

6.0 Techniques for Establishing Compatible Land Uses

Incompatible land uses plague airports nationwide. Today airports have two primary actions available to deal with compatibility issues:

- Reduce the number of existing incompatible land uses
- Implement strategies outlined in their land use plans to prevent future incompatibilities

6.1 Preventive Techniques

Various methods to achieve compatible land use are found below and include planning related options and actual implementation techniques. It is always more desirable to prevent the establishment of incompatible land uses than to correct them after the fact. Planning techniques are grouped into two basic categories: planning and ordinances. Both methods are useful, especially when one is used in conjunction with the other. **Table 6-1** highlights various preventive techniques.

6.1a. Planning

Planning related techniques are the first step in developing comprehensive land uses around an airport. The planning techniques related to land use, need to focus on the site-specific issues. However, their authority lies with the statewide and comprehensive planning, which takes place on the broader scale. The actions outlined in these various broad-scale planning arenas provide the foundation for airports to develop their own land use plans. These plans are based on safety and noise-related concerns and criteria, as previously discussed. The initial planning documents should guide preventive and corrective measures for the existing and future growth of the airport. The following measures provide the foundation for the various levels of planning available for land use issues.

→ *Planning techniques and zoning ordinances are the basis for preventive techniques for land use compatibility.*

a.1 Statewide Planning

As identified in Chapter 5, Oregon's planning program is driven by 19 statewide planning goals, with Goal 12 (Transportation) being most directly applicable to air transportation planning and operations. To realize these goals, there are a series of applicable state statutes and implementing administrative rules.

There are instances in local planning implementation where conflicts arise between competing goals (e.g., protecting public use airports under Goal 12 from bird strike hazards associated with water impoundments versus natural wildlife protection under Goal 5.) Local jurisdictions and state agencies continue to grapple with the means of effectively addressing conflicts between goals, while balancing mandates for goal and regulatory compliance.

Table 6-1: Preventive Techniques for Establishing Compatible Land Uses				
Preventive Measures				
Technique	Description	Advantage	Disadvantage	When to use
Comprehensive Planning	Mandated by Oregon Law; describes all future land use for the community	Low cost and minimal controversy if airport is not in a developed area	Not effective when existing incompatible development has encroached on the airport; only effective when supported by zoning	Each time a comprehensive plan is developed or updated, steps should be taken to ensure land use compatibility in the airport environs
Coordination Agreements	Agreement between two or more jurisdictions that are impacted by an airport	Most applicable when airport and area of influence are located outside the physical boundaries of the public sponsor (example: City of Eugene is the sponsor for the Eugene Airport which is located in the unincorporated community of Lane County)	Ineffective unless all parties share similar land use planning goals and objectives for areas in the airport environs	When comprehensive plans are updated and/or urban growth boundaries (UGBs) are amended
Urban Growth Boundaries	Mandated by Oregon Law; limits the developable area within a community	Controls the growth boundaries for a community	Many airports are located within UGBs. This can place the development pressures on property near the airports where adjoining development may be incompatible	Where opportunities present themselves, efforts should be made to have UGB limits and the associated development complement the airport-related safety areas
Airport Overlay Zone	Places additional conditions on affected land; underlying zone remains unchanged	Easy to implement, reduces hazards and incompatible land use	If land use is incompatible in underlying zone, this incompatibility will continue	Required by APR
Airport Development Zone	Creates separate zoning districts for airports	Creates a more distinct area of influence for the airport; gives the airport better opportunity to expand for airport-related dependent and compatible uses; avoids possible unintended uses that often accompany an overlay zone	Does not include areas beyond airport property; adjacent land uses can still be incompatible	Most applicable to airport property and identified expansion areas
Height Restrictions	Safety mandated by Oregon Administrative Rule Chapter 738, Division 70 - Physical Hazards to Air Navigation within the airport object-free zone	Prevents the location of objects which pose violations to FAR Part 77 surface	Only effective in preventing new height obstructions; may not be effective when terrain or trees are obstructions	Should be adopted as part of zoning to support land use identified in comprehensive plan. Required by APR

→ *Oregon cities and counties must prepare a comprehensive land use plan and TSPs that address airport issues as well.*

a.2 Comprehensive Planning

Oregon cities and counties must prepare comprehensive land use plans and have them acknowledged by LCDC as being in conformance with the 19 statewide planning goals. Goal 12 requires the provision of “a safe, convenient and economic transportation system,” which includes air transportation. LCDC’s adoption of the Transportation Planning Rule and Airport Planning Rule has given more specific direction on how local agencies must conduct planning for and around airports.

