



PHOENIX SKY HARBOR  
INTERNATIONAL AIRPORT

# Chapter Six NOISE COMPATIBILITY PROGRAM



## Chapter Six

# NOISE COMPATIBILITY PROGRAM



The updated F.A.R. Part 150 Noise Compatibility Program for Phoenix Sky Harbor International Airport includes measures to abate aircraft noise, control land development, mitigate the impact of noise on non-compatible land uses, and implement and update the program. F.A.R. Part 150 requires that the program apply to a period of no less than five years into the future, although it may apply to a longer period if the sponsor so desires. This Noise Compatibility Program has been developed based on a planning period through the year 2015.

The objective of the noise compatibility planning process has been to improve the compatibility between aircraft operations and noise-sensitive land uses in the area, while allowing the airport to continue to serve its role in the community,



state, and nation. The Noise Compatibility Program includes four elements aimed to satisfy this objective.

- The **Noise Abatement Element** includes noise abatement measures selected from the alternatives evaluated in Chapter Four, Noise Abatement Alternatives.
- The **Noise Mitigation Element** includes measures to mitigate or reduce the impact of aircraft noise on existing noise-sensitive land uses within the airport noise contours. Potential mitigation alternatives were evaluated in Chapter Five, Land Use Alternatives.
- The **Land Use Planning Element** includes recommended planning policies and land use

regulations for Phoenix, Tempe, Scottsdale, the Salt River Pima-Maricopa Indian Community, and Maricopa County selected from the measures evaluated in Chapter Five, Land Use Alternatives.

- **The Program Management Element** includes procedures and documents for implementing the recommended noise abatement, land use planning, and mitigation measures, monitoring the progress of the program, and updating the Noise Compatibility Program.

The recommendations of the updated Noise Compatibility Program are summarized in **Table 6F** at the end of the chapter. That table includes a brief description of each recommended measure, the entity responsible for implementing each measure, the cost of each measure, the proposed timing for implementation of the measure, and potential sources of funding.

## ***NOISE ABATEMENT AND LAND USE MEASURES DROPPED FROM CONSIDERATION***

Several noise abatement and land use alternatives were evaluated in this study. These were discussed with the Planning Advisory Committee, local citizens, and government officials. As a result of the public review process, and consultation with the airport staff, 12 noise abatement, five mitigation, and ten land use measures are recommended.

Before describing the selected noise abatement and land use measures, it is appropriate to discuss the measures which deserved further consideration in Chapters Four and Five but were subsequently eliminated in the review process.

## **NOISE ABATEMENT ALTERNATIVES**

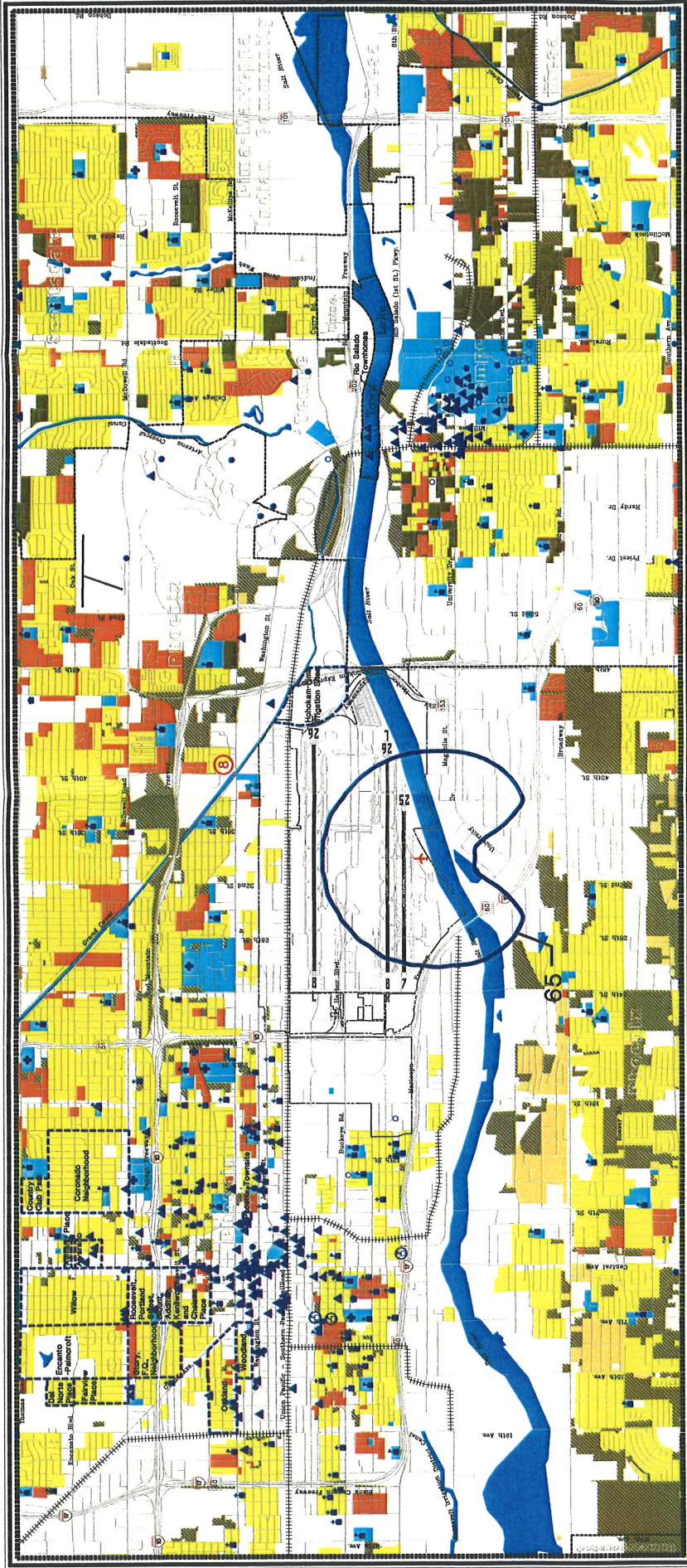
Chapter Four considered two potential locations for a run-up facility. A third location was identified during the review process. This run-up location is immediately south of new parallel Taxiway G and east of the national guard facilities. **Exhibit 6A** depicts the suggested location and noise contours of the run-up facility. The noise impact analysis indicated that no noise sensitive land uses would be impacted by run-ups in this location. Consequently this run-up location is a viable location for a run-up facility.

An additional runway use alternative was identified during the review of Chapter Four, Noise Abatement Alternatives. The following section outlines the proposed runway use alternative and the results of the analysis.

### **Alternative 7 - Runway 8L/R Straight-out Departure Procedure**

#### **Goals**

This alternative seeks to promote airport operational efficiency while keeping departing aircraft over noise



**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- Run-up dBa-Lmax Noise Contours
- Historic District Boundaries
- Noise Monitor Terminal
- Rural Residential (0-1 du/ac)
- Large Lot Residential (11-2 du/ac)
- Small Lot Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Water
- Noise-Sensitive Institutions
- Place of Worship
- School
- Charter School
- Hospital
- Museum
- Library
- Historic Structure
- Residence Halls
- Community Center
- Potential Residential Development Areas
- Potential Noise-Sensitive Institutions

Source: Coffman Associates and Brown-Buntin Associates Analysis.  
 Aerial Photography Land Use Interpretation  
 September 1998.



compatible corridors east of the airport. With the aid of RNAV (Area Navigation) technology, aircraft could depart Runways 8L/R and 7 and remain within the 4DME gate while not converging into a single departure track as specified in the 4DME procedure.

## Procedure

Aircraft departing Runways 8L/R would use RNAV or similar navigational aid to fly a straight-out departure to the PXR VOR 4DME gate. Aircraft departing Runway 7 would then intercept the straight-out departure track from Runway 8R and fly to the 4 DME gate. Aircraft would continue on a straight-out departure heading until being released on course headings.

For noise modeling purposes, the 2004 baseline input was modified to reflect straight-out departures from Runways 8L/R and a departure turn for aircraft departing Runway 7. Although it is estimated that only 83 percent of aircraft using Sky Harbor have RNAV capabilities, runway use percentages were modified to reflect 100 percent of aircraft using this procedure in order to achieve the most conservative noise impact counts.

## Noise Effectiveness

The noise contours depicted in **Exhibit 6B** illustrates the effects of this procedure. The size and shape of the alternative noise contours vary somewhat from the 2004 baseline contours east of the airport due to the straight-out departure procedure. The

alternative 65 DNL contour is wider both north and south of the departure path and forms two distinct lobes instead of one. Both the 70 DNL and 75 DNL contours become elongated and extend further east of the airport with the use of this procedure. No changes to the noise contours west of the airport are encountered. Increased noise and overflights would be experienced by Tempe both southeast and northeast of the airport.

**Table 6A** presents the population impacts for this alternative. This alternative affects 2,331 additional people than the baseline condition. A number of existing residential dwellings are brought into the 65-70 DNL contour southeast of the airport in Tempe. In addition, a number of future potential dwellings are also added northeast of the airport. A small area of high density residential east of the airport would be removed from the noise contours with the implementation of this alternative. The level-weighted population, an estimate of the number of people actually annoyed by noise, increases to 9,271 from 8,377 with this procedure.

A breakdown of the increase or decrease in population from the 2004 baseline and Alternative 7 noise contours is presented in **Table 6B**. This reveals that 774 people have more noise with the existing land use conditions with the use of this alternative. Given the potential for future development, both the 2004 baseline and Alternative 7 noise contours would impact additional individuals (see **Table 6A**). The implementation of Alternative 7 would impact 1,557 additional individuals

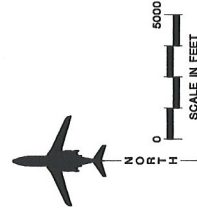
than the 2004 baseline operations. Individuals were added to the 65-70 DNL contour in the existing (744) and ultimate (1,557) land use conditions. While no individuals were added or removed from the 70-75 DNL contours during existing land use conditions, 64 were added to the ultimate land use

scenario. Neither the existing or ultimate land use conditions contain individuals within the 75 DNL contour. A total of 2,331 individuals would receive additional noise impacts with the implementation of this alternative versus 2004 baseline operations.

<b>TABLE 6A Population Impacted By Noise Alternative 7 - Runway 8L/R Straight-out Departure Procedure</b>			
<b>DNL Range</b>	<b>2004 Baseline</b>	<b>Alternative 7</b>	<b>Net Change</b>
<b>Existing Population<sup>1</sup></b>			
Phoenix			
65-70	4,455	4,455	0
70-75	0	0	0
75+	0	0	0
Tempe			
65-70	3,329	4,103	+ 774
70-75	0	0	0
75+	0	0	0
<b>Subtotal</b>	<b>7,784</b>	<b>8,558</b>	<b>+ 744</b>
<b>Potential Population<sup>2</sup></b>			
Phoenix			
65-70	1,188	1179	- 9
70-75	0	10	+ 10
75+	0	0	0
Tempe			
65-70	13,106	14,608	+ 1,502
70-75	117	171	+ 54
75+	0	0	0
<b>Subtotal</b>	<b>14,411</b>	<b>15,787</b>	<b>+ 1,557</b>
<b>Total</b>	<b>22,195</b>	<b>24,345</b>	<b>+ 2,331</b>
<b>LWP</b>	<b>8,377</b>	<b>9,271</b>	<b>894</b>
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. Existing population based on 1999 housing counts.</li> <li>2. Based on additional potential new dwelling units in 2004 reflecting current land use plans and zoning.</li> </ol>		



Source: Coffman Associates and Brown-Buntin Associates Analysis.  
 Aerial Photography Land Use Interpretation  
 September 1998.



**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- 2004 Baseline DNL Noise Contour
- Alternative DNL Noise Contour
- Departure Tracks
- Historic District Boundaries
- Rural Residential (0-1 du/ac)
- Large Lot Residential (1-2 du/ac)
- Small Lot Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Water
- Noise-Sensitive Institutions
- Place of Worship
- School
- Charter School
- Hospital
- Museum
- Library
- Historic Structure
- Residence Halls
- Community Center
- Potential Residential Development Areas
- Potential Noise-Sensitive Institutions



Exhibit 6B  
 ALTERNATIVE 7 - RUNWAY 8L/R  
 STRAIGHT-OUT DEPARTURE PROCEDURE

## Operational Issues

The use of a straight-out departure procedure would also mitigate current concerns associated with the adverse air traffic conditions generated by the use of the 4DME procedure as traffic volume continues to increase. The use of this procedure would increase ATC flexibility and increase the airport's operational capacity by allowing simultaneous departures during Visual Meteorological Conditions (VMC) from Runways 8L/R. The use of RNAV technology would help maintain aircraft

over pre-established departure corridors. Aircraft utilizing this procedure would likely require RNAV.

## Air Service Factors

This alternative would increase airport capacity and reduce delays in an eastern air traffic flow in visual conditions. In addition, Air Traffic Control will gain the ability to adequately space and sequence departing aircraft. No negative air service factors are anticipated.

2004 vs. Alt. 7	65-70	70-75	75+	Net Impact
Existing Land Use	774	0	0	+ 744
Ultimate Land Use	+ 1,493	+ 64	0	+ 1,557
<b>Totals</b>	<b>+ 2,267</b>	<b>64</b>	<b>0</b>	<b>+ 2,331</b>

## Costs

There are no negative operational costs associated with this alternative. The use of this alternative would decrease departure delays and mitigate adverse air traffic conditions currently associated with the 4DME procedure.

This procedure would bring noise sensitive land uses into the 65 DNL noise contours that were not previously exposed to aircraft noise above 65 DNL. Therefore, an Environmental Assessment (EA) would have to be prepared and impacts would have to be mitigated. This would also be sizeable given the number of homes added to the noise contours.

## Environmental Issues

As previously mentioned, the current policy of the FAA is to require an EA on most noise abatement procedures, particularly those that expose residential areas to new or increased aircraft noise. Consequently, an EA probably would be required in this case.

## Implementation

Prior to an adoption of straight-out departures from Runways 8L/R, revisions of the 1994 IGA between the cities of Phoenix and Tempe, and the Airport's 1993 EIS, would be required. This departure procedure would be



implemented by ATC. A Tower Order would define instructions to be issued by controllers. An RNAV Departure Procedure would likely need to be established and would aid in the containment of aircraft through the 4DME gate. Information regarding the procedure also could be published in a Notice to Airmen (NOTAM).

## **Conclusion**

A straight-out departure from Runways 8L/R would introduce additional dwelling units to aircraft noise above 65 DNL both north and south of the Salt River corridor. The current use of the 4 DME procedure for Runway 8L/R and 7 appears to be a more suitable procedure for noise abatement purposes. The continued use of the 4DME procedure currently has and will have increasingly adverse effects on airport capacity and air traffic safety as air traffic continues to increase at Phoenix Sky Harbor International Airport.

