BASEMENT CONSTRUCTION GUIDE

[This document contains relative code requirements when converting existing basements into habitable space. It does NOT cover all aspects of the code nor accept responsibility for errors or omissions, the actual language of the Connecticut State Building Code prevails. Rev19]

1. Definitions;

BASEMENT WALL-The opaque portion of a wall that encloses one side of a *basement* and has an average below *grade* wall area that is 50 percent or more of the total opaque and nonopaque area of that enclosing side.

CONDITIONED AREA. That area within a building provided with heating or cooling systems or *appliances* capable of maintaining, through design or heat loss or gain, 68°F(20°C) during the heating season or 80°F (27°C) during the cooling season, or has a fixed opening directly adjacent to a conditioned area.

CONDITIONED SPACE-An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate thru openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings or where they contain uninsulated ducts, piping or other sources of heating or cooling

HABITABLE SPACE- A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

2. Size Requirements;

R304.1 Minimum area. Habitable rooms shall have a floor area of not less than 70 square feet (6.5 m2). Exception: Kitchens.

R304.2 Minimum dimensions. Habitable rooms shall be not less than 7 feet (2134 mm) in any horizontal dimension.

R305.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).
Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).
2. The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
3. Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.
4. Ceiling height in existing basements being converted to habitable space shall not be less than 6 feet 8 inches (2032 mm) clear except under beams, girders, pipes, ducts or other obstructions where the clear height shall be a minimum 6 feet 4 inches (1931 mm)

R305.1.1 Basements. Portions of basements that do not contain habitable space, hallways, bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 6 inches (1981 mm).
Exception:
Beams, girders, ducts or other obstructions may project to within 6 feet 4 inches (1931 mm) of the finished floor.

3. Light, Ventilation and Heating;

R303.1 Habitable rooms. Habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural *ventilation* shall be through windows, skylights, doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The openable area to the outdoors shall be not less than 4 percent of the floor area being ventilated.
Exceptions:

1. The glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical *ventilation* system is installed in accordance with Section M1507.

2. The glazed areas need not be installed in rooms where Exception 1 is satisfied and artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

3. Use of sunroom and patio covers, as defined in Section R202, shall be permitted for natural ventilation if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.

R303.7 Interior stairway illumination. Interior stairways shall be provided with an artificial light source to illuminate the landings and treads. The light source shall be capable of illuminating treads and landings to levels of not less than 1 foot-candle (11 lux) as measured at the center of treads and landings. There shall be a wall switch at each floor level to control the light source where the stairway has six or more risers.
Exception: A switch is not required where remote, central or automatic control of lighting is provided.

R303.7.1 Light activation. Where lighting outlets are installed in interior stairways, there shall be a wall switch at each floor level to control the lighting outlet where the stairway has six or more risers. The illumination of exterior stairways shall be controlled from inside the *dwelling* unit.
Exception: Lights that are continuously illuminated or automatically controlled.

R303.9 Required heating. Where the winter design temperature in Table R301.2(1) is below 60°F (16°C), every *dwelling unit* shall be provided with heating facilities capable of maintaining a room temperature of not less than 68°F (20°C) at a point 3 feet (914 mm) above the floor and 2 feet (610 mm) from exterior walls in habitable rooms at the design temperature. The installation of one or more portable space heaters shall not be used to achieve compliance with this section.

4. Fire Protection;

4a. Smoke Detectors

R314.2.2 Alterations, repairs and additions. When *alterations*, *repairs* or *additions* requiring a permit occur, or where one or more sleeping rooms are added or created in existing *dwellings*, the entire *dwelling unit* shall be provided with smoke alarms located as required for new *dwellings*.
Exceptions:

1. Work involving the exterior surfaces of *dwellings*, such as the replacement of roofing or siding, the *addition* or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirements of this section.

2. Installation, alteration or repairs of plumbing, mechanical or electrical systems are exempt from the requirements of this section.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.

2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

3. On each additional *story* of the *dwelling*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

4. Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section R314.3.

R314.6 Power source. Smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and, where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Smoke alarms shall be permitted to be battery operated where installed in buildings without commercial power.
2. Hard-wiring of smoke alarms in existing areas shall not be required where the alteration or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure.

4b. Carbon Monoxide Detectors

R315.2.2 Alterations, repairs and additions. When *alterations*, repairs or *additions* requiring a permit occur, or where one or more sleeping rooms are added or created in existing *dwellings*, the individual *dwelling unit* shall be equipped with carbon monoxide alarms located as required for new *dwellings*. The carbon monoxide alarms shall have a power source in accordance with Section R315.5

Exceptions:

1. The carbon monoxide alarms may be battery operated or plug-in and are not required to be interconnected when other remodeling considerations do not require the removal of the appropriate wall and ceiling coverings to facilitate concealed interconnected wiring.
2. Alterations to the exterior surfaces of dwellings including but not limited to, re-roofing, residing, window replacements and the construction of decks, shall be exempt from the requirements of this section.
3. Carbon monoxide alarms shall not be required in dwelling units not containing a fuel-burning appliance, fireplace or attached garage.
4. Installation, alteration or repairs of plumbing, mechanical or electrical systems are exempt from the requirements of this section.

R315.3 Location. Carbon monoxide alarms in *dwelling units* shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning *appliance* is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.

R315.4 Combination alarms. Combination carbon monoxide and smoke alarms shall be permitted to be used in lieu of carbon monoxide alarms.

R315.5 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and, where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Carbon monoxide alarms shall be permitted to be battery operated where installed in buildings without commercial power.
2. Carbon monoxide alarms installed in accordance with Section R315.2.2 shall be permitted to be battery powered.

4c. Fire protection

R302.7 Under-stair protection. Enclosed accessible space under stairs shall have walls, under-stair surface and any soffits protected on the enclosed side with 1/2-inch gypsum board.

R302.11 Fireblocking. In combustible construction, fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective
fire barrier between stories, and between a top story and the roof space. Fireblocking shall be provided in wood-frame construction in the following locations:

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs, as follows:

   1.1. Vertically at the ceiling and floor levels.
   1.2. Horizontally at intervals not exceeding 10 feet.

2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.

