

Impacts within the Airport Influence Area

As examined in Chapter 1, nuisance noise, vibration, light, fumes, and low flying aircraft are the primary ingredients of the airport influence area. The key to assessing these impacts is knowing where aircraft fly as they use the airport. As examined in Chapter 1, nuisance noise is the primary ingredient of the airport influence area, though other factors such as vibration, fumes, and even fear may also come into play. In any case, the key to assessing these impacts is knowing where aircraft fly as they use the airport. However, because aircraft do not all fly in exactly the same places or at the same altitude, obtaining this information can prove challenging as you may have learned in Step 1. Airport managers and pilots, particularly flight instructors, will usually be your best sources for flight track and overflight area information. If your airport is located near a large airport that has a control tower, you might be able to get actual flight track data from its radar facility. “Near” can be 50 miles away or more, provided that no high terrain is situated between the two airports.

For more information on the aircraft operations and impacts see appendix section C.

Once you have mapped the flight routes, your next challenge is to decide what overflights are significant. For a typical general aviation airport, the airport influence area should at a minimum include the normal traffic pattern and adjacent locations regularly overflown as aircraft enter and leave the pattern. If the airport has instrument approach procedures, a more extended area may be affected by aircraft flying at altitudes below that of the normal traffic pattern. Also, faster

Noise Complaint History – Scottsdale Airport, Arizona

Year		Annual Operations	Number of Noise Complaints
1967		10,000	Not measured
1985		170,000	834
1998		210,000	570
2003		190,000	8,719

This data from Scottsdale Airport, Arizona, illustrates the point that noise complaints are usually more closely related to development patterns than to the volume of aircraft operations. As residential development encroached on the airport, the number of complaint increased more than ten-fold. Meanwhile, the airport had taken major steps to limit noise impacts and make submitting complaints easier.

airplanes—primarily turbo-props and business jets—tend to fly wider and longer patterns than slower, single-engine propeller planes.

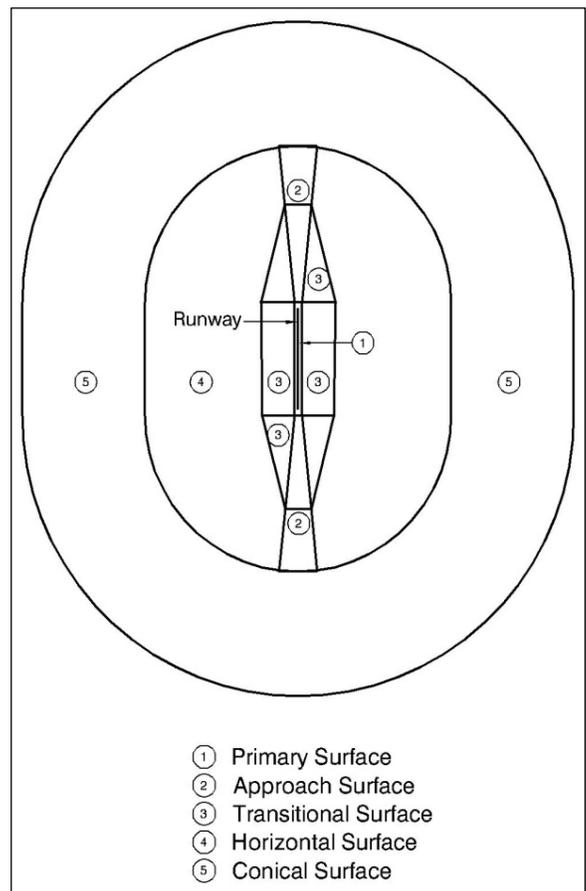
The noise levels produced by individual aircraft overflights also may be a useful determinant of the overflight area boundary. The difficult issue, though, will be to decide what noise level is significant. Aircraft, particularly jets, can generate peak outdoor noise levels high enough to interfere with speech communication a surprising distance from the airport—potentially many miles.

Another factor to consider when determining the extent of the airport influence area is the geographic distribution of noise complaints. Although only the busiest airports usually maintain complaint logs, most airport managers will be able to describe hot spots for noise complaints. It is interesting to note that complaints do not usually come from the most impacted areas, as people in those locations expect to be affected. Rather, the annoyance that underlies complaints usually result from unusual activity as described in Chapter 1. Concentrations of complaints from certain areas may suggest that something happening there is causing an identifiable impact. On the other hand, scattered complaints from locations beyond where aircraft normally fly are probably just random events that need not be considered in delineating the overflight impact area.

Airspace Protection Requirements

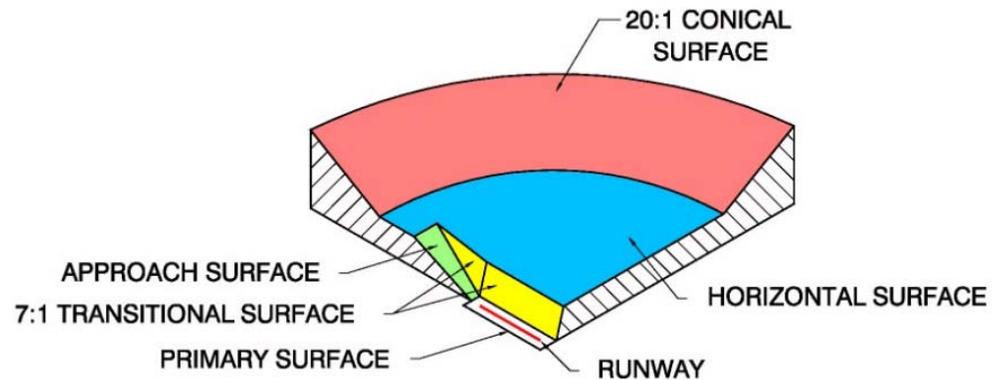
As noted in Chapter 1, airspace protection requirements address land use features that can cause or contribute to aircraft accidents. Most critical among such hazards are tall objects that penetrate the navigable airspace around an airport. However, other physical, visual, and electronic land use features can also create airspace hazards. FAA standards dictate the boundary of the area required for airport airspace protection.

With respect to tall objects that may affect the airport navigable airspace, the requirements are defined in Federal Aviation Regulations (FAR), Part 77, Objects Affecting Navigable Airspace. A map showing the airport’s airspace “imaginary surfaces” is usually prepared as part of the airport master plan or included with the set of airport layout plan drawings. If this map is not available, then one will need to be created.



The TERPS surfaces used in the design of instrument approach procedures (see Chapter 1) also may be critical at some airports. TERPS surfaces are highly complex, however, and take special expertise to draw. Moreover, any changes to an instrument approach procedure—whether because of new technology or a new obstruction—likely will result in changes to the surfaces. Generally, you can rely on the FAR Part 77

surfaces for compatibility planning, but make sure that the project applicant submits Form 7460 to the FAA as required by federal law (see Step 6) for any proposed object near the airport that meets the notification requirements, particularly if the object will be taller than its surroundings.



The FAA also has criteria defining how close landfills and other uses known to attract birds should be allowed near airports. For visual hazards such as smoke or glare and electronic hazards that can disrupt aircraft communication or navigation, the criteria are less precise. These types of conflicts can be site specific and often are only addressed after they arise.

 See these FAA documents for more information:

Federal Aviation Regulations Part 77 (14 CFR Part 77), Objects Affecting Navigable Airspace
http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&sid=cef54e5ded0ce244bbfe6ec32f6a63e8&tpl=/ecfrbrowse/Title14/14cfr77_main_02.tpl

Advisory Circular 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports
www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentNumber/150_5200-33B

Historical Accident Locations

Under this heading, we are concerned with the historical pattern of aircraft accidents and the consequences that result when something causes an aircraft flight to end at a location other than on a runway. Our concern is primarily for the people and property on the ground near airports, but potential consequences for the occupants of aircraft are important as well. The



Waterville Municipal Airport, WA

consequences can range from fatal accidents to successful emergency landings where no one is hurt and little or no damage occurs—and the outcome often depends upon land use characteristics at the point where the aircraft lands.

