

Plan Review Checklist
Basement Conversion to Habitable Space
1 & 2 Family Residential
9th edition , Massachusetts with 2015 IECC Review

*Stretch Code Requirement
performance option please provide
the projected HERS rating from the
Accredited HERS Rater that you hire.*

Plan Review Checklist

This document provides general guidance on the required documentation for a plan review. Depending on your project, some details may not be applicable. This checklist is intended to help you prepare for your plan review and streamline the process of obtaining a building permit.

If you have any questions, please contact the Hudson Building Department at (978) 568-9625. We would gladly arrange a meeting to address your questions and concerns.

2021 International Energy Conservation Code (IECC)

R402.2.9 Basement walls. Walls associated with conditioned basements shall be insulated from the top of the *basement wall* down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections R402.1.2 and R402.2.8.

TABLE R402.1.3 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT ^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^{b,i}	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b,e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE ^g	MASS WALL R-VALUE ^h	FLOOR R-VALUE	BASEMENT ^{c,g} WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^{c,g} WALL R-VALUE
5 and Marine 4	0.30 ⁱ	0.55	0.40	60	30 or 20&5ci ^h or 13&10ci ^h or 0&20ci ^h	13/17	30	15ci or 19 or 13&5ci	10ci, 4 ft	15ci or 19 or 13&5ci

c. "5ci or 13" means R-5 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "15ci or 19 or 13& 5ci" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall; or R-19 cavity insulation on the interior side of the wall; or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insulation on the interior or exterior surface of the wall.

d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation R-value for slabs, as indicated in the table. The slab-edge insulation for heated slabs shall not be required to extend below the slab

g. The first value is cavity insulation; the second value is continuous insulation. Therefore, as an example, "13 & 5" means R-13 cavity insulation plus R-5 continuous insulation

R502.1.1 Large additions. Additions to a *dwelling unit* exceeding 1,000 sq ft or exceeding 100% of the existing *conditioned floor area*, shall require the *dwelling unit* to comply with the maximum HERS ratings for alterations, additions or change of use shown in TABLE R406.5.



example of 15/19 utilizing R-5 continuous insulation

Three sets of plans or uploaded on-line Open-Gov

Construction Drawings

Cover Sheet

- o Address with Assessor Map and Parcel
- o Date of latest revision
- o Tabulated Square Foot Area of all proposed renovation (and spaces if applicable)

Construction documents (1/4" scale minimum)

- o Floor Plan area of work is being performed
- o Building dimensions Space designation – (ie: living room, kitchen, bedroom, storage, etc.)
- o Demonstrate light and ventilation compliance §R303.1
- o Door and window location per schedule on cover sheet, identifying egress windows and safety glazing including manufacturers specifications cut sheets on each type. Doors between condition & un-condition space be labeled solid and weather stripped.
- o Location and type of smoke detectors and carbon monoxide detectors & completed install permit
- o Emergency escape and rescue may be required if adding a new sleeping room to existing basement per R310.6.

Framing plan

- o Conventional framing plan all levels including roof, showing size, spacing and direction of structural members
- o Conventional header and beam sizes, spans and bearing clearly showing load path to foundation (ie: doorways, windows, archways, overhead doors, covered porches and decks and structural ridges)
- o Engineered floor framing and roof truss plans stamped by a professional registered engineer in the Commonwealth of Massachusetts.
- o Engineered manufactured beams and columns stamped by a registered professional engineer in the Commonwealth of Massachusetts. Calculations shall be site specific verifying they generated the loads indicated and that the input and output data provided is site specific to include verification of load path and column adequacy to foundation...disclaimers of any kind shall be rejected.

10. Cross sections

- o Complete cross section of all sections of building, detailing method of construction.
- o Stair detail showing type of material, rise and run, headroom height, handrail and guardrail.
- o Floor - finished ceiling height.

**Plan Review CO / Smoke Detector for Alteration / Installation in One or Two Family Dwelling
(if applicable)**

Project Information :

- o Description of work.
- o Number of dwelling units.
- o In conjunction with building permit.
- o Structure contains fossil fuel burning equipment.
- o System type.

Description of Equipment to be Installed:

- o Name of system.
- o Smoke Detector model number.
- o Combination Detectors (Smoke and CO) model number.
- o Heat Detector model number.

Property Details:

- | | |
|--|----------------------------------|
| o Number of Existing Floors in Structure. | o Additional Level Proposed. |
| o Number of Existing Bedrooms. | o Number of Existing Detectors. |
| o Number of New Bedrooms. | o Number of New Smoke Detectors. |
| o Number of New Combination Detectors
(Smoke and CO). | o Number of New Heat Detectors. |
| o Number of New Carbon Monoxide Detectors. | |

Installation Technician:

- | | |
|--------------------------------|----------------------------|
| o Name of Licensed Technician. | o License #. |
| o License Expiration Date. | o Address. |
| o City. | o State. |
| o Zip. | o Technician Phone Number. |

Electronic Set of plans for the installation of proposed location of detectors

§ AJ102.3 Smoke Heat Detection and Carbon Monoxide Alarm Systems and CO Detection and Alarm. When one or more sleeping rooms are added or created in existing dwellings, the entire existing building shall be provided with smoke detectors, heat detector and carbon detectors designed, located and installed in accordance with the provisions for new construction. Must submit for review plan layout of entire existing dwelling showing location of detection as per new construction

Specifications on Each Type of Fire Alarm Detection Devices Being Proposed

Up-Loaded in Open-Gov Portal Under Attachments

- o Smoke Detector model number.
- o Combination Detectors (Smoke and CO) model number.
- o Heat Detector model number.