## **LAND USE ALTERNATIVES**

Chapter Five considered the adoption of an Airport Influence Area for Sky Harbor International Airport (Revised Arizona Statute Section 28-8485). A recent revision (May 2000) of Revised Arizona Statute Section 28-8486 Public Airport Disclosure requires the recording of this public airport disclosure map in the office of the county recorder in each county that contains property in the vicinity of the public airport. This map is therefore sufficient to notify *current owners* and *potential purchasers* that the property of interest is located in or

outside of a territory in the vicinity of a public airport. Thus, the revision to Arizona Revised Statute 28-8486 eliminates the need to establish an Airport Influence Area under Arizona Revised Statute Section 28-8485. A real estate map meeting the requirements of Arizona Revised Statute 28-8486 is in the final development stages for Phoenix Sky Harbor International Airport.

The designation of an airport planning area based upon the 1999 65 DNL noise exposure contours and radar flight track information was reduced to the squared-off 1999 65 DNL noise contour boundary based upon comments from the August 30, 2000 public hearing and subsequent meetings with City agencies. This new area is referred to as the Noise Contour Planning Boundary (NCPB). The NCPB is used for the purposes of applying land use recommendations that reduce the likelihood of future additional incompatible land use development.

The Airport felt it was inappropriate to offer programs that randomly acquire property in the airport vicinity and instead focus on a voluntary acquisition area inside the highest noise contour levels. Therefore, purchase assurance and sales assistance alternatives were eliminated from consideration.

## **NOISE ABATEMENT ELEMENT**

The recommended noise abatement measures are described in this section. They include existing measures to be retained and new measures.

## EXISTING MEASURES TO BE RETAINED

1. **Continue the runway use program calling for the equalization of departure operations to the east and west for both daytime and nighttime.**

**Description.** Runway use is determined by the direction of the wind. During periods of calm winds (less than 5 knots), the airport can operate in either direction. However, switching runway use direction can be very difficult because changes generally cannot occur in a timely fashion due to the large number of aircraft that have to be re-sequenced.

By equalizing aircraft operations to both the east and west, the overall noise impacts can be distributed equitably. This helps ensure that certain individuals do not receive concentrated amounts of aircraft noise.

**Relationship to 1989 NCP.** This a continuation of Noise Abatement Measure 1 which was included in the 1989 NCP and approved by the FAA for purposes of F.A.R. Part 150.

**Implementation Actions.** As an existing Noise Abatement Policy, no additional implementation actions are necessary. The City of Phoenix should continue to monitor aircraft activity at the airport to ensure aircraft operators are complying with this policy.

**Costs and Funding.** Since this is an existing policy, no new costs would be

incurred by the City of Phoenix airport users.

**Timing.** This is an existing measure which is recommended to be continued through the future.

2. **Continue promoting use of AC 91-53A Noise Abatement Departure Procedures by air carrier jets.**

**Description.** The City of Phoenix should continue promoting the use of noise abatement departure procedures in Advisory Circular (AC) 91-53A by airlines operating jet aircraft over 75,000 pounds, certificated gross takeoff weight.

Throughout the 1980s and early 1990s, the FAA and the airlines did considerable work in studying noise abatement departure procedures. In 1993, the FAA published an advisory circular (91-53A) describing general parameters for two alternative noise abatement departures. (A copy of FAA AC 91-53A is in **Appendix G.**) Both involve thrust reductions soon after takeoff, but at an altitude no less than 800 feet above the ground. The procedures differ as to when the flaps should be retracted – either before or after the thrust reduction. Both reduce aircraft noise, but the “close-in” procedure, involving thrust reduction before flap retraction tends to produce greater noise reduction near the runway end, while the “distant” procedure, involving thrust reduction after flap retraction, tends to produce greater noise reduction further from the airport.

The airlines have implemented the AC 91-53A guidelines, although the specific details vary among the airlines based on their own operating philosophies and system needs. The airlines now routinely use noise abatement departures in accordance with the AC 91-53A criteria.

**Relationship to 1989 NCP.** This a continuation of Noise Abatement Measure 2 which was included in the 1989 NCP and approved by the FAA for purposes of F.A.R. Part 150.

**Implementation Actions.** No specific implementation actions are needed. Noise abatement departures are routinely used by air carrier jet aircraft in accordance with airline policy and wind, weather, and runway surface conditions. The City of Phoenix should continue to notify the airlines of the importance it places on noise abatement departure procedures to ensure the airlines continue using them at Phoenix.

**Costs and Funding.** As an existing procedure, no additional costs would be borne by the airport users. The City of Phoenix will incur normal administrative costs for informational efforts.

**Timing.** This is an existing procedure which is recommended to continue.

### **3. Continue promoting use of NBAA noise abatement procedures, or equivalent manufacturer procedures, by general aviation jet aircraft.**

**Description.** The City of Phoenix should actively encourage jet operators to use the National Business Aviation Association (NBAA) Approach and Landing Procedure and Standard Noise Abatement Departure Procedures, or equivalent quiet flying procedures developed by aircraft manufacturers. The NBAA standard procedure involves the management of thrust, flap settings, speed, and climb rate to reduce noise quickly after takeoff. (A complete description of the procedure is in **Appendix G.**) Some aircraft manufacturers have also developed and published similar procedures specifically for their own aircraft.

The NBAA has also published noise abatement approach procedures for jet aircraft. These include the use of minimum approach flap settings, maintaining minimum speed, and minimizing the use of reverse thrust after landing, consistent with safety. These procedures also included in **Appendix G.**

**Relationship to 1989 NCP.** This a continuation of Noise Abatement Measure 3 which was included in the 1989 NCP and approved by the FAA for purposes of F.A.R. Part 150.

**Implementation Actions.** As an existing policy, no specific implementation actions are required. The City of Phoenix should continue to actively inform local fixed base operators and jet aircraft owners of this policy.

**Costs and Funding.** Since this is an existing policy, no additional costs would be borne by the users. The City of Phoenix will incur normal administrative costs for informational efforts.

**Timing.** This is an existing policy which is recommended to continue.

4. **Continue DP procedure from Runway 26L requiring a turn to a 240-degree heading.**

**Description.** A published Departure Procedure (DP) from Runway 26L requires a turn to a 240-degree heading. This procedure reduces the number of overflight of noise sensitive land uses west of the airport along the Runway 26L centerline. This procedure also enhances aircraft separation and flow when aircraft are departing from Runways 26L\R.

**Relationship to 1989 NCP.** This is essentially a continuation of Noise Abatement Measure 4 from the 1989 NCP which recommended that the City of Phoenix work with the local FAA tower to establish a departure turn to 245-degrees (a 240-degree turn was implemented). This was approved by the FAA.

**Implementation Actions.** As an existing policy, no specific implementation actions are required.

**Costs and Funding.** Since this is an existing policy, no additional costs would be borne by the users, the City of Phoenix, or the FAA Airport Traffic Control Tower.

**Timing.** This is an existing policy which is recommended to continue.

5. **Continue the 4 DME departure route procedure which overflies the Salt River by all jets and large propeller aircraft departing Runways 8L/R.**

**Description.** The 4 DME departure procedure requires all jet aircraft and all large turboprop aircraft (over 12,500 pounds) departing to the east on Runways 8L and 8R to fly 4 nautical miles from the distance measuring equipment before turning on any ATC assigned heading. (This procedure replaces the One DME procedure recommended by the NCP, since the VORTAC was relocated.) Compliance with the 4 DME procedure was clarified in June 1998 to require the aircraft to pass through a 5,500-foot wide gate, running north/south, 4 DME east of the PXR VORTAC. The resulting flight paths are concentrated over the Salt River bed. It should be noted that this procedure does limit capacity at the airport which has significant cost implications for the airlines, airport customers, and local business sectors

dependent on the airport. In addition, as air traffic volume at the Phoenix Sky Harbor International Airport continues to grow, the continued viability of the 4DME procedure with respect to the safety of converging flight paths in high aircraft activity situations must be assessed.

**Relationship to 1989 NCP.** This is a continuation of Noise Abatement Measure 5 from the 1989 NCP. This was approved by the FAA.

**Implementation Actions.** As an existing policy, no specific implementation actions are required.

**Costs and Funding.** Since this is an existing policy, no additional costs would be borne by the users, the City of Phoenix, or the FAA Airport Traffic Control Tower.

**Timing.** This is an existing policy which is recommended to continue.

**6. Continue requiring compliance with the Airport's Engine Test Run-Up Policy.**

**Description.** Currently there is a prohibition on maintenance engine run-ups between 11:00 p.m. and 5:00 a.m. This policy reduces the impact of loud and long duration run-up noise on nearby residential areas during the nighttime hours.

**Relationship to 1989 NCP.** This a continuation of Noise Abatement Measure 7 which was included in the 1989 NCP and approved by the FAA for purposes of F.A.R. Part 150.

**Implementation Actions.** Since this is an existing policy, no specific implementation actions are necessary.

**Costs and Funding.** As an existing policy, no additional costs would be borne by the City of Phoenix or airport users. The City of Phoenix will continue to incur routine administrative costs in ensuring compliance with the rule.

**Timing.** This is an existing procedure which is recommended to continue.

## **NEW MEASURES**

Six noise abatement measures currently not implemented are recommended for implementation as listed below.

**7. Implement the 4 DME departure route procedure for all jets and large propeller aircraft departing Runway 7.**

**Description.** The 1989 NCP recommended and the 1994 Inter Governmental Agreement (IGA) between the City of Phoenix and the City of Tempe established the use of the 4 DME departure procedure for all jets and large propeller (over 12,500 pounds) aircraft departing Runway 7. The 4 DME departure procedure would require these aircraft departing to the east on Runway 7 to fly 4 nautical miles from the distance measuring equipment (the relocated Phoenix VORTAC) before turning on any ATC assigned heading. (This procedure replaces the One DME procedure recommended by the 1989 NCP, since the VORTAC was relocated.)

**Relationship to 1989 NCP.** This measure was included as a long term recommendation in the 1989 NCP and is to be implemented when Runway 7-25 is opened.

**Implementation Actions.** This is proposed as an addition to the existing departure procedures from Runway 8L/R. FAA Flight Standards Division would be charged with the revision of the established departure procedures to include the 4 DME procedure from Runway 7.

It does not appear that this procedure would require an environmental assessment as the procedure would not direct aircraft over noise-sensitive areas at altitudes below 3,000 feet AGL. Neither does the procedure cause increased noise within the 65 DNL contour in residential areas. Decisions about the need for an environmental assessment, however, must be made by the FAA.

**Costs and Funding.** Administrative costs will be borne by the FAA Flight Standards Division in establishing this procedure. The FAA may incur additional administrative costs in undertaking any potential environmental review needed.

Airport users will continue to incur operational costs due to delays during peak periods in an eastern flow when this procedure is in effect.

**Timing.** This is recommended for implementation simultaneously with the opening of the Runway 7-25, anticipated in 2000.

8. **Direct propeller aircraft departing Runway 7 to turn to a 120-degree heading upon reaching the end of the runway.**

**Description.** Propeller aircraft departing Phoenix Sky Harbor International Airport on Runway 7 would turn right at the runway end to approximately a 120-degree heading. The aircraft would continue to climb on this heading until being released to course headings. This procedure would concentrate traffic over a commercial/industrial corridor and Interstate 10 southeast of the airport. It is suggested that this procedure apply only to propeller-powered aircraft because of the early turn that is required for this procedure.

**Relationship to 1989 NCP.** This is a new measure not included in the 1989 NCP.

**Implementation Actions.** This procedure would primarily be implemented by ATC. A Tower Order would define instructions to be issued by controllers. Information regarding the procedure also could be published in a Notice to Airmen (NOTAM).

It does not appear that this procedure would require an environmental assessment as the procedure would not direct aircraft over noise-sensitive areas at altitudes below 3,000 feet AGL. Neither does the procedure cause increased noise within the 65 DNL contour in residential areas. Decisions about the need for an environmental assessment, however, must be made by the FAA.

**Costs and Funding.** Administrative costs will be borne by the FAA Air Traffic Control Tower in establishing a Tower Order for this procedure. The FAA may incur additional administrative costs in undertaking any potential environmental review needed.

The only user costs of this procedure might be slightly decreased departure delays due to departure separation requirements. These likely would not be sizeable since some propeller aircraft are currently being turned to the southeast when departing Runway 8R.

**Timing.** This is recommended for implementation after FAA review and approval of the NCP. This is anticipated in 2001.

**9. Direct aircraft departing Runway 25 to turn to a 240-degree heading upon reaching the end of the runway.**

**Description.** The 1989 NCP recommended and the 1994 Inter Governmental Agreement (IGA) between the City of Phoenix and the City of Tempe established a standard instrument departure (SID) procedure for Runway 25. This agreement

consists of a requirement that aircraft departing from Runway 25 turn to a 245-degree heading (It is suggested that a 240-degree turn be implemented to remain consistent with the Runway 26L departure turn procedure). This procedure reduces the number of overflight of noise sensitive land uses west of the airport along the Runway 25 centerline. This procedure also enhances aircraft separation and flow when aircraft are departing from Runway 26R.

**Relationship to 1989 NCP.** This measure was included as a long term recommendation in the 1989 NCP and is to be implemented when Runway 7-25 is opened.

**Implementation Actions.** This is proposed as an addition to the existing standard instrument departure procedures from Runway 26L/R. FAA Flight Standards Division would be charged with the revision of the established departure procedures to include the 240-degree departure turn procedure from Runway 25.

It does not appear that this procedure would require an environmental assessment as the procedure would not direct aircraft over noise-sensitive areas at altitudes below 3,000 feet AGL. Neither does the procedure cause increased noise within the 65 DNL contour in residential areas. Decisions about the need for an environmental assessment, however, must be made by the FAA.

**Costs and Funding.** Administrative costs will be borne by the FAA Flight Standards Division in establishing this procedure. The FAA may incur

additional administrative costs in undertaking any potential environmental review needed.

Airport users are not anticipated to incur additional operational costs because this turn procedure is currently being implemented on Runway 26L.

**Timing.** This is recommended for implementation simultaneously with the opening of the Runway 7-25, anticipated in 2000.

**10. Establish a side-step approach to Runway 25 for noise abatement.**

**Description.** The 1994 Inter Governmental Agreement (IGA) between the City of Phoenix and the City of Tempe established a "side-step" approach procedure for aircraft on final approach to Runway 25. This agreement *consists* of a requirement that aircraft on approach to Runway 25 would maintain an alignment with Runway 26L until reaching a point approximately three miles east of the runway (Sun Devil Stadium and Mill Avenue) followed by a turn to align with Runway 25 (approximately 800 feet south of the Runway 26L final approach course). The use of this "side-step" approach to Runway 25 is also supported in the Airport's 1993 EIS. Upon approach, the decision to execute a "side-step" approach versus a straight-in approach would ultimately be at the pilot's discretion.

**Relationship to 1989 NCP.** This measure was included as a long term

recommendation in the 1989 NCP and is to be implemented when Runway 7-25 is opened.

**Implementation Actions.** This is proposed as a visual approach procedure. FAA Flight Standards Division would be charged with the establishment of visual side-step approach to Runway 25.

