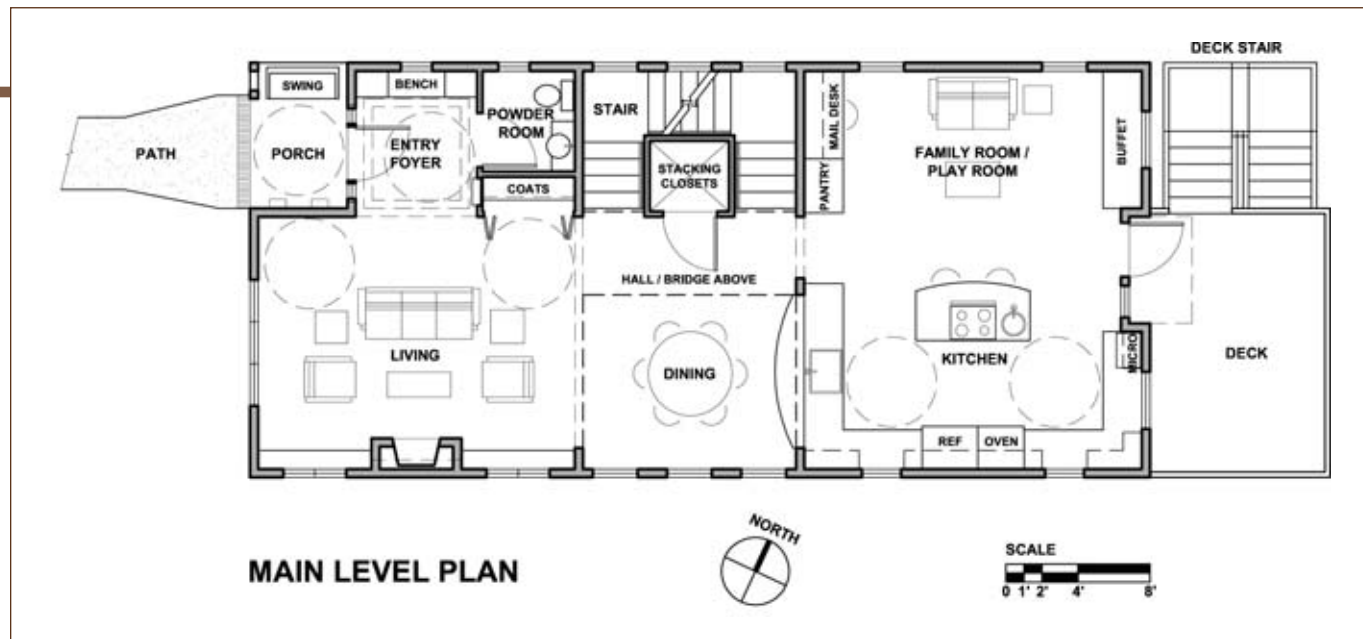


# Housing In Response To The Human Life Span

a test house in Seattle's Green Lake neighborhood

Emory Baldwin, AIA



MAIN LEVEL PLAN

## Background

A number of trends in our society contribute to a growing incompatibility between people and their housing. The average household composition in the United States is becoming increasingly varied as our society becomes more diverse. The traditional household makeup has expanded to include elderly relatives, caregivers, and unrelated adults. The rapidly aging American population and longer life expectancies are leading to a greater number of people with physical disabilities. Additionally, housing prices are high for new buyers, while many empty nesters have more space than they need. Unfortunately, conventional housing stock generally does not respond to these problems.

Such trends demand a new approach to designing environments, which would better accommodate peoples' chang-

ing situations and their varying abilities. By designing flexibility into homes from the beginning, it is possible to reduce one's need to move to a new home and also prevent an elderly person's premature move to an institution. By designing a home's layout and structure to allow for a number of varied floor plans, it may be easily modified when the need arises. This approach would reduce potential remodeling costs and waste, increase the marketability of the home, and contribute to more stable and sustainable communities.

