWER	DEPARTURE CONTROL
124.25	**121.7**	**126.0**	**126.4**



VFR PROCEDURE ONLY
CHART NOT TO SCALE -- NOT TO BE USED FOR NAVIGATION

ROUTE INSTRUCTIONS (DEPARTURES):

ALL AIRCRAFT: Climb to 1,200' MSL. Maintain 1,200' MSL until passing Campbell Airstrip, then maintain at or below 2,500 MSL until authorized by ATC.

RUNWAY 7 or 4: Climb straight out to Bragaw, turn right (southbound) and follow Bragaw to the Tudor Bus Barn then…

RUNWAY 25: Depart via left downwind to midfield; proceed direct to the Tudor Bus Barn then…

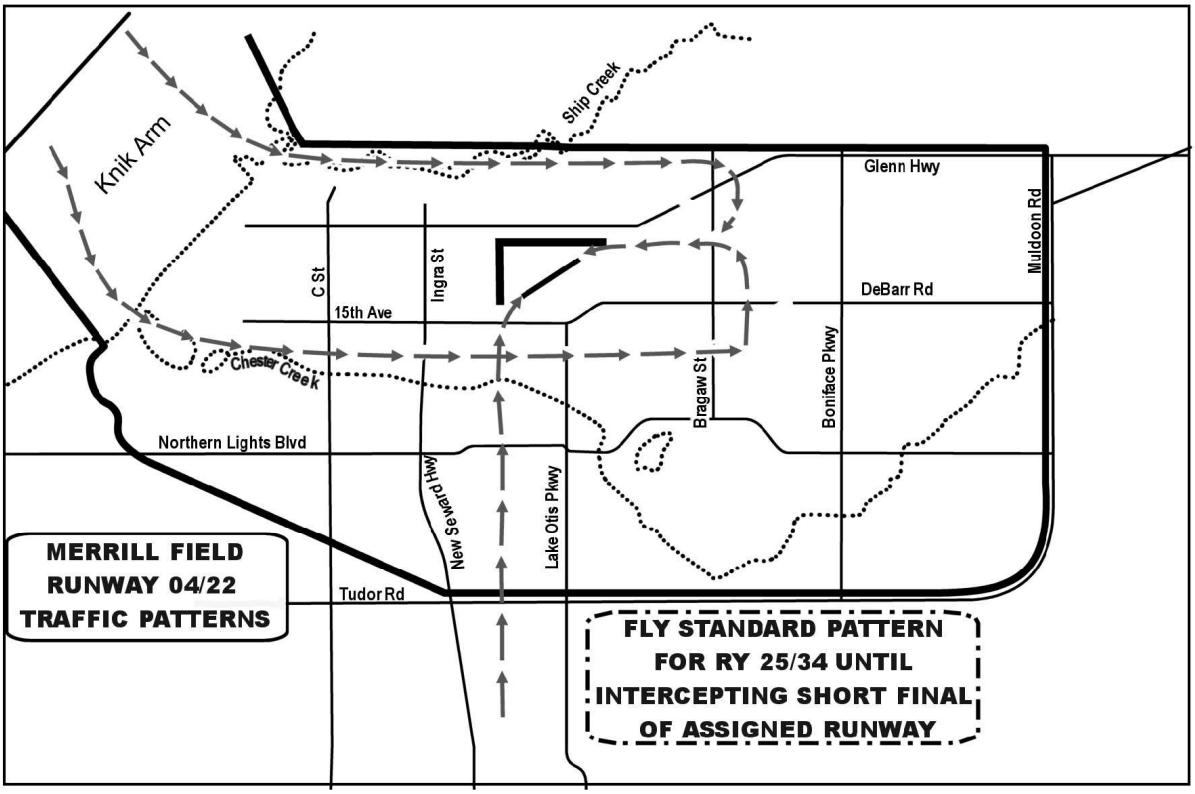
RUNWAY 34: Depart via right downwind along Bragaw to the Tudor Bus Barn then…

RUNWAY 16 or 22: Depart southeast bound direct to the Tudor Bus Barn then…

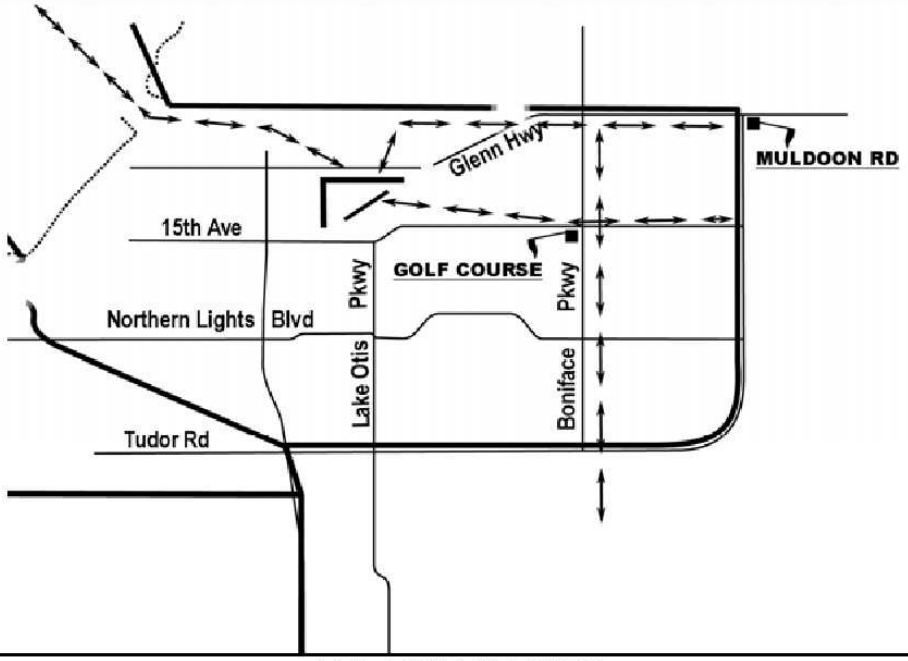
FROM THE TUDOR BUS BARN: Remain east of Abbott Loop Road until south of O'Malley Road.

ROUTE INSTRUCTIONS (ARRIVALS):

ALL AIRCRAFT: Proceed inbound one mile east of Abbott Loop Road to Campbell Airstrip. Cross Campbell Airstrip at 1,200' MSL then direct to the Boniface/Tudor Road intersection or as otherwise directed by ATC for traffic pattern entry.


Knik Arm
Ship Creek
Glenn Hwy
Muldoon Rd
C St
Ingra St
15th Ave
DeBarr Rd
Chester Creek
Bragaw St
Boniface Pkwy
Northern Lights Blvd
New Seward Hwy
Lake Otis Pkwy
MERRILL FIELD
RUNWAY 04/22
TRAFFIC PATTERNS
Tudor Rd
FLY STANDARD PATTERN
FOR RY 25/34 UNTIL
INTERCEPTING SHORT FINAL
OF ASSIGNED RUNWAY

ANCHORAGE, ALASKA		VFR DEPARTURE PROCEDURE	HELICOPTER ROUTES MERRILL FIELD
ATIS **124.25**	MERRILL TOWER **126.0**	DEPARTURE CONTROL EAST/WEST **119.1**	DEPARTURE CONTROL SOUTH **126.4**



VFR PROCEDURE ONLY
CHART NOT TO SCALE -- NOT TO BE USED FOR NAVIGATION

ROUTE INSTRUCTIONS:

ALL HELICOPTERS: Westbound helicopters cross Knik Arm in accordance with 14 CFR Part 93. East and southbound helicopters remain below and clear of fixed wing traffic patterns. Remain within Merrill Class D Airspace. Arrival routings are the reverse of the departure routings. All helicopters climb to and maintain 600' MSL unless otherwise instructed by ATC.

Departing South of Runway 7:

Ship Creek South: Remain north of 15th Avenue. Cross Runway 7 midfield at 600' MSL then proceed westbound along Ship Creek.

Golf Course: Proceed direct to Russian Jack Golf Course, then east to Muldoon or southbound along Boniface Parkway.

Departing North of Runway 7:

Ship Creek: Proceed north to then west along Ship Creek.

Highway: Proceed eastbound along the Glenn Highway to Muldoon or proceed southbound along Boniface Parkway.

Refer to www.alaska.faa.gov/ata for more information

Appendix I Public Outreach Workshops/Meetings April - June 2012

I.1 Newsletter April 2012

Merrill Field Airport

Phase I - Master Plan Update and Noise Exposure Plan

April 2012 » Volume 1

A Message from the Manager

From Dave Lundeby, Airport Manager

I am pleased to announce that Merrill Field (MRI) has begun a new Airport Master Plan (AMP) and Noise Study. The last AMP Update for MRI was completed more than a decade ago. The AMP update will serve as a blueprint for development at Merrill Field for the next 20 years. We have contracted with HDR Alaska, Inc. (HDR) to provide airport planning and engineering services in developing the plan. The project team encourages your participation in the process and there are a number of ways you can be involved. Please visit the project website (www.merrillfieldmasterplan.com) to learn about upcoming events, review and comment on the latest planning documents, receive updates on the planning process, sign-up for newsletters, and provide general feedback. Your input is valued, and I look forward to your participation in this important planning process for Merrill Field.

"The Airport Master Plan update will serve as a blueprint for development at Merrill Field for the next 20 years."

What's Happening at the Airport?

MRI is making plans for the future.

The AMP will create a blue print for serving existing and potential customers and businesses, and will identify improvements and infrastructure needs. The AMP update and Noise Study will be completed in two phases. Phase 1 will:

- Identify airport issues that need to be addressed
- Inventory existing engineering and environmental conditions on the airport
- Quantify baseline airport operations and activity
- Forecast future operations and activity
- Measure baseline noise levels and model future noise levels
- Review airport configuration against FAA development requirements and standards
- Develop draft alternatives to resolve issues and meet existing and future needs
- And most importantly, involve members of the public, airport users, and businesses in shaping the plan!

Phase 1 will culminate in a technical report that documents all the findings and lays out the future development scenarios for consideration and input.

Phase 2 will refine and evaluate the alternatives, allowing MRI management to select a preferred plan for future development. The decision will consider environmental, engineering, cost, and public input which will be documented in a draft AMP and set of engineering drawings (layout plan).

Ultimately, the draft AMP and layout plan drawing will be presented through the plan adoption cycle at the MOA, with review by the Municipal Airports Aviation Advisory Commission (MAAAC) and hearings in front of the Planning and Zoning Commission, Assembly, and Mayor. Once the plan has been adopted by the MOA, the airport layout plan will be sent to the FAA for signature and acceptance.

www.merrillfieldmasterplan.com

Merrill Field Airport/Phase I - Master Plan Update and Noise Exposure Plan

What is an Airport Master Plan?

The plan is a road map for meeting existing and future airport needs.

The plan will be a road map for meeting the airport's needs into the future. Based on professional evaluations and public involvement, the plan is a process to set short-, mid-, and long-term development goals. It will chart the course so that MRI continues to meet the aviation needs of the community and is compatible with the environment and surrounding neighborhoods. Conclusions will be written up in a report, including a schedule and a funding plan. The AMP and Noise Study are regulated by the Federal Aviation Administration. Some of the challenges that will be addressed include:

- Declining operations
- Encouraging private development on the airport
- Maintaining a viable, stable financial balance sheet
- Constrained air space and land availability
- Landfill challenges and opportunities
- Lease lot capacity
- Noise

Public involvement will be a key factor in reconciling these issues.

What is the Schedule?

The first phase of the plan is scheduled to be completed by April 2013.

- **April-July 2012.** Issues identification and Inventory
- **June-September 2012.** Aviation Demand Forecast
- **October 2012-April 2013.** Requirements Analysis and Draft Alternatives
- **April 2013.** Draft Airport Master Plan Phase 1 Report
- **April 2013.** Draft Part 150 Noise Study and Noise Exposure Plan

How can I be involved?

The project team wants to hear from you.

To be successful, the plan needs to hear from everyone who relies on or is affected by the airport, including—airport users such as leaseholders, interested aviation groups, the businesses and people who rely on service from MRI, local neighborhood groups such as Fairview, Mountain View, Russian Jack, Rogers Park, and Airport Heights community councils and others. The public involvement conducted in support of the AMP and Noise Study will bring a wide spectrum of voices, interests, and input to the process; will ensure those affected by the project are heard; and will ensure MRI has an opportunity to consider stakeholder viewpoints in the decision-making process.

There's lots of ways to get involved in the plan.

We look forward to hearing your feedback. Here's some ways that you can get involved:

- Sign up for future newsletters (online)
- Visit our website (www.merrillfieldmasterplan.com)
- Email the project team (contact@merrillfieldmasterplan.com)
- Attend upcoming events

MRI is planning a **public open house** to kick off the airport master planning process. Details are listed below.

Public Open House

Thursday, May 10, 2012 from 6 to 8 pm

at UAA's Aviation Technology Division

located on Merrill Field
2811 Merrill Field Drive
Anchorage, AK 99501

PLEASE JOIN US

www.merrillfieldmasterplan.com

Who is on the AMP Project Team?

Professionals, pilots, and planners

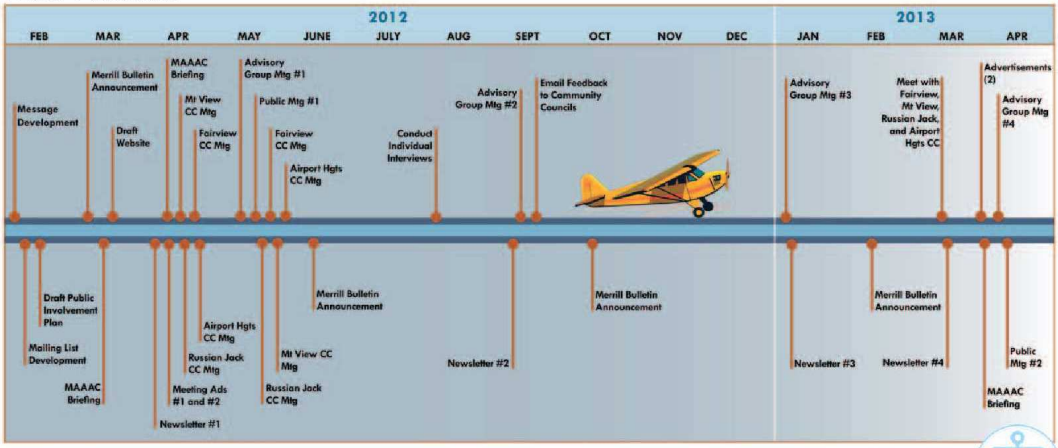
The plan is being conducted by professional airport planners and engineers, airport noise specialists, and public involvement professionals. The HDR team was selected because they have the team, tools, and experience to make the most out of MRI's AMP effort. Team highlights include:

- **HDR:** national aviation planning expertise, recent work at MRI and with local neighborhoods, planning for 30 airports in Alaska, and pilots who fly at MRI
- **HDL:** airport engineering for MRI for the past 8 years
- **HMMH:** specialty noise consultants
- **NEI/ISER:** local expert economists
- **McClintock Land Surveyors:** a survey and mapping firm

DID YOU KNOW...

Merrill Field has ranked among the busiest airports in the nation for several years. Activity peaked in 1984 when the field was ranked 15th in the nation. In 2010, Merrill Field was the 72nd busiest airport in the nation with 144,892 flight operations.

Phase 1 Schedule



MERRILL FIELD GENERAL AVIATION AIRPORT
ANCHORAGE N°1
1930-2005
CELEBRATING 75 YEARS

MERRILL FIELD
800 Merrill Field Drive
Anchorage, AK 99501

I.2 Presentation May 2012

Welcome!

Merrill Field Master Plan Update and Noise Study Open House

May 10, 2012

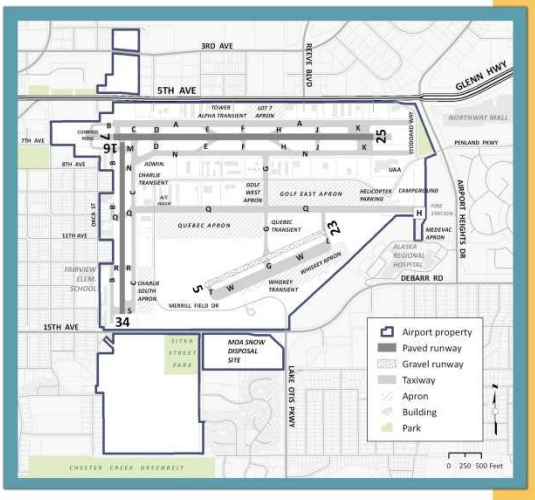
UAA Aviation Technology Division

HDR

Introduction/Overview of Merrill Field

Merrill Field is a Non-Hub Primary Commercial Service airport with a rich history in Anchorage.

Established in 1930 as Anchorage's first airport, Merrill Field is located directly east of the Central Business District of the MOA on approximately 438 acres of land at an elevation of 137 feet above mean sea level.

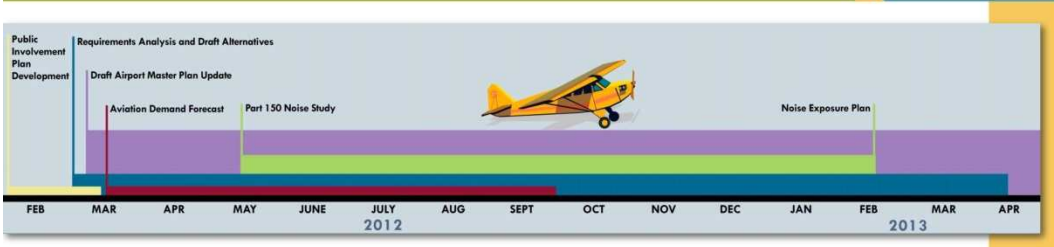


Russel Merrill
1894-1929

Russel Merrill was an early Alaskan aviation pioneer who discovered a pass through the Alaska Range to the Kuskokwim. The pass, in addition to the airport, is named in his honor. He disappeared in September 1929 on a flight to Bethel.

HDR

Schedule



Upcoming:

April – July 2012: Issues identification and inventory

June – September 2012: Aviation Demand Forecast

October 2012 – April 2013: Requirements Analysis and Draft Alternatives

April 2013: Draft Airport Master Plan Phase 1 Report

April 2013: Draft Part 150 Noise Study and Exposure Plan

HDR

What is an Airport Master Plan?

An Airport Master Plan is a blueprint for:

1) **serving** existing and potential customers and businesses
2) **identifying** improvements and infrastructure needs

The previous master plan was completed in July, 2000.

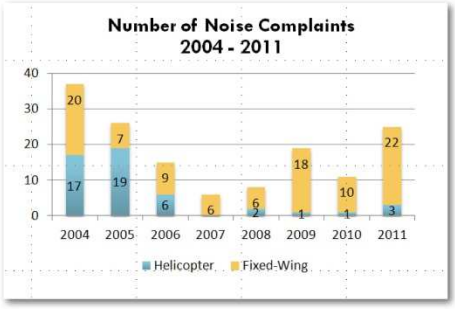
The Merrill Field airport master plan will be completed in two phases.

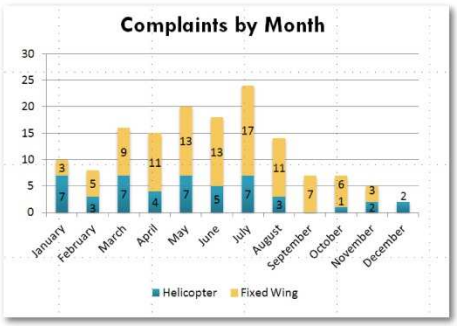
1
- Identify airport issues that need to be addressed
- Inventory existing engineering and environmental conditions on the airport
- Quantify baseline airport operations and activity
- Forecast future operations and activity
- Measure baseline noise levels and model future noise levels
- Review airport configuration against FAA development requirements and standards
- Develop draft alternatives to resolve issues and meet existing and future needs
- Involve members of the public

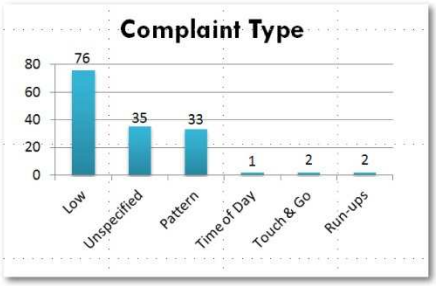
2
- Refine and evaluate the alternatives
- Selection of a preferred alternative
- Plan adoption by the MOA
- Plan acceptance by the FAA

HDR

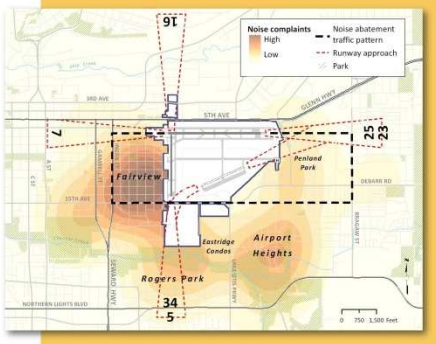
Noise Complaint Data



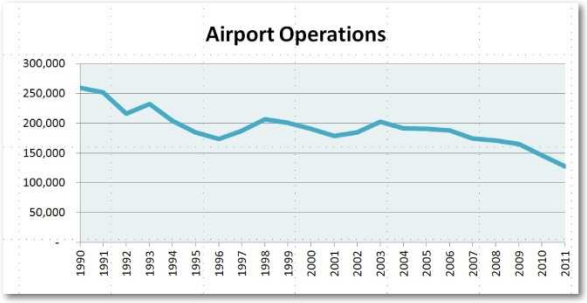


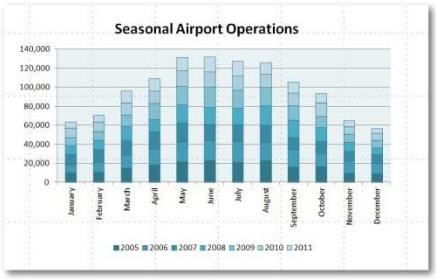


Noise Complaint Maps



Operations





HDR

Comments

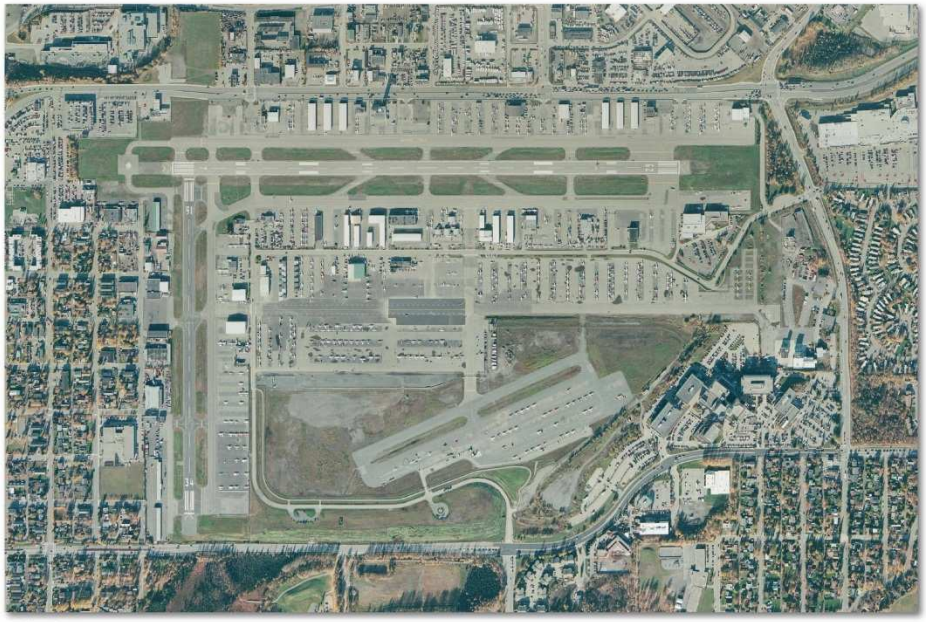
What are the topics and issues that you would like the plan to address?

Three ways to leave a comment:

1. Use the comment forms to write down feedback and place in the green comment box.
2. Document any specific airport comments on a sticky note and place on one of the aerial maps.
3. Dictate your comment to the project staffer manning the post-it pad.

HDR

Merrill Field Aerial Map



Aerial Photo October 2011
AeroMetric, Merrill Field

HDR

I.3 Flyer Notice for June 7, 2012 Workshop

Please Join Us for the Merrill Field Airport Master Plan and Noise Study Noise Workshop

HDR Alaska will be studying aircraft noise as part of the Merrill Field Airport Master Plan and Noise Study Project. This workshop is an opportunity for the public to provide input on potential noise monitoring locations, activities associated with unacceptable noise levels and other noise related issues, and to meet Harris Miller Miller & Hanson Inc., the sub consultant that will begin the noise monitoring program in June.

Please Join Us!

Date: Thursday, June 7th

Time: 6:30 to 8 p.m.