It does not appear that this procedure would require an environmental assessment as the procedure would not direct aircraft over noise-sensitive areas at altitudes below 3,000 feet AGL. Neither does the procedure cause increased noise within the 65 DNL contour in residential areas. Decisions about the need for an environmental assessment, however, must be made by FAA.

**Costs and Funding.** Administrative costs will be borne by the FAA Flight Standards Division in establishing this procedure. The FAA may incur additional administrative costs in undertaking any potential environmental review needed.

Airport users will incur increased operational costs due to delays during peak periods in a western flow when this procedure is in effect.

**Timing.** This is recommended for implementation simultaneously with the opening of the Runway 7-25, anticipated in 2000.



**11. Encourage the use of DGPS, RNAV, and FMS equipment to enhance noise abatement navigation.**

*Description.* In the future, the use of Differential Global Positioning System (DGPS), Area Navigation (RNAV), and Flight Management System (FMS) technology will be used to better define approach and departure routes. As equipment, flight standards, and use of this equipment becomes common place, efforts to refine noise abatement departure and arrival routes should be undertaken.

*Relationship to 1989 NCP.* This is a new measure that was not included in the 1989 NCP.

*Implementation Actions.* The City of Phoenix Aviation Department should monitor the progress, development, and integration of DGPS, RNAV, and FMS technology and encourage its use to refine noise abatement route procedures.

*Costs and Funding.* Administrative costs will be borne by the City of Phoenix and FAA Flight Standards Division in refining noise abatement procedures.

*Timing.* This is recommended for implementation after FAA review and approval of the NCP. This is anticipated in 2001.

**12. Build engine maintenance run-up enclosure.**

*Description.* An engine maintenance run-up enclosure should be built to

attenuate noise from maintenance run-ups. The facility should be designed to accommodate the largest aircraft now conducting run-ups or those which may conceivably be expected in the future. This is anticipated to be the Boeing 757 aircraft. It is also suggested that the facility be designed to handle conventional corporate jets with the highest mounted engines as well as propeller-driven aircraft.

A three-sided enclosure is envisioned which may possibly have doors on one end to fully enclose all four sides. An example of one potential run-up enclosure design is shown on Exhibit 4N after page 4-46 in Chapter Four.

The City of Phoenix should establish policies governing the use of the run-up enclosure. All maintenance run-ups done at more than idle power should be required to use the facility. The City of Phoenix could consider allowing maintenance run-ups in the facility at night if experience demonstrates that no adverse noise impacts are being caused in residential areas. (Maintenance run-ups are currently prohibited after 11:00 p.m. and before 5:00 a.m.) If it is decided to release the nighttime prohibition on maintenance run-ups, the City of Phoenix should allow this only on a trial basis at first, and collect data on the noise output produced by the run-ups out in the community. If the noise levels are moderate, and if the complaint record indicates that no problems are being caused, the City of Phoenix could consider allowing nighttime run-ups in the enclosure on a permanent basis.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** This measure is the responsibility of the City of Phoenix. They should contract with an acoustical engineer to develop detailed design specifications and then open a request for proposals and cost quotations. After selecting a contractor, any required environmental reviews must be conducted before starting construction.

**Costs and Funding.** This is estimated to cost approximately \$2.0 million. It will be eligible for up to 80 percent funding through the noise set-aside of the Federal Airport Improvement Program. The local share must be provided through the Airport's capital budget.

**Timing.** For planning purposes, this is projected for the years 2001 - 2002. This allows time for design and any required environmental reviews.

### **13. Support 161<sup>st</sup> Air Refueling Wing of the Arizona Air National Guard's efforts to re-engine KC-135 Aircraft.**

**Description.** The 161<sup>st</sup> Air Refueling Wing KC-135 aircraft are currently equipped with older TF-33 engines. The Air Refueling Wing is attempting to obtain new CFM-56 engines for the KC-135 fleet. Funding for new engines, however, is currently not available. The City of Phoenix should support the

efforts of the 161<sup>st</sup> Air Refueling Wing via contacting local, state and federal representatives to lobby for military funds for engine replacement.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** The City of Phoenix Aviation Department should monitor the progress of the 161<sup>st</sup> Air Refueling Wing efforts and provide support via contacting local, state and federal representatives to lobby for military funds for engine replacement.

**Costs and Funding.** Administrative costs will be borne by the City of Phoenix.

**Timing.** This is recommended for implementation after FAA review and approval of the NCP. This is anticipated in 2001.

## **NOISE CONTOURS**

The recommended noise abatement measures do not involve any changes that would alter the 1999 baseline noise exposure contours, shown in **Exhibit 6C**. Noise contours projected for the years 2004 and 2015, however, would change with implementation of the proposed new noise abatement measures. The updated future noise contours are shown in **Exhibits 6D** and **6E**. For the most part, the noise contours would be smaller to the east and bow out slightly more to the south than projected in the baseline noise

analysis presented in Chapters Two and Three of the *Noise Exposure Maps* document. (See Exhibits 3C and 3D after pages 3-9 and 3-14 in Chapter Three.) A comparison of the noise impacts of the Noise Compatibility Plan contours with the baseline contours is presented later in this chapter.

## ***NOISE MITIGATION ELEMENT***

The recommended noise mitigation measures for the Phoenix Sky Harbor International Airport vicinity are presented below. One is a continuation of an existing mitigation measures. The other four are new measures. They are summarized in **Table 6F** at the end of this chapter.

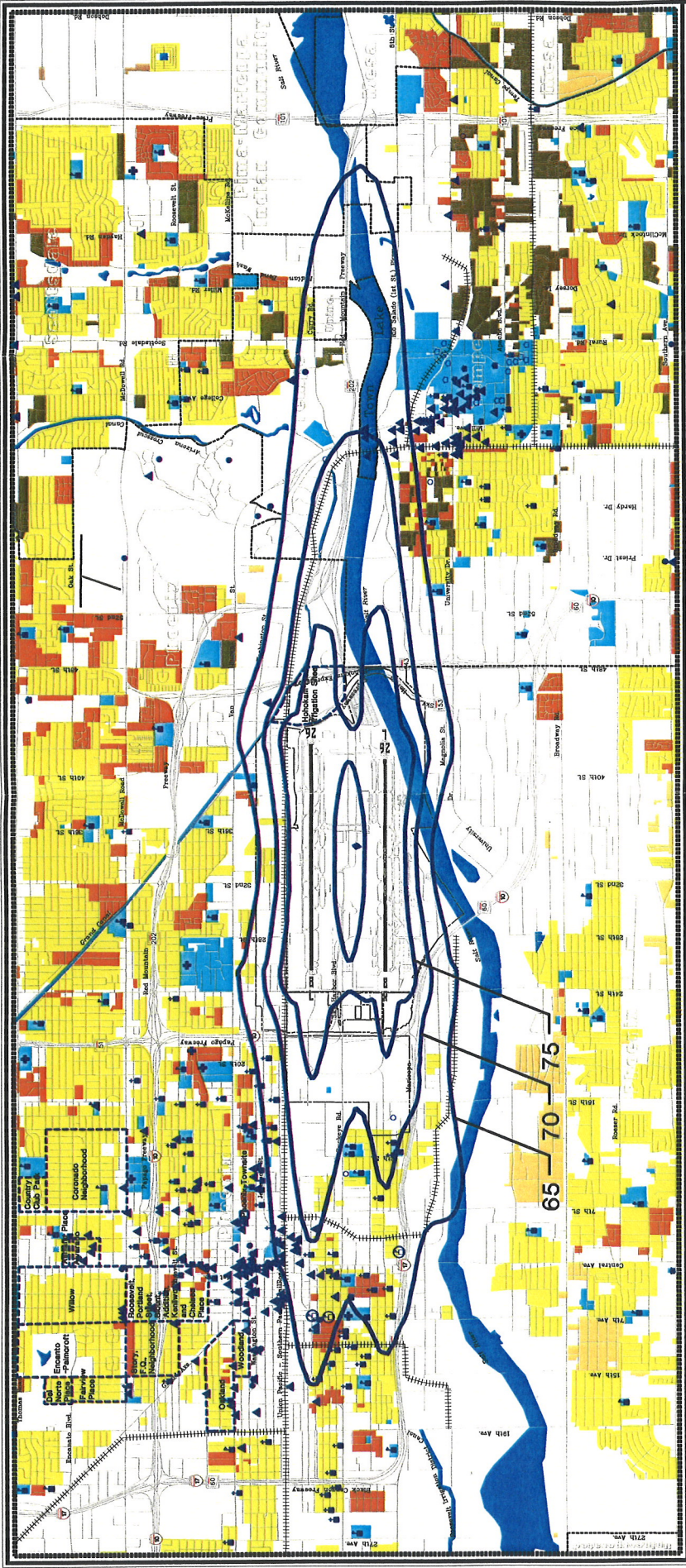
1. **Sound insulate single family homes within the 1992 65 DNL contour and single family homes outside the 1992 65 DNL contour but inside the 1999 65 DNL contour.**

**Description.** The City of Phoenix has developed acoustical treatment programs for single family homes based on recommendations of the 1989 Part 150 Noise Compatibility Program. Currently, 153 homes have been insulated to date. Another 250 homes are scheduled for sound insulation and are currently in the design process. The location of the homes that received sound insulation to date are shown in **Exhibit 6F**.

Typical acoustical treatment measures include the installation of acoustical doors and windows, insulation, and forced air heating and air conditioning systems. The estimated average cost of treating these homes is approximately \$30,000 each. This covers the acoustical treatment cost, engineering and administrative costs, plus a \$5,000 allowance for code deficiency repairs. The acoustical treatment costs are eligible for 80 percent Federal funding. The remaining 20 percent, plus the \$5,000 code deficiency allowance, is covered through the City of Phoenix's operating budget, passenger facility charges (PFCs), and bonds.

The updated noise contours for the year 1999, shown in **Exhibit 6F**, show less noise over Phoenix off the extended centerline of Runway 8L-26R to the west, to the southwest along the Salt River, and in Tempe to the northeast along the Indian Bend Wash. The updated noise contour increases in size in Phoenix along Interstate 17 to the west and in Tempe to the east along Rio Salado Parkway.

The City of Phoenix could consider expanding the boundaries of the residential acoustical treatment program to include 245 additional homes in the 1999 65 DNL noise contour. Approximately 2,420 homes would be included in the proposed acoustical treatment program. At an average cost of \$30,000 per home, the total acoustical treatment cost would be \$72.6 million. Approximately \$36.0 million would be eligible for Federal funding through the noise set-aside of



**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- DNL Noise Contour
- Historic District Boundaries
- Rural Residential (0-1 du/ac)
- Large Lot Residential (1:1-2 du/ac)
- Small Lot Residential (2:1-5 du/ac)
- Medium Density Residential (5-15 du/ac)
- High Density Residential (15+ du/ac)
- Water
- Noise-Sensitive Institutions
- Place of Worship
- School
- Charter School
- Hospital
- Museum
- Library
- Historic Structure
- Residence Halls
- Community Center

Source: Coffman Associates and Brown-Buntin Associates Analysis.  
Aerial Photography Land Use Interpretation  
September 1998.



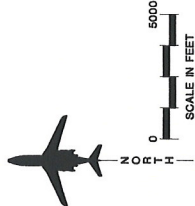
**Exhibit 6C**  
**PHOENIX SKY HARBOR INTERNATIONAL AIRPORT**  
**1999 NOISE EXPOSURE MAP WITH EXISTING LAND USE**

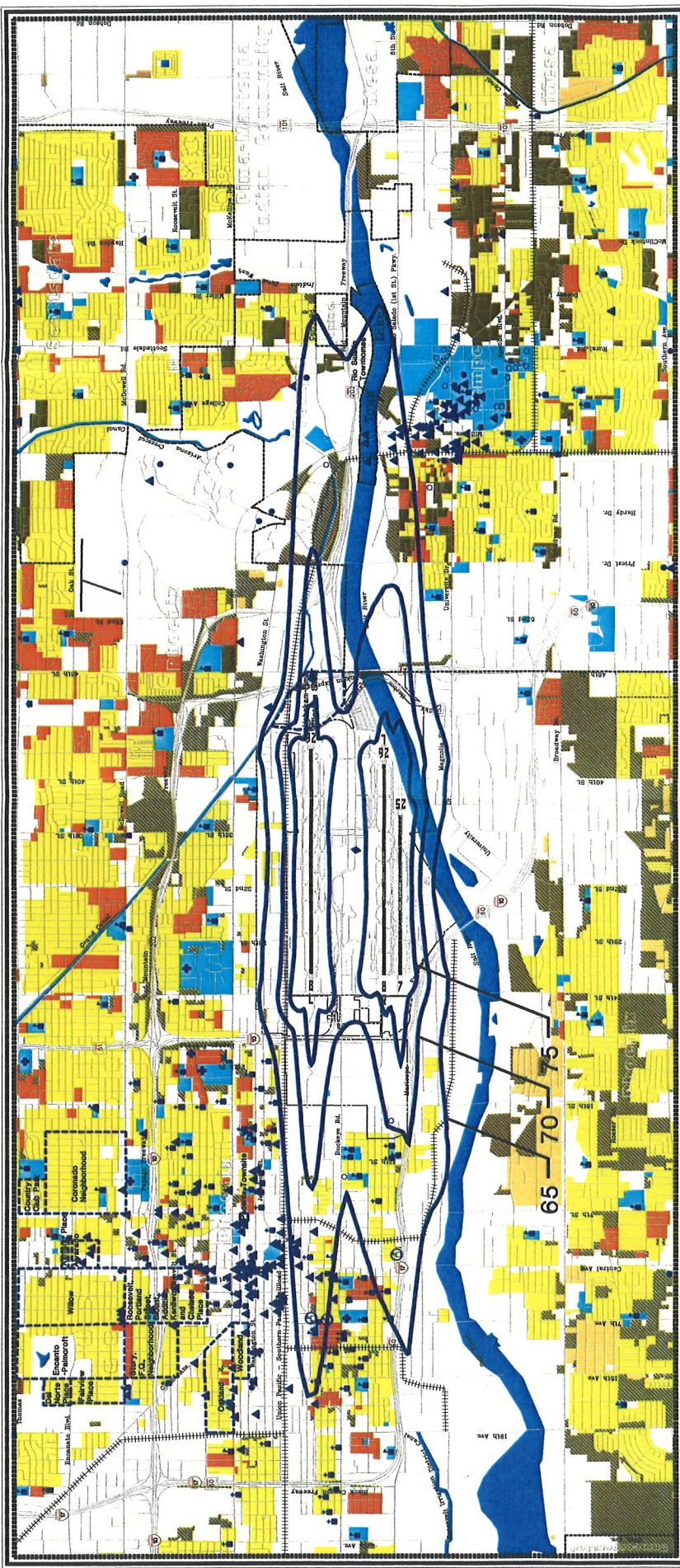


**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- 2004 Baseline DNL Noise Contour
- Historic District Boundaries
- Rural Residential (0-1 du/ac)
- Large Lot Residential (11-2 du/ac)
- Small Lot Residential (2.1-5 du/ac)
- Medium Density Residential (5.1-15 du/ac)
- High Density Residential (15+ du/ac)
- Water
- Noise-Sensitive Institutions
- Place of Worship
- School
- Charter School
- Hospital
- Museum
- Library
- Historic Structure
- Residence Halls
- Community Center
- Potential Residential Development Areas
- Potential Noise-Sensitive Institutions

Source: Coffman Associates and Brown-Buntin Associates Analysis.  
 Aerial Photography Land Use Interpretation  
 September 1998.