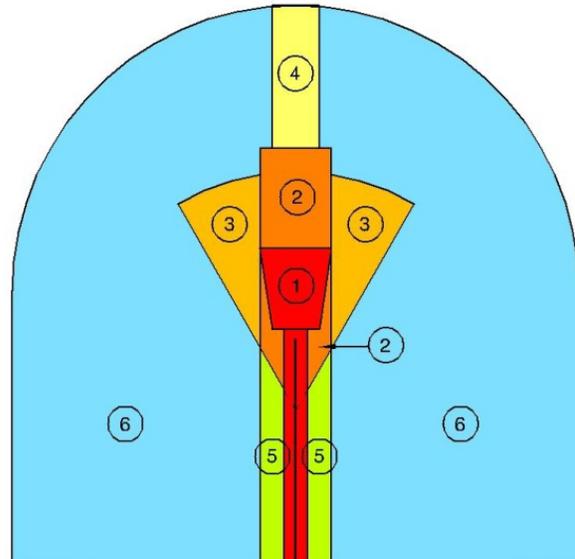
Safety is a difficult compatibility impact to measure. Unlike noise impacts which occur to some degree with every aircraft flight, safety deals with events that happened only occasionally and with much less predictability than noise. To get a handle on what might happen if an accident occurs, we look at what has happened in the past. In particular, we are interested in where accidents have occurred relative to the airport runway. Locations where accidents have historically been most concentrated represent the places where land use compatibility measures to reduce the potential consequences are most essential.

To date, the most comprehensive examination of the topic of accident locations is contained in the 2002 edition of the California Airport Land Use Planning Handbook published by the California Department of Transportation Division of Aeronautics. The California Handbook uses the general aviation accident scatter diagrams described in Appendix E of this Guidebook to identify sets of up to six safety zones. The sizes and shapes of the safety zones reflect varying degrees of aircraft accident concentrations and also take into account the manner in which aircraft fly as they land and takeoff (where they fly and turn and

Remember WSDOT’s compatibility zones address noise, safety, height hazards and land use to meet the requirements of Washington State law while California’s safety zones primarily address safety.

the altitude at which they normally would be). Different safety zone sizes and shapes are suggested depending upon the runway length and type of aircraft presumed to use the runway.

Most critical among the safety zones is Zone 1, which encompasses the runway protection zone (RPZ) and land along the edges of the runway. RPZs are where the highest concentrations of off-runway accidents take place. FAA standards define the dimensions of RPZs and the criteria for land uses within them. The function of RPZs is “to enhance the protection of people and property on the ground.” The FAA encourages airports to control the land uses in RPZs, preferably through acquisition of the property though easements or zoning may suffice. When owned by the airport, the center portion of the RPZ must be clear of all objects (except certain



navigation facilities) and only very-low-intensity uses such as automobile parking are acceptable elsewhere. These standards are strongly recommended even when the RPZ is not fully on the airport.

While Safety Zone 1 contains the highest concentration of historical accident points, data from the California Handbook indicates that only about 20 percent of off-runway, near airport accidents occur in this area. Significant accident potential thus exists in other parts of the airport environs, it is just more dispersed. Of the other zones, Safety Zone 2 is most important as it encompasses the second highest concentration of accident points. The concentrations in the other zones diminish from there. Land use compatibility criteria for each safety zone should be set in accordance with these relative concentrations of accidents—the greatest restrictions should apply within Safety Zone 1 and reduced limitations farther from the runway ends.

- ① Runway Protection Zone
- ② Inner Approach/Departure Zone
- ③ Inner Turning Zone
- ④ Outer Approach/Departure Zone
- ⑤ Sideline Zone
- ⑥ Traffic Pattern Zone



FAA Advisory Circular 150/5300-13 is available on-line at:
www.faa.gov/airports/resources/advisory_circulars/

If you wish to find data on historical accidents at your airport, much can be found on the National Transportation Safety Board website: <http://www.nts.gov/ntsb/>. Enter the name of the city associated with the airport.

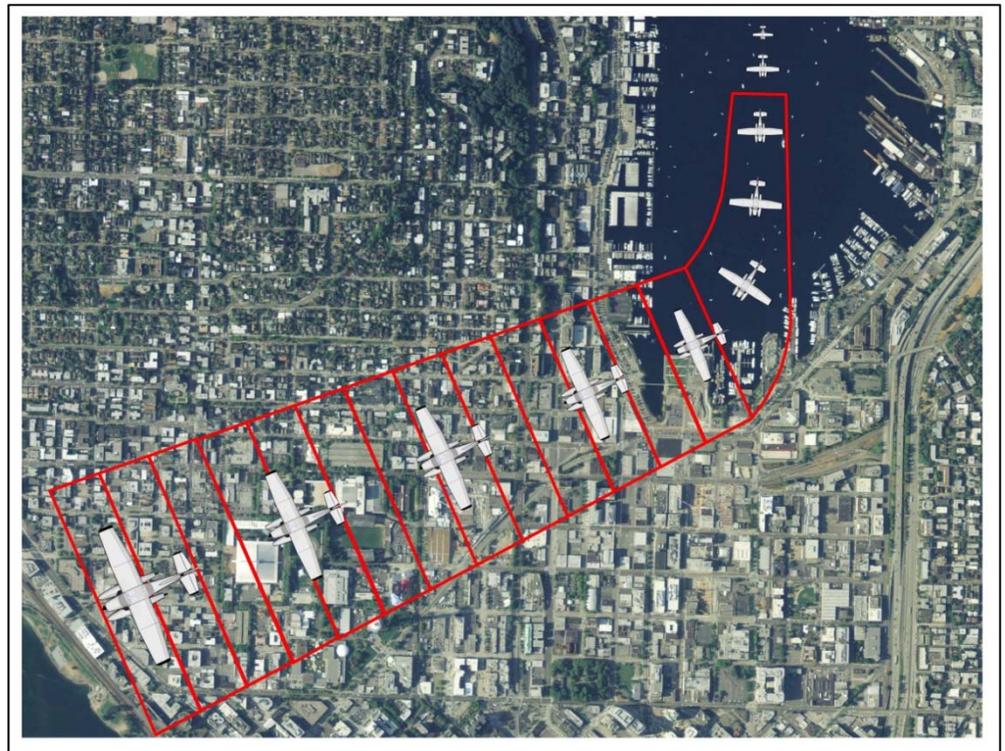
Step 2 Products:

- Map of the flight impact area and in applicable cases noise contours
- Map of the airport area
- Airport airspace map showing FAR Part 77 imaginary surfaces and elevations
- Overall boundary of the airport influence area

Seaplane Bases

What should be considered when determining the airport influence area for seaplane bases?

- Location and alignment of the area used for takeoffs and landings
- Any areas along the standard arrival and departure routes where aircraft will be below 1,000 feet AGL
- Estimates of how often different routes are used
- FAR Part 77 Imaginary Surfaces
- Land-based services areas



The primary difference between sea and land airports is in defining the takeoff and landing area: it is much less clearly defined for seaplane facilities. Once defined, however, the same compatibility planning factors apply as for land airports.

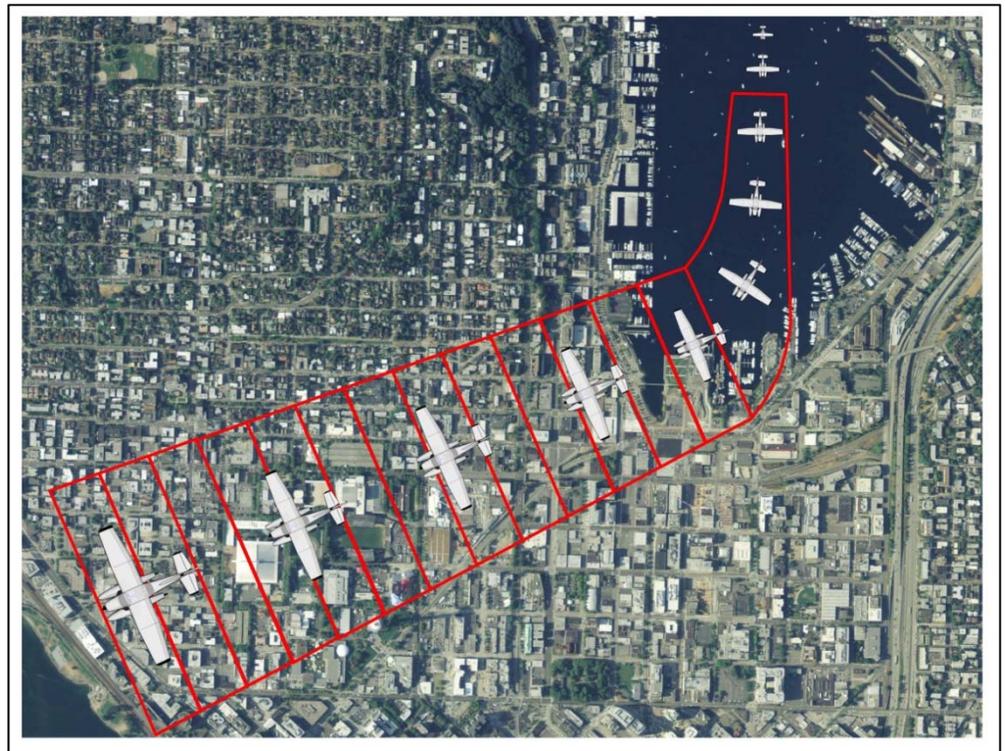
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Step 3: Identify Compatibility Concerns

You've set a foundation that described key information about your airport and community. You've also identified the airport influence area that is relevant. Now it's time to examine the level of compatibility in your community. This step will help you understand the various issues involved in determining compatibility.



