

SINGLE-FAMILY DWELLING DESIGN Checklist

(Abridged Summary of the 2015 IRC for 1- & 2-Family Dwellings & Townhouse Design)



This **Single-Family Dwelling Design Checklist** is based on St. Louis County's (SLCO) policies, construction codes amended and adopted by ordinance. See list below. It is not a substitute for those codes and ordinances, but serves as a guide to reading them. More information and explanation is provided in commentaries and interpretations published by St. Louis County and acknowledged code organizations.



List of Applicable Codes and Ordinances:

2015 International Residential Code (IRC) & Ordinance #27,654-Ch.1116 ("R" "G", "N", and "M" references and Appendix K - Sound Transmission).

2015 International Building Code (IBC) & Ordinance #27,654-Ch.1116\5 ("B" references).

2015 International Property Maintenance Code (IPMC) & Ord. #27,617-Ch.1110 ("PM" refs.).

2014 National Electrical Code (NEC) aka NFPA 70 & Ordinance #27,430-Ch.1102 ("E" references).

2015 Uniform Plumbing Code (UPC) & Ordinance #27,424-Ch.1103 ("P" references).

2015 Land Disturbance Code of St. Louis County, Missouri, Ordinance #21,578; 22,468; 24,084; 25,494 -Ch.1114 ("LD" references).

For inquiries regarding the information provided in this guide, please contact:

St. Louis County Permit Processing _____ (314) 615-5184

St. Louis County Zoning Review _____ (314) 615-3763

St. Louis County Building Plan Review _____ (314) 615-5485

Right-of-Way Owner

State _____ (888) 275-6636

County _____ (314) 615-8517

Municipality _____ Call the project site's Municipality

St. Louis County's Municipal Contracts Matrix shows those municipalities that currently contract for its Code Enforcement services. The Matrix is on our web site at

<https://stlouiscountymo.gov/st-louis-county-departments/transportation-and-public-works/residential-building/>

For the electronic plan review, scan QR code or visit us online at

<https://stlouiscountymo.gov/st-louis-county-departments/transportation-and-public-works/electronic-plan-review/>



Sections from the Codes, their Referenced Standards, and St. Louis County Ordinances, are shown at ends of statements and are *italicized* in parentheses (.).

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Submittal Requirements: Construction Drawings, Construction Notes & Drawing Preparation



- **Electronic Architectural/Structural** drawing sets shall contain general notes of construction and specifications and be properly sealed by a Missouri registered design professional (architect or professional engineer). The top sheet of submittal set shall be dated and stamped with an **electronic** seal and signed by the registered design professional. Subsequent sheets in set shall have the design professional's original or the **electronic** seal. The drawing set shall bear the name, business and email addresses and contact number of the registered design professional (*B107.1; SLCO Policy*).
- **Electronic Structural calculations**, where required, shall have a dated cover page **properly sealed with the **electronic** seal and signed by the registered design professional. Subsequent pages shall be sequentially numbered and totaled each page, starting with the cover as page 1. The cover page shall have the name, address and contact/phone number of the registered design professional (*R301.1; R301.1.1; R301.1.3; B107.1; SLCO Policy*).
- **Electronic Electrical and Mechanical Plans** with their Notes of Construction, Heat Loss/Heat Gain calculations and Energy Conservation calculations shall be **electronically** submitted for plan review. These documents are not required to be prepared, sealed, and signed by a licensed design professional (*SLCO Policy*).
- **Electrical Riser Diagram Drawings** shall be **electronically** submitted for electrical service provided at 600 amps or more, with wiring detailed from service entrance to sub panel. The drawings may be required to be sealed by a Missouri registered professional engineer, due to their complexity (*SLCO Policy*).
- **Plumbing Isometric Diagram Drawing(s) and General Notes** shall be **electronically** submitted when fixture count exceeds twenty-five (25). Fixtures counted include floor drains, hose bibs, refrigerators, washer appliances (both clothes- and dish-). These additional drawings submitted shall be either 1) dated, *properly sealed a Missouri registered professional engineer, or 2) dated and signed by a Licensed Missouri Plumber with valid, current License number noted (*SLCO Policy*).
- **Electronic Documents submitted** with a building permit application (along with items bulleted above) shall include **electronic** set of sealed drawings dimensioned, labeled, printed to an identified scale, and with the following minimum information:
 1. **Site Plan** (also see **Zoning Approval** requirements below)
 - a. Draw the lot configuration and dimension lot lines and:
 - 1) Show and dimension building outlines.
 - 2) Dash-outline and dimension the building's cantilevers, and any roof overhangs projecting out more than 18".
 - 3) Solid-outline, dimension, and label balconies, decks, wing walls, porches, patios, emergency escape wells, light wells, and other building projections.
 - 4) Dimension distance of any roof overhang edge less than 3'-0" from the property line.
 - 5) Note the building's top-of-foundation elevation and/or its finish floor elevation.
 - 6) Note the dwelling's number of stories.
 - 7) Note the basement as in-grade, walk-out, crawl space, or slab-on-grade.
 - 8) Show a driveway extending from the street into the lot and note its pavement type.
 - 9) Show and label any retaining walls and note their heights.

- 10) Show and identify any existing structures. Dimension their distances to the new dwelling (*R107.1, R302.1 & SLCO Policy*).
- b. Provide existing (after approved rough grading) and proposed finished grade elevations at each corner of the building, at each corner of the lot, and at the driveway entrance from the street. Existing grade elevations shall be based on existing site conditions or shall be taken from the approved subdivision improvement and/or grading plan. Use USGS Datum when available. Show with arrows surface drainage direction. Show and label any swales (*SLCO Policy*).
- Notice:** Provide finish grade elevations, with contour lines and/or spot elevations at 10'-0" intervals, around buildings with 4 floor levels. Locate and label the required lowest finished grade elevations between the basement wall and a point 6'-0" out from the wall. A structure 4 stories or more above grade shall be designed using the 2015 International Building Code. See "General Story Height Limitations" Section of this Guide for additional information (*SLCO Policy*).
- c. Provide finish grade elevations minimum 6" below top of foundation for wood frame and 4" below brick veneer on frame construction. Provide pressure-treated wood framing for members set on concrete or on masonry foundations less than 8" above exposed ground, and for all other wood less than 6" from the ground (*R317.1; R404.1.6*).
- d. Show and note grade slopes away from the foundation and/or to a swale, with a minimum drop of 6" in the first 10'-0". Impervious surfaces within 10'-0" of the building foundation shall be sloped away from the building a minimum of 2 percent (*R401.3; SLCO Policy*).
- e. **Notice:** Provide the following sentence, shown in quotes, on the Site Plans: "Siltation and erosion control measures must be provided to prevent siltation/erosion from leaving the construction site" (*SLCO Policy*).
- f. Provide a North directional arrow. Dimension front, side and rear yard clearances from house walls to property lines. Dimension front building line distance to property line (*SLCO Policy*).
- g. Show and dimension the areas of any easements on the lot. Show and name the locations of street(s) adjoining the lot (*SLCO Policy*).
- h. Note on the site plan the lot's number, the block number (if any), plat or addition to subdivision number and recorded subdivision name (*SLCO Policy*).
- i. Show and label the location of any on-site sewage disposal system and/or well, as applicable.
- j. The site plan shall be sealed by a Missouri Registered Professional Engineer for Dwellings proposed on compacted fill, or for Dwellings proposed on other-than spread footings (*B107.1; R401.4; R403.1.8; SLCO Rev. Ord. R106; SLCO Policy*).
- Exception:**
An approved properly sealed soil compaction report already on file, OR a Missouri registered Professional Engineer with geotechnical expertise submits an **electronically** dated, sealed and signed letter noting he/she is retained to observe the excavation for adequate bearing (*SLCO Policy*).
- k. Site plans of new work on properties in unincorporated St. Louis County, that shall have any portion of the lot located in the 100-year floodplain, shall be properly sealed by a Missouri Registered Design Professional and shall note the following (*B107.1; SLCO Rev. Ords. R107.1; R322.1; R322.1.5; R322.2.1; SLCO Policy*):
- 1) Lowest floor elevation at least 1'-0" above the 100-year flood plain elevation;
 - 2) The 100-year floodplain elevation, the floodplain boundary location, the floodway boundary, and the FIRM panel and edition.

Notice: Before the required foundation inspection is approved, and to ensure the LOMR required prior to occupancy can be obtained, a dwelling constructed in a flood plain must have the lowest floor elevation and the as-built low sill elevation certified by a Missouri Registered Professional Engineer, Architect or Registered Land Surveyor (*B110.1; B110.3; SLCO Rev. Ords. R111.1; SLCO Policy*).

2. **Architectural/Structural Plans** (*B107.1 & SLCO Policy*):
 - a. Foundation/Basement Plan(s) & Details.
 - b. Floor Plan(s).
 - c. Exterior Building Elevations (each side).
 - d. Show and identify members in Structural Framing Layout & all supporting Structural Elements.
 - e. The prescriptive or performance-based lateral bracing design method(s) shall be shown and labeled on the drawings. The locations of Braced Wall Lines (BWL), Lateral Braced Wall Panels (BWP) and/or Shear Wall Panels – as well as any required Hold-Down Devices - shall be shown, identified, with panel widths dimensioned on the floor plans or in the elevation views.

Exception: Braced Wall Lines (BWL) do not need to be identified when using the Basic Bracing Method.
 - f. Wall Sections and Stair Section(s).
 - g. Fireplace plan and construction/assembly section details in the sealed drawings submitted with the permit application and;
 - 1) Submit **electronic** set of the pre-fab fireplace manufacturer's installation manual that provides the appliance's proof of testing per UL-127 by a nationally recognized testing agency, only when the design professional has noted the specific manufacturer, model, fuel type and method of ventilation in the sealed drawings;
OR
 - 2) If not noted in the sealed drawings, submit a set of the manufacturer's installation manual. Hardcopy set to be kept readily available on job site for Inspection Staff use (*SLCO Policy*).
 - h. Other Sections and Details as determined to make construction requirements clear.
 - i. Specifications and General Notes of Construction and Materials Requirements.
3. **Truss Drawings** (*SLCO Rev. Ords. R502.11.1; R502.11.4; R802.10.1; R802.10.2*)
 - a. Manufacturer's Layout Plan of Truss Assembly and Truss Identification Location.
 - b. Truss Design Drawings Sealed by Missouri Registered Professional Engineer.
4. **Electrical Layout Plan(s)**

Provide a symbols key and locations in plans of all electrical devices, like receptacles, lights and switches, smoke and carbon monoxide alarms, and the electrical panel with its capacity noted.
5. **Mechanical Plan(s)**
 - a. Show locations and sizes of Ducts, Supply and Return Air Grilles, and Mechanical Equipment.
 - b. Gas Flue Section with Elevation Details & Schedules.
 - c. Heat Loss & Heat Gain Calculations for each Zone.
 - d. Whole-House Mechanical Ventilation System (*M1507*).
 - e. For Ground Source Heat Pump Systems, provide site plan layouts showing the locations and number of wells or the locations, quantity, and dimensioned extent of loops (*M2105*).
6. **Master Plans** drawing submittals shall include:
 1. An outline of the approved building plan, scaled to fit within a 4"x4" area and with each exterior wall dimensioned,
AND:

2. Show in dashed outline and label all options that change the footprint, like cantilevered bays; fireplaces and chimneys; light and window escape wells; extensions like decks, covered patios, front porches.
 3. For any habitable room or space options, provide Mechanical Plans as noted in Item 5 above. Examples are Hearth Room or Finished Basement as options.
- **Zoning Approval**
 1. Site plans and building plans for new dwellings in unincorporated St. Louis County must comply with St. Louis County Zoning Ordinances. Plans for dwellings proposed within contracting municipalities shall be reviewed and approved by the municipality for compliance with zoning and other local ordinances prior to issuance of a permit (*B107.2.5; SLCO Revised Ord. R107.1*).
 2. Before occupancy is granted of a dwelling within a 100-year flood elevation, submit a Letter of Map Revision (LOMR) obtained from FEMA, in which is noted the removal of building or structure from the special flood hazard area (*SLCO Revised Ord. R110.1; B110.3.14.1*).
 - **On-Site Wells or Sanitary Sewage Disposal System Require Separate Permit & Approval**
 1. Only the Missouri Department of Natural Resources (DNR) regulates and issues permits for on-site wells. Check the DNR website and contact them for permit requirements.
 2. A separate permit is required from St. Louis County Plumbing Inspections for any proposed individual sewage disposal system. Obtain the application and instructions for an individual sewage disposal system from St. Louis County' Code Enforcement offices or website under Public Works-Applications-Forms-Septic. Be aware a Missouri Registered Professional Engineer must conduct a Percolation or Soil Morphology Test from which a site design for the Sewage Disposal System is completed. The building permit will not be issued until the septic system permit is approved.
 - **Land Disturbance** (*SLCO Rev. Ord. LD106.3*)
Get a required separate Major Land Disturbance permit where the property's new work excavated and fill areas exceeds 1 acre. The separate permit requirement applies to unincorporated areas and to municipalities contracting with St. Louis County for Land Disturbance enforcement:
 - **Retaining Wall** (*SLCO Rev. Ord. B105.2-Item 4; SLCO Policy*):
A separate building permit is required for any of the following retaining wall conditions:
 1. The wall exceeds 3'-0" in height, measured from grade at base of exposed wall face to top of wall.
 2. The wall exceeds 2'-0" in height and supports a surcharge load (driveway, pool, or sim. structure).
 3. The wall's distance from the property line is less than or equal to its height.
 4. The wall with fence or guardrail at top has a total combined height exceeding 6'-0".
 5. The wall would block or affect an existing swale or drainage path.
 - The owner of the property, or their authorized agent, is responsible for contacting their project site's local fire protection district, and subdivision trustees as applicable, for their respective requirements and approval prior to beginning construction.
 - **Construction Site Access:**
A building permit issued for a new work dwelling does not authorize construction access to the project site. If no driveway entrance to the site exists, or it is unavailable for construction access, the owner/contractor must apply with the Owner of the Right-of-Way to obtain a separate permit to construct a temporary entrance.