Source: Coffman Associates and Brown-Buntin Associates Analysis.

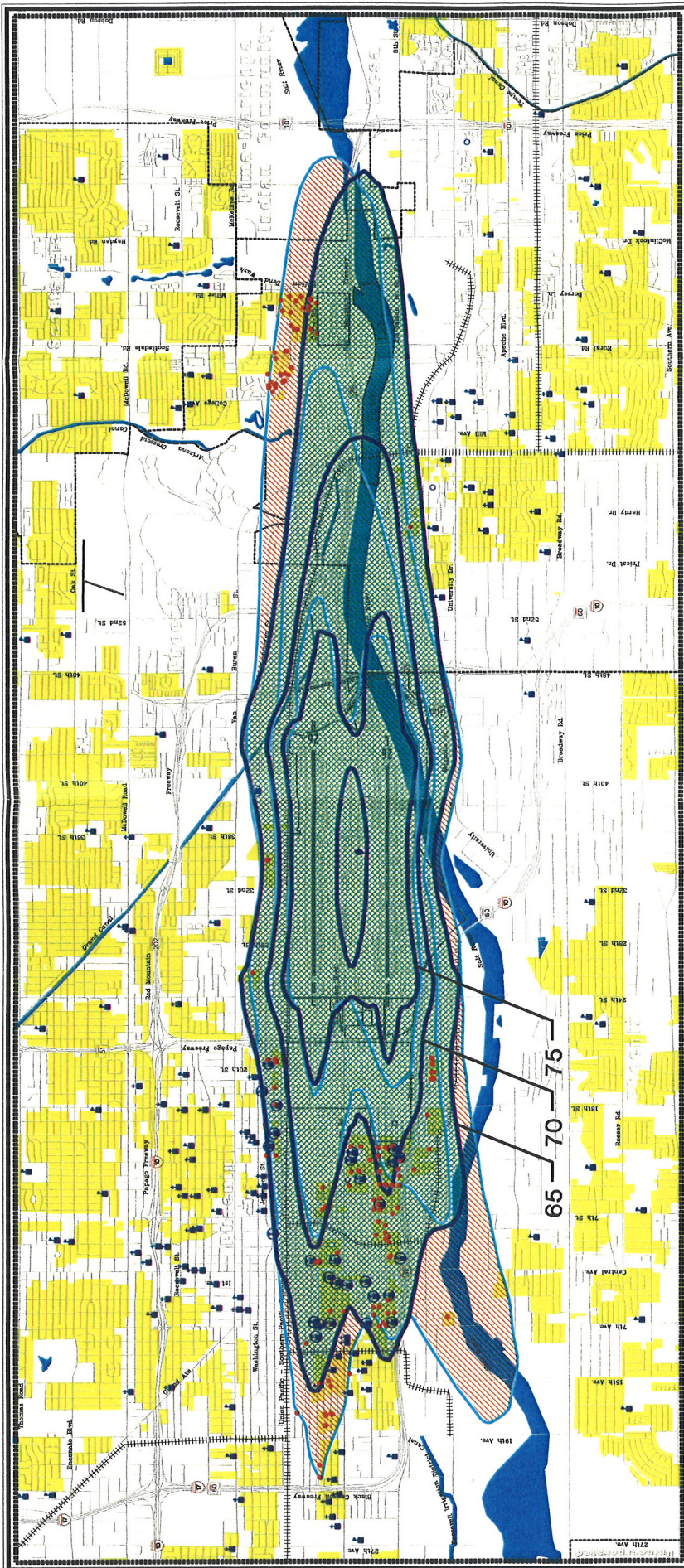
PHOENIX SKY HARBOR INTERNATIONAL AIRPORT

Exhibit 6E  
PHOENIX SKY HARBOR INTERNATIONAL AIRPORT  
2015 NOISE EXPOSURE WITH NOISE COMPATIBILITY PROGRAM

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LEGEND

Airport Property	High Density Residential (15+ du/ac)	Residence Halls
Municipal Boundaries	Water	Community Center
Study Area	Noise-Sensitive Institutions	Potential Residential Development Areas
DNL Noise Contour	Place of Worship	Potential Noise-Sensitive Institutions
Historic District Boundaries	School	
Rural Residential (0-1 du/ac)	Charter School	
Large Lot Residential (1-2 du/ac)	Hospital	
Small Lot Residential (2-5 du/ac)	Museum	
Medium Density Residential (5-15 du/ac)	Library	
	Historic Structure	



**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- 1992 Noise Exposure Contour
- 1999 Noise Exposure Contour
- Small Lot Residential (2:1-5 du/ac)
- Acoustically Treated Homes
- Schools
- Place of Worship
- Community Centers
- Acoustical Treatment Area Funded by Phoenix Aviation Department.
- Acoustical Treatment Area Eligible for Federal Funding from Airport Improvement Program Noise Set-a-side.
- Schools Eligible for Acoustical Treatment
- Place of Worship Eligible for Acoustical Treatment

Source: Maricopa Association of Governments, Updated by Coffman Associates.  
 Noise Exposure Map Documentation for Phoenix Sky Harbor International Airport, 1997.  
 Aerial Photography Land Use Interpretation September 1998.



Exhibit 6F  
**PHOENIX SKY HARBOR INTERNATIONAL AIRPORT**  
**RECOMMENDED ACOUSTICAL TREATMENT PROGRAM**

the Airport Improvement Program. The remaining \$36.5 million would be covered through bonds, PFCs, and the City of Phoenix's aviation operation budget.

As a condition of participation in the acoustical treatment program, the City of Phoenix requires homeowners to grant an avigation easement which is intended to prevent the imposition of Federal income taxes on a homeowner who would otherwise receive the acoustical treatment improvements without exchanging anything in return. While not universal, this is a very common feature of sound insulation programs around the country. In exchange for the home improvements, the property owner conveys an easement granting the Airport the right to operate aircraft in the area, with all attendant noise effects of aircraft operations, without being sued by the grantor (unless a significant increase in aircraft noise levels occurs). Since the easement runs with the land, it also helps to serve as a fair disclosure notice to future buyers of the home. A copy of the easement used in the Airport's acoustical treatment program is in **Appendix F**. Examples of easements used by other airports in their sound insulation programs are also in **Appendix F**.

It should be noted that easements were not required by the City in the pilot program for the acoustical treatment program. The City has required and obtained signed avigation easements for homes acoustically treated since the pilot program, but to date the avigation

easements have not been recorded with the Maricopa County Recorder.

Some of the property shown in the acoustical treatment eligibility area was discussed in Chapter Five as possibly being considered for acquisition and redevelopment. If that option is not pursued, acoustical treatment would be an alternative that could be offered to those homeowners. However, several of these dwellings do not meet building code or are not constructed on solid foundations and would require extensive renovation to meet the City's building codes.

There are several agencies and organizations that may be able to provide assistance in leveraging the acoustical treatment program funding with housing rehabilitation funding. Some of these entities and programs include the U.S. Department of Housing and Urban Development (HUD), Arizona Department of Commerce - Department of Housing and Infrastructure, City of Phoenix - Neighborhood Services and Housing Departments, and the Phoenix Revitalization Corporation. The City of Phoenix should try to coordinate these agencies and their housing assistance programs with the acoustical treatment program. The housing assistance programs should be used for general property improvements and corrections of code violations, while the City of Phoenix's acoustical treatment funding could be directed to acoustical treatment. This would help promote the City's objectives of neighborhood preservation.



**Relationship to 1989 NCP.** This is a continuation and expansion of Land Use Measure 5 from the 1989 NCP which recommended (1) that the City of Phoenix participate in a sound insulation program for noise-affected homes and (2) that the City of Phoenix acquire avigation easements over existing incompatible land uses inside the 65 DNL noise contour.

**Implementation Actions.** After FAA approval of the updated Noise Compatibility Program, the City of Phoenix should revise its acoustical treatment eligibility area maps to show the expanded area on the north side. No additional implementation actions are required. The acoustical treatment program requires ongoing management.

**Cost and Funding.** Costs of the acoustical treatment program have averaged approximately \$30,000 per house. Based on an estimate of 2,420 untreated homes remaining in the eligibility area, the total cost to complete this program would be \$72,600,000, assuming all eligible homeowners participate.

The City of Phoenix has received funding from the FAA through the noise set-aside of the Airport Improvement Program (AIP). It should be noted that homes within the 1999 65 DNL contour are eligible for up to 80 percent funding (this does not include the \$5,000 for building code deficiencies) from the noise set-aside of the Airport Improvement Program. The local match will continue to be provided through the Sky Harbor International

Airport's capital budget. Homes outside the 1999 65 DNL contour but inside the 1992 65 DNL noise contour must be funded by the Airport's capital budget.

**Timing.** This is currently being implemented. The City of Phoenix intends to continue until the owners of all eligible homes have been given the opportunity to participate in the program. The pace of the program will depend on the amount of available funding.

## **2. Sound Insulate approximately ten schools within the 1999 65 DNL contour.**

**Description.** To date, the City of Phoenix has not developed acoustical treatment programs for the six schools recommended in the original Part 150 Noise Compatibility Program. All six of these schools continue to be within the 1999 65 DNL noise exposure contour. In addition, three charter and one preschool have been identified within the 65 DNL noise contours. Pending a feasibility study, the ten schools include Lowell Elementary, Herrera Elementary, Annett Elementary, Dunbar, Maricopa Skills Center, Gateway Community College, Tertulia, Enterprise, Friendly House, and the Phoenix Day Preschool. The schools and community centers are depicted on **Exhibit 6F**.

**Relationship to 1989 NCP.** This is an continuation of Land Use Measure 5 from the 1989 NCP.

**Implementation Actions.** After FAA approval of the updated Noise Compatibility Program, the City of Phoenix will need to secure funding for the acoustical treatment of the eligible schools. It will then need to retain the services of acoustical engineers with expertise in sound insulation of existing structures. They must coordinate with the school operators in undertaking an inspection of the buildings to develop a work write-up and detailed specifications for the treatment program. The City of Phoenix, in association with the school owner, can then request bids from qualified contractors.

**Cost and Funding.** Costs of acoustically treating the schools are not possible to reliably estimate without an on-site inspection by a qualified specialist. For planning purposes only, the costs of treating the six schools are estimated at \$3 million each, including contingencies. This is roughly based on the costs to acoustically treat schools near other airports.

This project would be eligible for FAA funding through the noise set-aside of the AIP. The acoustical treatment costs are eligible for up to 80 percent funding through the AIP. The local match will continue to be provided through the City of Phoenix's capital budget.

**Timing.** These schools will be eligible for treatment after approval of the updated Noise Compatibility Program by the FAA, expected in 2001.

For planning purposes, acoustical treatment of the schools and preschools is projected for 2003 to 2006.

### **3. Acoustical Treatment of Community Center and place of worship classrooms/meeting rooms within the 1999 65 DNL contour.**

**Description.** It is recommended that the class/meeting rooms within the two community centers and two places of worship within the 1999 70-75 DNL noise contours and one community center and 20 places of worship within the 65-70 DNL noise contour be added to the acoustical treatment program. The community centers and places of worship are depicted on **Exhibit 6F**.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** After FAA approval of the updated Noise Compatibility Program, the City of Phoenix will need to secure funding for a feasibility study and the acoustical treatment of eligible Community Centers and Places of Worship class/meeting rooms. It will then need to retain the services of acoustical engineers with expertise in sound insulation of existing structures. They must coordinate with the owners and operators in undertaking an inspection of the buildings to develop a work write-up and detailed specifications for the treatment program. The City of

Phoenix, in association with the owner/operators, can then request bids from qualified contractors.

**Cost and Funding.** Costs of acoustically treating the class/meeting rooms within the Community Centers and Places of Worship are not possible to reliably estimate without an on-site inspection by a qualified specialist. For planning purposes only, the costs of treating class/meeting rooms within the Community Centers and Places of Worship are estimated at \$300,000 each, including contingencies for a total of \$7.5 million.

This project would be eligible for FAA funding through the noise set-aside of the AIP. The acoustical treatment costs are eligible for up to 80 percent funding through the AIP. The local match will continue to be provided through the City of Phoenix's capital budget.

**Timing.** Class/meeting rooms within eligible Community Centers and Places of Worship will be eligible for treatment after approval of the updated Noise Compatibility Program by the FAA, expected in 2001.

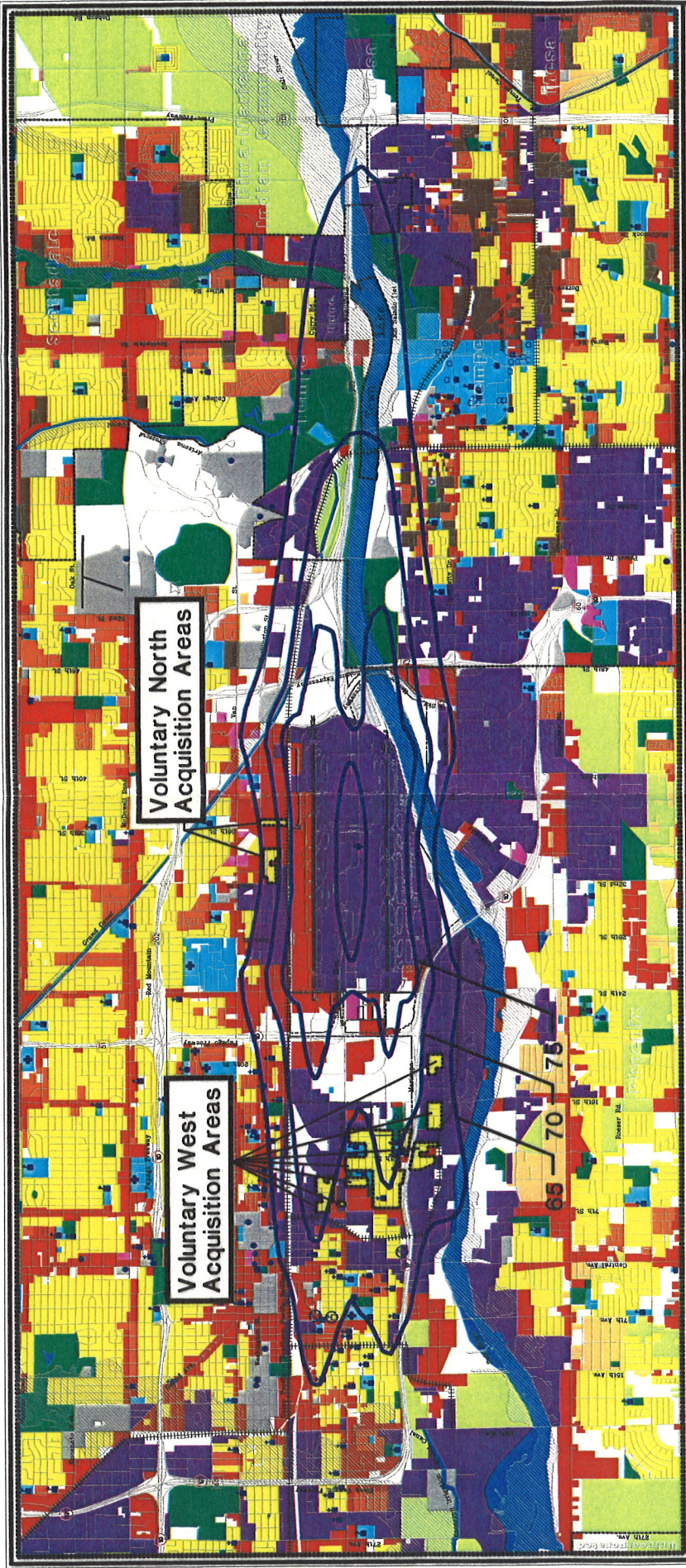
For planning purposes, acoustical treatment of the schools and preschools is projected for 2003 to 2006.

