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For this project, I considered all of the design challenges to propose the best fit building I could design for the clients. This four-member family can enjoy their 750 square foot home. This design was made for allowing light to shine in the windows during the day. The house is located on the east-west axis and has most of the windows facing south to allow the maximum amount of natural light to penetrate the house.

Toolbase.org Building Technology:

Affordable Construction:

I will be using a shared wastewater treatment system. This is one complete system that is made for each house. This septic system uses a single drain field for a few houses. Shared wastewater systems are used especially for narrow shaped lots, just like my site. There will be three adjoining lots which can all use the shared wastewater treatment system.

Energy Efficiency:

I will be using compact fluorescent lamps. These are mini versions of regular fluorescent lights. These lights use an arc discharge through a phosphor lined tube. These CFLs are up to four times more efficient and last up to 10 times longer than traditional incandescent bulbs.

Land Use:

Low Impact Development practices can be used for storm water management. This site will have bio-retention cells which consist of grass buffers, sand beds, and a ponding area for excess runoff storage. This will help reduce the water flow off of the site. I will also require that the driveway is a permeable pavement surface which allows water to penetrate to replenish the soil underneath.

Universal Design:

In my kitchen, I will be using universal designed kitchen cabinets. This provides access to the cabinets for people with different ability, height, and age. This is true accessibility since anyone will be able to reach/access the cabinets.

Rules of Thumb:

Site Design Considerations

1. Minimizing my building's footprint. "A smaller footprint means less impact on the site. A sprawling one-story house takes up more of the lot than a two-story house of the same square footage. That leaves more room for plants and wildlife, and better absorption of rain and snow runoff. In addition, smaller houses use fewer materials and cost less to operate."
2. Know who you are designing for. This house is for a family of four people. Knowing that information, you can properly design the house to meet the basic needs of a four person family.
3. Figure out if this house will last for about 50 years. Does it fit into the environment while maintaining components that will help the house last the test of time?

Response to Climate and Solar Exposure:

1. Light colored paving materials used to reflect heat. This reduces the heat island effect. Paving with concrete will help increase reflectivity.
2. Use of trees to keep the summer heat away. Shade trees lower the cost of cooling the house. The shade provided will help keep the house cool in the summer. When the leaves fall off in the fall, and when the temperature drops, sun will be able to penetrate into the house, keeping it warm.
3. My building is located on the east-west axis. This lets the south side of the building acquire sunlight from 9am to 3pm during the heating season. The important rooms which are inhabited during the day are located on the south side of the building.

Dwelling Spatial Organization:

1. My open floor plan optimizes the passive system operation.
2. My kitchen "work triangle" measures 14' total. This is in the range of 13'-26'. This optimizes the efficiency and reduces cost of the kitchen due to The University of Illinois School of Architecture" that developed the work triangle to emphasize cost reduction by standardizing construction.
3. The work isle in the kitchen is 52", which is more than the minimum of 42". This provides a comfortable amount of space to work in the kitchen.
4. The sink has a minimum of 24" on one side and 18" on the other side to maximize prep space.
5. The fridge has a minimum of 15" of counter space next to it.
6. The stove has at least 12" free on one side and at least 15" free on the other side.

7. The space under the staircase will be used for storage. This will ensure a decent storage space that does not take up precious space in this house.

Design Considerations for Privacy:

1. Smaller windows in the bathroom provide extra privacy.
2. Bedrooms located on the second floor increases the privacy of their spaces.
3. Bathrooms are located away from high-traffic areas.

Development of Appropriate Technical Means for Envelope Design, Structural Design, and Building Systems:

1. There will be a 6/10 slope from the building foundation wall. This will slope away from the house at least 10 feet out from the foundation. This will also help with drainage by keeping the water away from the house.
2. Shared wastewater treatment systems between the three houses.
3. Fluorescent lights will save energy and money.

Building Cost Based on \$150/SF:

1. Reducing the number of corners on exterior walls to reduce cost.
2. Lowering the roof pitch by just 5% can reduce the roof cost by half.
3. Uninsulated garage saves 40% of the base cost of the garage.