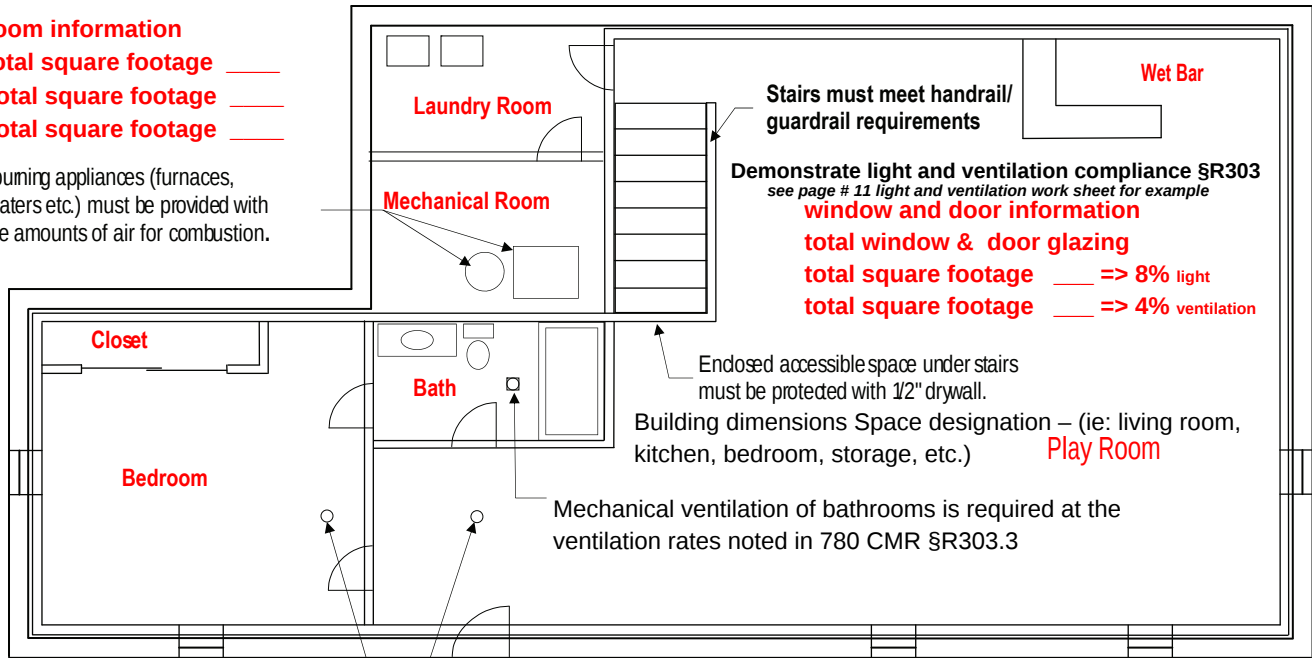
Completed Mechanical Application

- Identify the location and supply spec's of required mechanical ventilation of bathrooms at the ventilation rates noted in 780 CMR §R303.3
- 2015 IECC R403.5 Mechanical ventilation (Mandatory). Location of unit must be marked on plans Specification along with installation manual must be submitted.
- If utilizing existing equipment, you MUST submit a heat loss calculation showing existing loads and also proposed new loads (manual J)
- Heating system location, size (BTU), location of fuel source and method of combustion air make-up (manual S)
- Solid fuel burning appliance location, size, installation manual and method of combustion air make-up
- Location of ductwork...if installed in exterior wall, the Energy Conservation Application Form noted above must reflect decreased R-value or indicate method of maintaining exterior wall integrity (manual D)
- Complete mechanical permit

Typical Basement Conversion to Habitable Space

room information
total square footage _____
8% of total square footage _____
4% of total square footage _____

All fuel burning appliances (furnaces, water heaters etc.) must be provided with adequate amounts of air for combustion.