## Intent

My aim was to design a new house for my growing family that would demonstrate "The Principles of Universal Design," life-span design, and flexibility, so that it could allow for the various changes that people are likely to experience over the course of their lives. The project was intended to prove that the above concept can be built economically and aesthetically, so that it would be appealing to the mass population and be within reach financially of the average family. It was essential to prove that the home could be easily built by a typical contractor. Another intent was to ascertain what features would be expensive or inefficient in terms of cost or space, and also to try to discover any hidden problems with universal design features.

As a model home, it would be available for others to visit,

by appointment, so as to educate other designers, owners, and builders.

## Process

The following guidelines were developed and incorporated into the design of the home, to make it flexible enough to support a person throughout his or her life span:

### Location Near Amenities

The feasibility of a home designed for one's lifetime depends in large part upon the nearby location of a range of amenities that would provide services and opportunities for recreation. Such amenities would include medical clinics, pharmacies, grocery stores, activity centers, libraries, schools, parks, and public transportation. The availability of in-home services, such as home delivery of groceries, house visits by health care workers, special transportation, house cleaning, maintenance, and repair, would also be extremely helpful to elderly persons, people with disabilities, or people with busy careers. Access to friends, family, and society is important as well.

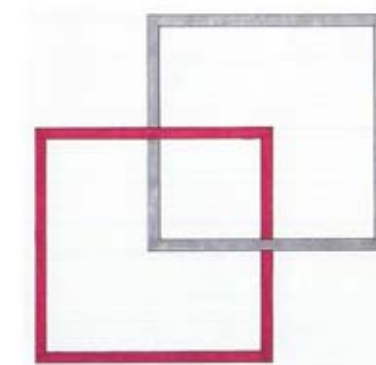
### Distinction Between Primary And Secondary Functions

Separate the core spaces from those that are only needed temporarily, so that secondary areas may be visually defined and

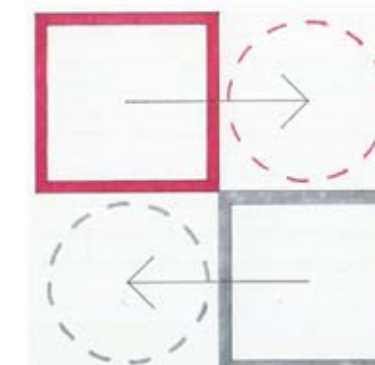
## synopsis

The life-span design applies "The Principles Of Universal Design" and flexibility so that it could allow for the various changes that people are likely to experience over the course of their lives.

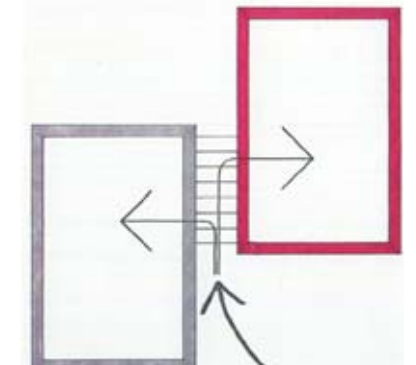
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Distinguish Primary and Secondary Functions



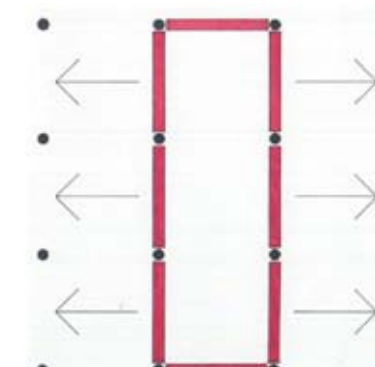
Private Outdoor Space



Private Entrance for Accessory Area



Central Vertical Circulation Core



Flexible Layout



Minimization of Load Bearing Walls

differentiated from the primary homeowner's realm. This separation also works to create privacy between primary and secondary areas.

### Varying Amounts Of Secondary Space

The amount of space that a household requires changes over time. By allowing the dwelling to be divided in a number of ways, the primary occupant can rent out or rezone space as needs evolve.