General Story Height Limitations For Frame Construction



- Dwellings are limited to 3 stories above the grade plane. Building height is the vertical distance measured from grade plane to the average height of the highest roof surface. Lateral unsupported stud heights shall not exceed heights provided in Table R602.3(5) of the 2015-IRC (*R202; SLCO Revised Ords. R101.2*).

Notice: A basement shall be considered a story above the grade plane, where grade and building elevations show the finished surface of the floor above the basement is:

1. More than 6'-0" above the grade plane; or
2. More than 6'-0" above finished ground level for more than 50% of the building perimeter; or
3. More than 12'-0" above the finished ground level at any point.

Minimum Room Dimensions



- A living room shall be provided with 120 sq. ft. minimum, and each bedroom shall be 70 sq. ft. minimum. For multiple-occupant bedrooms, provide minimum 50 sq. ft. per occupant (*PM404.4.1*).
- Each habitable room (used for living, sleeping, eating, cooking), except kitchens, shall be 70 sq. ft. minimum and shall not be less than 7'-0" in any horizontal dimension (*R304.1; R304.2*).
- Ceiling heights shall be minimum 7'-0" in habitable spaces, hallways and finished basements of habitable rooms. Provide minimum 6'-8" ceiling height in bathrooms, laundry, and toilet rooms (*R305.1*).
Exceptions:
 1. Rooms with sloped ceilings shall have a ceiling height of 7'-0" over at least 50% of the room's required floor area. The balance of the required floor area shall have a minimum ceiling height of 5'-0".
 2. Provide minimum 6'-8" ceiling at front-center of each bathroom fixture's required clearance area for intended use of fixture, including 30"x30" clear area at tub/showerhead (*R305.1-Exception 2*).
- New work unfinished basements shall allow for code-compliant future conversion to a finished basement by providing the minimum required area and ceiling height clearances noted (*SLCO Policy*).

Concrete, Footings & Foundations



- Concrete slab-on-ground floors shall be minimum 3-1/2" thick and shall be placed over 4" minimum thick gravel or crushed stone base course. This includes garage slabs that are below outside grade. Between the concrete floor slab and base course, place 6-mil polyethylene barrier with joints lapped 6" minimum. **Exception:** A polyethylene barrier not required under either garage slabs or exterior flatwork that is not intended to be enclosed in the future (*R506; R506.1*).
- Minimum compressive strength of concrete shall be for Severe weather potential (*Table R402.2*): 2500 PSI – Basement Slabs & Footings.

3000 PSI – Basement Walls, Foundation Walls & Exterior or Exposed Vertical Work.
 3500 PSI – Porches, Walks, Patios, Steps, Garage and Carport Slabs & Driveways.

- Concrete shall be air-entrained for all basement walls, foundations, porches, walks, patios, steps, garage and carport floor slabs and driveways. Basement slabs and interior slabs shall be air entrained if subject to freezing and thawing (*Table R402.2*).

Footings

- The bottom of exterior footings shall extend 12” minimum into undisturbed soil, shall be minimum 2'-6" below finished grade and shall bear on undisturbed soil (*R403.1.4; SLCO Rev. Ord. Table R301.2(1)*).
- The foundation wall shall be centered on the footing. Footings shall be keyed to, or held with vertical reinforcing extending into, the foundation(s) they support (*SLCO Policy*).
- Footing thickness shall be minimum 6” and not less than footing’s projection past the face of the foundation wall (*R403.1.1*).
- Footings shall project minimum 2” past both sides of foundation, and each projection shall not exceed the thickness of the footing. This means footing thickness must be increased to at least match the length of the projection needed for the footing size required (*R403.1.1*).
- The following Table provides minimum footing widths based on the Default or Certified soil-bearing capacity of the dwelling’s construction site. See the numbered notes below the Table for related requirements (*R403; Tables R403.1(1)(2)(3); SLCO Policy*):

MINIMUM FOOTING WIDTH SIZES REQUIRED FOR BEARING:				
	1500-PSF SOIL BEARING DEFAULT ON UNDISTURBED SOIL		2000-PSF SOIL BEARING CERTIFIED BY A MISSOURI PROFESSIONAL ENGINEER ¹	
	Framed Wall	Framed Wall with Brick Veneer	Framed Wall	Framed Wall with Brick Veneer
1 Story slab on Grade	12”	12”	12”	12”
1 Story w/Basement	21”	24”	16”	18”
2 Story slab on Grade	15”	21”	12”	16”
2 Story w/Basement	24”	30”	18”	23”
3 Story Slab on Grade	23”	32”	17”	24”
3 Story w/Basement	27”	36”	21”	27”

1. A Missouri registered professional engineer with geotechnical expertise shall provide a dated, sealed and signed certification letter on a per lot(s) basis, or provide a dated, properly sealed and signed compaction report for the entire subdivision.

1. Stepped footing lengths shall be labeled and dimensioned in plans and elevations. Include structural section details of construction (*R403.1.5; SLCO Policy*).
2. Interior footings integral with a concrete slab shall be minimum 12" deep x 16" wide, unless properly sealed calculations submitted verify adequacy of smaller size (*SLCO Policy*).

Foundations

- **Notice:** For masonry, wood and ICF foundation design requirements, see Chapter 4 of the 2015 International Residential Code (IRC) and St. Louis County Ordinances.
- Where unstable soil or groundwater conditions do not exist, concrete foundation walls may be constructed in accordance with the following Table R404.1.2(10) (SLCO Rev. Ord. R404.1.3.2; Table R404.1.2(10)):

Maximum Wall Height	Maximum Depth of Unbalanced Backfill	Minimum Nominal Wall Thickness (For Soil Classes SC, MH, ML-MC & Inorganic CL)
7'-0"	6'-0" or less	8"
	7'-0"	10" ^a
8'-0"	8'-0" or less	8" ^a
9'-0"	9'-0" or less	10" ^b

- Construct concrete foundation walls with height measured upward from the top of the footing. Provide a minimum of (2) two #4 reinforcing bars placed horizontally in the top and bottom of the foundation walls. Provide a minimum of two (2) #5 reinforcing bars on all sides of window and door openings in concrete foundation and basement walls, and extend the bars a minimum of 24" beyond the corners of the openings.
 - Construct concrete foundation walls with height measured upward from the top of the footing. Provide a minimum of (2) two #5 reinforcing bars placed horizontally in the top, middle, and bottom of the foundation walls. Provide a minimum of two (2) #5 reinforcing bars on all sides of window and door openings in concrete foundation and basement walls and extend the bars a minimum of 24" beyond the corners of the openings.
- Concrete foundation thickness shall be equal to or greater than the thickness of the wall the foundation supports. Where a concrete foundation thickness is reduced to provide shelf support of masonry veneer, the reduced thickness shall be equal to or greater than the thickness of the wall in the story above (R404.1.5; R404.1.5.2).
 - **Notice:** Concrete foundation stem walls (no basement) not laterally supported at the top and with light-frame, braced wall panel construction bearing upon it, shall have minimum 1 continuous #4 horizontal reinforcing bar within 12" of the stem wall's top and bottom (R404.1.3.2; R404.1.3.2.2).
 - Submit properly sealed structural calculations for the following (R404.1.1):
 1. Reinforced or plain concrete/masonry foundations not designed in accordance with the requirements of the IRC Tables in Chapter 4 (R404.1; R404.1.2; R404.1.3).
 2. Foundation(s) subject to hydrostatic pressure from groundwater.
 3. Foundation(s) supporting more than 48" of unbalanced backfill and without permanent lateral support at the top of the foundation.
 4. For dwellings with their footings supported on piers, submit structural drawings properly sealed by a Missouri Registered Design Professional (R301.1.3).
 - 1-and 2-Family Dwellings foundation anchorage requirements are as follows:
 1. Space minimum 1/2" diameter anchor bolts 6'-0" o.c. maximum around entire foundation.
 2. Extend bolts 7" minimum into foundation through 2x treated wood sill plate, and secure to sill plate with minimum 1-1/2" dia. washers and nuts.
 3. Grout the sill plate level or provide sill sealer with approved shim materials and methods.

4. Place anchor bolts 4"-12" from the ends of a sill plate segment and;
5. Place anchor bolts in the middle 1/3 of the plate width.
6. Provide minimum anchor 2 bolts per sill plate segment, regardless of plate segment length.

Notice: Provide 2" x 2" x 3/16" square washers in place of 1-1/2" dia. washers for anchor bolts securing portal frame panel construction (*R403.1.6; R602.10.6; R602.11; SLCO Policy*).

- Townhouse foundation anchorage requirements area as follows:
 - a. Space minimum 1/2" diameter anchor bolts 6'-0" o.c. maximum around entire foundation for buildings 2-stories maximum in height.
 - b. Space minimum 1/2" diameter anchor bolts 4'-0" o.c. maximum around entire foundation for buildings more-than-2-stories in height.
 - c. Extend bolts 7" minimum into foundation through 2x treated wood sill plate, and secure to sill plate with minimum 3" x 3" x 0.229" plate washers and nuts.
 - d. Provide the same anchorage requirements at interior sill plates on continuous footings supporting bearing walls.
 - e. Grout the sill plate level or provide sill sealer with approved shim materials and methods.
 - f. Place anchor bolts 4"-12" from the ends of a sill plate segment and;
 - g. Place anchor bolts in the middle 1/3 of the plate width.
 - h. Provide minimum anchor 2 bolts per sill plate segment, regardless of plate segment length (*R403.1.6; R403.1.6.1; R602.11.1*).
- Porch haunches or brackets require reinforcing, shown and labeled in drawings (*SLCO Policy*).

Waterproofing & Dampproofing



- Foundations or portions of it that retain earth and enclose interior spaces and floors below grade shall be waterproofed in the presence of groundwater, or dampproofed if there is no presence of groundwater (*R406.1; R406.2*).
- An evaluation of the soil is required to determine the presence or absence of ground water. The evaluation report shall be based on either a subsurface soil investigation or satisfactory data from adjacent areas together with an inspection of the excavation prior to pouring concrete (*SLCO Rev. Ord. R405.1.2*).
- Groundwater present - Provide drain tile, perforated pipe, or other approved drainage system such as an approved water channel system around the outside and inside of the foundation perimeter. Drain discharge shall be by gravity to daylight or be connected to a basement floor sump (*B104.11; B104.11.1; B104.11.2; SLCO Rev. Ord. R405.1.2.1*).
 1. Waterproof the foundation exterior with 2-ply hot-mopped felts; 55-pound roll roofing; 6-mil PVC; 6-mil polyethylene; 40-mil polymer-modified asphalt; 60-mil flexible polymer cement; 1/8" cement-based fiber-reinforced waterproof coating; or 60-mil solvent-free liquid-applied synthetic rubber. Lap and seal joints in the membrane waterproofing with a compatible adhesive noted by the manufacturer (*R406.2*).
 2. Apply waterproofing to the foundation exterior from top of the footing to finished grade (*R406.2*).
- No ground water present - Provide drain tile, perforated pipe, or other approved foundation drainage systems, such as an approved water channel system, around the outside or inside of foundation perimeter. Drain discharge shall be by gravity to daylight or be connected to a basement floor sump (*B104.11; B104.11.1; B104.11.2; SLCO Rev. Ord. R405.1.2.2*):

1. Damp-proof foundation exterior with a bituminous coating; 3-lbs. per sq. yd. of acrylic modified cement; 1/8" coat of surface bonding cement; or other materials approved for wall waterproofing, as listed in the "Groundwater present" section above (R406.1).
 2. Apply dampproofing from top of footing to finished grade (R406.1).
- Place an approved filter membrane over top of drain tile joints and pipe perforations. Set the drain tile on a minimum of 2" gravel or crushed stone and cover with 6" minimum gravel or crushed stone. Place the drain tile a minimum of 1'-0" beyond the outside edge of the footing and 6" above the top of footing (SLCO Rev. Ords. R405.1; R405.1.2.3).
 - Discharge the drainage system by gravity to daylight OR connect to an approved sump minimum 15" diameter and 18" minimum depth and with fitted cover. The sump pump is required for finished or partially finished basements, and its pump shall discharge by an approved method (P1101.6.2; Table R405.1; SLCO Rev. Ords. R405.1; R405.1.2.4).
 - Precast concrete foundations that retain earth, enclose below-grade habitable or usable space, and are set upon footings of crushed stone shall have a drain tile system provided with crushed stone bed and cover and drainage discharge as noted above (SLCO Rev. Ords. R405.1.1).
 - Provide a 6-mil polyethylene or approved vapor retarder, with joints overlapped 6" minimum, between concrete floor slab and the base course below it (R506.2.3).
 - Direct downspout discharge away from the foundation and away from adjoining properties, and be directed to not create a nuisance (P1101.1; P1101.2; P1101.7; P1101.11).
 - Direct sump pump discharge and roof drainage to a storm drain or to an approved water course.
 - **Notice:** discharging to or within 10'-0" of a property line, sidewalk, driveway, street or discharging that creates a nuisance to adjoining properties is prohibited (P1101.1; P1101.6; P1101.6.5; P1101.11).

