Residential Construction Guide
For detached single story buildings and additions less than 800 square feet

This guide describes the prescriptive construction requirements of the International Residential Code and is not intended to relieve other requirements of the code.

Worksheet
Fill out the worksheet on the following page.
- Describe use of building or addition
- Select construction details you plan to use from sheets 3 through 10 and fill in information on page 2
- Sheets 11, 12, and 13 are drawing samples only

Floor plans and elevations
- Applicant must provide two (2) copies of floor plans and elevation
- Floor plans must be drawn to ¼” = 1’ scale
- If adding on to an existing home, please show existing rooms adjoining the addition
- Label use of each room and show all doors, windows etc.

Additional information and/or requirements may apply. Contact a Permit Technician.

Clark County Building Safety adopted the 2015 International Building and Residential Code on July 1, 2015. Please note below additional requirements based on the 2015 IRC:
- Winds Speed: 135 MPH, 3 second gust
- Exposure: B
- Seismic: Zone D1
- Snow: Minimum roof snow load 25 psf, no reductions, 30 psf ground
- Allowable bearing pressure: 1,500 psf without a geotechnical report
Building Description

Owner name: ____________________________ Permit number: ____________________________
Address: __________________________________________________________________________
Phone: ____________________________ Email address: __________________________________________________________________________
Describe building use(s): __________________________________________________________________________

Check the appropriate item for each category:

**Building type**
- ☐ Detached
- ☐ Attached
Total square feet of project: ___________

**Footing type** - see sheet 3
- ☐ Monolithic
- ☐ Slab
- ☐ Other (provide detail)
- ☐ Foundation

**Floor type** – see sheets 4 and 5
- ☐ Slab
- ☐ Post and beam
- ☐ Floor joist
- ☐ Other – provide detail, see example on sheet 11

**Wall type** – see sheet 6
- ☐ Detail 1: 2x6 insulated with exterior sheathing (wall)
- ☐ Detail 2: 2x6 insulated with siding and sheathing (double wall)
- ☐ Detail 3: 2x4 or 2x6 unheated garage or shop

**Roof type** – see sheets 7 through 10
- ☐ Conventional roof framing – rafters with ceiling joist (see sheet 7)
- ☐ Vaulted ceiling – rafters with ridge beam (see sheet 8)
- ☐ Engineered trusses (see sheet 9)
- ☐ Shed roof (see sheet 10)
FOOTINGS

2x wall (see details on page 6)
26 gauge galvanized iron flashing or approved equal

grade surface water away from foundation a min. 6" within the first 10'-0" or slope to drain or swale R401.3

Option 1: R-10 perimeter insulation for heated structures w/flashing and protection board or coating

Option 2: max. 2x2 p.t nailer strip permitted w/R-10 rigid insulation - 24" total length.

3 1/2" monolithic concrete slab

heated space

one #5 or two #4's located in middle third of the footing - min. 30" lap-grade 60 steel required. Secure tie wire R403.1.2

12" single story
15" two story
23" three story
Table R403.1

NOTE:  * Footings over 4'-0" high are required to be designed as retaining walls
* Minimum concrete strength 2500 p.s.i. Lap rebar min. 60 diameters at splices-secure with tie wire

Monolithic slab/footing

see note above for anchor bolt spacing

2x wall (see details on page 6)
sill seal - if heated

# 4 rebar horizontal continuous top and bottom

driveway slab or paving

foundation vents - 1 sf for every 300 s.f. of floor area. place within 3'-0" or corners- provide cross ventilation

# 4 vert. @ max. 48" o.c w/min. 14" extension into stem wall with 6" hook-detail R403.1.3.1

4" concrete slab 3000 psi see page 4 for wood floor

granular fill

Residential Construction Guide drawn by mlm 11-13-14 3 of 13
NOTES:
1. 4x6 D.F. #2 girders - maximum 7'-0" span.  4x8 maximum 8'-0" span.
2. 4x4 D.F. #2 post.  4x6 required at girder splices.
3. 2x decking must be covered with 3/8" plywood or approved underlayment.
4. 4x post over 3'-0" high must be braced.
5. See page 6 for rebar requirement in footing.
6. Support insulation at 24" o.c. to hold tight to underside of floor deck - do not compress - WSEC R402.2.7.
7. Foundation vents required 1 sf for each 300 s.f. of under-floor area - distribute approximately equally on at least two sides.  Recommend starting placement within 3' of corners.  R408.
8. Minimum concrete strength 2500 p.s.i. lap rebar min. 60 diameters at splices-secure with tie wire.  See IRC Table R611.5.4(1).

