

Chapter 3

Airport Land Use Compatibility Implementation Toolkit

Introduction

This chapter describes a collection of tools that you can use to implement the airport land use compatibility strategies you selected as you worked through the steps outlined in Chapter 2. Some of these are tools you use on a daily basis: comprehensive plans and zoning ordinances. But, how do you specifically use these tools for addressing airport land use compatibility issues? The first two sections of the chapter will provide you some guidance. Then, in the latter part of the chapter, you will find various tools that can be applied to more individualized compatibility problems or during the approval process of specific projects. A final section at the end of this chapter outlines several planning scenarios that put the various tools to use. Also, take a look at the *Guidebook* appendices for additional information on airports and aircraft operations.



In this chapter you will learn about:

- ◆ **Comprehensive Plan.** Where compatibility issues can or should be addressed; what land uses should be planned for near airport and what ones should be avoided
- ◆ **Zoning Ordinances.** Aspects of airport land use compatibility planning that should be addressed in a traditional zoning ordinance; airport overlay zones and other types of zoning that can be employed to address compatibility concerns
- ◆ **Tools for Addressing Specific Compatibility Factors.** Guidance on specific criteria to use with regard to noise, overflight, safety, and airspace protection
- ◆ **Other Tools.** These include some special tools that planners and airport managers can employ to promote compatibility
- ◆ **Scenarios.** Some examples of how tools might be applied in particular situations.

Reflecting Compatibility Issues in the Comprehensive Plan

Creating a Comprehensive Plan

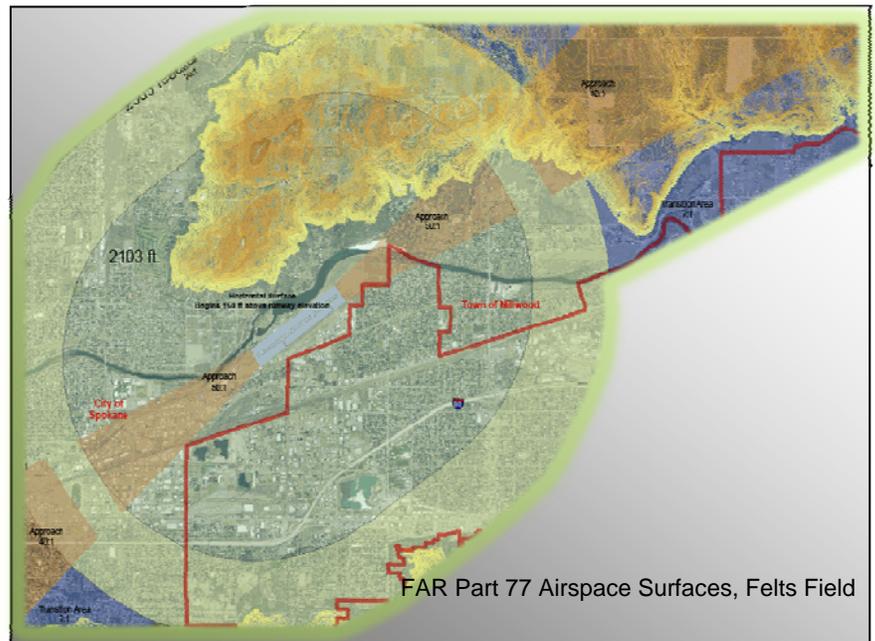
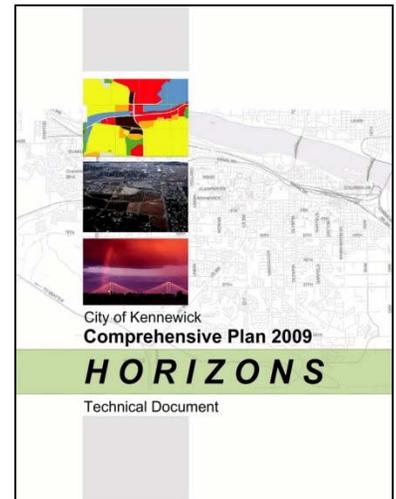
As discussed in Chapter 1, a comprehensive plan presents a community’s vision about itself and what it would like to become. The comprehensive plan is the policy framework on which all future community planning actions will be based and it is the starting point for any discussion regarding local land use. Therefore, when an airport’s influence area extends into a community’s territory, the comprehensive plan is where airport land use compatibility issues must fundamentally be addressed.