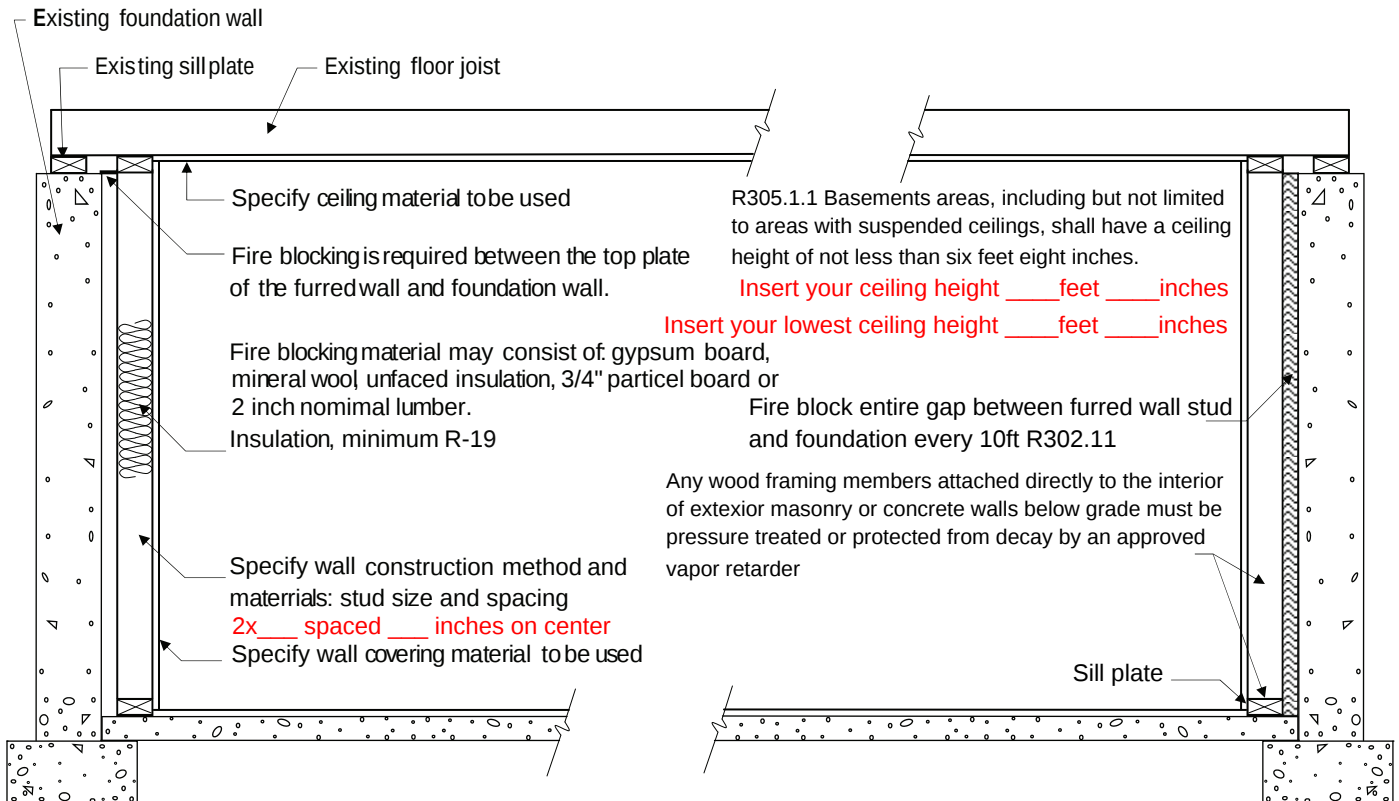


All sleeping rooms must have an emergency escape window. §R310
See detail on next page

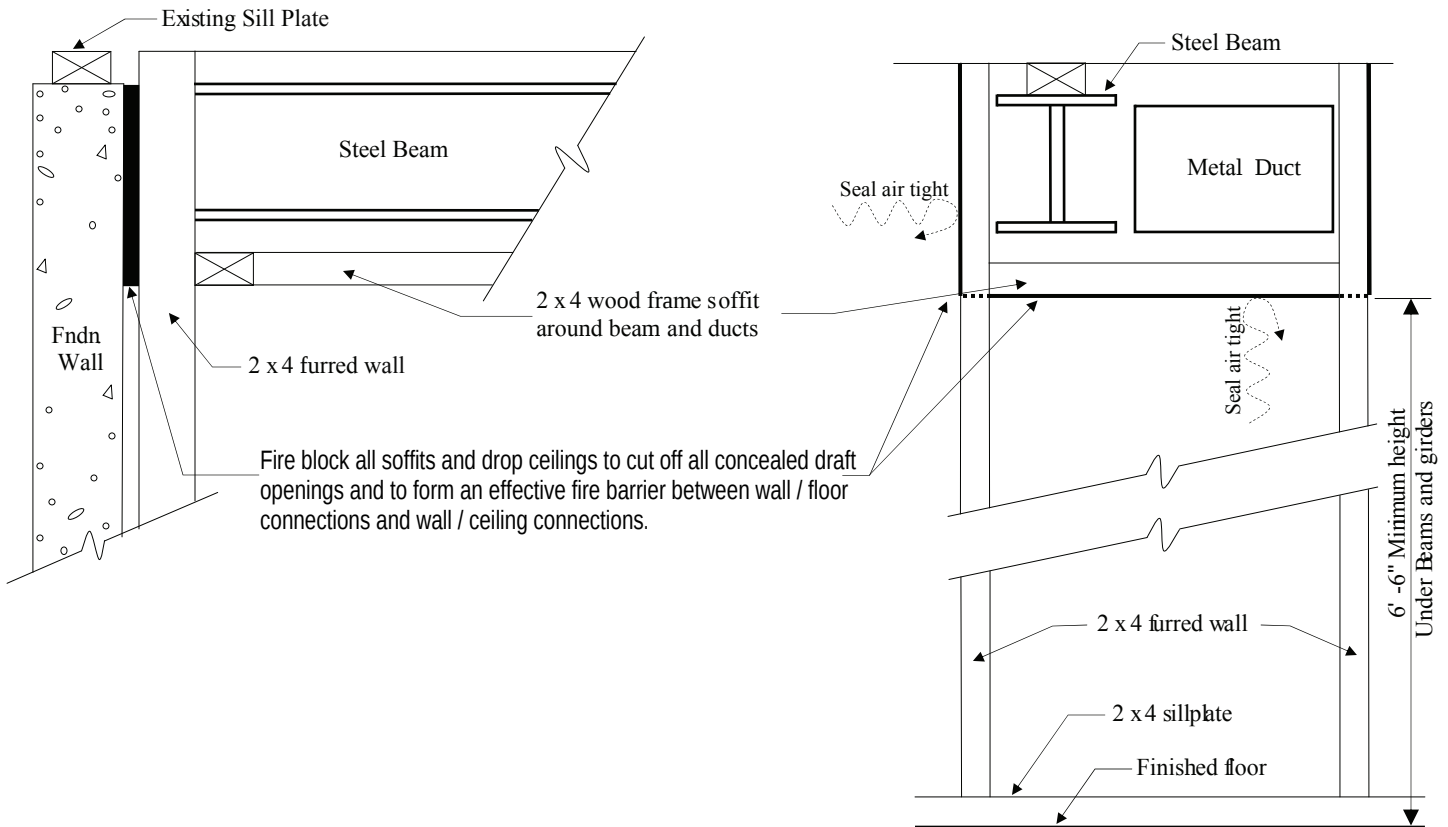
§ AJ102.3 Smoke Heat Detection and Carbon Monoxide Alarm Systems and CO Detection and Alarm. When one or more sleeping rooms are added or created in existing dwellings, the entire existing building shall be provided with smoke detectors, heat detector and carbon monoxide detectors designed, located and installed in accordance with the provisions for new construction, 780 CMR

