

Sound Planning for a Quiet House

by Gordon Tully

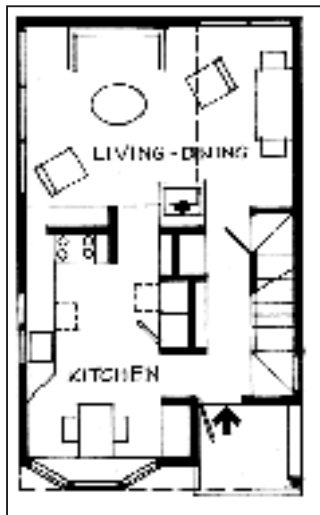


Figure 1. Although the 600-square-foot main floor of this house designed by Jeremiah Eck is open, the narrow openings between the kitchen and the living room effectively limit sound transmission. To complete the acoustic separation, doors could be added.

Most acoustical problems in residences can be solved with special construction: absorptive or sound-deadening materials, sealing, weatherstripping, double-stud walls, resilient channels, or additional mass. But good planning can complement these technical solutions.

Generally, there are four types of acoustical planning problems in homes:

- Separating quiet areas from sources of noise.
- Separating competing noisy areas.
- Masking sounds made in private areas.
- Making conversation easier to hear.

Separating Quiet and Noisy Areas

Many people follow good planning rules for protecting quiet spaces. For example, most designers know not to put living areas over bedrooms, especially in multi-unit buildings. The better plans are neatly divided into quiet and noisy zones.

If a noisy space and a quiet one must be close together, try to insert some kind of buffer between them, such as a hall, closet, chimney, basement stair, or bathroom. Enter the quiet area from a passage so that sound from the noisy room has to go around a corner to enter the quiet space.

But when noisy and quiet rooms must be side-by-side, use the best acoustical construction you can afford:

- Add sound absorption into the flooring system with a sound deadening board, such as Homasote (PO Box 7240, West Trenton, NJ 08628; 800/257-9491), or fiberglass batts.
- Make floor joists one size deeper than required.
- Use double walls or resilient clips, and acoustic batts.
- Seal all openings.
- Stagger electrical outlet boxes in party walls.
- Treat noisy spaces with acoustically absorptive material such as carpeting.
- Add plants along exterior walls.

Separating Competing Noisy Areas

Combining rooms in one large living space is a classic way to make a small home seem bigger and to save hall space. But such open planning usually creates acoustical problems. Most households are made up of people with differing schedules, habits, hobbies, and concentration levels.

If there is only one living area, one noisy activity such as television watching, piano practice, or conversation will drive out anyone not sharing in the activity. A bedroom or bathroom then becomes the only possible quiet retreat. In my plans, I insist on at least one secondary living space, such as a kitchen or eating area, that is acoustically separate from the main living area (see Figure 1).

In a small dwelling, separation requires solid core doors between the spaces. In larger houses, acoustically separate spaces can be partly open to each other. But either there must be sufficient distance between the areas, or they must be around a corner from each other (see Figure 2, previous page).

Bays, nooks, or alcoves within a room also create areas with some acoustic and visual separation. This kind of partial separation is ideal for small kids, who want to be part of the larger group but who need an area of their own. It also helps large groups break up into smaller ones.

Masking Sounds Made in Private Areas

Bathrooms and adult bedrooms are sources of sounds that can arouse anxiety or curiosity in both producers and listeners.

For the most part, these sounds are not very loud, so the chief culprits are proximity and line-of-sight transmission. Keep bathrooms and adult bedrooms far enough away from potential listeners and the problem disappears. Plan so that the bed can be placed on a neutral or outside wall, instead of a

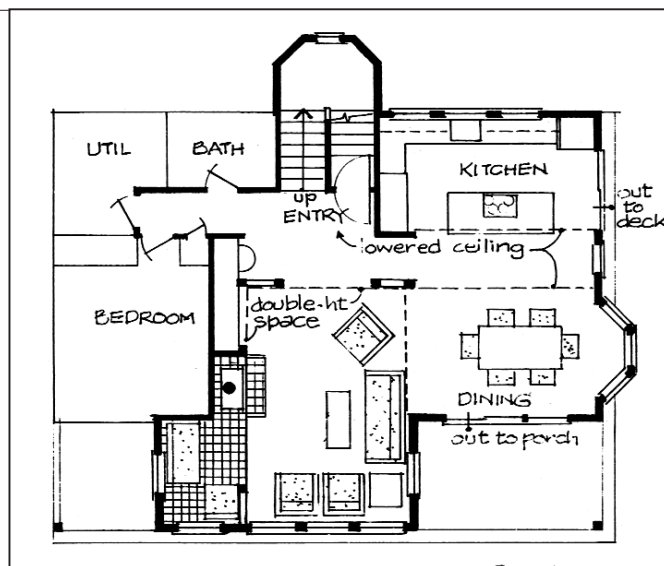


Figure 2. Despite its size, this house offers little acoustical privacy because of its open floor plan. While the living, kitchen, and dining areas are visually distinct, they form a single acoustical space.

wall adjacent to another bedroom or to public rooms, to cut down on sound transmission through the wall.

On the other hand, if a room is made acoustically private by technical means, it can be located quite close to noncompatible uses, providing it is reached through some sort of neutral space, such as a hall. A good way to create a sense of isolation is to tuck the door around a corner. Even if you end up right next to where you started, needing to go around a corner or two will make the space feel more private.

Visual and acoustical privacy are linked. For instance, if you can see the bed when you pass the door of an adult bedroom, any sense of privacy will be compromised not only by the real line-of-sight sound transmission but also by the short and direct visual connection to the source of noises. One also has the sense that should the door open, there is no "second line of defense," and this tends to make the acoustic problem seem worse than it is. The same principle prohibits a bathroom door that opens directly off any area where people sit. Bathroom doors are best put around a corner or down the hall.

Making Communication Possible

There are some situations where you want to encourage sound transmission.

Hearing baby in the night. Many parents insist that a young child's bedroom be near theirs, so they can hear the child if it cries at night. Unfortunately, this runs counter to the need for privacy in the adult bedroom.

The sound waves from high-pitched sounds, such as a child's cry, can travel in straight lines through doorways. Low frequency sound waves, however, are larger than a doorway, so they tend to spread out and dissipate whenever they pass through one. Thus you can hear a

child from quite a distance if the sound travels in a straight line, while it might be hard to hear a child in the next room if the sound must turn several corners.

This makes it tempting to create a line-of-sight path for sound between the parent's bedroom and the baby's. But since this problem only occurs for a short time in the life of most families, I recommend planning the house for privacy and simply using an inexpensive intercom system — one-way "baby monitors" cost less than \$40 — until the child gets old enough to be safely out of earshot.

Taking the noise out of dinner time. Communication is difficult within a room if all its surfaces are hard, particularly if it's a busy room. This problem often crops up in kitchen eating areas and dining rooms, where the room's small size, lack of sound-absorbing materials, and high level of activity can make hearing table conversation a strain. In general, the smaller the room, the more absorption is needed. One amenity, which should be required in every home, is an acoustical ceiling or panel of some sort over the dining table.

How to Choose

In a custom home, acoustical needs can be addressed precisely, as long as the owner is able to look at plans and picture what life will be like in the new home. In the more usual case of a house built from stock plans, the designer must imagine lots of possible and typical needs, and plan for these. When in doubt, plan for more acoustic privacy. Quiet is an inexpensive luxury of which even the rich are often deprived through bad planning. ■

Gordon Tully is an architect practicing in Cambridge, Mass. He also teaches at the Harvard Graduate School of Design.