You will know you've been successful when:

- *You have determined the compatibility status of existing land uses in the airport influence area*
- *You have identified potential compatibility conflicts that could arise from future development*
- *You have identified the particular compatibility concerns that will require further review in the next step*

What is the land use character of the airport influence area?

Once you've identified the influence area, the next step is to understand the land use conditions within that area. What are current land uses? What types of development are allowed under existing development regulations? The following factors should be taken into account when assessing existing conditions in the airport influence area:

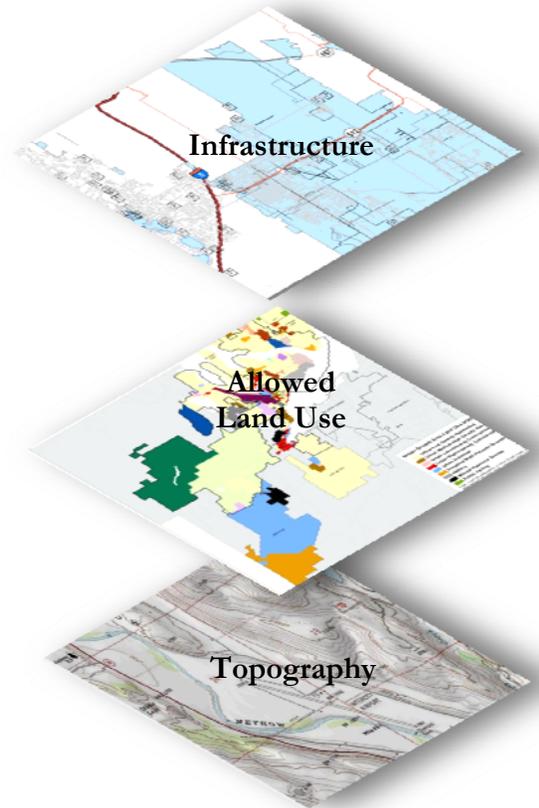
- ◆ **Existing Land Uses.** Describe the function, condition and height of existing structures within the airport influence area. Note typical types of uses and age of uses where possible. Also describe the residential density and nonresidential development intensity. Identify and describe vested development proposals where possible.

"Density" vs. "Intensity"

As used for airport land use compatibility purposes, "density" refers to residential development and is measured in dwelling units per acre. "Intensity" applies to nonresidential uses and is measured in people per acre.



- ◆ **Infrastructure.** Review existing and planned infrastructure in the airport area—particularly water, sewer, major roadways—to assess what type of future development it will support.
- ◆ **Allowed Land Uses.** Describe what land uses might be allowed under a maximum build-out scenario based on current comprehensive plan policies and development regulations. Also take note of where there are large parcels that can be subdivided under current policies and regulations. Note potential density and intensity where possible.
- ◆ **Topography/Geography.** Provide a general description of land features within the airport influence area. Of particular interest are features that constrain future development: steep terrain, lakes, flood zones, environmentally sensitive habitats, etc.



What is the current compatibility status?

Although the focus of this compatibility planning process is on preventing new incompatible land uses from being created, knowing the airport’s compatibility status relative to existing land uses can be helpful. Sometimes it is essential to make sure that existing problems don’t become worse; in other instances, infill development similar in character to the existing uses may be reasonable. Also, knowing the current compatibility status will help you to look for opportunities where incompatible uses could be converted to more compatible ones if encouraged by local policies.

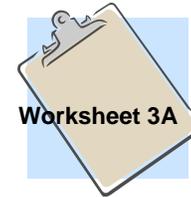
The following table is a general guide to the compatibility of various uses that may be found around the airport. You will be able to make a more detailed assessment of the land use compatibility status once you have drafted specific compatibility criteria in Step 4.



Mixed-use development may be appropriate depending where it is located and what type of uses are involved. A good mixed-use development might include offices, retail, and multi-family residential.

Now inventory the uses that exist within the airport influence area. Are these uses clearly compatible or incompatible with the airport? Flag the uses that could potentially be incompatible or that you are uncertain about.

Use Worksheet 3A to summarize your information.



To the extent that land uses are compatible with the airport, you will want to ensure that policies are in place to continue that status. This is especially true in locations on the edge of urban areas where pressures are greatest for conversion of agricultural lands to urban uses. Airport compatibility must be considered when drawing or modifying urban growth area boundaries. As for existing incompatibilities, there may not be a lot that can be done to remedy them, but some actions may be possible. For example:

- Are there areas of transitional or mixed uses near the airport where industrial or other compatible uses can be encouraged and residential uses phased out?
- Are there prospects that the airport could obtain FAA or state funds to buy the most highly impacted lands close to the runway ends and convert the areas to compatible uses?
- Can the airport obtain funds to install sound attenuation in noise-impacted residences and schools in locations where conversion to other uses is impractical? This option would be available only to the busiest airports with considerable jet traffic.