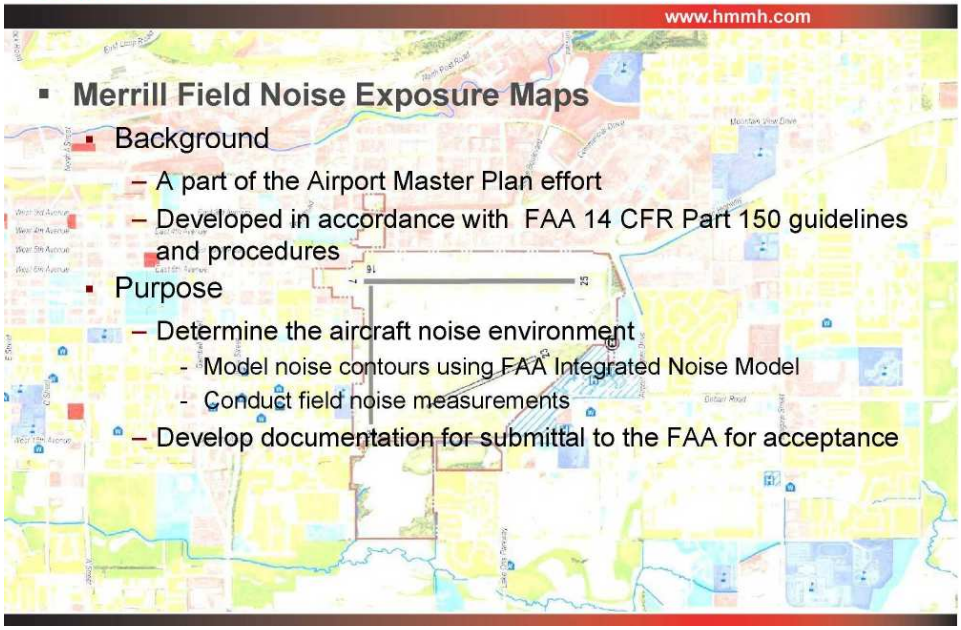
Location: CIRI Building First Floor Conference Room located at 2525 C Street, Anchorage, Alaska, 99503

Questions? Contact RaeShaun Schmidt at 644-2032 or email at raeshaun.schmidt@hdrinc.com

This noise workshop will provide an opportunity to learn about how noise is evaluated at the airport to include an explanation of the noise modeling process, will define a Noise Exposure Plan, and provide an opportunity to ask questions about airport noise.

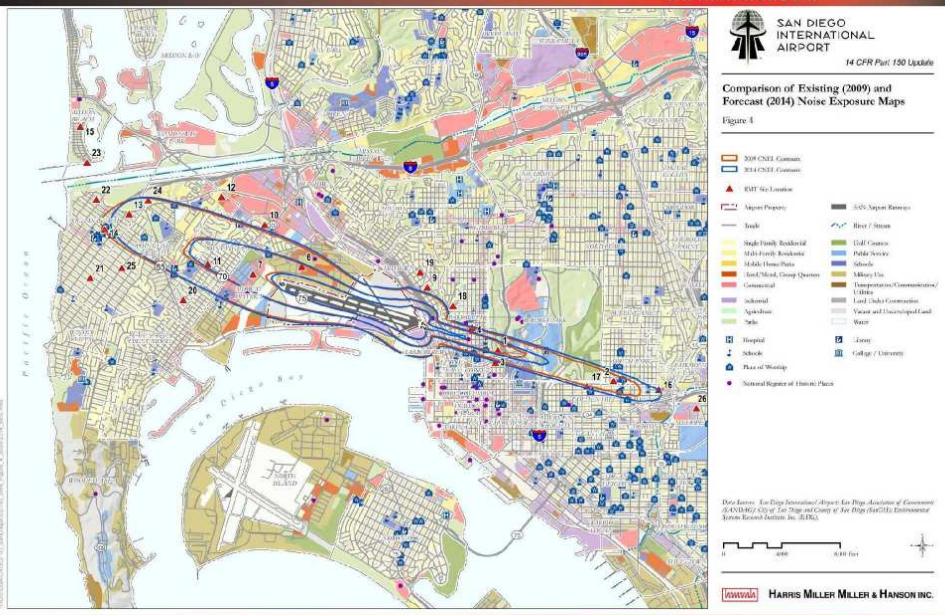
I.4 Presentation to Fairview Noise Exposure Plan Workshop, June 6, 2012 and Noise Exposure Plan Workshop, June 7, 2012

Overview



Sample Noise Exposure Map
San Diego International Airport - 2009 and 2014

www.hmmh.com



Workshop Agenda
June 2012

www.hmmh.com

- **Project Details**
  - Scope and expected schedule
  - Work to date
- **Introduction to Aircraft Noise**
  - Aircraft noise metrics
  - Aircraft noise regulations/guidelines
- **Noise Modeling - FAA's Integrated Noise Model (INM)**
- **Noise Measurement Program**
- **Questions**

Scope and Schedule

www.hmmh.com

- Data Gathering - June 2012
- Summer aircraft noise measurements - June 2012
- Begin aircraft noise modeling using the INM - July 2012
- Winter aircraft noise measurements - November 2012
- Complete modeling and draft document for review by Airport - November 2012
- Present results of study - December 2012/January 2013
- Submit to FAA for review/acceptance - December 2012/January 2013

Data Gathering

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- Discussions with Neighborhoods
  - Issues and concerns in relation to aircraft operations
  - Identify locations for noise measurements
- Discussions with FAA
  - Reporting requirements for the Noise Exposure Map update
- Discussions with Airport, Airport users and FAA Tower
  - Airport configuration (runways, taxiways, etc.)
  - Aircraft types using airport and aircraft operations
  - Runway use
  - Flight tracks and use
  - Noise-sensitive locations in vicinity of Airport
  - Noise measurements and observations of aircraft activity

Aircraft Noise Terminology

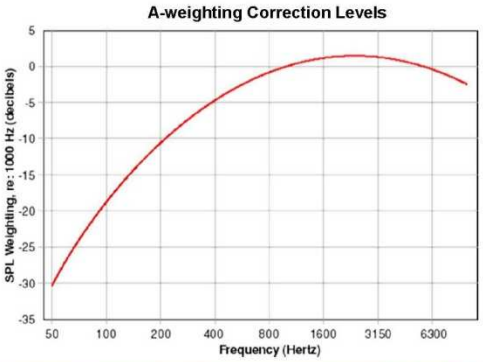
www.hmmh.com

- Noise - "unwanted sound"
- The Decibel, dB
- A-Weighted Decibel
- Maximum A-Weighted Sound Level, Lmax
- Sound Exposure Level, SEL
- Day-Night Average Sound Level, DNL

A-weighted Sound Pressure Level

www.hmmh.com

- The human auditory system is not equally sensitive to all frequencies
- To be a useful environmental analysis tool we need a way to measure sound the same way the ear hears it
- The A-weighted sound level achieves this goal
- The EPA has adopted the A-weighted sound level for environmental analyses



Common A-weighted Sound Levels, in dB

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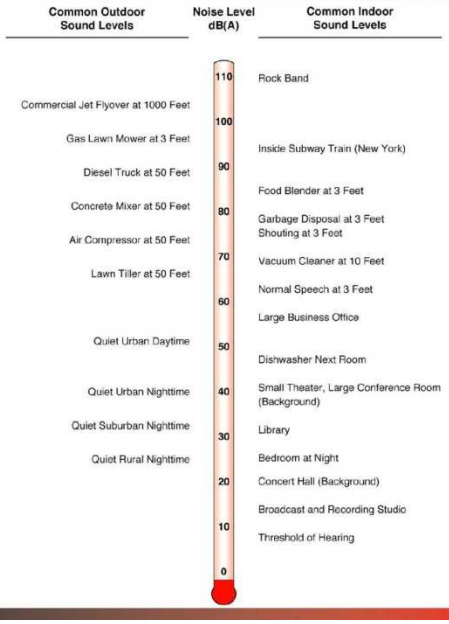

Maximum Sound Level (Lmax)

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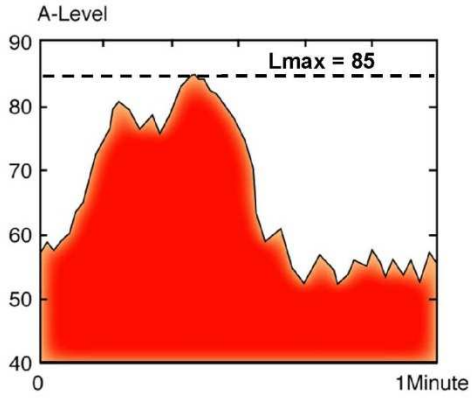
- Because of the variation in level of a sound event, it is often convenient to describe the event with its maximum sound level, abbreviated as Lmax
- Accounts only for sound amplitude (A-weighted level)
- Two events may have the same maximum level, but much different exposures



Sound Exposure Level (SEL)

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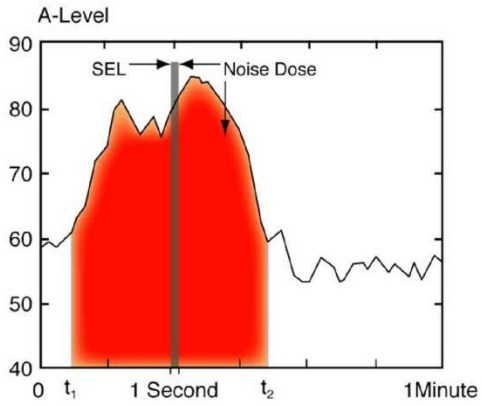
- A way to describe the "noisiness" of a complete noise event
- Accounts for sound amplitude (A-weighted level)
- Accounts for noise event duration



Sound Exposure Level (SEL)

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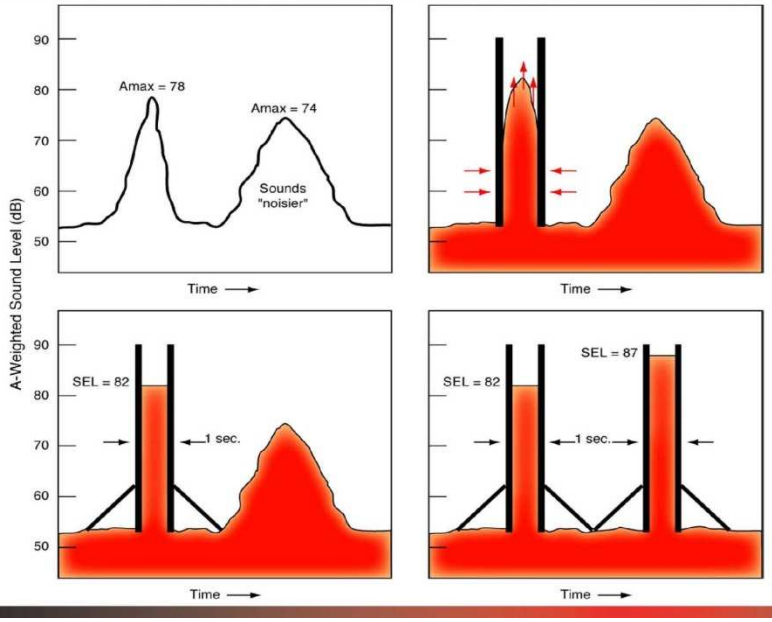

Day-Night Average Sound Level (DNL)

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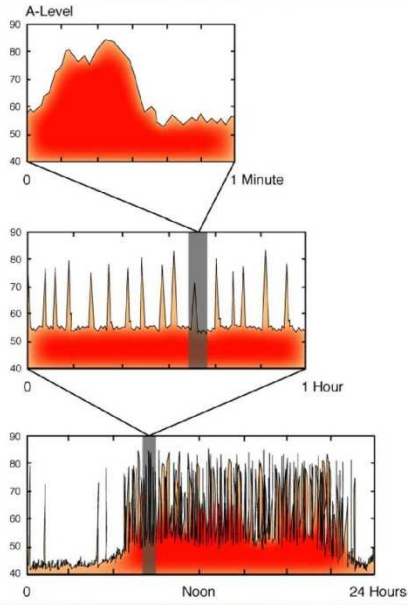
- A way to describe the noise dose for a 24-hour period
- Accounts for noise event "noisiness" (SEL)
- Accounts for number of noise events
- Provides an additional weighting factor for nighttime operations (Add 10dB)
  - Nighttime is 10 pm to 7 am



DNL and Land Use Compatibility

www.hmmh.com

- DNL is most widely accepted metric for compatibility
- Federal Aviation Administration (FAA) guidelines
  - All land uses compatible below DNL 65 dB
  - FICON reconfirmed in 1992
  - Local responsibility for determining acceptability
- US Dept. of HUD publishes "standards" for federal funding of residential construction
  - Acceptable ≤ DNL 65 dB
  - Normally unacceptable DNL 65 to 75 dB (additional sound attenuation required)
  - Unacceptable above DNL 75 dB (case-by-case conditional approval)

Noise Modeling

www.hmmh.com

- FAA's Integrated Noise Model version 7.0
  - Obtain Airport physical configuration input
  - Obtain aircraft operation input
    - aircraft types
    - number of operations
    - time of day
    - nominal flight tracks
  - Obtain meteorological data input
- Develop existing (2013) and forecast (2018) noise exposure maps
  - Use annual average day
- Comparison to compatible land use guidelines

Noise Measurement Program

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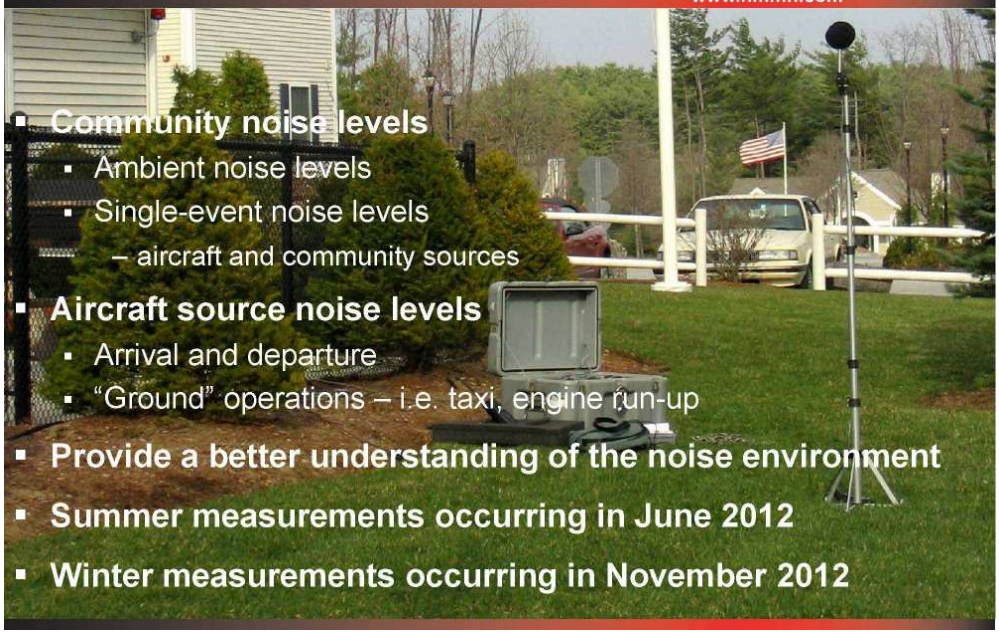


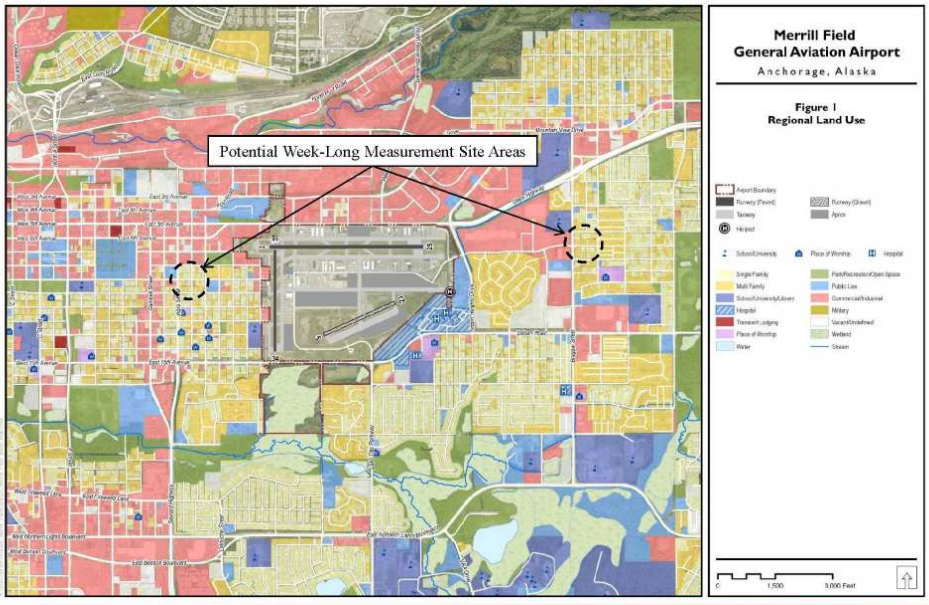
Noise Measurement Program
Community Measurements

www.hmmh.com

- Two long-term sites (7 days) and up to four short-term sites (24 hours) - Summer 2012
  - Long-term sites near identified aircraft flight tracks
  - Short-term sites in Neighborhoods
- Same two long-term sites (7 days) - Winter 2012
- Observations during noise measurements
  - Aircraft noise levels
  - Aircraft flight tracks
  - Correlate aircraft operation to recorded noise level
    - Subset of correlation will provide guidance to estimate total aircraft generated noise at each site after the measurements are completed

Noise Measurement Program – Local Community

www.hmmh.com



Noise Measurement Program
Factors To Consider in Site Selection

www.hmmh.com

- Unobstructed line-of-sight to aircraft
- Security for equipment
- Accessibility to equipment
- Any site specific noise sources that may interfere
  - Excessive dog barking
  - Construction activities
  - Abnormal road/street traffic
- Final determination of selected site made upon visit to potential sites
- Need volunteers to allow measurements on their property

Questions

www.hmmh.com

- Study goals
- Scope of Work
- Project details
- Expected schedule

Contact Information

Harris Miller Miller & Hanson Inc.
8880 Cal Center Drive, Suite 430
Sacramento, CA 95826
(916) 368-0707
rbehr@hmmh.com

I.5 Handout for Public Workshops May – June 2012

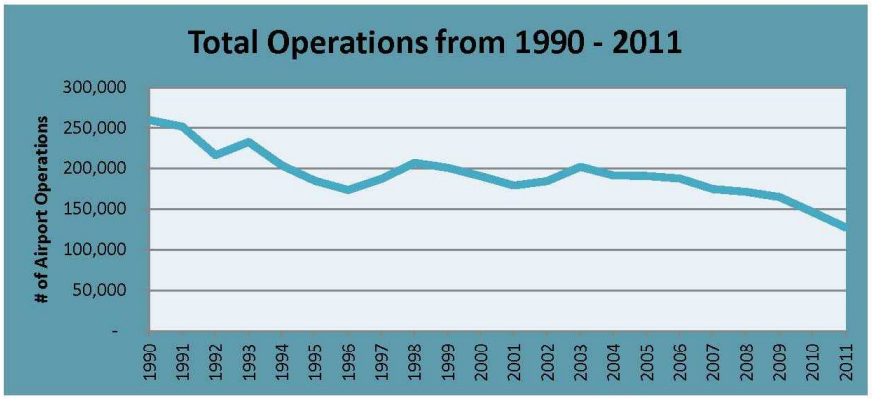
Operations Flyer

Merrill Field Airport/Phase I - Master Plan Update and Noise Exposure Plan

May 2012

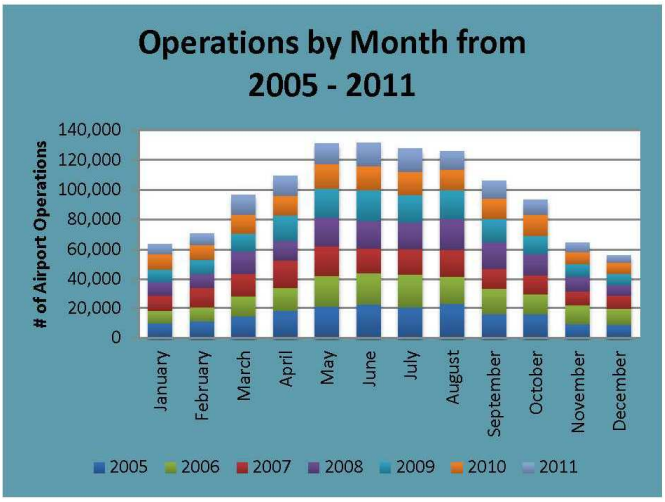
Tower Operations

An operation is defined as one aircraft take-off or landing. According to the FAA, the number of annual operations at Merrill Field has declined by approximately 50 percent between 1990 and 2011. In 2011, there were 127,632 airport operations–the lowest in the past 20 years.



Merrill Field has the highest numbers of aircraft operations between May and August and the fewest number of aircraft operations in December.

Aircraft operations can be considered *local* (the operation stays within the traffic pattern airspace) or *itinerant* (the operation arrives from outside or departs the traffic pattern). At Merrill Field, the percentage of operations that are itinerant has been increasing. In 2011, itinerant operations made up approximately 53.5 percent of all aircraft operations. In 1990, itinerant operations made up approximately 40.6 percent of all operations.



www.merrillfieldmasterplan.com

NOISE FLYER

Merrill Field Airport/Phase I - Master Plan Update and Noise Exposure Plan

May 2012

Noise Study Frequently Asked Questions

What is the Noise Study?

The Noise Study is part of the overall Airport Master Plan that includes an in-depth noise and land use compatibility study conducted in accordance with Title 14 of the Code of Federal Regulations Part 150 (14 CFR Part 150 or Part 150). The Study involves developing a detailed analysis of aircraft-related noise levels, noise exposure in the community from aircraft operations and the variables that affect aircraft noise, and working with the community to address its concerns. A consulting team led by HDR, Inc. is conducting the Airport Master Plan with Harris Miller Miller & Hanson Inc. (HMMH) leading the Noise Study. The study will take approximately 12-months and will result in a detailed report prepared for the Municipality of Anchorage Merrill Field Airport and submitted to the FAA for acceptance.

What does the Noise Study include?

The principal technical element of this Noise Study is the development of the Noise Exposure Maps (NEMs). The NEMs include aircraft noise exposure contours created using FAA's Integrated Noise Model (INM). The noise contours are overlaid on a map that depicts the airport's layout and operation, the community's land uses surrounding the airport, and the aircraft-related noise exposure reflecting operations occurring during the year of submission to the FAA (2012) and noise anticipated to occur in a forecast year, which is five years in the future (2017) as mandated by FAA.

How does the Community get involved?

To ensure that the Noise Study addresses as broad a base of concerns as possible from both aviation and community interests, public workshops will be held in conjunction with the Airport Master Plan to educate, inform and solicit input from the noise-impacted communities.

Is this kind of Noise Study unique to Merrill Field?

Some 250 airports have voluntarily conducted similar Noise Studies under Part 150 to work with communities on managing aircraft noise. While many of the elements of a Part 150 Study are the same, every airport and every community is distinctive and has unique issues. As a result, the needs, the process and the outcomes of the Part 150 Study are tailored to meet the needs of each airport region. For more information regarding Part 150, see the FAA link at:

http://www.faa.gov/airports/environmental/airport_noise/

www.merrillfieldmasterplan.com

Fly Friendly

The Merrill Field Management, the FAA Air Traffic Control Tower, and surrounding neighborhoods have been working together to address noise issues. By reviewing the patterns of aircraft noise complaints over a period of time, steps to minimize noise disturbances can be taken. A "Fly Friendly" traffic pattern that minimizes noise is currently in effect and all airmen are encouraged to follow its guidelines.

The Fly-Friendly traffic pattern for Runway 07/25 minimizes the noise impact to the surrounding residential areas. In addition to flying the recommended pattern, the Fly-Friendly guidelines encourage pilots to:

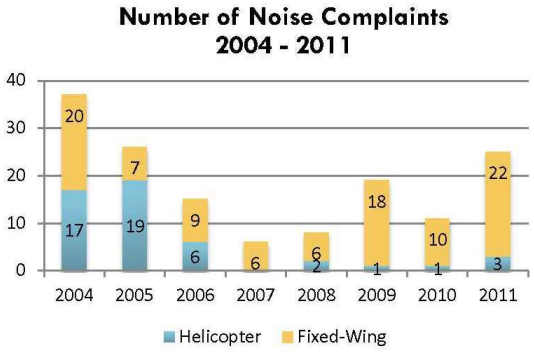
1) Utilize the entire length of the runway (intersection departures are discouraged);
2) Follow the established traffic patter (early cross wind turns on departure are discouraged);
3) Maintain the lowest propeller RPM setting necessary for safe flight;
4) Plan training activities during daytime hours.