3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R302.7.

4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements.

R302.11.1 Fireblocking materials. Except as provided in Section R302.11, Item 4, fireblocking shall consist of the following materials.

1. Two-inch nominal lumber.

2. Two thicknesses of 1-inch nominal lumber with broken lap joints.

3. One thickness of 23/32-inch wood structural panels with joints backed by 23/32-inch wood structural panels.

4. One thickness of 3/4-inch particleboard with joints backed by 3/4-inch particleboard.

5. One-half-inch gypsum board.

6. One-quarter-inch cement-based millboard.

7. Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place.

8. Cellulose insulation installed as tested in accordance with ASTM E119 or UL 263, for the specific application.

R302.11.1.1 Batts or blankets of mineral or glass fiber. Batts or blankets of mineral or glass fiber or other *approved* non-rigid materials shall be permitted for compliance with the 10-foot (3048 mm) horizontal fireblocking in walls constructed using parallel rows of studs or staggered studs.

R302.11.1.2 Unfaced fiberglass. Unfaced fiberglass batt insulation used as fireblocking shall fill the entire cross section of the wall cavity to a height of not less than 16 inches (406 mm) measured vertically. Where piping, conduit or similar obstructions are encountered, the insulation shall be packed tightly around the obstruction.

R302.11.1.3 Loose-fill insulation material. Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.

R302.11.2 Fireblocking integrity. The integrity of fireblocks shall be maintained

5. Egress Requirements;

R311.4 Vertical egress. Egress from habitable levels including habitable attics and *basements* not provided with an egress door in accordance with Section R311.2 shall be by a ramp in accordance with Section R311.8 or a stairway in accordance with Section R311.7.

R310.1 Emergency escape and rescue openings required. Basements, habitable attics and every sleeping room shall have not less than one operable emergency escape and rescue opening. Where basements and attics contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room, but shall not be required in adjoining habitable areas of the basement or attic.
Emergency escape and rescue openings shall open directly into a public way, or to a yard or
Court that opens to a public way.
Exceptions:

1. Habitable basements without sleeping rooms are not required to have emergency escape and rescue openings when they are provided with two remote, code-compliant stairways.
2. In existing buildings, basements and attics being converted to habitable space without sleeping rooms are not required to have emergency escape and rescue openings.

R310.2.1 Minimum opening area. Emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m2). The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. The net clear opening height shall be not less than 24 inches (610 mm) and the net clear opening width shall be not less than 20 inches (508 mm).
Exceptions: 1. Grade floor or below grade openings shall have a net clear opening of not less than 5 square feet (0.465 m2)

R310.2.2 Window sill height. Where a window is provided as the emergency escape and rescue opening, it shall have a sill height of not more than 44 inches (1118 mm) above the floor; where the sill height is below grade, it shall be provided with a window well in accordance with Section R310.2.3.
Exception: The 44-inch (1118 mm) maximum sill height shall be permitted to be measured vertically above a fixed, permanent platform, step or steps whose minimum width shall equal or exceed the operable width of the opening and shall be centered on such opening and which shall comply with Sections R311.7.5.1 and

R311.7.5.2. Glazing in windows complying with this exception shall not be subject to the provisions of Section R308.4.6 or R308.4.7.

R310.2.3 Window wells. The horizontal area of the window well shall be not less than 9 square feet (0.9 m2), with a horizontal projection and width of not less than 36 inches (914 mm). The area of the window well shall allow the emergency escape and rescue opening to be fully opened.
Exception: The ladder or steps required by Section R310.2.3.1 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the window well.

R310.2.4 Emergency escape and rescue openings under decks and porches. Emergency escape and rescue openings shall be permitted to be installed under decks and porches provided that the location of the deck allows the emergency escape and rescue openings to be fully opened and provides a path not less than 36 inches (914 mm) in height to a *yard* or court.

R311.7.1 Width. Stairways shall not be less than 36 inches in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4½ inches (114 mm) on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31½ inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are provided on both sides.
Exceptions:

1. The width of spiral stairways shall be in accordance with Section R311.7.10.1.
2. The width of existing stairways serving existing unfinished attics or existing unfinished basements being converted to habitable space or replacement stairways within existing dwellings shall not be less than 32 inches (813 mm) in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4 inches (102 mm) on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 28 inches (711 mm) where a handrail is installed on one side and 24 inches (610 mm) where handrails are provided on both sides.
3. Where an incline platform lift or stairway chairlift is installed on a stairway within a dwelling unit, a clear passage width not less than 20 inches (508 mm) shall be provided. If the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

R311.7.2 Headroom. The minimum headroom in all parts of the stairway shall not be less than 6 feet, 8 inches (2032 mm) measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.
Exceptions:

1. Where the nosing of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall be allowed to project horizontally into the required headroom a maximum of 4¾ inches (121 mm).
2. The minimum headroom in all parts of existing stairways serving existing unfinished attics or existing unfinished basements being converted to habitable space or replacement stairs where the pitch or slope cannot be reduced because of existing construction shall be 6 feet, 4 inches (1930 mm), measured in accordance with Section R311.7.2.

R311.7.5.1 Risers. The maximum riser height shall be 8 ¼ inches (209.5 mm). The riser shall be measured vertically between leading edges of adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than ⅜ inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the opening between treads does not permit the passage of a 4-inch-diameter (102 mm) sphere.
Exceptions:

1. The maximum riser height of existing stairs serving existing unfinished attics or existing unfinished basements being converted to habitable space or replacement stairs where the pitch or slope cannot be reduced because of existing construction shall be 9 inches (229 mm), measured in accordance with Section R311.7.5.1.

2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

R311.7.5.2 Treads. The minimum tread depth shall be 9 inches (229 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than ⅜ inch (9.5mm).
Exception: The minimum tread depth of existing stairs serving existing unfinished attics or existing unfinished basements being converted to habitable space or replacement stairs within existing dwellings shall be 8 inches (203mm), measured in accordance with Section R311.7.5.2.