Depending upon the nature of the relationship between the airport and the community—where the airport is located relative to the community boundaries, whether the community owns the airport or it belongs to another entity, the airport’s economic importance to the community, etc.—airport land use compatibility topics could be addressed in various places within the comprehensive plan. Take a particularly close look at these standard comprehensive components and make sure that they discuss the airport and compatibility issues:

- Introduction and description
- Goals
- Policies
- Elements
- Urban Growth area (UGA)
- Land Use Map

Additionally, when there is an airport in your community—or even when the airport is outside your boundaries, but its impacts extend inside—the following items should be included somewhere in the comprehensive plan:

- Map of the airport influence area
- Map of the FAR Part 77 Airspace Protection Surfaces
- An inventory of compatible and incompatible land uses



Policies and Goals

Comprehensive plan goals and policies provide decision makers with a foundation for making strategic, long-term land-use decisions. Community planning commissions and city councils use these policies and goals to determine appropriate steps to take when planning for airport land use compatibility. Goals and policies guide regulations and development decisions within the airport's influence area, so it is critical to include policies that address incompatible development.

Policies should acknowledge the airport's role as an essential public facility, its economic contribution to the community and its role in the overall aviation system.

Comprehensive Plan Elements

The issue of airport land use compatibility is relevant to many of the elements of a comprehensive plan including

- Transportation
- Land Use
- Housing
- Capital Facilities
- Utilities
- Economic Development (optional)
- Parks and Recreation (optional)
- Rural (county comprehensive plans only)
- Natural Resources

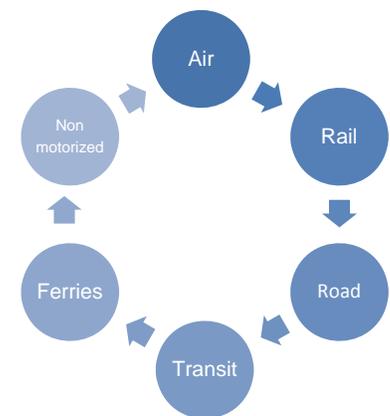
WSDOT Aviation recommends that airport land use compatibility and other airport-related topics particularly be addressed in these four elements.

Transportation Element

The transportation element should:

- Inventory transportation assets, including all public-use airports within the jurisdiction (required by law).
- Recognize the unique access that airports provide.
- Recognize the role aviation facilities play in emergency management.
- Identify the role that the community's airport or airports play in the Washington State Aviation System Plan (WASP).

Be sure to address the airport's relationship to other modes within the transportation element



- Identify, reference, and coordinate with the current Airport Master Plan or Airport Layout Plan.
- Provide an inventory of airport operations and facilities, both existing and planned.
- Identify the siting and expansion process of general aviation airports (required by law).
- Promote inter-jurisdictional planning that encourages regional transportation linkages and multimodal connections to and from aviation facilities and employment centers.

Land Use Element

The land use element should:

- Discourage incompatible residential development by establishing policies, standards and compatible land-use designations within the airport influence area.
- Identify the best available science used to develop residential compatibility policies.
- Include policies and standards addressing noise, safety, airspace protection and the aviation catchment area.
- A map of the Federal Aviation Regulations Part 77 airspace protection surfaces indicating the acceptable heights of objects in and near the runway approach zones.

Housing Element

The housing element should:

- Recognize the airport as an industrial use.
- Include a map that identifies the airport influence area.
- Inventory compatible and incompatible land uses within the airport influence area.
- Discourage development of incompatible uses by establishing policies, standards and compatible land-use designations for the airport influence area.
- Encourage alternatives to residential development within the airport influence area.

Capital Facilities Element

The capital facilities element should:

- Provide an inventory of airport facilities. Jurisdictions planning under the Growth Management Act and owning an airport are required to inventory the airport facilities as a part of this element.

