

Tweed-New Haven Airport Authority's Residential Sound Insulation Program and Future Policy Considerations

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Issue

This report summarizes the history and status of the [Tweed–New Haven Airport Authority's Residential Sound Insulation Program](#), including the underlying federal law behind its creation and eligibility requirements. It also identifies future policy considerations for reducing the impact of aircraft noise on those living near the airport, including providing sound insulation improvements to additional homes that are not eligible under the current program.

Summary

Tweed's Residential Sound Insulation Program arose out of a voluntary, federally-funded Airport Noise Compatibility Planning Study the Airport Authority completed in 2012. As part of that study, a [486-page report](#) was produced that (1) established areas of significant noise exposure around the Tweed–New Haven Regional Airport and (2) presented proposals, such as the Residential Sound Insulation Program, for reducing the impact of noise in those areas. The study was conducted in accordance with federal law, which included participation by and consultation with the public, and was necessary in order to secure additional federal grants to support implementation of the program and other noise reduction measures.

The two principal components of such a study are Noise Exposure Maps (NEMs) and a Noise Compatibility Program (NCP). The NEMs identify land uses in the vicinity of an airport that are exposed to noise from aircraft operations that reach, generally, 65, 70, and 75 decibel (dB) levels, based on an airport's conditions that exist at the time of the study and projected

five years into the future. The NCP consists of strategies to reduce, mitigate, and prevent existing and future noncompatible land uses around an airport, in which the general measure of noncompatibility is exposure to aircraft noise in excess of 65 dB.

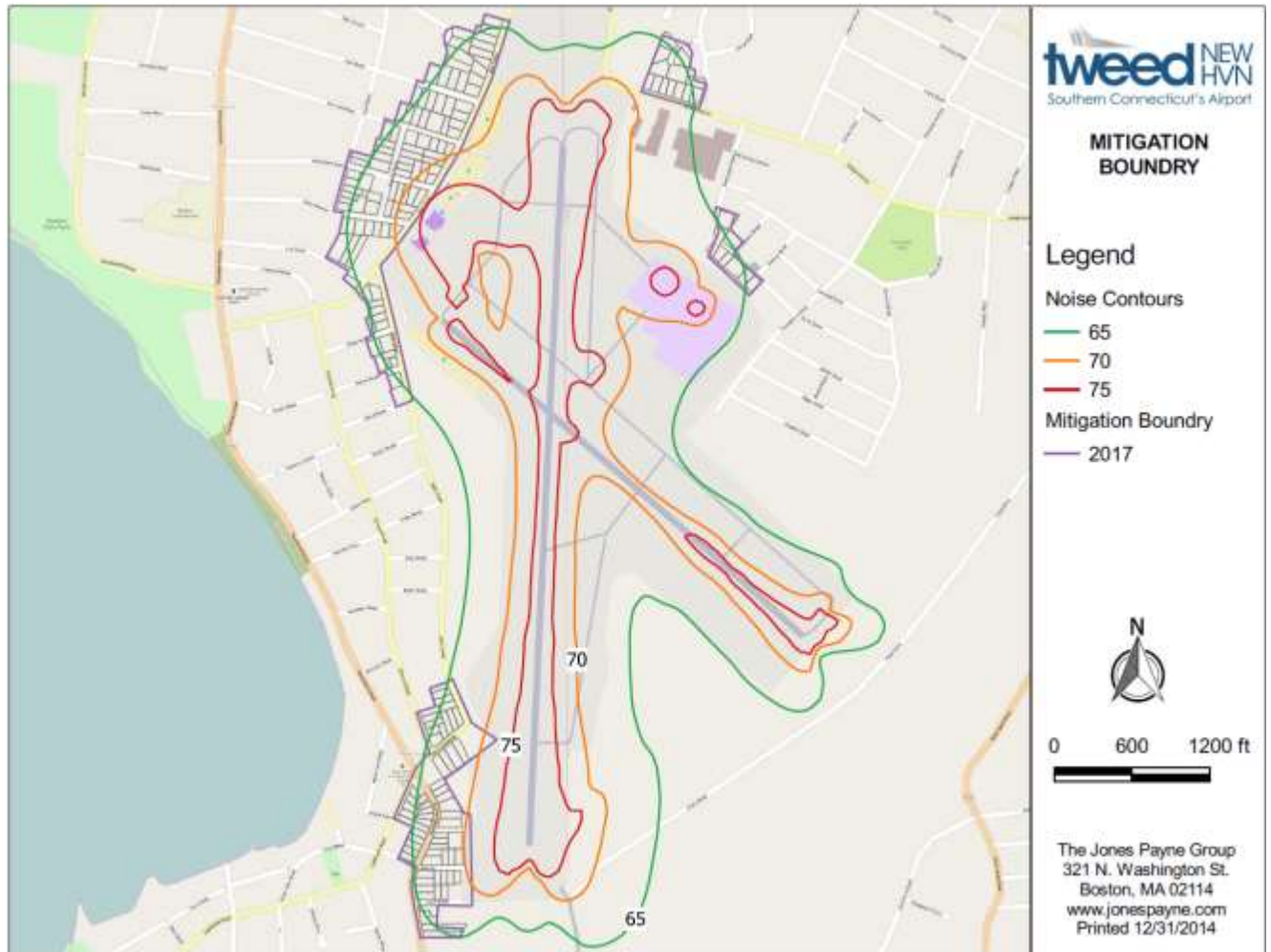
Tweed's NCP from its study contained 21 recommended actions, made up of six noise mitigation, ten land use mitigation, and five program management measures. The Federal Aviation Administration (FAA) reviewed Tweed's NCP and approved, in a [2013 memorandum](#), a majority of its proposals, including for a residential sound insulation program (see Measure L2), as being consistent with federal law.