Radon mitigation required for habitable spaces:
- min schedule 40 PVC piping
- "radon reduction system" labels to applied to piping at all accessible locations.
- min 6 mil. black ploy. vapor barrier with 1.2' overlaps at seams.
- electrical junction box for future fan required at accessible location nearest to pipe termination.
- radon duct shall be located within warm walls.
1. Floor joists to be minimum Douglas Fir #2. Code loading requirements-40# live and 10# dead.

2. Minimum spans for subfloor-underlayment see subfloor span table this sheet.

3. Minimum concrete strength 2500 psi, lap rebar min. 60 diam. at slices-secure with tie wire.

4. Foundation vents required 1 sf for each 300 s.f. of under-floor area-distribute approximately equally on at least two sides. Recommend starting placement within 3' of corners. R408.

### Table R502.3.1(2) Floor joists

<table>
<thead>
<tr>
<th>Floor joist</th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x6</td>
<td>10'-9&quot;</td>
<td>9'-9&quot;</td>
<td>8'-1&quot;</td>
</tr>
<tr>
<td>2x8</td>
<td>14'-2&quot;</td>
<td>12'-7&quot;</td>
<td>10'-3&quot;</td>
</tr>
<tr>
<td>2x10</td>
<td>17'-9&quot;</td>
<td>15'-5&quot;</td>
<td>12'-7&quot;</td>
</tr>
<tr>
<td>2x12</td>
<td>20'-7&quot;</td>
<td>17'-10&quot;</td>
<td>14'-7&quot;</td>
</tr>
</tbody>
</table>

### Table R503.2.1 Subfloor spans

<table>
<thead>
<tr>
<th>Grade</th>
<th>16&quot; o.c.</th>
<th>20&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>5/8&quot;</td>
<td>3/4&quot;</td>
<td></td>
</tr>
</tbody>
</table>
EXTERIOR WALL TYPES

1. 2x6 Wall with Exterior Sheathing
   - TI-11 panel sheathing or other approved exterior sheathing panel
   - D.F. #2 studs - 2x6's @ 16" o.c. - maximum 10'-0" high w/ single bottom plate and double top plates
   - R-21 insulation at heated areas - staple vapor barrier flange to face of studs
   - 1/2" gypsum wall board

2. 2x6 Wall with Siding and Sheathing
   - Lap siding on #15 felt or other approved weather-resistant barrier
   - 1/2" cdx plywood
   - TI-11 panel sheathing or other approved exterior sheathing panel
   - D.F. #2 studs - 2x6's @ 16" o.c. - maximum 10'-0" high w/ single bottom plate and double top plates
   - R-21 insulation at heated areas - staple vapor barrier flange to face of studs
   - 1/2" gypsum wall board
   - Glazing U-value at heated space
     - U-.30 unlimited glazing percentage

3. 2x4 or 2x6 Wall - Unheated
   - Douglas Fir #2 studs at 16" o.c.
     - 2x6 maximum 10'-0" high
     - 2x4's maximum 10'-0" high
     - single bottom and double top plates
     - plates on concrete to be pressure treated
     - no insulation required at unheated areas
     - unfinished heated areas must have exposed insulation with flame spread 25 vapor barrier

Residential Construction Guide
ROOF TYPES (Rafters w/Ceiling Joists)

1. Ceiling joists to be Douglas Fir #2 or better.
2. Rafters to be Douglas Fir or better. Roof slopes greater than 3:12. (see sheet 10 for slopes less than 3:12). Rafters are for light roof coverings only - 30# ground snow - 10# dead load.
3. Roof vent total net area to be 1/300 of roof area if half of required vents are 3'-0" above eave, otherwise 1/150 of roof area is required in roof vents R806.2
4. Provide a drip edge that overlaps a min. of 2" and extends a 1/4" below roof sheathing. Fastened to roof deck 12" o.c. Install underlayment over the drip edge along the eaves and under the drip edge on gables. Unless specified by manufacturer. Shingles are permitted to be flush with the edge.