Aviation Sub-Element

Jurisdictions with airports in their midst should consider developing an aviation sub-element within the transportation element of their comprehensive plan. An aviation sub-element can be particularly useful for jurisdictions that both own the airport and control the land uses around it. In this way, all of the key information about planned airport improvements and projected activity can be brought together with the planning for future roads, infrastructure, and land use development in the airport environs. Competing objectives should become more readily apparent and policies can be set in place to help ensure long-term airport land use compatibility.

Use an aviation sub-element to document the methods, data, analysis and results of the jurisdiction's land-use compatibility process. This sub-element preserves information as a part of the public record and establishes an easy-to-use tool to gauge compatibility efforts.

WSDOT Aviation highly recommends the addition of an aviation sub-element because it establishes a defensible public record of the process and analysis the jurisdiction used to achieve its land-use compatibility goals. Recommended components of this sub-element include:

- Introduction and description
- Goals
- Policies
- Compatibility criteria
- References to aviation planning documents: Airport Master Plan or Airport Layout Plan
- Map of the airport influence area
- Map of surrounding land uses
- An inventory of compatible and incompatible land use
- FAR Part 77 Airspace Protection Surfaces map
- Airport compatibility overlay map
- Formal consultation process with WSDOT Aviation
- Public participation process

Sub-Area Plans

Another way of focusing airport and airport land use compatibility topics in one component of the comprehensive plan is via a sub-area plan. Many jurisdictions, particularly counties, cover wide geographic areas. While the comprehensive plan addresses issues that are common to all or many parts of the jurisdiction, individual locations may have planning issues that are unique to that area and warrant closer investigation. In these instances, a set of sub-area plans may be prepared to address these issues.

The environs of airports often pose planning challenges that make these areas distinct from elsewhere in the jurisdiction. In these instances, creating an airport sub-area is worth considering. The airport's role within the community and the importance of airport land use compatibility would be a major focus. Goals and policies should address these topics. Implementation actions to be taken to pursue airport land use compatibility should be described in detail.

The City of Bremerton is proactively addressing land use compatibility through the current development of the SKIA Subarea Plan.



Urban Growth Area Issues

Jurisdictions are required by the GMA to comprehensively plan for future development and make informed land-use decisions. A part of this planning effort is the urban growth area (UGA). It represents the community's projected land use needs for the next 20 years. Land within a jurisdiction's UGA should be capable of accommodating the community's urban growth needs, including residential, commercial, industrial, institutional, and other uses.

The basic concept of the UGA is to focus growth in appropriate areas where infrastructure, such as sewer, water and power, already exists. This discourages leap-frog developments and costly sprawl which, over time, diminishes the quality of life for Washington residents. Jurisdictions are required to review UGAs, at least every seven to ten years and make changes if needed. Many jurisdictions revisit their plans and update them every year.

Critical Concept!

It is extremely important to understand that lands within the UGA will be developed to an urban level of intensity and use. If the property is zoned for single-family residential development, it will be developed to an urban density that is incompatible with an aviation environment. In much of the airport influence area, multi-family residential is preferable to single-family because it is less susceptible to noise intrusion.



Click here for more information: www.commerce.wa.gov/site/402/default.aspx

How can the Urban Growth Area be used to promote airport land use compatibility?

- **Inside the UGA.** An urban growth area (UGA) allows property adjacent to an airport to be developed for complementary commercial and industrial use. Having an airport inside the UGA allows a community to unlock its economic potential as a transportation asset. When surrounding property is zoned appropriately, it can be developed to its fullest potential and yet be compatible with the airport.
- **Outside the UGA.** If a community contains enough land to accommodate foreseeable growth over the next 20 years, lands within the airport influence area should preferably remain outside the UGA. Because many types of development that would be incompatible with the airport are not allowed outside the UGA, protecting the airport from encroachment can be easier to accomplish than when the airport is inside the UGA.

Addressing Particular Land Use Types

A central component of all comprehensive plans is the land use map. Here is where the future geographic pattern of land uses in the community are depicted. For most communities, the majority of the land will show designations that simply represent what already exists on the ground indicating that no changes in the uses are contemplated. Where this is the case, there is little that your airport land use compatibility efforts can accomplish other than to maybe encourage land uses that are incompatible with airport activities to be redeveloped and converted to more compatible uses.