**4. Voluntary Acquisition and Redevelopment: Acquire dwellings north and west (to 7<sup>th</sup> Street) of the airport within the 1999 70 DNL contour.**

**Description.** One thousand one hundred eleven dwellings are recommended for acquisition. Not only are these homes exposed to loud cumulative noise, but most are so near the airport that they also experience very high single event noise from aircraft takeoffs and landings. **Exhibit 6G** shows the location of homes recommended for acquisition. Fifty-seven single-family and 12 duplexes are located immediately north of the Airport. These residential areas receive noise between 65 and 75 DNL in 1999, and are somewhat isolated from other neighborhoods by surrounding industrial development. The remaining 1,042 dwellings, located west of the Airport out to 7<sup>th</sup> Street, that are between the 1999 65 and 75 DNL noise exposure contours. This includes 51 homes that have already been sound insulated.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** A voluntary acquisition, clearance, and redevelopment program would be best administered by the City of Phoenix. The City of Phoenix has the legal authority to accept Federal funding for purchasing noise impacted residential property and would be the most appropriate entity to handle any subsequent redevelopment plans and projects in the area. It is also the most appropriate forum for weighing the importance of legitimate, but potentially competing, public interests, such as the need for airport



**LEGEND**

	Airport Property		High Density Residential (15+ du/ac)		Place of Worship
	Municipal Boundaries		Hotels, Motels, & Resorts		School
	Study Area		Commercial / Office		Charter School
	1999 DNL Contour		Public		Hospital
	Agriculture		Park & Open Space		Museum
	Rural Residential (0-1 du/ac)		Water		Library
	Large Lot Residential (11-2 du/ac)		Industrial		Residence Halls
	Small Lot Residential (21-5 du/ac)		Vacant		Community Center
	Medium Density Residential (5.1-15 du/ac)		100-Year Floodplain		Voluntary Acquisition Areas
			Noise-Sensitive Institutions		

Source: Maricopa Association of Governments, Updated by Corlman Associates. Aerial Photography Land Use Interpretation September 1998.

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compatibility, the need for employment opportunities, and the need to preserve affordable housing.

If the City of Phoenix was willing to consider voluntary acquisition and redevelopment as a matter of policy, numerous important details would have to be addressed. Among these are the pace and phasing of acquisition, what to do about residents choosing not to relocate, and the proper care and management of vacant lots. A residential relocation plan must consider the availability of alternative housing and the effects of large scale residential removal on local institutions such as schools and churches. Redevelopment plans must emphasize the creation of visual buffers between industrial areas and the remaining residential areas and efficient traffic flow through the redeveloped area so the project does not inadvertently create blighting influences.

**Cost and Funding.** The cost of the acquisition and redevelopment program are potentially enormous. The number of dwellings in the two redevelopment areas include approximately 1,042 single family homes and 12 duplexes. Consideration should also be given to including the 51 homes that have been sound insulated in the two identified redevelopment areas. Purchase prices for single family homes is estimated at \$65,000 based on recent home acquisitions in these areas, the estimate for duplexes is \$100,000, relocation costs could be up to \$22,500 per household, and demolition and hazardous material abatement could be

up to \$18,000 per building. The total estimated cost for acquisition and redevelopment would be \$118.4 million. At least part of these costs would be offset by revenues from the sale or lease of the land for redevelopment.

A majority of the costs of this program would be eligible for up to 80 percent Federal funding through the noise set-aside of the Airport Improvement Program. Fifty-one homes within the voluntary acquisition area homes would not be eligible for additional Federal funding because they received Federal funds to be acoustically treated. The City of Phoenix would have to determine the most appropriate source for the local match.

The airport must comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Act because Federal funds are being used. (See 49 CFR Part 24.) Under these regulations, the fair market value of the home is established through professional appraisals. The homeowner is also entitled to reimbursement of moving expenses and compensation for other relocation expenses (such as closing costs and incidental expenses for a new home, and compensation for a higher interest rate on the new mortgage) up to a maximum of \$22,500. If the maximum relocation benefit, in addition to the sale price of the home, is not enough to assure the displaced person of acquiring comparable housing or, in any case, decent, safe, and sanitary housing, additional relocation payments may be

available, subject to a case-by-case review.

**Timing.** The City of Phoenix can start this acquisition program after approval of the Noise Compatibility Program by the FAA. The voluntary acquisition program could be offered as early as 2001 if funding is available.

#### **5. Exchange dwellings impacted within the 70 DNL noise contour with a dwelling outside the 65 DNL noise contour.**

**Description.** As an alternative to a large acquisition program, a voluntary program could be setup that exchanges a dwelling within the voluntary acquisition area with a new replacement dwelling constructed outside the 65 DNL noise exposure contours. In this program, the owner of a home within the acquisition areas identified on **Exhibit 6G** would give the title of the noise impacted home to the program sponsor in exchange for the title of the new home outside the 1999 65 DNL noise contour. The home within a voluntary acquisition area would then be demolished and property would be held or sold for a noise compatible use.

**Relationship to 1989 NCP.** This is a modified version of Noise Mitigation Measure 2 from the original 1989 NCP. It was recommended that the City of Phoenix survey the local community to determine if local residents would be

interested in this program. This measure has never been implemented.

**Implementation Actions.** A voluntary dwelling exchange program would be best administered by the City of Phoenix. The City of Phoenix has the legal authority to accept Federal funding and would be the most appropriate entity to handle any subsequent redevelopment plans and projects in the area. Numerous important details would have to be addressed if the City of Phoenix is willing to consider voluntary dwelling exchange and clearance and redevelopment of exchanged dwellings outside the 1999 65 DNL noise contours. Among these are the location of replacement dwellings, who would be responsible for the outstanding mortgage balance (if any) on the exchange dwelling, and the proper care and management of new vacant lots. In addition, dwelling exchange programs must consider the timing and availability of replacement housing outside the 65 DNL contour and the effects of large scale residential removal on local institutions such as schools and places of worship. Redevelopment plans must emphasize the creation of visual buffers between industrial areas and the remaining residential areas and efficient traffic flow through the redeveloped area so the project does not inadvertently create blighting influences.

**Cost and Funding.** The cost of dwelling exchange program for the

voluntary acquisition areas depicted on **Exhibit 6G** will essentially be the same as the acquisition program. For planning purposes, it is estimated this program would cost \$11.8 million. This assumes that ten percent of residents would use the dwelling exchange program. However, the costs of this program would be eligible for only 50 percent Federal funding through the noise set-aside of the Airport Improvement Program based upon a similar program implemented in Louisville International Airport.

**Timing.** This program would be offered concurrently with the voluntary acquisition program. It would begin after FAA approval of the updated Noise Compatibility Program, expected by the year 2001.

## **LAND USE PLANNING ELEMENT**

The recommended land use planning measures for the Phoenix Sky Harbor International Airport vicinity are presented below. They are summarized in **Table 6F** at the end of this chapter.

- 1. Update General Plans to reflect the 1999 noise contour planning boundary from Part 150 Study as basis for noise compatibility planning.**

Phoenix, Tempe, Scottsdale, Salt River Pima-Maricopa Indian Community, and

Maricopa County should amend their general plans to show the 1999 noise exposure contour planning boundary (NCPB) for Phoenix Sky Harbor International Airport. **Exhibit 6H** shows the NCPB for Phoenix Sky Harbor International Airport. It includes land within the squared-off 1999 65 DNL noise exposure contour.

**Relationship to 1989 NCP.** This is a continuation and update of Land Use Measure 3 from the 1989 NCP which recommended Phoenix and Tempe adopt the final Part 150 Study as the airport compatibility element of their general plans.

**Implementation Actions.** This policy can be established by each jurisdiction (Phoenix, Tempe, Salt River Pima-Maricopa Indian Community, and Maricopa County) amending their general plans.

**Cost and Funding.** Adoption of this measure would involve administrative expenses for Phoenix, Tempe, Salt River Pima-Maricopa Indian Community, and Maricopa County. These would have to be borne by the operating budgets of each jurisdiction.

**Timing.** Amendments to general plans take time to prepare and process. The Growing Smarter legislation requires communities to update and re-adopt their General Plans by the end of 2001. This would be an ideal opportunity to incorporate the appropriate airport related amendments into the General Plans.

**2. Amend General Plan designations to reflect existing compatible and existing lower density land uses within the NCPB.**

*Description.* Several areas within the NCPB are developed with compatible land uses, but are planned for noncompatible land uses or higher concentrations of noncompatible land uses. In addition, two areas west of the Airport are developed with low density residential that are planned for higher concentrations of residential. It is recommended that within the NCPB that general plan designations be amended to reflect the existing compatible land uses or lower density residential use. **Exhibit 6J** depicts the General Plan designations within the NCPB to be amended.

*Relationship to 1989 NCP.* This is a new measure that was not included in the 1989 NCP.

*Implementation Actions.* This measure would be implemented through general plan amendments reflecting this policy by the City's of Phoenix and Tempe.

*Cost and Funding.* This measure would involve administrative expenses. Funding would come from the operating budgets of each jurisdiction.

*Timing.* For planning purposes, implementation is projected for 2001 to allow time for preparation and processing of the amendments.

**3. General Plan Amendment: Amend Mixed Use designations within the 1999 65 DNL contour to exclude residential.**

*Description.* Large areas of planned mixed-use (which allows high concentrations of residential development) east of the airport and within Tempe should be amended. Developing a new mixed use category that does not allow residential inside the 1999 65 DNL noise exposure contour is recommended.

*Relationship to 1989 NCP.* This is a new measure that was not included in the 1989 NCP.

*Implementation Actions.* This measure would be implemented through general plan amendments reflecting this policy by the City's of Phoenix and Tempe.

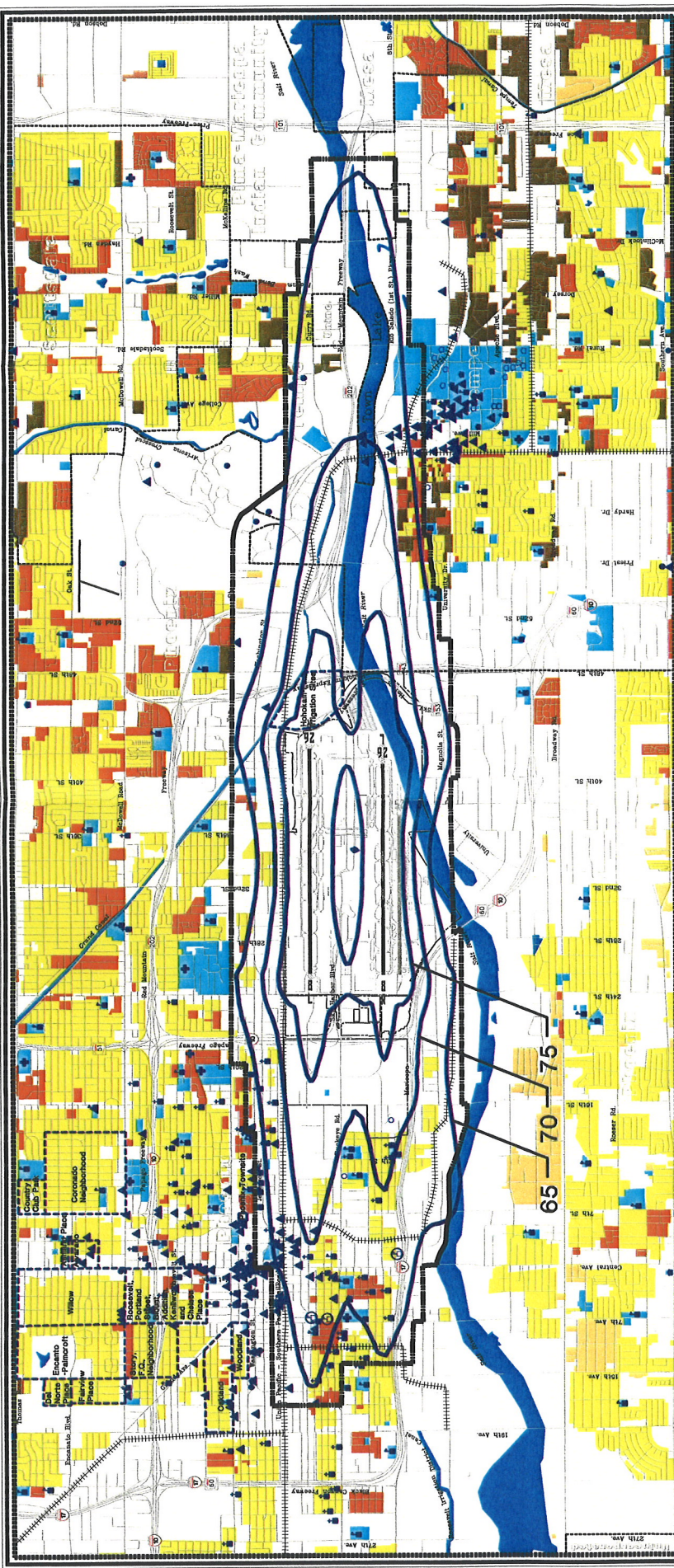
*Cost and Funding.* This measure would involve administrative expenses. Funding would come from the operating budgets of each jurisdiction.

*Timing.* For planning purposes, implementation is projected for 2001 to allow time for preparation and processing of the amendments.