### Private Outdoor Space

The primary and secondary parts of the dwelling should each have their own private outdoor space. Such a space should provide privacy not only from the street and alley, but also from other parts of the building. We included a private patio for the basement.

### Private Entrance For Accessory Area

Both work areas and accessory apartments should be accessible without entering the zone of the primary homeowner.

### Central Vertical Circulation Core

Both the stairway and the dedicated vertical shaft (stacking closets which can be converted into an elevator) should be centrally located within the home, and near the entrance. The two means of vertical circulation should be closely associated with each other, so that one is not further away or more difficult to access than the other.

### Areas For Future Expansion

The inclusion of a sunroom, courtyard, attic, or basement provides the option for future inward expansion. The incorporation of such unfinished spaces in the original design makes future additions less expensive and raises the value of the dwelling.

### Flexible Layout

Living arrangements and needs change over time. Allow the building to be flexible so that the layout may be easily changed, and an area can be used for different functions over time.

**"By designing flexibility into homes from the beginning, it is possible to reduce one's need to move to a new home and also prevent an elderly person's premature move to an institution."**



### Minimization Of Load-Bearing Walls

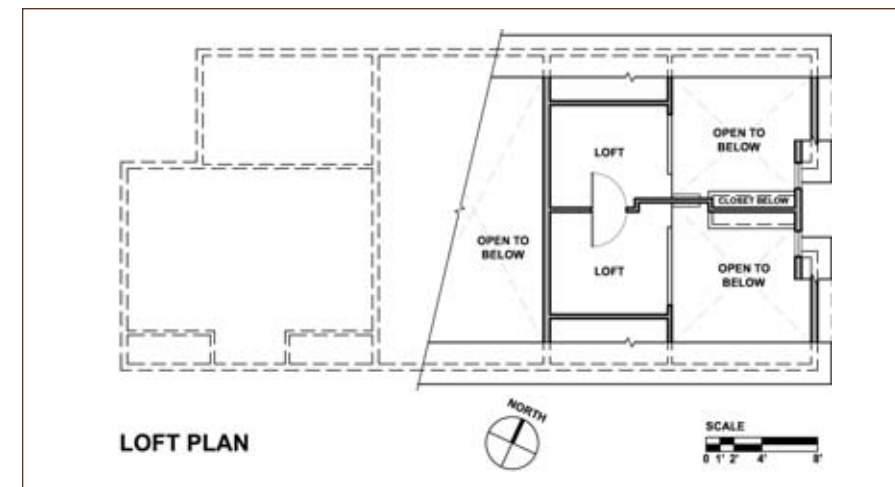
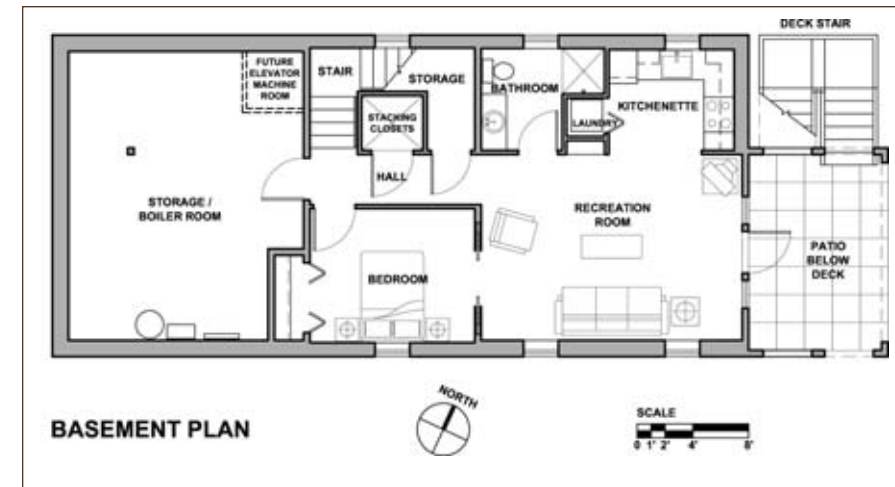
Use a post-and-beam, or structural panel, system in order to maximize the level of flexibility of the building. Large areas of load-bearing wall inhibit the building's ability to change over time.