For more information about the Fly Friendly Guidelines visit the following link:

http://www.muni.org/Departments/merrill_field/Pages/NoiseAwareness.aspx

Noise Complaint Summary

Between 2004 and 2011, Merrill Field received 147 noise complaints from 71 individuals. This is an average of 18.4 complaints per year. The majority (68%) of the complaints have been associated with fixed-wing aircraft activity with only 32% being associated with helicopters.



Almost half (51%) of the complaints are caused by an aircraft/helicopter flying too low. Approximately 23% of the complaints were unspecified and 22% were associated with a failure to follow the established traffic pattern. Other causes of complaints include activity too late at night, touch-and-go's, and run-ups.

Merrill Field receives the most noise complaints in July (24 complaints) followed by May and June with 20 and 18 complaints respectively. Noise complaints are at their lowest in December (2 complaints) and November (5 complaints).

Overall, the number of complaints from both helicopters and fixed-wing aircraft was at its highest in 2004 and then gradually lessened until 2007 when there were only 6 complaints. Complaints associated with helicopters were at their highest in 2005 with 19 complaints. Since then, the number of helicopter related complaints has declined dramatically with most years only receiving 1 or 2 complaints. However, with 22 complaints, fixed-wing related complaints have shown an increase and were at their highest most recently in 2011.

How do we Describe Aircraft Noise?

We use a number of terms to describe aircraft noise. These metrics form the basis for the majority of noise analyses conducted at most airports in the U.S.

The Decibel, dB

All sounds come from a source – a musical instrument, a voice speaking, an airplane. The energy that produces these sounds is transmitted through the air in waves, or sound pressures, which impinge on the ear, creating the sound we hear.

The decibel is a ratio that compares the sound pressure of the sound source of interest (e.g., the aircraft over flight) to a reference pressure (the quietest sound we can hear). Because the range of sound pressures is very large, we use logarithms to simplify the expression to a smaller range, and express the resulting value in decibels (dB). Two useful rules of thumb to remember when comparing individual noise sources are: (1) most of us perceive a six to ten dB increase to be about a doubling of loudness, and (2) changes of less than about three dB are not easily detected outside of a laboratory.

The A-Weighted Decibel, dB(A)

Frequency, or "pitch", is an important characteristic of sound. When analyzing noise, we are interested in how much is low-, middle-, and high-frequency noise. This breakdown is important for two reasons. First, our ears are better equipped to hear mid- and high-frequencies; thus, we find mid- and high-frequency noise more annoying. Second, engineering solutions to noise problems are different for different frequency ranges. The "A" filter approximates the sensitivity of our ear and helps us to assess the relative loudness of various sounds.

Maximum A-weighted Sound Level, Lmax

A-weighted sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. Figure 1 illustrates this phenomenon. We often describe a particular noise "event" by its maximum sound level (Lmax). Figure 2 shows typical Lmax values for some common noise sources. In fact, two events with identical Lmax may produce very different total exposures. One may be of very short duration, while the other may be much longer.

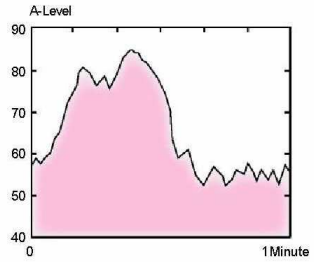


Figure 1. A-weighted Sound Levels Over Time

Sound Exposure Level, SEL

The most common measure of cumulative noise exposure for a single aircraft flyover is the Sound Exposure Level (SEL). Mathematically, it is the sum of the sound energy over the duration of a noise event – one can think of it as an equivalent noise event with a one-second duration. Figure 3 shows that portion of the sound energy included in this event. Because the SEL is normalized to one second, it will almost always be larger in magnitude than the Lmax for the event. In fact, for most aircraft events, the SEL is about 7 to 12 dB higher than the Lmax. Also, the fact that it is cumulative measure means that a higher SEL can result from either a louder or longer event, or some combination.

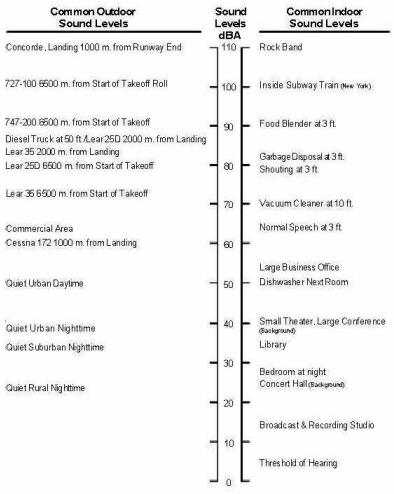


Figure 2. Common Environmental Sound Levels

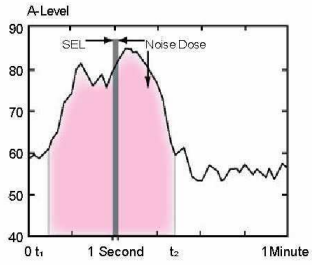


Figure 3. Sound Exposure Level

SEL provides a comprehensive way to describe noise events for use in modeling and comparing noise environments. Computer noise models base their computations on SEL values.

Day-Night Average Sound Level, DNL

The Day-Night Average Sound Level (DNL) represents noise as it occurs over a 24-hour period, with the assumption noise events occurring at night (10 p.m. to 7 a.m.) are 10 dB louder than they really are. This 10 dB penalty is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive because nighttime ambient noise is less than daytime ambient noise.

Figure 4 depicts a hypothetical daily noise dose. The top frame repeats the one-minute noise exposure that was shown in Figure 1. The center frame includes this one-minute interval within a full hour; now the shaded area represents the noise during that hour with 16 noise events, each producing an SEL. Finally, the bottom frame includes the one-hour interval within a full 24 hours. Here the shaded area represents the listener's noise dose over a full day.

DNL normally can be measured with standard monitoring equipment or predicted with computer models.

Most aircraft noise studies utilize computer-generated estimates of DNL, determined by accounting for all of the SELs from individual events which comprise the total noise dose at a given location on the ground.

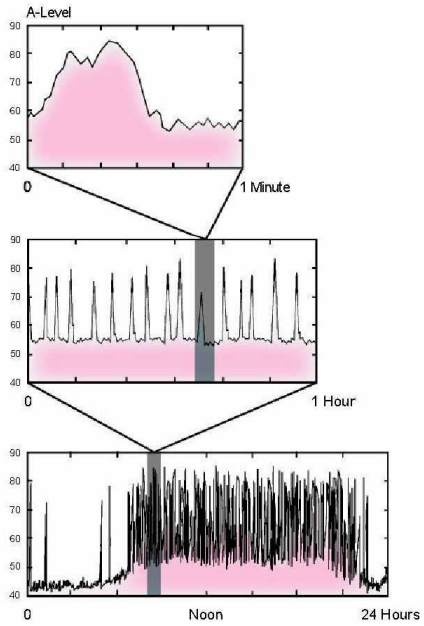


Figure 4. Daily Noise Dose

Computed values of DNL are often depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). DNL contours usually reflect annual average operating conditions, taking into account the average number of flights each day, how often each runway is used throughout the year, and where over the surrounding communities the aircraft normally fly.

I.6 Public Workshop Sign-in Sheets – June 6 & 7 2012

Merrill Field Airport Master Plan Update and Noise Study

Fairview Noise Exposure Plan Workshop

June 6, 2012, 7:00pm – 8:30pm
Fairview Recreational Center

Name	Email	Phone
ALEX JUMAO-AS	jumao-asab@muni.org	343-6311
John McPherson	John.McPherson@hdrinc.com	644-2013
Claris Syren	—	272-6164
Carl Siebe	carl.siebe@hdrinc.com	644-2163
Laurie Cummings	laurie.cummings@hdrinc.com	644-2065
Paul Kaucitz		278-1880
ALLEN KEMPLEN	KEMPLEN@GCI.NET	274-9972
Heidi Heinrich	alaskaluckywife@yahoo.com	375-3454
George Harrison	gharr14943@aol.com	884-1041
J. Haggerty		278 2889

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Merrill Field Airport Master Plan Update and Noise Study

Fairview Noise Exposure Plan Workshop

June 6, 2012, 7:00pm – 8:30pm
Fairview Recreational Center

Name	Email	Phone
[illegible]	leeross@gci.net	276-5124
SJ Klein	35c Fairview Community.org	

Page ___ of ___

Merrill Field Airport Master Plan Update and Noise Study

Noise Exposure Plan Workshop

June 7, 2012, 6:30pm – 8:00pm
CIRI First Floor Conference Room

Name	Email	Phone
Tyler Andrews	atylerandrews@adk.com	
Gloria Syren	———	272-6166
Kim Skinner	dinonut@alaska.net	3511758
ED SKINNER	" "	350-2518
MELODY & GARY TENNOR	SHEASTREET@GCI.NET	
ALEX JUMAO-AS	~~ALEXA~~ jumao-asab@muni.org	343-6311
Nicole Ferreira	mikeshdesign@gmail.com	947-1626
~~SAMSON FERREIRA~~		
Stacey Dean		344-5733
~~DANIAN ALEXANDER~~		272-7196
MARK MADDEN	maddenmg@muni.com	343-6279
Patti Sullivan	Patricia.Sullivan@faa.gov	271-5454
CARL HANADEL	mrceocarl@hotmail.com	258-4357
Richard Kurt	gwsgwb@Alaska.net	
Megan McFadden	gwbgwb@Alaska.net	274074
Sid Atwood	SidAtwood@Hotmail.Com	440-9183 ← Would have a microphone
C. A. Ryan	caryan797@gmail.com	223-6594
James Patterson-Simes	jsimes@alaska.net	333-1819
Carl Siebe		644-2163

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I.7 Comments Received at or Immediately Following Public Workshops June 2012

HDR | ONE COMPANY *Many Solutions*℠

Memo

To: File	
From: Laurie Cummings	Project: Merrill Field Airport Master Plan Update and Noise Study
CC:	
Date: June 7, 2012	Job No:

RE: Fairview Noise Exposure Plan Workshop

On Wednesday June 6, 2012, a Noise Exposure Plan Workshop was held from 7pm to 9pm in the Fairview Recreation Center. The purpose of the meeting was to provide an overview of the noise exposure plan that is being developed as part of the master plan update, obtain suggestions on potential noise monitoring locations, and answer questions the community has about the process.

Specific questions/issues that arose during the workshop include:

- The fly friendly guidelines developed in the 2003/2005 timeframe has made an improvement and overall noise has gotten better, however, it seems that over time pilots fall back into their same routines of cutting corners. Noise near the gravel strip has gone up though.
- Most of the noise issues are the result of pilots not following the established patterns
- FAA uses the same model for every airport and requires an average annual noise contour. Attendees were concerned that this does not accurately represent the noise associated with MRI. Noise at MRI occurs during a compressed timeframe. It is important to note that while the FAA has specific requirements, that does not mean that other noise concerns can not be identified as part of the process or that MRI will only address noise based on the resulting contours. MRI wants to be a good neighbor and wants to continue to work with the community and pilots to identify ways to reduce noise impacts on the residents.
- Attendees indicated the noise is worst during July, August and September.
- Question: An attendee asked how the flight path information would be identified and if it was possible to use radar data. Answer: The flight path information in the model is based on observations and interviews. The use of radar information is not planned at this time. Many of the planes that use MRI would not show up on radar data.
- Question: How does the model account for annoyance because it is more annoying during the day during the summer because this is when people are outside? Answer: The model will add a penalty for nighttime noise (between 10 pm and 7 am) but not for daytime operations or summer operations.
- The noise model is based on a 5 year forecast. If conditions change, MRI can ask FAA to update the analysis
- Attendees indicated that it is not easy for the average person to report a noise complaint as they don't know how to properly identify the aircraft. Alex Jumao-asindicated that people should report what they can (time, location, etc) and that they can work with the tower to identify the plane involved.
- MRI is a training tower which results in a frequent turnover of tower staff. This is a concern as tower staff may be unfamiliar with the fly friendly noise policies and the impact of noise on adjacent residents.
- Removal of the buffer row of housing near Orca has made a difference to noise. Run ups near Orca Street was reported as quite loud. Alex mentioned that the hanger owners have been recently asked to conduct any run ups on the east side of Runway 16/34 to minimize the impact to adjacent properties. He is hopeful that is helping reduce that noise source.
- One attendee expressed a concern about the modeling being consistent with the advisory circular of not having 10 days on monitoring. It was explained that three monitors are being used with more than 10 days being collected.

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HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, Alaska 99503-2632

Phone (907) 644-2000
Fax (907) 644-2022
www.hdrinc.com

- Attendees indicated that pilots often turn when the see the appropriate street not when they are over it. Changes to the pattern may be a method to address this.
- Changing the pattern to be over Gambell instead of Ingra may be beneficial as Gambell is more of a commercial corridor.
- Question: Can the pattern be changed? If so, by whom? Answer: The pattern is supposed to be set through a joint effort between the FAA and the MOA.

The meeting concluded with attending suggesting potential locations for monitoring sites with several attendees volunteering to have the monitoring occur on their property.

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Memo

To: File	
From: Laurie Cummings	Project: Merrill Field Airport Master Plan Update and Noise Study
CC:	
Date: June 8, 2012	Job No:

RE: June 7 - Noise Exposure Study Workshop Notes

On Thursday June 7, 2012, a noise exposure study workshop was held in the HDR 4th floor conference room. The meeting purpose was to provide an overview of the noise exposure plan that is being developed as part of the master plan update, obtain suggestions on potential noise monitoring locations, and answer questions the community has about the process. The meeting was attended by approximately 20 members of the public.

Specific questions/issues that arose during the workshop included:

- Question: Will the study consider existing plans? Answer: Yes, the project will consider existing plans as recommendations are developed.
- Question: Is the airport expanding? Answer: It depends on the needs of the airport. The purpose of the Airport Master Plan Update is to identify the future needs of the airport. Historically, operations have been declining.
- Question: What is the plan phasing? Answer: We are currently in Phase 1 which will be completed in the summer of 2013. Phase 2 will take an additional 18 to 24 months.
- Question: Planes that don't use the full runway make the most noise. Are there any ways to make sure pilots use the entire runway during take off? Answer: This is at pilot discretion. MRI is looking at additional voluntary measures to reduce airport related noise in adjacent neighborhoods.
- Question: Are pilots being notified on the study? Attendees were concerned that if the pilots were aware of the monitoring, they would change their behavior while the monitoring was occurring which would give an inaccurate portrayal of the noise issue. Answer: The noise workshops were publically advertised however, pilots were not notified of when and where the monitoring will occur.
- Question: What type of operations data do you have? Answer: We have information about commercial (air taxi) as well as general aviation. We are also getting information about the fleet mix.
- Question: Will the model capture people who aren't following the pattern? Answer: Flight tracks representing pilots that do not follow the pattern can be added. The tracks will be added based on field observations and interview results.
- Question: What have we done to involve the neighborhoods? Answer: In addition to the two noise workshops, we have done an open house, 2 rounds of community council presentations, a website, project newsletter and a project email list.
- Attendees were concerned about an average annual day being used in the study because they felt this would flatten out the results and not provide an accurate representation of their noise issue. FAA requires an average annual day be used.
- Question: Will the monitoring equipment separate out background noise? Answer: The monitors will capture everything but will be set so that typically background noise does not generate a noise event.
- Question: Isn't Alaska Regional a quiet zone? Does that change the requirements? Answer: Hospitals may be incompatible land uses. However, Alaska Regional was built after the airport so it is likely that they addressed the potential for noise as part of the design.
- Question: How long are we measuring noise? Answer: There will be 2 7-day sites and 4 24-hour sites.
- Question: How will you use the measurements? Answer: The measurements will be used to verify the model.
- Attendees noted that early Saturday, early Sunday and Sunday evenings were the worst for noise

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2525 C Street, Suite 305
Anchorage, Alaska 99503-2632

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Fax (907) 644-2022
www.hdrinc.com

- Question: Do you have the results of previous noise studies? Answer: Yes, we have a previous study from the late 1980s/early 1990s.

The meeting concluded by asking for volunteers to host noise monitoring equipment.

Appendix J Public Outreach and Review 2013

J.1 Merrill Field Bulletin September 2013

Merrill Field, a proud tradition of serving Alaska

Providing over 80 years of aviation service

MERRILL FIELD BULLETIN

Current News About Your Airport

Merrill Field Airport *September, 2013*
800 Merrill Field Drive, Anchorage AK 99501 *www.muni.org/merrill1/merrill1.cfm*

What's Happening at Merrill Field

Fall is just around the corner and summer is coming to an end. It has been a very busy summer construction season here at the airport.

The Medevac/Helipad Apron construction was completed a few weeks ago. This project improved the drainage issue and eliminated the water ponding.

We are finishing up the Security/Camera project. A total of thirteen (13) new high definition cameras were installed at the airport's entrances (15th/Lake Otis & Airport Heights/Merrill Field Drive). The team of Alcan Electric (contractor), HDL, and Marsh Creek (consultants) is working to provide the airport with an improved system to capture and record images. Leaseholders will be notified when the camera system is operational.

Identifying signs have been installed on all security gates (pedestrian, vehicle and barrier gates). Let's keep an eye on individuals who appear lost or are not authorized to access the air operations area and report any unlawful activity immediately to our office or the FAA Tower. This will ensure safety for everyone and help eliminate potential vehicle/pedestrian deviations or runway incursions.

As always, we appreciate your patience and understanding of the inconvenience during the construction season. Your cooperation demonstrates your commitment in helping us provide a better, safer airport.

We are looking forward to working with you again on capital projects next summer.

MRI Users Group Meetings Proposed

It has been suggested that informal opportunities for pilots and business owners to meet with airport management to cover any topics related to Merrill Field be established.

If you would be interested in attending/participating in such a meeting with other airport users, please call the Airport Manager's Office at 343-6303 or send an email message to merrillinfo@muni.org by **October 31st.** Frequency, day, time and location are to be determined, so please express your meeting day and time preferences: Monday-Friday; morning, noon or evening and/or specific timeframe.

If enough interest is generated, meeting notices will be posted on our website and in future Bulletins. We will respond to specific suggestions.

Master Plan Update

Work continues on the Municipality of Anchorage Merrill Field Airport (MRI)'s Airport Master Plan (AMP) update. When complete, the AMP will serve as a guidebook for airport development over the next 20 years.

In the past few months, the planning team has been identifying alternatives to meet the airport's issues and future needs as well as developing the Part 150 Noise Study. In addition, the aviation forecast was approved by the Federal Aviation Administration (FAA) in June 2013.

MRI is hosting a public meeting to collect ideas and comments of potential alternatives, to present a draft of the noise analysis, and the results of the FAA-approved aviation forecast on October 22nd at the UAA Aviation Building. The meeting will be from 4 – 7 PM with a presentation at 6 PM.

To sign-up for the Airport Master Plan email list or newsletter, view the project schedule, provide feedback, or contact the project team, please visit www.merrillfieldmasterplan.com.

Be responsible, keep vehicle gates closed

Power outages can cause some electric vehicle gate operators to stop working. If this happens, airport maintenance will set the affected gates to "manual operation" which means that airport users must manually roll the gate open to access their lot. It is very important that each time a gate is opened, it is closed. Even if you plan to be in your apron for "just a few minutes", the gate should always be closed.

Fencing and gates were installed on the airport to increase safety by preventing runway incursions. Merrill Field Airport is situated in the middle of commercial, industrial, and residential districts, and individuals who are not familiar with our operations may take a short-cut by crossing the runways. FAA has provided grant funds to ensure our runways and taxiways are safe, and one of the grant assurances is for the airport to maintain a safe environment. Each time a gate is left open an unsafe situation occurs. In the interest of safety, please take an extra few minutes to make sure the gate is closed when you enter or leave Merrill Field. After all, the life you save could be your own.

Aviation Events

Thursday, September 26: Lake Hood User Group Fall Meeting
Ted Stevens Anchorage International Airport (ANC) announces the Lake Hood User Group Fall Meeting will be held on Thursday, September 26, 2013 from 12 p.m. to 2 p.m. The meeting will be held at the Alaska Aviation Museum, located at 4721 Aircraft Drive, Anchorage, AK 99502. A light lunch will be provided. Call 266-2410 for details.

Wednesday, October 9: Ninety Nines - Alaska Chapter Monthly Meeting The 99s meet the second Wednesday of each month at the Denny's Restaurant, 3950 Debarr Road, 6:00 – 8:30 p.m. Request more information at flyquilt@mtaonline.net or call Melanie Hancock at 694-4571.

Thursday, November 7: Municipal Airports Aviation Advisory Commission Meeting Bi-monthly meetings are held at the Anchorage Fire Training Center, 1140 Airport Heights, Bldg. A, 12:00 p.m. – 1:00 p.m. For more information, call the Manager's Office, 343-6303.

Saturday, November 23: Fall Safety Seminar "Doing the Right Things to Stay Alive" The Alaskan Aviation Safety Foundation hosts this informative, annual seminar. The event will be held at the UAA Aviation Technology Center, 2811 Merrill Field Drive, Anchorage, 8:00AM – 4:00PM. For more details, call Harry Kieling 271-4626.

MUNICIPAL AIRPORTS AVIATION ADVISORY COMMISSION

The Municipal Airports Aviation Advisory Commission meetings are open to the public and held the first Thursday of every other month. Please call 343-6303 for additional information.

Meeting Dates:
Nov 7, Jan 7, Mar 6, May 1

Commissioner	*Term Exp.*
Dick Armstrong	10/14/15
Sharon Chamard	10/14/15
Jim Cieplak	10/14/13
Don DeVoe, V Chair	10/14/13
Greg Pearce	10/14/14
Terry Pena	10/14/15
Jim Powell, Chair	10/14/14

Statistics
Operations:
Sep, 2012 – Aug, 2013: 131,640
2013 Based Aircraft: 833

Tower Talk

As always, thank you for your continued professionalism. This summer had some challenges associated with it and I thank you for a job well done. Don't forget about safety and if you need something, don't hesitate to call.

SVFR Procedures

The Anchorage Bowl will begin to see an increase in weather below basic VFR. An ATC clearance must be obtained before operating at MRI when the weather is less than that required for VFR flight.

A Special VFR Clearance is required to operate in weather below basic VFR conditions. This clearance must be requested by the pilot and approved by ATC. Controllers **may not** assign a Special VFR Clearance until pilot requested. If a tower or approach controller states, "Merrill is below basic VFR, say intentions" that is your clue that **you** must request a SVFR clearance. That can be accomplished by telling the controller, "Request SVFR Clearance out of/into the Merrill Class D Surface Area." Inbound aircraft to Merrill Field should contact Anchorage Approach Control directly to request a Special VFR Clearance.

Controllers may try to expedite traffic by asking pilots if they can maintain visual separation with either another Special VFR Aircraft or an IFR aircraft. For instance, to get several departures off the airport, tower may ask if you can follow and maintain visual separation with a preceding departure. If you can, then both of you can be departed. If you cannot, then the preceding aircraft will be departed. You will have to wait until the previous departure exits the Class D Surface area. Approach Controllers may also try to bring several planes into the Class D Surface Area using Visual Separation rather than bringing you in one at a time. Don't push safety and don't do anything you are not comfortable with.

Readbacks

Just a reminder that ATC needs a read back of your call sign with the runway number and any hold short requirements all in one transmission or we will ask for it again.

When given an instruction by ATC, we need November, Tango, type aircraft, or your Air Taxi call sign stated with your last three. It is not OK to just say your last 3.

Communicate

Don't forget, tours are available. It is a great way to get questions answered and for controllers and pilots to meet. We can also come to you for a CFI meeting or pilot briefing. If in doubt, ask for clarification. It is really easy to say you don't understand or to call and ask a question. Reduce the risk, be safe!

Brian Ochs, Manager
Merrill Field ATCT
271-2698

Aviation Art Contest

Grab your favorite artist's tools and create a poster for this year's competition, "Flying Saves Lives". All Children and young adults are invited to participate in this international contest. Full contest rules are available at www.nasao.org or contact Linda.Bustamante@alaska.gov or Angie.Slingluff@faa.gov. Entries must be submitted by January 14, 2014.

Lost & Found

If you have misplaced or lost an item on Merrill Field, don't hesitate to stop by the Airport Manager's Office to see if it has been turned in to us. We have a collection of small, miscellaneous items. If you're missing an aircraft cover, call to make arrangements to look through the box of various covers stored in the maintenance shop. Don't forget to mark your aircraft N number on your covers.