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The width perpendicular to the direction of travel shall be not less than the width of the flight served. Landings of shapes other than square or rectangular shall be permitted provided that the depth at the walk line and the total area is not less than that of a quarter circle with a radius equal to the required landing width. Where the stairway has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).
Exceptions:

1. A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.
2. The depth in the direction of travel of landings of existing stairs serving existing basements being converted to habitable space or replacement stairs within existing dwellings shall be at least equal to the stair width but not less than 32 inches (762 mm) where Section R311.7.1, exception 2 is utilized for a reduced stair width.

R312.1.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102mm) in diameter.
Exceptions:

1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of stairs shall not have openings that allow passage of a sphere 4-3/8 inches (111 mm) in diameter

6. Handrails:

R311.7.8 Handrails. Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.

R311.7.8.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches and not more than 38 inches.
Exceptions:

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.

2. Where handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to *guard*, or used at the start of a flight

R311.7.8.3 Grip-size. All required handrails shall be of one of the following types or provide equivalent graspability.

1. **Type I**. Handrails with a circular cross section shall have an outside diameter of at least 1-1/4 inches and not greater than 2 inches. If the handrail is not circular, it shall have a perimeter dimension of at least 4 inches and not greater than 6-1/4 inches with a maximum cross section of dimension of 2-1/4 inches. Edges shall have a minimum radius of 0.01 inch.

2. **Type II.** Handrails with a perimeter greater than 6-1/4 inches shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of ¾ inch measured vertically from the tallest
portion of the profile and achieve a depth of at least 5-1/6 inch within 7/8 inch below the widest portion of the profile. This required depth shall continue for at least 3/8 inch to a level that is not less than 1-3/4 inches below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1-1/4 inches to a maximum of 2-3/4 inches. Edges shall have a minimum radius of 0.01 inch.

R312.1.2 Guard Height. Required guards at open-sided walking surfaces, including stairs, porches or landings, shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface or the line connecting the leading edges of the treads.
Exceptions:

1. Guards on the open sides of stairs shall have a height not less than 34 inches measured vertically from a line connecting the leading edges of the treads.

2. Where the top of the guard serves as a handrail on the open sides of stairs, the top of the guard shall be not less than 34 inches and not more than 38 inches as measured vertically from a line connecting the leading edges of the treads.

7. Insulation:

T. 1102.1-Basement walls enclosing conditioned space shall be insulated to an R-value of 15/19.
"15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

N1102.4.1.1 Installation. The components of the *building thermal envelope* as listed in Table N1102.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table N1102.4.1.1, as applicable to the method of construction. Where required by the *building official*, an *approved* third party shall inspect all components and verify compliance.

8. Mechanical:

N1102.4.4 Rooms containing fuel-burning appliances. In Climate Zones 3 through 8, where open combustion air ducts provide combustion air to open combustion fuel-burning appliances, the appliances and combustion air opening shall be located outside the building thermal envelope or enclosed in a room, isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table N1102.1.2, where the walls, floors and ceilings shall meet a minimum of the basement wall *R*-value requirement. The door into the room shall be fully gasketed and any water lines and ducts in the room insulated in accordance with Section N1103. The combustion air duct shall be insulated where it passes through conditioned space to a minimum of R-8.
Exceptions:

1. Direct vent appliances with both intake and
exhaust pipes installed continuous to the outside.

2. Fireplaces and stoves complying with Sections N1102.4.2 and R1006.

M1305.1.2 Appliances in rooms. Appliances *installed in a compartment, alcove,* basement *or similar space shall be accessed by an opening or door and an unobstructed passageway measuring not less than 24 inches (610 mm) wide and large enough to allow removal of the largest* appliance *in the space, provided there is a level service space of not less than 30 inches (762 mm) deep and the height of the* appliance, *but not less than 30 inches (762 mm), at the front or service side of the* appliance *with the door open.*

M1401.2 Access. Heating and cooling *equipment* and appliances shall be located with respect to building construction and other *equipment* and appliances to permit maintenance, servicing and replacement. Clearances shall be maintained to permit cleaning of heating and cooling surfaces; replacement of filters, blowers, motors, controls and vent connections; lubrication of moving parts; and adjustments.
Exception:
Access shall not be required for ducts, piping, or other components approved for concealment.

M1502.2 Independent exhaust systems. Dryer exhaust systems shall be independent of all other systems and shall convey the moisture to the outdoors.
Exception: This section shall not apply to *listed* and *labeled* condensing (ductless) clothes dryers.

M1507.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another dwelling unit and shall be exhausted directly to the outdoors. Exhaust air from bathrooms and toilet rooms shall not discharge into an attic, crawl space or other areas inside the building.

G2407.1 General. Air for *combustion*, ventilation and dilution of *flue gases* for *appliances* installed in buildings shall be provided by application of one of the methods prescribed in Sections G2407.5 through G2407.9. Where the requirements of Section G2407.5 are not met, outdoor air shall be introduced in accordance with one of the methods prescribed in Sections G2407.6 through G2407.9. *Direct-vent appliances*, gas *appliances* of other than *natural draft* design, vented gas *appliances* not designated as Category I and *appliances* equipped with power burners, shall be provided with *combustion*, ventilation and *dilution air* in accordance with the *appliance* manufacturer's instructions.
Exception: *Type 1 clothes dryers* that are provided with *makeup air* in accordance with Section G2439.5

G2407.5 Indoor combustion air. The required volume of indoor air shall be determined in accordance with Section G2407.5.1 or G2407.5.2, except that where the air infiltration rate is known to be less than 0.40 air changes per hour (ACH), Section G2407.5.2 shall be used. The total required volume shall be the sum of the required volume calculated for all *appliances* located within the space. Rooms communicating directly with the space in which the *appliances* are installed through openings not furnished with doors, and through *combustion air* openings sized and located in accordance with Section G2407.5.3, are considered to be part of the required volume.

G2407.5.1 Standard method. The minimum required volume shall be 50 cubic feet per 1,000 *Btu*/h (4.8 m3/kW) of the appliance input rating.