see page # 13 fire detection location

FLOOR PLAN FOR BASEMENT FINISH

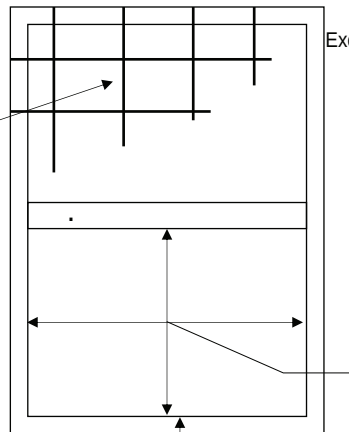


TYPICAL WALL SECTION



SOFFIT FIRESTOPPING DETAIL

Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape opening or window wells provided they meet the minimum net clear opening requirements and such devices are releasable or removable from the inside without the use of a key, tool, special knowledge or force greater than that which is required for normal operation of the escape and rescue opening.



44" Max. sill height for egress (bedroom) ____" (insert your sill height)

EMERGENCY ESCAPE WINDOW DETAIL

windows measured from floor to top of sill

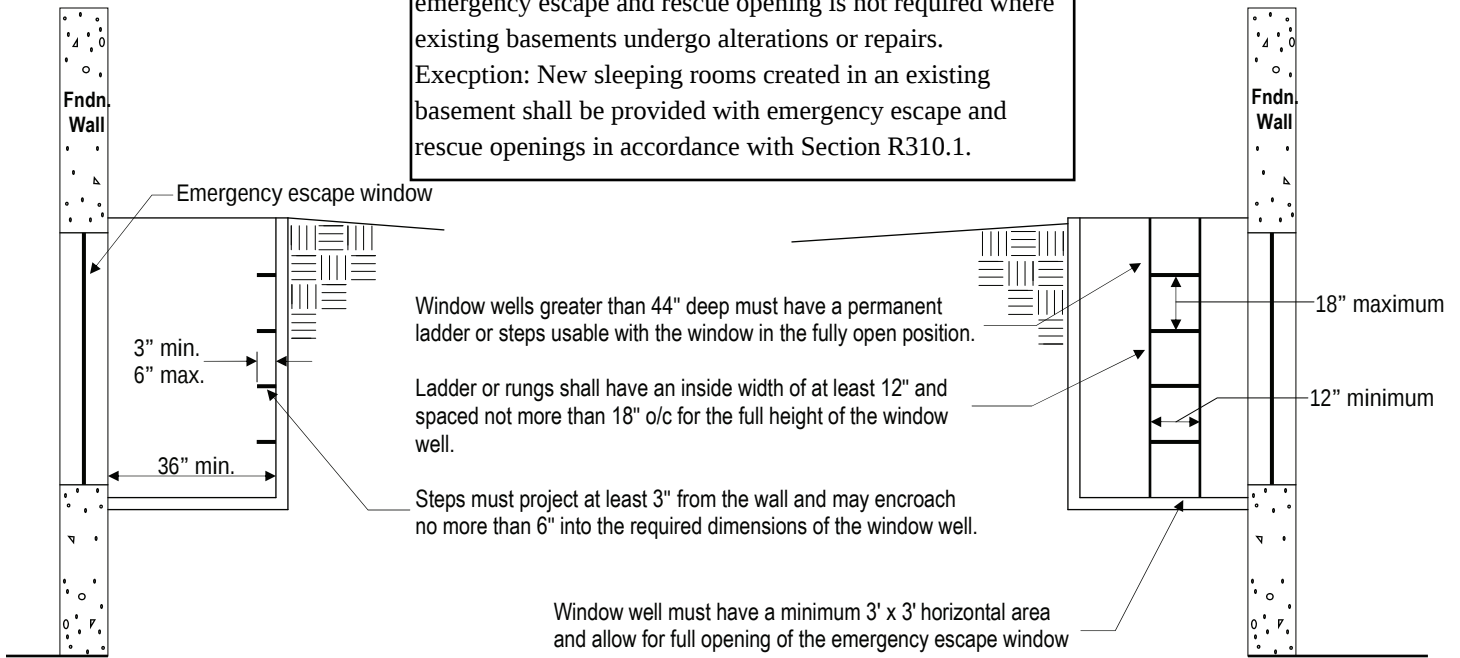
Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge.