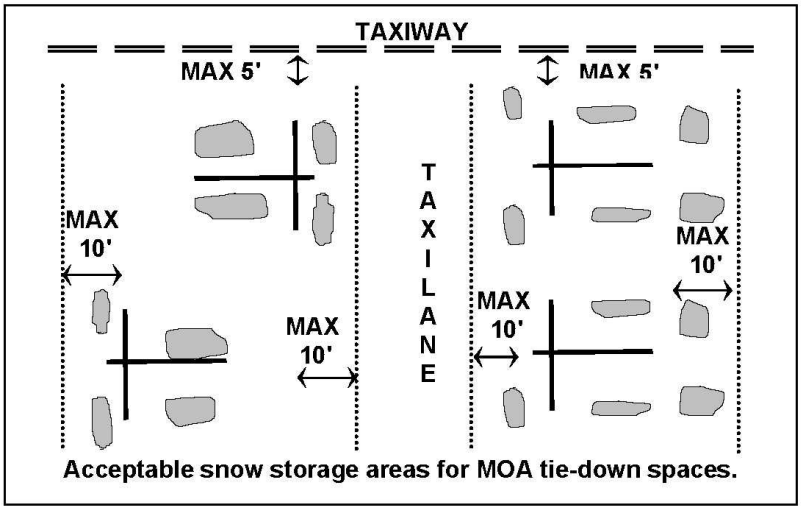
Seasonal Snippets

Number of Chemical Toilets Reduced: On October 1, the chemical, portable toilets located at Campground Transient, Quebec Transient and Charlie South will be removed for the winter season. Portable toilets will remain at Alpha Transient (by the tower) and Whiskey Transient (ski strip).

Wash Rack Reminder: If you have been putting off cleaning your aircraft, you may not want to wait much longer. When the temperature dips below freezing, the wash system will be shut down for the season.

Seasonal Waterfowl Activity: The fall waterfowl migratory season is here, and again this year we are working with Wildlife Specialists from the U.S. Department of Agriculture to reduce the possibility of aircraft conflict with birds on Merrill Field. An airport vehicle is being used "after hours" for waterfowl hazing activities. The effect of our combined efforts with USDA should discourage migratory waterfowl from returning to roost on Merrill Field.

Snow Storage Procedures: Each year the Airport Manager's Office staff is frequently asked, "Where should I put the snow?" To keep the taxi lanes open, please store snow in the designated areas of your tiedown space as shown below. Snow stored in front of or behind your aircraft will be removed when the taxilanes are cleared. ***Municipal Code prohibits the dumping or relocating of snow onto or across taxilanes, taxiways, runways, or airport roads by any persons except Municipal employees***. As always, the objective of our Snow Removal Plan is to have the Airport runways open and functional as soon as possible after a new snowfall.



Acceptable snow storage areas for MOA tie-down spaces.

Winter preparation

The Airport maintenance staff is busy gearing up for the first snowfall of the season. Each aircraft owner can help by removing all items and/or debris from your tie-down area that could potentially be pushed away with a pile of snow. Not only can items of value be lost or damaged--these items can also cause ***substantial*** damage to snow removal equipment.

All unsecured items (blocks, boards, shovels, ladders, gas and oil cans, etc.) found in your tiedown after October 15, 2013 will be removed by Airport Maintenance. Your cooperation and attention to this important request is greatly appreciated.

Merrill Field Airport Bulletin, Published Quarterly
Merrill Field Airport, 800 Merrill Field Drive, Anchorage, AK 99501 Phone (907) 343-6303, Fax (907) 276-8421
Paul Bowers A.A.E., Airport Manager , e-mail: merrillinfo@muni.org, online:www.muni.org/merrill1/merrill1.cfm

J.2 Newsletter October 2013

Merrill Field Airport

Phase I - Master Plan Update and Noise Exposure Plan

October 2013 » Volume 2

A Message from the Manager

From Paul Bowers, Airport Manager

An update of the Airport Master Plan (AMP) for Merrill Field is underway and we need your input at an upcoming meeting. The AMP update will serve as a blueprint for development at Merrill Field for the next 20 years. The Municipality has contracted with HDR Alaska, Inc. (HDR) to provide airport planning and engineering services in developing the plan. Public and Advisory Committee meetings were held in 2012 to collect information on airport-related issues and needs. Since then HDR has developed an aircraft activity forecast, an analysis of facility requirements, draft airport development alternatives, and an aircraft noise analysis. Public and Advisory Committee meetings will be scheduled for the third week of October to discuss these draft reports. Your input is valued and I look forward to your participation in this important planning process for Merrill Field.

"The plan is a roadmap for meeting existing and future airport needs. It's a roadmap for meeting the airport's needs into the future. Based on professional evaluations and public involvement, the plan is a process to set short-, mid-, and long-term development goals. It will chart the course so that MRI continues to meet the aviation needs of the community and is compatible with the environment and surrounding neighborhoods."

FAA Approves Master Plan Forecast

The AMP's draft aviation activity forecasts have been approved by the Federal Aviation Administration (FAA). The forecast projects moderate growth in airport activity over the next 20 years (2013-2033):

- Based Aircraft: projected to increase from 827 to 910
- Aircraft Operations (takeoffs and landings): projected to increase from 128,628 to 145,654

- Based Aircraft Fleet Mix: The fleet mix at MRI is expected to remain relatively similar to today. Single engine aircraft will still comprise approximately 90% of the aircraft based at MRI.
- Design Aircraft: Runway 7/25 will accommodate B-II aircraft such as the Beechcraft King Air 200. Runway 16/34 will accommodate slightly smaller B-I aircraft such as the Piper PA-31. Runway 5/23 will continue to serve A-I aircraft such as the Cessna 207.

During the 20 year forecast period, single engine planes are expected to remain the dominant aircraft. However, helicopter activity expected to increase. The number of helicopters based at MRI is expected to increase from 33 to 47.

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Merrill Field Airport/Phase I - Master Plan Update and Noise Exposure Plan

Facilities Requirements

The updated facilities requirements for Merrill Field Airport reflect the aviation activity forecast and conformity to applicable FAA design standards and guidance.

Facilities Requirements include:

- New FAA design standards – Historically, there were two FAA standards for runways serving B-II aircraft; one for small B-II aircraft under 12,500 pounds and another for B-II aircraft including those weighing over 12,500 pounds. FAA has eliminated the small aircraft B-II standard, so Runway 7/25 now needs to meet more comprehensive B-II standards. This may require the Runway Protection Zones to be expanded.
- Meeting existing standards – Improvements may be needed at MRI for the airport to meet existing FAA standards for Runway Safety Areas, Runway Protection Zones, and parallel taxiway setbacks.

Draft Noise Study

The draft noise study evaluated aircraft noise exposure for current (2013) and forecasted (2018) aircraft operations at MRI. According to FAA guidelines, all identified land uses, even the more noise-sensitive ones, are compatible with aircraft noise at DNL values below 65 dB. The study found that one multi-family residential parcel is within the DNL 65 dB contour for both the existing and forecast conditions. There are no housing units or people exposed to greater than 65 dB DNL.

The draft noise study will be available for review on our website in late October.

Alternative Concepts

A set of four preliminary concepts have been prepared to address existing requirements and future airport needs. The proposed improvements reflect the forecasted aviation demand and input from stakeholders such as MRI users and local residents. The improvements were grouped into one of the following four themes:

- Safety, Standards and Asset Preservation – This concept includes improvements which should be considered for safety reasons, to meet an applicable standard, or to maintain MRI's existing assets.
- Existing Trends – Improvements in this theme are intended to maintain the status quo
- Community Focus – This theme emphasizes common uses of airport property and integration with the larger municipal trail system.
- Economic Driver – Improvements included in this theme encourage the growth of aviation activity at MRI.

The improvements in these themes will be evaluated based on technical, cost, and environmental factors as well as public input. The project team wants to hear from the public, MRI users, and other stakeholders about what they like, dislike, and would like to see changed about these concepts. This information will be used as part of the alternative evaluation process to be conducted during Phase II of the AMP update. The recommended development alternative is likely to be a combination of improvements selected from more than one theme.

Illustrations showing the alternative concepts will be available for review on our website in late October.

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A Plan in Two Parts

The first phase of the plan is scheduled to be completed by December 2013. Phase I elements include:

- Airport issues that need to be addressed
- Existing engineering and environmental conditions
- Baseline airport operations and activity
- Future operations and activity forecast
- Baseline noise levels and future noise levels (based on baseline models)
- Airport configuration analysis based on FAA requirements and standards
- Draft alternatives to resolve issues and meet existing and future need

Phase II further refines and evaluates the preliminary alternatives. MRI will identify a preferred alternative solution and develop capital improvement, financing, and airport layout plans prior to submitting the materials to the Municipality of Anchorage Municipal Airports Aviation Advisory Commission, Planning and Zoning Commission, and the Anchorage Assembly. Once the AMP has been approved at the municipal level, it will be submitted to the FAA for final approval.

Did you know...

The mission of Merrill Field is to:

- **Provide an environment that meets the needs of the general aviation community**
- **Encourage private business**
- **Promote economic development**
- **Maintain a viable financial position and**
- **Be a good neighbor within our community.**

Get Involved!

The project team wants to hear from you.

To be successful, the plan needs to hear from everyone who relies on or is affected by the airport, including—airport users such as leaseholders, interested aviation groups, the businesses and people who rely on service from MRI, local neighborhood groups such as Fairview, Mountain View, Russian Jack, Rogers Park, and Airport Heights community councils and others.

There's lots of ways to get involved in the plan.

We look forward to hearing your feedback. Here's some ways that you can get involved:

- Sign up for future newsletters (online)
- Visit our website (www.merrillfieldmasterplan.com)
- Email the project team (contact@merrillfieldmasterplan.com)
- Attend upcoming events

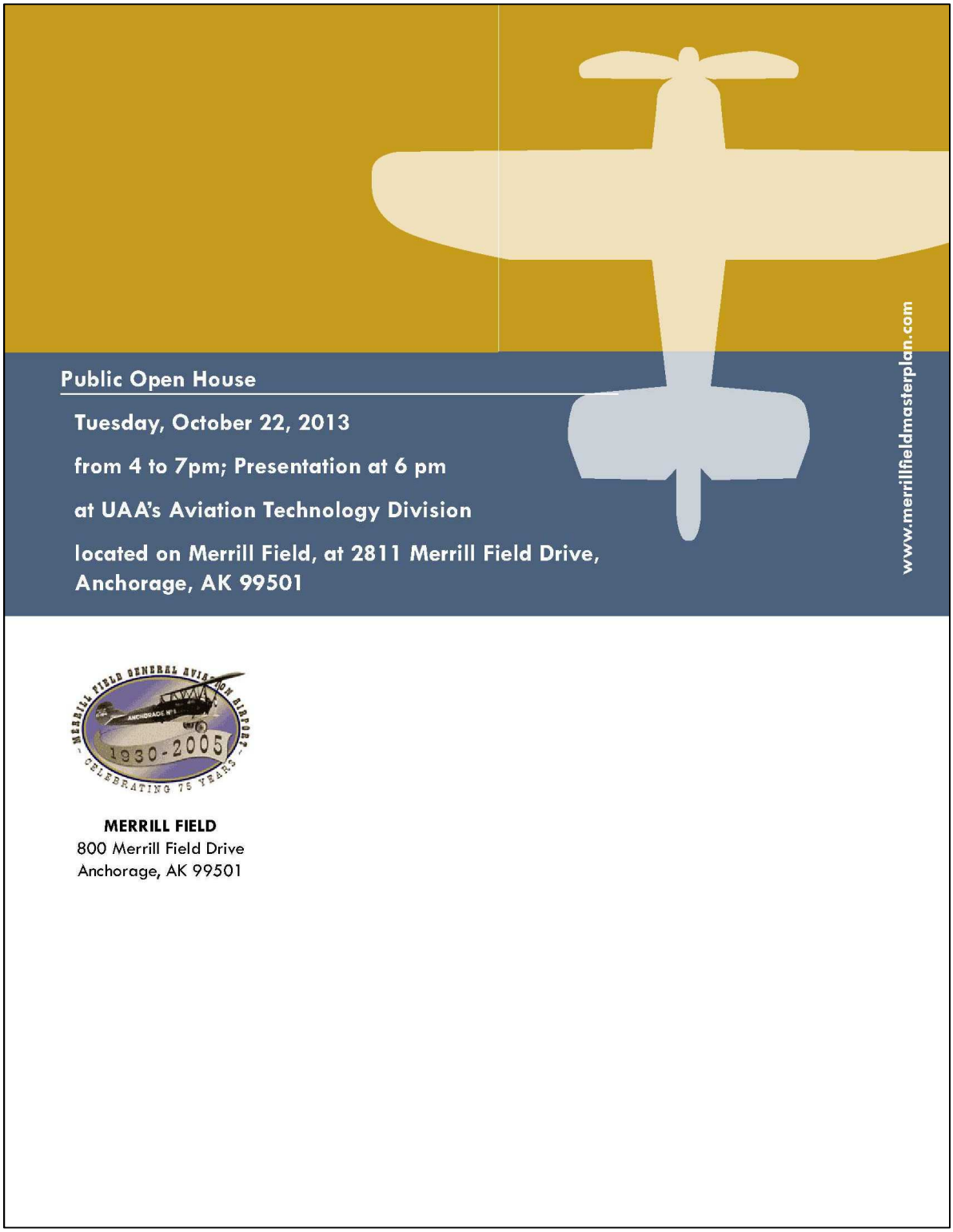
Public Open House

Tuesday, October 22, 2013 from 4-7 pm at UAA's Aviation Technology Division

Presentation at 6 pm

Located on Merrill Field
2811 Merrill Field Drive
Anchorage, AK 99501

PLEASE JOIN US


Public Open House
Tuesday, October 22, 2013
from 4 to 7pm; Presentation at 6 pm
at UAA's Aviation Technology Division
located on Merrill Field, at 2811 Merrill Field Drive,
Anchorage, AK 99501
www.merrillfieldmasterplan.com
MERRILL FIELD GENERAL AVIATION AIRPORT
1930-2005
CELEBRATING 75 YEARS
MERRILL FIELD
800 Merrill Field Drive
Anchorage, AK 99501

J.3 Presentation October 2013

The presentation provided a joint review of the Airport Master Plan and Noise Exposure Map. It was provided to the Airport Advisory Group on October 21, 2013 and to the Public Workshop on October 22, 2013. In addition the Noise Exposure Map presentation was given to a special Fairview Community meeting on October 21, 2013. The full presentation is included here for reference.


Airport Advisory Group Agenda
October 21, 2013 Meeting #3
• Quick Introduction of Project Team and AAG Members Present
• Master Plan Overview and Update
• Noise Analysis Update
• Alternatives Review and Discussion
• Next Steps
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What is a Master Plan?
An airport master plan (AMP) identifies the long-term vision, goals, and objectives for a facility based on anticipated need (forecast).
• Has a 20-year timeframe (to 2033)
• Identifies improvements and infrastructure needs
• Should be updated every 10 years
○ MRI's last master plan was completed in 2000.
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Project Status

Phase 1 (2012/13)

- ✓ Chapter 1 – Overview & Background
- ✓ Chapter 2 – Inventory & Existing Conditions
  - ✓ Inspection report
  - ✓ Issues Inventory
  - ✓ New aerial photography and mapping
- ✓ Chapter 3 – Forecast (approved by FAA)
- ✓ Noise Modeling Inputs
- ✓ As-built ALP approved (approved by FAA)

Working on:

- ❑ Chapter 4 – Facility Requirements
- ❑ Chapter 5– Draft Alternatives
- ❑ Part 150 Noise Study

Phase 2 (2014/15)

- ❑ Alternatives Evaluation
- ❑ Chapter 6 – Recommended Airport Master Plan
  - ❑ Preferred alternative
  - ❑ Capital Improvement Plan
  - ❑ Financial Plan
  - ❑ New Airport Layout Plan
- ❑ Chapter 7 – Coordination and Involvement
- ❑ Adoption/Approval

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Inventory and Inspection

- Interviews
  - Operators
  - Airport Management
  - FAA
  - Maintenance personnel
- Engineering Inspection
  - Runways/Taxiways
  - Aprons
  - Access and Circulation
  - Security and Fencing
  - Snow storage and maintenance
  - Airport buildings and facilities

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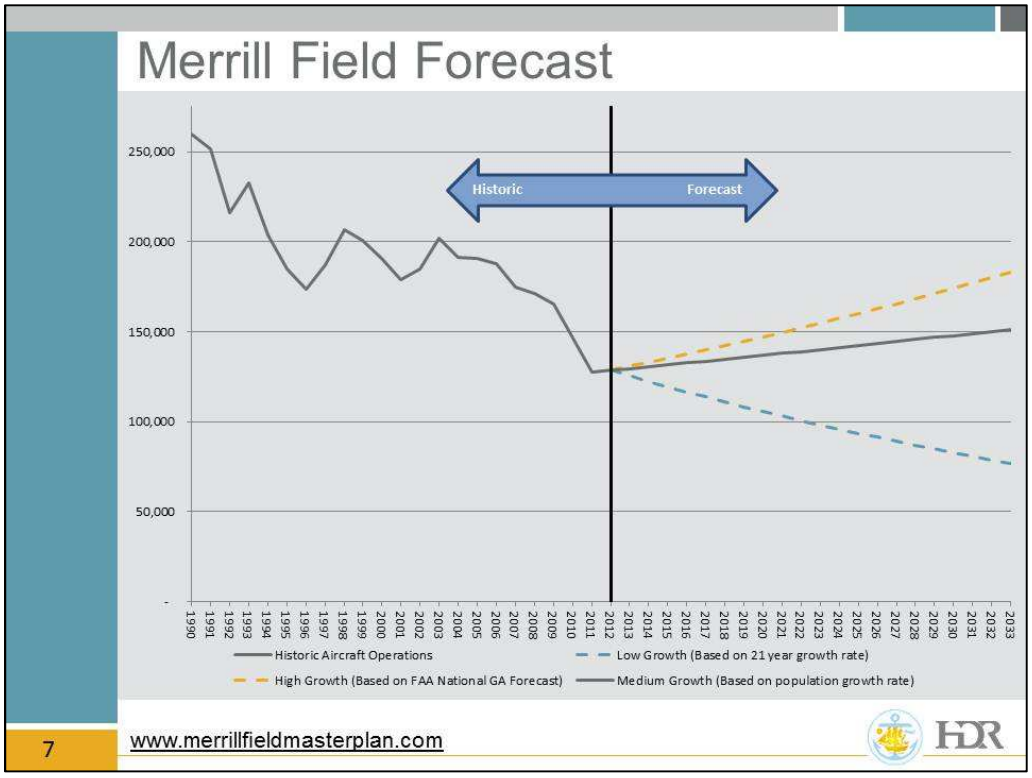
Merrill Field Forecast
250,000
200,000
150,000
100,000
50,000
-
Historic
Forecast
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033
Historic Aircraft Operations
Low Growth (Based on 21 year growth rate)
High Growth (Based on FAA National GA Forecast)
Medium Growth (Based on population growth rate)
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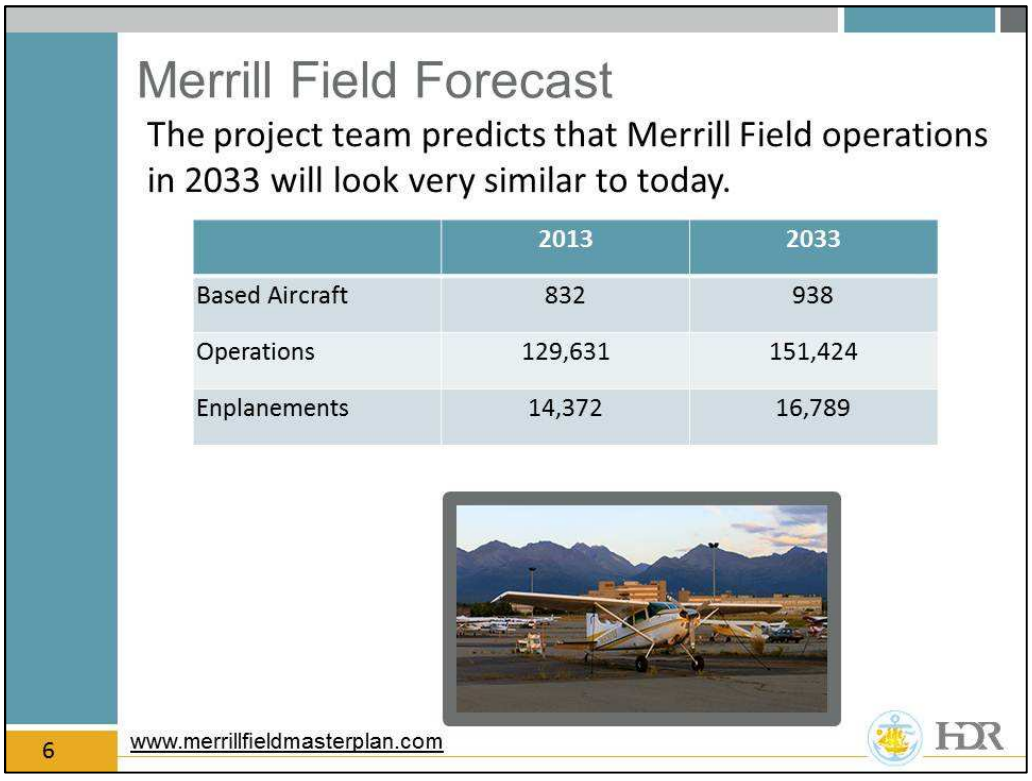
Merrill Field Forecast
The project team predicts that Merrill Field operations in 2033 will look very similar to today.
2013
2033
Based Aircraft
832
938
Operations
129,631
151,424
Enplanements
14,372
16,789
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Merrill Field Noise Exposure Maps - Overview

October 21-22, 2013

- Background
  - A part of the Airport Master Plan effort
  - Developed in accordance with FAA 14 CFR Part 150 guidelines and procedures
- Results
  - Determined the aircraft noise environment
    - Conducted field noise measurements
    - Modeled noise contours using FAA Integrated Noise Model
  - Developed documentation for submittal to the FAA for acceptance

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Scope of Work and Schedule

October 21-22, 2013

Task	Date
Data Collection	June 2012 – May 2013
Summer Aircraft Noise Measurements	June 2012
Winter Aircraft Noise Measurements	November-December 2012
Aircraft Operations Forecast Approval	June 2013
Noise Modeling Inputs Approval	June 2013
Noise Modeling and Draft Report	June-August 2013
Draft Report Review	September-November 2013
Submit Noise Exposure Map to FAA	December 2013

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Data Gathering

October 21-22, 2013

- Community Meetings – June 2012
  - Issues and concerns in relation to aircraft operations
  - Identified locations for noise measurements
- Discussions with FAA – June 2012
  - Reporting requirements for the Noise Exposure Map update
- Discussions with Airport, Airport Users and FAA Tower
  - Airport Configuration (runways, taxiways, etc.)
  - Aircraft types using airport and operations
  - Runway use
  - Flight tracks and use
  - Noise sensitive locations in vicinity of airport
  - Noise measurements and observations of aircraft activity

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DNL and Land Use Compatibility

October 21-22, 2013

- Federal Aviation Administration Guidelines
  - All land uses compatible below DNL 65 dB
- U.S. Dept. of HUD published "standards" for federal funding of residential construction
  - Acceptable ≤ DNL 65 dB
  - Normally unacceptable DNL 65 to DNL 75 dB (additional sound insulation required)
  - Unacceptable above DNL 75 dB (case-by-case conditional approval)

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Noise Measurement Program
October 21-22, 2013
Community noise levels
Ambient noise levels
Aircraft source noise levels
Arrivals and departures
Summer measurements – June 2012
Winter measurements – November-December 2012
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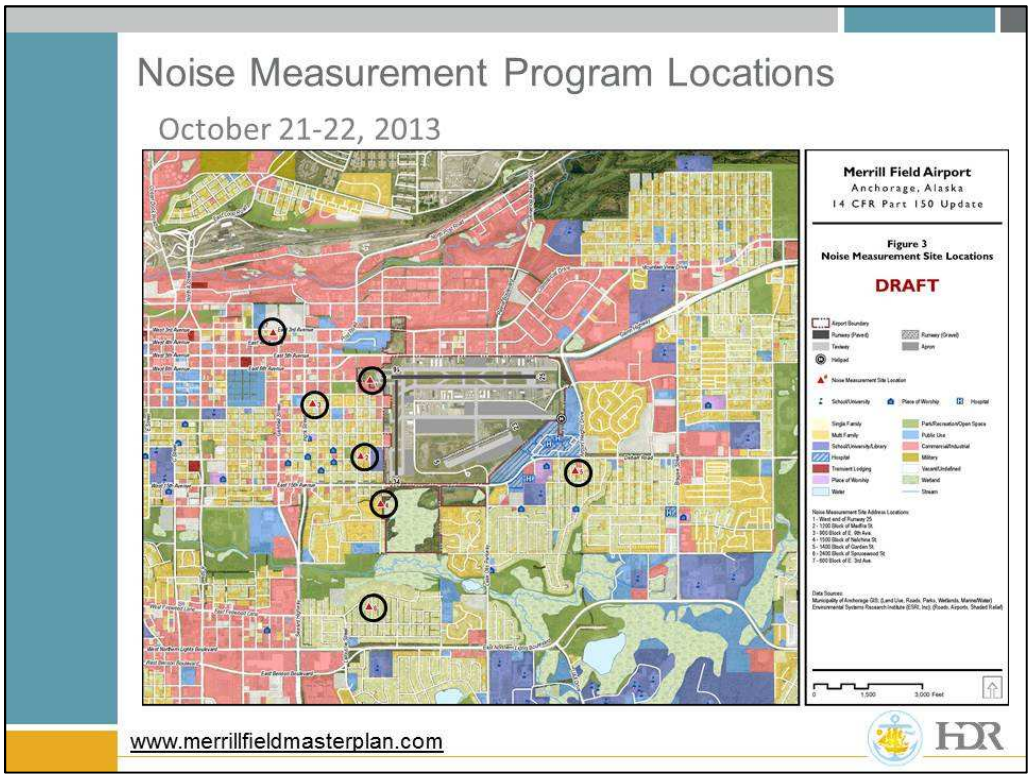
Noise Measurement Program Locations
October 21-22, 2013
Merrill Field Airport
Anchorage, Alaska
14 CFR Part 150 Update
Figure 3
Noise Measurement Site Locations
DRAFT
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Noise Measurement Program Results
DNL All Sources

