



Finishing a basement to make additional living space in a house is a popular construction project for many homeowners.

Homeowners with some construction skills can often do the work themselves, or if a contractor or other person is hired, the costs are usually reasonable. The following information concerns building and zoning regulations, which must be considered before you start your project.

1. A building permit is required for finishing a basement. Electrical, mechanical and plumbing permits are also required, if any of these systems of the house are altered. The Zoning Department has regulations in addition to those of Code Administration; please contact Zoning at 540-394-2148 to learn their requirements/regulations.
2. To obtain permits, complete an application and submit plans/drawings, which show the work to be done. The Code Administration Office does not draw plans. It is the responsibility of the applicant to submit 1 set of plans, which are complete and show in detail, the scope of the work to be done.

### *What details are required on the plans?*

- Plans must be drawn to scale (minimum scale; ¼"=1'-0"), showing the width, length and other dimensions of the room(s) of the basement. The height from the floor to the underside of the floor joists above, must also be shown. Also, indicate the size and location of any beams, which project below the floor joists.
- Plans must show existing construction such as stairs and partitions, and the new proposed construction. Please show a typical wall section, indicating the studs to be used, the size and location of openings in walls, insulation in exterior walls and the interior finish (gypsum board, paneling, etc.).
- The use of the rooms must be indicated.
- Doors and windows must be shown and their sizes indicated.
- Equipment such as a furnace, sump pump or water heater must be shown and designated as either fuel burning or electrically operated. For fuel burning equipment, please indicate the BTU input requirements (shown on a label on the equipment).
- Existing electrical lighting, switches and receptacles, service panel, smoke detector, circuit for electric dryer or hot water heater, and other existing electrical equipment must be designated on the plans.
- New proposed switches, lighting, smoke detector(s), receptacles, GFCI protected receptacles, and any other electrical equipment must be indicated. Also indicate any new circuits, including the size of the circuit breaker (or fuse), and the size and type of the wiring.
- If you're installing a new kitchen and it's been pre-approved by Zoning, please attach a copy of the new kitchen layout.

Details of all new plumbing fixtures must be indicated on the plans. If the plumbing drain pipe, water pipes, and vent pipes were "roughed-in" at the time the house was constructed, please indicate the location of these. If you are installing new DWV piping, please indicate

the size, material and location of the new piping. Also, indicate where any new drain and vent piping will connect to the existing system.

- Indicate any alterations to the existing heating and ventilation system, such as the addition of new ducts and registers. Details of any new heating or air-conditioning system must be shown. Note; an exhaust fan for a new bathroom must discharge to the exterior of the house.
- New or moved gas lines require a riser diagram showing the type of piping and the size of the piping length of the runs. It will also need to indicate the BTU's and whether it's vented or un-vented.

## DEFINITIONS

**Ceiling Height** Ceiling height shall be the clear vertical distance measured from the finished floor to the finished ceiling. Habitable rooms, except kitchens, shall have a ceiling height of not less than 7 feet. Beams spaced not less than 4 feet on center may project not more than 6 inches below the minimum ceiling height (bottom of beam may be as low as 6 feet 6 inches from the floor).

Ceiling height in basements without habitable spaces may not be less than 6 feet 8 inches clear except under beams, girders, ducts or other obstructions where the clear height shall be 6 feet 4 inches.

**Habitable Room.** Habitable room shall mean any room meeting the requirements of this code for sleeping, living, cooking or dining purposes, **excluding** such enclosed places as closets, pantries, bath or toilet rooms, hallways, laundries, storage spaces, utility rooms and similar spaces.