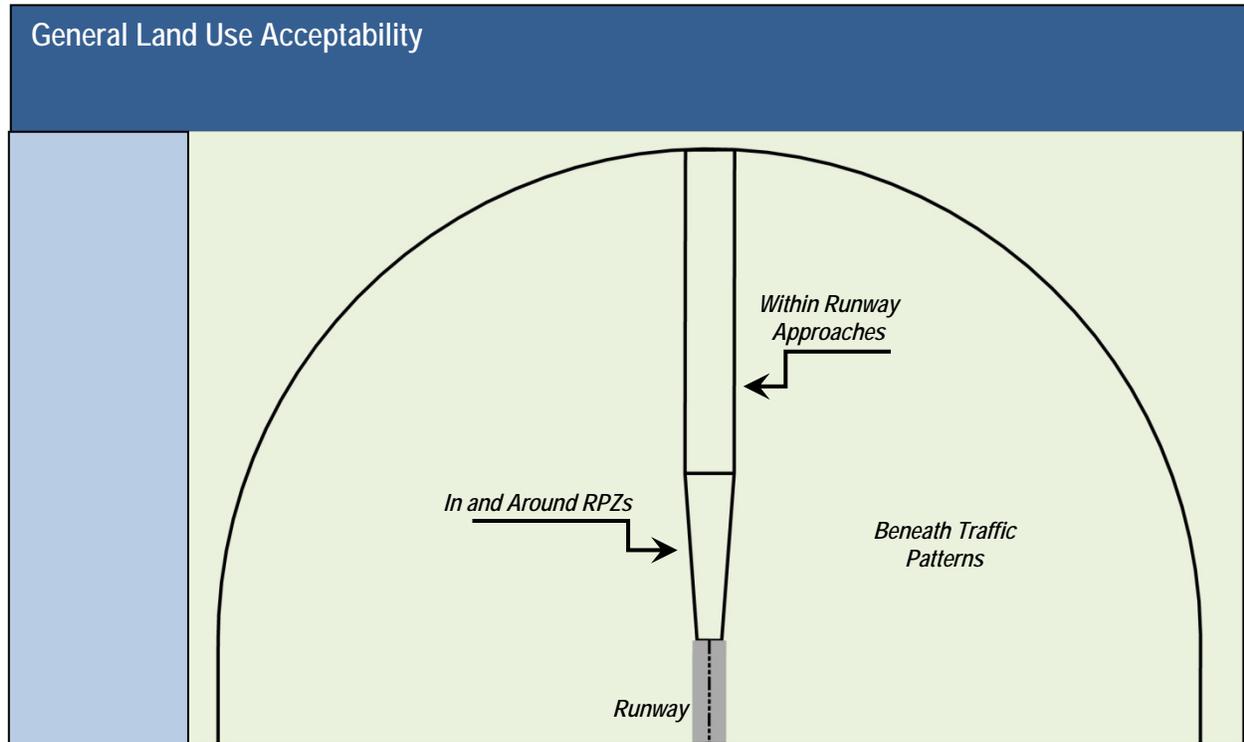


Table 2-2: General Land Use Acceptability

Typical Land Use Types	<i>Airport Proximity:</i>	<i>In and Around RPZs</i>	<i>Within Runway Approaches</i>	<i>Beneath Traffic Patterns</i>
	In General...		Only low heights and few or no people	Limited building height and number of people; no noise-sensitive uses
Agricultural		Compatible if not bird attractant or produces airspace obstructions	Compatible if not bird attractant	Compatible if not bird attractant
Power Plants / Transmission Lines / Roads		Generally incompatible	Compatible if does not produce airspace obstructions	Compatible
Parks / Recreation		Incompatible	Compatible if low intensity	Compatible
Stadiums		Incompatible	Incompatible	Generally incompatible
Industrial		Compatible if low-activity, warehousing, mini-storage, etc.	Compatible if does not produce airspace obstructions or have bulk amounts of hazardous materials	Compatible if does not produce airspace obstructions
Retail / Service Uses		Incompatible	Compatible only if low intensity	Compatible
Dining / Entertainment		Incompatible	High-intensity and outdoor areas incompatible	Outdoor areas generally incompatible
Offices / Industrial Parks		Incompatible	Compatible if low intensity	Compatible
Places of Worship		Incompatible	Incompatible	Compatible if low intensity
Residential		Incompatible	Incompatible	Generally incompatible
Children's Schools / Daycare Centers		Incompatible	Incompatible	Incompatible
Hospitals / Nursing Homes		Incompatible	Incompatible	Incompatible

What potential compatibility conflicts are on the horizon?

Here is where your efforts stand to reap the greatest benefits in terms of enhancing airport land use compatibility. Questions you should ask include:

- Where could uses allowed by current plans and zoning be developed, yet potentially be incompatible with the airport?
- Are there plans to extend utilities, roads, and other infrastructure into an area to support development that would be incompatible with the airport?
- Are there locations within the airport influence area where redevelopment is planned? Will the redevelopment result in uses that would be incompatible because of density/intensity, noise, height, or other factors? Can the redevelopment be directed toward uses that are compatible with the airport?
- Are there vacant or underdeveloped sites that have infill development potential within these areas? Would such development be too incompatible with the airport to consider or could it be acceptable given the character of the surrounding land uses?
- To what extent can reuse of existing buildings result in more intense occupancy? Can a vacant building shell be used in a manner that might be incompatible with the airport? For example, can an office or religious institution go into a building originally planned as industrial or warehouse space?
- What controls do you have over the heights of cell towers, antennas, and other such structures that could be airspace obstructions?



Tips

Much of this exercise relies upon a review of the designations indicated in your comprehensive plan land use map. However, other maps in the comprehensive plan also may indicate proposals such as new roads that could lead to new incompatible uses.

Use Worksheet 3B to understand how the jurisdiction's plan for future development in the airport influence area will affect compatibility concerns: increase? decrease? remain the same? Identify issues that have the potential to become conflicts in the future.



What compatibility concerns need to be addressed?

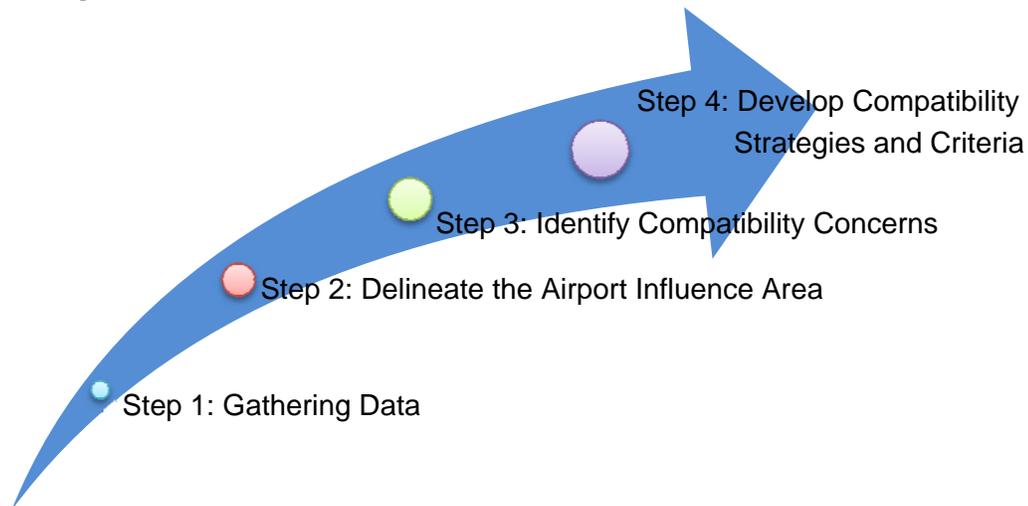
Now, list in Worksheet 3C the specific issues that must be addressed to ensure that development of incompatible land uses is avoided in the airport influence area. You will use this list in Step 4.



→ Step 3 Products:

- List of current community policies affecting land use development in the airport influence area
- Evaluation of current compatibility status
- Identification of potential future compatibility conflicts
- List of specific compatibility issues to be addressed by new policies

Step 4: Develop Compatibility Strategies and Prepare Comprehensive Plan Update



Steps 1 through 3 led you through the research and analysis needed to describe and assess the interactions between airports and surrounding land uses. You now know what constitutes compatible land uses around your airport and have identified key challenges to prevention of more incompatible uses. What are your options for addressing those challenges? This step will help you think through the various compatibility strategies available, then evaluate and incorporate the best strategies into the draft update of your comprehensive plan.

- You will know you've been successful when:*
- *You have weighed the comparative advantages and disadvantages of available planning strategies*
 - *You have identified preferred planning strategies*
 - *You have decided upon specific compatibility criteria*
 - *You have fully considered airport land use compatibility measures in your comprehensive planning process and incorporated compatibility policies into the draft comprehensive plan where appropriate*
 - *You are ready to circulate the proposed comprehensive plan for review and adoption*

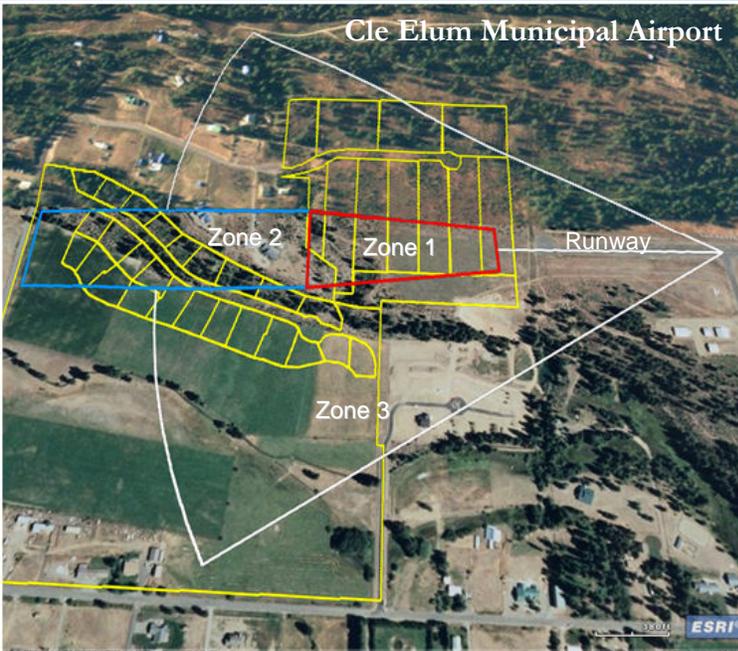
What does it mean to discourage development of incompatible land uses?

State law requires towns, cities and counties to “adopt comprehensive plan policies and regulations to discourage development of incompatible land uses adjacent to public use airports.” What does that mean to you? It means that your jurisdiction must take actions necessary to preserve investment in transportation infrastructure and protect the airport as an essential public facility.

Communities can address airport land use compatibility in a variety of ways based on the characteristics of the individual airport facility as well as numerous other factors that are unique to each location. The following two principles—developed based on WSDOT’s experience and expertise with airport land use compatibility—guide our technical assistance program:

- To “discourage” encroachment, communities must take proactive steps to prevent the proliferation of incompatible land uses adjacent to public-use airports. Existing conditions should be maintained or improved to prevent future incompatible development.
- To adopt effective goals, policies and regulations, communities must conduct thorough analyses to understand available research and apply it appropriately to the unique characteristics of a particular airport and its environs.