### Construction

The construction of the house took 10-1/2 months (3-1/2 months more than the contractor's estimate). Although we lived next door to the construction site, it was still challenging at times to keep on top of the contractor, especially when I needed to be out of town for some reason. The contractor generally did a good job on the house, but a few items had to be re-done in order to meet the correct design intent. Some mistakes were made (such as plumbing for the kitchen sink being in the wrong place) which reduced the extent to which the house was universally designed. However, most things turned out according to plan, by my careful checking of the work as it progressed.

### Design Overview

The home is an "urban infill" project in the Green Lake neighborhood of Seattle, Washington. It is a three-story house including a finished basement. The home is designed to promote "aging-in-place" and is an urban response to the otherwise suburban ranch-style house. Both the main floor and the finished basement (which is designed as a mother-in-law apartment) are accessible. (The main floor is accessible from the front sidewalk, while the basement is accessible from the rear alley.) All doors throughout the house are wide (3 feet) for enhanced maneuverability, and the house has many univer-



sally designed features throughout, including level thresholds at all exterior doors, and curbless showers. All bathrooms in the house have base cabinets on casters that roll away when not needed. This allows accessibility for people in a seated position. Three stacking closets are framed, sized, and wired for a future elevator so that the house can accommodate the resident's changing needs and abilities down the road. The upper level of the stacking closets is currently used as a "reading nook" for bedtime stories. A large vertical open space connects the dining room of the main floor with the bridge of the upper floor. The bridge, in turn, connects the master suite with the children's bedroom area.

### Detailed Description Of The Home

To make up for the frequent gray Seattle weather, we made the house seem light and welcoming, by implementing a three-pronged approach:

1. Incorporating many windows for natural lighting, and carefully positioning them to allow for maximum privacy from the neighbors. We also put in several interior windows, to borrow light from other rooms.

2. Using bright, cheerful paint colors on the walls.

3. Adding extra light fixtures, both to give us ample levels of lighting when needed, and also to give us flexibility in which kinds of lighting we can have on, depending on the situation.

Although our lot is narrow (only 33 feet, 6 inches wide), the house feels spacious due to its open layout. We created a center "hub" with a high vertical space over our dining room to enhance the sense of openness. It has also made it easier to communicate with people between floors. Additionally, we added adjoining lofts looking over the girls' bedrooms. A door between them has locks on both sides so that both girls have to agree to have it open.

Recognizing that our needs will change



over time, we have created flexible spaces. For example, the basement is designed to be a comfortable mother-in-law apartment. However, it is currently used as a large home office and exercise room, and we plan to use it as a recreation room when the girls are older. The structure of the open space is designed to accommodate another room, if it is ever needed in the future. The room adjacent to the kitchen is currently a play area, but in the future it can be used as a family, music, or dining room.

### Features

The following universal design features are included in the house:

- Level paths from both street and alley
- No threshold entries at all exterior doors: Good for wheelchairs, walkers, canes, strollers, and unsteady legs
  - Fold-down package shelf at front door (This is handy when carrying bags)
  - Three-foot wide doors throughout (with maneuvering space beside most doors)
  - Lever handles on all doors: Easy to open with closed fist, or while holding key, bags, or children
  - Loop handles on all cupboards (easy to open with closed fist)
  - Pull-out drawers in cupboards and pantry
  - Open plan layout for enhanced maneuverability and communication
  - Reduced hallway lengths
  - Wide hallways (42 inches wide and 52 inches wide at the two short halls that were included)
  - Low-pile carpeting, with no loose carpets (to reduce tripping hazards)
  - Radiant floor heating: Avoids obstacles, reduces burns,