**Kitchen** Kitchen shall mean an area used, or designated to be used, for the preparation of food.

### 3. Bedrooms:

- The minimum size of a new bedroom must be 70 square feet, and the least dimension of the room must be not less than 7 feet.
- Emergency egress: A door opening directly to the outside of the house, or an approved window is required for every bedroom. A grade level window must have a minimum clear opening of 5.0 square feet. The minimum clear width of the opening must be 20 inches, and the minimum clear height of the opening must be 24 inches. Please note that if you multiply 20 x 24, the area is 3.33 square feet, and does not meet the minimum area requirement. The window sill must not be higher than 44 inches above the floor. Please ask for the **emergency escape and rescue requirements** handout.
- A new bedroom must have a smoke detector both inside and outside the bedroom. The smoke detector outside the bedroom must be in the immediate vicinity of the bedroom door. Where there is no finished ceiling already in place, the smoke detectors must be interconnected to communicate and other smoke detectors in the house should be connected if possible. If one smoke detector is activated, all the others will also be activated, and everyone will be alerted to the trouble. Additionally, the existing house must have smoke detectors installed in locations required for new construction. Please ask for the **smoke alarms in single family dwellings** handout.
- Light and Ventilation. All habitable rooms shall be provided with aggregate glazing area of not less than 8 percent of the floor area of such rooms. One-half of the required area of glazing shall be openable.

#### Exceptions

- A. The glazed areas need not be openable where the opening is not required by Sect. 310

and an approved mechanical ventilation system is provided capable of producing 0.35 air change per hour in the room or a whole-house mechanical ventilation system is installed capable of supplying outdoor ventilation air of 15 cubic feet per minute per occupant computed on the basis of two occupants for the first bedroom and one occupant for each additional bedroom.

- B.** The glazed areas may be omitted in rooms where the opening is not required by Sect. 310 and an approved mechanical ventilation system is provided capable of producing 0.35 air change per hour in the room or a whole-house mechanical ventilation system is installed capable of supplying outdoor ventilation air of 15 cfm per occupant computed on the basis of two occupants for the first bedroom and one occupant for each additional bedroom, and artificial light is provided capable of producing an average illumination of 6 foot-candles over the area of the room at a height of 30 inches above the floor level. IRC section R303.

- Furnaces and Water Heaters. Fuel burning furnaces and fuel burning water heaters located in a bedroom shall be installed in a sealed enclosure such that combustion air will not be taken from the living space. IRC Sections M1701.4 & M2005.2.
- Door from a Garage. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. IRC Section 309.1.

4. Furnace rooms:

- A furnace or boiler which is fuel fired (gas or heating oil) and a fuel fired water heater, must have sufficient air for complete and proper combustion. An insufficient air supply can result in carbon monoxide being produced, and even small concentrations of carbon monoxide can be fatal. If your basement is completely open, and you want to enclose the furnace/boiler/water heater in a small area, louvers or other openings must be incorporated in partitions or doors, to allow fresh air to reach the equipment.

5. Firestopping:

- Concealed spaces formed between vertical and horizontal spaces must be firestopped with approved materials. This is to prevent the rapid spread of flames and smoke in the event of a fire, and allow extra time for the occupants to be alerted and take appropriate action. See the attached sketch for typical firestopping locations.

6. Joists may have bored holes for wiring, plumbing or gas piping, or other equipment. See the attached sketch for limitations for holes in joists.

