Appendix H. Using Building Codes

In scenarios where land acquisition is not feasible and changes in zoning may be contentious, local governments may consider adding or changing local building codes to implement a series of development standards (such as requirements for down shielded lighting, trash containment, and noise insulation) intended to increase the compatibility of new uses in proximity to an airport.

Building codes are a set of regulations that set minimum requirements for how structural components, plumbing, heating, ventilation, air conditioning (HVAC), lighting, accessibility, and other elements should be designed and constructed for residential and commercial buildings. These codes are established to preserve the health and safety of the public. While some requirements are set at the federal level (e.g., accessibility requirements from the Americans with Disabilities Act [ADA] and safety requirements from the Occupational Safety and Health Administration [OSHA]), building codes generally fall under the purview of state and local governments. Since Arizona is a home rule state, codes are adopted and enforced by local governments.

Establishing and/or Updating Building Codes

Most local governments rely on model codes and standards that are established and made available by the International Code Council (ICC). The ICC produces 15 sets of modern building safety codes including the International Building Code (IBC) which is commonly used as a base from which local governments tailor standards based on local needs. Other sets of codes created by the ICC include the International Residential Code (IRC) and the International Mechanical Code (IMC), as examples.

Since building codes dictate the design and construction of development, local governments may choose to use them as the vehicle in which to require specific design elements that would increase the level of compatibility that a certain building or development would have with a nearby airport. As detailed in **Chapter 1: Airport Land Use Compatibility and Why it is Important**, there are five key characteristics to consider when assessing the level of compatibility that a particular use or development may have. A discussion of if, and how, each factor can be addressed with building codes is provided in the following sections. Since local building codes vary widely from one location to another, this appendix does not provide model building codes, rather information on how building codes may be useful and examples of their use, where available.