G2407.5.3 Indoor opening size and location. Openings used to connect indoor spaces shall be sized and located in accordance with Sections G2407.5.3.1 and G2407.5.3.2

G2407.5.3.1 Combining spaces on the same story. Each opening shall have a minimum free area of 1 square inch per 1,000 *Btu*/h (2,200 mm2/kW) of the total input rating of all *appliances* in the space, but not less than 100 square inches (0.06 m2). One opening shall commence within 12 inches (305 mm) of the top and one opening shall commence within 12 inches (305 mm) of the bottom of the enclosure. The minimum dimension of air openings shall be not less than 3 inches (76 mm).

G2407.6 Outdoor combustion air. Outdoor *combustion* air shall be provided through opening(s) to the outdoors in accordance with Section G2407.6.1 or G2407.6.2. The minimum dimension of air openings shall be not less than 3 inches

G2407.6.1 Two-permanent-openings method. Two permanent openings, one commencing within 12 inches (305 mm) of the top and one commencing within 12 inches (305 mm) of the bottom of the enclosure, shall be provided. The openings shall communicate directly or by ducts with the outdoors or spaces that freely communicate with the outdoors. Where directly communicating with the outdoors, o rwhere communicating

with the outdoors through vertical ducts, each opening shall have a minimum free area of 1square inch per 4,000 *Btu*/h (550 mm2/kW) of total input rating of all *appliances* in the enclosure. Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of not less than 1 square inch per 2,000 *Btu*/h (1,100 mm2/ kW) of total input rating of all *appliances* in the enclosure

G2407.6.2 One-permanent-opening method. One permanent opening, commencing within 12 inches (305 mm) of the top of the enclosure, shall be provided. The *appliance* shall have *clearances* of at least 1 inch (25mm) from the sides and back and 6 inches (152 mm) from the front of the *appliance*. The opening shall directly communicate with the outdoors or through a vertical or horizontal duct to the outdoors, or spaces that freely communicate with the outdoors and shall have a minimum free area of 1 square inch per 3,000 *Btu*/h (734 mm2/kW) of the total input rating of all *appliances* located in the enclosure and not less than the sum of the areas of all *vent connectors* in the space.

G2407.7 Combination indoor and outdoor combustion air. The use of a combination of indoor and outdoor *combustion air* shall be in accordance with Sections G2407.7.1 through G2407.7.3.

G2407.7.1 Indoor openings. Where used, openings connecting the interior spaces shall comply with Section G2407.5.3.

G2407.7.2 Outdoor opening location. Outdoor opening(s) shall be located in accordance with Section G2407.6.

G2407.7.3 Outdoor opening(s) size. The outdoor opening(s) size shall be calculated in accordance with the following:
1. The ratio of interior spaces shall be the available volume of all communicating spaces divided by the required volume.
2. The outdoor size reduction factor shall be one minus the ratio of interior spaces.
3. The minimum size of outdoor opening(s) shall be the full size of outdoor opening(s) calculated in accordance with Section G2407.6, multiplied by the reduction factor. The minimum dimension of air openings shall be not less than 3 inches (76 mm).

G2407.8 Engineered installations. Engineered *combustion air* installations shall provide an adequate supply of *combustion*, ventilation and *dilution air* and shall be *approved*.

G2407.9 Mechanical combustion air supply. Where all *combustion air* is provided by a mechanical air supply system, the *combustion air* shall be supplied from the outdoors at a rate not less than 0.35 cubic feet per minute per 1,000 *Btu*/h (0.034 m3/min per kW) of total input rating of all *appliances* located within the space.

G2407.9.1 Makeup air. Where exhaust fans are installed, *makeup air* shall be provided to replace the exhausted air.

G2407.9.2 Appliance interlock. Each of the *appliances* served shall be interlocked with the mechanical air supply system to prevent *main burner* operation when the mechanical air supply system is not in operation.

G2407.9.3 Combined combustion air and ventilation air system. Where *combustion air* is provided by the building's mechanical ventilation system, the system shall provide the specified *combustion air* rate in addition to the required ventilation air.

9. Electrical:

E3901.2 General purpose receptacle distribution. In every kitchen, family room, dining room, living room, parlor, library, den, sun room, bedroom, recreation room, or similar room or area of dwelling units, receptacle outlets shall be installed in accordance with the general provisions specified in Sections E3901.2.1 through E3901.2.3

E3902.1. Bathroom receptacles. 125-volt, single-phase, 15-and 20-ampere receptacles installed in bathrooms shall have ground-fault circuit-interrupter protection for personnel.

E3902.16 Arc-fault circuit-interrupter protection. Branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreations rooms, closets, hallways, laundry areas and similar rooms or areas shall be protected.

E3901.2.1 Spacing. Receptacles shall be installed so that no point measured horizontally along the floor line of any wall space is more than 6 feet (1829 mm), from a receptacle outlet.

E3901.2.2 Wall space. As used in this section, a wall space shall include the following:

1. Any space that is 2 feet (610 mm) or more in width, including space measured around corners, and that is unbroken along the floor line by doorways and similar openings, fireplaces, and fixed cabinets.

2. The space occupied by fixed panels in exterior walls, excluding sliding panels.

3. The space created by fixed room dividers such as railings and freestanding bar-type counters.

Disclaimer;

This Guide assumes NO responsibility for errors or emissions nor contains every aspect of the code associated with creating a habitable basement. The actual language of the 2018 Connecticut State Building Code shall prevail per CGS 29-252. Please contact the Building Department directly with any questions regarding your particular project.

Construction Documents;

R106.1 Submittal documents. Submittal documents consisting of *construction documents*, and other data shall be submitted in two or more sets with each application for a *permit*. The *construction documents* shall be prepared by a registered *design professional* where required by the statutes of the *jurisdiction* in which the project is to be constructed. Where special conditions exist, the *building official* is authorized to require additional *construction documents* to be prepared by a registered *design professional*.
Exception: The *building official* is authorized to waive the submission of *construction documents* and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that reviewing of construction documents is not necessary to obtain compliance with this code.