Structural Framing & Sheathing



- Floor Joists spans shall comply with Tables R502.3.1(1) and R502.3.1(2). Joists under parallel bearing partitions shall be adequately sized to support the load. Bearing partitions perpendicular to joists shall not be offset from supporting beams, girders, or walls by more than the joist depth. Floor joists cantilevered to support a roof and an exterior bearing wall, or to support a balcony, shall comply with Table R502.3.3(1) or Table R502.3.3(2). Floor framing shall be attached to braced wall panels to provide a load path for wind forces (R502.3; R502.4; R602.10.8).
- Show and note the size, weight and spacing of each steel beam and column. Label wood beams and columns and note for each their size and spacing, and note their required fiber stress or species and grade of lumber. Identify each interior bearing wall (B107.2.1; R407; SLCO Policy).
- Show and note floor joist direction, size and spacing, and note either their fiber stress, or species and grade of lumber. Note and show in plan where floor joists and/or sheathing are to accommodate horizontal chase construction. Detail the chase construction (B107.2.1; R502.2; SLCO Policy).
- Provide floor framing that shall support the following minimum Live Loads/LL (R301.5):
 1. Floor areas other than sleeping rooms LL 40 lb. per sq. ft.
 2. Sleeping rooms LL 30 lb. per sq. ft.
 3. Balcony (Exterior) LL 40 lb. per sq. ft.
 4. Decks LL.40 lb. per sq. ft.

- Provide floor, roof and wall members that shall not exceed allowable deflection limits (*Table R301.7*).
- Provide cutting, notching, and/or boring holes in wood beams, joists, rafters, or studs that meet 2015-IRC limits (*R502.8; R602.6; R602.6.1; R802.7*).
- Floor, wall, and roof frame assemblies shall be nailed and fastened in accordance with Tables R602.3(1) through R602.3(4). Fasten interior gypsum board in accordance with Table R702.3.5. Comply with Table R602.3(1) for fastening gypsum sheathing (*R602.3; R503.2.3; R803.2.3*).
- In walls with studs spaced at 24" o.c., any joists, trusses or rafters spaced more than 16" o.c. shall bear on the double top plates within 5" of the studs in the wall below, unless the wall has 3 top plates, or 2-2x6 or 2-3x4 top plates (*R602.3.3*).

Wall Framing

1. Wall construction and its wood and wood-based products and connections shall be structurally adequate to support loads exerted on them, shall adequately transfer loads to supporting members, and shall comply with the Code's wood-framing requirements (*R301; R601; R602*).
2. Dimension wall height from the bottom of the sole/sill plate to the top of the top plate. A tolerance of +/-2" is allowed, so a 10'-0" wall height drawn may be 10'-2" in the field (*R602.3; SLCO Policy*).
3. Show and note the quantity, size, and grade of wood headers and the gauge/thickness of steel lintels over exterior wall openings (*B107.2.1; R602.7; R708.3; Table R708.3.1; SLCO Policy*).
4. Wood structural panel box headers shall comply with R602.7.3 and Table R602.7.3, or drawn and calculated/justified using accepted engineering practice (*R301.1.1; R301.1.2; R301.1.3*).

Wall Bracing

1. Brace 1-and 2-family dwellings and accessory structures to resist wind forces in accordance with 2015-IRC prescriptive methods, or in accordance with SLCO's (St. Louis County's) Basic Bracing method guide. SLCO's Appendix A1 guide provides additional explanation of the 2015 prescriptive bracing methods. A 2015 IBC-compliant, performance-based lateral load design and calculations, sealed by a Missouri Design Professional, may be used alone or with any of the approved prescriptive methods (*R301.1.3; R301.2.1; R602.10; R602.12; R602.13; SLCO Policy*).
2. Townhouses shall be braced to resist both seismic and wind lateral forces (*R101.2; R202; R602.10.3; Tables R602.10.3(1-4); SLCO Policy*).
3. Townhouses with masonry veneer shall have braced wall panel lengths in exterior and interior walls at stories above the 1st floor that are 50% more or 1.5 times the amount required in *Table R602.10.3(4)*. The requirement applies to all prescriptive bracing.
4. The 2015-IRC's prescriptive bracing methods for resisting lateral wind forces are for a maximum 10'-0" frame wall height; **however**, up to a 12'-0" height is allowed where the drawings show the 2015-IRC's adjustment factors are applied. St. Louis County's prescriptive Basic Wind Bracing Method allows a maximum 12'-0" frame wall height. Greater frame wall heights must be justified as structurally adequate in bracing drawings and bracing calculations properly sealed by a Missouri registered design professional (*R301.3; R602.3.1; Table R602.3(5); SLCO Policy*).
5. **Notice:** The 2015-IRC's prescriptive wind bracing methods may be mixed as allowed by the Code from story to story, or from braced wall line to braced wall line. St. Louis County's prescriptive Basic Wind Bracing Method must be used alone for the entire structure and cannot be mixed with other prescriptive bracing methods. The 2015-IRC prescriptive bracing methods can be provided with performance-based bracing that is justified with calculations sealed by a Missouri registered design professional (*R301.1.3; R602.10.4.1; SLCO Policy*).
6. Identify on the drawings those bracing method(s) drawn out in the plans or elevations. In the floor

plans, key plans, or exterior elevations, label and dimension the length of each braced wall line, and dimension the length of each braced wall panel identified in each braced wall line. Dimension the distance between each braced wall panel, and dimension the distance of the closest braced wall panel from a building corner and from the end of a braced wall line. Dimension the lengths of exterior solid sheathing provided at corners when continuous sheathing is provided (*B107; B107.2.1; R301.1.3, R602.1; R602.3; R602.10; R602.10.4; R602.12; SLCO Rev. Ords. R107; R602.13*).

7. Using the prescriptive bracing provided by the 2015-IRC, note in the drawings the specific bracing method(s) used in the building design and provide details of: a) the type of bracing; b) the bracing connections; c) the location and dimensioned length of each labeled braced wall line; d) the braced wall panel locations and length of each; e) the sum of the lengths of braced wall panels in each braced wall line and; f) the minimum required aggregate length of braced wall panels in each braced wall line (*SLCO Policy*).
8. Using the SLCO Basic Bracing Method, show and label in the drawings the required braced wall panel locations and length of each. Show and label in the plans or elevations the locations of any required minimum 800# hold-down devices. Provide in the sealed drawings applicable bracing details. Verify the bracing layout proposed complies, then provide the required certification statement on the bracing drawing sheet as applicable. (*B107; B107.2.1; SLCO Rev. Ords. R107; R602.13*).
9. For stacked walls not ballooned framed from the floor to ceiling line (like an exterior frame wall supporting a gable end truss or frame, where the truss bottom chord adjoins the open space of a vaulted ceiling):
 - a. Floor to ceiling height 12'-0" or less: Fasten together, on the interior side of an exterior frame wall and the gable end truss or pony frame above it using minimum 16 gauge, 1-1/4" wide x 21" long metal straps spaced apart horizontally maximum 4'-0" o.c. Fasten 10" of the strap to the stud below and the remainder of the strap to the stud above. Use 9-16d nails to fasten the strap to the studs below and above, for a total of 18-16d nails in the entire strap. Straps must be located at each end of the walls connected, or as close to the ends as space allows for the strap length required for top and bottom studs. Straps are prohibited from being bent horizontally to accommodate offset wood framing. Instead, add 2x4/6 nailers to the wall above or below to provide the stud alignment to mount the straps correctly (*SLCO Policy*).
 - b. Floor to ceiling height greater than 12'-0": Submit structural calculations, properly sealed by a Missouri Registered Design Professional, that provide per 2015-IBC requirements the braced wall's resistance to transverse loading (perpendicular to the wall). The calculations must also address longitudinal loading (racking, in plane with the wall), if the wall is not prescriptively braced using the IRC or SLCO methods referenced above, OR if braced wall panels are located in that portion of the wall taller than 12'-0" (*SLCO Policy*).

Roof Frame Assemblies

1. Show in plan and section roof rafters and ceiling joists framing layout and note member sizes, spacing, species, and fiber stress or grade of wood. Note a minimum 3:12 roof slope is required to use rafters and ceilings joists Tables R802.4(1)(2) and Tables R802.5(1)-(9) in the 2015-IRC. For roof framing slopes less than 3:12, submit gravity load and deflection calculations to justify structural adequacy of solid sawn framing. Calculations may be required to be properly sealed by a Missouri engineer or architect (*R802, esp. R802.2; R802.4; R802.5; Tables R802.4(1)(2); R802.5.1(1)-(9); Figure R802.5.1*).
2. Conventional roof framing and truss roof framing assemblies provided shall resist uplift. Rafters and trusses are allowed to attach to their supporting wall assemblies in accordance with Table R602.3(1), if their assemblies meet all of the following:

- a. Verified to have an uplift force not exceeding 200-lbs;
 - b. Framing is spaced not more than 24" o.c. and;
 - c. The roof overhang does not project more than 24" from the face of the wall below it.
3. Trusses shall be nailed to the wall top plates with 3-16d nails toe nailed without splitting the end of the truss (*R602.3; R802.11; Tables R602.3(1); R802.11; SLCO Policy*).
 4. Approved roof tie-down anchorage (clips) are required for the first 8'-0", measured from the corners of gable ends, to meet capacity requirements noted in Table R802.11 where (see the Table's footnote d):
 - a. Roof pitch is less than 5:12, and roof span is more than 28'-4", OR;
 - b. Roof pitch is 5:12 or more, and roof span is more than 33'-3".
 5. Provide a roof framing design that supports the following minimum loads:
 - a. Truss top chord or roof rafter:
 - 1) Snow Load: **20 lb. per sq. ft.** (*R301.2; R301.6*).
 - 2) Dead Load: Actual dead load and weight of 2 layers of roof covering (*R301.4; R908*).
 - b. Truss Bottom chord or ceiling joist:
 - 1) Shall support a live load of 20-lb. per sq. ft. where attic storage is possible. Attic storage is possible when a 42" high x 24" wide rectangle can be placed perpendicular to the rafter/ceiling joists or trusses. Use 10 lb. per sq. ft. live load for no attic storage where rectangle-space dimensions are less.
 - 2) **Notice:** The live load design on the ceiling joist or bottom chord of a truss shall not be required if all of the following conditions are adhered to (*R301.5; SLCO Policy*):
 - a) Dwelling attic access opening maximum 22"x 30" through finished ceiling with no pull-down stairway.
 - b) Attach on each side of the attic access opening warning signs at least 36" above the bottom chord and within 18" of the edge of the opening. Each sign shall be metal or other approved durable materials suitable for attic conditions; shall be at least 40 sq. inches with letters 3/4" high on a contrasting background that reads "WARNING-TRUSSES NOT DESIGNED FOR ATTIC STORAGE".
 - c) In attic around the access opening over a garage with finished ceiling, provide a horizontal railing attached to the trusses on each side of the access opening 24" - 36" above the bottom chord. The railing shall be made of 1x4's, 2x4's or 3/8"x 6" plywood and shall obstruct easy access for storage Railing may be shop or field applied.
 - d) In attic around the access opening over a garage with finished ceiling, provide a horizontal railing attached to the trusses on each side of the access opening 24" - 36" above the bottom chord. The railing shall be made of 1x4's, 2x4's or 3/8"x 6" plywood and shall obstruct easy access for storage Railing may be shop or field applied.
 - c. Dead Load: Use actual dead load (*R301.4*).
 6. Metal-plate-connected wood truss design and manufacture shall comply with ANSI/TPI 1.
 7. Submit roof and floor truss design drawings sealed by a Missouri registered engineer that include the required spacing and slope or depth of the truss span shown. Provide the truss manufacturer's assembly layout plan that identifies a) the locations of the trusses shown in the sealed drawings and; b) locations of any girder trusses (*SLCO Rev. Ord. R107; B107.2.1; R502.11 esp. R502.11.4; R802.10.1; R802.10.2; SLCO Policy*).
 8. The Project's Design Professional shall review and coordinate the truss forces' load pass to soils through adequately sized building structure including lintels, beams, bearing walls, columns, truss-to-bearing-plate connections, truss-to-truss connections, etc. The Project Design

Professional shall incorporate the truss framing layout and girder locations into sealed structure framing plans (*B107.1; B107.2.1; B107.2.6; R801.2; SLCO Rev. Ord. R107; SLCO Policy*).

9. Wood structural panel roof sheathing, fastened to trusses or rafters spaced 24" o.c., shall be minimum 15/32" thick without edge support, or minimum 3/8" thick with 24/0 span rating and edge support. Edge support shall be tongue-and-groove joints, 2x lumber blocking, or panel edge clips at mid-point between each support (*Table R503.2.1.1(1); R803.2.1; Ref. Std. APA Pub. N335P, D481*).