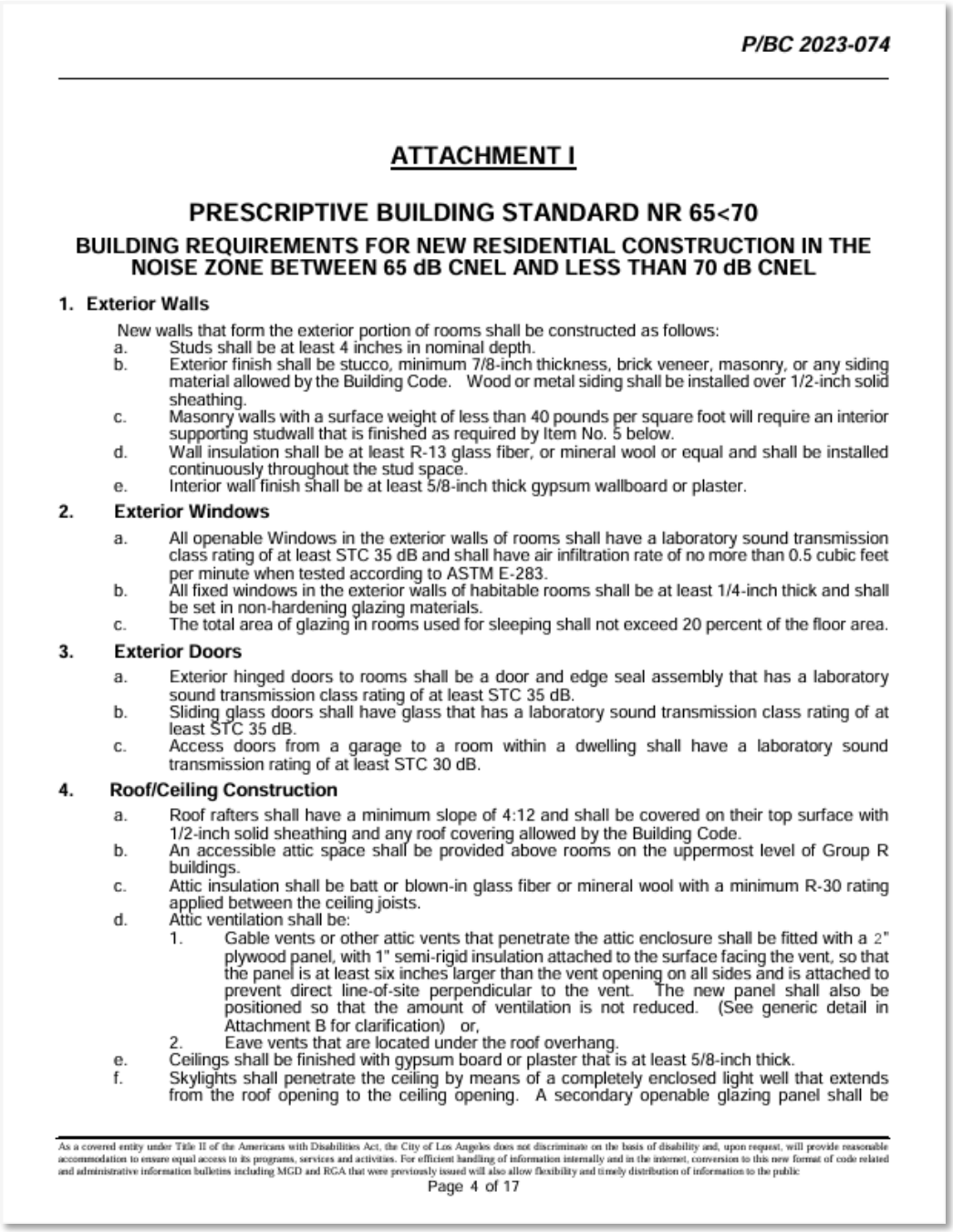
Noise

Ideally, zoning would be used prevent or reduce the development of noise-sensitive uses within areas exposed to significant aircraft noise; however, building codes can be used to increase compatibility of noise-sensitive uses near airports when they aren't otherwise prohibited. This is done by setting prescriptive building standards that specify the exact materials or methods of installation for specific building components, such as exterior walls, windows, doors, roofs, floors, ventilation, and fireplaces. As an example, a wall assembly may require a specified type of glass fiber insulation, thickness of gypsum board, exterior wall type and thickness, and more.

Building codes aimed at reducing noise may reference Sound Transmission Class (STC) ratings. This rating system is used to understand how much sound will be blocked from going through specific STC rated materials. Codes can specify materials or structure assembly of a certain STC rating be used to minimize the impact of aircraft noise, where appropriate. This includes windows, doors, and more.

If a community decides to adopt building codes to address aircraft noise, special considerations should be made for defining areas of significant aircraft noise, determining standards for building components to reduce noise exposure, and evaluating the costs and practicality for developers and builders to comply with construction standards. Options for defining areas of significant aircraft noise include using noise contours (if available) from an airport's latest master plan or noise compatibility study and the traffic pattern airspace depicted on an airport's public airport disclosure map (available from the Arizona Department of Real Estate) as examples. **Figure H-1** includes an excerpt of the building requirements for new residential uses around Los Angeles International Airport (LAX) which are subject to noise levels between 65 and 70 decibels (dB) using the Community Noise Equivalent Level (CNEL).

Figure H-1: Building Requirement for New Residential Construction in the Noise Zone Between 65 dB and 70 dB CNEL



P/BC 2023-074

ATTACHMENT I

PRESCRIPTIVE BUILDING STANDARD NR 65<70

BUILDING REQUIREMENTS FOR NEW RESIDENTIAL CONSTRUCTION IN THE NOISE ZONE BETWEEN 65 dB CNEL AND LESS THAN 70 dB CNEL

1. Exterior Walls

New walls that form the exterior portion of rooms shall be constructed as follows:

a. Studs shall be at least 4 inches in nominal depth.
b. Exterior finish shall be stucco, minimum 7/8-inch thickness, brick veneer, masonry, or any siding material allowed by the Building Code. Wood or metal siding shall be installed over 1/2-inch solid sheathing.
c. Masonry walls with a surface weight of less than 40 pounds per square foot will require an interior supporting studwall that is finished as required by Item No. 5 below.
d. Wall insulation shall be at least R-13 glass fiber, or mineral wool or equal and shall be installed continuously throughout the stud space.
e. Interior wall finish shall be at least 5/8-inch thick gypsum wallboard or plaster.

2. Exterior Windows

a. All openable Windows in the exterior walls of rooms shall have a laboratory sound transmission class rating of at least STC 35 dB and shall have air infiltration rate of no more than 0.5 cubic feet per minute when tested according to ASTM E-283.
b. All fixed windows in the exterior walls of habitable rooms shall be at least 1/4-inch thick and shall be set in non-hardening glazing materials.
c. The total area of glazing in rooms used for sleeping shall not exceed 20 percent of the floor area.

3. Exterior Doors

a. Exterior hinged doors to rooms shall be a door and edge seal assembly that has a laboratory sound transmission class rating of at least STC 35 dB.
b. Sliding glass doors shall have glass that has a laboratory sound transmission class rating of at least STC 35 dB.
c. Access doors from a garage to a room within a dwelling shall have a laboratory sound transmission rating of at least STC 30 dB.

