

1. Identify the Problem

We will design an affordable home for a client using sustainable practices. Many community organizations are dedicated to providing simple and efficient housing for those in need of assistance. The guidelines for the Habitat Home, along with codes and a client survey, will serve as the constraints for the project. We will produce a client survey, create bubble diagrams and sketches, conduct site planning, identify water supply considerations, lay out electrical and plumbing systems, and complete water drainage calculations. The house will be modeled using 3D architectural design software. We will present our work in the form of a written report and construction documents, including floor plans, elevations, a section view, and a site plan.

2. Identify Criteria and Constraints

Size of the House:

- Two-bedroom 900 sq. feet
- Basement
- One bathroom (meets accessibility standards)

Type of Construction:

Basement:

- Basements access will be provided from the interior of the house. In addition, an exterior access will be provided to meet egress requirements.

Building Materials:

- Foundation drainage shall be provided. Drainage of the system shall be by gravity flow if the site allows it; by sump pump if the site requires it.
- Exterior wood frame wall construction will consist of 2X6 fully sheathed with ½-inch foam board insulation.
- Exterior concrete wall construction will conform to the systems manufacturer's recommendations for concrete wall construction.
- Roof construction shall consist of trusses @ 16-inch centers with 7/16 OSB rated panels.
- Roof pitch shall be approximately 5/12 (optimized to minimize waste) with gable ends.

Garage:

- Houses will not include a garage, or a carport unless required by city code, other restrictions, family health needs, or neighborhood considerations.

Accessibility:

Entrance:

- An accessible entrance with no steps and a porch or overhang.

Doors:

- Passage doors, including the full bathroom, will be 36 in. wide. If necessary, secondary bathroom doors may be 32 in. wide.
- All hallways will be 42 in. minimum frame to frame.

Kitchen:

- Kitchen will be designed to permit wheel chair maneuverability (5 ft diameter open area).

Bathroom:

- Wall reinforcing for grab bars in bathrooms. If the family requires grab bars in the bathrooms at the time of selection, they will be installed during the initial construction.
- At least one full bathroom must be accessible (meet accessibility standards).

Energy Efficiency:

Houses will incorporate energy conservation features, making them as energy efficient as practicable. Features of ENERGY STAR energy efficient houses are considered a model to be emulated, not a standard to be achieved at this time.

Insulation: The following describe insulation to be provided.

- Wood frame construction shall include exterior walls insulated to at least an R-19 value using fiberglass batt insulation and ½ inch insulation foam.
- R-38 blown-in insulation shall be used in ceilings.
- For the basement, the foundation walls will be insulated with 2 in. “blue board” foam insulation glued to the walls. A vapor barrier will be installed under the floor slab.

Doors and Hardware:

- Two steel clad entry insulated doors will be provided. Both doors will be 3 ft - 0 in.
- The primary entrance door shall be a 6-panel door with half-moon light.

Windows:

- All windows shall be white, vinyl, single hung, tilt-in, low e double pane.
- Screens shall be integral with the windows.
- Every bedroom will have at least one window and meet minimum egress requirements, as required by code.
- Kitchen/Dining room will have at least two windows or one double and one single window.
- If a basement is provided, an egress window will be provided as required by the codes.

HVAC, Washer/Dryer, & Plumbing: The following describes heating, ventilation, and air conditioning to be provided.

- Electric heat pumps (14 SEER units) will be provided for the heating and cooling system.
- A 40 gallon water heater shall be installed for a two bedroom house. (Basement)
- An area shall be provided for installation of a clothes washer and dryer. (Basement)
- Two hose bibs shall be provided on the home exterior.

Lighting: The following describes lighting to be provided.

- Ceiling light fixtures for incandescent light shall be provided in all rooms.
- A single fluorescent, switched fixture shall be installed in each closet.
- A light fixture shall be installed over the sinks in the bathroom and kitchen.
- The porches or entrance areas shall have exterior light fixtures.

3. Brainstorm Possible Solutions

Entrance:

- An accessible entrance with no steps and a porch or overhang.
- Two steel clad entry insulated doors will be provided. Both doors will be 3 ft - 0 in.
- The primary entrance door shall be a 6-panel door with half-moon light.
- The porches or entrance areas shall have exterior light fixtures.

Exterior:

- Exterior wood frame wall construction will consist of 2X6 fully sheathed with ½-inch foam board insulation.
- Exterior concrete wall construction will conform to the systems manufacturer's recommendations for concrete wall construction.
- Wood frame construction shall include exterior walls insulated to at least an R-19 value using fiberglass batt insulation and ½ inch insulation foam.
- Two hose bibs shall be provided on the home exterior.

Roof:

- Roof construction shall consist of trusses @ 16-inch centers with 7/16 OSB rated panels.
- Roof pitch shall be approximately 5/12 (optimized to minimize waste) with gable ends.
- R-38 blown-in insulation shall be used in ceilings.

Dining Room:

- Kitchen/Dining room will have at least two windows or one double and one single window.
- Ceiling light fixtures for incandescent light shall be provided in all rooms.

Kitchen:

- Kitchen will be designed to permit wheel chair maneuverability (5 ft diameter open area).
- Kitchen/Dining room will have at least two windows or one double and one single window.
- All windows shall be white, vinyl, single hung, tilt-in, low e double pane.
- Screens shall be integral with the windows.
- A light fixture shall be installed over the sinks in the bathroom and kitchen.

Bedrooms:

- All windows shall be white, vinyl, single hung, tilt-in, low e double pane.
- Screens shall be integral with the windows.
- Passage doors, including the full bathroom, will be 36 in. wide.
- Every bedroom will have at least one window and meet minimum egress requirements, as required by code.
- Ceiling light fixtures for incandescent light shall be provided in all rooms.
- A single fluorescent, switched fixture shall be installed in each closet.
- A light fixture shall be installed over the sinks in the bathroom and kitchen.

Basement:

- Basements access will be provided from the interior of the house. In addition, an exterior access will be provided to meet egress requirements.
- Foundation drainage shall be provided. Drainage of the system shall be by gravity flow if the site allows it; by sump pump if the site requires it.
- All windows shall be white, vinyl, single hung, tilt-in, low e double pane.
- Screens shall be integral with the windows.
- Passage doors, including the full bathroom, will be 36 in. wide.
- The foundation walls will be insulated with 2 in. “blue board” foam insulation glued to the walls. A vapor barrier will be installed under the floor slab.
- Electric heat pumps (14 SEER units) will be provided for the heating and cooling system.
- A 40 gallon water heater shall be installed for a two bedroom house. (Basement)
- An area shall be provided for installation of a clothes washer and dryer. (Basement)

Bathroom:

- Wall reinforcing for grab bars in bathrooms. If the family requires grab bars in the bathrooms at the time of selection, they will be installed during the initial construction.
- At least one full bathroom must be accessible (meet accessibility standards).

Garage:

- Houses will not include a garage, or a carport unless required by city code, other restrictions, family health needs, or neighborhood considerations.