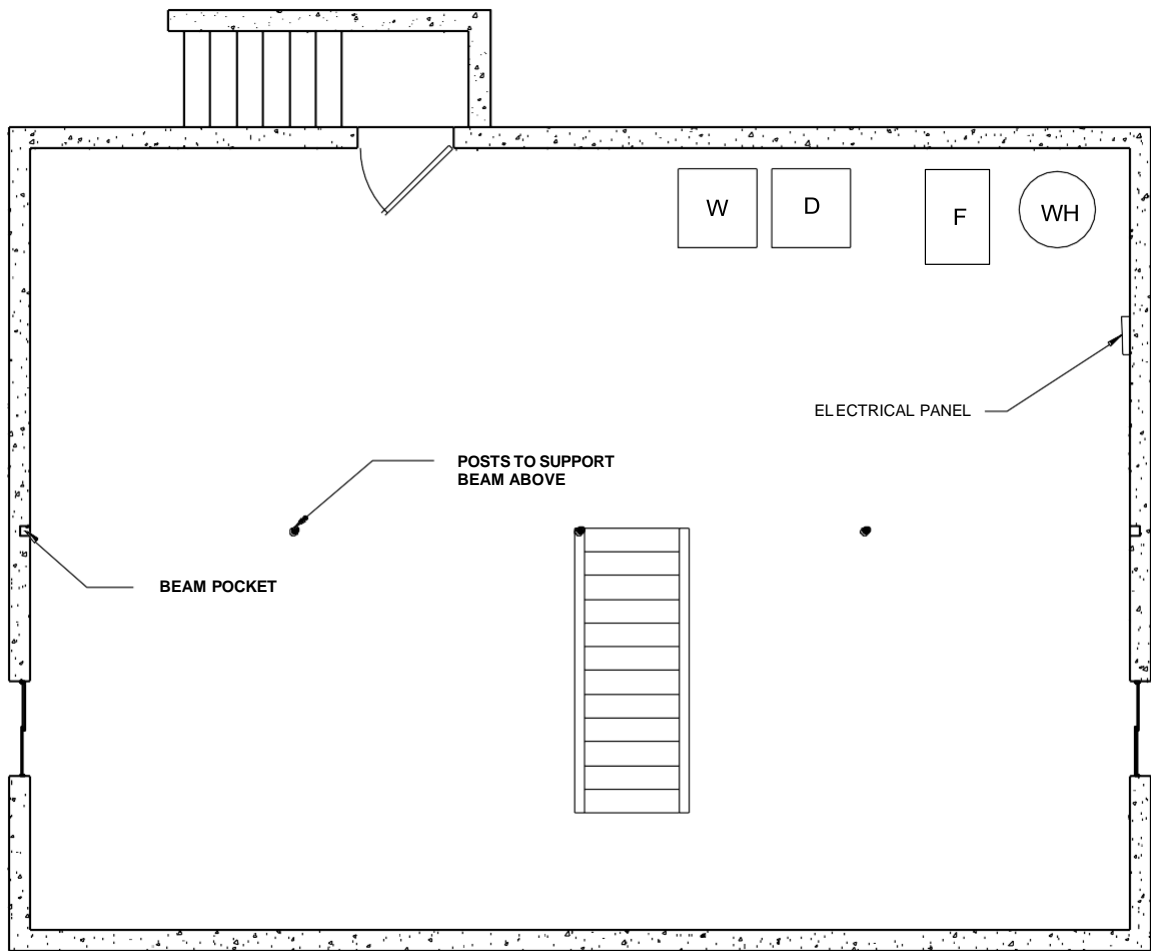
7. These considerations are not meant to be a design document. There are other considerations, such as bathrooms, insulation, heating and cooling, use of rooms, etc., that only the people who will be using the space must decide upon. All these details must be shown on your plans/drawings.

The attached drawings show a “typical” basement remodeling project. The unfinished basement contains a washer/dryer, a gas furnace and a gas water heater. The two existing windows in the basement are 24" high by 36" wide sliding type windows, with the window sill 5' above the floor. The existing height from the concrete floor to the bottom of the floor joists is 8', the washing machine drains into an existing sanitary sewer stack, there are no partitions except those beside the existing stairway, and the house electrical panel is located as shown.