4. Roof/Ceiling Construction

a. Roof rafters shall have a minimum slope of 4:12 and shall be covered on their top surface with 1/2-inch solid sheathing and any roof covering allowed by the Building Code.
b. An accessible attic space shall be provided above rooms on the uppermost level of Group R buildings.
c. Attic insulation shall be batt or blown-in glass fiber or mineral wool with a minimum R-30 rating applied between the ceiling joists.
d. Attic ventilation shall be:
   1. Gable vents or other attic vents that penetrate the attic enclosure shall be fitted with a 2" plywood panel, with 1" semi-rigid insulation attached to the surface facing the vent, so that the panel is at least six inches larger than the vent opening on all sides and is attached to prevent direct line-of-site perpendicular to the vent. The new panel shall also be positioned so that the amount of ventilation is not reduced. (See generic detail in Attachment B for clarification) or,
   2. Eave vents that are located under the roof overhang.
e. Ceilings shall be finished with gypsum board or plaster that is at least 5/8-inch thick.
f. Skylights shall penetrate the ceiling by means of a completely enclosed light well that extends from the roof opening to the ceiling opening. A secondary openable glazing panel shall be

Source: Los Angeles Department of Building and Safety, Sound Insulation Requirements for Noise Sensitive Structures Near Los Angeles International Airport, effective 01-01-2023.

Visual, Electronic, and Atmospheric Interference

Building codes can help protect against visual obstructions that impede the vision of a pilot or air traffic controller, particularly related to the creation of glare and light emissions.

The extensive use of reflective materials on the exterior of a building or structure can produce glare which can limit a pilot's visibility. This is particularly concerning when located within the air traffic pattern. To avoid hazards associated with glare, building codes could be established which prohibit the use of a completely reflective façade, such as that of mirrored glass. They could also be used to require non-reflective equivalent materials be used, such as non-reflective panels in solar panel installations. The intent is not to prohibit the use of a reasonable number of windows, doors, etc. but rather restrict large-scale use of reflective materials. In most cases, non-reflective materials can be sourced and used.

Several elements of light emissions can be addressed through building codes. Examples include requiring exterior lighting to be down shielded, limiting lighting intensity and flashing, and/or requiring the placement of lights in non-linear patterns near runways in order to not mimic runway lighting or other airport operational areas. Building codes often reference the Illuminating Engineering Society of North America (IESNA) when defining exterior lighting styles, such as full cutoff styles. Although not established for the protection of pilot vision, the Town of Huachuca City, AZ has established building codes which require exterior lighting be down shielded and prohibit searchlights, as shown in **Figure H-2.**

Figure H-2: Excerpts from Huachuca City Outdoor Lighting Regulations

18.125.030 General requirements.

A. Shielding. All exterior illuminating devices, except those exempt from this code and those regulated by Section 18.125.040(C), shall be fully or partially shielded as required in subsection C of this section.

1. "Fully shielded" shall mean that those fixtures shall be shielded in such a manner that light rays emitted by the fixture, either directly from the lamp or indirectly from the fixture, are projected below a horizontal plane running through the lowest point on the fixture where light is emitted.

2. "Partially shielded" shall mean that those fixtures shall be shielded in such a manner that the bottom edge of the shield is below the plane centerline of the light source (lamp), minimizing light above the horizontal.

18.125.040 Prohibitions.

A. Searchlights. The operation of searchlights for advertising purposes is prohibited.

Source: Huachuca City Municipal Code, Chapter 18.125 Outdoor Lighting Regulations, effective 04-27-2023.

Tall Structures

While building codes may address structure height, it is typically in reference to occupancy and how fire restrictive a building is. They are not typically used to define allowable heights of land uses like local zoning does. Zoning establishes maximum allowable height of structures in a defined area, but the design of the development (including height) is still subject to the local building and fire codes. In some cases, there may be overlap between building codes and zoning codes in the limitation of structure height, in such cases the most restrictive code should apply. Local government could explore the creation of building codes to restrict the

height of ancillary uses, such as roof-mounted antennas or wind turbines, but ultimately the allowable height on a given parcel will be subject to the allowable height established by local zoning. Since structure height is primarily controlled through zoning, no example code(s) are provided.

Population Density

While building codes could potentially be used to reduce the number of people exposed to aircraft noise or accident risk by setting reduced maximum occupancy levels for a building and requiring additional egress points for emergency use, controlling the population density of uses near airports is traditionally addressed through zoning, not building codes. Local governments across the state are required to meet the Arizona State Fire Code which is based on the 2018 International Fire Code (IFC). The IFC and building codes are used to set building occupancy and meet requirements for fire flow, fire department access, emergency lighting, fire protection systems, and occupant egress. Since population density is primarily controlled through zoning, no example code(s) are provided.

Wildlife Attractants

Regulating the characteristics of a land use which would make it attractive to wildlife (providing a source of water, food, or shelter) is best accomplished through local zoning. Requirements such as trash containment (e.g., lids on dumpsters), limiting the species of vegetation allowed for landscaping (e.g., fruit bearing trees and dense shrubbery), and limiting manmade bodies of water are achieved via zoning or another local ordinance. Since these regulations are primarily controlled through zoning, no example code(s) are provided.