Ceiling joist Table R802.4(1)

<table>
<thead>
<tr>
<th>Ceiling joist</th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>9'-10&quot;</td>
<td>8'-9&quot;</td>
<td>7'-2&quot;</td>
</tr>
<tr>
<td>2x6</td>
<td>14'-10&quot;</td>
<td>12'-10&quot;</td>
<td>10'-6&quot;</td>
</tr>
<tr>
<td>2x8</td>
<td>18'-9&quot;</td>
<td>16'-3&quot;</td>
<td>13'-3&quot;</td>
</tr>
<tr>
<td>2x10</td>
<td>22'-11&quot;</td>
<td>19'-10&quot;</td>
<td>16'-3&quot;</td>
</tr>
</tbody>
</table>

Rafter joist Table R802.4(2)

<table>
<thead>
<tr>
<th>Rafters (slope &gt; 3:12)</th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>8'-7&quot;</td>
<td>7'-10&quot;</td>
<td>6'-8&quot;</td>
</tr>
<tr>
<td>2x6</td>
<td>13'-6&quot;</td>
<td>11'-11&quot;</td>
<td>9'-9&quot;</td>
</tr>
<tr>
<td>2x8</td>
<td>17'-5&quot;</td>
<td>15'-1&quot;</td>
<td>12'-4&quot;</td>
</tr>
<tr>
<td>2x10</td>
<td>21'-4&quot;</td>
<td>18'-5&quot;</td>
<td>15'-1&quot;</td>
</tr>
<tr>
<td>2x12</td>
<td>24'-8&quot;</td>
<td>21'-5&quot;</td>
<td>17'-6&quot;</td>
</tr>
</tbody>
</table>

NOTES:

- Scale - 1" = 1'-0"
- Rafter joist dimension calculations are scaled from the true slope of the roof. Depending on the slope, rafters sizes are calculated accordingly.

Residential Construction Guide

Clark County Building Safety Division

drawn by mlm 11-13-14
**NOTES:**

1. \(3\frac{3}{8}, 3\frac{3}{8}, 5\frac{1}{2}, 5\frac{1}{2}\) and \(6\frac{1}{2}\) glu-lam beams
   
   \(F_b = 2400\)

2. 2x, 4x and 6x
   
   Douglas Fir #2
   
   unless otherwise noted.

3. Ridge beam to be supported by vertical wall or post to footings.

### Beam Span

<table>
<thead>
<tr>
<th>Rafter Span</th>
<th>10'-0''</th>
<th>12'-0''</th>
<th>14'-0''</th>
<th>16'-0''</th>
<th>18'-0''</th>
<th>20'-0''</th>
<th>22'-0''</th>
<th>24'-0''</th>
</tr>
</thead>
<tbody>
<tr>
<td>10'-0''</td>
<td>4 x 10</td>
<td>4 x 12</td>
<td>6 x 12</td>
<td>1 3 x 1 3</td>
<td>3 3 x 2 5 2</td>
<td>3 3 x 2 4</td>
<td>5 3 x 1 4</td>
<td>6 3 x 1 3 2</td>
</tr>
<tr>
<td>12'-0''</td>
<td>4 x 12</td>
<td>6 x 12</td>
<td>6 x 14</td>
<td>3 3 x 1 5</td>
<td>3 3 x 2 2 1</td>
<td>5 3 x 1 3 2</td>
<td>5 3 x 1 4</td>
<td>5 3 x 1 5</td>
</tr>
<tr>
<td>14'-0''</td>
<td>4 x 14</td>
<td>6 x 14</td>
<td>3 3 x 1 3 1 3</td>
<td>3 3 x 1 5</td>
<td>5 3 x 1 2</td>
<td>5 3 x 1 3 2</td>
<td>5 3 x 1 4</td>
<td>5 3 x 1 6</td>
</tr>
<tr>
<td>16'-0''</td>
<td>6 x 12</td>
<td>6 x 14</td>
<td>5 3 x 1 2</td>
<td>3 3 x 1 5</td>
<td>5 3 x 1 3 1 3</td>
<td>5 3 x 1 6</td>
<td>5 3 x 1 8</td>
<td></td>
</tr>
<tr>
<td>18'-0''</td>
<td>6 x 12</td>
<td>6 x 16</td>
<td>3 3 x 1 6 2 5</td>
<td>3 3 x 1 6 7 5</td>
<td>3 3 x 2 4</td>
<td>5 3 x 1 5</td>
<td>5 3 x 1 6 7 5</td>
<td>5 3 x 1 9 3 2</td>
</tr>
</tbody>
</table>

**Scale:** 3/4" = 1'-0"
**ROOF TRUSSES (ENGINEERED)**

scale - 3/4" = 1'-0"