The greatest opportunities for promoting airport land use compatibility are within the portions of the airport influence area where new development is planned and flexibility remains as to what types of land uses to locate where. Expanding upon the basic compatibility criteria noted in Table 2–4 of Chapter 2, listed below are brief assessments of the positive and negative compatibility aspects of basic land use categories. More detailed evaluations are included in Appendix C.

Agricultural Uses

- Most agricultural uses are compatible with airports.
- Crops that attract waterfowl or flocks of birds should be avoided.
- Packing facilities and similar high-intensity agricultural-related functions should not be situated in runway approach zones.

Residential Uses

- It is best to minimize new residential development in the airport influence area because of impacts within the aviation catchment area, noise and safety impacts
- No new dwellings should be allowed inside any runway protection zone



Arlington Municipal Airport leases its RPZ for aviation compatible agricultural use.



Substantial residential encroachment around Hoskins Field Olympia, WA

- Outside the urban growth area, scattered, large-lot, agricultural-related residences are acceptable, but not subdivisions.
- Inside the urban growth area, new residential development should not be planned for high-noise areas or any of the approach compatibility zones (Zones 1 through 5); in the traffic pattern area (Compatibility Zone 6), multi-family residential is preferable to single-family uses because safety concerns are less and multi-family residences are less susceptible to noise intrusion.

Schools and Institutional Uses

- Give children’s schools the highest degree of compatibility protection; don’t allow new schools or expansion in high-noise areas or the approach compatibility zones; the same applies to large day-care facilities.
- Libraries should generally be treated the same as schools.
- Hospitals, nursing homes, and other medical facilities where patients remain overnight should not be situated in approach compatibility zones.

Parks and Recreational Facilities

- Parks and recreational facilities intended primarily for children should follow the same criteria as for schools.
- Other facilities that don’t have spectator seating can be located anywhere in the airport influence area other than the runway protection zones.

Commercial Uses

- The airport compatibility of commercial uses depends largely upon their intensity—the number of people concentrated on the site—and proximity to the runway approaches.
- Office-type uses, particularly those having only one or two floors, are generally acceptable throughout the airport influence area except in and near the runway protection zone (Compatibility Zones 1 and 2); taller buildings may present airspace obstruction issues as well as be too intense (too many people) for good safety.
- Retail spaces are generally acceptable beyond Compatibility Zones 1 and 2, but major shopping centers and big-box stores should not be located in any of the compatibility zones; low-intensity retail uses such as furniture stores are preferable.
- The high concentration of people in many dining establishments makes them vulnerable to aircraft accident risks and should be avoided in the approach compatibility zones, particularly Zone 2.
- Lodging facilities are generally compatible with airports—and often located nearby—but should not be situated within the runway approaches (Zones 1 through 5) because of noise and safety impacts.



Industrial Uses

- Most light-industrial uses are low intensity and low height, making them preferred choices being for close to the airport.
- The compatibility of heavy industry depends on the facility—tall smokestacks or other features, generation of steam or electromagnetic interference, and storage or use of large amounts of hazardous materials are all features that are incompatible within the runway approach zones.

Warehouse and Storage Facilities

- These types of facilities are generally ideal near airports because they have few occupants.
- Avoid placing large buildings on runway centerline; keep this area open for parking lots.

Sports Arenas and Large Assembly Facilities

- The high concentrations of people in sports arenas, convention centers, multiplex theaters, large places of worship, and other assembly facilities (500 or more people) makes them incompatible within any of the compatibility zones, including the traffic pattern zone (Zone 6).
- Outdoor arenas and amphitheaters can be particularly incompatible because no structure provides protection from a light aircraft accident; noise intrusion can also be an issue.

Utilities and Communications Facilities

- Critical facilities that could be made inoperable if struck by an aircraft should not be situated in the approach compatibility zones.

Addressing Compatibility in the Zoning Ordinance

Beyond the comprehensive plan itself, the zoning ordinance is the most fundamental tool available for addressing airport land use compatibility issues. Various types of development regulations can be structured as zoning ordinances. The two forms of zoning most clearly applicable to compatibility planning are traditional, community-wide zoning and overlay zoning.