As you begin drafting compatibility policy and map for the airport and melding those policies into the comprehensive plan for your community, you must look first at the impacts generated by the airport as identified in Step 2. Your task does not stop there, however. Compatibility planning seldom takes place in a vacuum where existing land uses and future development expectations around the airport can be ignored. Policy that may be appropriate for a rural airport surrounded by farmlands are likely to be unacceptable in an urban environment. The analyses you’ve done in Step 3 thus will significantly affect how you proceed with Step 4.



Case Study: After completing a two million dollar runway and taxiway reconstruction project at a public use airport in Washington State the local jurisdiction approved two single family residential developments within the airport’s approach.

A jurisdiction’s comprehensive plan drives a community’s development pattern. Good comprehensive plan policies can also promote compatible development, while poor policies can promote the proliferation of incompatible uses that inevitably limit the potential and utility of the transportation asset.

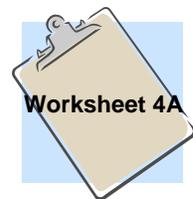
What compatibility policies are already in place?

If the airport you are addressing is owned by your jurisdiction or physically located within its boundaries, chances are that your current comprehensive plan acknowledges it in some manner. If only portions of the airport influence area overlap your community's territory, then the comprehensive plan may make little or no mention of the airport's impacts. The absence of explicit compatibility policies may implicitly be a policy that allows or even promotes incompatible development.

Remember the guiding philosophy of "Do no more harm"

The number one goal of airport land use compatibility planning is to support continuation of existing compatible land uses around airports and prevent encroachment by new incompatible uses. Beyond that, any feasible actions that can be taken to reduce or eliminate existing conflicts are desirable as well.

Review the land use planning documents gathered during Step 1. In Worksheet 4A, list the existing goals, policies, and development regulations affecting the airport influence area. Also note any implicit policies that may affect future land use compatibility.



Next, assess the effectiveness of these policies.

- Do the current policies help prevent incompatible land use development in the airport influence area or do they tend to promote this development?
- To what extent have policies intended to prevent incompatible development been inadequate to the task? Why? Are there loopholes in the policies that allow compatibility goals to be circumvented?
- Are the policies clearly defined or are they open to a wide degree of interpretation?
- Do the current policies provide a good starting point for more detailed and thorough policies or do you need to start from nothing?

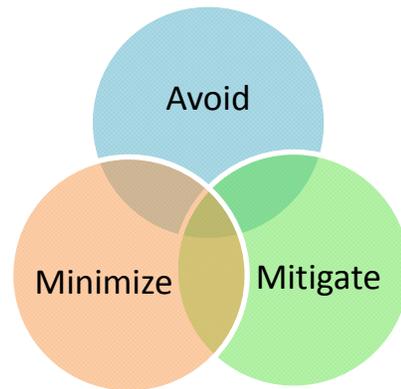
In Worksheet 4B, write statements of fact that document your findings. These statements provide evidence of your work on airport land use compatibility and may be used to support adoption of policies and regulations, and may also be referenced in any proceedings of the Growth Management Hearings Board.



What strategies can be used to respond to compatibility planning challenges?

Every community faces certain challenges in planning for airport land use compatibility. In almost every case, communities must decide how to balance a range of competing interests in order to protect the airport, preserve quality of life, and meet the requirements of state law.

Avoid, minimize, and mitigate is a principle used in planning to address adverse impacts of development. This principle is a hierarchical approach; the idea is to first avoid negative impacts when possible. When it is not possible to avoid adverse effects, the second part of the strategy is to minimize the effects to the greatest degree possible. The third step, used in cases where the adverse impacts are truly unavoidable, is to mitigate the negative effects by offsetting the impacts in some way. This approach can be used in airport land use compatibility planning as well. This *Guidebook* provides tools to empower local jurisdictions to prevent development of incompatible land uses adjacent to airports. However, where it is not possible to prevent such development, the tools may also be used to minimize and mitigate the effects.



The table on the next page lists a series of challenges you may encounter as you prepare compatibility policies and incorporate them into your comprehensive plan. For each of these challenges, the table identifies one or more basic strategies that can be used to address these challenges. Most jurisdictions will utilize a combination of techniques to implement their compatibility programs. Note, though, that some strategies may be appropriate for your community, while others will not be. Also, different strategies are applicable to different circumstances. Specifically, some strategies are “preventative,” meaning that they are designed to avoid new incompatible development. Other strategies are “mitigation techniques,” meaning that they are used to minimize the negative effects of incompatible development when such development already exists or is unavoidable.

These strategies are not intended to represent specific policies or criteria. Think of them more as tools. Indeed most are discussed in Chapter 3, Airport Land Use Compatibility Toolkit.

Table 2-3: Compatibility Challenges and Strategies

Challenge	Strategy															
	Encourage Airport to Buy Property	Prohibit the Use	Limit Residential Density	Limit Usage Intensity (people per acre)	Avoid Highly-Risk Sensitive Uses	Avoid Noise-Sensitive Uses	Encourage Development Clustering	Encourage Transfer of Development Rights	Consider limited criteria exceptions	Require Preservation of Open Land	Restrict Heights of Structures	Prohibit Bird & Wildlife Attractants	Require Avigation Easement Dedication	Require Recorded Deed or Plat Notice	Recommend Disclosure During Real Estate Transactions	Establish Coordination Mechanism
Expansion of UGA to encompass all or part of the airport influence area is proposed							X	X		X	X			X	X	X
The airport influence area encompasses all of a town or city					X				X		X	X				X
The airport influence area encompasses multiple jurisdictions								X								X
The airport area is in a GMA and extensive new development is unavoidable			X	X	X	X	X	X						X	X	
Airport influence area is almost completely developed and there is a demand for infill			X	X	X	X	X	X					X	X	X	
Redevelopment is planned for part of airport influence area					X	X					X					
Nearby property is more valuable than airport							X	X								
Land near the airport is needed for residential development		X	X				X	X		X			X	X	X	
There are existing residential areas near the airport and a new school is needed		X		X												
The community's commercial core area is within runway approach zone				X	X						X		X			
Some of runway protection zone is private property	X			X					X	X	X	X	X			
Planned new high-intensity development near runway approaches would put people at risk			X	X												
Little open land remains near the airport							X			X						
High terrain exceeding FAR Part 77 standards exists near the airport									X	X	X		X			
Property is so close to runway that FAR Part 77 height criteria doesn't allow buildings	X	X					X		X				X			
Tall buildings could be located near the airport		X						X			X		X			
Cell towers and antennas are not restricted in the airport environs		X									X		X			
Existing uses in the airport area attract birds or other wildlife												X				X
Airport compatibility conflicts with siting requirements for other essential public facilities located nearby					X											X

Which approach is right for you?

There is no single right way to approach these issues—although there are some wrong ones—and WSDOT does not endorse a particular approach for every community. Rather, what is most critical is that every community evaluate the options that are available and make informed decisions about the right course of action that will meet its stated goals and policies and uphold the requirements of the Growth Management Act (RCW 36.70A) and RCW 36.70.547.

As you consider the various options for addressing compatibility challenges, think about the advantages and disadvantages for your airport and your community. How would use of each technique influence the efficacy of your airport land use compatibility program? How would the approach work in your community?

Using the table below, rate the level of compatibility in the airport influence area. This will help you set expectations for the kinds of amendments that may be needed to achieve airport land use compatibility in your community.

	Green	Yellow	Red
<i>Airport Influence Area Land Use Characteristics</i>	Few opportunities for incompatible development given existing policies and regulations.	Some incompatible development already exists; some opportunity for new incompatible development based on existing policy and regulations.	Significant amount of existing and potential future incompatible development.
<i>Strategy</i>	Keep a good thing going.	Proceed with caution.	Change direction.
<i>Action</i>	Perform a review of existing land use map, policies, and regulations for key elements of compatibility. Amend comprehensive plan and development regulations as necessary for continued success.	Consider course corrections to prevent new incompatible development. Consider down-zoning or rezoning to a more compatible use to achieve airport land use compatibility objectives.	Planning as usual will not discourage incompatible land use. A new direction is needed to protect the airport.

The next worksheet takes you through the process of evaluating various strategies available and settling on the best approaches. It is important as you evaluate each approach to remember the principles that guide airport land use compatibility planning: How does each approach serve (or detract) from these planning principles? What should the specific compatibility criteria be?