The goal of a residential sound insulation program is to reduce the level of noise present outside of particularly-affected residences, which is generally 65 dB or greater, so that it is only felt as 45 dB inside the building. At such a level, the noise has only minimal interference with daily activities, such as telephone conversations, watching television, and sleep. The noise reduction is achieved by modifying parts of a residence, such as upgrading and caulking windows and doors, increasing attic and wall insulation, modifying structural venting, or adding an air conditioning system.

Full implementation of Tweed's Residential Sound Insulation Program is subject to several variables. Specifically:

1. **Funding must be secured.** The FAA's approval of the program assisted in securing federal financing, but it did not by itself constitute a funding commitment. The Airport Authority has had to compete to secure portions of available federal funding on an annual basis and to secure state and local matching funding as well.
2. **Applicable federal law must be satisfied.** Accepting federal funds requires complying with several federal legal requirements that affects who is eligible under the program. These generally include, with certain exceptions, that a residence is:
 - a. exposed to at least 65 dB of aircraft noise outdoors,
 - b. impacted by aircraft noise levels of 45 dB or greater inside the building, and
 - c. constructed before October 1, 1998.
3. **Program participation is voluntary.** Eligible residents are not required to participate in the program. Although many of the program's costs are covered by outside funding, participating residents are required to accept certain terms and conditions in the form of various contracts that some may choose to reject.

Under Tweed's program, 189 residences have generally been deemed eligible to participate, as depicted within the mitigation boundaries in the [following program map](#):



Individuals can enter their address on this [program webpage](#) to see if their residence may specifically be eligible.

Tweed's program roughly started in [October 2014](#) when the Airport Authority hired a consultant. Through 2018, 76 residences have received sound insulation and an additional 48 residences are expected to be serviced throughout 2019 (see this [program webpage](#)). The program is primarily funded by grants from the FAA, generally equal to 90% in accordance with federal law, with additional financial support from the State of Connecticut, City of New Haven, and Airport Authority (see, e.g., this [program newsletter](#)). From 2014 to 2019, the program received six grants from the FAA totaling approximately \$10.56 million (the grant information is available through this [FAA webpage](#)). Additionally, the FAA forecasted in 2018 an estimated \$29.13 million in grants for Tweed for the 2019-2023 period (see [Appendix A](#) of the latest [National Plan of Integrated Airport Systems Report](#)).

Beyond the existing program, there are several other policies that could further reduce the impact of aircraft noise around Tweed. For example, it may be possible to secure federal funding to insulate homes impacted by less than 65 dB in aircraft noise outdoors if East Haven and New Haven adopt a lower local standard for acceptable noise on residential land. Alternatively, Connecticut could independently fund a secondary sound insulation program that has eligibility requirements that are less stringent than the federal government. There are also many other actions proposed in Tweed's NCP and FAA's policy documents, such as erecting noise barriers or modifying the state building code, that could decrease the effect of aircraft noise.