Roofing & Underlayment



- Class A, B, or C roofing is required where roof edge is less than 3'-0" from a lot line (*R902.1*).
- Minimum required underlayment is Type I (also called 15# specification felt) per ASTM D 226; D 1970; D 4869; or D 6757 (*R905.1.1*).
- Provide corrosion-resistant flashing at roof intersections, at changes in roof slope or direction at walls and chimneys, around roof openings, and at abutments with porches and decks. Follow St. Louis County Ordinances for valley flashing requirements (*R903.2; SLCO Rev. Ord. R905.2.8.2*).
- Valley flashing shall be installed in accordance with the manufacturer's installation instructions before applying shingles. The following valley linings are permitted (*SLCO Rev. Ord. R905.2.8.2*):
 1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be at least 24" wide and of any of the corrosion-resistant metals listed in the 2015-IRC Table R905.2.8.2.
 2. For open valleys, valley lining of 2-ply of mineral surface roll roofing, complying with ASTM D 3909 or ASTM D 6380 Class M, shall be permitted. The bottom layer shall be 18" and the top layer a minimum of 36" wide.
 3. For closed valleys (valley covered with shingles), valley lining of 1-ply of smooth roll roofing complying with ASTM D 6380, or 2-ply of smooth roll roofing complying with ASTM D 226 Type I, ASTM D 4869 Type I or ASTM D 6757 and at least 36" or valley lining as described in Item 1 or 2 above shall be permitted. Self-adhering polymer modified bitumen underlayment complying with ASTM D 1970 shall be permitted in lieu of the lining material.
- Drip edge is required at eaves and rakes of shingle roofs. Extend drip edge minimum 2" onto roof sheathing and minimum 1/4" below roof sheathing. Install roof underlayment over the drip edge along eaves and under the drip edge at rakes (*R905.2.8.5*).
- Underlayment for asphalt shingles:
 1. Minimum roof slope is 2:12 for asphalt shingles. 2 layers of underlayment required on slopes of 2:12 to less than 4:12. Starting at and parallel with the eaves, fasten a 19" strip of underlayment felt. Starting at the eave, apply 36" wide sheets of underlayment. Successive 36" wide sheets of underlayment shall overlap the previous 36" wide sheet by 19". Adequately fasten underlayment to hold in place (*R905.1.1; R905.2; Table 905.1.1(2)*).
 2. 1 layer of underlayment required on slopes 4:12 and greater. Apply underlayment shingle fashion, so it is parallel to and starting from the eave and is lapped 2". Adequately fasten to hold in place. End laps shall be 4" and offset 6'-0" (*R905.1.1; Table 905.1.1(2)*).
- Ice Barrier underlayment is not required (*R905.1.2; SLCO Rev. Ord. Table R301.2(1)*).
- Mineral-surfaced roll roofing requires 1:12 slope minimum (*R905.5*).

- Built-up roofing requires 1/4:12 slope minimum. Exception: Coal-Tar built-up roofing requires 1/8:12 slope minimum (*R905.9; Table 905.9.2*).
- Thermoset and Thermoplastic single-ply roofing requires 1/4:12 slope minimum (*R905.12; R905.13*).

Fireblocking & Draftstopping



- Provide fireblocking of approved materials at the following locations (*R302.11; R302.11.1*):
 1. Vertically-placed at frame ceiling and floor levels.
 2. Horizontally-placed at 10'-0" maximum intervals along the top and bottom of conventional, double stud, furred spaces and staggered stud frame walls.
 3. Vertical and horizontal concealed connections in soffits, dropped and cove ceilings.
 4. Between stairway stringers at the top and bottom of the run. Provide in accessible enclosure under stairs 1/2" gypsum board on the underside stair surface, walls and any soffits (*R302.7*).
 5. Openings around vent, pipe, duct, cable and wire penetrations of ceilings and floors.
 6. Spaces between a chimney and the floor or ceiling assembly through which the chimney passes. Fireblocking shall be approved noncombustible material, such as batt or blanket mineral wool or glass fiber, securely fastened, self-supporting or on metal or metal lath strips (*R1003.19*).
 7. Cornices at the separation line between 2-family dwellings and townhouses.
- Provide draftstopping at 1000 sq. ft. intervals placed parallel to main framing members above ceilings suspended below framing or attached directly to perforated or open-web trusses (*R302.12*).

Fire-Resistant Construction & Wall Coverings



- The requirements in this section shall be used for *1-and 2-family dwellings and Townhouses* where lot lines may or may not be present between dwellings or between Townhouses.
- Exterior wall construction, projections, openings and penetrations of dwellings and accessory structures shall comply with Table R302.1(1) OR; shall comply with Table R302.1(2) if the building is equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13D (*SLCO Rev. Ord. R302.1*).

Exceptions:

 1. Walls, projections, and wall openings or penetrations perpendicular to the lot line or imaginary line between structures used to determine fire separation distance.
 2. Walls of dwellings and accessory structures located on the same lot.
 3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
 4. Detached garages accessory to a dwelling located within 2'-0" of a lot line are allowed to have roof eave projections not exceeding 4".
 5. Foundation vents installed per this Code are allowed.

- 6. Cantilevered manufactured fireplaces.
- 7. Roof eave overhangs.
- 8. Uncovered decks.

- Exterior Walls (Without Sprinklers) – SLCO Rev. Ord. Table R302.1(1) below:

Exterior Wall Element		Minimum Fire-Resistance Rating	Minimum Fire Separation Distance
Walls	Fire-resistance rated	1 hour – tested in accordance with ASTM E 119 or UL 263 with exposure from both sides	< 3 Feet
	Not fire-resistance rated	0 hours	≥ 3 Feet
Projections	Not allowed	N/A	< 2 Feet
	Fire-resistance rated	1 hour on the underside ^{a, b}	≥ 2 Feet to < 3 Feet
	Not fire-resistance rated	0 hours	≥ 3 Feet
Openings in walls	Not allowed	N/A	< 3 Feet
	25% maximum of wall area	0 hours (Not Allowed)	3 Feet
	Unlimited	0 hours (Not Allowed)	3 Feet
Penetrations	All	Comply with Section R302.4	< 3 Feet
		None required	3 Feet

a. Roof eave fire-resistance rating shall reduce to 0 hours at underside of an eave that has fireblocking provided from wall top plate to underside of roof sheathing.

b. Roof eave fire-resistance rating shall reduce to 0 hours at underside of an eave that has NO gable vent openings.

- Exterior walls with a fire separation distance of less than 3'-0" from a property line (measured perpendicularly from the wall face) must be built in accordance with a tested wall assembly that is rated for 1-hour exposure to fire from both sides and the wall shall be constructed without any openings.
- **Notice:** Bay windows, box windows, and similar wall projections perpendicular to the property line (both cantilevered and foundation supported designs) are considered part of the main house wall if all of the following conditions are met (*SLCO Policy*):
 1. The bay or box window projects 2'-0" maximum from the main house wall.
 2. The main house wall has a minimum 7'-0" fire separation distance.
 3. The projected side or end face of the bay or box window unit is more than 3' from the side lot line, or from an imaginary line located between structures and placed perpendicular to the main house wall containing the bay or box window. Measure the distance perpendicular to the window unit from its edge nearest to the lot line or the imaginary line.
- Projections from a wall (i.e. roof overhangs) shall not be closer than 2'-0" to a property line. Wall projections located less than 3'-0" but 2'-0' or greater to the property line shall be protected on the underside of the projection with 1 hour fire-resistive construction (2 layers of 5/8" Type X gypsum sheathing).

Exceptions:

Roof overhangs adjacent to interior lot line placement between 1-and 2-family dwellings and Townhouses may be unprotected on the underside and placed adjacent to the interior lot line where:

 1. An approved fire-retardant treated wood is used as a roof sheathing for a distance of 4'-0" on the side of the separation wall directly underneath the exposed roof overhang.
 2. In lieu of fire-retardant treated roof sheathing, 5/8" Type x drywall may be installed on the underside of the roof sheathing between the roof rafters/trusses for a distance of 4'-0" perpendicular to the side of the separation wall under the unprotected overhang. The Type x drywall shall be held in place with continuous wood 2x2 ledgers nailed to the sides of the rafter/trusses (*SLCO Policy*).

- 2-Family Dwellings being built with a property line between them shall be constructed with a 1-hour exterior wall on each side of the property line. The two 1-hour exterior walls may be constructed on top of the dwellings' common foundation wall. Each frame wall assembly must be continuous from foundation to roof sheathing. The plans shall contain both the tested assembly identification number (U.L. or equal) and either a text description of the assembly or a labeled detail of the assembly.
- 2-Family Dwellings being built without a property line between the units shall be separated by wall and/or floor assemblies that are approved, minimum 1-hour fire-resistance rated both sides, tested in accordance with ASTM E 119 or UL 263. Fire-resistance-rated assemblies shall extend to and be tight against exterior walls and shall extend from the foundation to the underside of roof sheathing. Support rated floor assemblies on construction with an equal or greater fire-resistance rating (*R302.3; R302.3.1*):
 - Exceptions:**
 1. Reduction to an approved 1/2-hour fire-resistance rated assembly is allowed where the building is provided throughout with an automatic fire sprinkler system in accordance with NFPA 13D.
 2. Rated wall assemblies are not required to extend through the attic where:
 - a. The story below the attic has a ceiling of 5/8" Type X gypsum board throughout;
 - b. An attic draft stop constructed in accordance with R302.12.1 is provided above and along the wall assembly separating the dwelling units.
 - c. The structure supporting the ceiling framing is protected with minimum 1/2" gypsum board.
- Townhouses are 3 or more attached single-family dwellings, each structurally independent from foundation to roof, and each having a yard or public way on at least 2 sides (*R202; R302.2.4*):
 - Exceptions:**
 1. Foundations supporting common walls or exterior walls;
 2. Structural roof and wall sheathing from each townhouse fastened to the common wall framing;
 3. Townhouses separated by a common wall as provided in Section R302.2-Item 1 or 2.
- Townhouses with a property line between them shall be constructed with a 1-hour exterior wall on each side of the property line. The two 1-hour exterior walls may be constructed on top of the townhouses' common foundation wall. Each frame wall assembly must be continuous from foundation to roof sheathing. The plans shall contain both the tested assembly identification number (U.L. or equal) and either a text description of the assembly or a labeled detail of the assembly.
- The following requirements apply to townhouses (*R302.4*):
 1. **Notice:** Plumbing, mechanical equipment, ducts and vents are prohibited in the common wall cavity. The wall assembly shall be rated on both sides for fire exposure. The common wall shall extend to and be made tight against abutting exterior walls and underside of roof sheathing. Electrical in wall shall comply with NFPA 70. Provide only membrane penetrations that are approved rated (*R302.4; R302.4.2; SLCO Rev. Ords. R302.2; R302.4*).
 2. Provide the common wall fire-resistance rated both sides as follows (*SLCO Rev. Ord. R302.2*):
 - a. Where a fire sprinkler system in accordance with NFPA 13D is not provided, a minimum 2-hour fire-resistance-rated wall assembly is required tested in accordance with ASTM E 119 or UL 263, OR; provide a common wall of 2 separate 1-hour fire-resistance-rated, tested and approved assemblies.
 - b. Where a fire sprinkler system is provided in accordance with NFPA 13D, provide a minimum 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263.
 3. A parapet is an extension of, and shall have the same fire-resistance rating as, a 2-hour common wall or two (2) 1-hour fire resistance rated exterior walls. Parapet sides adjacent to a roof shall have non-combustible finishes on the parapet's uppermost 18", including its counter-flashing and coping materials (*R302.2.3*).
 4. Provide required minimum parapet heights for the conditions noted:

- a. Where a roof slope greater than 2:12 declines toward a parapet, the parapet shall be at least 30" tall and not less than the height of the roof slope within 3'-0" of the parapet (R302.2.3).
- b. Minimum 30" above 1-level roof surfaces that adjoin the parapet (R302.2.2).
- c. Minimum 30" above the lower of 2 roof surfaces adjoining the parapet, where the higher roof is 30" maximum above the lower roof (R302.2.2).

Exceptions:

- 1) A parapet is not required where roof sheathing or decking is non-combustible or is approved fire retardant treated wood (FRTW) for a distance of 4'-0" perpendicular to each side of the common or separation walls, and the roof covering has a minimum Class C rating tested per ASTM E 108 or UL 790. Openings and/or penetrations prohibited in the 4'-0" spans of the FRTW sheathing or decking (B2303.2; R902.1).
 - 2) A parapet is not required where 5/8" Type X gypsum board is installed on the underside of the roof sheathing for a distance of 4'-0" perpendicular to each side of the common or separation walls, and held in place between the roof rafters/trusses with continuous wood 2x2 ledgers nailed to the sides of the rafters/trusses. Openings and/or penetrations prohibited in the required 4'-0" spans of the Type X gypsum board and roof sheathing (B2303.2; R902.1).
- For fire protection requirements, cover the underside of floor framing members with minimum 1/2" thick gypsum wallboard or 5/8" wood structural panels or approved equivalent. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping or similar shall be permitted. Fire blocking, draftstopping, fire taping, and/or additional framing is not required. Provide as noted, unless more restrictive requirements are provided elsewhere in the Code for horizontal fire-resistance rated assemblies (SLCO Rev. Ord. R302.13).

Exceptions:

1. Floor assemblies directly over a space protected by a NFPA-13D-compliant automatic sprinkler system, or by other approved equivalent sprinkler system.
2. Floor assemblies directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies compliant with the following are allowed to be unprotected:
 - a. Maximum 100 sq. ft. aggregate area of unprotected floor assembly per HVAC zone.
 - b. Floor assembly areas covered by an HVAC metal plenum, trunk lines, and steel structural beams. Gypsum wallboard cover shall be within 2" of all items noted.
4. Wood floor assemblies with minimum 2x10 nominal dimension- or structural composite-lumber, or other approved floor assemblies demonstrating equivalent fire performance.

Interior Walls - Finishes & Base Boards

- Provide interior finishes with maximum 200 flame spread and 450 smoke developed indices (R302.9).
- Water-resistant backer board on bathtub and shower walls, provided as a base for tiles or other nonabsorbent finish material, shall not be applied over a vapor barrier.
- Any water-resistant gypsum backer board provided on ceilings must be either (R702.3.7 & R702.4.2):
 1. Minimum 1/2" thick on ceilings framed 12" o.c. maximum;
 - OR
 2. Minimum 5/8" thick on ceilings framed 16" o.c.
- Backer boards of fiber-cement, fiber-mat reinforced cement, glass mat gypsum and fiber-reinforced gypsum boards may be provided as a base for tiles, as long as installation follows the manufacturer's installation instructions (R702.3.7 & R702.4.2).
- **Notice:** At exterior walls, a vapor barrier behind any tub or shower backer board with a non-absorbent finish is **prohibited** (R702.3.7).