**4. Enact guidelines specifying noise compatibility criteria for the review of development projects within NCPB.**

*Description.* It is recommended that Phoenix, Tempe, and the Salt River





**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- Historic District Boundaries
- Noise Contour Planning Boundary
- 1999 DNL Noise Exposure Contour
- Rural Residential (0-1 du/ac)
- Large Lot Residential (1.01-2 du/ac)
- Small Lot Residential (2.01-5 du/ac)
- Medium Density Residential (5.01-15 du/ac)
- High Density Residential (15+ du/ac)
- Water
- Noise-Sensitive Institutions
- Place of Worship
- School
- Charter School
- Hospital
- Museum
- Library
- Historic Structure
- Residence Halls
- Community Center

**Source: Coffman Associates and Brown-Buntin Associates Analysis.**

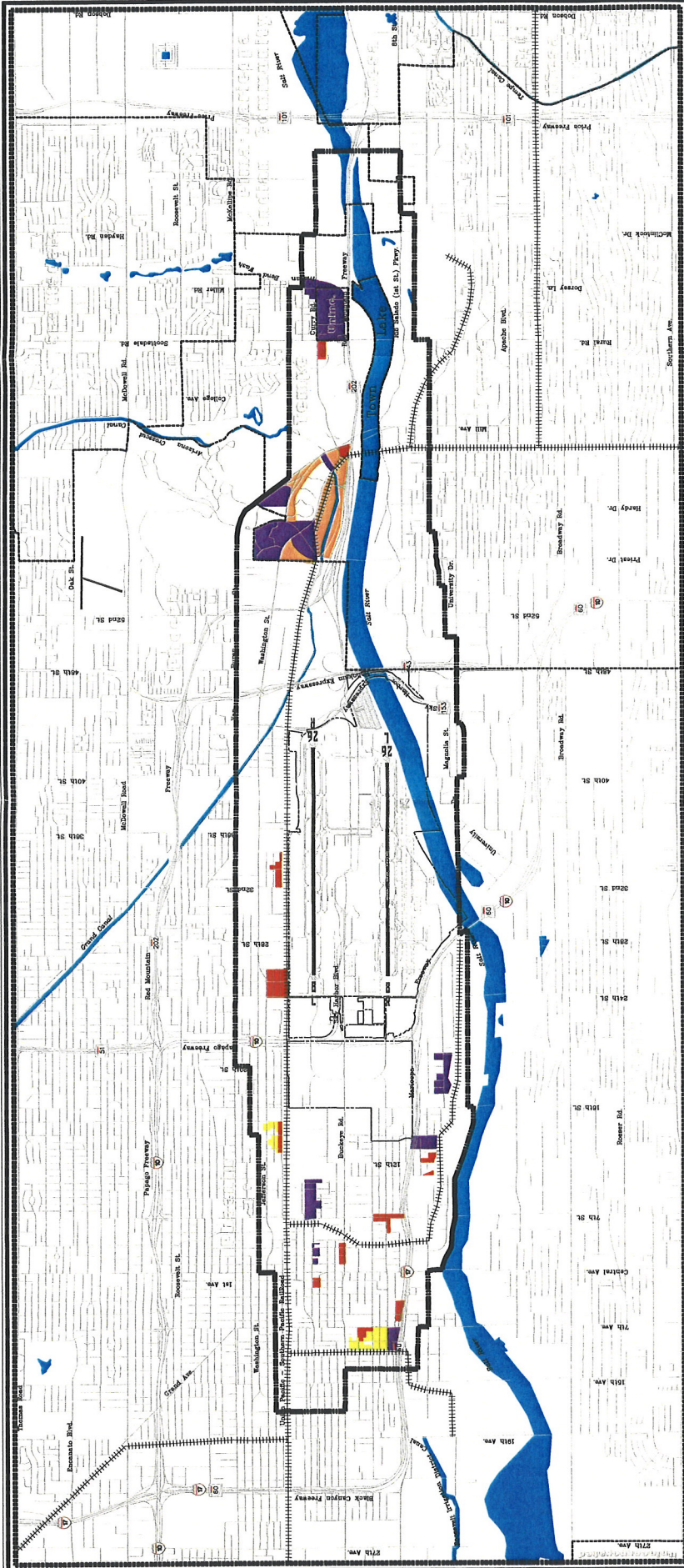
- Air Carrier Activity for August 20, 1998.
- Commuter Activity from May 1 to May 18, 1998.
- General Aviation Activity from May 1 to May 31, 1998.
- Aerial Photography Land Use Interpretation September 1998.

**PHOENIX SKY HARBOR INTERNATIONAL AIRPORT**

**Scale in Feet**  
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**North Arrow**

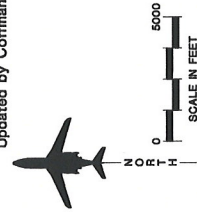
**Exhibit 6H**  
**PHOENIX SKY HARBOR INTERNATIONAL AIRPORT**  
**RECOMMENDED NOISE CONTOUR PLANNING BOUNDARY**



**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- Noise Contour Planning Boundary
- Existing Small Lot Residential Planned for Higher Density Residential
- Open Space Planned for Mixed Use Development
- Existing Commercial / Office areas Planned for Noise Sensitive Uses
- Existing Industrial Planned for Noise Sensitive Uses
- Water

Source: General Plan for Phoenix, 1985-2000, City of Phoenix, 1985; General Plan for Scottsdale, Arizona, City of Scottsdale, 2000, 1988; General Development Plan of the Salt River, Pima-Maricopa Indian Community, Updated by Coffman Associates.



Pima-Maricopa Indian Community adopt airport land use compatibility guidelines for discretionary review of development projects within the 1999 65 DNL noise exposure contour planning boundary (NCPB). Adding these guidelines to the general plans would add little cost or administrative burden to the review process. A simple checklist could be prepared listing the important factors to consider in reviewing development proposals within the 1999 65 DNL noise exposure contour. The following criteria are suggested:

- A. Determine the sensitivity of the subject land use to aircraft noise levels. The F.A.R. Part 150 land use compatibility table can be used for this purpose. (See Exhibit 3A in Chapter Three of the Phoenix Noise Exposure Map Update.)
- B. Advise the airport management of development proposals involving noise-sensitive land uses within the NCPB.
- C. Locate noise-sensitive public facilities outside the NCPB, if possible. Otherwise, require building construction to provide an outdoor to indoor noise level reduction of 25 decibels within the 65-70 DNL range. Also, require the dedication of noise and aviation easements to the City of Phoenix as the airport proprietor and the recording of a fair disclosure agreement

and covenant noting the proximity of the airport and the existing and projected airport noise contours.

- D. Discourage the approval of rezonings, exceptions, variances, and conditional uses which introduce noise-sensitive development into areas exposed to noise exceeding 65 DNL.
- E. Where noise-sensitive development within the NCPB must be permitted, encourage developers to incorporate the following measures into their site designs.
  - (1) Where noise-sensitive uses will be inside a larger, mixed use building, locate noise-sensitive activities on the side of the building opposite the airport or, if the building is beneath a flight track, opposite the prevailing direction of aircraft flight.
  - (2) Where noise-sensitive uses are part of a larger mixed use development, use the height and orientation of compatible uses, and the height and orientation of landscape features such as natural hills, ravines and man-made berms, to shield noise-sensitive uses from

ground-noise generated at the airport.

**Relationship to 1989 NCP.** This is a continuation and updated of Land Use Measure 4 from the 1989 NCP which recommended development guidelines be adopted for Phoenix and Tempe.

**Implementation Actions.** Phoenix, Tempe, and the Salt River Pima-Maricopa Indian Community must approve these amendments by ordinance.

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is planned for 2001.

**5. Retain compatible land use zoning within the NCPB.**

**Description.** There are several areas within the NCPB are currently zoned for compatible use. When possible, the areas that are zoned for compatible use should be maintained. These areas are depicted on **Exhibit 6K** in dark red (Commercial/Office), dark purple (Industrial), and dark green (Park & Open Space).

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** Phoenix, Tempe, and the Salt River Pima-

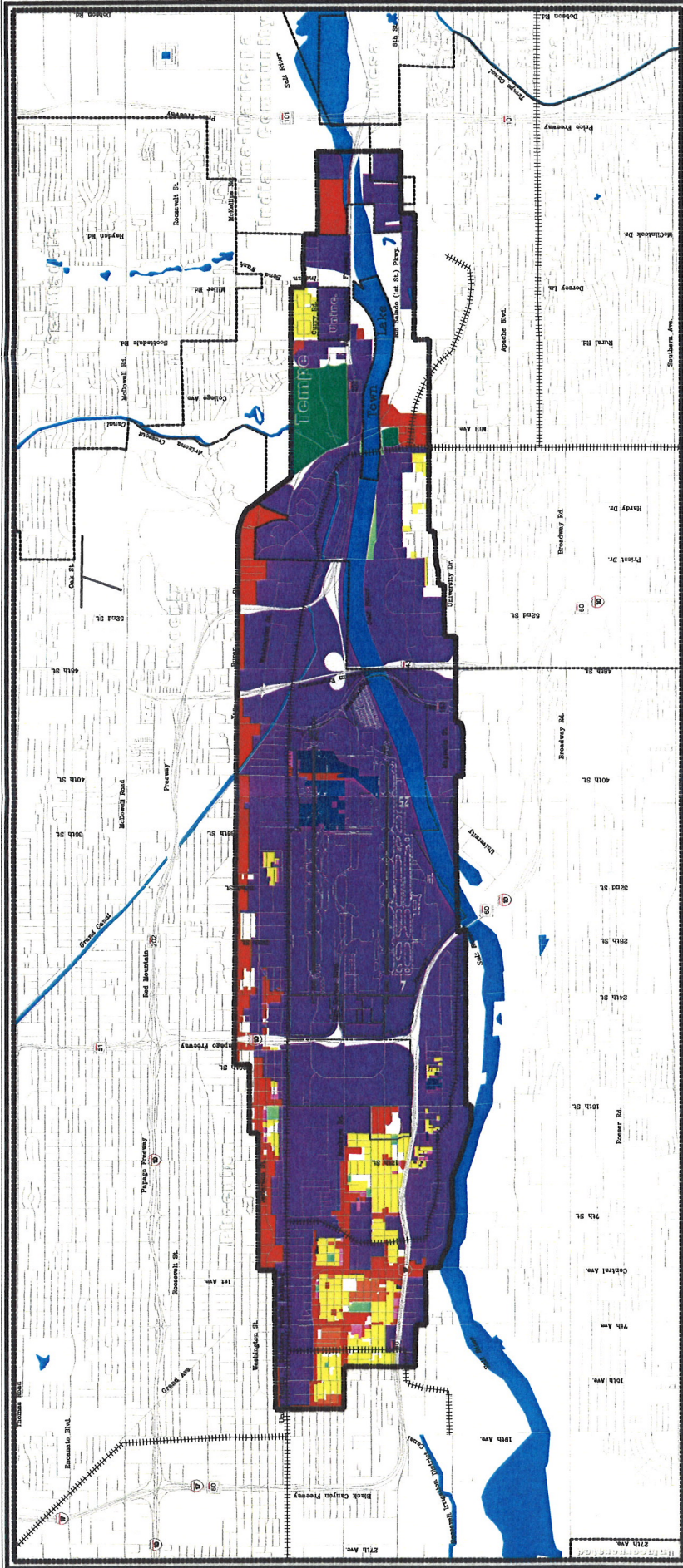
Maricopa Indian Community should monitor land use actions within the NCPB and discourage rezoning within these areas.

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is planned for 2001.

**6. Amend Zoning Map to reflect General Plan and existing compatible land uses within the NCPB.**

**Description.** Consideration should also be given to encourage the rezoning areas to compatible land uses (commercial or industrial) within the NCPB that are currently developed with compatible land uses, but are zoned for non-compatible land uses. **Exhibit 6K** depicts several areas that are developed with compatible land uses but, are zoned for non-compatible land uses. These areas are identified on **Exhibit 6K** with pink and dark blue colors. Rezoning these areas to current compatible land uses should be encouraged. In addition, several existing parks and open space areas west of the Airport are zoned for noise sensitive uses. To the east, a large area at the intersection of Curry and Miller Roads is currently developed in low density residential but zoned for higher density residential. These areas are identified on **Exhibit 6K** with yellow, orange, and light green colors.



Source: Maricopa County, City of Phoenix, City of Tempe, City of Mesa, City of Scottsdale, and Phoenix Sky Harbor International Airport Community Zoning Maps. Updated by Coffman Associates.



**PHOENIX SKY HARBOR INTERNATIONAL AIRPORT  
RECOMMENDED ZONING AMENDMENTS**

Exhibit 6K

**LEGEND**

- Existing Medium Density Residential Zoned for Higher Density Residential
- Existing Commercial / Office areas Zoned for Noise Sensitive Uses
- Existing Industrial Zoned for Noise Sensitive Uses
- Existing Park & Open Space Zoned for Noise Sensitive Uses
- Existing Small Lot Residential Zoned for Higher Density Residential
- Airport Property
- Municipal Boundaries
- Study Area
- Noise Contour Planning Boundary
- Existing Commercial / Office areas
- Existing Industrial
- Existing Park & Open Space
- Water

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** Phoenix, and Tempe should encourage rezoning when appropriate

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is projected for 2001.

7. **Encourage rezoning several large tracts of land currently developed with low density residential but zoned for higher density non-compatible land uses within the 1999 65 DNL noise exposure contour.**

**Description.** The City of Phoenix should encourage rezoning several large tracts of land currently developed with low density, residential but zoned for higher density non-compatible land uses within the 1999 65 DNL noise exposure contour west and northeast of the Airport. The large tracts, depicted in orange and yellow colors on **Exhibit 6K**, of low and medium density residential land west of the Airport are currently zoned for high density residential.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** Phoenix, and Tempe encourage rezoning these areas when appropriate.

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is projected for 2001.

8. **Enact overlay zoning to provide noise compatibility land use standards near Airport.**

**Description.** In order to fully promote airport compatibility throughout the Phoenix Sky Harbor International Airport area, it is recommended that Phoenix, Tempe, the Salt River Pima-Maricopa Indian Community, and Maricopa County amend their respective zoning ordinances to include overlay zoning. The suggested overlay zoning boundaries are depicted on **Exhibit 6L** with standards in **Table 6C**.

**Relationship to 1989 NCP.** This is a continuation and update of Land Use Measure 1 from the 1989 NCP which was not implemented.