- composition roofing over 15# felt over 1/4" cdx plywood or OSB
- insulation baffle
- R-49 or R-38 adv. insulation
- engineered trusses or rafters
- Simpson H2.5 connector or approved equal each truss
- 2x6 bracing
- solid blocking
- Roof sheathing
- 2x4 runner
- 2x4 studs at 24" o.c. or gable end assembly w/ 2x4 backing or provide bracing engineering by truss manufacturer
- solid blocking for 2x4 runner

**GABLE END DETAIL**

scale - 3/4" = 1'-0"

(trusses shown- conventionally framed gable end bracing similar)

gutter and downspouts to approved drainage (see permit specialist)
ROOF TYPES (shed)

When enclosed, venting required—each end, each space—no obstructions. 1" air space min.

RAFTER SPAN TABLE R802.5.1(5)
ground snow load = 30 psf L/Δ = 240, dead load = 10 psf

<table>
<thead>
<tr>
<th></th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>8'-7&quot;</td>
<td>7'-10&quot;</td>
<td>6'-8&quot;</td>
</tr>
<tr>
<td>2x6</td>
<td>13'-6&quot;</td>
<td>11'-11&quot;</td>
<td>9'-9&quot;</td>
</tr>
<tr>
<td>2x8</td>
<td>17'-5&quot;</td>
<td>15'-1&quot;</td>
<td>12'-4&quot;</td>
</tr>
<tr>
<td>2x10</td>
<td>21'-4&quot;</td>
<td>18'-5&quot;</td>
<td>15'-1&quot;</td>
</tr>
<tr>
<td>2x12</td>
<td>24'-8&quot;</td>
<td>21'-5&quot;</td>
<td>17'-6&quot;</td>
</tr>
</tbody>
</table>

NOTES:
1. 2:12 slope min. for 3 tab composition roofing—slopes 2:12 to 4:12, two layers of 15# felt required, applied shingle fashion. R905.2.7.
2. Pitches less than 2:12 are to be hot mop, metal, sheet metal, rolled roofing or other approved material, applied as directed in approved manufacturer's instructions.
3. When ceiling is applied, vent each rafter space continuously through top and bottom blocking.
   When heated, insulate with R-38 insulation, using 2x12 rafters to allow one inch vent space R806.3
4. When attaching to existing building show ledger, size and method of fastening joist and ledger.
   Show required flashing.
5. Rafters are D.F. #2 per IRC Table R802.5.1(5).
EXAMPLE

**Foundation/Floor Framing Plan**

- 18" diameter x 8" thick concrete pad
- 4" concrete slab
- Continuous footing with rebar
- 18" diam. x 8" thick concrete pad
- Foundation vents
- 12" FTG.

Note: If attaching addition to an existing residence, show adjoining rooms of existing home.

**Floor Plan**

- 4x HDR w/2" rigid insulation (typ)
- Full height studs required - this wall
- Wood Structural Panel (WSP) less than 4'-0" see Clark county alternate braced wall details
- 4'-0" WSP required every 20'-0" o.c. and within 10'-0" of each corner

**Dimensions**

- 35'-0"
- 11'-0"
- 24'-0"
- 4'-0"
- 16'-3"
- 24'-3"
- 35'-0"
EXAMPLE

structural modifications

NOTE: If attaching to existing home- show 2x4 runner for bracing see detail

For post and beam floor see detail

footing - see detail

Longitudinal Cross Section

scale- 1/4" = 1'-0" (REDUCED EXAMPLE)
R-30 insulation
4x6 girders

scale- 1/4" = 1'-0" (REDUCED EXAMPLE)

1/4" T1-11 plywood

gutters and downspouts to approved drainage

composition roofing over 15# felt

SIDE ELEVATION

scale- 1/4" = 1'-0" (REDUCED EXAMPLE)

FRONT ELEVATION

scale- 1/4" = 1'-0" (REDUCED EXAMPLE)

2x8 ridge
2x6 rafters @ 24" o.c.

2x12 ceiling joists

2 - 2x14 ridge
2x12 rafters at 24" o.c w/ R-38 insulation

2x6 studs w/ R-21 insulation
4x6 girders
R-30 insulation

SECTION (thru garage)

scale- 1/4" = 1'-0" (REDUCED EXAMPLE)

SECTION (thru shop)

scale- 1/4" = 1'-0" (REDUCED EXAMPLE)