Finishes on Exterior Frame Walls

- A weather-resistant exterior wall envelope is required with the following (*R703.1; R703.1.1*):
 2. A water-resistant barrier behind exterior veneer;
 3. A means to drain to the exterior water that enters the exterior wall assembly;
- Provide water-resistant barrier of minimum 1 layer Type I (No.15) asphalt felt per ASTM D226, or other approved material, over exterior studs or sheathing of all exterior walls (*R703.2*).

Siding

- Exterior wall coverings, siding, backing materials and their attachments shall be provided to resist wind loads in accordance with *Tables R301.2(2)* and *R301.2(3)*.
- Nominal thickness and attachment of exterior wall coverings shall comply with *Table R703.3(1)*, the Code's requirements for different materials, and the manufacturer's installation instructions (*R703.3*).

Anchored Masonry Veneer

- Provide minimum 3/16" diameter weepholes maximum 33" apart and placed directly above the flashing. Provide flashing between the first course of masonry and the structure supporting the veneer assembly (*R703.8.6*).
 - Maximum wall height is 30'-0" above the foundation and maximum 38'-0" measured to top of gable-end walls (*R703.8; Table R703.8(1)*).
 - Townhouses with masonry veneer shall have braced wall panel lengths in exterior and interior walls at stories above the 1st floor that are 50% more or 1.5 times the amount noted as required in *Table R602.10.3(4)*. The requirement applies to all prescriptive bracing methods.
 - Anchor masonry veneer to wall studs with minimum No. 22 gage x 7/8" corrosion-resistant corrugated metal ties spaced maximum 32" o.c. horizontally [x 12" vertically = 2.67-sf] or maximum 24" o.c. vertically [x 16" horizontally = 2.67-sf]. Each tie shall support maximum 2.67 square feet of wall. Provide 1" airspace between veneer and wall sheathing, or grout-fill the 1" space in accordance with Section *R703.8.4.2* (*R703.8.4; R703.8.4.1; Table R703.8.4*).
- Exception:** On townhouses, each masonry veneer tie shall support maximum 2.0 sq. ft. of wall, spaced maximum 32" o.c. horizontally [x 9" vertically = 2.0-sf] or maximum 24" o.c. vertically [x 12" horizontally = 2.0-sf] (*R703.8.4.1*).
- Any opening greater than 16" in either direction in a masonry veneer wall shall have additional metal ties spaced maximum 3'-0" o.c. around and within 12" of the opening (*R703.8.4.1.1*).
 - Masonry veneer above openings shall be supported on lintels of non-combustible materials, and have a minimum 4" bearing length each end. Steel lintels shall be protected from rust. Lintel construction and spans shall comply with *Section R703.8.3* and *Table R703.8.3.1*.

Adhered Masonry Veneer

- For stud frame walls, provide minimum clearances 4" above the earth; 2" above paved areas; 1/2" above exterior walking surfaces supported by the same foundation as the wall; OR as required in the manufacturer's installation instructions (*R703.12*).
- For stud frame walls, provide minimum 26-gage metal corrosion-resistant or 0.019" plastic flashing or screed with minimum 3-1/2" vertical attachment flange that extends minimum 1" below the foundation plate (*R703.12.2*).
- Provide a water-resistive barrier lapping over the screed's exterior attachment flange or the flashing (*R703.12.3*).

Smoke & Carbon Monoxide Alarms



- Smoke alarms shall be provided in dwellings, shall be AC powered and have battery backup, shall comply with NFPA 72, and shall be listed in accordance with UL 217 (*R314.1; R314.1.1*).
- Provide smoke alarms as follows:
 1. Place in each sleeping room between the room's entrance and the bed and;
 2. Place outside (like a hallway) and in the immediate vicinity of the entry to each separate sleeping room and upstream from any return air grille;
 3. Provide on floor levels without bedrooms, including basements and habitable attics.
 4. In split level dwellings without a door between the levels, a smoke alarm provided on the upper level shall suffice for an adjacent lower level that is less than 1 full story below the upper level.
 5. In split level dwellings, provide a smoke alarm on both levels where a door intervenes between them, or the levels are 1 full story apart (*R314.3*).
- When more than 1 smoke alarm is required within a dwelling unit, interconnect alarm devices so that activation of 1 alarm will activate all alarms throughout the dwelling unit (*R314.4*).
- Provide a carbon monoxide alarm outside of each separate sleeping area in the immediate vicinity of the bedrooms in a dwelling with a fuel-fired appliance or with an attached or basement garage (*R315.2; R315.3*).
- Provide a carbon monoxide alarm in a bedroom in the space between a bed and the fuel-burning appliance, including appliances in a bathroom that opens to the bedroom (*R315.3*).
- A carbon monoxide alarm shall be AC powered and have battery backup and be listed per UL 2034. A combination carbon monoxide/smoke alarm shall be listed in accordance with UL 2034 and UL 217 (*R315.1.1*).

Attic & Under-Floor (Crawl Space) Space Access



- Provide minimum 16" x 24" access opening in crawl space perimeter walls or minimum 18" x 24" opening in floor. See M1305.1.4 for access to mechanical equipment in crawl space (*R408.4*).
- For an attic area over 30 sq. ft., provide an access opening in the ceiling or wall minimum 22" x 30" in a hallway or other accessible location. The attic shall have a minimum 30" clear height over the opening. See M1305.1.4 for access to mechanical equipment in in attic (*R807.1*)

Insulation & Energy Conservation



- Submit sealed drawings and documents showing the dwelling's compliance with energy conservation requirements of the 2015-IRC using the Code's prescriptive requirements or using an approved national, state or local energy-efficiency program (*SLCO Rev. Ord. N1101.4*).

- The Dwelling shall be tested by an approved 3rd party to verify an air leakage rate of maximum 4 air changes per hour, in accordance with ASTM E779 or ASTM E1827 and reported at 0.2" water gage (w.g.) pressure (50 Pascals). The dwelling shall be tested after the creation of all penetrations of the building thermal envelope. A written report of the test results shall be signed by the 3rd party conducting the test and shall be submitted to Inspections. See SLCO Ordinances for additional testing requirements (*SLCO Rev. Ord. N1102.4.1.2*)).
- See the 'HVAC & General Mechanical Requirements' Section of this checklist for additional Energy Conservation requirements.
- Show and label in wall and building sections the type, thickness and "R" value of insulating materials. Provide the "U" values of windows, doors, and skylights in the drawings. R-values noted must be only for the insulation material used, not for the total system assembly (*N1101.5; N1101.5.1; SLCO Policy*):

MINIMUM INSULATION (R-Values) & MAXIMUM FENESTRATION (U-factors & SHGCs) REQUIREMENTS <i>(SLCO Rev. Ord. Table N1102.1.2)</i>	
Roof/ Ceiling	R-38
Wood Frame Walls & Band Joists/Boards adjoining exterior or unconditioned spaces	R-15
Floor over exterior space, or unconditioned space, or unheated Crawl Space	R-19
Concrete/Masonry Basement Foundation Walls: For Unfinished Basement Areas For Finished Basement Areas	R-5 ¹ R-13
Slab-On-Grade Floors ²	R-10 no ductwork in slab R-15 ductwork in slab
Crawl Space Wall (No Insulation Required if Naturally Vented)	R-5
Access ^{3,4} Doors & Hatches <i>(SLCO Rev. Ord. N1102.2.4)</i>	Insulate Equal to R-Value of Surrounding Wall or Ceiling Insulation R-value
Fenestration U-Factor (Includes Doors; Excludes Skylights)	0.34 Max.
Skylight U-Factor	0.55 Max.

1. **Exception:** Unfinished basements shall not have more than 20% of the total basement wall area as exposed un-insulated concrete foundations above the outside finished grade/ground level:
 - a. Determine the foundation wall area above outside grade allowed to be un-insulated, using the formula $0.20 \times H_{max} \times P_{bew}$. See next item for explanation.
 - b. Translation: 20% of the maximum height 'H' of all basement exterior walls, including insulated exterior frame walls for walk-out basements and walls common to both

basement and attached garages - x the perimeter 'P' of the 'bew' basement exterior walls.

c. In unfinished basement areas, foundation walls exposed above outside finished grade in excess of 20% of the total basement wall area shall have minimum R-5 insulation. Extend the insulation down to the basement floor slab, or extend at least 24" below the outside grade that is above the floor slab.

2. Insulation under a slab-on-grade, or under slabs adjoining walk-out basement walls, shall start at the foundation perimeter/slab edge and extend back 24" minimum under the slab, or downward 24" minimum directly behind the foundation.
- Provide batt or blanket insulation and their facings (such as vapor retarders) or other vapor permeable membranes left exposed in areas like unfinished basements with a maximum 25 flame spread rating and a maximum 450 smoke development rating. Facings verified as installed in substantial contact with the concealed finish surface of a ceiling, floor, or wall need not comply with flame spread and smoke development limits (R302.10).
 - Provide foam plastics with a maximum flame spread rating of 75 and a maximum smoke development rating of 450 per ASTM E84 or UL 723 (R316.3; R316.6).
 - Show foam plastic insulation is separated from the building interior by an approved thermal barrier, like 1/2" gypsum wallboard or 23/32" wood structural panel (R316.4).
Exceptions:
 1. In an attic or crawl space that has access, foam plastic may be protected with the following, in place of the thermal barrier (R316.5.3; R316.5.4):
 1. 1-1/2" thick mineral fiber insulation;
 2. 1/4" thick wood structural panels hardboard;
 3. 3/8" thick particleboard or gypsum board;
 4. Corrosion-resistant steel with 0.016" base metal thickness;
 5. 1-1/2" thick cellulose insulation 1/4" thick fiber cement panels (these 2 in attic spaces only).
 2. Siding backer board foam plastic insulation maximum 1/2" thick and maximum 2000 Btu per sq. ft. of potential heat tested per NFPA 259 is separated from building interior by minimum 2" of mineral fiber insulation, in place of the thermal barrier (R316.5.7).
 - Provide a hold-back or baffle around door and hatch horizontal/ceiling access openings surrounded by loose-fill insulation. The door or hatch shall be weather-stripped (N1102.2.4).
 - Provide vertical access doors with insulation required for Fenestration per Table N1102.1.2.

Exits & Stairways



- Identify/label the Primary Egress/entry door on the drawings. It must have minimum a 3'-0" wide door leaf and be side-hinged with a minimum clear opening of 32" x 78". At double-leaf doors labeled as Primary Egress, 1 of the 2 door leaves must comply with the door width and clear opening requirements (R311.2; SLCO Policy).
- The Primary Egress door shall open from inside without use of a key, special knowledge or effort. Inside key operation is permitted provided the key cannot be removed from the lock when locked from the inside. Locks with thumb turns on the inside are permitted (R311.2; SLCO Policy).

- Provide a landing on both sides of each exterior door. Landing width shall not be less than the door served and shall be 36" minimum in the direction of travel. Landing slope shall exceed 1/4:12 (SLCO Rev. Ord. R311.3).
- Primary egress door landings both sides shall be 1-1/2" maximum below the door threshold. Deck or porch surfaces may serve as the door's exterior landing.
Exceptions:
 1. An exterior landing may be 7-3/4" maximum below the primary egress/entry door threshold, as long as the door does not swing outward over the landing. A secondary exterior storm or screen door may swing outward (R311.3.1; R311.3.3; SLCO Policy).
 2. Landings for exterior doors other than the primary means of egress are allowed to be:
 - a. Maximum 7-3/4" below the door threshold;
 - b. Without a top landing where a stair flight is on the exterior side of the door and has maximum 4 with a maximum 7-3/4" riser height. The door not swing out over the stair. Its exterior storm or screen door may swing out over the stair (R311.3.3; SLCO Rev. Ord. R311.3.2).
- Passage opening to/from habitable spaces and bathrooms must have at least a minimum 2'-4" wide door leaf. Utility Room entry or door opening must be wide enough to allow passage of the largest appliance component. Hallway width is minimum 3'-0" (R311.1; R311.6; M1305.1.2; SLCO Policy).
- Minimum clear width of doors to or from stairways within the dwelling unit is 29-3/4". The opening width shall allow a 2'-8" door leaf with side-hinged hardware (SLCO Policy).

Stairways

- Stairway minimum clear width is **36"**. With handrail on 1 side, the minimum remaining clear width at and below handrail height is 31-1/2" (R311.7.1).
- Stairway headroom minimum height is **6'-8"**, measured vertically from the tread nosing and from the floor surface of a landing or platform. See R311.7.10.1 for spiral stairs headroom (R311.7.2).
- Show quantity and note stringer size (2 x12 minimum) and note tread material and thickness. Stairs must support a 40-psf live load or 300-lbs. concentrated load acting on 4 sq. inches at mid-span of tread, whichever produces the greater stresses and deflections (Table R301.5; SLCO Policy).
- Maximum riser height is **7-3/4"** and the minimum tread depth (measured horizontally from tread nosing to tread nosing) is **10"**. The greatest riser height and/or tread depth shall not exceed the smallest riser height and/or tread depth by more than 3/8" within a single flight of stairs (R311.7.5).
- A nosing projection of at least 3/4" and not more than 1-1/4" is required on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8" between 2 stories, including nosings at landings and floor levels (R311.7.5.3).
Exception: A nosing projection is not required where the tread depth is at least 11" (R311.7.5.3).
- Winder treads must have a **10"** minimum tread depth measured 12" from the narrow end and have at least 6" tread depth at the narrow end (R311.7.5.2.1).
- Spiral stairways are allowed; see R311.7.10.1. Ships ladders are allowed but shall not serve as a required means of egress; see R311.7.12.
- Open risers are allowed as long as openings located more than 30" above adjoining floor or grade do not allow passage of a 4" sphere (R311.7.5.1).
- Enclosed accessible space under stairs shall have its walls, the under stair surface, and any soffits protected on the enclosed side with 1/2" gypsum board (R302.7).