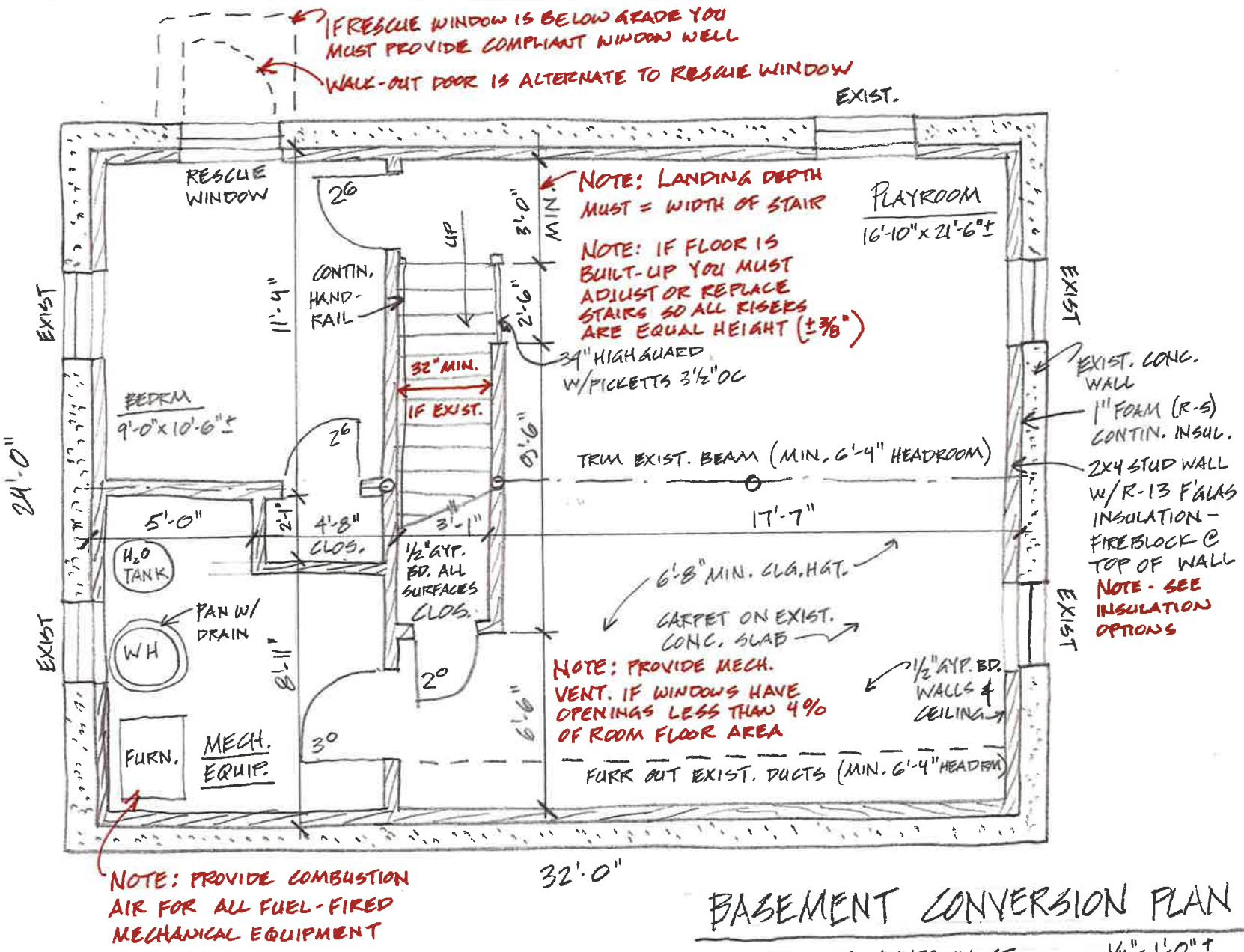
R106.1.1 Information on construction documents. Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted where approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.

When submitting construction drawings a scaled or dimensioned floor plan of the entire basement needs to be developed. You will need to identify and label all rooms as to their intended use and also identify those portions of your basement that will be finished vs. unfinished.

All existing and proposed Mechanical appliances and Electrical equipment locations must be shown on your floor plan. The finished ceiling height including all clear ceiling heights under beam, girders, ducts or other obstructions must be stated on your plans, please also indicate ceiling heights above all portions of the staircase including landings.

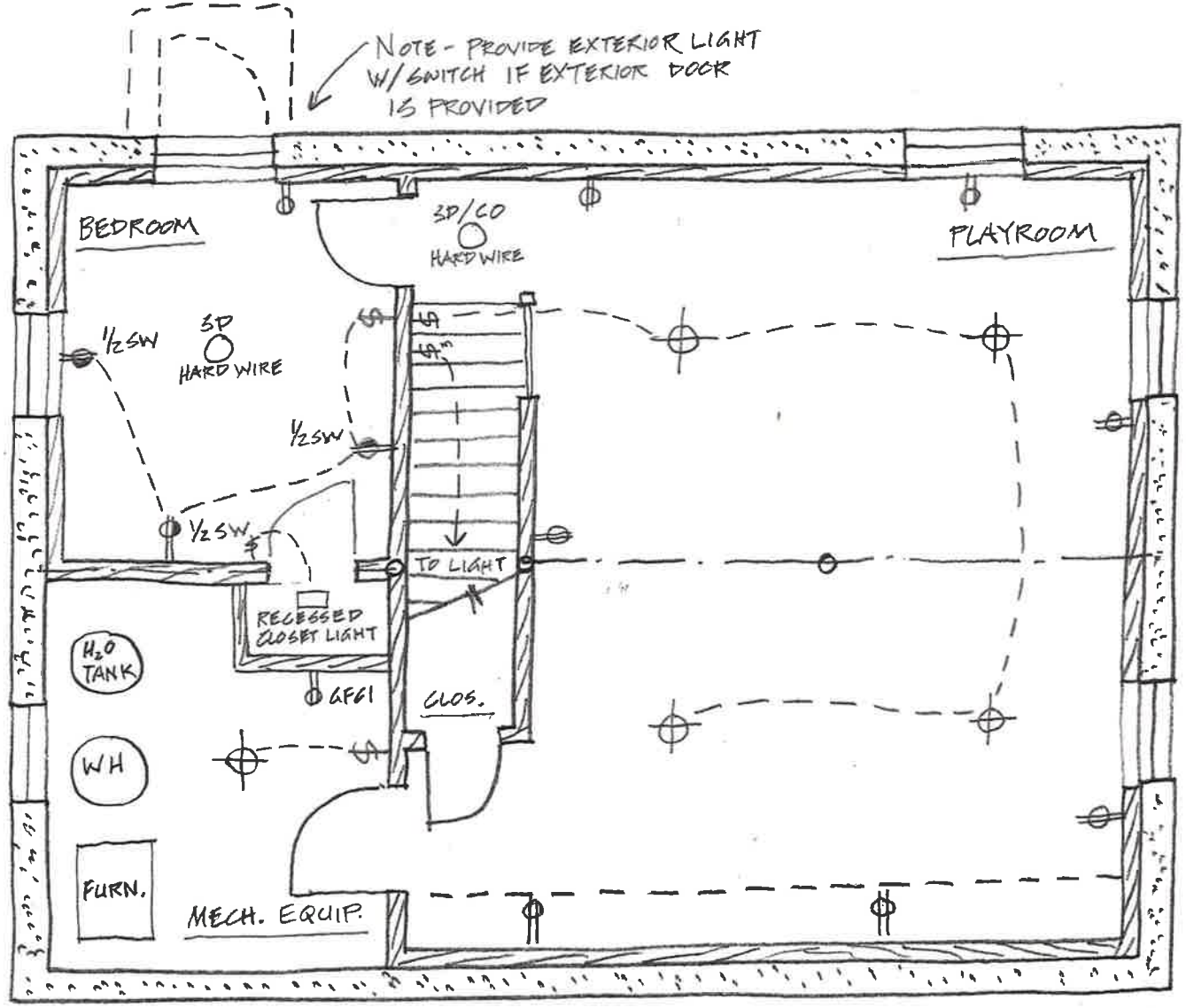
A cross section should also be developed indicating size and material of framing members, method of fire stopping at top of wall, drop ceilings or soffits and "R-values" of all types of insulation to be installed.