Conventional Zoning

Conventional zoning ordinances typically involve two components: text and a map. The text defines the categories, uses and standards of development permitted within a particular land use designation. The map demonstrates the spatial distribution of the zoning classifications.

Historically, zoning has been used as a land-use control technique to segregate incompatible land uses and establish standards for the type and intensity of use. Zoning ordinances typically categorize land uses into several different classifications. Usually included are: residential, commercial, industrial, institutional/governmental, parks/open space, and agricultural. The exact classifications will vary from jurisdiction to jurisdiction. Zoning is also used to regulate the manner in which structures can be placed on the site—setback distances, lot coverage, and allowable height. Parking and landscaping requirements for each land use classification are typically specified in the zoning ordinance as well.



Click here to review your jurisdiction's development regulations: www.mrsc.org/codes.aspx

Tips

Be sure to address the topic accessory uses within the airport influence area. Development regulations should only permit accessory uses when they would be permitted as a standalone use.

How can *Conventional Zoning* be used to promote airport land use compatibility?

To discourage the encroachment of incompatible land uses within the airport influence area, jurisdictions can implement zoning that limits residential development and promotes compatible commercial, agricultural, light industrial and mixed use development. Parcels within the airport influence area should, at a minimum, be maintained at their current level of compatibility or rezoned for a more compatible use. Parcels should not be rezoned to allow a more incompatible use. Remember, jurisdictions are required to discourage incompatible development, not encourage its proliferation through passive zoning regulations.

Airport Overlay Zoning Ordinance

Overlay zoning is used to modify the standards set in the conventional zoning ordinance. While the land use classifications established in conventional zoning are applicable wherever that land use occurs within the jurisdiction, overlay zones are usually created to be applied only within smaller geographic areas. Overlay zones either modify or supplement the criteria and restrictions of the underlying zoning classification.

Overlay zoning is a highly useful and efficient tool by which land use compatibility measures for an airport influence area can be applied. By creating an airport overlay zone, the underlying zoning criteria for property within the airport influence area can be modified to ensure compatibility with the airport, yet be applied without modification elsewhere in the community. In this way, the need to create an “airport industrial,” “airport commercial,” or other such classifications specific to the airport influence area can be avoided.

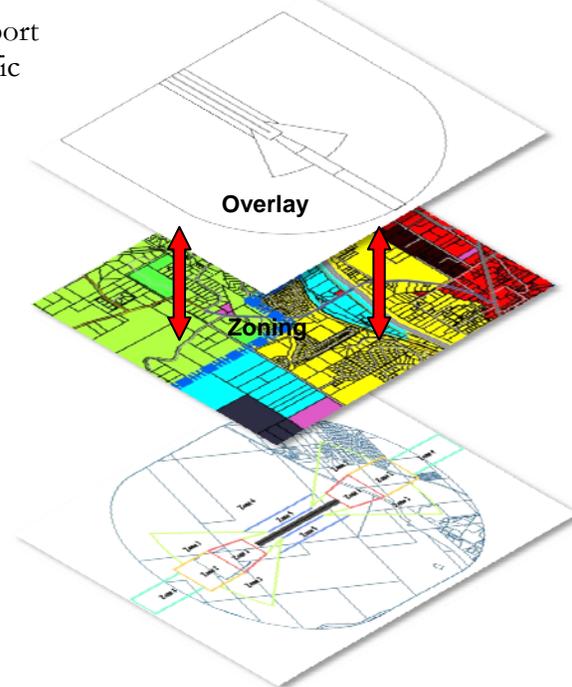
As an example, commercial and industrial uses are generally compatible with airports, but some of these uses may include features that would be incompatible. The use might involve high numbers of people, be too tall, be highly noise sensitive, or generate smoke, all of which would be unsuitable for the airport environs. An airport overlay zone can prevent new development that would contain these features.

Height limits established to implement FAR Part 77 airspace protection standards are a prime example of airport overlay zoning. However, an airport overlay zoning ordinance that fully addresses airport land use compatibility matters must contain more than aviation-related height limits. It also needs to ensure that land use development is compatible with the noise and safety impacts of airport activity.