a.3 Transportation System Plans (TSPs)

Transportation System Plans (TSPs) are required of local governments pursuant to OAR 660, Division 12. Communities may develop stand-alone airport plans, or address airport-related issues within an airport element of a local transportation plan. In any event, public use airports can help assure airport land use compatibility by adopting and implementing an airport layout plan (ALP) and map. The ALP and map should be incorporated either directly, or by reference, as part of the local jurisdiction’s transportation system plan to meet the requirements of the APR and other applicable agency rules and statutory requirements. FAA guidelines are explicit concerning the text and diagram components commonly included as part of an airport master planning effort. The ALP should address existing conditions, existing and future land use compatibility issues and conflicts, proposed actions, and the jurisdiction(s) responsible for implementation.

An Airport Layout Plan and map are essential parts of transportation system plans. The airport plan should address existing conditions, as well as existing and future land use compatibility issues. It should identify actions to be taken and identify the jurisdiction or agencies responsible for implementation.

a.4 Coordination Agreements

Land impacted or affected by airports often is located in more than one jurisdiction. When this is the case, coordination between jurisdictions is necessary to establish or preserve compatible land uses and a coordination agreement between the affected jurisdictions is required. This usually occurs if an airport or an airport’s impact area is located outside the jurisdiction of the airport sponsor. Coordination agreements can also be used to identify responsibilities for noise abatement programs and height restrictions.

a.5 Urban Growth Boundaries

An urban growth boundary (UGB) is defined as an area of land that is served by urban services and facilities and is determined to be suitable and necessary for future urban expansion. UGBs are developed in an attempt to establish the limits of full-build out. Oregon is the national leader in the development and use of UGBs to manage growth of urban development.

The incorporated communities in Oregon have UGBs acknowledged by LCDC. The UGB’s procure a minimum 20-year land supply. The extension of urban levels of key services is generally limited to land within UGB’s. Airports within or proximate to UGBs may benefit from the availability of urban services. But they can also be impacted by the encroachment of incompatible land uses inside the UGB. Airport sponsors should work aggressively with local jurisdictions to develop and implement appropriate zoning and land use measures (see below) as tools to limit or mitigate potential incompatibilities.

→ *Appendices D, E, and F provide sample ordinances to address airport safety and compatibility overlay zones.*

6.1b. Ordinances

Zoning is an effective tool used to reduce incompatible land uses in and around airports. It is most effective if implemented early in the development of an airport and its surrounding environs. When developing a zoning ordinance, issues to consider include:

- the review of existing zoning and approval actions necessary by state agencies, and
- determination of whether assistance may be needed from an outside consultant, or if in-house analysis is sufficient.

b.1 Airport Overlay Zoning

An Airport Overlay Zone is a zone that promotes compatible land uses for specific distances around airports. An Airport Overlay Zone applies additional conditions or restrictions to a specified area while retaining the existing base zoning classification. This zone can be highly effective in addressing a number of potential incompatibilities with airports and airport operations. For example, the Airport Overlay Zone may limit the height of objects surrounding an airport, restrict uses producing conditions that may be hazardous to air navigation (e.g., smoke, glare), and limit uses that are noise-sensitive. Model Airport Overlay Zoning Ordinances are included in Appendices D, E and F.

b.2 Airport Development Zoning

This type of zoning is applied to areas around an airport identified for airport-related and dependent uses. It often replaces industrial, public facility or other designations currently given to the airport site and immediate vicinity. The Airport Development Zone is a base zoning district that identifies outright and conditionally permitted uses on airport property. The zone should include areas used or needed for airport operations, areas needed for anticipated facility growth, airport-related industry and commercial operations and airport-related industrial, commercial or recreational activities. According to OAR 660-013-0160, local governments must update their zoning and land use regulations to conform to this division at periodic review. Amendments to plan and land use regulations may be accomplished per OAR 660-013-0160 (5) through the plan requirements of ORS 197.610 to 197.625 in advance of periodic review, where such amendments are in full compliance with Division 13 of OAR 660.

b.3 Local Ordinances

In addition to zoning ordinances, local jurisdictions may also address and/or mitigate potential land use incompatibilities through Site Plan Review procedures and building code standards.