**The Following examples of construction drawings are shown for reference only and should not be utilized nor considered as sufficient for submittal when filling an application.



BASEMENT CONVERSION PLAN 1

123 MAIN ST. ANYTOWN CT. ¼" = 1'-0"±

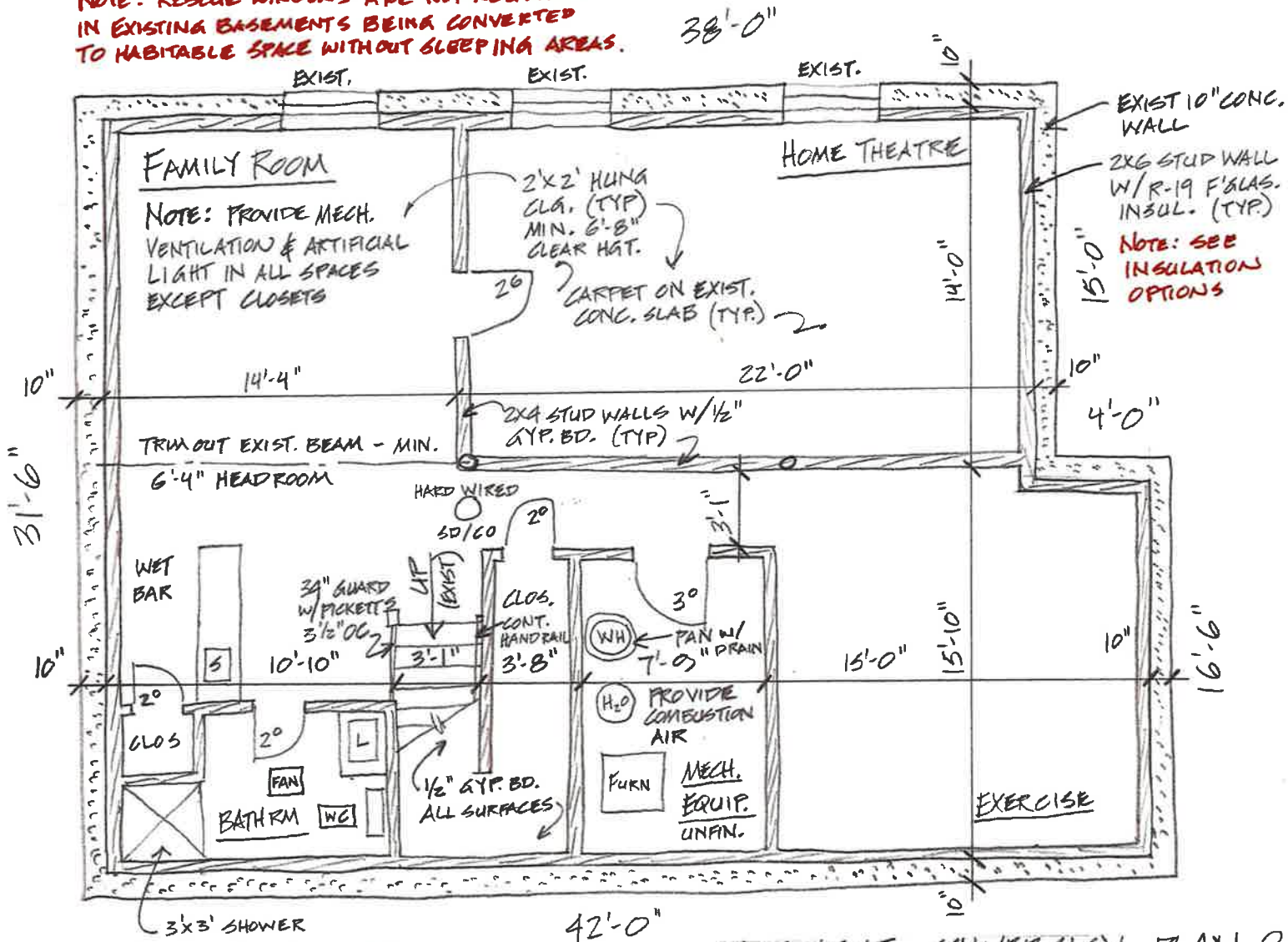


NOTE - ADD BATTERY POWERED SMOKE & CO DETECTORS IN LOCATIONS REQ'D. BY CODE THROUGHOUT HOUSE WHERE NONE EXIST.