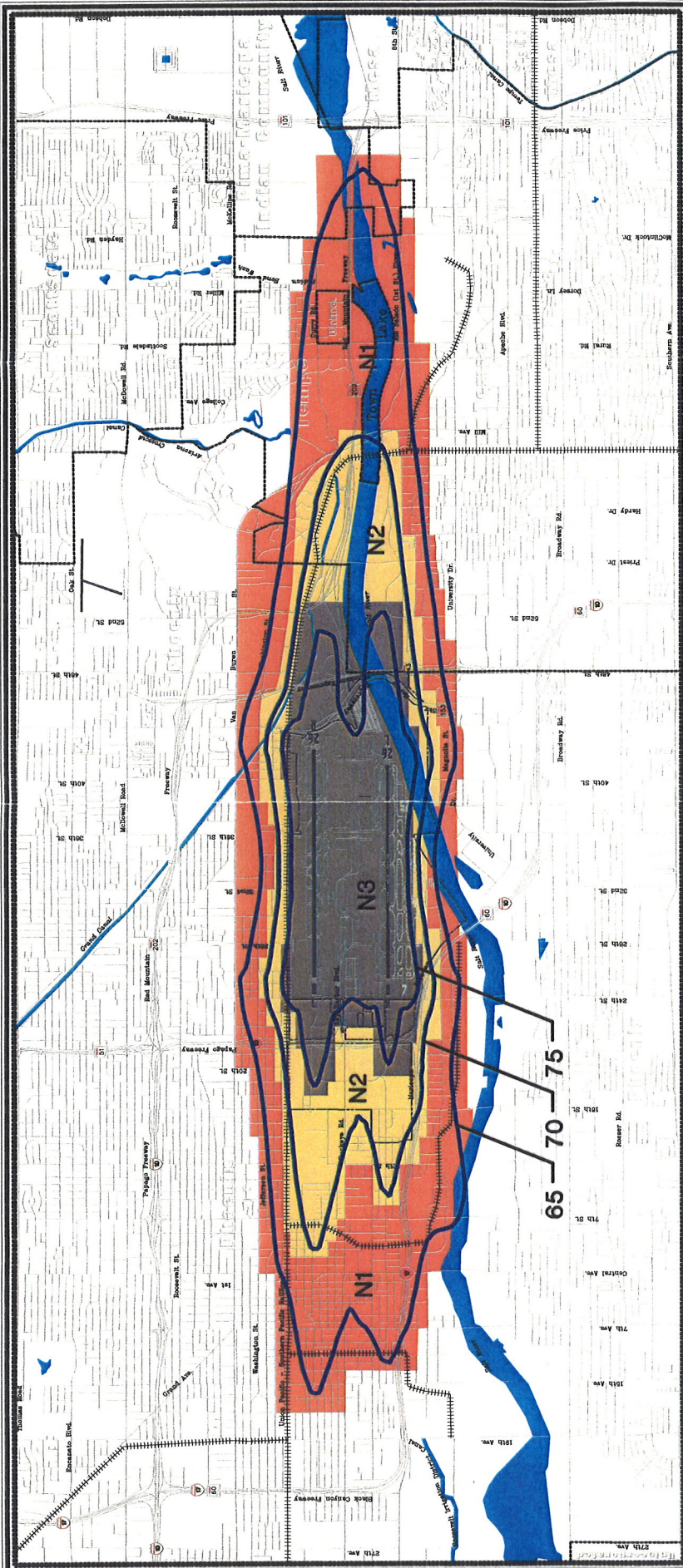
**Implementation Actions.** Phoenix, Tempe, the Salt River Pima-Maricopa Indian Community, and Maricopa County must approve these amendments by ordinance.

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is projected for 2001.

**TABLE 6C**  
**Potential Land Use Compatibility Standards**  
**Phoenix Sky Harbor International Airport**

		Noise Zones/Levels in DNL		
SLUCM No.	Land Use Name	N-1 65-70	N-2 70-75	N-3 75+
<b>10</b>	<b>Residential</b>			
11	Household Units	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.11	Single Units - detached	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.12	Single Units - semi-detached	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.13	Single Units - attached row	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.21	Two Units side-by-side	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.22	Two Units over-under	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.31	Apartments - walk-up	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
11.32	Apartments - elevator	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
12	Group Quarters	Y <sup>1,5,7</sup>	Y <sup>1,5,7</sup>	N
13	Residential Hotels	Y <sup>1,5</sup>	Y <sup>1,5</sup>	N
14	Mobile Home in and out of Parks <sup>6</sup>	N	N	N
15	Transient Lodgings, Hotels, Motels	Y <sup>1,5</sup>	Y <sup>1,5</sup>	Y <sup>3,5</sup>
16	Other Residential	Y	Y	N
<b>20</b>	<b>Manufacturing</b>			
21	Food & kindred products	Y	Y	Y
22	Textile Mill products	Y	Y	Y
23	Apparel & other finished products made from fabrics, leather, & similar materials	Y	Y	Y
24	Lumber & wood products (except furniture) Furniture & fixtures	Y	Y	Y
25	Paper & allied products	Y	Y	Y
26	Printing, publishing, & allied industries	Y	Y	Y
27	Chemicals & allied products	Y	Y	Y
28	Petroleum refining and related industries	Y	Y	Y
29	Rubber & misc. plastic	Y	Y	Y
	Stone, clay, & glass products - mfg.			
31	Primary metal ind.	Y	Y	Y
32	Fabricated & metal products - mfg.	Y	Y	Y
33	Professional, scientific, & controlling instruments; photographic & optical goods;	Y	Y	Y
34	watches & clocks - mfg.	Y	25	30
35				
	Misc. mfg.			
39		Y	Y	Y



Source: Maricopa Association of Governments,  
Updated by Corlman Associates.



**Exhibit 6L**  
**PHOENIX SKY HARBOR INTERNATIONAL AIRPORT**  
**RECOMMENDED NOISE OVERLAY ZONES**

**LEGEND**

- Airport Property
- Municipal Boundaries
- Study Area
- 1999 Noise Exposure Contour
- Recommended Noise Overlay Zone 1 (DNL 65-70)
- Recommended Noise Overlay Zone 2 (DNL 70-75)
- Recommended Noise Overlay Zone 3 (DNL 75+)



**TABLE 6C (Continued)**  
**Potential Land Use Compatibility Standards**  
**Phoenix Sky Harbor International Airport**

SLUCM No.	Land Use Name	Noise Zones/Levels in DNL		
		N-1 65-70	N-2 70-75	N-3 75+
<b>40</b>	<b>Transportation, communication, and utilities</b>	Y	Y	Y
41	Rail transportation	Y	Y	Y
42	Motor vehicle transportation	Y	Y	Y
43	Aircraft transportation	Y	Y	Y
44	Marine craft transportation	Y	Y	Y
45	Hwy. & st. right-of-way	Y	Y	Y
46	Automobile parking	Y	Y	Y
47	Communication	Y	Y	Y
48	Utilities	Y	Y	Y
49	Other transportation, communication, and utilities	Y	Y	Y
<b>50</b>	<b>Trade</b>			
51	Wholesale trade	Y	Y	Y
52	Retail trade - bldg. materials, hardware, & farm equipment	Y	Y	Y <sup>3</sup>
53	Retail trade - general merchandise	Y	Y	Y <sup>3</sup>
54	Retail trade - food	Y	Y	Y <sup>3</sup>
55	Retail trade - auto	Y	Y	Y <sup>3</sup>
56	Retail trade - apparel & accessories	Y	Y	Y <sup>3</sup>
57	Retail trade - furniture home furnishings	Y	Y	Y <sup>3</sup>
58	Retail trade - eating & drinking est.	Y	Y	Y <sup>3</sup>
59	Other retail trade	Y	Y	Y <sup>3</sup>
<b>60</b>	<b>Services</b>			
61	Finance, insurance, & real estate	Y	Y	Y <sup>3</sup>
62	Personal services	Y	Y	Y <sup>3</sup>
62.4	Cemeteries	Y	Y	N
63	Business services	Y	Y	Y <sup>3</sup>
64	Repair services	Y	Y	Y <sup>3</sup>
65	Professional services	Y	Y	Y <sup>3</sup>
65.1	Hospitals, nursing homes	Y <sup>2,5</sup>	Y <sup>3,5</sup>	N
65.1	Other medical facilities	Y <sup>2,5</sup>	Y <sup>3,5</sup>	N
66	Contract construction services	Y	Y	Y
67	Government services	Y	Y <sup>2</sup>	Y <sup>3</sup>
68	Education services	25, <sup>5</sup>	30, <sup>5</sup>	N
69	Misc. services	Y	Y	Y <sup>3</sup>

**TABLE 6C (Continued)**  
**Potential Land Use Compatibility Standards**  
**Phoenix Sky Harbor International Airport**

		Noise Zones/Levels in DNL		
SLUCM No.	Land Use Name	N-1 65-70	N-2 70-75	N-3 75+
70	<b>Cultural, entertainment, and recreational</b>			
	Cultural activities (including churches)			
71	Nature exhibits	25, <sup>5</sup>	30, <sup>5</sup>	N
71.2	Public assembly	Y	Y	N
72	Auditoriums, concert halls	25	30	N
72.1	Outdoor music shells, amphitheaters	25, <sup>5</sup>	30, <sup>5</sup>	N
72.11	Outdoor sports arenas, spectator sports	N	N	N
72.2	Amusement	Y <sup>4</sup>	N	N
73	Recreational activities (including golf courses,	Y	Y	N
74	riding stables, water recreation)	Y	Y	Y
	Resorts & group camps			
75	Parks	Y	N	N
76	Other cultural entertainment & recreation	Y	Y	Y
79		Y	Y	N

Source: Adapted by Coffman Associates, Inc. from **Guidelines for Considering Noise In Land Use Planning and Control**, Federal Interagency Committee on Urban Noise, June 1980.

**TABLE 6C (Continued)**  
**Land Use Compatibility Standards**  
**Phoenix Sky Harbor International Airport**

**NOTES FOR TABLE 6C**

<sup>1</sup> All residences in the N-1 and N-2 Zones are marginally noise compatible. As a condition of issuance of a building permit, the builder of the dwelling shall soundproof to achieve a 25 dB reduction from outdoor noise levels (NLR) in the N-1 Zone and a 30 dB NLR in the N-2 Zone. All such soundproofed residential units should be provided with heating, cooling, and ventilation systems capable of permitting closed windows and doors year round. An avigation easement for noise also shall be provided to the City of Phoenix.

Soundproofing will not eliminate outdoor noise problems. However, building location and site planning, design and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures which only protect interior spaces.

<sup>2</sup> Measures to achieve NLR of 25 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.

<sup>3</sup> Measures to achieve NLR of 30 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. Motels and hotels in Ldn 75 contour must achieve NLR of 35 in all areas.

<sup>4</sup> Land use compatible provided special sound amplification system is installed.

<sup>5</sup> A noise easement and non-suit covenant should be provided to the City of Phoenix for all new residential development and other specified noise-sensitive uses.

<sup>6</sup> Includes mobile homes and recreational vehicles as defined in the Phoenix Zoning Ordinance.

<sup>7</sup> **A fair disclosure agreement and covenant shall be recorded as a condition of development approval for all permitted uses.**

**KEY TO TABLE 6C**

SLUCM **Standard Land Use Coding Manual**, U.S. Urban Renewal Administration and Bureau of Public Roads, 1965.

Y (Yes) Land use and related structures compatible without restrictions.

N (No) Land use and related structures are not compatible and shall 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 or 30 Land use and related structures generally compatible; measures to achieve NLR of 25 or 30 dB must be incorporated into design and construction of structure.

**9. Subdivision Regulation Amendment: Require recording of fair disclosure agreements and covenants and overflight easements within the NCPB.**

**Description.** Phoenix, Tempe, the Salt River Pima-Maricopa Indian Community, and Maricopa County should amend their respective subdivision regulations to support the relevant requirements of Airport Overlay Zoning Ordinance as it is recommended to be amended. Specifically, it should be amended to require the recording of fair disclosure agreements and covenants within the Airport Planning Area Zone and the dedication of avigation easements within Airport Overlay Zone 1. This would apply only to new subdivisions. This will ensure that these are taken care of even if no rezoning actions are required prior to subdivision approval. A copy of a suggested amendment to the subdivision regulations is in **Appendix G**.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** This requires adoption of an ordinance by each jurisdiction amending its subdivision regulations.

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is projected for 2001.

**10. Building Code Amendment: Enact construction standards within the NCPB.**

The Airport Overlay zoning ordinance establishes a standard for the outdoor-to-indoor noise level reduction for selected land uses within various noise overlay zones. In order to assist with the implementation of these requirements, Phoenix, Tempe, the Salt River Pima-Maricopa Indian Community, and Maricopa County should amend their local building codes to establish specific construction standards for sound insulation. This would provide builders and inspectors with specific guidance on the materials and construction techniques to ensure adequate sound insulation.

The Maricopa Association of Governments recently published a model set of sound insulation standards in support of a land use study in the Luke Air Force Base environs. This would be an appropriate model for the local jurisdiction to use. A copy of these standards is in **Appendix D**, Implementation Materials.

**Relationship to 1989 NCP.** This is a new measure that was not included in the 1989 NCP.

**Implementation Actions.** This requires adoption of an ordinance by each jurisdiction amending its building code.

**Cost and Funding.** This will involve administrative expenses that will have to be covered through the operating budget of each jurisdiction.

**Timing.** For planning purposes, implementation is projected for 2001.

## **PROGRAM MANAGEMENT ELEMENT**

The success of the Noise Compatibility Program requires a continuing effort to monitor compliance and identify new or unanticipated problems and changing conditions. Four program management measures are recommended at Phoenix Sky Harbor International Airport. The City of Phoenix is responsible for implementing these measures. They are discussed below and summarized in **Table 6F**.

### **1. Continue noise abatement information program.**

**Description.** The City of Phoenix uses the noise monitoring and flight track system to investigate aircraft noise complaints and provide general information to the public and airport users upon request. The City of Phoenix has also established a noise complaint phone hotline to log aircraft noise complaints and better respond to area residents.

**Relationship to 1989 NCP.** This program management element was included in the 1989 NCP.

**Implementation Actions.** As an existing program, no additional implementation actions are necessary.

**Cost and Funding.** Since this is an existing policy, no new costs would be incurred by the City of Phoenix.

**Timing.** This is an existing measure which is recommended to be continued through the future.

### **2. Monitor implementation of the updated F.A.R. Part 150 Noise Compatibility Program.**

**Description.** The City of Phoenix must monitor compliance with the Noise Abatement Element. This will involve checking periodically with the air traffic control manager regarding compliance with the procedures (Noise Abatement Measures 1, 4, 5, 7, 8, 9, and 10). Where appropriate, the City of Phoenix also should check occasionally with airport users. This is especially appropriate in checking on compliance with the NBAA standard or manufacturer noise abatement departure procedures (Noise Abatement Measure 3).

The City of Phoenix should develop informational and promotional materials explaining the noise abatement program to pilots. These materials should include a pilot guide, a detailed description of the NBAA standard or manufacturer noise abatement departure procedures. These materials should be prepared in a format allowing for insertion into a standard Jeppesen manual. The airport management also should print a series of eye-catching posters for display in pilot lounges and at the FBOs explaining different aspects of the noise abatement program.

It may be necessary from time to time to arrange for noise modeling or flight track analysis to study issues that may arise in the future.

The City of Phoenix also should maintain communications with Phoenix, Tempe, Scottsdale, the Salt River Pima-Maricopa Indian Community, and Maricopa County planning officials to follow their progress in implementing the relevant measures of the Land Use Management Element.