What should the compatibility criteria be?

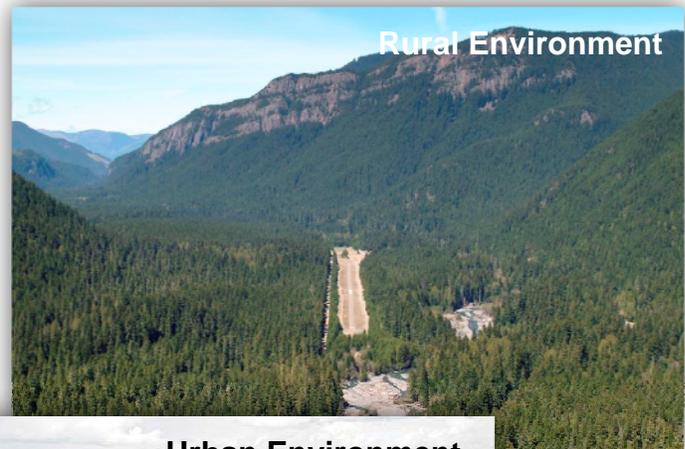
Things to Consider

You have decided upon the compatibility strategies that will work best for your community. Next you will need to prepare specific compatibility criteria. How detailed you choose to make the criteria will depend upon the issues you are facing. In outlying areas where little development is expected, providing general development parameters (such as height limits or maximum number of people per acre) may be sufficient. Where much development will be occurring, a detailed list of acceptable and unacceptable land uses and conditions to be met if the use is marginal may be necessary.

Another major decision to be made at this point is how restrictive your compatibility criteria should be. Again, the choice may depend upon the existing character of the airport environs. For example, it may be a simple decision to have policies precluding high-intensity development in outlying rural areas because such development is unlikely to occur anyway. In developed or developing locations, the point at which the line is drawn for acceptability with regard to airport impacts can be controversial. Questions you should consider in making this choice include:

- Is the development not likely to occur for reasons other than airport compatibility restrictions?
- What is the community's current image of the airport? Is it seen as a good neighbor?
- Are existing uses that might seem to be incompatible felt to be acceptable in your community given the community characteristics, relationship with the airport, and other factors?
- What are the community's expectations for and acceptance of growth in airport activity and the additional impacts that might result?

- What assurances can be given to protect the viability of the airport if relatively relaxed compatibility criteria are established?
- What realistic and economically viable uses of the land would remain with the compatibility restrictions in place?
- Could highly restrictive criteria cause some private property to be unusable and thus raise concerns that the policies could be deemed a taking?



- Would restrictive criteria render large areas of existing development as nonconforming to the compatibility criteria? What implications would this have?
- Should infill areas be treated differently than larger sites and ones on the edges of urbanized areas?
- Are different parts of the airport environs sufficiently different in land use character that different compatibility criteria should be applied?



Tips To avoid takings issues, you usually will want to allow a single-family dwelling to be built on a legal residential lot of record.



For more about takings, review this advisory Washington Department of Commerce publication:
qa.cted.wa.gov/CTED/documents/ID_1068_Publications.pdf



Basic Criteria

Table 2-5 is intended as a starting point for your preparation of specific compatibility criteria. It provides basic, qualitative criteria for different types of airport environs from outlying to developed. Your criteria will most likely need to be more detailed and quantitative.

With regard to the four primary compatibility factors, some key points to remember are:

- ◆ **Noise.** No new noise-sensitive uses should be permitted within the high-noise-impact areas defined by noise contours. This especially includes residential uses, but other uses with outdoor activities are also incompatible. Remember that noise impacts extend beyond the runway approach and departure areas into the aviation catchment area. Avoid residential uses except in urban areas where background noise levels are high. Where residential uses are to be accommodated, multi-family residential is preferable to single-family because of the typically greater background noise, fewer outside walls through which outside noise can intrude, and less amount of outdoor living space. Consider establishing some form of buyer awareness program to alert prospective new residents to the occurrence of noise.
- ◆ **Affects within the aviation catchment area.** Vibration, fumes, and an element of fear from low-flying aircraft all contribute to annoyance and other impacts associated with the aviation catchment area.
- ◆ **Airspace Protection.** You can generally use FAR Part 77 standards as the guide for determining allowable heights for new structures, but be sure to take into account any plans for runway extensions or new types of instrument approach procedures. Work with the airport and the FAA to determine acceptable heights in places where the ground itself exceeds the standards. Also be sure to address other hazards to flight. Uses that attract birds into the airport airspace or wildlife onto the runways are a particular concern. Other hazards include land uses that generate steam or smoke, produce glare, or otherwise interfere with the view of pilots and ones that could generate electrical interference with aircraft navigation or communication signals.

- ♦ **Safety.** Uses that attract concentrations of people into small areas near airports are not wise planning, especially in locations close to the ends of runways. New children’s schools, hospitals, and other uses in which the occupants are young or infirm should not be allowed. Uses involving quantities of hazardous materials also don’t belong near airports. Seek to cluster development in a manner that leaves some flat, open land where small aircraft could make an emergency landing if necessary.



Can the airport influence area size be adjusted?

Most of the time, the airport influence area will consist of a combination of the areas affected by each of the four preceding compatibility factors. In some instances, though, there are reasons for making adjustments. This should be done by going back to the four individual factors and reconsidering the underlying assumptions. Simply expanding the influence area boundary when no impacts occur and no compatibility criteria would apply within part of the area would serve little purpose. Oppositely, to omit locations where identified impacts warrant some form of compatibility policies would be contrary to the purpose of compatibility planning.

See Chapter 3 for further information and some specific examples that you can adopt or use as a starting point for your policies.



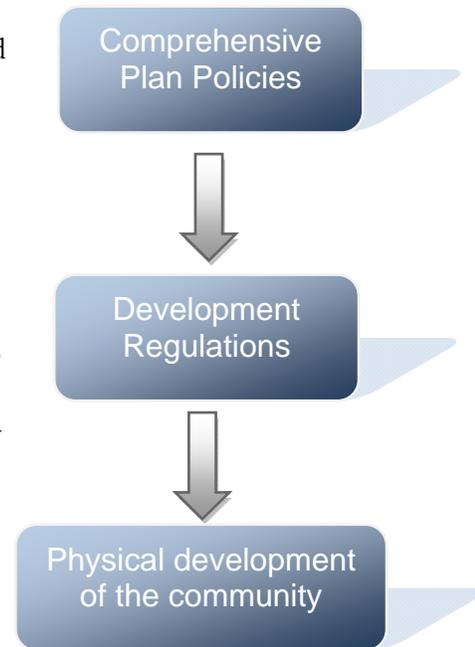
Table 2-5: Characteristics of Existing Influence Area Environs

Characteristics of Existing Influence Area Environs:	Rural <i>Existing land use is agricultural or remote; few buildings; new development not anticipated</i>	Limited Development <i>Existing development is scattered or low-intensity with little new development anticipated</i>	Developing <i>Extensive vacant or underutilized land with urban development potential</i>	Developed <i>Fully or mostly developed; potential redevelopment</i>
In and Around Runway Protection Zone	Airport should control land consistent with design standards Height restrictions Avoid new buildings	Airport should control land consistent with design standards Height restrictions Avoid new buildings Avoid new roads	Airport should control land consistent with design standards Height restrictions Avoid new buildings Avoid new roads	Airport should control land consistent with design standards Height restrictions Infill uses if low intensity
Lateral to Runway	Aviation-related development preferred No new residential tracts Low intensity non-residential uses acceptable No new schools, day care centers, nursing homes, etc. Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage keeping land agricultural, undeveloped, or in airport-related uses</i>	Aviation-related development preferred No new residential tracts Low intensity non-residential uses acceptable Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage keeping land agricultural, undeveloped, or in airport-related uses</i>	Aviation-related development preferred Low/moderate intensity non-residential uses acceptable No new residential tracts No new schools, day care centers, nursing homes, etc. No new shopping centers or places of public assembly* Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage light industrial and other low-intensity uses or airport-related uses</i>	Aviation-related development preferred Low/moderate intensity non-residential uses acceptable No new residential tracts No new schools, day care centers, nursing homes, etc. No new shopping centers or places of public assembly* Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage light industrial and other low-intensity uses or airport-related uses</i>
Approaches / Extended Runway Centerline	Low-intensity non-residential uses acceptable (consider a one-story limit to ensure acceptable intensity) No new residential tracts No new schools, day care centers, nursing homes, hospitals, etc. Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage continuation of agricultural and related uses</i>	Low-intensity non-residential uses acceptable (consider a one-story limit to ensure acceptable intensity) No new residential tracts No new schools, day care centers, nursing homes, hospitals, etc. Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage continuation of agricultural and related uses</i>	Low/moderate-intensity non-residential uses acceptable (consider a two-story limit to ensure acceptable intensity) No new residential tracts; infill discouraged No new schools, day care centers, nursing homes, hospitals, etc. No new shopping centers, industrial uses with high concentrations of people, places of public assembly* Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage light industrial, office, and other low-intensity uses</i>	Low/moderate-intensity non-residential uses acceptable (consider a two-story limit to ensure acceptable intensity) Residential as infill acceptable No new schools, day care centers, nursing homes, hospitals, etc. No new shopping centers, industrial uses with high concentrations of people, places of public assembly* Tall structures restricted to protect airspace Caution regarding land uses that attract birds <i>Encourage light industrial, office, and other low-intensity uses</i>
Traffic Pattern	<i>Maintain existing minimal development conditions to maximum extent practical</i>	Limit residential tracts <i>Encourage continued agricultural and agriculture-related commercial or other low-intensity commercial uses</i>	<i>Encourage nonresidential uses except for ones with very high intensities (such as sports arenas)</i> <i>Favor high-density or clustered residential over low-density if residential is necessary</i>	<i>Encourage nonresidential uses except for ones with very high intensities (such as sports arenas)</i> <i>Favor high-density residential as infill or redevelopment</i>
* Places of worship, auditoriums, outdoor sports arenas, etc.				

