



Noise Abatement Criteria Activity Category C Analysis

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- Activity Category C includes the exterior impact criteria for a variety of land use facilities.
- The approach NAC level for this activity category is 66 dB(A).

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■ Examples:

active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, golf courses, Section 4(f) resources, schools, television studios, trails, trail crossings

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- **Impact assessments will involve:**
 - **the identification of the land use through a field review**
 - **determination of whether exterior areas of frequent or potentially frequent human use occur that might be impacted by future traffic noise levels for the build condition that approach or exceed the NAC.**
- **If exterior areas of frequent human use for this NAC category are noted during the field review, detailed modeling of the receptor will occur to determine if an exterior noise level impact will occur.**

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- **The FHWA “Highway Traffic Noise: Analysis and Abatement Guidance” states that:**
 - **“the highway agency should develop a method to evaluate the number of receptors used to represent non-residential locations considering the use, potential use, and capacity limits of the activity area”**
- **It also introduces the concept of “equivalent residential receptors”**
- **Most DOTs (92%) have developed standard practices for identifying and placing non-residential receptors and equating them to residential receptors.**
- **Methods vary from state to state**
- **Some states use a single method while others use a combination of methods.**

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- **In general terms, the methods include to determine equivalent ERs:**
 - Method A (Single Point) – each impacted facility (pool, tennis court, ball fields, etc.) is counted as 1 equivalent receptor
 - Method B (Frontage Based) – equivalent receptors based on the frontage of a land use as related to the average residential frontage (ER = frontage length/average frontage length for residential properties)
 - Method C (Lot Size-Based) – equivalent receptors calculated based on the area of a land use as related to the average residential lot size (ER = parcel size/average parcel size of residential properties)
 - Method D (Grid Based) – grid based methodology to calculate equivalent receptors (ERs depend on the distribution over the parcel based using spacing based statewide data) (see example)
 - Method E (Usage Based) equivalent receptors calculated based on intensity of use, time of use, facility enrollment, capacity of the facility, and other use related factors (see example)
 - Method F (Combination) – combination of the above

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- Grid spacing example:
 - Determine the historic average barrier height – Say 16'
 - A 1 mile length of barrier would contain:
 - $5,280 \text{ feet/mile}(16') = 84,480 \text{ square feet/mile}$
 - Determine the historic average square feet/benefited receptor (residence) = say 1,400 sf/br
 - $(84,480 \text{ square feet/mile})/1,400 \text{ square feet per residence} = 101 \text{ feet per residence}$
 - Say 100 foot spacing
 - Number of ERs depends on the dimensions of the facility

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- **Sample to determine ERs based on the “Usage based” Method E**
 - State Data:
 - Persons per household = **2.48** (from Census data specific to the state)
 - Hours per day used by average household occupant = 8.67 (sleeping) + 1.80 (household activity) + .54 (caring) + .16 (homework) + 2.82 (TV) + .20 (telephone) + .6 (eating) = 14.49 say **15 hours per day usage per household occupant** (data can be obtained from Bureau of Labor Statistics)
 - Person hours per day = $2.48 \times 15 = 37.2$
 - Person hours per year = $37.2 \times 365 = 13,578$ person hours per year use
 - Pool example:
 - Assume a 3,500 square foot pool used 120 days per year 8 hours per day
 - Assume 50 persons using the pool per hour
 - $(120 \text{ days per year})(8 \text{ hours per day})(50 \text{ persons per hour}) = 48,000$ persons per year
 - $48,000/13,578 = 3.5$ ERs

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■ Placement of ERs for analysis

- Less than 50% of the states provide guidance on placement of receptors for impact analysis
 - Location specific – building or a defined location (picnic area, playground pool, etc.)
 - Using a point at the center with points closest to the noise source or around the boundary of the land use
 - Along a line defined by the frontage method
 - Along a line representing a linear land use (trail, bike path, etc.)
 - Land use location expected to experience greatest noise impact
 - Discrete location within interior rooms (classroom, hospital room, hotel room, etc.)
 - Uniformly distributed within a grid
 - Combination

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- **Place ERs within the property to reflect activity use**
- **Determine impacts based on receptors placement**
- **Determine the size of barrier required to take care of the impacts**
- **Determine the cost of the barrier**
- **Divide the cost of the barrier by the number of ERs**
- **Compare to the maximum cost per benefited receptor established by the state**



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