**Relationship to 1989 NCP.** This was included in the 1989 NCP.

**Implementation Actions.** The administrative actions discussed above in the "Description" will be necessary.

**Costs and Funding.** This measure will require considerable administrative time and staff support. Expenditures for posters, promotional materials, and special noise monitoring or modeling studies could be necessary from time to time. For budgeting purposes, this cost is estimated at \$30,000 every three years. This would be covered through the airport operating budget.

**Timing.** This is an ongoing activity that should begin as soon as the *Noise Compatibility Program* is approved by the City of Phoenix.

### **3. Update Noise Exposure Maps and Noise Compatibility Program.**

**Description.** The airport management should review the *Noise Compatibility Program* (NCP) and consider revisions and refinements as necessary. A complete plan update will be needed periodically to respond to changing conditions in the local area and in the

aviation industry. This can be anticipated every seven to ten years.

An update may be needed sooner, however, if major changes occur. An update may not be needed until later if conditions at the airport and in the surrounding area remain stable.

Proposed changes to the NCP should be reviewed by the FAA and all affected aircraft operators and local agencies. Proposed changes should be submitted to the FAA for approval after local consultation and a public hearing to comply with F.A.R. Part 150.

Even if the NCP does not need to be updated, it may become necessary to update the *Noise Exposure Maps* (NEMs). F.A.R. Part 150 requires the NEMs to be updated if any change in the operation of the airport would create a substantial, new non-compatible use. The FAA interprets this to mean an increase in noise levels of 1.5 DNL or more, above 65 DNL, over non-compatible areas that had formerly been compatible.

**Relationship to 1989 NCP.** This recommendation was included in the 1989 NCP.

**Implementation Actions.** No specific implementation actions, other than those discussed above, are required.

**Cost and Funding.** Costs of a complete update of the Noise Compatibility Program are estimated at \$450,000. This would be eligible for up to 80 percent funding from the FAA. The City of Phoenix would be responsible for the remaining 20

percent. This would come from the airport operating budget.

**Timing.** This should be done as necessary. Updates are typically needed every seven to ten years, depending on how much change occurs at the airport and in the local area. For planning purposes, one update can be expected over the next 10 years.

#### **4. Expand flight track monitoring coverage.**

**Description.** The City of Phoenix should expand the flight track monitoring coverage for 15 miles to 30 miles. This will provide additional coverage that will allow airport staff to better respond to aircraft noise complaints, monitor potential route changes, and provide information for requests in outlying areas.

**Relationship to 1989 NCP.** This is a new measure not included in the 1989 NCP.

**Implementation Actions:** The City of Phoenix Aviation Department will have to amend their current agreement with the FAA to obtain the additional flight track coverage. Software adjustments to display screens and information storage requirements will be needed to accommodate the expanded flight track coverage area.

**Cost and Funding.** The cost of the software adjustment is estimated at \$10,000. This would be eligible for Federal funding through the noise set-aside of the Airport Improvement Program. This would cover up to 80 percent of the costs. The balance would

be covered through the City of Phoenix's capital budget.

**Timing.** For planning purposes, this is projected for the year 2001.

## **RESIDUAL NOISE IMPACTS**

The recommended noise abatement and land use management programs will reduce the cumulative aircraft noise exposure impact now and in the future. A review of the residential impacts from the Noise Compatibility Plan is presented below.

### **NOISE-SENSITIVE LAND USE**

**Table 6D** shows the number of dwelling units exposed to noise for baseline conditions and after implementation of the Noise Compatibility Plan. For 1999 baseline conditions, 5,231 dwelling units are impacted by noise above 65 DNL. The number impacted by noise above 70 DNL is 322. No dwellings are impacted above 75 DNL.

In the year 2004, the total number of homes exposed to noise above 65 DNL without the Plan would be 3,114. If the recommended plan is fully implemented, the number of dwellings impacted by noise in the year 2004 would decrease to 3,110.

Approximately 3,816 dwellings are impacted in the year 2015 without the Plan. If the recommended plan is implemented, the number of dwellings impacted by aircraft noise would decrease to 3,815 homes in the year 2015.

<b>TABLE 6D Dwelling Units Exposed to Noise With Noise Compatibility Plan Versus Baseline Conditions</b>					
	<b>Baseline Noise (Without Plan)</b>			<b>With Noise Compatibility Plan</b>	
	<b>1999</b>	<b>2004</b>	<b>2015</b>	<b>2004</b>	<b>2015</b>
65-70 DNL	4,909	3,114	3,813	3,110	3,812
70-75 DNL	322	0	3	0	3
75+ DNL	0	0	0	0	0
<b>Total Above 65</b>	<b>5,231</b>	<b>3,114</b>	<b>3,816</b>	<b>3,110</b>	<b>3,815</b>

<sup>1</sup> Totals include homes acoustically treated.  
Source: Coffman Associates analysis.

**Table 6E** shows the population exposed to noise with implementation of the Noise Compatibility Plan in comparison with baseline conditions. For 1999 baseline conditions, 13,117 people are impacted by noise above 65 DNL. For the 2004 Noise Compatibility Plan, the population impacted by noise above 65 DNL is 7,777 compared with 7,784 by 2004 without the Plan. The level-weighted population (LWP) with the

Plan is 2,924 compared with 2,927 for the baseline conditions. (Level-weighted population is an estimate of the number of people actually annoyed by aircraft noise. The footnote in **Table 6E** explains how it is computed.)

The population impacted by noise above 65 DNL is 9,571 with the 2015 Noise Compatibility Plan compared with 9,574 by 2015 without the Plan.



**TABLE 6E**  
**Population Exposed to Noise**  
**With Noise Compatibility Plan Versus Baseline Conditions**

	Baseline Noise (Without Plan)			With Noise Compatibility Plan	
	1999	2004	2015	2004	2015
65-70 DNL	12,312	7,784	9,566	7,777	9,563
70-75 DNL	805	0	8	0	8
75+ DNL	0	0	0	0	0
Total Above 65	13,117	7,784	9,574	7,777	9,571
LWP <sup>1</sup> Above 65	5,147	2,927	3,601	2,924	3,601

<sup>1</sup> LWP - level-weighted population is an estimated of the number of people actually annoyed by noise. The actual population within each 5-DNL range is multiplied by the appropriate response factor to compute LWP. The factors are: 65-70 DNL - .376; 70-75 DNL - .644; 75+ DNL - 1.00. See the Technical Information Paper, **Measuring the Impact of Noise on People**.

Source: Coffman Associates analysis.

## **SUMMARY**

The Noise Compatibility Program for Phoenix Sky Harbor International Airport is summarized in **Table 6F**. The total cost of the program is estimated at \$219,345,500. Most of the costs are due to the voluntary acquisition and exchange of dwellings. This includes \$106,555,950 for the acquisition of dwellings and \$11,839,550 for a dwelling exchange program. Other significant costs include sound insulation of single family homes (\$72,600,000), sound insulation for schools (\$18,000,000),

acoustical treatment for community centers and places of worship (\$7,800,000), monitor implementation of the updated Noise Compatibility Plan (\$90,000), update of the Plan (\$450,000) and expansion of the noise monitoring system (\$10,000).

Most of the cost (\$149,876,535) would be eligible for FAA funding through the noise set-aside of the Federal Airport Improvement Program. Thirty-two percent of the cost (\$69,448,965) would be covered through the City of Phoenix's airport operating budget.

**TABLE 6F**  
**Summary of Noise Compatibility Program, 1999-2015**  
**Phoenix Sky Harbor International Airport**

Measure	Cost to Airport or Government	Direct Cost to Users <sup>1</sup>	Timing	Lead Responsible Agency <sup>2</sup>	Potential Funding Sources
<b>NOISE ABATEMENT ELEMENT</b>					
1. Continue the runway use program calling for the equalization of departure operations to the east and west for both daytime and nighttime.	None	None	Ongoing	City of Phoenix	N.A.
2. Continue promoting use of AC 91-53A Noise Abatement Departure Procedures by air carrier jets.	Administrative <sup>3</sup>	None	Ongoing	City of Phoenix	N.A.
3. Continue promoting use of NBAA noise abatement procedures, or equivalent manufacturer procedures, by general aviation jets.	Administrative <sup>3</sup>	None	Ongoing	City of Phoenix	N.A.
4. Continue SID procedure from Runway 26L requiring a turn to a 240-degree heading.	Administrative <sup>3</sup>	None	Ongoing	City of Phoenix, (FAA Airport Traffic Control)	N.A.
5. Continue the 4 DME departure route procedure which overflies the Salt River by all jets and large propeller aircraft departing Runways 8R/L.	Administrative <sup>3</sup>	None	Ongoing	City of Phoenix	N.A.
6. Continue compliance with the Airport's Engine Test Run-up Policy.	Administrative <sup>3</sup>	Negligible	Ongoing	City of Phoenix,	N.A.

**TABLE 6F (Continued)**  
**Summary of Noise Compatibility Program, 1999-2015**  
**Phoenix Sky Harbor International Airport**

Measure	Cost to Airport or Government	Direct Cost to Users <sup>1</sup>	Timing	Lead Responsible Agency <sup>2</sup>	Potential Funding Sources
<b>NOISE ABATEMENT ELEMENT (Continued)</b>					
7. Implement the 4 DME departure route procedure which overflies the Salt River by all jets and large propeller aircraft departing Runway 7.	Administrative <sup>3</sup>	Negligible	2000	FAA Airport Flight Standards Division	N.A.
8. Direct small piston aircraft departing Runway 7 to turn to a 120-degree heading upon reaching the end of the runway.	Administrative <sup>3</sup>	Negligible	2000	FAA Airport Flight Standards Division	N.A.
9. Direct aircraft departing Runway 25 to turn to a 240-degree heading upon reaching the end of the runway.	Administrative <sup>3</sup>	Negligible	2000	FAA Airport Flight Standards Division	N.A.
10. Establish a "side-step" approach to Runway 25.	Administrative <sup>3</sup>	Negligible	2000	FAA Airport Flight Standards Division	N.A.
11. Encourage the use of DGPS, RNAV, FMS equipment to enhanced noise abatement navigation.	Administrative <sup>3</sup>	Negligible	2000	City of Phoenix, FAA Airport Traffic Control Tower	N.A.
12. Build engine maintenance run-up enclosure.	\$2,000,000	None	Dependent upon funding	City of Phoenix	FAA (80%) Airport capital budget (20%)
13. Support 161 <sup>st</sup> air refueling wing of the Arizona Air National Guard's efforts to re-engine KC-135 aircraft.	Administrative <sup>3</sup>	Negligible	2000	City of Phoenix	N.A.

**TABLE 6F (Continued)**  
**Summary of Noise Compatibility Program, 1999-2015**  
**Phoenix Sky Harbor International Airport**

Measure	Cost to Airport or Government	Direct Cost to Users <sup>1</sup>	Timing	Lead Responsible Agency <sup>2</sup>	Potential Funding Sources
<b>NOISE MITIGATION ELEMENT</b>					
1. Sound Insulate single family homes within the 1992 65 DNL contour and single family homes outside the 1992 65 DNL contour but inside the 1999 65 DNL contour.	\$72,600,000	None	Ongoing	City of Phoenix	FAA (80%) <sup>4</sup> Airport capital budget (20%)
2. Sound Insulate approximately ten schools within the 1999 65 DNL contour. <sup>5</sup>	\$30,000,000	None	Dependent upon funding	City of Phoenix	FAA (80%) Airport capital budget (20%)
3. Acoustical Treatment of community centers and Church class/meeting rooms within the 1999 65 DNL contour.	\$7,500,000	None	Dependent upon funding	City of Phoenix	FAA (80%) Airport capital budget (20%)
4. Voluntary Acquisition and Redevelopment: Acquire dwellings north and west (to 7 <sup>th</sup> Street) of the airport within the 1999 70 DNL contour.	\$106,555,950	None	Dependent upon funding	City of Phoenix	FAA (80%) Airport capital budget (20%)
5. Exchange dwellings impacted within the 70 DNL noise contour with a dwelling outside the 65 DNL noise contour.	\$11,839,550	None	Dependent upon funding	City of Phoenix	FAA (50%) Airport capital budget (50%)

**TABLE 6F (Continued)**  
**Summary of Noise Compatibility Program, 1999-2015**  
**Phoenix Sky Harbor International Airport**

Measure	Cost to Airport or Government	Direct Cost to Users <sup>1</sup>	Timing	Lead Responsible Agency <sup>2</sup>	Potential Funding Sources
<b>LAND USE PLANNING ELEMENT</b>					
1. Update General Plans to reflect the 1999 65 DNL noise contour planning boundary (NCPB) from Part 150 Study as basis for noise compatibility planning.	Administrative <sup>3</sup>	None	2001	Phoenix, Tempe, and Salt River Pima-Maricopa Indian Community	N.A.
2. Amend General Plan designations to reflect existing compatible and existing lower density land uses with the NCPB.	Administrative <sup>3</sup>	None	2001	Phoenix and Tempe	N.A.
3. General Plan Amendment: Amend Mixed Use designations within the 1999 65 DNL contour to exclude residential.	Administrative <sup>3</sup>	None	2001	Tempe	N.A.
4. Enact guidelines specifying noise compatibility criteria for the review of development projects within the NCPB	Administrative <sup>3</sup>	None	2001	Phoenix, Tempe, and Salt River Pima-Maricopa Indian Community	N.A.
5. Retain compatible land use zoning within the NCPB.	Administrative <sup>3</sup>	None	2001	Phoenix, Tempe, and Salt River Pima-Maricopa Indian Community	N.A.

**TABLE 6F (Continued)**  
**Summary of Noise Compatibility Program, 1999-2015**  
**Phoenix Sky Harbor International Airport**

Measure	Cost to Airport or Government	Direct Cost to Users <sup>1</sup>	Timing	Lead Responsible Agency <sup>2</sup>	Potential Funding Sources
<i>LAND USE PLANNING ELEMENT (Continued)</i>					
6. Amend Zoning Map to reflect General Plan and existing compatible land uses within the NCPB.	Administrative <sup>3</sup>	None	2001	Phoenix and Tempe	N.A.
7. Encourage rezoning several large tracts of land currently developed with low density residential but zoned for higher density non-compatible land uses within the 1999 65 DNL noise exposure contour.	Administrative <sup>3</sup>	None	2000 - 2001	City of Phoenix	N.A.
8. Airport Noise Overlay Zoning: Enact overlay zoning to provide noise compatibility land use standards near Airport.	Administrative <sup>3</sup>	None	2000 - 2001	Phoenix, Tempe, Scottsdale, and Salt River Pima-Maricopa Indian Community	N.A.
9. Subdivision Regulations Amendment: Require recording of fair disclosure agreements and covenants and overflight easements within the NCPB.	Administrative <sup>3</sup>	None	2000 - 2001	Phoenix, Tempe, and Salt River Pima-Maricopa Indian Community	N.A.
10. Building Code Amendment: Enact construction standards within the NCPB.	Administrative <sup>3</sup>	None	2000 - 2001	Phoenix, Tempe, and Salt River Pima-Maricopa Indian Community	N.A.