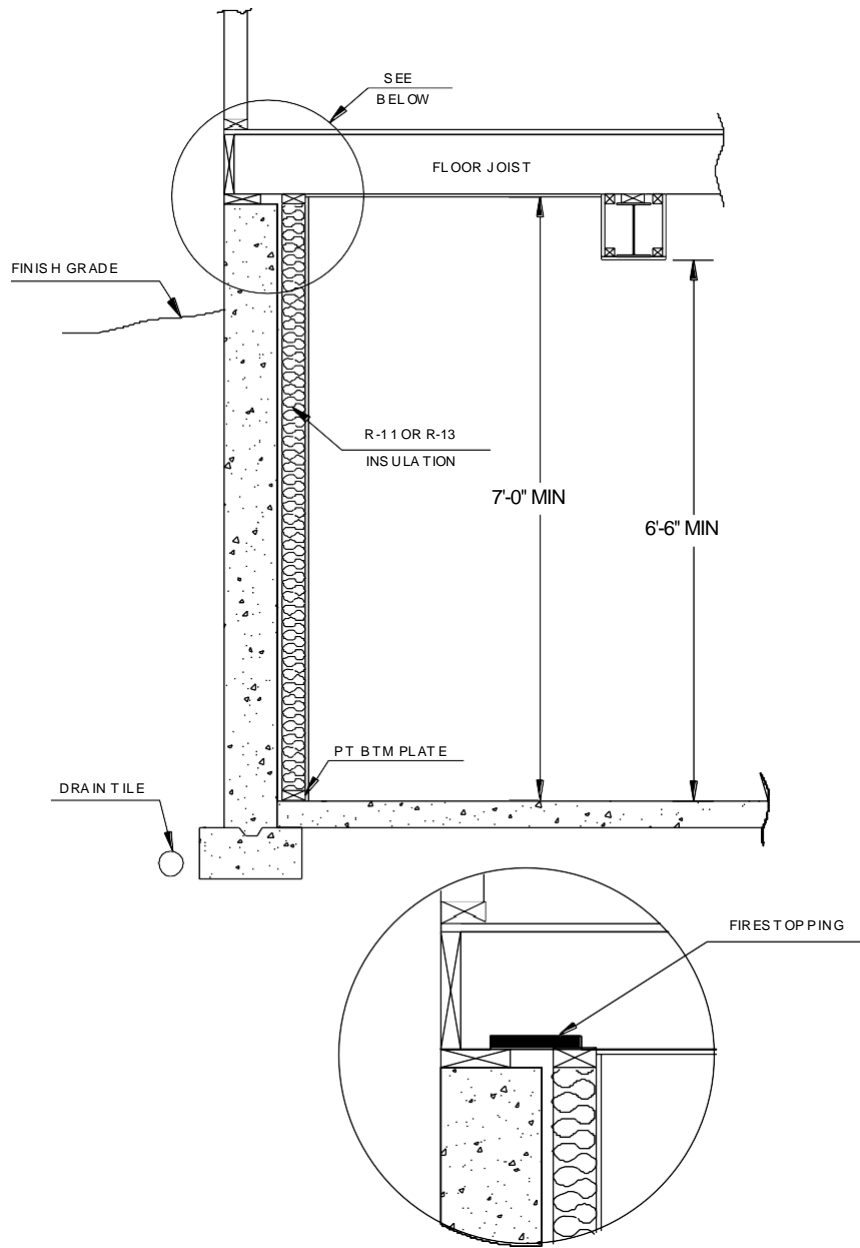
The owner has decided to create two new bedrooms, a bathroom, closets, and install a wet bar as shown on the "typical" basement plan. For this remodeling project she will be required to obtain a building, electrical, mechanical and plumbing permit.

For this project, attention must be paid to the following items:

- An emergency escape and rescue window must be installed in the larger bedroom. In this example the basement wall is underground, which means that a window well must be constructed. In an emergency, the occupants must be able to exit out the window, or fire fighters must be able to enter through the window in order to rescue an occupant inside.
- Smoke detectors are installed inside and outside the bedrooms, and the smoke detectors are interconnected to communicate.
- The dryer, furnace and water heater are gas fired equipment, and will require fresh air for combustion. The new partition to enclose these items will have louvered doors to allow fresh air to the equipment.
- The closet created under the stairs must have ½" gypsum board installed on the inside of the closet, and on the underside of the stairs.
- Access to the electrical panel must be maintained. A 36" space in front of the panel, and a 30" wide space for the panel, is required. Note that with the louvered doors of the furnace room closed, this space is maintained.
- A new bathroom and wet bar will be created. The bathroom exhaust fan shown must vent to the outside of the house. Details of the plumbing water piping, waste piping and vent piping, must be provided with the plumbing application. The bathtub/shower control valve must be the anti-scald type (**meets ASSE 1016 standard**).
- Light fixtures are not shown. A switch is provided at the entrance to each room, and this switch must operate either an overhead light fixture or a wall receptacle, so that people do not have to enter a dark room. Existing electrical equipment for the washer/dryer, furnace, etc., is not shown. A switch is required at the top and bottom of the stairs to operate a light witch will illuminate the stairs.
- Details of wood framed partition walls with firestopping, insulation, and other construction details must be on the submitted plans.  
The HVAC ducts are not shown. Typically a main supply duct is located under the floor joists, and extends most of the length of the house. New supply ducts may be attached to this trunk line, to supply individual rooms.



**UNFINISHED BASEMENT**



TYPICAL ELEVATION