October 21-22, 2013

- On-airport DNL 62-68 dB
- Off-airport DNL 54-62 dB
  - Suburban to urban DNL

Site #	Total Daily DNL (dB) (All Sources)									
	June 2012 Measurements									
	Fri. 6/8/12	Sat. 6/9/12	Sun. 6/10/12	Mon. 6/11/12	Tue. 6/12/12	Wed. 6/13/12	Thu. 6/14/12	Fri. 6/15/12	Sat. 6/16/12	Sun. 6/17/12
1	66	65	66	65	62	66	67	67	68	67
2	57	56	57	57	54	57	54	56	55	56
3	P	59	P	-	-	-	-	-	-	-
4	-	-	P	60	P	-	-	-	-	-
5	-	-	-	-	P	55	P	-	-	-
6	-	-	-	-	-	-	P	54	P	-
7	-	-	-	-	-	-	-	-	P	62
	November-December 2012 Measurements									
	Fri. 11/30/12	Sat. 12/1/12	Sun. 12/2/12	Mon. 12/3/12	Tue. 12/4/12	Wed. 12/5/12	Thu. 12/6/12			
1	64	65	63	65	65	66	65			
2	56	56	56	55	P	55	P			

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Noise Measurement Program Results
Estimated Aircraft DNL

October 21-22, 2013

- On-airport DNL 61-67 dB
- Off-airport DNL 45-59 dB
  - At least 3 dB difference

Site #	Total Daily DNL (dB) (Estimated Aircraft)									
	June 2012 Measurements									
	Fri. 6/8/12	Sat. 6/9/12	Sun. 6/10/12	Mon. 6/11/12	Tue. 6/12/12	Wed. 6/13/12	Thu. 6/14/12	Fri. 6/15/12	Sat. 6/16/12	Sun. 6/17/12
1	65	65	66	65	62	65	66	67	67	66
2	50	48	50	54	47	49	47	53	50	48
3	P	56	P	-	-	-	-	-	-	-
4	-	-	P	54	P	-	-	-	-	-
5	-	-	-	-	P	46	P	-	-	-
6	-	-	-	-	-	-	P	49	P	-
7	-	-	-	-	-	-	-	-	P	59
	November-December 2012 Measurements									
	Fri. 11/30/12	Sat. 12/1/12	Sun. 12/2/12	Mon. 12/3/12	Tue. 12/4/12	Wed. 12/5/12	Thu. 12/6/12			
1	62	64	61	63	65	65	64			
2	45	45	47	48	P	49	P			

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Noise Measurement Program Results
Estimated Aircraft Events and Lmax Range

October 21-22, 2013

- On-airport daily noise events 68-293 (estimated departures)
- Off-airport daily noise events 11-131

Site #	Estimated Aircraft Events Above 65 dB and Lmax Range										
	June 2012 Measurements										
	Fri. 6/8/12	Sat. 6/9/12	Sun. 6/10/12	Mon. 6/11/12	Tue. 6/12/12	Wed. 6/13/12	Thu. 6/14/12	Fri. 6/15/12	Sat. 6/16/12	Sun. 6/17/12	Lmax Range (dB)
1	175	162	184	264	81	211	293	238	222	136	68-107
2	121	60	74	131	46	91	54	66	66	45	65-82
3	P	93	P	-	-	-	-	-	-	-	65-92
4	-	-	P	85	P	-	-	-	-	-	65-93
5	-	-	-	-	P	27	P	-	-	-	65-79
6	-	-	-	-	-	-	P	28	P	-	65-82
7	-	-	-	-	-	-	-	-	P	62	65-96
	November-December 2012 Measurements										
	Fri. 11/30/12	Sat. 12/1/12	Sun. 12/2/12	Mon. 12/3/12	Tue. 12/4/12	Wed. 12/5/12	Thu. 12/6/12				
1	198	123	120	94	68	100	90				65-102
2	36	32	25	35	11	54	15				65-84

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Noise Modeling

October 21-22, 2013

- FAA's Integrated Noise Model version 7.0
  - Input
    - Airport physical configuration
    - Aircraft operations
      - Aircraft types
      - Number of operations
      - Time of day
      - Nominal flight tracks
    - Meteorological data
  - Output
    - Existing (2013) noise exposure map
    - Forecast (2018) noise exposure map
- Compared results to compatible land use guidelines

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Noise Modeling Inputs
Aircraft Operations from Master Plan Forecast

October 21-22, 2013

2013 Operations Summary

Category	Number of Annual Operations Forecast	Number of Annual Average Daily Operations Modeled
General Aviation - Itinerant	69,354	190.0120
General Aviation - Local	60,277	165.1436
Total	129,631	355.1556

2018 Operations Summary

Category	Number of Annual Operations Forecast	Number of Annual Average Daily Operations Modeled
General Aviation - Itinerant	72,100	197.5358
General Aviation - Local	62,666	171.6866
Total	134,766	369.2224

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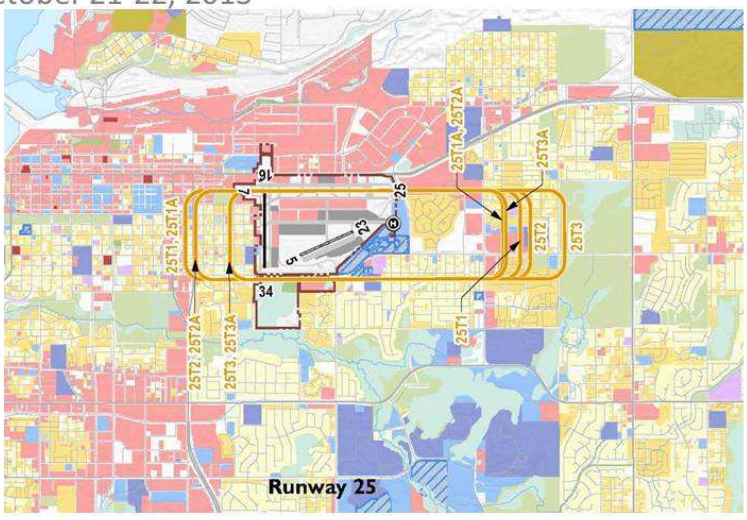
Noise Modeling Inputs
Aircraft Flight Tracks – Local Pattern

October 21-22, 2013



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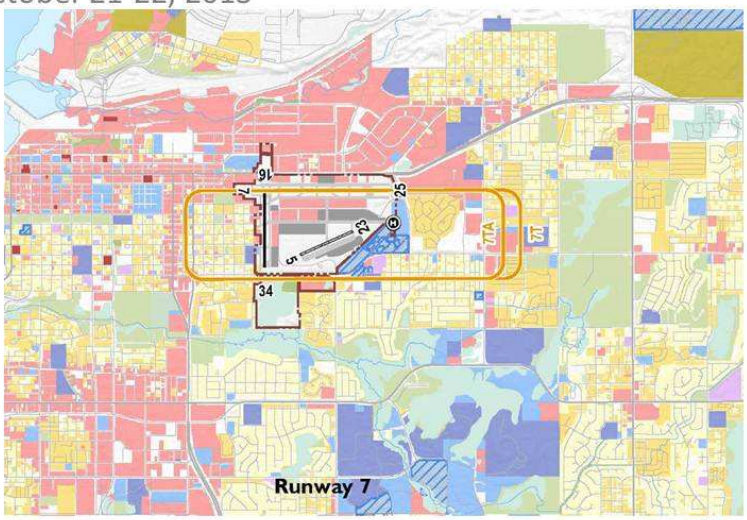
Noise Modeling Inputs
Aircraft Flight Tracks – Local Pattern

October 21-22, 2013



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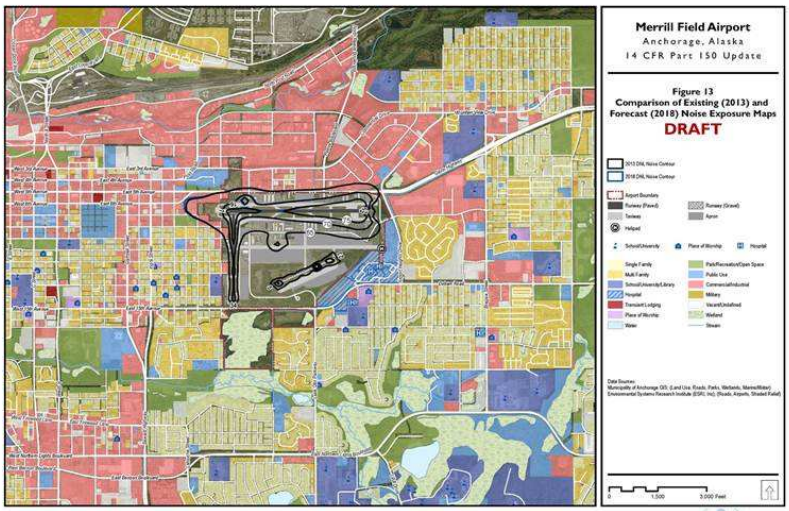
Noise Modeling Results
Comparison of Existing and Forecast DNL Contours

October 21-22, 2013



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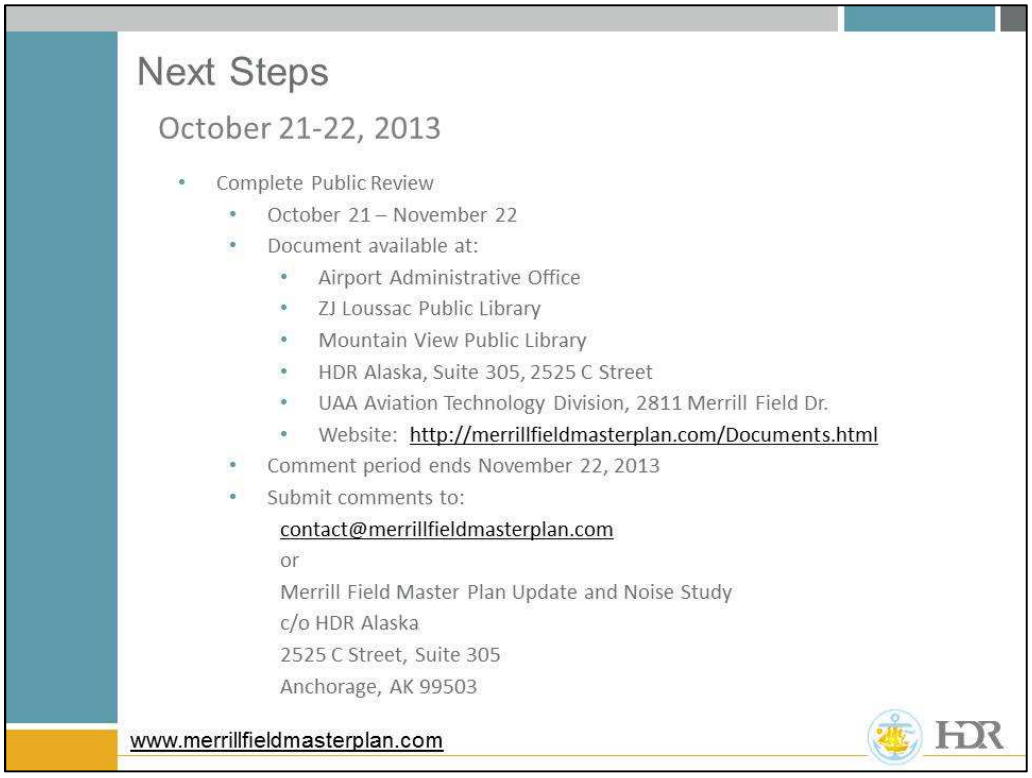
Next Steps
October 21-22, 2013
Complete Public Review
October 21 – November 22
Document available at:
Airport Administrative Office
ZJ Loussac Public Library
Mountain View Public Library
HDR Alaska, Suite 305, 2525 C Street
UAA Aviation Technology Division, 2811 Merrill Field Dr.
Website: http://merrillfieldmasterplan.com/Documents.html
Comment period ends November 22, 2013
Submit comments to:
contact@merrillfieldmasterplan.com
or
Merrill Field Master Plan Update and Noise Study
c/o HDR Alaska
2525 C Street, Suite 305
Anchorage, AK 99503
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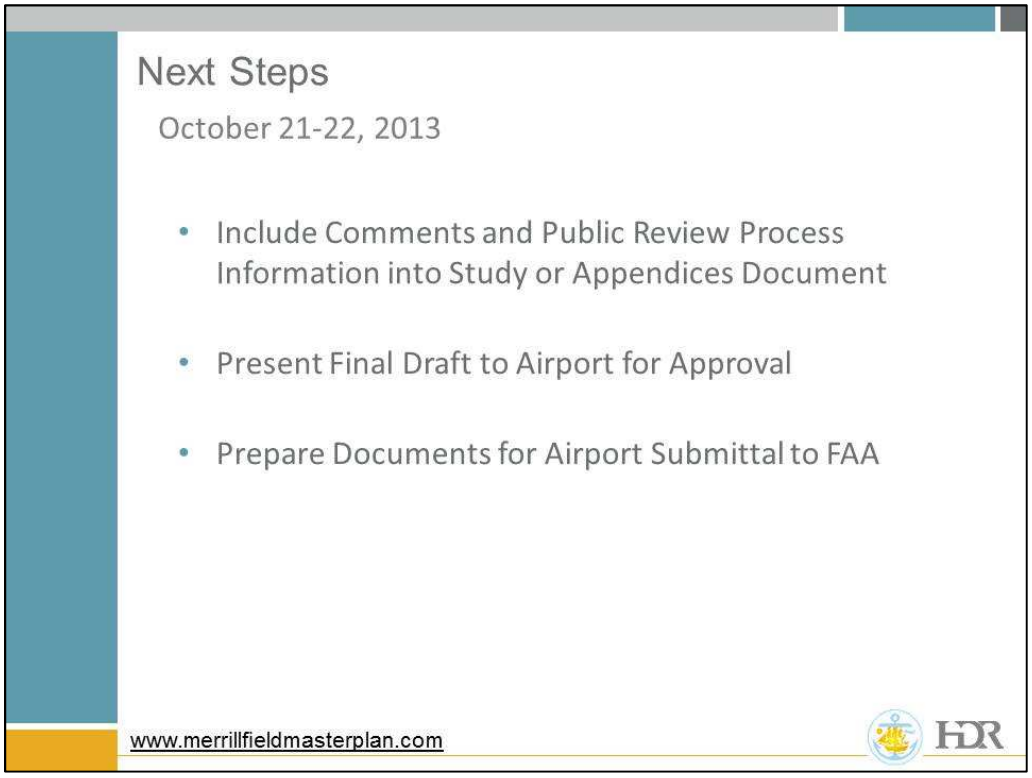
Next Steps
October 21-22, 2013
Include Comments and Public Review Process Information into Study or Appendices Document
Present Final Draft to Airport for Approval
Prepare Documents for Airport Submittal to FAA
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Questions

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Facility Requirements

- Facility requirements are based on the FAA approved forecast
- Compare capacity with demand
- Compare built environment to FAA Standards
- Changes to MRI based on new standards may include:
  - Runway safety areas
  - Runway protection zones
  - Parallel taxiway setbacks

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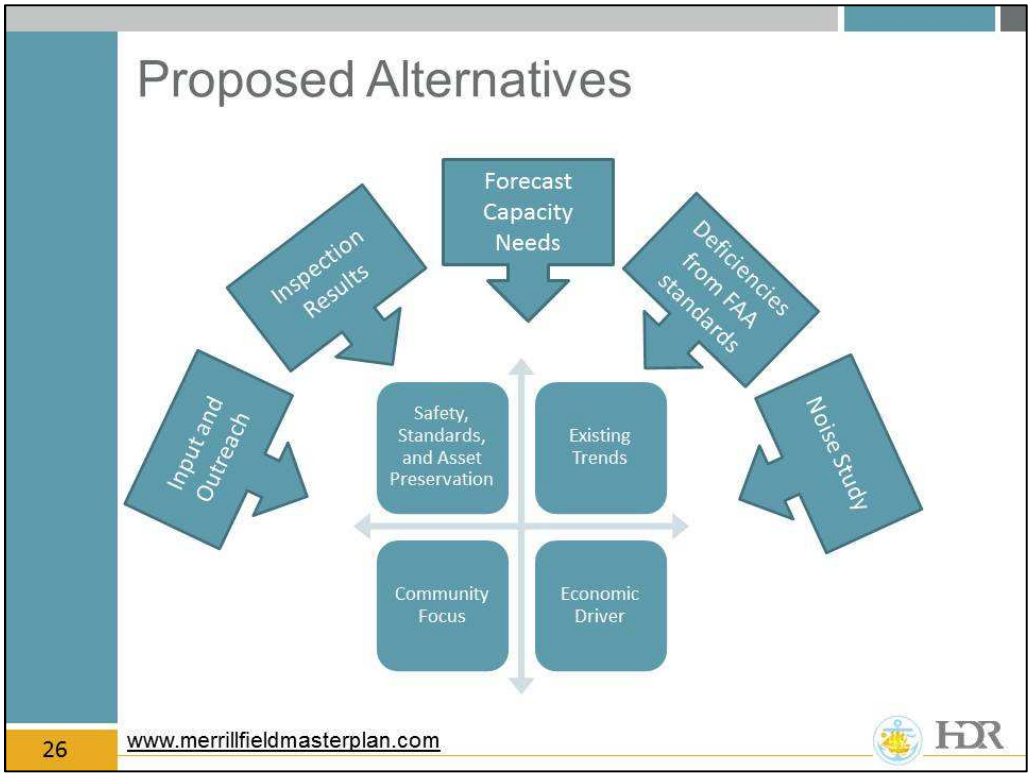
Proposed Alternatives
Forecast Capacity Needs
Inspection Results
Deficiencies from FAA standards
Input and Outreach
Noise Study
Safety, Standards, and Asset Preservation
Existing Trends
Community Focus
Economic Driver
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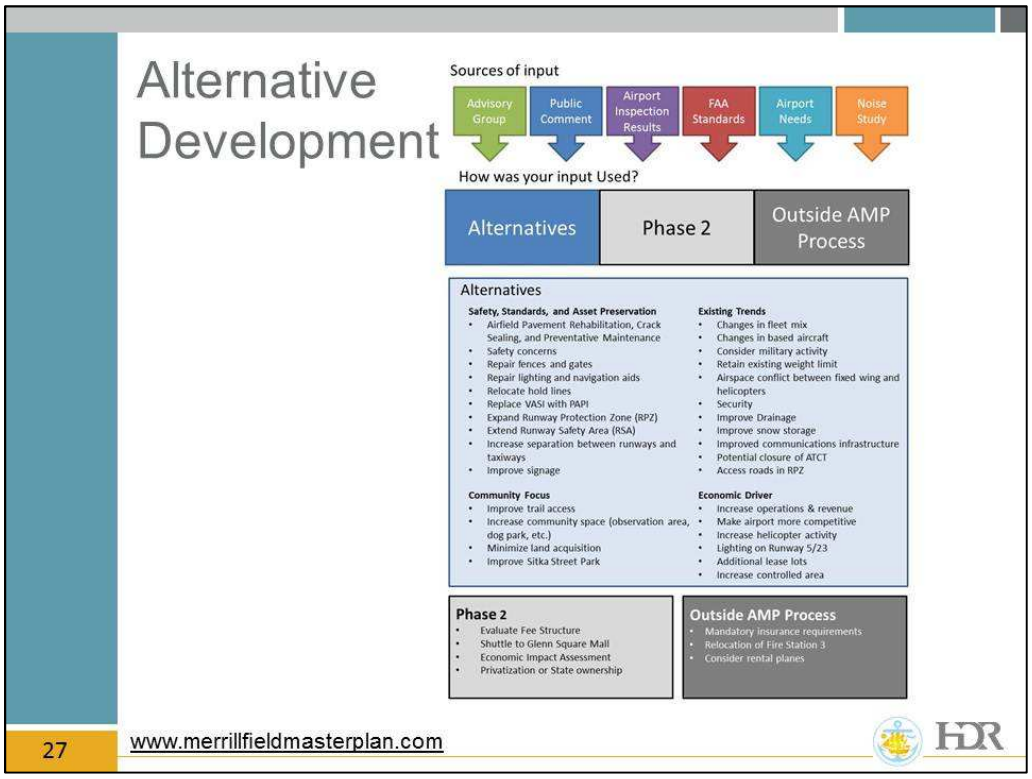
Alternative Development
Sources of input
Advisory Group
Public Comment
Airport Inspection Results
FAA Standards
Airport Needs
Noise Study
How was your input Used?
Alternatives
Phase 2
Outside AMP Process
Alternatives
Safety, Standards, and Asset Preservation
Airfield Pavement Rehabilitation, Crack Sealing, and Preventative Maintenance
Safety concerns
Repair fences and gates
Repair lighting and navigation aids
Relocate hold lines
Replace VASI with PAPI
Expand Runway Protection Zone (RPZ)
Extend Runway Safety Area (RSA)
Increase separation between runways and taxiways
Improve signage
Existing Trends
Changes in fleet mix
Changes in based aircraft
Consider military activity
Retain existing weight limit
Airspace conflict between fixed wing and helicopters
Security
Improve Drainage
Improve snow storage
Improved communications infrastructure
Potential closure of ATCT
Access roads in RPZ
Community Focus
Improve trail access
Increase community space (observation area, dog park, etc.)
Minimize land acquisition
Improve Sitka Street Park
Economic Driver
Increase operations & revenue
Make airport more competitive
Increase helicopter activity
Lighting on Runway 5/23
Additional lease lots
Increase controlled area
Phase 2
Evaluate Fee Structure
Shuttle to Glenn Square Mall
Economic Impact Assessment
Privatization or State ownership
Outside AMP Process
Mandatory insurance requirements
Relocation of Fire Station 3
Consider rental planes
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Proposed Alternatives

Based on the FAA approved forecast and input from MRI users and local residents we have grouped potential improvements around the following 4 themes:

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Alternative—Safety, Standards and Asset Preservation

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Alternative—Community Focus

Community Focus

This scenario would include all of the improvements identified in the Safety, Standards and Preservation scenario, plus:

Airfield and Air Traffic Control
- Noise control

Ground Access and Parking
1. Tunnel
- Pedestrian access and parking improvements

Airport Support
- Potential closure of ATCT

Other
1. Observation area(s)
2. Additional community purpose area(s)
3. Additional green space
4. Sitka Street Community Use Area improvements
- Ongoing coordination with Fairview community
- Youth aviation program
- Realtor education program

Runway Protection Zone (RPZ)

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Alternative—Existing Trends

Existing Trends

This scenario would include all of the improvements identified in the Safety, Standards and Preservation scenario, plus:

Airfield and Air Traffic Control
1. Roads in RPZ
2. Drainage
3. Location identification
4. Property acquisition and records
5. Continue Taxiway B
6. Additional tie-down spaces
- Airspace safety when ATCT closed
- Airspace conflicts between fixed-wing and helicopter traffic
- Security for AOA and aircraft parking

Airport Support
1. Snow storage

Other
- Compatibility with other airports
- Internet connection infrastructure
- Wireless broadband interference
- Long-term maintenance of information and records

Runway Protection Zone (RPZ)

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Alternative—Economic Driver

Economic Driver

This scenario would include all of the improvements identified in the Safety, Standards and Preservation scenario, plus:

- **Airfield and Air Traffic Control**
  1. Promote helicopter training, establish helicopter terrain park
  2. Provide lighting on Runway 5/23
  3. Increase area under ATCT control
  4. Lease areas
  - Promote use by larger aircraft: remove 12,500 lb weight limit
  - Add commerical and/or residential airpark
- **Airport Support**
  1. New service road
- **Utility Service**
  1. De-icing facility
  2. Fueling facility
  3. Additional aircraft wash
- **Passenger Terminal/Administrative Complex**
  1. Relocate/Redesign Airport Manager's office, passenger terminal
- Runway Protection Zone (RPZ)

32 www.merrillfieldmasterplan.com

Preferred Alternative—Likely a Hybrid

33 www.merrillfieldmasterplan.com

Next Steps

- 30-Day Comment Period (by Thanksgiving)
  - Comments on Facility Requirements.
  - Comments on Draft Alternatives
  - Comments on Noise Study
- Finalize chapters/reports (by end of the year)
- Additional Advisory Committee Meeting
- Additional Newsletter