b.4 Height Restrictions

Providing height restrictions on proposed development beyond the airport property is an essential element of any land use plan that focuses on safety of the airport and the public. Used in conjunction with the Airport Overlay Zone, height restrictions can be used to preserve navigable airspace. According to the FAA and the regulations outlined in *FAR Part 77 – Objects Affecting Navigable Airspace*, any object or structure which penetrates any of the “imaginary surfaces” outlined in FAR Part 77 are considered to be an obstruction to air navigation. Details on specific height restrictions should be included in the development of zoning regulations, and the regulations contained in FAR 77 should form the basis of the height restrictions. FAA Form 7460-1 should be submitted to both the FAA and Oregon Department of Aviation. It is important to understand the timeframe necessary for government review and to hold final approval of land use applications until both FAA and ODA comments are received. The regulations contained in FAR Part 77 attempt to accomplish the following:

- Establish standards and requirements for notice to FAA of proposed construction or alteration of a structure which may impact aviation and therefore requires a study for aeronautical effect
- Establish standards for determining which structures will be obstructions to air navigation

→ *FAR Part 77 establishes standards for notifying the FAA of proposed construction with the use of FAA Form 7460-1, shown in Appendix K.*

- Provide for studies of obstructions to determine their effect on the safe and efficient use of airspace. If an object is identified as an obstruction, but does not adversely affect a significant volume of air traffic, it is determined not to be a hazard to air navigation.
- Provide authority for public hearings and other reviews to examine the potential for hazardous effects to air navigation of proposed construction or alterations
- Reference guidelines for marking and lighting obstructions to air navigation

All of these goals should be contained in an overall land use plan that addresses these specific height related issues.

6.1c. Summary of Preventive Techniques

The techniques described above may be used as individual elements of a larger comprehensive land use plan or can be used as independent methods of establishing land use compatibility. Each community has its own unique issues which should be dealt with on a case-by-case basis. The information contained in this guide can be used as a resource for establishing these various techniques and protection measures.

6.2 Corrective and Preventive Techniques

Acquisition techniques are the primary tool used as either a corrective or preventive measure for land use compatibility. As a corrective technique, land acquisition can be used to remove, lower or control existing land uses. As a preventive tool, acquisitions can take place to acquire property and easements prior to the development of a conflicting land use. Acquisition typically has two forms; fee simple acquisition or acquisition of easements. Each of these methods is discussed below. Planners should use both of these methods as corrective and preventive measures where necessary to provide compatible land uses. **Table 6-2** highlights these various preventive techniques.

6.2a. Fee Simple Acquisition

Property acquisitions may appear to be an excessive expense. However, it is good planning to acquire property prior to development rather than after it becomes an incompatible land use. As airport expansion becomes imminent, the value of land adjacent the airport is often inflated in an attempt to reap a larger financial gain during the acquisition process. Acquisition prior to land costs increasing represents potential savings for the airport owner.

→ *Property acquisitions and aviation easements are the most common corrective and preventive techniques.*

Fee simple acquisition is the process by which the airport purchases property from the existing property owner in its entirety, including the property and structures or facilities on the property, as well as the air and mineral rights. This is the most effective means of acquisition because it places sole ownership of the property in the hands of the airport. This allows the airport to maintain the property in a compatible manner. The FAA recommends airport sponsors own the property under the runway approach and departure areas that include, as a minimum, the limits of the Runway Protection Zones (RPZs).

The federal process outlined in *FAA Advisory Circular 150/5100-17 change 3 – Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects* and the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (P.L. 91-646) must be adhered to when purchasing property with federal funds. The FAA has developed a very useful information brochure titled *Land Acquisition for Public Airports*, which summarizes the required process for land acquisition. Guidance should be

received from the ODA when land acquisition is considered, to ensure the proper process is utilized if federal funding is applied to an acquisition project.

6.2b. Easements

Easements may be used as an effective method of land use control to reduce incompatible land uses in the airport environs. To be effective, they should be used in concert with a broader land use plan and they must be enforced. Easements are typically a less expensive method of land use control, but are governed by the same process as outlined in the fee simple acquisition process, which includes the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and associated FAA Advisory Circulars. There are three basic types of avigation and hazard easements that can be used depending upon the situation and type of land use control required. One major advantage of easements is that they are usually permanent agreements, whereas zoning ordinances can be changed, thus impacting or changing the affect on the airport. **Table 6-3** illustrates the various easements and the rights that are acquired by the easements. **Exhibit 6-1** illustrates how a property is controlled by avigation easement.