Handrails & Guards

- Show and label at least 1 continuous handrail along each continuous flight of stairs with 4 or more risers, or along ramp with slope greater than 1:12. Provide handrail 34"-38" above tread nosing or ramp surface. Show handrail ends return to wall or approved safety terminal (*R311.7.8; R311.8.3*).
- Handrail (and projections below handrail) shall project maximum 4-1/2" into stairway required width. Handrail shall be at least 1-1/2" clear from adjacent wall or vertical surface (*R311.7.1; R311.7.8.2*).
- Handrails shall be Type I or II (see below) or shall provide equivalent graspability (*R311.7.8.3*):
Type I: Circular cross section with outside diameter minimum 1-1/4" and maximum 2".
Type II: Approved shapes with a maximum allowable horizontal width of 2-3/4" and maximum perimeter of 6-1/4". A graspable perimeter shall comply with R311.7.8.3. A large-scale cross-section must be provided in the sealed drawings, with critical dimensions shown to verify compliance with 2015-IRC requirements (*SLCO Policy*).
- Provide Guards with minimum 36" height along open-sided walking surfaces, stairs, ramps, porches, balconies and/or landings that – when measured vertically - are more than 30" above the adjoining grade or surface. Walking surfaces include those within 24" of tops of retaining walls. Insect screening shall not be considered a Guard. (*SLCO Rev. Ord. R312.1.1; R312.1.2*).
Exceptions:
 1. At tops of retaining walls 4'-0" or less in height.
 2. At tops of retaining walls more than 4'-0" in height where the walking surface, path, parking lot or driveway is 2'-0" or more away from the front face of the wall.
 3. Provide minimum 34"-38" guard height along stairs, where the guard also serves as the handrail. Measure height vertically from a line connecting the leading edge of the treads.
- Guards shall not have openings that allow passage of a 4" sphere. Guard rail patterns are allowed that comply with opening requirements (*R312.1.3*).
Exceptions:
 1. Triangular openings formed by the surrounding bottom rail of a required guard, riser, and tread shall not allow passage of a 6" sphere.
 2. Guards required on stairs shall have openings through which a 4-3/8" sphere cannot pass.

Emergency Escape Openings & Wells, Light & Ventilation

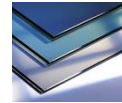


- Each basement, habitable attic, and sleeping room shall have at least 1 emergency escape opening that meets the following minimums (*R310*):
 1. Maximum height to bottom of clear opening - 44"
 2. Minimum net clear opening width - 20"
 3. Minimum net clear opening height - 24"
 4. Minimum net clear opening area - 5.7 sq. ft.
 5. The required net clear opening area shall be met by normal window operation from inside dwelling, and shall not require the use of keys, tools or special knowledge;
 6. Grade floor or below-grade windows may have a net clear opening of minimum 5 sq. ft.
- The emergency escape well shall be minimum 9 sq. ft. in horizontal area, minimum 36" x 36" clear in width and projection from the window escape opening wall. Its clear area must allow the emergency escape window to fully open. Where located under decks or porches, provide minimum 36" clear height over the entire well and continuous to an open yard or court. See this Guide's Plumbing Section for window well drain requirements (*R310.2.3; R310.2.4*).

- Emergency escape wells deeper than 44" must have a permanent ladder or steps. Ladders or steps shall extend 6" maximum into the required dimensions of the escape well. The ladder provided must be at least 12" wide, project minimum 3" from the well wall and have rungs vertically-spaced maximum 18" o.c. for the full extent of the escape well wall (*R310.2.3; R310.2.3.1*).
- For emergency escape wells deeper than 48", submit properly sealed structural calculations verifying the escape well structure shall retain soil to the well height proposed (*R301.1.3; SLCO Policy*).
Exceptions:
 1. Submit a current, valid ICC-ES Research Report that verifies the escape well is structurally adequate to retain soils to the well wall height/depth proposed (*B104.11; B1604; B1807.2*); AND
 2. The proposed emergency escape well model number and manufacturer is provided in the drawings properly sealed the Missouri Registered Architect or Engineer (*B107.2.1*).
- A 36" high guard, with openings not more than 4", is required to separate a path, drive, walking surface within 24" of the high side of a window well deeper than 48". Provide guard between a window well deeper than 30" and an adjacent to a patio slab or deck. Locate window well so a guard is not required around the entire well (*R312.1.3; SLCO Rev. Ord. R312.1.1*).
- Provide sizes of all windows and note sill height above floor in elevation or plan views (*SLCO Policy*).
- Glass area in habitable rooms shall be minimum 8% of floor area served. Area required to open to the outdoors shall be 4% of the floor area served (*R303.1; R303.2*).
Exceptions:
 1. The glazed area is not required to open for natural ventilation in those habitable rooms artificially ventilated by the dwelling's whole house mechanical ventilation system provided in compliance with Section M1507.
 2. The glazed area is not required in those habitable rooms that meet Exception 1 and are each artificially lit with an average illumination of 6 footcandles measured 30" above the floor.
- Attic and enclosed rafter space net free ventilation area shall be at 1/150 of the area served. Provide 2 remote vents minimum for cross-ventilation of each attic space (*R806.1; R806.2*).
Exceptions:
The ventilation required may be reduced to 1/300 of the area served where
 1. 40%-50% of required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space;
 2. Ventilators are 3'-0" maximum below the ridge or highest point of the space, measured vertically.
 3. The balance of required ventilation is provided with eave or cornice vents.
 4. Ventilators are installed in accordance with manufacturer's installation instructions (*R806.2; R806.4*).
- In vented insulated attics, provide minimum 1" clear continuous air passage between the top of the insulation and the underside of roof sheathing, so the air passage extends to vents at the roof ridge. Provide baffles adjacent to the soffit or eave vents, and place the baffles over the top of the insulation to maintain the 1" clear continuous air passage. (*R806.3; N1102.2.3*).
- Provide minimum 18" clear height in foundation crawl spaces and provide a vent opening within 3'-0" of each corner. Total vent area shall be at least 1/150 of the area served (*R408.1; R408.2*).
Exceptions:
 1. Reduce the required vent area to 10% of the above (1/1500) where an approved Class I vapor retarder is provided over crawl space exposed ground. Vents with operable louvers are allowed.
 2. Clear height less than 18" shall have wood floor structure preservative-treated in accordance with AWPA U1 or provide naturally durable wood framing (*R317.1-Item 1*).

- Ventilate enclosed crawl space areas as follows (*R408.3*):
 1. Cover exposed earth with approved Class I vapor retarder, seams overlapped 6" taped and sealed, and extended up perimeter walls 6" taped and sealed.
 2. Provide mechanical exhaust and supply air system of 0.02 cfm/sq. ft. of horizontal area that operates continuously.
- b. Cover inside of crawl space walls with R-5 insulation. See the 'Insulation & Energy Conservation' section for restrictions on exposed insulation.

Safety Glazing



- Glazing in locations noted below shall be tested and labeled in accordance with CPSC 16 CFR Part 1201 Standard as a Type I or II category. Provide safety glazing in sliding doors and for any glazing more than 9 square feet. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs, and showers shall be a Type II category and so noted on the sealed plans (*R308*).

Option: Glazing tested in accordance with ANSI Z97.1 may be provided in hazardous locations other than in enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs, and showers. Provide Type B glazing in place of Type A for a glass pane area less than 9-sq. ft. and Type A for sliding glass doors and glazing more than 9-sq. ft. (*R308.3.1-Exception; Table R308.3.1(2)*).
- Provide sizes of all glazed openings and windows, the dimensioned height of glazing bottom edge above the floor, and the horizontal distance from glazing door edge, to verify required Type I or II safety glazing locations as follows (*B107.2.1; R308.3.1; R308.4; Table R308.3.1(1); SLCO Policy*):
 1. Glazing in doors, fences, and enclosures of bathtubs, showers, hot tubs, whirlpools, saunas, steam rooms, spas, indoor or outdoor pools where glazing is 60" or less, measured horizontally, from the water's edge and less than 60" vertically above a standing surface (*R308.4.5*).
 2. Glazing material less than 60" above the floor and a) in the same plane as, and within 24" of, either side of a closed door OR; b) is in a wall perpendicular to a closed door and within 24" of the hinge-side of an in-swinging door (*R308.4.2; SLCO Policy*).

Exceptions:

 - a. Decorative glass.
 - b. A wall or other permanent barrier is between the door and the glazing.
 - c. Glazing adjacent to a closet door serving a storage area 3' or less in depth. Glazing shall comply with Section R308.4.3.
 - d. Glazing adjacent to the fixed panel of patio doors.
 - e. Glazing in walls on latch side of, and perpendicular to, the plane of a closed door.
 3. Glazing in fixed or operable panels that meet all of the following (*R308.4.3; Table R308.3.1(1)*):
 - a. Individual pane larger than 9 sq. ft. and;
 - b. Bottom edge less than 18" above floor and;
 - c. Top edge more than 36" above floor and;
 - d. Walking surface within 36" measured horizontally.

Exceptions:

 - 1) Decorative glass.
 - 2) A 1-1/2" height rail placed 34"-38" above walking surface on accessible side of glass. Rail shall withstand minimum 50-lbs. per linear foot horizontal load with no glass contact.
 4. Glazing in all doors fixed or operable, swinging, sliding, or bi-fold (*R308.4.1*):

Exceptions:

 - a. Glazed opening in a door through which a 3"-diameter sphere cannot pass.

- b. Decorative glass.
- 5. Glazing in guards and railings, regardless of area or height above a walking surface (*R308.4.4*).
- 6. Glazing with bottom edge less than 36" above, and adjacent to, the walking surface of stairways, landings between stairs, and ramps (*R308.4.6*).
Exception:
 A 1-1/2" height rail placed 34"-38" above walking surface on accessible side of glass. Rail shall withstand minimum 50-lbs. per linear foot horizontal load with no glass contact.
- 7. Glazing with bottom edge less than 36" above, and adjacent to, bottom landing of stairs, and within a 60" horizontal arc that is less than 180-degrees from the bottom tread nosing (*R308.4.7*).
Exception:
 A Guard complying with R312 is provided on the accessible side of the glass, and is located more than 18" away from the glass plane.
- Glazing exempted from requirements for hazardous locations are louvered windows and jalousies minimum 3/16" thick, maximum 48" long, with smooth exposed edges (*R308.2; R308.3; R308.4*).
- Site-built windows shall comply with B2404.
- Glazing in skylights shall comply with R308.6.

All-Masonry & Factory-Built Fireplaces & Chimney Assemblies



- Footings for masonry fireplaces and their chimneys shall be concrete or solid masonry at least 12" thick and extend 6" beyond face of fireplace or foundation all sides. Set footings on undisturbed earth or engineered fill at frost depth 30" below grade. Hearth and hearth extension shall be concrete or solid masonry, with minimums 4" thick hearth and 2" thick hearth extension. Show and note reinforcing required in hearth, hearth extension, and hearth haunch (*R1001.2; R1001.9; R1003.2; SLCO Policy*).
- Provide the following minimum hearth sizes (*R1001.10; M1307.1*):
 1. Solid fuel with 6 sq. ft. or more opening = 1'-8" minimum, and 12" each side.
 2. Solid fuel with less than 6 sq. ft. opening = 1'-4" minimum, and 8" each side.
 3. Gas fired - per manufacturer's installation instructions.
- Provide minimum 20" depth to concrete or masonry firebox. Start throat minimum 8" above fireplace opening/lintel. Provide throat opening with minimum 4" depth. Dimension the fireplace opening width and height, and dimension the distance from the floor of the firebox to the top of the chimney flue liner (*R1001.6; R1001.7; R1003.11; Figure R1003.15.2; SLCO Policy*).
- An exterior combustion air supply is required for masonry or factory-built fireplaces for proper fuel combustion. See the sub-heading "Factory Built Fireplaces & Chimneys" below for exterior combustion air supply requirements for masonry fireplaces, which are the same.
- Provide a ferrous metal damper located at least 8" above the fireplace opening and operable from the room containing the fireplace (*R1001.7.1*).
- Fireplace/smoke chamber walls shall be a minimum aggregate 8" thickness, made of solid masonry, stone, concrete, or hollow masonry units grouted solid, and with 2" of fire brick per ASTM C 1261. If

minimum 5/8" thick vitrified clay lining per ASTM C 315 is provided in place of the 2" fire brick, minimum aggregate wall thickness may be reduced to 6" (R1001.8).