Phase 2 – Early 2014

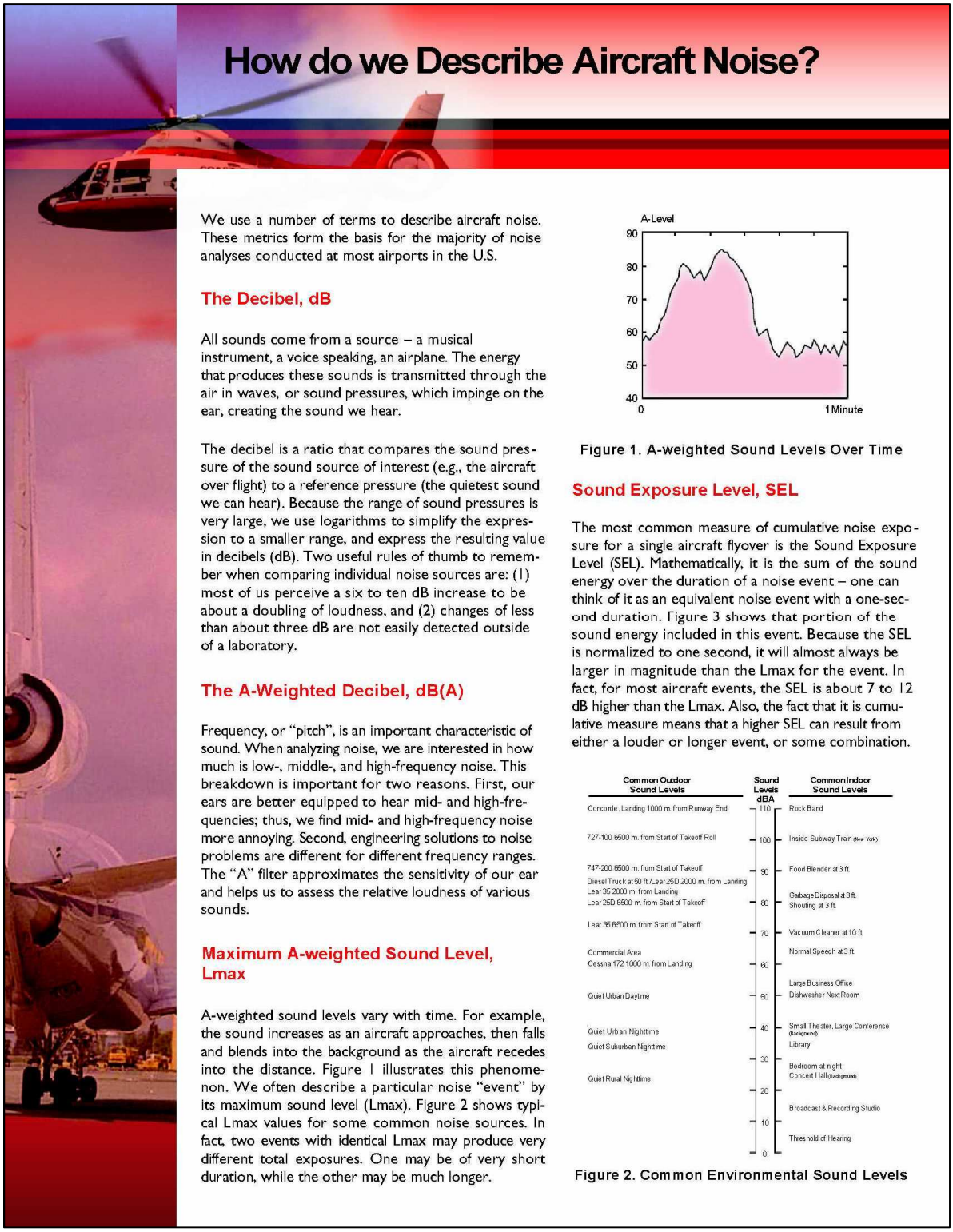
1 www.merrillfieldmasterplan.com

Discussion

- We would like your feedback on the draft documents.
- Any questions?

1 www.merrillfieldmasterplan.com

J.4 Noise Handouts for October 2013 Meetings/Workshop



How do we Describe Aircraft Noise?

We use a number of terms to describe aircraft noise. These metrics form the basis for the majority of noise analyses conducted at most airports in the U.S.

The Decibel, dB

All sounds come from a source – a musical instrument, a voice speaking, an airplane. The energy that produces these sounds is transmitted through the air in waves, or sound pressures, which impinge on the ear, creating the sound we hear.

The decibel is a ratio that compares the sound pressure of the sound source of interest (e.g., the aircraft over flight) to a reference pressure (the quietest sound we can hear). Because the range of sound pressures is very large, we use logarithms to simplify the expression to a smaller range, and express the resulting value in decibels (dB). Two useful rules of thumb to remember when comparing individual noise sources are: (1) most of us perceive a six to ten dB increase to be about a doubling of loudness, and (2) changes of less than about three dB are not easily detected outside of a laboratory.

The A-Weighted Decibel, dB(A)

Frequency, or "pitch", is an important characteristic of sound. When analyzing noise, we are interested in how much is low-, middle-, and high-frequency noise. This breakdown is important for two reasons. First, our ears are better equipped to hear mid- and high-frequencies; thus, we find mid- and high-frequency noise more annoying. Second, engineering solutions to noise problems are different for different frequency ranges. The "A" filter approximates the sensitivity of our ear and helps us to assess the relative loudness of various sounds.

Maximum A-weighted Sound Level, Lmax

A-weighted sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. Figure 1 illustrates this phenomenon. We often describe a particular noise "event" by its maximum sound level (Lmax). Figure 2 shows typical Lmax values for some common noise sources. In fact, two events with identical Lmax may produce very different total exposures. One may be of very short duration, while the other may be much longer.

Figure 1. A-weighted Sound Levels Over Time

Sound Exposure Level, SEL

The most common measure of cumulative noise exposure for a single aircraft flyover is the Sound Exposure Level (SEL). Mathematically, it is the sum of the sound energy over the duration of a noise event – one can think of it as an equivalent noise event with a one-second duration. Figure 3 shows that portion of the sound energy included in this event. Because the SEL is normalized to one second, it will almost always be larger in magnitude than the Lmax for the event. In fact, for most aircraft events, the SEL is about 7 to 12 dB higher than the Lmax. Also, the fact that it is cumulative measure means that a higher SEL can result from either a louder or longer event, or some combination.

Figure 2. Common Environmental Sound Levels

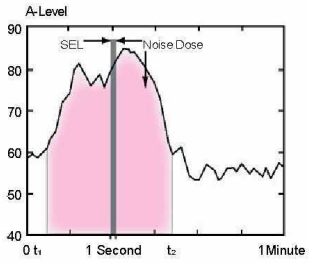


Figure 3. Sound Exposure Level

SEL provides a comprehensive way to describe noise events for use in modeling and comparing noise environments. Computer noise models base their computations on SEL values.

Day-Night Average Sound Level, DNL

The Day-Night Average Sound Level (DNL) represents noise as it occurs over a 24-hour period, with the assumption noise events occurring at night (10 p.m. to 7 a.m.) are 10 dB louder than they really are. This 10 dB penalty is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive because nighttime ambient noise is less than daytime ambient noise.

Figure 4 depicts a hypothetical daily noise dose. The top frame repeats the one-minute noise exposure that was shown in Figure 1. The center frame includes this one-minute interval within a full hour; now the shaded area represents the noise during that hour with 16 noise events, each producing an SEL. Finally, the bottom frame includes the one-hour interval within a full 24 hours. Here the shaded area represents the listener's noise dose over a full day.

DNL normally can be measured with standard monitoring equipment or predicted with computer models.

Most aircraft noise studies utilize computer-generated estimates of DNL, determined by accounting for all of the SELs from individual events which comprise the total noise dose at a given location on the ground.

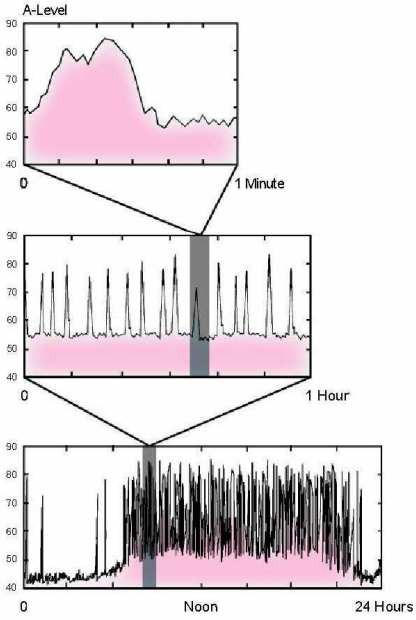


Figure 4. Daily Noise Dose

Computed values of DNL are often depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). DNL contours usually reflect annual average operating conditions, taking into account the average number of flights each day, how often each runway is used throughout the year, and where over the surrounding communities the aircraft normally fly.

What is the Noise Study?

The Noise Study is part of the overall Merrill Field Airport Master Plan update that includes an in-depth noise and land use compatibility study conducted in accordance with Title 14 of the Code of Federal Regulations Part 150 (14 CFR Part 150 or Part 150). The Study involves developing a detailed analysis of aircraft-related noise levels, noise exposure in the community from aircraft operations and the variables that affect aircraft noise, and working with the community to address its concerns. A consulting team led by HDR Alaska, Inc. is conducting the Airport Master Plan with Harris Miller Miller & Hanson Inc. (HMMH) leading the Noise Study. The study will result in a detailed report prepared for the Municipality of Anchorage (MOA) Merrill Field Airport and submitted to the Federal Aviation Administration (FAA) for acceptance.

What does the Noise Study include?

The principal technical element of this Noise Study is the development of the Noise Exposure Maps (NEMs). The NEMs include aircraft noise exposure contours created using FAA's Integrated Noise Model (INM). The noise contours are overlaid on a map that depicts the airport's layout and operation, the community's land uses surrounding the airport, and the aircraft-related noise exposure reflecting operations occurring during the year of submission to the FAA (2013) and noise anticipated to occur in a forecast year, which is five years in the future (2018) as mandated by FAA.

Are noise measurements used to define the noise environment?

Noise measurements provide important input for understanding the noise environment around an airport. While 14 CFR Part 150 does not require noise monitoring for the development of the NEMs, the regulation[1] provides specific guidelines for data acquisition and refinement for airports that desire to conduct noise measurements and report the results in the NEM. Ultimately Part 150 requires that the INM be used for obtaining Day-Night Average Sound Level (DNL, the average noise level over a 24-hour period with an additional 10-dB weighting for nighttime noise events from 10:00 pm – 7:00 am) contours for the following reasons: (a) measurements are practical only for obtaining DNL values for a limited numbers of points, (b) in the absence of a permanently installed monitoring system, noise measurements only cover relatively short time periods, and (c) noise measurements are snapshots of existing conditions and cannot be used to predict or evaluate future conditions.

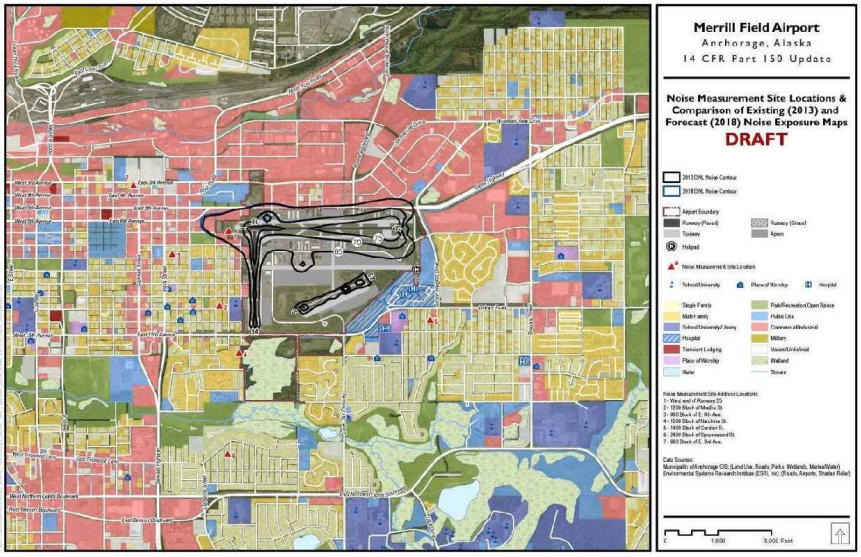
Noise measurements were conducted in the airport environs at seven locations in June 2012 and at two of the same locations in November-December 2012.

What are the results of the modeling process?

The objective of airport noise compatibility planning is to promote the compatible growth and development of airports with their surrounding communities. The MOA uses the FAA's land-use compatibility guidelines, as set forth in 14 CFR Part 150, which consider all land uses to be compatible with aircraft-related DNL below 65 dB.

The draft results, shown on the following graphic, present the existing (2013) and forecast (2018) conditions DNL contours overlaid on a base land use map. The outer contour is the DNL 65 dB contour. The results indicate that for both 2013 and 2018 there is one residential parcel (off the west end of Runway 7-25) identified within the DNL 65 dB contour and not compatible within the FAA land use compatibility guidelines.

[1] 14 CFR Part 150 Appendix A, Part A, Section A150.5



What happens next?

There is a 30-day period for the public to review and provide comments. This will occur from October 21 through November 22, 2013. The document is available for review at the following locations;

- Merrill Field Airport Administrative Office, 800 Merrill Field Drive
- ZJ Loussac Public Library, 3600 Denali Street
- Mountain View Branch Library, 120 Bragaw Street
- HDR Alaska, Suite 305, 2525 C Street
- UAA Aviation Technology Division, 2811 Merrill Field Drive

It is also available on the web at http://merrillfieldmasterplan.com/Documents.html

Comments must be received no later than November 22, 2013 to:

Email: contact@merrillfieldmasterplan.com or

Mail: Merrill Field Master Plan and Noise Study
c/o HDR Alaska, Inc.
2525 C Street
Anchorage, AK 99503

After the review, the document will then be submitted by the MOA to the FAA in December 2013 for review and consideration of acceptance.

Upon FAA acceptance, the MOA may consider reviewing airport operations or other options to further mitigate airport noise and eliminate any land use incompatibilities.

J.5 NEM Update Display Boards for Public Workshop October 2013

Noise Measurement Program Results - DNL All Sources

www.hmmh.com

- On-airport site DNL 62-68 dB
- Off-airport sites DNL 54-62 dB
  - Suburban to urban DNL

Site #	Total Daily DNL (dB) (All Sources)									
	June 2012 Measurements									
	Fri. 6/8/12	Sat. 6/9/12	Sun. 6/10/12	Mon. 6/11/12	Tue. 6/12/12	Wed. 6/13/12	Thu. 6/14/12	Fri. 6/15/12	Sat. 6/16/12	Sun. 6/17/12
1	66	65	66	65	62	66	67	67	68	67
2	57	56	57	57	54	57	54	56	55	56
3	P	59	P	-	-	-	-	-	-	-
4	-	-	P	60	P	-	-	-	-	-
5	-	-	-	-	P	55	P	-	-	-
6	-	-	-	-	-	-	P	54	P	-
7	-	-	-	-	-	-	-	-	P	62
	November-December 2012 Measurements									
	Fri. 11/30/12	Sat. 12/1/12	Sun. 12/2/12	Mon. 12/3/12	Tue. 12/4/12	Wed. 12/5/12	Thu. 12/6/12			
1	64	65	63	65	65	66	65			
2	56	56	56	55	P	55	P			

Noise Measurement Program Results - Estimated Aircraft DNL

www.hmmh.com

- On-airport site Aircraft DNL 61-67 dB
- Off-airport sites Aircraft DNL 45-59 dB
  - At least 3 dB difference

Site #	Total Daily DNL (dB) (Estimated Aircraft)									
	June 2012 Measurements									
	Fri. 6/8/12	Sat. 6/9/12	Sun. 6/10/12	Mon. 6/11/12	Tue. 6/12/12	Wed. 6/13/12	Thu. 6/14/12	Fri. 6/15/12	Sat. 6/16/12	Sun. 6/17/12
1	65	65	66	65	62	65	66	67	67	66
2	50	48	50	54	47	49	47	53	50	48
3	P	56	P	-	-	-	-	-	-	-
4	-	-	P	54	P	-	-	-	-	-
5	-	-	-	-	P	46	P	-	-	-
6	-	-	-	-	-	-	P	49	P	-
7	-	-	-	-	-	-	-	-	P	59
	November-December 2012 Measurements									
	Fri. 11/30/12	Sat. 12/1/12	Sun. 12/2/12	Mon. 12/3/12	Tue. 12/4/12	Wed. 12/5/12	Thu. 12/6/12			
1	62	64	61	63	65	65	64			
2	45	45	47	48	P	49	P			

Noise Measurement Program
Results - Estimated Aircraft Events and Lmax Range

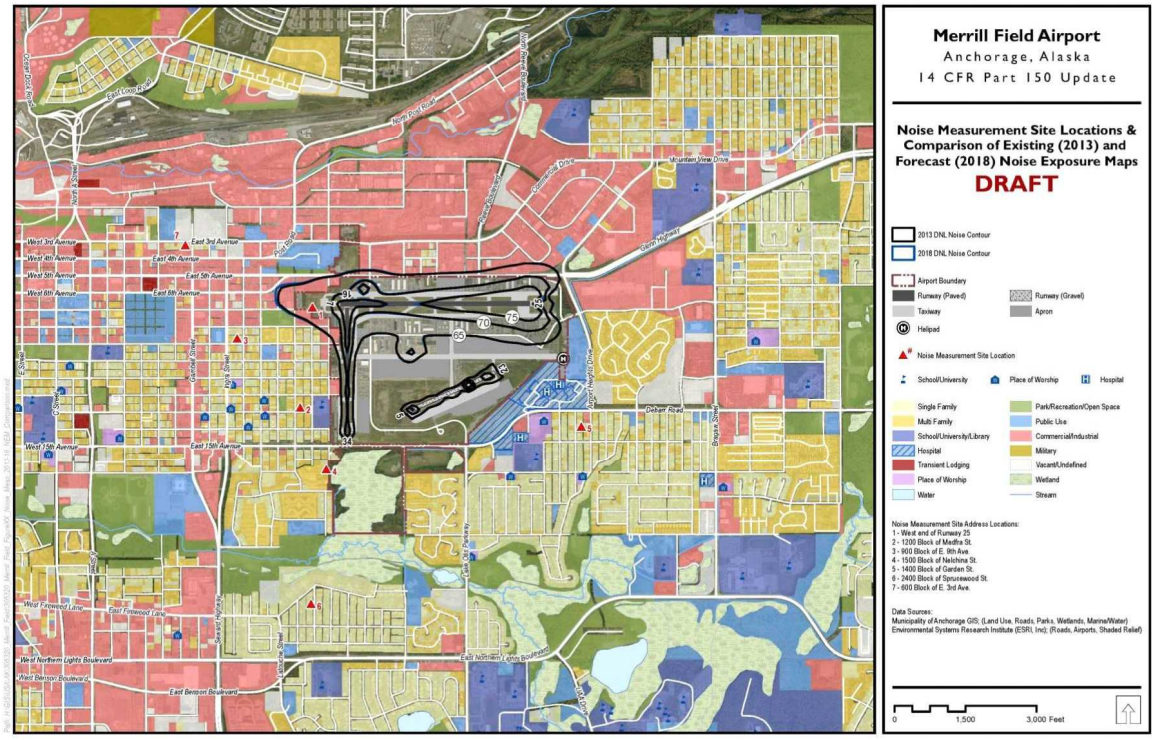
www.hmmh.com

- On-airport site daily noise events 81-293 (estimated departures)
- Off-airport sites daily noise events 27-131

Site #	Estimated Aircraft Events Above 65 dB and Lmax Range										
	June 2012 Measurements										
	Fri. 6/8/12	Sat. 6/9/12	Sun. 6/10/12	Mon. 6/11/12	Tue. 6/12/12	Wed. 6/13/12	Thu. 6/14/12	Fri. 6/15/12	Sat. 6/16/12	Sun. 6/17/12	Lmax Range (dB)
1	175	162	184	264	81	211	293	238	222	136	68-107
2	121	60	74	131	46	91	54	66	66	45	65-82
3	P	93	P	-	-	-	-	-	-	-	65-92
4	-	-	P	85	P	-	-	-	-	-	65-93
5	-	-	-	-	P	27	P	-	-	-	65-79
6	-	-	-	-	-	-	P	28	P	-	65-82
7	-	-	-	-	-	-	-	-	P	62	65-96
	November-December 2012 Measurements										
	Fri. 11/30/12	Sat. 12/1/12	Sun. 12/2/12	Mon. 12/3/12	Tue. 12/4/12	Wed. 12/5/12	Thu. 12/6/12				
1	198	123	120	94	68	100	90				65-102
2	36	32	25	35	11	54	15				65-84

Noise Modeling Results
Comparison of Existing and Forecast DNL Contours

www.hmmh.com



J.6 Airport Advisory Group Meeting October 21, 2013 Sign-in Sheets

Airport Advisory Group Meeting
October 21, 2013

UAA Aviation Building, Room 243
Anchorage

11:30—1:00 PM

	Name	Organization	E-mail	Phone
1.	Carl Siebe	HDR	Carl.Siebe@hdrinc.com	644-2163
2.	BRIAN OCHS	FAA/MRI ATCT	brian.ochs@faa.gov	271 2698
3.	Jim Cieplak	Ak Av Safety Foundation	jcieplak@gci.net	360-5544
4.	ROCKY CAPOZZI	UAA AVIATION	rpcapozzi@uaa.alaska.edu	786-7208
5.	Jim Powell	MOA Av. Com'n	planepowell@gci.net	229-1013

	Name	Organization	E-mail	Phone
6.	John McPherson	HDR	John.McPherson@hdrinc.com	644-2013
7.	MITCH STANALAND	ALASKA REGIONAL HOSPITAL	MITCHELL.STANALAND@HCAHEALTHCARE.COM	264 1277
8.	Mike Edelman	FAA/Airports	mike.edelman@faa.gov	907-271-5026
9.	ALLEN KEMPLEN	FCC	NARDCITY@GMAIL.COM	907 274-9772
10.	MARK MADDEN	MOA/SWS	maddenmg@muni.org	907 343-6279
11.	Debra Fitzgerald	MOA	fitzgerald dl @ muni.org	907. 343.4481
12.	Mio Johnson	99s	johnsonm@muni.org	263-5408
13.	Carol Wong	MOA	wongcc@muni.org	343-7920
14.	ALEX JUMAAS	MRI		343-6311
15.	Stacey Dean	Planning/Zoning Comm	Stacey@graffingconstruction.com	344-5783
16.	Jairus Duncan	Tanalian Aviation	jairus@tanalianaviation.com	280-8023
17.	MARK BARKER	Tanalian Aviation	mark@tanalianaviation.com	280-8023

AAG Meeting—October 21, 2013 page 2

	Name	Organization	E-mail	Phone
18.	CRAIG LYON	MOA-AMATS	lyonch@muni.org	343-7996
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				

AAG Meeting—October 21, 2013 page 3

J.7 Fairview Community Meeting October 21, 2013 Sign-in Sheet

Merrill Field Airport Master Plan Update and Noise Study

Fairview Noise Workshop

October 21, 7:00pm – 8:00pm
Fairview Recreational Center

Name	Email	Phone
John McPherson	John.McPherson@hdrinc.com	644-2013
BRIAN OCHS	brian.ochs@faa.gov	271-2698
Pam Bowen	BowenPJ@muni.org	343-6301
Harry Need	~~tacq@~~ hwneed@hotmail.com	310-5747
SJ Klein	sje fairviewcommunity.org	727-6774

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J.8 Public Workshop October 22, 2013 Sign-in Sheets

Merrill Field Airport Master Plan Update and Noise Study

Public Meeting #2

October 22, 2013, 4:00pm – 7:00pm
UAA Aviation Technology Division
2811 Merrill Field Dr., Anchorage, AK 99501

Name	Email	Phone
Myla Nawiesniak	815-347-9726	MFnawiesniak@alaska.edu
TRED OWENS	907-	907-278-8440
Michael Collins		707-991-4644
Mike Edelman	Mike.edelman@faa.gov	907 271 5026
RODRICK MATHENY	rodmatheny@yahoo.com	(208) 553 4499
Kayla Epstein	Kayla epstein48@yahoo.com	(907) 337-1688
Jamie Patterson Simes	jsimes@alaska.net	
Paul Reich	pdreich@gci.net	272-9679
Carol Anderson	carolkanderson@gci.net	830-3398

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Merrill Field Airport Master Plan Update and Noise Study

Public Meeting #2

October 22, 2013, 4:00pm – 7:00pm
UAA Aviation Technology Division
2811 Merrill Field Dr., Anchorage, AK 99501

Name	Email	Phone
ALEX JUMAO-AS		343-6311
ROB SWENSON	robswe gci.net	441-2654
Pat Shryock		907-469-0635
michal Chamberlain		907-223-9209
Sharon Chamard	chamard@gci.net	222-0649
Kirk Huff	Kirk.huff.ctr@us.af.mil	384-1064
John Whitlock		227-5662
Tom Crowley	crowleyx4@gci.net	274-8709
Nathan Zenker	nathanzenker@gmail	
Max Gruenberg	rep.max.gruenberg@legis.state.ak.us	269-0123

Merrill Field Airport Master Plan Update and Noise Study

Public Meeting #2

October 22, 2013, 4:00pm – 7:00pm
UAA Aviation Technology Division
2811 Merrill Field Dr., Anchorage, AK 99501

Name	Email	Phone
Camden Yehle	camdenyehle@gmail.com	
Leah Henderson	Lhenderson@dawlhtm.com	562-2000

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J.9 Public Comments Received during Comment Period or at Public Meetings/Workshop, October 2013

J.9.1 Summary of comments at 2013 Public Workshop

Public Meeting #2

Tuesday, October 22, 2013

UAA Aviation Technology Building

Twenty-one individuals signed in for the open house, although additional students and others traveling through the UAA Aviation Building viewed the open house materials. Approximately 13 people attended the presentation.