Critical Concept!

To be successful in implementing both an airport overlay and traditional zoning, the two strategies must have and maintain a give-and-take relationship. This means you cannot change the underlying zoning without due process or cause, such as a change in circumstance or operations. Jurisdictions should establish a clear record of their methodology and goals regarding efforts to achieve a more compatible environment through the use of both tools.

Symbiotic Relationship



How can an *Airport Overlay Zoning Ordinance* be used to promote airport land use compatibility?

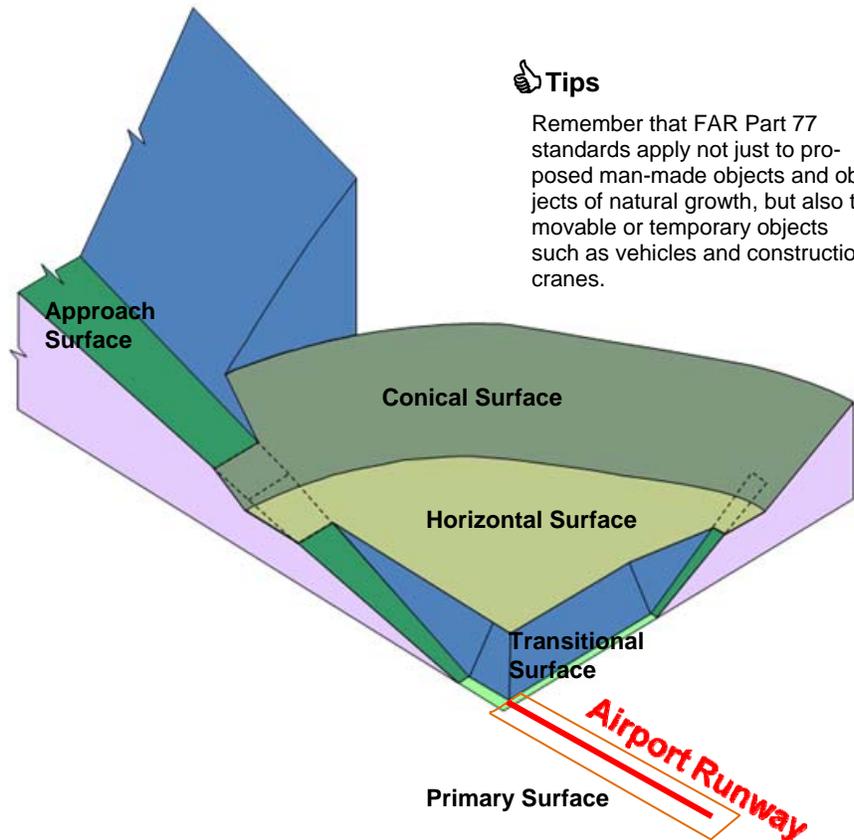
Use the airport overlay to prohibit or restrict land use features and activities within underlying zoning districts where those features or activities would be incompatible with the airport or create unsafe operating conditions. Use the overlay to address issues such as:

- Tall structures and development that would penetrate critical airspace surfaces within airport influence area.
- Stormwater or other facilities (such as stormwater or agricultural operations) that may attract hazardous wildlife. The overlay may direct staff to use a specific standard such as the Washington Aviation Stormwater Manual.
- Special function uses, such as facilities that produce interference with air navigation (i.e. smoke, electromagnetic interference).
- High-intensity land uses, such as schools, places of worship, and sporting arenas.
- Above-ground bulk storage of fuel, explosive, or hazardous chemicals within the airport approach or other sensitive areas.
- Noise-sensitive uses.
- Reflective building materials. The overlay may suggest reducing light and glare by limiting the type of materials or requiring special conditions such as downward shaded lighting equipment.
- Promoting compatible uses such as mixed use.