- Minimum clearances from combustible materials to the exterior surface of masonry fireplace walls and chimneys shall be 4" minimum from the back of the fireplace, 2" from the front and sides of the masonry fireplace, and 2" minimum from chimneys. Provide only approved fireblocking in the clearance spaces. (R1001.11; R1001.12; R1003.18; R1003.19):

Exceptions:

1. Exposed combustible trim, edges of sheathing, siding, and drywall may abut the masonry fireplace side walls and hearth extensions, provided the combustible edge is at least 12" from the firebox lining or flue lining. Provide clearances for wood wall, floor, and roof framing members.
 2. Combustible mantels or trim may be placed directly on the masonry fireplace front, as long as the material is not within 6" of the fireplace opening. Combustible materials within 12" of the fireplace opening shall not project more than 1/8" for each 1" distance from the opening.
 3. Chimneys on the outside of exterior walls may have a minimum 1" clearance from combustible materials, including at the chimney's passage through the soffit or cornice.
 4. Chimneys provided with a liner listed and labeled as in accord with UL-1777, or fireplaces listed and labeled as in accord with UL 127, and the chimney, or the fireplace, has been installed in accordance with the manufacturer's installation Instructions, may then have combustible materials in contact with their exterior surfaces.
- Chimney walls shall be minimum 4" solid masonry and with a flue lining as follows (R1003.11):
 1. A clay flue liner compliant with ASTM C 315. An air space equal to the thickness of the flue liner is required between the liner and the full masonry chimney.
 2. Listed chimney lining systems complying with UL 1777.
 3. Factory-built chimney or chimney units listed for installation within masonry chimneys.
 4. Approved materials that resist corrosion, erosion, softening, or cracking from flue gases and condensate at temperatures up to 1,800-degrees Fahrenheit.
 - Show the chimney location in the exterior elevations. Show and dimension the chimney flue opening at least 3'-0" above the roof it penetrates. Show and dimension the chimney flue opening at least 2'-0" higher than any portion of the building within 10' horizontally (B107.2.1; R1003.9; SLCO Policy).

Factory-Built Fireplaces & Chimneys

- Submit an **electronic** set of the pre-fab fireplace manufacturer's installation manual that provides the appliance's proof of testing per UL-127 by a nationally recognized testing agency, only when the design professional has noted the specific manufacturer, model, fuel type and method of ventilation in the sealed drawings. If not noted in the sealed drawings, submit an **electronic** set of the manufacturer's installation manual (SLCO Policy).
- Provide an exterior air supply to factory-built fireplaces for proper fuel combustion as follows:
 1. The air ducts for exterior combustion air intake and for the interior combustion air outlet shall be manufacturer-listed components of the fireplace, and both shall be installed in accordance with the manufacturer's installation instructions; OR the exterior combustion air intake/interior combustion air outlet duct(s) provided must be approved as equivalent(s) (SLCO Rev. Ord. R1006.1.1).
 2. The cross sectional area of the exterior combustion air intake passageway shall be minimum 6 sq. in. and maximum 55 sq. in., unless the manufacturer's installation instructions notes otherwise (R1006.4).
 3. The exterior combustion air intake duct shall not be placed higher than the firebox, unless the manufacturer provides otherwise. The exterior combustion air intake duct shall be installed below the firebox base where the inlet is installed inside the fireplace chamber (R1006.2).

4. The exterior air combustion intake duct shall draw the required combustion air from outdoors or from a naturally ventilated crawl space or attic and shall be covered with a corrosion resistant screen of 1/4" mesh (R1006.2).
 5. The interior combustion air outlet shall be located in the back or side of the firebox chamber or may be located at the level of the hearth within 24" of the firebox opening. The interior combustion air outlet shall be closable and designed/installed so that burning material cannot drop into a concealed combustible space (R1006.5).
- Gasketed doors are allowed only on a factory-built fireplace system specifically tested, listed and labeled per UL 127 for use with such doors (R1004.5).
 - Chimney flue offsets allowed by the manufacturer shall be limited to an angle 30-degrees maximum from vertical, and the entire assembly shall have 4 elbows maximum.
Exception: The chimney manufacturer's installation instructions allows otherwise (SLCO Rev. Ord. 1005.7).
 - Show and label chimney cricket construction required where the chimney side parallel to the roof ridge is more than 30". Show and label intersections, flashing, and counter-flashing (R1003.20).
 - Install gas fireplaces, gas logs, and gas room heaters in accordance with 2015-IRC Chapter 24. Install unvented gas log heaters only in those factory-built fireplaces specifically tested, listed and labeled for such use in accordance with UL-127 (R1004.4).

Garages Attached, and With Story Above



- Show and identify the garage floor approved noncombustible material and note its slope that allows surface liquid to move toward the main vehicle entry doorway (R309.1).
- Dwelling garage floors in flood hazard areas shall comply with (SLCO Rev. Ord. R309.3).
- Provide minimum 1/2" gypsum board on the garage side of the wall common to the house. Show and note the gypsum board extends from the top of the slab to the underside of the roof sheathing or ceiling finish (R302.6; Table R302.6).
- Provide minimum 5/8" Type X gypsum board garage ceiling finish where a habitable room or story is provided above the garage (R302.6; Table R302.6).
- Provide minimum 1/2" gypsum board finish on garage bearing walls, beams, and columns that shall support the ceiling/floor assembly above (R302.6).
- Door between garage and residence shall comply with the following:
 1. 1-3/8" thick solid core wood door OR;
 2. 1-3/8" thick solid or honeycomb core steel door OR;
 3. 20-minute fire-resistance rated door.
 4. Also, openings between garage and sleeping room are **prohibited** (SLCO Rev. Ord. R302.5.1).

HVAC (Heating, Ventilation, Air Conditioning) & General Mechanical Requirements



- Show and label in Architectural and Mechanical plans the furnace location and type (such as fan-assisted induced draft or natural draft), source of combustion air as applicable, flue sizes, locations and sizes of ducts, supply and return air grilles, and note at least 1 thermostat is provided for each heating and cooling system. Submit a section detail showing all gas appliances, flue sizes, connectors, lengths, heights, and clearance dimensions. Submit drawings and construction notes identifying any underground duct systems of approved concrete, clay, metal, or plastic. Submit drawings and construction notes for Show any underground metallic ducts proposed without approved corrosion protection are completely encased in minimum 2" concrete (*B107.4; G2426; G2427; M1601.1.2; N1103.1; SLCO Policy*).
- Provide the primary heating and cooling system of the dwelling with a programmable thermostat that allows changing the temperature set points automatically throughout the day. The manufacturer shall initially program the thermostat to a maximum heating set point of 70-degrees F and a minimum cooling temperature set point of 78-degrees F (*N1103.1.1*).
- Insulate supply and return ducts outside the building thermal envelope to minimums noted below:

SUPPLY & RETURN DUCT INSULATION REQUIREMENTS (N1103.3.1)	
≥ 3" diameter, and In Attic	R-8
< 3" diameter, and in Attic	R-6
≥ 3" diameter, and In Other Unconditioned Spaces	R-6
≤ 3" diameter, and In Other Unconditioned Spaces	R-4.2

- Ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with either the 2015-IMC or 2015 IRC Section M1601.4.1 (*N1103.3.2*);
Exceptions:
 1. Air-permeable spray foam products may be applied without additional joint seals.
 2. Ducts with a static pressure classification of less than 2" of water column shall not require additional closure systems at continuously welded joints and seams, nor at locking-type joints and seams of other than snap-lock and button-lock types. All snap-lock and button-lock type seams shall be sealed.
- **Notice:** Building framing cavities used as supply air ducts are **prohibited** (*SLCO Rev. Ord. N1103.3.5*).
- Provide listed and labeled fuel-burning appliances that vent to the outdoors in accordance with the manufacturer's installation instructions (*M1801.1*).
- Support outdoor fuel-burning equipment and appliances on a level concrete slab or on other approved material that is 2" minimum above adjoining grade (*SLCO Rev. Ord. G2408.4*).
- The dwelling's HVAC ducts shall be pressure-tested with Inspections present to determine air leakage using the Rough-In Test Method or the Post-Construction Test Method. A written report of the test results shall be signed by the 3rd party conducting the test and shall be submitted to Inspections (*N1103.3.3*).
Exception:
A duct leakage test is not required where ducts and air handlers are entirely within the building thermal envelope.

- Provide a whole-house mechanical ventilation system compliant with 2015-IRC Section M1507, or with the International Mechanical Code (IMC), or with other approved ventilation means. Provide outdoor air intakes and/or exhausts with automatic or gravity dampers that close when ventilation system is off (*N1103.6*).
- Extend chimneys (masonry, metal, and factory-built) for low-heat appliances at least 3'-0" above their roof penetration and at least 2'-0" higher than any portion of the building within 10'-0" horizontally. Show and note the chimney location and extent in plans, sections and exterior elevations. Factory-built chimneys with solid-fuel burning appliances shall be listed and labeled with, as well as comply with, HT requirements of UL103 (*R1005.4; G2427.5.3, G2430.1; SLCO Policy*).
- Fuel gas appliances in a room or space with a volume less than 50 cubic feet/1000 BTU/hr. input rating shall have combustion and dilution air provided as follows (*G2407.5.1; G2407.5.3; G2407.6.2*):
 1. Using inside air: Provide 2 openings, placing 1 within 12" of the ceiling and 1 within 12" of the floor. Each opening shall have 1 sq. in. of free area for every 1000 BTU/hr. input rating of the fuel gas appliance(s) in the room/space. Openings shall not have less than 100 sq. inches of free area. Common ducts are prohibited. Combustion air shall not be taken from bedrooms.
 2. Using outside air: Provide 1 opening within 12" of the ceiling with a net free area of 1 sq. in. for every 3000 BTU/hr total input rating of the fuel gas appliance(s) in the room/space.
- **Notice:** Fuel gas appliance(s) in a sleeping room, bathroom, toilet room, storage closet, or in a space that opens only into such rooms or spaces are **prohibited** (*G2406.2*).
Exceptions:
 1. The appliance is a direct vent unit that obtains all combustion air directly from outdoors and is installed in accordance with its listing and the manufacturer's instructions.
 2. Appliance installation is in a room or space only for that purpose, opens only into a bedroom or bathroom, door is solid, self-closing, weather-stripped, and combustion air is from outdoors only.
- Minimum appliance clearance from combustibles is 18", unless the manufacturer's installation instructions for the listed appliance allows or requires otherwise. Provide a level working space at least 30" wide x 30" deep" clear in front of the control side to service an appliance (*G2408.5; G2409; M1305.1; M1306; SLCO Policy*).
- Note in the drawings that each gas appliance shall have a gas shutoff valve located in the same room and within 6'-0" of the appliance, and installed upstream of a required ground joint union. Provide a sediment trap required downstream of the appliance shutoff valve and as close to the appliance inlet as practicable (*G2419.4; G2420.5; SLCO Policy*).
- Cooking appliances shall be listed and labeled for household use and shall be installed as required by the manufacturer's installation instructions (*M1901.2*).
- Provide note in drawings that the interior gas piping outside the room of the appliance it serves shall have a yellow label marked 'GAS' in black letters spaced at intervals of 5'-0" maximum.
Exception: Steel pipe is not required to be labeled (*G2412.5*).
- Show equipment and appliances with an ignition source and installed in a garage - like furnaces and water heaters - have the ignition source minimum 18" clear (or higher as required by manufacturer) above the floor. Show equipment or appliances are protected with pipe bollards or other approved method (*M1307.3; M1307.3.1; SLCO Policy*).
- Show a fuel burning appliance suspended in a garage is 6'-0" clear above the floor (*G2408.3*).
- **Notice:** HVAC ducts that extend through a garage shall be minimum 28-gage (0.41mm) sheet steel and shall not open into garage (*SLCO Rev. Ord. R302.5.2*).

- Provide clothes dryer exhausted to exterior through smooth, 4" diameter, 0.0157" thick metal duct independent of other systems, supported 12'-0" o.c. and secured in place. Show and label the duct run and termination in plans (*M1502; G2439.7.1; G2439.7.2; SLCO Rev. Ords. M1502.4.1; M1502.4.2*).
- The maximum developed dryer exhaust duct length is 35'-0" measured from the dryer's transition duct to the outlet terminal. Show and note the exhaust length: add 5'-0" for each 90° bend and 2'-6" for each 45° bend to the length of the straight runs. When fittings are used, exhaust lengths reduce; see 2015-IRC Table M1502.4.5.1 (*M1502; G2439.1, SLCO Rev. Ord. M1502.4.5.1; G2439.7.4.1*).
Exception:
The total developed length of dryer exhaust ducts may be 55'-0" where cleanout access panels are (*M1502; SLCO Rev. Ord. M1502.4.5.1; G2439.7.4.1*):
 1. Labeled with permanent signage;
 2. Provided every 15'-0" of developed length;
 3. Provided within 12" of the 2nd elbow and,
 4. Provided at every elbow thereafter, and;
 5. Highlighted at the dryer exhaust connection with permanent signage that informs occupants of periodic cleaning and inspection requirements.
- Provide bathrooms and toilet rooms with a minimum 50 CFM fan exhausted to the exterior. Fan may discharge through an attic gable vent or soffit vent if its duct can be attached or secured without obstruction within 6" of the vents. Recirculation of air from bathrooms and toilet rooms is prohibited (*M1507.2, M1507.3, & P303.3; SLCO Rev. Ord. R303.3; M1501.1-Exception 2*).
- **Exception:**
Bathrooms and toilet rooms provided with minimum 3.0 sq. ft. of natural light, of which 1/2 is openable, shall not require mechanical ventilation. Both natural light and natural ventilation requirements must be provided (*SLCO Rev. Ord. R303.3*).
- Provide kitchen range with a listed hood or downdraft exhausted to the exterior with a 100 CFM fan (intermittent use), or a 25 CFM fan (continuous use). OR, install in accordance with manufacturer's installation instructions a listed and labeled recirculating ductless range hood with a required filtration system to remove grease and provide odor control (*M1507.4; R303.1; SLCO Rev. Ord. M1503.1*).
- For a kitchen exhaust hood with more than 600 cfm exhaust flow, makeup air shall be minimum 156 in² for a damper/louver having 75% net free area. Calculate the minimum required opening size at 0.26 in²/cfm x the kitchen hood fan capacity in cfm (assumes 75% net free area). To calculate the minimum free area, multiply 0.2 in²/cfm by the kitchen hood fan capacity in cfm. The louver/damper shall be automatically controlled to start and operate simultaneously with the exhaust system. Locate the damper so that no permanent construction or any other ducts need to be removed to access the damper for inspection, service, repair or replacement (*R303.5; SLCO Rev. Ord. M1503.4*).