A display of approximately 15 boards about topics and issues addressed by the master plan update was available for inspection by the public before the formal presentation. Planning Team staff members circulated among the displays answering questions. A narrated PowerPoint presentation was later delivered in the auditorium, followed by a question/answer session.

Questions from the Public

Question (Q): Is the duration of noise events taken into consideration in the model? Helicopter noise is of longer duration than noise from fixed-wing aircraft.
Answer (A): Yes, duration is factored into the development of the noise contours shown on the mapping.

Q: Does the model take into consideration the seasonal peaks of activity and noise at MRI?
A: Yes, it is taken into consideration in calculating the annual average day contour, but the model does not calculate an average summer day contour. The noise measurement program did take summer readings and is reflective of peak days.

Q: Do the noise contours identify buildings that would be eligible for financial assistance?
A: Noise contours are used to identify buildings affected by noise. One building was identified and incompatible within the 65DB contour. Whether financial assistance would be available for that one building has not been determined and is not a part of the current study's scope.

Q: What is the difference between itinerant and local GA traffic?
A: Local GA traffic is generally described as operations by aircraft based at the airport, it is traffic that stays in the traffic pattern for the airport. All other traffic is classified as itinerant.

Q: Why did you choose those days of the week for off-site noise measurements?
A: Noise measurements were collected at Sites 1 and 2, which were in residential areas known to be among the most noise-averse locations, on a 24-hour basis for a continuous 12-day period.

www.merrillfieldmasterplan.com

For other data collection sites, the day of the week when data were collected was determined based on the location of volunteers who came to the first noise workshop. Volunteer locations were selected to try to represent noise levels of typical operations and patterns.

Q: Is the tunnel shown on the alternative drawing a pedestrian tunnel?
A: Yes.

Q: Why did you pick site for Rogers Park noise monitoring?
A: The Rogers Park collection site was chosen because it was volunteered by the property owner, it was in a residential development, and it was located near a major flight corridor to the north south runway that tends to receive noise complaints.

Q: Is there a possibility for a dog park?
A: A dog park has been suggested by members of the public during the initial round of public outreach. The airport property south of E15th Avenue or along the bluff over the old landfill might be compatible for use as a dog park. This option will be explored in the next phase of the plan's development.

J.9.2 Draft Resolution by Fairview Community Council

A Resolution relating to the update of the Merrill Field Airport Master Plan

Whereas, the Fairview Community Council is officially recognized by the Municipality of Anchorage as the designated forum for civic participation at the neighborhood level, and

Whereas, Council boundaries extend over the western third of the Municipally owned and operated Merrill Field Airport, and

Whereas, the operational behavior of aircraft activities at Merrill Field have raised "issues of concern" within the Council, and

Whereas, these issues of concern include:

1. Excessive noise from low-flying aircraft deviating from published departure/approach procedures.
2. Excessive noise from revving aircraft engines at west side T-hangers
3. Excessive encroachment of industrial use upon residential commercial properties,
4. Excessive removal of private property from the tax rolls for non-revenue producing aviation use,
5. Excessive number of aircraft crashes with associated loss of life, significant injuries and property damage.

Whereas, the current effort by Merrill Field to update its Airport Master Plan presents an opportunity to address these issues of concern in a substantive and meaningful way, and

Whereas, recent Phase I work tasks and published deliverables reveal inadequate attention to Council issues of concern, and

Whereas, this lack of attention is documented by:

1. No discussion of the number, location, severity or cause of aircraft crashes in the published chapters nor in the draft alternatives,
2. Proposed expansion of Runway 7 Runway Protection Zone (RPZ) that would eliminate viable commercial properties,
3. Continued acquisition of residential properties of runway __ thus destroying a neighborhood niche of single-family, owner-occupied homes,
4. No discussion of T-hanger noise and need for mitigation,
5. Quantitative data acquired from the 2013 Noise Study showing noise events above 65 dB in the middle of a residential neighborhood exceeding 100 unique events in a 24-hour period.

Whereas, there is acknowledgement that Merrill Field has shown some sensitivity to Council concerns by adding a noise study to the update of the Airport Master Plan using FAA Part 150 guidelines and hosting two noise workshops at the Fairview Community Recreation Center, and

Whereas, it has been pointed out that Part 150 guidelines for development of noise contours is meant for airports with regular scheduled commercial aviation services operating 365 days a year while Merrill Field activities are heavily seasonal in nature thus resulting in unrepresentative noise contours for the peak activity periods, and

Whereas, the Council passed Resolution xxxx requesting the AMP process include analysis of radar data to document prevailing aircraft patterns

Therefore, Be It Resolved that the Fairview Community Council acting as the voice of residents, businesses and property owners in the area immediately west of Merrill Field Airport makes the following recommendations:

- ☒ Include support for community oriented improvements at Sitka Park including, but not limited to, a new paved trail connection along the eastern edge of Sitka Park southward from the entrance to the Chester Creek Greenbelt,
- ☒ Request the removal of recommendations that remove private property from the tax rolls to support non-tax producing aviation uses. This includes no further acquisition of private property along Orca Street and no expansion of the RPZ for Runway 7.
- ☒ Address the RPZ for Runway 7 using a displaced threshold or other technique that eliminates the harmful neighborhood impacts of a weakened commercial economic base,
- ☒ Include a recommendation for design and construction of a noise barrier along the western and southwestern edges of the field to mitigate the negative impacts of revving aircraft engines by users of the T-hangers and taxiing aircraft,
- ☒ Address the issue of public safety by quantifying for the public record the location, date and severity aircraft crashes associated with aviation activities at Merrill Field Airport,
- ☒ Include a recommendation that flight training activities operating in a circling pattern around Merrill Field maintain a minimum height of at least 900 feet about residential housing,
- ☒ Address the issue of noise mitigation through the inclusion of recommendations that:
    - Merrill Field FAA Tower to adopt an official policy of minimizing the number of approvals for variances from the published arrival and departures procedures for aircraft,
    - Merrill Field FAA Tower to maintain a record of early departures by date, time and flight and submit the data on a quarterly basis to the Municipal Airport Aviation Advisory Commission for inclusion review and inclusion into the public record,
    - Merrill Field implement a more robust pilot education program on the Good Neighbor Policy, the issue of negative noise impacts and aircraft safety procedures,
    - Merrill Field implement a permanent noise monitoring program to include installation of strategically placed noise detection and reporting equipment within the neighborhood of Fairview with options for expansion to the neighborhoods of Rogers Park and Airport Heights,
- ☒ Include the recommendation that Merrill Field take the lead in promoting the development of an accountability mechanism for repeat and flagrant violators of the

Merrill Field Good Neighbor Policy to include, but not be limited to, adoption of a fine-based Municipal Ordinance.

Resolution is or is not approved/disapproved by a vote of _____ Ayes, _____ Nays and ____ Abstains on the _____ day of December 2013.

Attested to by:

_____
SJ Klein, President
Fairview Community Council

J.9.3 Municipality of Anchorage/ Merrill Field Airport response to Fairview Community Council draft resolution

MUNICIPALITY OF ANCHORAGE

Merrill Field Airport

Ph. 907-343-6303

Mayor Dan Sullivan

December 5, 2013

SJ Klein, President
Fairview Community Council

RE: Fairview Community Council Draft Resolution Query

Dear SJ Klein,

Thank you for your comments on the Merrill Field Airport Master Plan (AMP) Update and Noise Study and sharing your council's draft Resolution. We appreciate your council's active interest and input into our AMP planning process. Based on the draft resolution you sent on November 22, 2013, we will be considering several of your recommendations as part of our AMP update. Below are our responses to the specific recommendations mentioned in the draft resolution:

- Community oriented improvements – The Community Focus Alternative will be refined to include a new paved trail connection along the eastern edge of Sitka Park southward from the entrance to the Chester Creek Greenbelt. This connection will be studied as part of the alternative evaluation process. Recommended recreational improvements will be coordinated with the MOA's Parks and Recreation Department as it will be their responsibility to fund and implement this type of improvement.
- Proposed expansion of Runway 7 Runway Protection Zone (RPZ) – The RPZ expansion is proposed in order to meet Federal Aviation Administration (FAA) safety standards. The purpose of the RPZ is to enhance safety and to protect people and property on the ground. The FAA recommends compatible land uses within the RPZ for safety purposes. The Safety, Standards, and Asset Preservation Alternative will be modified to include considering the use of a displaced threshold to meet RPZ requirements without needing to acquire additional property to accomplish the same purpose. The alternative evaluation process will be used to identify the most suitable way to meet the RPZ standard for Runway 7.
- Minimize property acquisition along Orca Street - Property acquisition along Orca Street is included in the plan because this land is needed to meet the need for aviation related land. The previous 2000 Merrill Field Airport Master Plan (AMP) recommended property acquisition of several properties adjoining Runway 16/34 is to ensure airport's compatible land use. There are two such parcels of land remaining for acquisition (Potelcom and City Electric properties). The acquisition of these properties will provide continuous full-length access between Taxiway Bravo and Runway 16/34 on the west side, which is a high safety priority for this airport. These two property parcels along Orca Street are the only Fairview Community area parcels that the Merrill Field (MRI) AMP has identified for future airport acquisition.

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Please also note that while Merrill Field owned property does not pay Municipal property taxes, all airfield parcels that are leased by private entities are leased at market rates and provide an important source of income for the airport. Furthermore, all Lessees also pay property taxes on their improvements to their leased property.

Additionally, while MOA owned enterprises such as Merrill Field do not pay Municipal property taxes, per se, they do pay a Municipal Enterprise Service Assessment (MESA). The MESA – in the past also known as Payment-In-Lieu-Of-Taxes - is a payment similar to property tax that is assessed to Merrill Field to pay for the governmental services provided to the airport. As a result, Airport owned property and the taxed Lessee improvements thereupon provide a substantial contribution to the Municipal budget.

- Noise barrier along western and southwestern edge of the airfield – A noise barrier will be considered as part of the alternative evaluation process. Standard airport operating procedures, which Merrill Field regularly reminds airport users of, is that engine run ups (which involve the revving of aircraft engines) along Runway 16/34 should occur only on the airfield side of the hangars.
- Aircraft crashes – A discussion of aircraft crashes was added to Chapter 2 of the AMP in response to comments we received on the draft chapter. The revised Chapter 2, along with the revised Chapters 1, 3, 4 and 5, which incorporate the comments received to date will be published at the conclusion of Phase 1 of the AMP update. We anticipate publishing these revised chapters in the Spring of 2014.
- Flight training activities should be a minimum height of at least 900 feet above residential housing – Currently at Merrill Field, the published air traffic pattern altitude for Merrill Field Airport is 900 feet when flying over urban areas. While it is obvious that take offs and landing must necessarily be below 900 feet, specific aircraft height above underlying terrain during these procedures will vary and will be a function of specific flight paths, as well as the performance abilities of each aircraft. In all events, ALL aircraft operators at MRI are reminded to "Fly Friendly," noise-wise, relative to adjoining neighborhoods.
- Have the FAA Tower minimize variances from published arrival and departure patterns – This concern will be shared with the FAA as Merrill Field does not have the ability to dictate how the Air Traffic Control Tower (ATCT) controls air traffic. Published arrivals and departure patterns are intended to provide guidelines for pilots rather than as act as a regulatory procedure, plus actual conditions may require pilots to deviate from the published procedure for the safe operation of their aircraft. Notwithstanding that limitation, MRI actively engages with the FAA ATCT to emphasize the need for aircraft operators at MRI to "Fly Friendly," noise-wise, relative to adjoining neighborhoods.
- Have the FAA Tower record early departures – This concern will be shared with the FAA as Merrill Field does not have the ability to require the ATCT to collect this type of information.
- More robust pilot education program – Merrill Field will consider ways its "Fly Friendly" program can be expanded as part of the alternative evaluation process.
- Permanent noise monitoring equipment – The installation of permanent noise monitoring equipment is not being considered at this time because it would not provide the airport with additional information to help reduce the noise impact on adjacent residential areas. The FAA requires a Part 150 noise study to document noise levels and uses that information to determine if the airport can apply for FAA funds for noise mitigation. A Part 150 study is based on a model that uses inputs on plane

type, the number of operations, runway use, etc. and does not need the results of noise monitoring equipment. One issue that limits the usefulness of noise monitors is that they can record events over a certain noise threshold but they do not record the source of the sound. For example, the noise monitoring equipment does not know if the noise is from an airplane, a passing car, or another noise source. Merrill Field does recognize that aircraft noise is a significant concern for all of the communities adjacent to MRI.

- Accountability mechanism – As part of the "Fly Friendly" program, Merrill Field contacts the pilots of aircraft responsible for a noise complaint in cases where the pilot has been identified. Merrill Field will consider ways the "Fly Friendly" program could be modified to address pilots that are responsible for an excessive number of complaints.

Additionally, FYI, the federal 14 CFR Part 150 guidelines used to develop the noise study are applicable to all airports nationwide, regardless of airport size and type of activity. This allows the results to be comparable to other airports and determines if the airport is eligible for FAA funds for noise mitigation activities. The resulting noise contours reflect the noise on the day-night average sound level on an annual basis as required by the FAA. ONLY when this national federal standard noise level is exceeded will the FAA participate in noise mitigating/insulating efforts: adjoining neighborhood MRI noise contours do not exceed this threshold.

If you have further comments or concerns, please contact me at paul.bowers@muni.org or 343-6303. I will have a representative to attend your scheduled December 12, 2013 Council meeting to address questions as well.

Sincerely,

Paul Bowers, AAE
Airport Manager

J.9.4 Final Resolution by Fairview Community Council, December 12, 2013

A Resolution relating to the update of the Merrill Field Airport Master Plan

Whereas, the Fairview Community Council is officially recognized by the Municipality of Anchorage as the designated forum for civic participation at the neighborhood level, and

Whereas, Council boundaries extend over the western third of the Municipally owned and operated Merrill Field Airport, and

Whereas, the operational behavior of aircraft activities at Merrill Field have raised "issues of concern" within the Council, and

Whereas, these issues of concern include:

1. Excessive noise from low-flying aircraft deviating from published departure/approach procedures.
2. Excessive noise from revving aircraft engines at west side T-hangers
3. Excessive encroachment of industrial use upon residential commercial properties,
4. Excessive removal of private property from the tax rolls for non-revenue producing aviation use,
5. Excessive number of aircraft crashes with associated loss of life, significant injuries and property damage.

Whereas, the current effort by Merrill Field to update its Airport Master Plan presents an opportunity to address these issues of concern in a substantive and meaningful way, and

Whereas, recent Phase I work tasks and published deliverables reveal inadequate attention to Council issues of concern, and

Whereas, this lack of attention is documented by:

1. No discussion of the number, location, severity or cause of aircraft crashes in the published chapters nor in the draft alternatives,
2. Proposed expansion of Runway 7 Runway Protection Zone (RPZ) that would eliminate viable commercial properties,
3. Continued acquisition of residential properties of runway __ thus destroying a neighborhood niche of single-family, owner-occupied homes,
4. No discussion of T-hanger noise and need for mitigation,
5. Quantitative data acquired from the 2013 Noise Study showing noise events above 65 dB in the middle of a residential neighborhood exceeding 100 unique events in a 24-hour period.

Whereas, there is acknowledgement that Merrill Field has shown some sensitivity to Council concerns by adding a noise study to the update of the Airport Master Plan using FAA Part 150 guidelines and hosting two noise workshops at the Fairview Community Recreation Center, and

Whereas, it has been pointed out that Part 150 guidelines for development of noise contours is meant for airports with regular scheduled commercial aviation services operating 365 days a year while Merrill Field activities are heavily seasonal in nature thus resulting in unrepresentative noise contours for the peak activity periods, and

Whereas, the Council passed Resolution xxxx requesting the AMP process include analysis of radar data to document prevailing aircraft patterns

Therefore, Be It Resolved that the Fairview Community Council acting as the voice of residents, businesses and property owners in the area immediately west of Merrill Field Airport makes the following recommendations:

- Include support for community oriented improvements at Sitka Park including, but not limited to, a new paved trail connection along the eastern edge of Sitka Park southward from the entrance to the Chester Creek Greenbelt,
- Request the removal of recommendations that remove private property from the tax rolls to support non-tax producing aviation uses. This includes no further acquisition of private property along Orca Street and no expansion of the RPZ for Runway 7.
- Request the removal of any recommendation for raising the maximum weight limit for aircraft transiting Merrill Field.
- Address the RPZ for Runway 7 using a displaced threshold or other technique that eliminates the harmful neighborhood impacts of a weakened commercial economic base,
- Include a recommendation for design and construction of a noise barrier along the western and southwestern edges of the field to mitigate the negative impacts of revving aircraft engines by users of the T-hangers and taxiing aircraft,
- Address the issue of public safety by quantifying for the public record the location, date and severity aircraft crashes associated with aviation activities at Merrill Field Airport,
- Include a recommendation that flight training activities operating in a circling pattern around Merrill Field maintain a minimum height of at least 900 feet about residential housing,
- Address the issue of noise mitigation through the inclusion of recommendations that:
    - Merrill Field FAA Tower to adopt an official policy of minimizing the number of approvals for variances from the published arrival and departures procedures for aircraft,

  - Merrill Field FAA Tower to maintain a record of early departures by date, time and flight and submit the data on a quarterly basis to the Municipal Airport Aviation Advisory Commission for inclusion review and inclusion into the public record,
  - Merrill Field implement a more robust pilot education program on the Good Neighbor Policy, the issue of negative noise impacts and aircraft safety procedures,
  - Merrill Field implement a permanent noise monitoring program to include installation of strategically placed noise detection and reporting equipment within the neighborhood of Fairview with options for expansion to the neighborhoods of Rogers Park and Airport Heights,
- Include the recommendation that Merrill Field take the lead in promoting the development of an accountability mechanism for repeat and flagrant violators of the Merrill Field Good Neighbor Policy to include, but not be limited to, adoption of a fine-based Municipal Ordinance.

Resolution is or is not approved/disapproved by a vote of 14 Ayes, 0 Nays and 0 Abstains on the 12 day of December 2013.

Attested to by:

_____

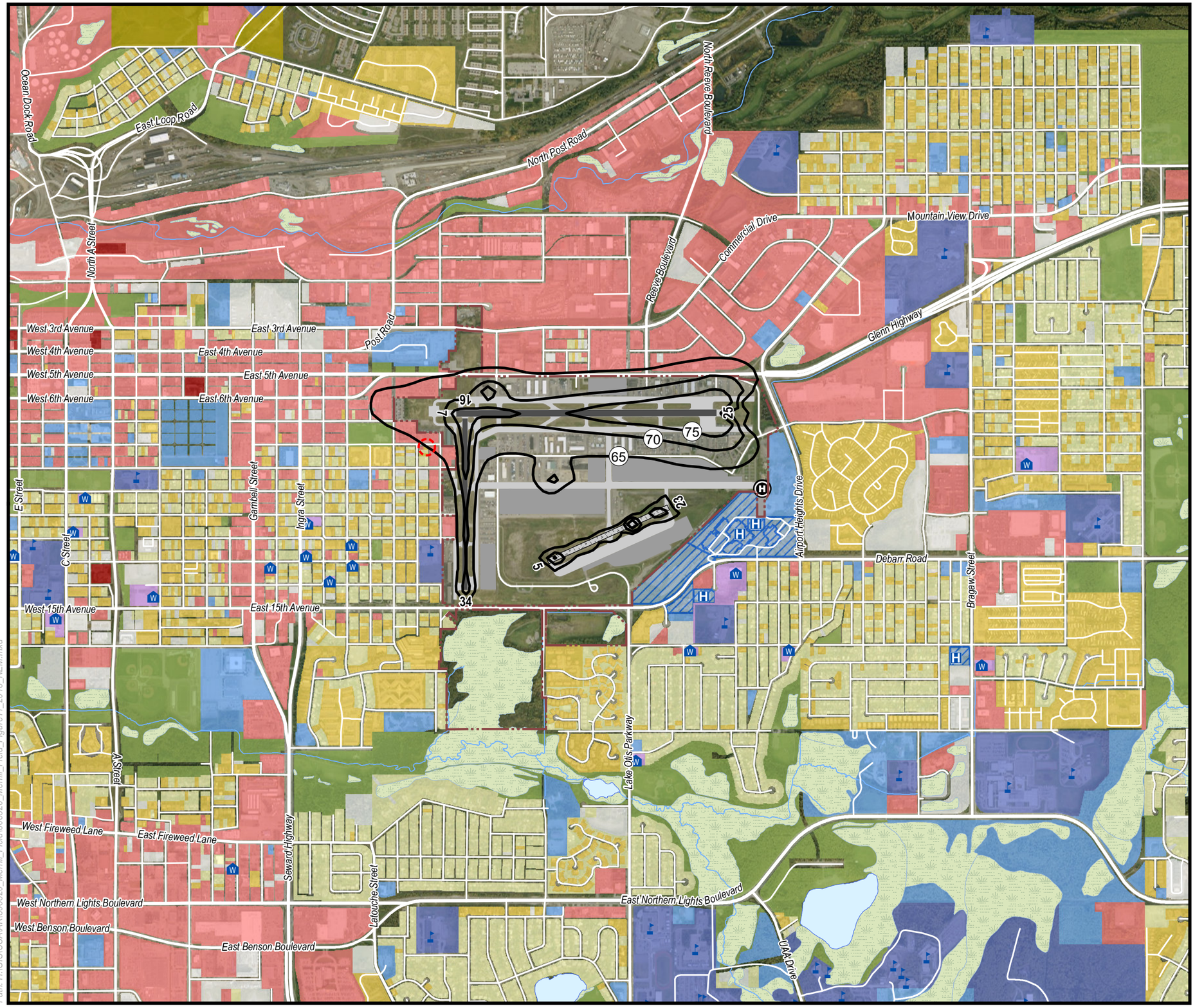
SJ Klein, President
Fairview Community Council

Merrill Field Airport

Anchorage, Alaska

14 CFR Part 150 Update

Figure 11
Existing Condition (2013)
Noise Exposure Map



2013 DNL Noise Contour

Estimated Parcel on/within DNL 65 dB Contour

Airport Boundary

Runway (Paved)

Runway (Gravel)

Taxiway

Apron

Helipad

School/University

Place of Worship

Hospital

Single Family

Multi Family

School/University/Library

Hospital

Transient Lodging

Place of Worship

Water

Park/Recreation/Open Space

Public Use

Commercial/Industrial

Military

Vacant/Undefined

Wetland

Stream

Data Sources:
Municipality of Anchorage GIS; (Land Use, Roads, Parks, Wetlands, Marine/Water)
Environmental Systems Research Institute (ESRI, Inc); (Roads, Airports, Shaded Relief)