Airspace Protection / Height Limit Overlay

The Federal Aviation Administration's Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*, establishes standards for determining obstructions to the airspace necessary for safe aircraft operations. To do this, the regulations define a set of airspace protection surfaces referred to as "imaginary surfaces." The sizes and shapes of the surfaces are determined by the airport's runway configuration, the weight of the aircraft each runway can accommodate, and the type of approach procedure (visual, non-precision, or precision) at each runway end. There are five types of surfaces:

- ♦ **Primary Surface.** It is longitudinally centered on a runway and, if the runway is paved, extends 200 feet beyond the runway ends.
- ♦ **Approach Surfaces.** These surfaces begin at the end of the primary surface and extend from 5,000 feet to as much as 50,000 feet if the runway has a precision approach. The surface slopes upward at a horizontal-to-vertical ratio of 20:1, 34:1, or 50:1.
- ♦ **Transitional Surfaces.** These surfaces are situated along the edges of the primary and approach surfaces. They have a slope of 7:1 running at right angles to the runway centerline.



👍 Tips

Remember that FAR Part 77 standards apply not just to proposed man-made objects and objects of natural growth, but also to movable or temporary objects such as vehicles and construction cranes.

- ♦ **Horizontal Surface.** As the name suggests, this surface is a horizontal plane. Its elevation is 150 feet above the highest point on the airport runway(s) and it extends either 5,000 or 10,000 feet from the runway.
- ♦ **Conical Surface.** Extending outward and upward from the periphery of the horizontal surface, the conical surface has a slope of 20:1 for a horizontal distance of 4,000 feet.

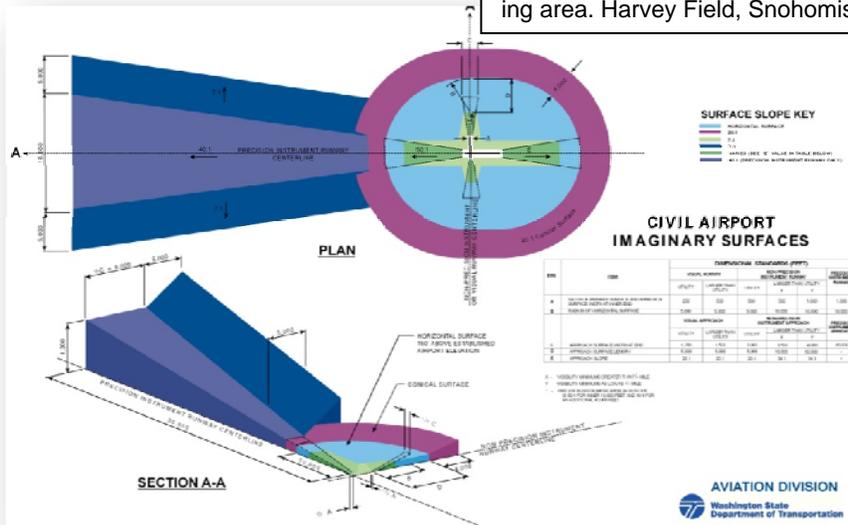
Objects that are too tall may constitute airspace hazards. By holding objects to heights that remain below the FAR Part 77, land use jurisdictions can ensure that constraints are not placed on the length of the runway usable for aircraft takeoffs and landings or on the runway's instrument approach procedures.

Did You Know?

The FAA relies on local jurisdictions with land use authority to keep critical airspace clear of obstructions. If jurisdictions permit tall structures within the approach of their community airport, it may limit the airport's ability to develop a more sophisticated instrument approach in the future.



Airspace obstructions, as seen above, can severely limit the utility of an airport by displacing the runway's threshold and limiting the allowable landing area. Harvey Field, Snohomish County, WA



See Appendix D for a diagram of FAR Part 77 imaginary surface and a chart of the surfaces' dimensions

How can an Airspace Protection / Height Limit Overlay be used to promote airport land use compatibility?

Use the airspace definitions provided in federal law to identify Part 77 surfaces for your airport, and include in the development regulations language that prohibits penetration of these surfaces. Provide a map and instructions to assist community members, airport managers, and planning staff with implementing the regulations.

Click here for the airspace assessment worksheet. (To be added)

Airport Noise and Safety Overlay

This component of an airport overlay zoning ordinance can cover a wide range of compatibility criteria. For example, the standard zoning designation for a property could be modified to enhance airport compatibility by:

- Requiring extra sound insulation if the commercial or industrial building is in a high-noise location.
- Restricting the amount of outdoor living space for multifamily residential uses.
- Prohibiting dining or assembly spaces in facilities situated where accident risks are high.
- Limiting the number of occupants in a building.
- Limiting the building footprints on large sites to encourage open land.
- Requiring that the building have sprinklers or other features to enhance safety in the event of an aircraft accident.
- Prohibiting storage of large quantities of hazardous materials.