Table 6-2: Preventive and Corrective Techniques for Establishing Compatible Land Uses

Preventive Measures				
Technique	Description	Advantage	Disadvantage	When to use
Fee Simple Acquisition	Purchase of land and all land use rights	Allow complete control over future and pre-existing land use; not reversible	Often very costly with possible legal opposition; takes land off tax roles	Should be considered to protect critical safety zones (RPZs) and areas subject to high levels of noise impact. Most effective method for resolving existing problems: may be eligible for FAA grant
Easements	Transfer of money to obtain the rights to use or restrict use in a specified manner	Can provide more positive control than zoning; less expensive than acquisitions, land may remain on active tax roles	Does not alter existing incompatible use	Can be used to compensate owner for substantial noise impacts, and can be used to gain right to remove obstructions (i.e., trim trees)
Transfer of Development Rights	Property or development rights transferred to alternative location	Less costly than purchase	Applicable in very limited situations, not suitable to large areas; requires coordination	TDR opportunities may substantially differ between cities and counties. Coordination with DLCD and ODA is suggested if this action is considered

6.2c. Transfer of Development Rights

The Transfer of Development Rights (TDR) involves separate ownership and the use of various “rights” associated with a parcel of land. Under the TDR concept, some of the property’s development rights are transferred to an alternate location where they may be used to intensify allowable development. For example, land identified within the approach to an airport could be kept in open space or agricultural use and its development rights for residential use transferred to locations outside the approach area. Landowners could be compensated for the transferred rights by selling the development rights at the new location. In order to be a viable option, the TDR approach must be fully coordinated with an overall

planning and zoning process, which is best achieved through the use of planned zoning. TDR opportunities may substantially differ between cities and counties.

6.2d. Summary of Corrective and Preventive Techniques

The techniques described as corrective and preventive have the ability to be used to correct an existing incompatible land use or used as a means to prevent future incompatible land uses from being established. In either case, these methods require the local community to monitor the uses in these areas. For example, acquiring an avigation easement over a piece of property, while legally binding, does not guarantee that a future property owner will be made aware of the easement and thus be mindful of its impact and restrictions on the property. There are many instances where a change of ownership has led to the new owner unknowingly compromising the existing easement and its restrictions. Consequently, oversight of these types of techniques is essential to their success as land use measures.