§ R310 Minimum Opening Area.

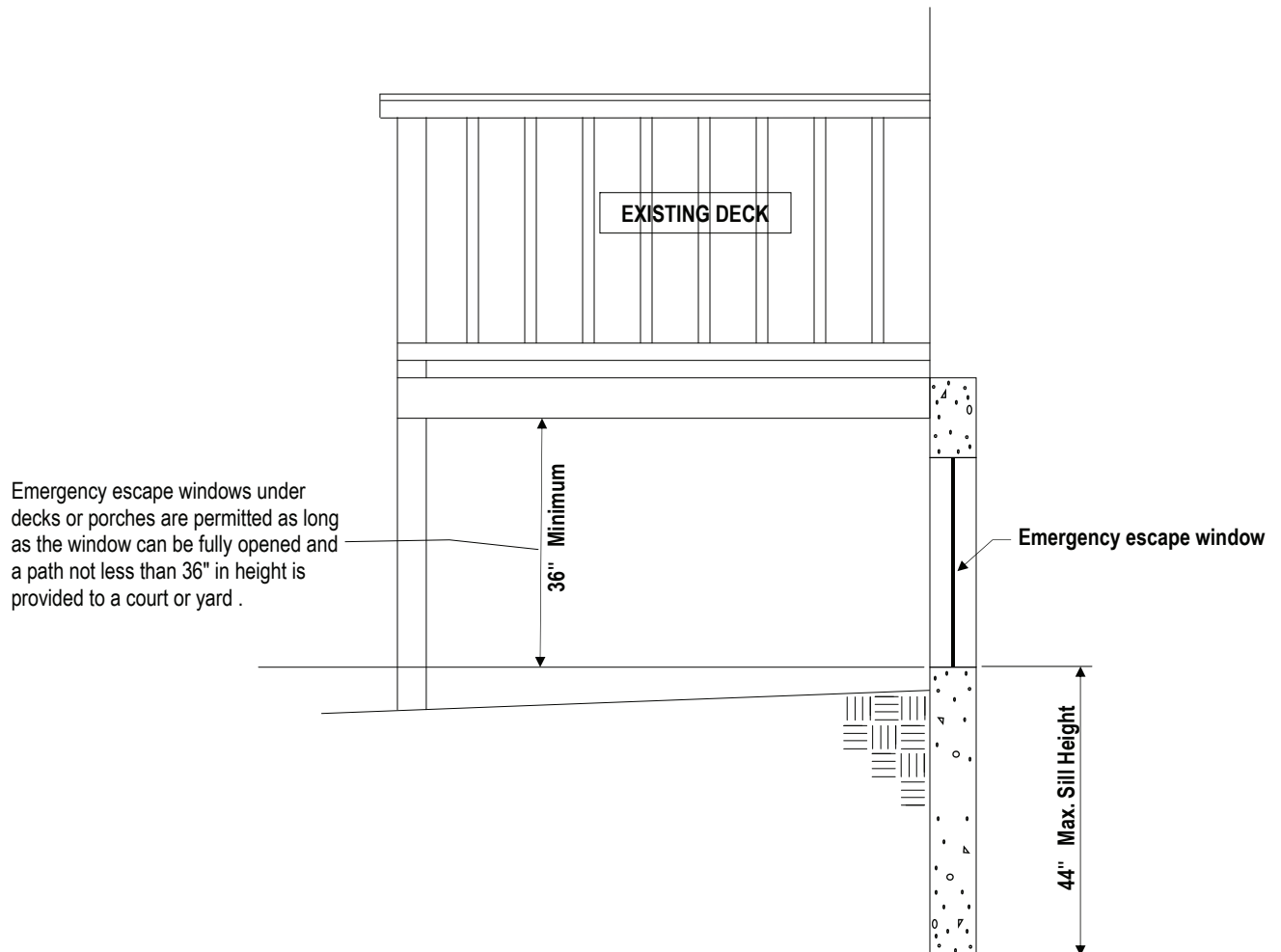
All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet.

- Exceptions:
1. Grade floor openings shall have a minimum net clear opening of five square feet (0.465 m²).
 2. Double hung windows used for emergency escape shall be permitted to have a net clear opening of 3.3 square feet (0.31 m²) provided that at least one operable sash meets the minimum height and width required by 780 CMR § R310.1.2 and § R310.1.3 and operational constraints defined by 780 CMR § R310.1.4.