Also see Noise and Safety Tools later in this chapter.

Other Types of Zoning Ordinances

Form-Based Codes

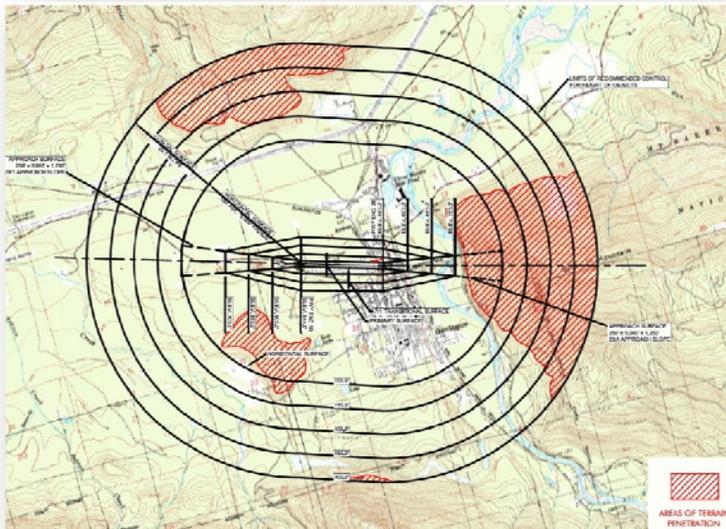
Form-based zoning codes differ from traditional zoning in that they focus on the size and shape of buildings rather than on the way the land is used. The codes often include drawings illustrating how buildings should relate to the public spaces around them. While not highly widespread in application, form-based codes are becoming more common particularly for the more highly developed, core areas of cities and where redevelopment to more intensive uses is desired.

How can *Form-Based Codes* be used to promote airport land use compatibility?

Form-based codes have pluses and minuses in terms of their relationship to the objectives of airport land use compatibility planning. They might be beneficial in setting height limits, defining building types that offer better protection in the event of an aircraft accident, and in setting criteria for open land areas where an emergency landing could be made. On the other hand, they typically do not address occupancy types that are at the heart of conventional zoning and compatibility planning. Nevertheless, by incorporating provisions addressing usage intensities and noise sensitivity, form-based codes could be an ideal mechanism for promoting airport land use compatibility in urban communities.

Wireless Communication Facilities Ordinance

In the last decade, Washington State has seen an unprecedented growth in wireless communication facilities. Unfortunately, most jurisdictions lack development regulations governing the siting of wireless communication facilities communication towers and other tall structures that can be hazards to aviation. Wireless communications antennas—because of their height and relative inconspicuousness from a fast-moving aircraft—can adversely affect airport airspace. The frequent location of these facilities on ridge lines and other high terrain can pose conflicts with aviation airspace even when situated well away from an airport. The potential for electronic interference with aircraft communications also should be examined in the siting of the antennas.



How can a *Wireless Communications Facilities Ordinance* be used to promote airport land use compatibility?

Jurisdictions can craft ordinances to address the siting of wireless communication facilities. Ordinances can be designed to minimize obstruction of critical airspace by allowing their construction in safe and appropriate areas, and thus discourage their placement adjacent to aviation facilities.

Jurisdictions should:

- Work with stakeholders to identify pre-approved areas for cell towers.
- Expedite the process for cell tower companies.

A wireless communications ordinance should include:

- A definition of wireless communication towers.
- Prohibit penetration of the FAA's FAR Part 77 "Imaginary Surfaces."
- Require co-location of communication facilities/structures to accommodate multiple communication antennas—new towers should not be built until it is demonstrated that no existing towers or structures (such as rooftops, water towers) can accommodate the equipment.
- Designate approved and prohibited locations
- Designate:
 - Maximum allowable height in geographic locations.
 - Setbacks.
 - Compliance with various standards such as the Uniform Building Code, National Electric Code.