BASEMENT ELEC. PLAN 1

123 MAIN ST. ANYTOWN CT.

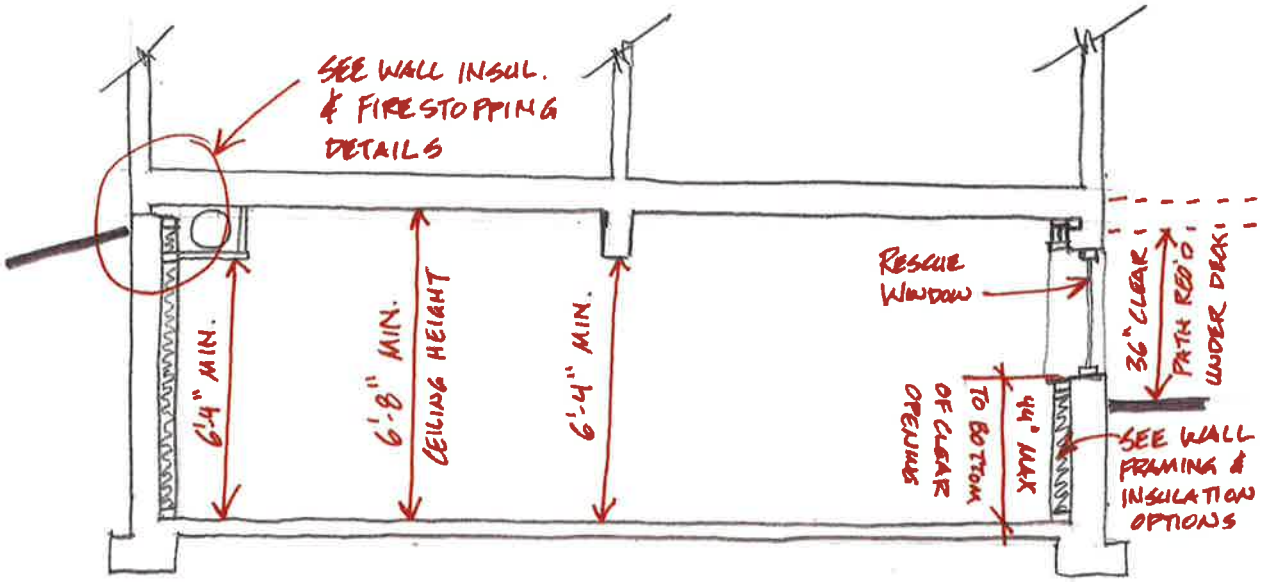
NOTE: RESCUE WINDOWS ARE NOT REQUIRED IN EXISTING BASEMENTS BEING CONVERTED TO HABITABLE SPACE WITHOUT SLEEPING AREAS.



NOTE: PROVIDE BATTERY OPERATED SMOKE & CO DETECTORS IN CODE REQUIRED LOCATIONS THROUGHOUT EXISTING HOUSE WHERE NONE EXIST.