Electrical Requirements



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- Show and label location and capacity in amps of electrical panel. Show location of all receptacles, switches, lights, ceiling fans, and exhaust fans on floor plans. Identify all 240 volt receptacles/circuits. Identify all 240 volt receptacles/circuits. Provide/draw curved lines from wall switches and lighting receptacles to the lights they each control (*B107.2.1; SLCO Policy*).
 - For electrical service at 600 amps and above, submit riser diagram(s) detailing the wiring from the service entrance to the sub panels (*B107.2.1; SLCO Policy*).

- Provide minimum 1 communications outlet required in an accessible area inside the dwelling and cabled to the service provider demarcation point (*E800.156*).
- Provide at least 1 intersystem bonding terminal to ground communication systems (*E800.100*).
- Underground metal water pipe used as grounding electrode must have connection made within 5'-0" of pipe entry into building. Supplemental grounding electrode shall comply with *E250.50, E250.53*.

Receptacles

- Receptacle outlets are required in the minimum quantities noted in the following locations (*E210.52*):
 1. In habitable rooms so no space along a wall is more than 6'-0" from a receptacle (bathrooms not included), and in wall spaces 2'-0" wide or more. Include in the 6'-0" measurement fixed panels of glass doors and fixed room dividers such as free-standing bar-type counters or railings.
 2. In hallways 10'-0" or more in length. A foyer is considered an entry hallway.
 3. In walls above kitchen countertops with the receptacle of at least 2 different 20 amp circuits, so any point along the counter is 24" maximum from a receptacle. Provide wall receptacle(s) at countertops minimum 12" wide isolated by sinks, ranges or refrigerators. Provide minimum 1 receptacle at each island or peninsula that has a counter area 24" x 12" or more.
Notice: Receptacles face-up in counter work-surfaces are prohibited (*E210-52(A)(B)(C)*).
 4. In bathrooms, 1 wall-mounted receptacle within 36" of each basin rim (*E210-52(D)*).
 5. Outdoor weather-proof receptacle at front and back of the house, accessible from, and maximum 6'-6" above, grade level (*E210.52(E)(1)*).
 6. In laundry room/space, at least 1 receptacle supplied by a dedicated 20 ampere branch circuit.
 7. In separate unfinished basement areas, minimum 1 receptacle.
 8. At each garage bay, minimum 1 receptacle that is maximum 5'-6" above the floor.
 9. Floor outlets must be in boxes listed for the purpose and within 18" of wall or fixed room divider.
 10. At a balcony, deck or porch with door direct access to the dwelling interior, at least 1 receptacle maximum 6'-6" above the floor of the balcony, deck or porch.
- Ground-fault circuit-interrupter (GFCI) protection is required for all 125 volt, single phase, 15 and 20 ampere receptacles provided in the following locations (*SLCo Rev. Ord. E210.8(A)*):
 1. Bathrooms.
 2. Garages, with 1 receptacle 5'-6" maximum above floor provided for each bay and accessory buildings with a) a floor located at or below grade level, b) are not habitable, c) are limited to storage areas, work areas, and areas of similar use (*E210.52(G)(1)*).
Exceptions:
 - a. Ceiling mounted receptacle for garage door opener.
 - b. A single or a duplex receptacle for the appliances located in a dedicated space for normal use.
 3. Outdoors, including:
 - a. The interiors of screened enclosures;
 - b. Balconies, decks and porches;
 - c. Within 25'-0" of air conditioning condensing unit with weatherproof enclosure and hood (*E406.9*).
 4. Crawl spaces at or below grade level for service use of mechanical equipment or plumbing.
 5. Unfinished basements or unfinished basement areas.
 6. Receptacles serving kitchen counter top surfaces (*E210.8(A)(6)*).
 7. Receptacles within 6'-0". of the rim of the outside edge of a sink.
 8. Receptacles installed within 6'-0" of the outside edge of a bathtub or shower stall.
 9. Laundry areas with a sink.

- Provide arc-fault circuit-interrupter (AFCI) protection for circuits supplying outlets or devices installed in bedrooms (*SLCO Rev. Ord. E210.12(A)*).
- Provide 3-pole with ground type receptacle outlets for ranges and clothes dryers (*E250.140*).
- Install at least 1 communications outlet in an accessible area inside dwelling and cabled to the service provider demarcation point (*E800.156*).
- Provide an intersystem bonding terminal for grounding communication systems (*E800.100*).
- Underground metal water pipe used as grounding electrode must have connection made within 5'-0" of pipe entry into building. Supplemental grounding electrode shall comply with *E250.50, E250.53*.

Lighting

- Lighting is required in the following areas (*E210.70; M1305.1.3.1; SLCO Rev. Ord. M1305.1.4.3*):
 1. At least 1 wall switch-controlled lighting outlet installed in every habitable room, kitchen, bathroom, hallway, each floor level of interior stairways, exterior entryway, attached garage, detached garage with electrical power, and at exterior doors. Wall switch shall be placed near room or space entry. Occupancy sensors in habitable rooms, kitchen, or bathrooms may be provided in addition to a wall switch or shall be equipped with a manual override and be located at the customary wall switch location.
 2. At least 1 lighting outlet and 1 receptacle in each attic, crawl space, basement and utility room used for storage or containing heating, air-conditioning or other equipment that requires service. Locate light switch at the room or space entry.
- Interior stairways shall have a minimum of 1 foot-candle of light measured at centers of treads and landings. Provide stairs with wall light switch at each floor level with 6 or more risers, unless remote, central, or automatic light control is provided (*R303.7; E210.70*).
- Exterior stairways serving the dwelling shall have a light in the immediate vicinity of the stair landing closest to the house. Exterior stairways to basement shall have Provide light at stairs bottom landing entrance to basement (*E210.70; SLCO Rev. Ords. R303.8*).
- Lighting in clothes closets (*E410.16*):
 1. Locate fixtures on ceiling or on wall above door and from the nearest storage space as follows:
 - a. 12" minimum clearance: Surface-mounted incandescent or LED fixtures.
 - b. 6" minimum clearance: Surface mounted fluorescent fixtures and recessed fixtures.
 2. **Notice:** Incandescent fixtures with open or partially enclosed lamps and pendant fixtures are prohibited in clothes closets.
- Electrical panels (*E110.26; E240.24*):
 1. **Notice:** Electrical panels in bathrooms, clothes closets, or over/above stairs are prohibited.
 2. Allowed in bedrooms as long as clothes cannot be stored in panel enclosure w/ solid door.
 3. Provide lighting in the vicinity of the electrical panel
 4. Install in areas with at least 6'-6" headroom.
 5. Provide centered in front of electrical panel minimum clear space 36" deep and 30" wide.
 6. **Notice:** Counters and cabinets installed under the electrical panel are prohibited.
- **Notice:** Receptacles are prohibited within a bathtub or shower space (*E406.9(C)*).
- Lighting fixtures above bathtub and shower spaces: No parts of hanging/pendant fixtures, track lighting and ceiling paddle fans shall be located within 3'-0" horizontally measured from its outside edge and 8'-0" vertically from the top of a bathtub rim or shower threshold (*E410.10(D)*).

- Lighting fixtures above bathtub and shower spaces: Luminaires within the 8'-0" height restriction must be marked for damp locations, or for wet locations subject to shower spray (*E410.10(A)(D)*).
- Recessed luminaires in the building thermal envelope shall be 'I.C.' rated (Insulation Contact rated) and labeled with an air leakage limit of 2.0 cfm per ASTM E283. The housing may be sealed with a gasket or caulk at the interior finish ceiling or wall (*R302.14; SLCO Rev. Ord. N1102.4.5*).

Plumbing Requirements



- Show and label kitchen sink(s), dishwasher, refrigerator, bar sink(s), lavatories, water closets (toilets), bathtubs, showers, hot water heater(s), floor drain(s), hose bibs, plumbing chases and all other plumbing fixtures in the architectural plans (*B107.2.1; SLCO Rev. Ord. P1103.P-136; SLCO Policy*).
- Locate and space bathroom fixtures as required by the IRC and UPC (*SLCO Rev. Ord. R307.1*).
- Note shower and/or bathtub floors and walls shall be finished with a nonabsorbent surface extending minimum 6'-0" above the shower or bathtub floor (*R307.2*).
- Shower minimum interior space is 1024 sq. in. any shape, into which a 30" diameter circle shall fit up to 70" above the shower drain outlet (*P408.6*).
- Shower doors shall open to provide minimum 22" unobstructed opening for egress (*P408.5*).
- Shower thresholds or curbs shall comply with the requirements of the 2015-UPC (*P408.5*).
- An additional floor drain is required outside of the shower, but within 5'-0" of the shower floor drain, on all roll-in showers with a threshold. This threshold drain shall connect to shower drain waste pipe above the trap (*SLCO Rev. Ord. P418.3-Item 9*).
- Dimension minimum 15" clear width from side wall, tub edge or shower threshold to toilet centerline. Show and dimension min. 30" clear between centerlines of the toilet and an adjacent fixture. Provide 21" – 24" min. clear space in front of water closets and lavatories. Accessory items like paper dispensers or grab bars are not clear space obstructions (*P402.5; SLCO Rev. Ord. R307.1*).
- Show and label the locations of the clothes-washer hose connection bib and laundry standpipe (*B107.2.1; SLCO Rev. Ord. 1103.P-136; SLCO Policy*).
- Wrap hot water pipes with R-3 insulation for any of these conditions (*SLCO Rev. Ord. N1103.5.3*):
 1. Nominal diameter is more than 3/4".
 2. Located outside of the conditioned space.
 3. Extends from the water heater to a distribution manifold.
 4. Located under a floor slab.
 5. Is buried.
 6. Provides supply and return in recirculation systems other than demand recirculation systems.
- Identify basement floor drain, required with or without fixtures (*SLCO Rev. Ord. P418.3-Item 11*).
- Show the basement areaway drains and foundation drain tiles shall not connect to sanitary sewer. Show and note open basement areaways adjoining building and less than 100 sq. ft shall have 3" drain; and show such areaways greater than 100 sq. ft. shall size drains per UPC Table 1101.8 and shall not drain to subsoil (*P1101.3; P1101.6; P1101.7; SLCO Rev. Ord. 1101.8*).

- Show and note a floor drain required within 15'-0" of and in the same room as heating/cooling system(s) and/or water heater(s) (SLCO Rev. Ord. R306.7; P418.3-Item 7; P603.4.8).
- Note or label all floor drains shall have approved-type strainers (SLCO Rev. Ord. P418.2).
- An expansion tank is required for water heaters more than 30 gallons (SLCO Rev. Ord. P501.2).
- Note the water service line size; the minimum required is 1" up to the first branch. Plastic water service piping shall terminate 10'-0" minimum from foundation's outside face. Metal piping shall extend into the building and to the house valve outlet or to the PRV outlet, whichever is further from the pipe's building entry point. Minimum water main pressure shall be considered when sizing the water service piping (P604.1; P610.8; SLCO Rev. Ord. P604.10 SLCO Policy).
- Note the water service pipe and the building sewer shall be minimum 10'-0" apart horizontally and separated by undisturbed or compacted earth (SLCO Rev. Ord. P720.0-Exception).
- Provide the location of minimum required 1 outside hose bib, and note it shall have a backflow preventer and freeze protection (P417.4; P603.4.7; P603.5.7; SLCO Rev. Ord. R306.6; P603.5.6.2).
- Show and note gutters and downspouts are required on roof overhangs projecting less than 36" (P1103.2; P1103.3; SLCO Rev. Ord. P1101.12.1; SLCO Policy).
- **Notice:** Downspouts shall not connect to a sanitary sewer (P1101.3; SLCO Rev. Ord. P1101.16.2).
- Note lead-free solder is required on copper water supply piping (P604.2; P604.11; P605.1.4).
- Show a window areaway less than 10-sq. ft. has a floor drain with 2" pipe that drains to daylight, or to a sump pit with approved pump installation. Provide a window areaway 10-sq. ft. or more but less than 100 sq. ft. has a floor drain with 3" pipe drained in the same manner. Provide an areaway greater than 100 sq. ft. with a floor drain sized per Table 1101.8 of the 2015 UPC. A cover over the areaway does not remove the drain requirement (P1101.6; P1101.7; P1101.9).

Notice:

While the aforementioned items cover the major points for compliance relative to plan preparation / review with the Building Code, Mechanical Code, Electrical Code, and Plumbing Code, other items on the plans which are not in compliance with code requirements, or those needing clarification, will be indicated by the Plan Reviewer. Compliance with this list does not necessarily meet all code requirements that a Plan Reviewer may expect to see on a set of plans. It should also be emphasized that many code requirements are met through the field construction or installation / inspection process and are not necessarily reflected within the approved plan documents.

It is the applicant's responsibility to obtain all permits and approvals required in connection with the proposed work. In addition to St. Louis County Department of Public Works, applicant should check with the St. Louis County Department of Highways & Traffic, the sewer district, the fire district and the local municipality. Other enforcement agencies may have requirements more restrictive or in addition to those noted above.