good for allergies, and nice even heat

- Stacking closets, for future elevator: Walls framed and wired per manufacturer's recommendations
  - Floor structure of closets is removable, independent from the rest of floor
  - Elevator pit built into foundation
  - Short runs of stairs (wrapping around elevator) to reduce injuries from falls: This is good for everyone, especially toddlers and elderly persons
    - Structure sized to allow future room to infill open space above dining room: Allows future flexibility
    - Wider clearances in kitchen (5 feet wide)
    - Most kitchen storage in base cabinets, in drawers, and pull-out shelves
    - Lower oven with racks lining up with countertop (and controls at 4 feet A.F.F.)
    - Accessible countertop microwave
    - Induction cooktop (electro-magnetic): Smooth surface for easy movement of pots and pans. Surface does not get too hot (safe for children, the elderly, etc.)
    - Veggie sink adjacent to cooktop, with pull-out spray for filling pots with water
    - "Floating" vanities in all bathrooms, supported by in-wall bracket system: Roll-away base cabinets on locking casters allow option for extra storage
    - TOTO Washlet bidet seats on toilets, with outlets near rear of all toilets
    - Lights over all showers
    - Curbless showers, with offset controls for caregivers
    - Handheld showers on adjustable rods
    - Blocking in all bathroom walls for future grab bars
    - Lowered thermostats throughout the house, with large numbers for easy viewing



The following universal design features were intended, but later deleted either due to cost, poor product selection, or the contractor's misunderstanding:

- Accessible kitchen sink with removable base cabinet on rolling casters
- Raised toe-kicks at kitchen cabinets
- Side-hinged oven
- Outlets are higher than typical, but not as high as intended

### Sustainable Materials

The main level has wood flooring made from the off-cuts of engineered beams, a sustainable and affordable alternative to hardwood or bamboo flooring. The stability of this flooring material works well with our radiant floor heating.

Used playground tiles under the deck were made from recycled tires which provides a soft-enough surface for falling on, but also a firm enough surface for a tricycle or wheelchair.

Our kitchen's backsplash was made from chalkboards salvaged from a local high school.

Other materials include Hardiboard siding, Trex decking, and water-efficient TOTO toilets.

### Results

We believe the finished house is a good example of an urban solution for an "aging-in-place" home. Our family uses all of the spaces well, and as they were intended. Some of the things that we like particularly best about the house are features that may seem intended for a person with a disability, but that make our lives easier as well. For instance, the gently sloping path to our front door (and the low threshold there) make it easy to push our children's strollers inside, and also makes it easier for my wife's grandparents to visit. The stacking closets are currently used as extra-



deep storage, and work well for stowing strollers without needing to collapse them. The upper level of the stacking closets is used as a "reading nook" for bedtime stories, and has been designed to be semi-open until the elevator is needed in the future.

### Conclusions

Generally, universal design features did not cost us too much more money. Lever handles, wider doors, and low-threshold entries have negligible cost. Spaces were planned to be very open, thus reducing the length of any hallways. The areas where extra cost was noticed were at the kitchen and bathrooms, as we had expected. Both were bigger, therefore adding immediate cost over a typical residential solution. Bathrooms required tile floors in order to allow for a seamless curbless shower. Kitchens required more real estate in order to make the oven, cooktop, and microwave accessible. Also, the way that cooking appliances are priced, we ended up paying at least twice as much to have the cooktop and oven separated, rather than buying them together as in a standard arrangement.

Overall, however, the additional direct cost for incorporating universal design was about \$9,000 (2 percent of the total construction cost). The house could have been reduced in size in order to reduce the total cost, but our personal preferences led us to the layout of the house as it now stands. **UHD**

### The Author

Emory Baldwin is an architect specializing in "aging-in-place" residences. He graduated with a Masters in Architecture from the University of Washington in 1997, where he wrote his master's thesis on "Housing In Response To The Human Life Cycle." Since then, he has been designing a range of residential projects, primarily senior housing and multi-family mixed-use developments. Emory and two of his colleagues have recently started their own architectural firm (ZAI Inc.), which focuses on universally designed residential environments that are flexible in plan so that they can accommodate the changing physiological and socio-economic changes that people are likely to experience over the course of their lives.

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