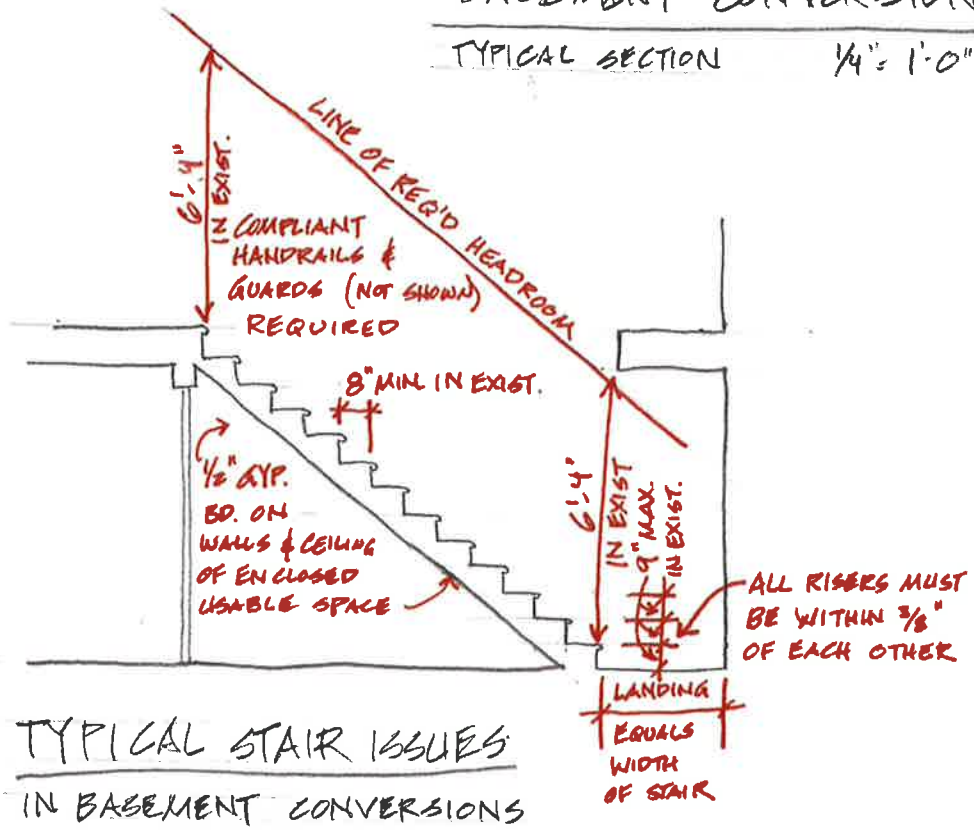
BASEMENT CONVERSION PLAN 2

456 MAIN ST. YOURTOWN CT 3/16" = 1'-0" ±



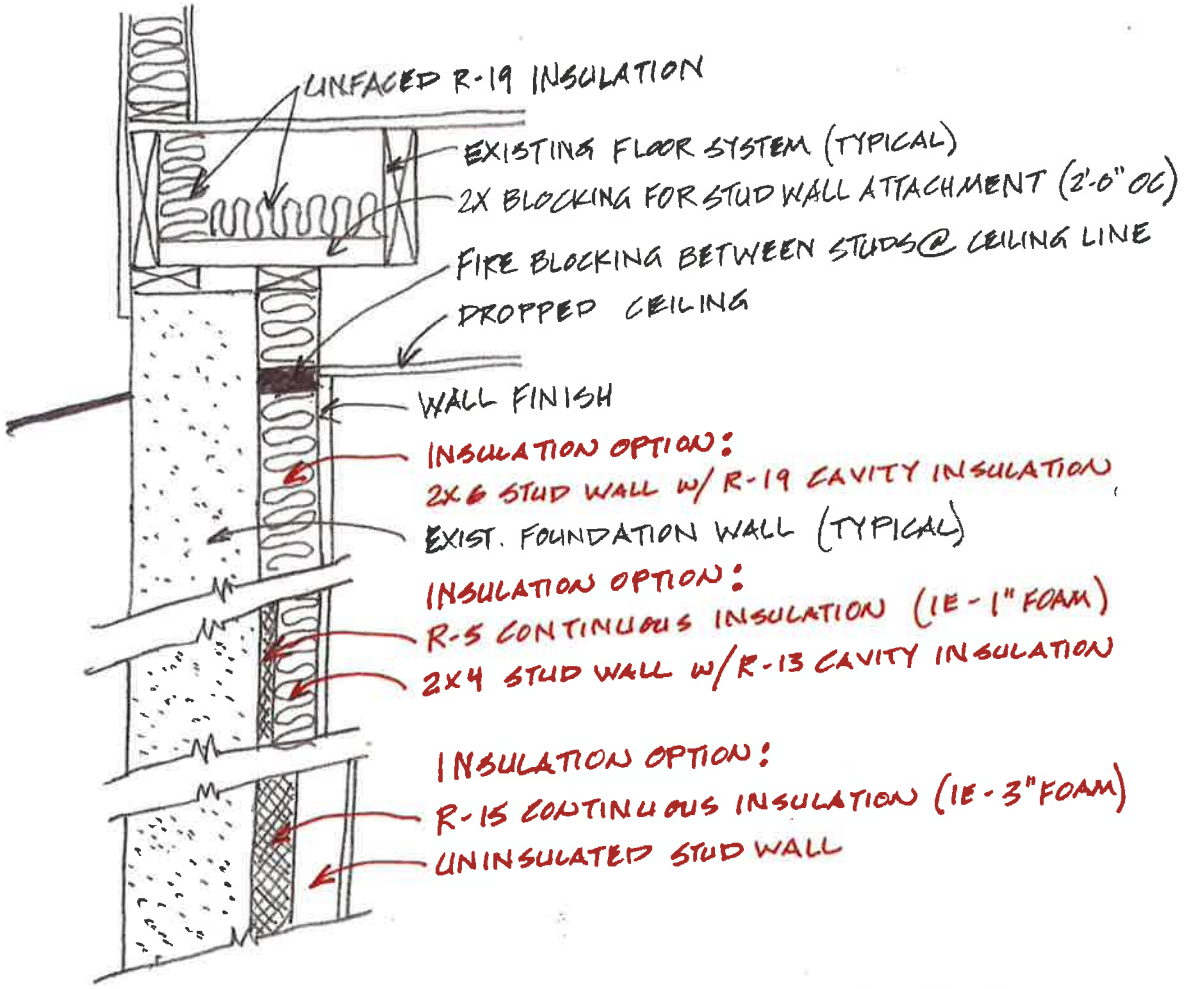
BASEMENT CONVERSION

TYPICAL SECTION 1/4" = 1'-0" ±



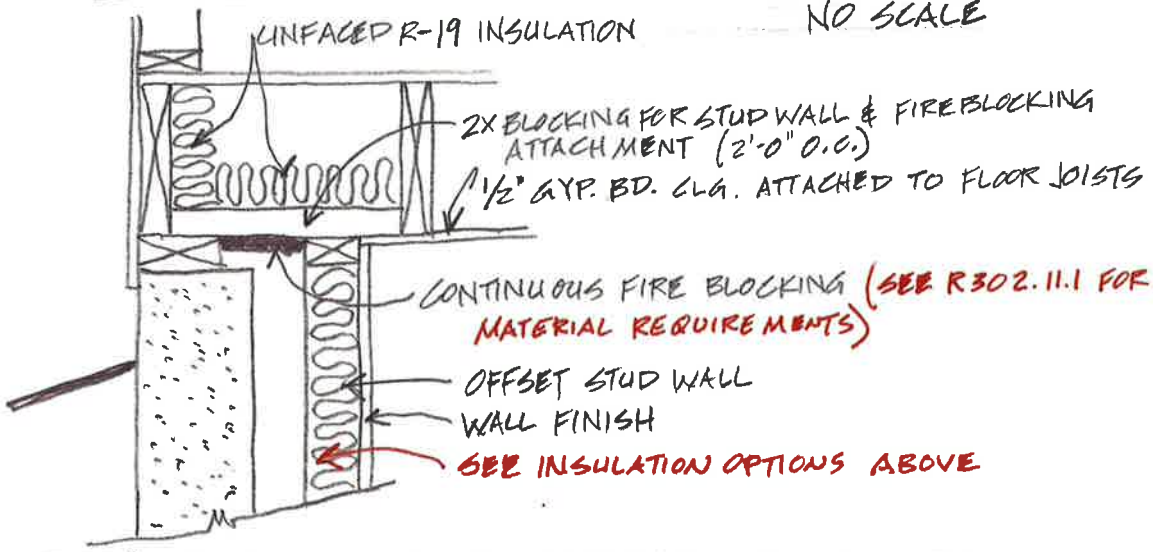
TYPICAL STAIR ISSUES

IN BASEMENT CONVERSIONS



FIREBLOCKING @ DROPPED CEILING

NO SCALE



FIREBLOCKING @ OFFSET STUD WALL

NO SCALE