R310.6 Alterations or repairs of existing basements. An emergency escape and rescue opening is not required where existing basements undergo alterations or repairs. Exception: New sleeping rooms created in an existing basement shall be provided with emergency escape and rescue openings in accordance with Section R310.1.

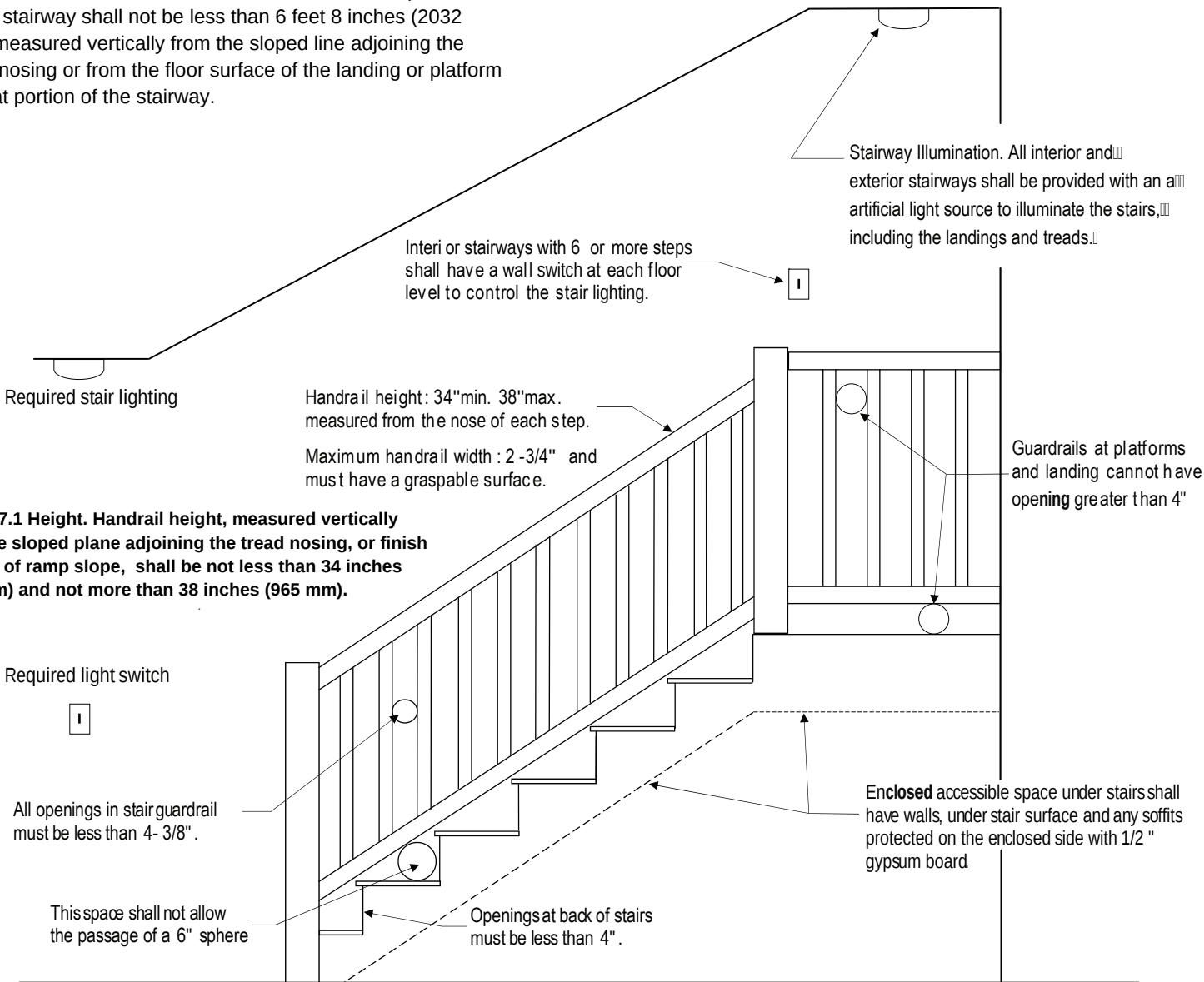


EMERGENCY ESCAPE WINDOW WELL DETAIL

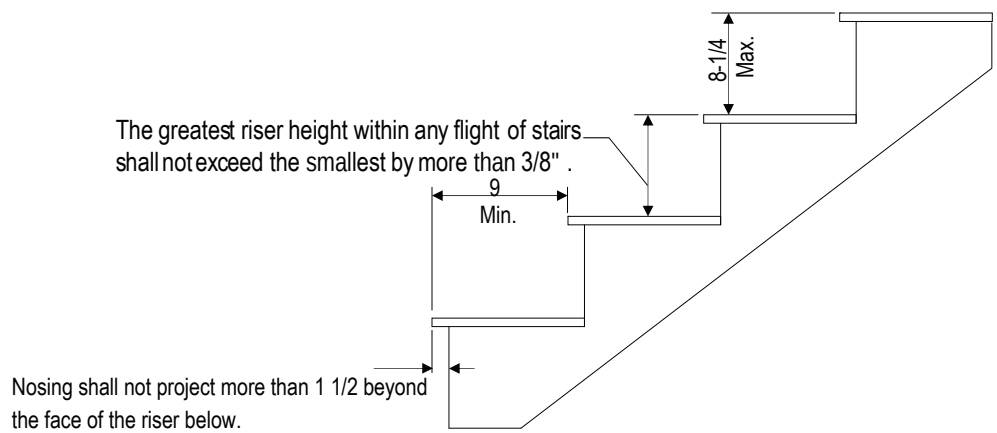


EMERGENCY ESCAPE WINDOW UNDER EXISTING STRUCTURES

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.