Applicable Federal Law

Historical Overview

A number of federal statutes, regulations, policy statements, and other guidance materials address noise created by airports and consequently how sound insulation programs are constructed and funded. The foundation of much of the law governing airport noise is an [Aviation Noise Abatement Policy Statement](#) released by the FAA and the Department of Transportation in 1976. Principally, this statement identified 65 dB as the noise exposure level above which aircraft noise creates a "significant annoyance for most residents." [According to the FAA](#), the 65 dB threshold has been its noise goal in evaluating noise reduction projects since the statement's issuance.

In February 1980, the [Aviation Safety and Noise Abatement Act](#) (ASNA) ([49 USC 47501, et seq.](#)) was enacted to establish a process for identifying current and future noise problems around airports and for developing and implementing programs to resolve them. ASNA does this by, among other things, providing funding assistance to encourage airport operators to voluntarily develop NEMs and prepare and carry out NCPs.

In January 1981, the FAA began adopting regulations to implement ASNA (see [Federal Register Vol. 46 at 8316](#) for the initial version, which was then finalized in [Vol. 49 at 49260](#)). Titled "Airport Noise Compatibility Planning" and more commonly known as "Part 150" due to being codified in [14 CFR Part 150](#), these regulations establish procedures, standards, and methodologies for airport operators to use in preparing NEMs and NCPs. In particular, Part 150 identifies land uses which are normally compatible with various levels of airport noise, such as 65 dB being the level below which residential land use is generally compatible.

Additionally, the [Airport and Airway Improvement Act \(49 USC 47101, et seq.\)](#) was enacted in September 1982. It established the [Airport Improvement Program \(AIP\)](#) and authorized funding for airport infrastructure projects and airport development and planning, including NCPs under ASNA. Airports are entitled to a certain amount of AIP funding each year, based on passenger volume, and the FAA can supplement their entitlements with discretionary funding if more is needed. Certain projects, such as noise compatibility planning and noise mitigation, are discretionary priorities and there are formulas and requirements associated with the use of these funds. Airports must compete for discretionary funds each year and money is allocated to projects that would provide the greatest benefit. The Part 150 65 dB residential land use compatibility guideline generally forms the basis of eligibility for AIP-funding and an FAA-approved NCP is the primary vehicle for gaining federal funding approval. AIP guidelines additionally require, with exceptions, that noncompatible residences experience interior noise of 45 dB or greater to receive funding. AIP funds are drawn from the Airport and Airway Trust fund, which is supported by user fees, fuel taxes, and other similar revenue sources.

Noise Exposure Maps (NEMs) & Compatible Land Uses

[Appendix A to Part 150](#) sets out the requirements for creating an airport NEM. Under these regulations, aircraft noise must be measured in decibels based on a cumulative yearly day-night average sound level, which includes a 10 dB penalty on noise that occurs during certain night and early morning hours ([14 CFR § A150.3\(b\)](#); see also [14 CFR § 150.7](#)). Noise that reaches 65, 70, and 75 dB levels must be graphically represented as noise contours on an NEM ([14 CFR § A150.101\(a\)](#)).

Two NEMs must be prepared if an airport operator wants to submit an NCP for FAA approval ([14 CFR §§ 150.23\(e\)\(1\)](#) & [B150.3](#)). The first map must depict the airport's current conditions and, in effect, identify the airport's existing noise compatibility problems. The second map must project ahead five years in the future taking into account changes in land use and in airport operations, plus any improvements in compatibility from noise mitigation actions which may be planned for that five-year period ([14 CFR § 150.21\(a\)](#)).

Beyond presenting noise levels, NEMs must also contain and identify a number of other items as well, including noncompatible land uses within those noise contours ([14 CFR § A150.101\(e\)](#)). [Part 150's Table 1](#) sets forth guidelines relating types of land use to airport sound levels. It shows compatibility parameters for residential, public (e.g., schools, churches, nursing homes, hospitals, libraries), commercial, manufacturing and production, and recreational land uses.