What needs to be added or changed in the comprehensive plan?

The comprehensive plan establishes the policy foundation that guides the physical development of a community. Towns, cities, and counties in the state each must adopt a comprehensive plan. Policies directed toward ensuring airport land use compatibility in the community must be an integral part of the plan. These policies should be evident in:

- The goals that the community seeks to achieve with regard to future development and the manner in which the airport and provisions for land use compatibility around it fit into these goals.
- Description of the types of airport land use compatibility standards that future development will need to meet
- Comprehensive plan map designation of lands near the airport for types of development that will be compatible with the airport.
- Identification of the specific tools that will be used to ensure implementation of the compatibility standards.



Goals

It is critically important that a community’s goals for air transportation facilities and adjacent land uses be expressed in the comprehensive plan. Values and strategies included in the comprehensive plan filter down through all other planning decisions, from zoning to issuing building permits. The land use, transportation, capital facilities, and economic sections are all appropriate places to discuss airports and land use compatibility.

The goals should cover a range of issues that express the value of the airport to the community, as well as the community’s commitment to preserving the airport consistent with its value. At a minimum, the goals should:

- Recognize the multiple roles of the airport in the community, its contribution to the community’s economy, and the services it provides to the community’s businesses, residents, and visitors.
- Recognize the airport as an essential public facility.
- Recognize the airport as part of the multi-modal transportation system.
- Signal the community’s intent to discourage development of incompatible land uses adjacent to the airport.
- Signal the community’s intent to protect the airport’s airspace.

Compatibility Criteria Identification

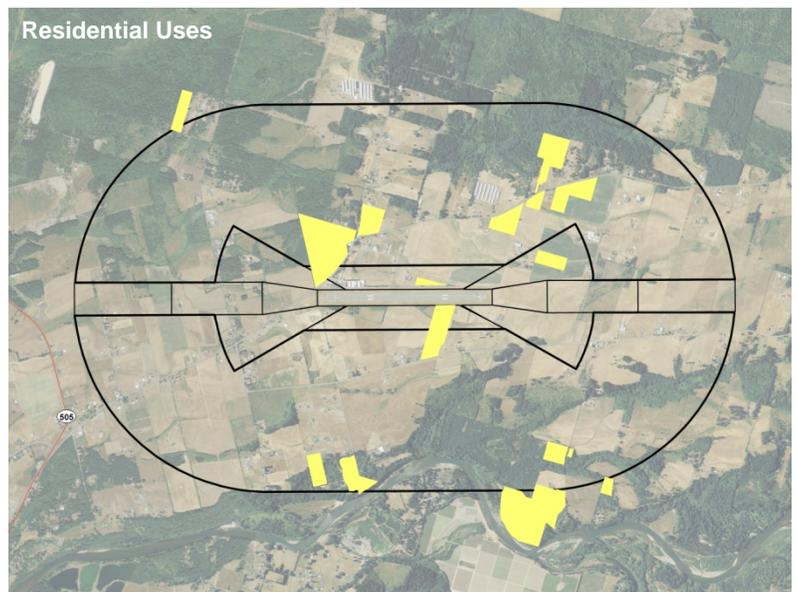
The basic objectives of the compatibility criteria for each of the four compatibility concerns should be identified in the comprehensive plan. Indicate which of the strategies you selected earlier in Step 4. Also, the airport influence area boundary that you have defined should be presented in the comprehensive plan together with a discussion of the factors on which it is based.

At least a basic level of compatibility criteria should be included in the comprehensive plan to ensure that they are not overlooked during reviews of individual development proposals. Highly detailed criteria may be better suited to inclusion in a separate policy document or within an airport compatibility overlay component to the community zoning ordinance. If the complete criteria will appear in the comprehensive plan rather than in other policy documents, then maps of the impact areas for the four individual compatibility factors would need to be included as well.

Land Use Map Designations

Designating land uses that will be compatible with the airport impacts in a particular location is key to the success of the whole compatibility planning process.

- ◆ **Agricultural Uses and Related Uses.** How much of these types of undeveloped or minimally developed uses can be continued? Especially outside of urban growth boundaries, this should be a high-priority choice.
- ◆ **Residential Uses.** Residential land uses are a particular concern. Is new residential development, especially any new subdivisions, proposed for locations where it would be incompatible with the airport? If so, are other more compatible uses possible?
- ◆ **Noise- and Risk-Sensitive Uses.** Where are schools, hospitals, and other sensitive uses planned to be located? If these uses already exist, can expansion be limited? Are there any critical community infrastructure uses—such as power plants and communication facilities—planned in the airport influence area that could be built elsewhere instead?
- ◆ **Other Nonresidential Uses.** Take a close look at commercial and other nonresidential uses that potentially have high concentrations of people. Are any such uses proposed within the compatibility zones close to the runway? If so, what can be done to limit the intensity? Also make certain the building heights allowed for these uses would not result in airspace obstructions.

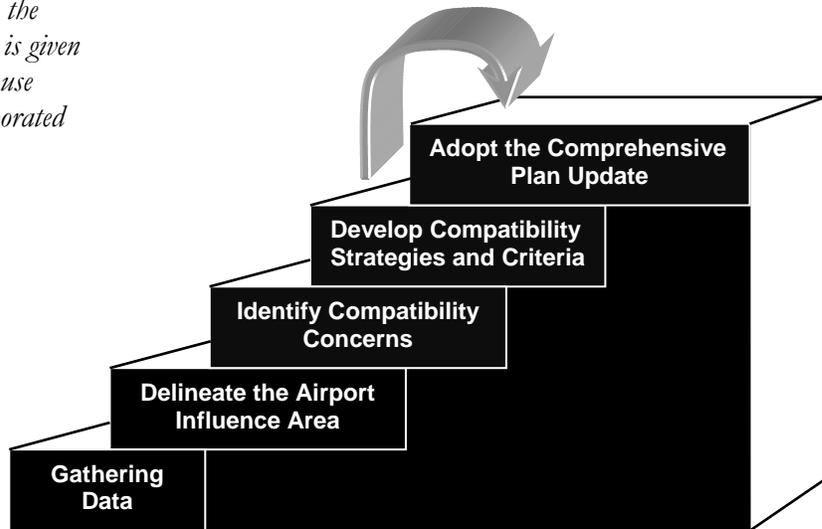


➔ **Step 4 Products:**

- List of current policies affecting airport land use compatibility in your community whether positively or negatively (Worksheet 4A)
- Assessment of the adequacy of current policies (Worksheet 4B)
- Evaluation of alternative compatibility strategies (Worksheet 4C)
- Draft of specific compatibility criteria
- Adjustment of airport influence area boundary if necessary (Worksheet 4D)
- Draft comprehensive plan policies
- Draft comprehensive plan land use map

Step 5: Adopt the Comprehensive Plan Update

This short step takes the comprehensive plan update you prepared in Step 4 through the adoption process. Particular emphasis is given to gaining support for the airport land use compatibility measures you have incorporated into the draft plan.