INTERIOR STAIR DETAIL



TREAD AND RISER DETAIL

CHECKLIST FOR APPLICATION CHECKLIST

1. Owner's Authorization Form Completed
2. Signed contract between homeowner and the registered home improvement contractor subject to MGL c 142
3. In lieu of submitting a signed contract as the owner of record, the owner shall submit Signed Affidavit for Home Improvement Contractor Required Contract Terms
4. Electronic Set of plans for the building or structure
5. Mechanical Application (If applicable)
6. Smoke Detector Application (co-smoke application under Building Department portal)
7. Sprinkler install approval, which must include a Fire Protection Narrative Tier 1 at a minimum, for cost effectiveness you may include Tier 2 for review simultaneously for review
8. Copies of Variances or Special Permits Granted by The Planning Board of Zoning Board of Appeals or any other Town Boards
9. Worker's Compensation **Affidavit**
10. Insurance Binder from Insurance Company made out to the Town
11. Homeowner License Exemption (If applicable)
12. Copy of Construction Supervisor License
13. Copy of Home Improvement Registration (If applicable)
14. Statement for disposal of debris (If applicable)
15. Massachusetts Energy Compliance Report

1 "Whoever is aggrieved by an interpretation, order, requirement, direction or failure to act by any state or local agency or any person or state or local agency charged with the administration or enforcement of the state building code or any of its rules and regulations, except any specialized codes as described in section 96, other than the specialized stretch energy code developed and promulgated by the department of energy resources, may within forty-five days after the service of notice thereof appeal from such interpretation, order, requirement, direction, or failure to act to the appeals board. Appeals hereunder shall be on forms provided by the appeals board and shall be accompanied by such fee as said appeals board may determine." G. L. c. 143, § 100, second paragraph (effective as of June 24, 2021).

Natural Light and Ventilation Worksheet

Space Designation	Floor Area Square Feet	Light (8% Required)	Light (Actual)	Ventilation (4% Required)	Ventilation (Actual)

Natural and Mechanical Ventilation:

Each habitable room must be provided with natural ventilation through open screened window or door areas that total at least 4% of the floor area of the room. As an alternative, the code permits mechanical ventilation. Most major manufacturers of ventilation equipment offer balanced supply and exhaust fan units for this purpose. Simple exhaust fans are not permitted since the resulting negative house air pressure is a safety hazard and infiltration is insufficient. Another code permitted alternative is to provide outside air directly into the return air plenum of a forced air HVAC unit in the required amount of 15 CFM per bedroom plus 15 CFM. Mechanical ventilation equipment manufacturer's specifications must be provided. (AJ501.6)(2009 IRC, R303)

Equation below is how to convert square inches to square footage

1st Equation is for natural light (8%)

$37 \text{ inches} \times 57 \text{ inches} = 2,109 \text{ square inches} / 144 = 14.65 \text{ square footage}$

2nd Equation is for natural ventilation (4%)

$33.87 \text{ inches} \times 24.50 \text{ inches} = 828.8 \text{ square inches} / 144 = 5.76 \text{ square footage}$

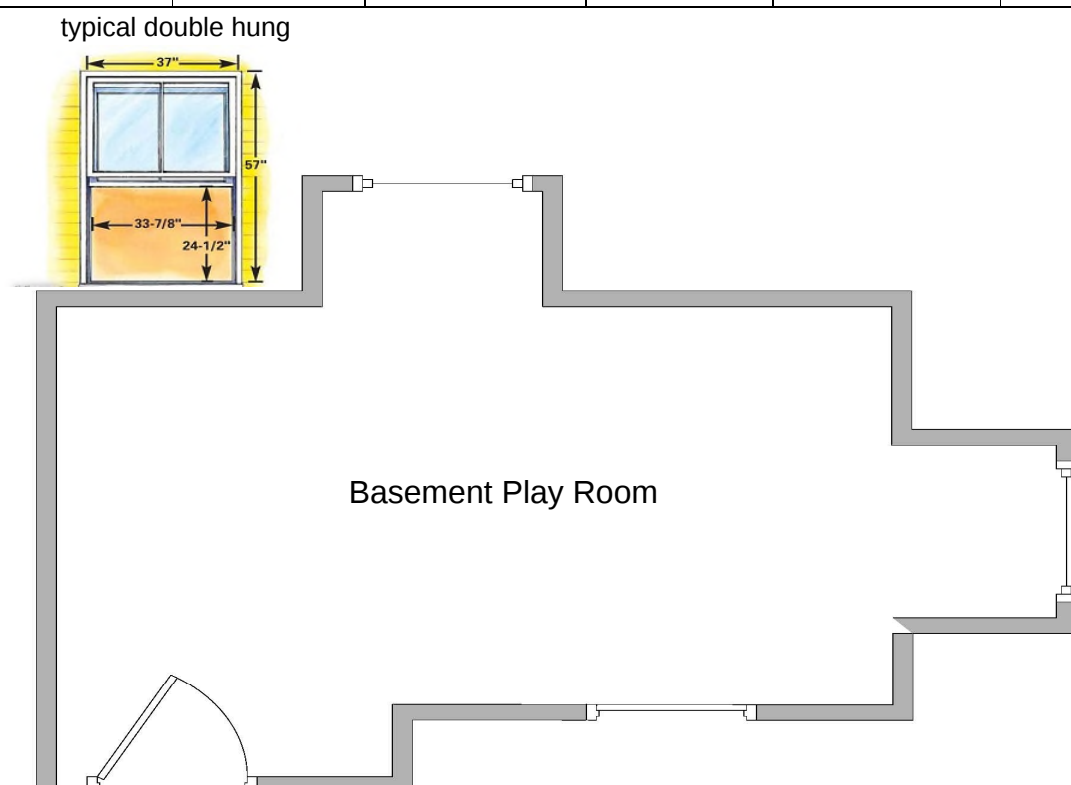
This space has three windows one door with no screen.