Exhibit 6.1 – Area Controlled by Avigation Easement

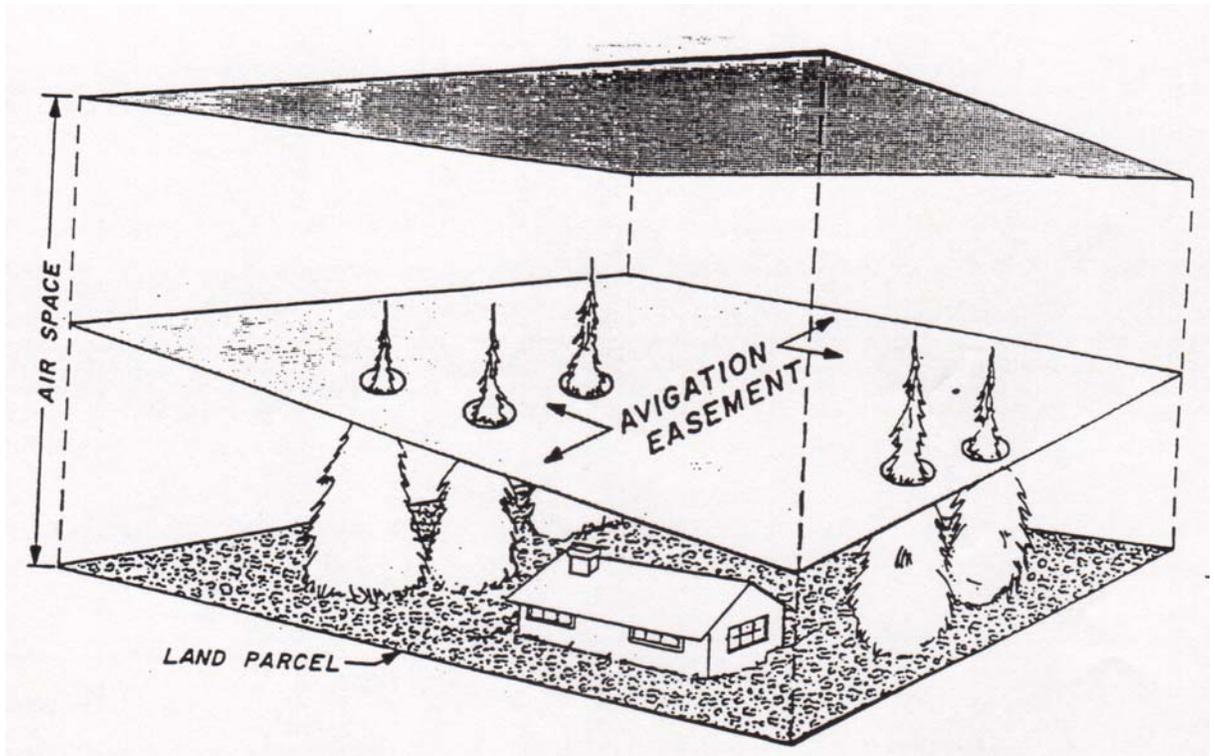


Table 6-3: Basic Types of Avigation and Hazard Easements

Type of Avigation / Hazard Easements	Rights Acquired
Model Avigation and Hazard Easement	<ol style="list-style-type: none"> 1. Right-of-flight at any altitude above the approach surface 2. Prevents any obstruction above approach surface 3. Right to cause noise, vibrations, fumes, dust, and fuel particles 4. Prohibits creation of electrical interference or unusual lighting 5. Grants right-of-entry to remove trees, buildings, etc., above approach surface
Limited Avigation Easement	<ol style="list-style-type: none"> 1. Right-of-flight above approach slope surface (20:1, 34:1 or 50:1) 2. Prohibits any obstruction above approach slope surface 3. Right-of-entry to remove any structure or growth above approach slope surface
Clearance Easement	<ol style="list-style-type: none"> 1. Prohibits any structure, growth or obstruction above approach slope surface (20:1, 34:1 or 50:1) 2. Right-of-entry to remove, mark, or light any structure or growth above approach slope surface

6.3 Corrective Techniques

Many airports have some form of incompatible land use in close proximity to the airport. Developing plans to mitigate these incompatibilities is an important step in preserving the airports of the state. Since each airport has its own unique land use issues, it is important to provide an assortment of techniques for airports to use in their plan. The various methods outlined below are the most common forms of corrective actions available. **Table 6-4** highlights these various corrective techniques.

6.3a. Change in Operational Procedures

One remedy for some compatibility issues is a change in operational procedures. For example, if an airport is experiencing noise complaints from a residential neighborhood which lies under the extended runway approach area, the airport could create a non-standard departure/approach pattern, which would require aircraft to turn before reaching the neighborhood to reduce noise from overflights. This is a perceptual remedy since the level of noise is most likely within acceptable levels. A procedural change such as this can be implemented fairly efficiently through the use of promotional material from the airport, pilot information/support groups and airport directories. It should be noted that this does not remove or change the incompatible land use, but it does reduce the impact and provides a temporary fix to the issue. Specific examples include use of preferential runways, non-standard turns and non-standard approach/departures.

✈ *Changes in operational procedures are only temporary fixes to incompatible land uses issues and should not be used as actual mitigation measures.*

Examples of possible operational procedures targeted to effect noise control may include, but are not limited to, the following:

- restricting the ground movement of aircraft
- restricting engine run-ups or the use of ground equipment (identifying times of day and/or limiting locations)
- raising the glide slope angle or intercept
- managing aircraft power and flaps
- limiting the use of reverse thrust, and
- changing the traffic pattern.

All of these procedures are considered to be acceptable methods of mitigation. However, as noted previously, they are considered temporary measures and should be used as interim mitigation options until a more permanent option for addressing the land use issue is available.

6.3b. Noise Mitigation

Aircraft noise is one of the largest areas of concern with regards to land use issues. Developing mitigation options for noise impacts is one of the most costly corrective measures. Noise is often defined as unwanted sound, which provides a very large spectrum of options when trying to address a “noise” related problem. For example, someone who lives fifteen hundred feet from the end of a runway has a different definition of noise compared to someone who is three thousand feet away from the airport, yet they both may have noise complaints. Soundproofing, noise barriers, and land acquisition are common types of noise mitigation measures available.