You will know you've been successful when:

- Airport stakeholders feel that their concerns regarding compatibility matters have been understood and appropriately considered in the comprehensive plan update.
- You have gained public acceptance of the importance of airport land use compatibility planning.
- WSDOT Aviation provides comments supporting the compatibility measures you propose to take in your comprehensive plan update.
- Your community's decision-makers have adopted a comprehensive plan update that contains appropriate measures to protect the airport from encroachment by incompatible land uses.

Does WSDOT Aviation need to review the draft comprehensive plan update?

Under RCW 36.70.547, “all proposed and adopted plans and regulations shall be filed with the aviation division of the department of transportation within a reasonable time after release for public consideration and comment.” Beyond this requirement, as you begin work on preparing your draft comprehensive plan, it is important that you coordinate with WSDOT Aviation. We can provide technical assistance and help you identify and understand the airport land use compatibility issues you will need to consider during your comprehensive plan update process.

What public participation is needed for policy adoption?

By the time you reach this step, you should have thoroughly examined airport land use compatibility issues and incorporated appropriate measures into the draft comprehensive plan update. Airport land use compatibility planning now becomes one of many issues that the public and decision-makers will evaluate during the process leading to the adoption of the comprehensive plan update. Thus, the formal public participation process for compatibility planning should be the same as for the comprehensive plan and implementing regulations.

Airport land use compatibility planning has its own unique group of stakeholders, however, and these stakeholders may not always be active participants in the comprehensive planning process. Chapter 1 described the stakeholders in compatibility planning and the importance of involving them in the process. Now, at the adoption phase, is where special effort to engage these stakeholders is particularly important.



Tips

- Information collected for the transportation inventory can be expanded as public outreach materials to educate community members about the airport. For example, a brief fact sheet or flyer describing activities supported by the airport and future activity anticipated at the airport can be a great resource for raising awareness about the role of the airport in the local, regional and state transportation system.

How can you gain public and decision-maker support for airport land use compatibility measures?

For people closely involved with aviation, the importance of airport land use compatibility planning is probably obvious. To other people, it may not be as evident or they may view it as less of a priority than other community planning objectives. For the airport land use compatibility measures you have developed by following this five-step process to be successful, the people who have the authority to make decisions or the ability to sway those decisions must be convinced.

One way of doing this is to demonstrate why compatibility is important not just to the airport, but also to the community's residents and businesses. This topic was covered in Chapter 1. Simply put, development that unnecessarily puts people where they will be exposed to significant noise or risk is poor planning.



Another approach is to focus on the economic importance of the airport to the community. This topic has already touched upon several times in this *Guidebook*. From a statewide perspective, some additional points to consider are these:

- Airports, aviation, and industries related to aviation in Washington have an impact on the economic well-being of communities throughout the state. Airports and aviation-related industries create thousands of jobs and provide millions of dollars in income and sales each year.
- According to a WSDOT study conducted in 2001, airport operations, aviation-related businesses, air travel visitor spending, and special aviation events in Washington generate an estimated \$19.6 billion annually in total economic activity, support over 176,900 full- and part-time employees statewide; and produce \$14 billion each year in employee wages and benefits for state residents.

- Capital spending by local airports also contributes to the economic well-being of local and regional economies. While not generally an annual expenditure, spending on capital improvements in the year 2000 generated an additional \$137.9 million in output, supported over 1,400 jobs and produced \$42 million in employee wages and benefits for state residents.



For more on the WSDOT Aviation economic impact study, see www.wsdot.wa.gov/aviation/EconImpacts.

To bring these points home at a local level, preparation of an airport economic analysis focusing on your airport may be worth considering. Such studies can document several types of economic benefits:

- They measure the new economic benefits that the region accrues because of the airport.
- They provide a metric for comparison to other public projects in terms of rate of return on investment.
- They show the net benefit of dollars flowing into the local economy from outside of the community because of the airport.

Step 5 Products:

- A strategy to gain public and decision-maker support of the compatibility measures
- Information materials describing the importance of the airport and airport land use compatibility
- An adopted comprehensive plan incorporating airport land use compatibility measures

Step 6: Implementing Development Regulations

Congratulations! You have shepherded airport land use compatibility matters through the research and analysis process. You have successfully reflected the concerns in your draft comprehensive plan update, which has now been adopted by your community's decision-makers. But, you can't stop there. The one final step involves preparing implementing regulations, getting them adopted, and then using them on a day-to-day basis to ensure that compatibility concerns continue to be recognized and avoidable conflicts do not occur.



You will know you've been successful when:

- You have proposed revised development regulations to implement the policies
- You have begun to put the policies to use

What implementing regulations are needed?

Most likely, unless the compatibility issues you face are simple, your comprehensive plan will not contain all the tools necessary for implementation of the compatibility criteria. The details will need to be included in separate implementing regulations. Primary among these is your zoning ordinance, but subdivision and environmental impact regulations, and other implementing regulations also may need to be reviewed and revised to reflect the comprehensive plan policies on airport land use compatibility.

With regard to zoning, there are at least a couple of ways to proceed. One is to modify your community-wide ordinance in a manner that will prevent land use conflicts with airport operations. This approach may be sufficient where the airport controls a substantial amount of land around the runway. For example, if airport airspace protection would not restrict any off-airport locations to heights of less than 35 feet and the height limit under community-wide zoning is 35 feet, then airport-specific restrictions might not be needed (although regulations on the height of antennas, poles, and trees might still be necessary).

↳ Tips

Development regulations put policy into action. It is important that the regulations implement the policy, not start a new direction. Make sure to provide adequate detail in the regulations to help the development community understand what is required.

Similarly, if surrounding lands are all zoned for agriculture or other generally compatible uses, then minor additions to the established zoning to address height limits and other miscellaneous compatibility issues may be adequate.

A different option to consider, especially for airports where adjoining land uses are closer and more varied, is to adopt an airport overlay zoning ordinance. Overlay zones supplement the community-wide land use zoning. These zones may modify the underlying zoning or add other conditions. Flood hazard overlay zoning is a common example.

An airport overlay zone ordinance can serve as a convenient means of bringing various airport compatibility criteria into one place. The airport-related height-limit zoning that many jurisdictions have adopted as a means of protecting airport airspace is a form of overlay zoning. Compatibility criteria addressing noise/overflight and safety factors can be included as well. Other than where direct conflicts need to be eliminated from the comprehensive plan text and maps, implementation of compatibility policies could be accomplished almost entirely through the airport overlay zoning ordinance. **Use worksheet 6A to confirm that you have addressed all the compatibility criteria in your implementing regulations.**



An outline of topics that could be addressed in an airport overlay or combining zone is included in Chapter 3.

What actions are necessary to ensure continued implementation of the policies?

To conclude this five-step process, a final point to remember is that your work does not end with adoption of a comprehensive plan and implementing regulations that incorporate airport land use compatibility planning measures. The criteria must continue to be applied on an on-going basis.

Among the continuing actions are:

- Make sure that compatibility criteria are not buried in the planning policies and implementing regulations so that planners do not overlook them. Flagging parcels affected by airport compatibility criteria with an airport overlay zoning designation is a way of helping to ensure that the criteria are noticed. Consider incorporating the compatibility criteria into a geographic information system (GIS) to make the criteria quickly evident.
- Pay attention not just to the finished height of structures, but also to any add-on features such as antennas that would increase the overall height. Also consider construction cranes or other temporary objects that could be airspace obstruction if near the airport. The height of trees could be another concern. Be certain that project proponents submit proper notification (Form 7460) to the FAA for an Aeronautical Study in accordance with FAR Part 77 requirements.

- Don't overlook proposed changes of use of existing buildings. A proposal to change a low-intensity or vacant building to one with many occupants, or to a use that is noise sensitive, could be contrary to the compatibility criteria.

 **Tips**

- Local jurisdictions are strongly encouraged to conduct a preliminary analysis to determine if the project meets local height regulations and FAR Part 77 standards. This preliminary analysis should be done prior to when the project applicant submits Form 7460 to the FAA. If the project would penetrate a FAR Part 77 surface and thus be an airspace obstruction, jurisdictions should require the applicant to propose alterations to the proposal.

→ **Step 6 Products:**

- Draft and adopt implementing regulations such as an airport overlay zoning ordinance that contain the specific compatibility criteria to be met
- Identify continuing actions and specific points in the development review process where airport land use compatibility concerns will be addressed