A land use is generally compatible with the outdoor noise environment around an airport when the yearly day-night average sound level is at or below what is identified for that use in Table 1 ([14 CFR § 150.7](#)). Based on Table 1's guidelines, all land uses, including residential, are considered compatible at levels below 65 dB. For levels at or above 65 dB, different land uses are either permitted outright, allowed with recommended sound attenuation materials incorporated into the construction, or not recommended.

The regulations emphasize that its compatible land use sound levels are merely guidelines. Under Table 1, the regulations state that "responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses."

NEMs must be prepared in consultation with an airport's users, the public, local governments, land use control agencies, and the FAA ([49 USC § 47503\(a\)](#); [14 CFR § 150.21\(b\)](#)). Airport operators must update and revise their NEMs if there is a substantial increase or significant decrease in the noise contour over noncompatible land uses, which is generally considered to be a 1.5 dB change or greater ([49 USC § 47503\(b\)](#); [14 CFR § 150.21\(d\)](#)). Additionally, if NEMs used for an NCP are more than five years old, FAA requires that airport operators confirm in writing that the NEMs continue to be a reasonable representation of current or forecast conditions at the airport ([AIP Handbook Appendix R-7](#)).

Noise Compatibility Programs (NCPs)

The noise compatibility planning process is largely covered in Part 150 and an FAA advisory circular titled "Noise Control and Compatibility Planning for Airports" ([AC 150/5020-1](#)). An NCP sets forth the measures that an airport operator has taken or proposes to take to reduce existing noncompatible land uses and prevent additional noncompatible land uses within the area covered by its NEMs ([49 USC § 47504\(a\)](#); [14 CFR § 150.23\(e\)](#)). Its purpose is generally to seek optimal accommodation of both airport operations and community activities within acceptable safety, economic, and environmental parameters ([AC 150/5020-1](#)). More specifically, an NCP should develop and implement noise reduction techniques and land use controls that confine aircraft noise of 75 dB or greater to areas within an airport's boundary and maintain compatible land uses in areas affected by noise between the 65 and 75 dB contours ([14 CFR § B150.1\(b\)\(3\)](#)).

Both ANSA and Part 150 contain examples of possible NCP measures, which can be generally classified into three categories ([49 USC § 47504\(b\)](#); [14 CFR § B150.7\(b\)](#)). First are operational measures that relate to airfield or aircraft operations, including changes in runway use or flight track locations. Another category are preventative measures such as using zoning to stop new noise-sensitive land uses from occurring in the existing and future airport noise contours. Finally, there are remedial measures such as installing sound insulation to, or acquiring, existing noncompatible land uses.

Part 150 sets out various standards and requirements regarding what must be included in an NCP, such as a schedule for implementing the program and identifying the entity responsible for executing each proposed action as well as the sources of the necessary funds ([14 CFR §§ 150.23\(e\) & B150.5](#)). As is the case with NEMs, the general public and public agencies must be given an opportunity to participate in the development of an NCP ([49 USC § 47504\(a\)](#); [14 CFR §§ 150.23\(c\) & \(d\)](#)). NCPs submitted to the FAA must be acted upon within 180 days or, with the exception of flight procedures, the NCP's mitigation measures are deemed approved ([49 USC § 47504\(b\)](#); [14 CFR § 150.35](#)).

Airport Improvement Program (AIP) Grants

The federal government has, through AIP, made available millions of dollars each year for carrying out NCPs across the country (see, e.g., [49 USC § 47117\(e\)](#); [49 USC § 48103\(a\)](#)). FAA approval of an NCP however does not guarantee that its measures will be eligible for this federal funding ([14 CFR § 150.5\(b\)](#)). AIP grants are subject to several legal requirements, many of which are set out in the FAA's 586-page [Airport Improvement Program Handbook](#).

In terms of requirements affecting sound insulation programs, it is generally FAA's policy that only residences (1) located within the 65 dB contour on an NEM and (2) experiencing existing interior noise levels that are 45 dB or greater with the windows closed are eligible for funding ([AIP Handbook Appendix R-6 & R-8](#)). Additionally, a residence must generally have been built prior to October 1, 1998 ([Federal Register Vol. 63 at 16409](#)). However, there are several exceptions to these policies.