Natural light would be each window 14.65 time three window equals 43.95 square feet

Natural ventilation would be each window 5.76 times three windows equals 17.28 square feet

example of natural light and ventilation work sheet

Space Designation	Floor Area Square Feet	Light (8% Required)	Light (Actual)	Ventilation (4% Required)	Ventilation (Actual)
Basement Play Room	336	26.88	43.95	13.44	17.28



SECTION R314 SMOKE ALARMS

R314.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning *equipment* provisions of NFPA 72.

R314.2 Smoke detection systems. Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. The system shall be monitored by an *approved* supervising station and be maintained in accordance with NFPA 72.

Exception: Where smoke alarms are provided meeting the requirements of [Section R314.4](#).

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 but 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.

When more than one smoke alarm is required to be installed within an individual *dwelling* unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

R314.3.1 Alterations, repairs and additions. When *alterations*, repairs or *additions* requiring a *permit* occur, or when one or more sleeping rooms are added or created in existing *dwellings*, the individual *dwelling unit* shall be equipped with smoke alarms located as required for new *dwellings*.

R314.5 Heat Detector. A single heat detector listed for the ambient environment shall be installed in:

1. Any integral garage ("garage under") or attached garage to the main house (detached garages do not require a heat detector).
2. A new addition attached garage to an existing dwelling. If the existing house contains a fire detection system that is compatible with the garage heat detector, then the detector shall be interconnected to the existing system. Where the existing fire detection system is not compatible with the garage heat detector, the garage heat detector shall be connected to a sounder (occupant notification appliance) or compatible heat detector containing a sounding device, located in the dwelling and within 20 feet (6096 mm) of the nearest door to the garage from the dwelling. The required garage heat detector is neither required to incorporate audible alarm notification nor is any audible notification device required in the garage.

R314.5.1 Heat Detector Placement. For flat-finished ceilings, the single heat detector shall be placed on or near the center of the garage ceiling. For sloped ceilings having a rise to run of greater than one foot in eight feet (305 mm in 2438 mm), the single heat detector shall be placed in the approximate center of the vaulted ceiling but no closer than four inches (102 mm) to any wall.

R315.1 Governing Regulations. Carbon monoxide alarms (alarms) for new construction and existing dwellings shall be furnished, installed and maintained by the owner in accordance with this section, M.G.L. c. 148, § 26F½, 527 CMR 31.00: *Carbon Monoxide Alarms*, 248 CMR, NFPA 720 and the manufacturer's instructions.

R315.2 Installation Locations. One alarm shall be installed on each story of a dwelling unit, including basements and cellars (but not including crawl

spaces and uninhabitable attics). When mounting a carbon monoxide alarm on a story with a bedroom, the alarm, shall be located outside of bedrooms but no further than 10 feet of any bedroom door. If a combination smoke/carbon monoxide alarm is used, its location must comply with this section.

R315.3 New Construction. Alarms shall either be an interconnected 120V or part of a low voltage combination system or wireless system. Alarms shall have secondary (standby) power from monitored batteries in accordance with NFPA 72. For fire alarm control units (panels) and wireless systems, the panel battery shall serve as the source of secondary power. Alarms shall be UL 2034 or UL 2075 listed, as applicable. Alarms may be interconnected with fire alarms providing they are compatible and the fire alarms take precedence.

R315.4 Existing Dwellings. For existing dwellings, carbon monoxide alarms shall be provided in accordance with Section 315 for new construction, as applicable, for the following circumstances:

1. When one or more bedrooms are added or created in a dwelling unit, the entire dwelling shall be provided with alarms.
2. When a dwelling unit undergoes complete reconstruction such that all walls and ceilings are open to framing the entire dwelling unit shall be provided with alarms.
3. In an existing two-family dwelling, when one or more bedrooms are added or created in both of the two dwelling units, the entire building shall be provided with alarms.
4. In a townhouse building when one or more bedrooms are added or created in a dwelling then that dwelling unit shall be provided with carbon monoxide alarms.
5. In a townhouse building when a dwelling unit undergoes complete reconstruction such that all walls and ceilings are open to framing, that dwelling unit shall be provided with carbon monoxide alarms.