Table 6-4: Corrective Techniques for Establishing Compatible Land Uses

Preventive Measures				
Technique	Description	Advantage	Disadvantage	When to use
Change Operational Procedures	Changing normal operating patterns to reduce noise can include preferential runway end use, non-standard turns on departures, non-standard approach and departure altitudes	Can help reduce noise impacts in areas of incompatible development	Does not change incompatible land use; may be only temporary fix if continued development of incompatible use occurs or airport grows	Consider as part of Master Plan, Part 150 or Environmental Assessment for airport; must be fully coordinated with airport owner, users, and FAA
Noise Mitigation	Sound barriers or soundproofing can be used to mitigate existing noise impacts	Can help to reduce noise impacts on noise-sensitive land uses that have developed within the airport environs	Very costly to implement; is not a long-term solution but a temporary fix	Can be investigated as part of an airport planning or noise study; applicable for larger airports and smaller airports that want to do volunteer soundproofing and ground sound barriers

b.1 Noise Barriers

Noise barriers provide mitigation options with a very specific focus. Since noise barriers have limited applications, they are typically used on airport property to shield noise-sensitive areas from the most intense levels of noise from the airport. For example, when aircraft depart an airport they must do a run-up where the engine(s) of the aircraft are brought to full power and then tested. The action is typically noisy and normally done at the end of the runway just prior to take-off. If an airport has a noise-sensitive area near the run-up area, then a noise barrier may be required to shield the sensitive area from the run-up noise. This also applies to airports that have aircraft engine repair or maintenance. Since these businesses often test the engines after their repair or maintenance, a specific location for engine run-ups may be necessary. A noise barrier can surround this run-up area in an effort to contain the aircraft noise.

➔ *Noise barriers and soundproofing are two methods of mitigating noise impacts.*

Noise barriers can take many different forms. Coniferous trees and shrubs can often be used as noise barriers, however, these forms of vegetation often have limited noise reduction attributes but act as a visual barrier and are thus perceived as a noise barrier. Topographic features can also be used as barriers. Earthen berms are the most common topographic feature since they are easy to create and fairly inexpensive to construct. Man-made noise barriers are the most costly of the options, which often include fencing or masonry walls. Fencing is the most common type of noise barrier since it serves two purposes; the screening of the visual impacts as well as the noise. Masonry walls also provide barriers but are used in areas where there is a specific point of noise generation such as the engine run-up areas previously discussed.

b.2 Soundproofing

Soundproofing, while considered a mitigation measure, is a temporary fix to a noise issue. Since soundproofing only addresses the indoor environment, the outside impacts of noise levels go unchecked. For example, if a home is determined to be within an area with a high level of noise, the house can have improvements made to reduce the levels of noise within the structure. Windows and doors of a more dense construction can be installed, as well as air conditioning units or a central air system, which reduces the need to open windows that allow noise to enter the structure. Additional insulation can also be installed to deaden the outside noise. All of these measures, while helpful to the indoor setting, do nothing to lower the outdoor noise levels. While this is acceptable, it should be a consideration when developing a compatible land use plan. For example, an airport receives repeated calls from a neighbor of the airport with noise complaints. He complains about noise levels while he is trying to entertain guests at his home on the weekends in the summer. This neighbor is most likely having a barbecue or picnic in his backyard. In this instance, soundproofing his residence will not mitigate his noise issues since the major complaints are associated with outdoor activities. It is important to recognize this issue and be cognizant of it as an airport attempts to mitigate noise issues in the local community.

b.3 Summary of Noise Mitigation

As outlined above, noise barriers and soundproofing are methods of addressing noise related land use issues, however, both of them may have limited applications depending upon the nature of noise complaints at each airport. Prior to utilizing either of these methods, the long term goals of the land use plan should be identified to ensure that these methods will provide the desired results and advance the existence of compatible land uses around the airport. More often, land acquisition is a more viable option since it addresses the heart of the problem - incompatible land uses in close proximity of the airport. Land acquisition is a mitigation measure, which can be used as a corrective and a preventive technique and is addressed below.

➔ *Using a combination of preventive and corrective techniques, along with a comprehensive plan is required to develop a successful compatible land use program.*

6.4 Summary

The various techniques for addressing compatible land use have one thing in common - the need to have an underlying plan for comprehensive land use for the airport. None of these techniques are effective if an overall plan is not in place to guide the selection, implementation and maintenance of these techniques. The airport must be aware of the various techniques used to provide for compatible land uses and work to maintain those techniques since each method has their own requirements and focus. Using a combination of these techniques provides an airport with a wide range of opportunities to provide compatible land uses near the airport.

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