One exception, "block rounding," permits the inclusion of residences that are located just outside the 65 dB contour but that are on parcels contiguous to those within that contour and satisfy various other requirements, including that it is experiencing interior noise greater than 45 dB ([AIP Handbook Appendix R-9](#); [AIP Handbook Table R-2](#)). Another exception, "neighborhood equity," addresses residences that are located within the 65 dB contour but have interior noise less than 45 dB by permitting them to receive limited, less expensive

improvements, such as caulking and weather stripping, in certain circumstances ([AIP Handbook Appendix R-10](#); [AIP Handbook Table R-3](#)). Lastly, residences constructed after October 1, 1998, may be eligible for funding if there wasn't a published NEM at that time or if airport development created a new noncompatible land use ([AIP Handbook Table R-6](#)).

Beyond program eligibility requirements, certain other conditions apply as well. This includes that the federal government's share of program costs is generally 90% ([49 USC § 47109\(a\)](#)). Certain noise mitigation projects and costs are prohibited as well. For example, sound insulation costs cannot extend to making other improvements needed in order to comply with a building code ([AIP Handbook Table C-5](#)).

Additionally, fund recipients must accept various grant assurances which, among other things, require maintaining and operating airport facilities safely and efficiently (see, e.g., [49 USC § 47107](#); [FAA Grant Assurance webpage](#)). Recipients must also assure compliance with several federal statutes and regulations, such as the Americans with Disabilities Act and Federal Fair Labor Standards Act, and, for NCPs carried out on private property, enter into agreements with participating property owners that contain provisions specified by the Department of Transportation Secretary (see [AIP Grant Assurances for Airport Sponsors](#)).

Tweed's Residential Sound Insulation Program

Implementation Logistics

The Airport Authority has published several materials outlining how it has moved to implement Tweed's Residential Sound Insulation Program. Principally, it used the 2012 study to identify residences within the NEM's 65 dB contour and then had an acoustical consultant perform tests within those residences to determine their interior noise levels (see this [program newsletter](#)).

[According to the Airport Authority](#), residences with interior noise levels averaging greater than 45 dB are eligible for full acoustic treatments, while those with levels averaging less than 45 dB may be eligible for secondary treatments and ventilation. Primary treatments under the program reportedly include replacement of windows and doors, adding a layer of sheetrock to a wall or ceiling, ventilation upgrades and, in some cases, air conditioning. Secondary treatments may include adding insulation and sealing behind outlets or window sills, ventilation upgrades and, in some cases, air conditioning (see this [program newsletter](#)). Structural repairs, maintenance items, rehabilitation work, abatement of hazardous materials, environmental remediation, and weatherization not directly related to sound reduction are excluded from the program (see this [program webpage](#)).

Specific improvements are tailored to the characteristics of each home with program consultants working with each owner individually. Proposed improvements are reviewed for consistency with federal guidelines and by each homeowner before bid documents are prepared for construction. Program work is bid to insured, licensed, and bonded general contractors, and the contractor with the lowest, responsive bid is awarded the job (see this [program webpage](#)).

Work on the program has proceeded in phases (see, e.g., this recent [Invitation to Bid](#) on Phase 5) with priority given to residences exposed to 70 dB of aircraft noise (see this [program webpage](#)). According to the report for Tweed's study, an airport may be at various stages of completion of many phases at the same time.

For more information on implementing resident sound insulation programs, see the FAA advisory circular titled "Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations" ([AC 150/5000-9A](#)).

Participation Factors

There are several factors that may affect the decisions of eligible residents to participate in the program. This includes that participants must agree to certain contracts, including a [Participation Agreement](#) and an [Easement](#). The former largely sets out the terms and means of making the sound insulation improvements and the latter centrally grants the right of aircraft overflights in the airspace above the residence.

Certain participants may also be required to sign a [Waiver](#) because their participation may trigger the application of Federal Emergency Management Agency (FEMA) regulations. Specifically, residents located within FEMA-designated flood hazard areas may be required to elevate their residence or make other flood proofing measures. This is due to federal guidelines and a New Haven ordinance interpreting them that if the cost of all improvements to a residence, including sound insulation work, exceeds 50% of the market value of the building before improvements are made, then the residence must be brought into compliance with FEMA requirements for new construction.