0 1,500 3,000 Feet

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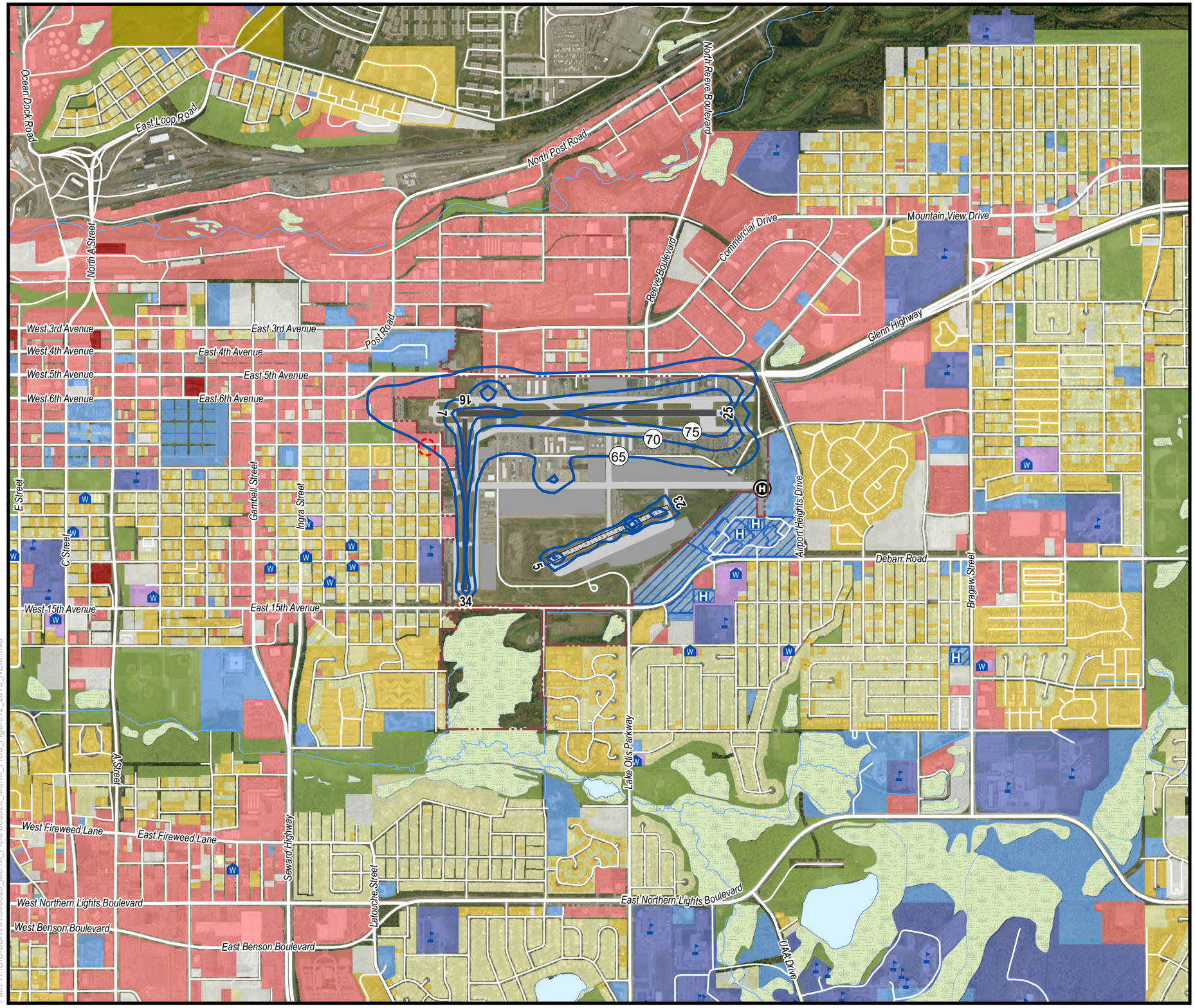
Merrill Field Airport

Anchorage, Alaska

14 CFR Part 150 Update

Figure 12
Forecast Condition (2018)
Noise Exposure Map



2018 DNL Noise Contour

Estimated Parcel on/within DNL 65 dB Contour

Airport Boundary

Runway (Paved)

Runway (Gravel)

Taxiway

Apron

Helipad

School/University

Place of Worship

Hospital

Single Family

Multi Family

School/University/Library

Hospital

Transient Lodging

Place of Worship

Water

Park/Recreation/Open Space

Public Use

Commercial/Industrial

Military

Vacant/Undefined

Wetland

Stream

Data Sources:
Municipality of Anchorage GIS; (Land Use, Roads, Parks, Wetlands, Marine/Water)
Environmental Systems Research Institute (ESRI, Inc); (Roads, Airports, Shaded Relief)

0 1,500 3,000 Feet

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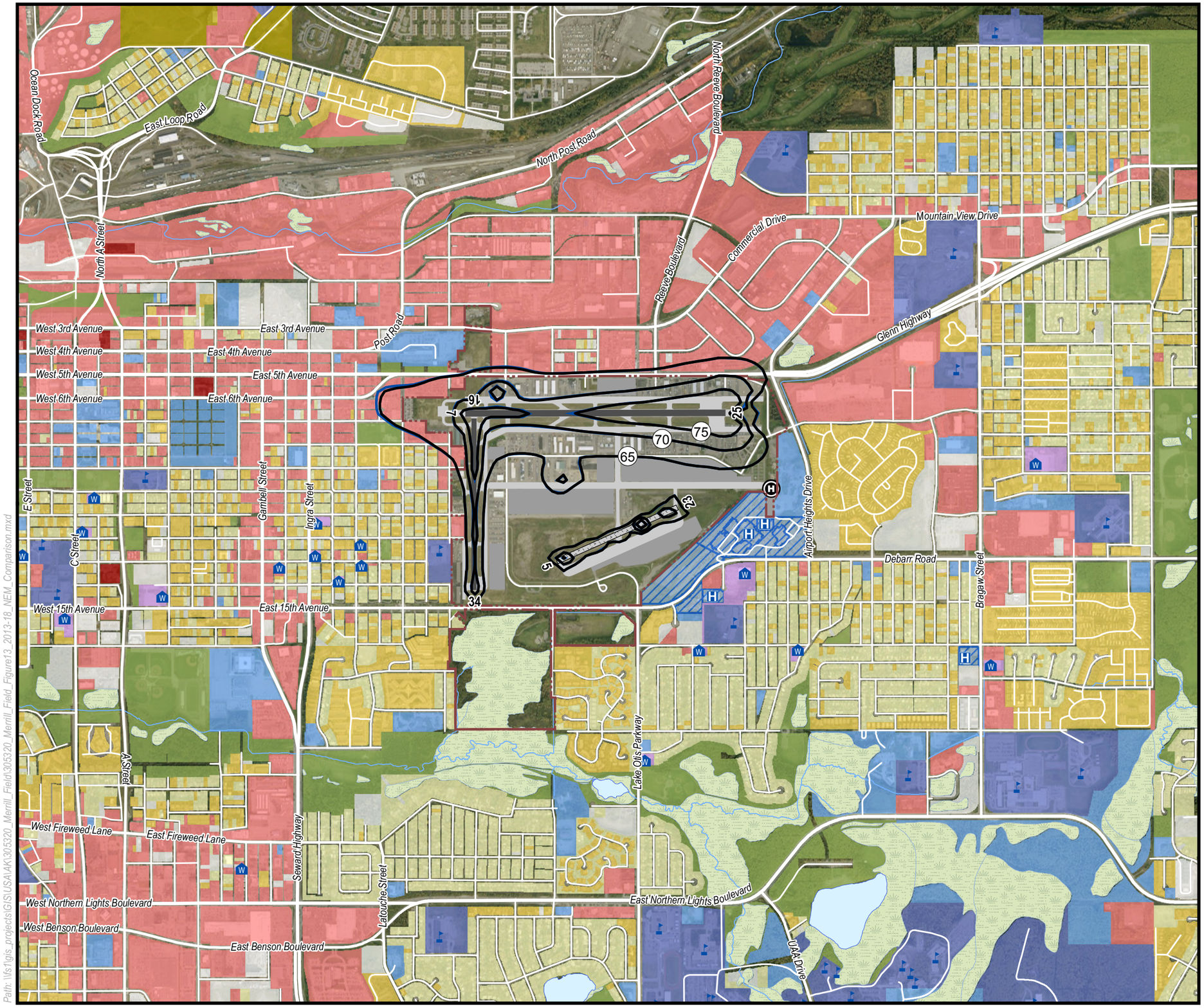
Merrill Field Airport

Anchorage, Alaska

14 CFR Part 150 Update

Figure 13
Comparison of Existing (2013) and Forecast (2018) Noise Exposure Maps



2013 DNL Noise Contour

2018 DNL Noise Contour

Airport Boundary

Runway (Paved)

Runway (Gravel)

Taxiway

Apron

Helipad

School/University

Place of Worship

Hospital

Single Family

Park/Recreation/Open Space

Multi Family

Public Use

School/University/Library

Commercial/Industrial

Hospital

Military

Transient Lodging

Vacant/Undefined

Place of Worship

Wetland

Water

Stream

Data Sources:
Municipality of Anchorage GIS; (Land Use, Roads, Parks, Wetlands, Marine/Water)
Environmental Systems Research Institute (ESRI, Inc); (Roads, Airports, Shaded Relief)

0 1,500 3,000 Feet

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Appendix E

Historic AIP Grants to MRI

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Merrill Field (MRI) AIP Grants 1982 - 2016		Obligated	Closed	Entitlement	Discretionary	Total
3-02-0015-001-1982	Expand Apron	9/29/1982	7/9/1986	$1,563,946	$0	$1,563,946
3-02-0015-002-1983	Install Runway Lighting (ST RW LI)	9/28/1983	4/28/1988	$102,807	$0	$102,807
	Acquire Snow Removal Equipment (ST EQ SN)	9/28/1983	4/28/1988	$140,625	$0	$140,625
	Acquire Land for Development (ST LA DV)	9/28/1983	4/28/1988	$2,019,150	$3,408	$2,022,558
3-02-0015-003-1984	Expand Apron 15/33 (ST AP IM)	9/21/1984	5/5/1988	$667,939	$54,587	$722,526
	Install Apron Lighting (ST AP LI)	9/21/1984	5/5/1988	$30,000	$0	$30,000
3-02-0015-004-1984	Improve Access Road (OT GT AC)	9/26/1984	5/10/1988	$528,951	$38,738	$567,689
	Improve Access Road (OT GT AC)	9/26/1984	5/10/1988	$443,109	$30,000	$473,109
	Improve Access Road (CA GT AC)	9/26/1984	5/10/1988	$989,955	$0	$989,955
3-02-0015-005-1985	Rehabilitate Apron 6/24 (RE AP IM)	7/3/1985	5/16/1988	$328,125	$0	$328,125
	Acquire Snow Removal Equipment (ST EQ SN)	7/3/1985	5/16/1988	$84,376	$0	$84,376
	Rehabilitate Apron 6/24 (RE AP IM)	7/3/1985	5/16/1988	$1,667,793	$48,941	$1,716,734
	Acquire Security Equipment 6/24 (SA EQ SE)	7/3/1985	5/16/1988	$140,625	$0	$140,625
3-02-0015-006-1986	Expand Apron (ST AP IM)	6/9/1986	5/12/1988	$184,720	$4,746	$189,466
	Expand Apron (ST AP IM)	6/9/1986	5/12/1988	$2,731,977	$74,354	$2,806,331
	Rehabilitate Taxiway Lighting (RE TW LI)	6/9/1986	5/12/1988	$82,199	$0	$82,199
3-02-0015-007-1987	Acquire Land for Development 13/31 (ST LA DV)	1/13/1987	2/19/1987	$2,130,133	$0	$2,130,133
3-02-0015-008-1987	Acquire Snow Removal Equipment (ST EQ SN)	9/23/1987	3/6/1990	$338,572	$0	$338,572
	Acquire Land for Development (ST LA DV)	9/23/1987	3/6/1990	$973,573	$2,100,082	$3,073,655
3-02-0015-009-1988	Construct Taxiway (CA TW CO)	7/20/1988	8/2/1991	$23,437	$0	$23,437
	Expand Apron (CA AP EX)	7/20/1988	8/2/1991	$35,437	$0	$35,437
	Rehabilitate Runway 15/33 (RE RW IM)	7/20/1988	8/2/1991	$946,047	$150,008	$1,096,055
	Install Apron Lighting (ST AP LI)	7/20/1988	8/2/1991	$23,000	$0	$23,000
	Extend Taxiway (CA TW EX)	7/20/1988	8/2/1991	$103,125	$0	$103,125
	Improve Access Road (CA GT AC)	7/20/1988	8/2/1991	$792,415	$0	$792,415
3-02-0015-010-1989	Conduct Noise Compatibility Plan Study (EN PL NO)	6/7/1989	10/13/1992	$290,625	$0	$290,625
3-02-0015-011-1989	Acquire Land for Development (ST LA DV)	9/13/1989	12/16/1992	$171,281	$0	$171,281
	Acquire Miscellaneous Land (ST LA MS)	9/13/1989	12/16/1992	$152,062	$0	$152,062
	Noise Mitigation Measures for Public Buildings (EN PB 75)	9/13/1989	12/16/1992	$50,719	$17,619	$68,338
3-02-0015-012-1990	Acquire Land for Development (ST LA DV)	9/21/1990	12/17/1991	$70,312	$0	$70,312
3-02-0015-013-1991	Rehabilitate Apron (RE AP IM)	9/11/1991	9/28/1993	$455,963	$0	$455,963
	Construct Apron (ST AP CO)	9/11/1991	9/28/1993	$568,464	$204,808	$773,272
	Acquire Security Equipment (SA EQ SE)	9/11/1991	9/28/1993	$340,963	$0	$340,963
3-02-0015-014-1992	Acquire Land For Approaches (ST LA SZ)	8/7/1992	8/13/1992	$863,273	$0	$863,273
3-02-0015-015-1993	Install Apron Lighting (ST AP LI)	2/17/1993	10/24/1998	$27,163	$0	$27,163
	Remove Obstructions (ST OT OB)	2/17/1993	10/24/1998	$281,250	$0	$281,250
3-02-0015-016-1994	Acquire Land For Approaches (ST LA SZ)	6/17/1994	12/28/1994	$1,840,808	$0	$1,840,808
3-02-0015-017-1995	Remove Obstructions (ST OT OB)	8/1/1995	7/14/1999	$0	$500,625	$500,625
	Acquire Snow Removal Equipment (ST EQ SN)	8/1/1995	7/14/1999	$0	$187,500	$187,500
	Acquire Security Equipment (SA EQ SE)	8/1/1995	7/14/1999	$0	$126,250	$126,250
	Install Guidance Signs (SA OT SG)	8/1/1995	7/14/1999	$0	$171,065	$171,065
3-02-0015-018-1996	Rehabilitate Taxiway (RE TW IM)	9/19/1996	7/24/2000	$1,050,131	$0	$1,050,131
	Improve Access Road (OT GT AC)	9/19/1996	7/24/2000	$125,000	$0	$125,000
	Rehabilitate Apron (RE AP IM)	9/19/1996	7/24/2000	$1,325,000	$0	$1,325,000
3-02-0015-019-1996	Acquire Snow Removal Equipment (ST EQ SN)	9/19/1996	1/25/2000	$374,041	$0	$374,041
3-02-0015-020-1996	Conduct Airport Master Plan Study (PL PL MA)	9/19/1996	9/21/2000	$448,907	$0	$448,907
3-02-0015-021-1996	Acquire Land for Development (ST LA DV)	9/19/1996	6/8/2000	$166,712	$0	$166,712
3-02-0015-022-1997	Acquire Snow Removal Equipment (ST EQ SN)	6/6/1997	1/25/2000	$434,650	$0	$434,650
3-02-0015-023-1997	Improve Access Road (OT GT AC)	9/22/1997	9/21/2001	$57,079	$0	$57,079
	Rehabilitate Taxiway (RE TW IM)	9/22/1997	9/21/2001	$50,729	$0	$50,729
	Rehabilitate Runway Lighting 6-24 (RE RW LI)	9/22/1997	9/21/2001	$98,190	$0	$98,190
	Install Runway Vertical/Visual Guidance System (ST RW VI)	9/22/1997	9/21/2001	$13,125	$0	$13,125
	Install Apron Lighting (ST AP LI)	9/22/1997	9/21/2001	$28,417	$0	$28,417
	Construct Taxiway (ST TW CO)	9/22/1997	9/21/2001	$64,242	$0	$64,242
	Improve Runway Safety Area 24 (ST RW SF)	9/22/1997	9/21/2001	$62,366	$0	$62,366
3-02-0015-024-1997	Acquire Land for Development (ST LA DV)	9/22/1997	9/21/2000	$204,870	$0	$204,870
3-02-0015-025-1998	Construct Taxiway (ST TW CO)	3/24/1998	9/27/2002	$78,125	$400,000	$478,125
	Install Miscellaneous NAVAIDS (SP OT IN)	3/24/1998	9/27/2002	$150,000	$0	$150,000
	Rehabilitate Runway Lighting 6-24 (RE RW LI)	3/24/1998	9/27/2002	$0	$600,000	$600,000
	Improve Runway Safety Area 6-24 (SA RW SF)	3/24/1998	9/27/2002	$300,000	$53,364	$353,364
3-02-0015-026-1998	Acquire Snow Removal Equipment (ST EQ SN)	6/26/1998	9/5/2001	$234,375	$0	$234,375
	Install Perimeter Fencing (ST EQ SE)	6/26/1998	9/5/2001	$299,306	$0	$299,306

Merrill Field (MRI) AIP Grants 1982 - 2016		Obligated	Closed	Entitlement	Discretionary	Total
3-02-0015-027-1999	Install Perimeter Fencing (ST EQ SE)	3/25/1999	9/8/2003	$0	$300,000	$300,000
	Rehabilitate Taxiway (RE TW IM)	3/25/1999	9/8/2003	$300,000	$497,387	$797,387
3-02-0015-028-1999	Construct Runway (ST RW CO)	3/25/1999	9/27/2002	$293,646	$39,847	$333,493
3-02-0015-029-2000	Acquire Snow Removal Equipment (ST EQ SN)	6/20/2000	8/31/2001	$152,362	$0	$152,362
3-02-0015-030-2000	Construct Taxiway (ST TW CO)	7/31/2000	8/26/2004	$0	$847,500	$847,500
	Install Perimeter Fencing (ST EQ SE)	7/31/2000	8/26/2004	$262,500	$420,589	$683,089
3-02-0015-031-2000	Install Perimeter Fencing (ST EQ SE)	9/8/2000	4/30/2004	$18,750	$437,816	$456,566
3-02-0015-032-2001	Improve Access Road (OT GT AC)	8/17/2001	5/3/2004	$1,517,199	$0	$1,517,199
3-02-0015-033-2001	Install Perimeter Fencing (ST EQ SE)	8/17/2001	5/3/2004	$0	$89,227	$89,227
3-02-0015-034-2001	Construct Runway (ST RW CO)	9/13/2001	2/24/2005	$1,424,640	$0	$1,424,640
3-02-0015-035-2002	Rehabilitate Taxiway C (RE TW IM)	8/13/2002	6/24/2005	$578,000	$0	$578,000
	Security Enhancements (ST EQ SE)	8/13/2002	6/24/2005	$243,000	$550,000	$793,000
	Rehabilitate Apron (RE AP IM)	8/13/2002	6/24/2005	$119,000	$40,514	$159,514
3-02-0015-037-2003	Install Guidance Signs (RSAT recommendations) (SP OT SG)	8/21/2003	7/27/2007	$0	$563,358	$563,358
3-02-0015-038-2003	Rehabilitate Taxiway (RE TW IM)	8/7/2003	1/12/2007	$1,208,834	$0	$1,208,834
3-02-0015-039-2004	Security Enhancements (SA EQ SE)	7/23/2004	3/12/2007	$0	$1,042,500	$1,042,500
	Expand Apron (ST AP IM)	7/23/2004	3/12/2007	$1,000,000	$179,029	$1,179,029
3-02-0015-036-2005	Extend Taxiway (RSAT Recommendation) (ST TW IM)	5/24/2005	7/1/2008	$0	$1,060,000	$1,060,000
	Rehabilitate Runway 06/24 (RE RW IM)	5/24/2005	7/1/2008	$1,000,000	$1,092,500	$2,092,500
	Security Enhancements (RSAT Recommendations) (ST EQ SE)	5/24/2005	7/1/2008	$0	$1,155,163	$1,155,163
3-02-0015-040-2006	Acquire Snow Removal Equipment (ST EQ SN)	8/4/2006	5/6/2010	$525,464	$0	$525,464
	3-02-0015-041-2006 Rehabilitate Apron Phase 1 (block 5) (RE AP IM)	8/21/2006	6/16/2008	$927,100	$0	$927,100
	Security Enhancements (RSAT Recommendations, Phase 2) (ST EQ SE)	8/21/2006	6/16/2008	$500,000	$286,631	$786,631
3-02-0015-042-2007	Acquire Equipment (Public Address System) (ST EQ MS)	5/22/2007	6/13/2011	$0	$264,696	$264,696
3-02-0015-042-2007	Rehabilitate Apron Phase 2 (block 5) (RE AP IM)	5/22/2007	6/13/2011	$1,000,000	$1,036,000	$2,036,000
3-02-0015-043-2007	Construct Taxiway Phase 1 (Land Acquis.) (ST TW CO)	6/28/2007	6/3/2010	$1,528,788	$0	$1,528,788
3-02-0015-044-2008	Rehabilitate Apron Block 5 (phase 3), Charlie South (RE AP IM)	6/12/2008	6/4/2012	$2,546,000	$29,567	$2,575,567
3-02-0015-045-2008	Install Runways Incursion Caution Bars Runway VPD barrier gate and warning light upgrades, phase 1 (SP OT SG)	9/8/2008	3/7/2013	$244,129	$0	$244,129
3-02-0015-046-2009	Rehabilitate Apron Apron Rehabilitation - ARRA Funded (RE AP IM)	5/1/2009	1/18/2011	$0	$0	$0
3-02-0015-047-2009	Install Runways Incursion Caution Bars Runway VPD barrier gate and warning lights upgrades, phase 2 (SP OT SG)	5/1/2009	3/26/2012	$250,000	$0	$250,000
	Rehabilitate Apron Block 5 (phase 4) (RE AP IM)	5/1/2009	3/26/2012	$1,794,066	$0	$1,794,066
3-02-0015-048-2009	Rehabilitate Taxiway Rehabilitate Taxiway Quebec -Phase 1 (ARRA funded) (RE TW IM)	8/18/2009	3/29/2011	$0	$0	$0
3-02-0015-049-2010	Acquire Snow Removal Equipment Acquire SRE (part C) (ST EQ SN)	6/7/2010	7/3/2013	$83,896	$569,704	$653,600
3-02-0015-050-2010	Install Runway Vertical/Visual Guidance System 16/34 Replace Rwy 34 non-fed PLASI with non-fed PAPI (ST RW VI)	3/15/2010	8/22/2013	$250,000	$0	$250,000
	Rehabilitate Runway 16/34 Rehab. runway (RE RW IM)	3/15/2010	8/22/2013	$274,346	$2,861,218	$3,135,564
3-02-0015-051-2010	Acquire Land For Approaches Acquire Land (ST LA SZ)	7/16/2010		$313,500	$0	$313,500
3-02-0015-052-2010	Remove Obstructions Remove structure and obstructions (ST OT OB)	8/31/2010		$152,000	$0	$152,000
3-02-0015-053-2011	Acquire Snow Removal Equipment Acquire SRE -Replace Sweeper/Vacuum Truck (ST EQ SN)	9/27/2011		$323,000	$0	$323,000
3-02-0015-054-2011	Conduct Airport Master Plan Study Conduct Airport Master Plan Phase I (PL PL MA)	8/26/2011		$608,000	$0	$608,000
3-02-0015-055-2011	Rehabilitate Taxiway Rehabilitate Taxiway Quebec -Phase 2 (RE TW IM)	6/8/2011		$2,253,400	$0	$2,253,400

Merrill Field (MRI) AIP Grants 1982 - 2016		Obligated	Closed	Entitlement	Discretionary	Total
3-02-0015-056-2011	Acquire Safety Equipment and/or Fencing Fencing, Signage, Lighting (VPD reduction) (SA EQ RF)	9/9/2011		$392,000	$157,100	$549,100
3-02-0015-057-2012	Rehabilitate Taxiway Rehabilitate Taxiway Quebec -Phase 3 (RE TW IM)	5/17/2012		$1,000,000	$1,437,500	$2,437,500
3-02-0015-058-2012	Acquire Safety Equipment and/or Fencing Fencing, Signage, Lighting (VPD reduction) Phase 2 (SA EQ RF)	8/27/2012		$0	$1,560,000	$1,560,000
3-02-0015-059-2013	Acquire Snow Removal Equipment (ST EQ SN)	8/8/2013		$937,500	$0	$937,500
3-02-0015-060-2013	Rehabilitate Runway Lighting 16/34 (RE RW LI)	8/27/2013		$1,012,500	$0	$1,012,500
3-02-0015-061-2014	Update Airport Master Plan Study Phase 2 (PL PL MA)	9/19/2014		$0	$600,000	$600,000
3-02-0015-062-2014	Rehabilitate Taxiway Rehabilitate Taxiway Quebec -Phase 4 (RE TW IM)	9/18/2014		$1,000,000	$0	$1,000,000
3-02-0015-063-2015	Acquire Safety Equipment and/or Fencing	4/29/2015		$1,000,000	$3,577,100	$4,577,100
3-02-0015-064-2015	Construct Taxiway	9/9/2015		$1,995,000		$1,995,000
3-02-0015-066-2015	Rehabilitate Taxiway Q and Apron	6/14/2016		$0	$7,125,000	$7,125,000
3-02-0015-067-2015	Runway 5/23 Lighting and Signing	7/14/2016		$656,250		$656,250
				$57,435,054	**$32,586,041**	**$90,021,095**

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