The Airport Authority worked with City officials and the state Department of Energy and Environmental Protection to address how residents in the flood plain can participate in the sound insulation program and not be negatively affected by the FEMA requirements (see this [program newsletter](#)). Notably, the Participation Agreement contains a provision that sound insulation work will not be done if it would immediately trigger the FEMA regulations.

Beyond the terms of those contracts, another participation factor is the disruption that the installation could cause. The Airport Authority has estimated that the work typically requires seven to ten days in the residence (see this [program newsletter](#)). Additionally, [according to the Airport Authority](#), no other improvements may be done while the sound insulation work is going on.

Lastly, while the cost of labor and materials to install the sound insulation are covered by the FAA and others, residents may incur some other costs. This includes adjusting or replacing window dressings (e.g., blinds and draperies) if existing ones cannot be reinstalled, correcting a building code violation that impacts the sound insulation work, reconnecting alarm systems, and otherwise preparing the residence for the work. Relatedly, if residents made sound insulation improvements before the program, they will not be reimbursed for doing so (see this [program webpage](#) and [program newsletter](#)).

Future Policy Considerations

There are a number of other policies that could further reduce the effect of airport noise on residences around Tweed. These include changing local zoning rules for outdoor noise or creating a state-funded sound insulation program, among others as described below.

Expanding Federal Eligibility through Local Zoning

The FAA can consider an outdoor noise threshold lower than 65 dB if both the airport operator and jurisdictions with land use authority surrounding the airport formally adopt a lower local standard ([AIP Handbook R-6](#)). This policy potentially expands the number of residences around airports that are eligible for federal funding and reflects the fact that the federal government does not have control over local land use planning decisions. Rather, those decisions are solely within the realm of the states and municipalities.

It should be noted that Tweed's NCP included two zoning-related measures, L6 and L8. While neither measure suggested using zoning to adopt a noise threshold below 65 dB, the FAA in its approval memorandum acknowledged that such land use planning is within the authority of the City of New Haven and the Town of East Haven. (In Connecticut, municipalities have (1) general municipal and zoning powers and (2) the authority to adopt noise ordinances ([CGS §§ 7-148, 8-2, & 22a-73](#)).)

Notably, while the FAA may recognize a lower standard for outdoor noise, it will not recognize a local standard below 45 dB for interior noise ([AIP Handbook R-8](#)).

Creating an Exclusively State-Funded Sound Insulation Program

Connecticut could conceivably fund another sound insulation program without federal assistance, thereby bypassing the federal legal requirements that constrain the eligibility under the existing program. If such a program set a lower outdoor noise threshold, it appears that the Airport Authority may have some data from its study of the reach of noise below 65 dB (see, e.g., this [program newsletter](#)). However, if it could not create noise contours from that data or if a new study is needed, the study's report estimated that the cost to create a new map could range from \$50,000 to \$100,000. Based on the timeline of the study, it took roughly two years from hiring a consultant to conduct the study, collect data, and produce a program (the consultant was hired in late 2010 according to this [program newsletter](#) and the study's report was published in November 2012).

For the 76 residences that have received sound insulation under Tweed's existing program, the average cost per home has been between \$35,000 and \$40,000 (see this [program webpage](#)). The study estimated that program management fees are approximately 20% of construction costs. The [FAA estimates](#) that the costs of noise insulation can range from as low as \$2,000 to as high as \$50,000 per residence depending on the modifications needed.

Other Alternatives

There are several other options besides government-funded sound insulation that the State or local governments could take to reduce the impact of aircraft noise around Tweed. Tweed's NCP highlights several. For example, Measure N2 suggests studying the erection of a noise barrier. Measure L10 recommends modifying building codes to require the use of windows and doors with higher sound insulation ratings. Both of these measures were approved by FAA's memorandum, however, it is not clear if they have been implemented.

FAA's policy documents, such as [AC 150/5020-1](#), also set out several ideas for state and local governments (see Chapter 3, Sections 3 and 4). These include actions to reduce existing noncompatible land uses, such as acquiring impacted land and encouraging existing favorable land use trends, and strategies to prevent new noncompatible development, such as obtaining easements and transferring development rights.

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