

**MURRAY CITY**  
**SUMMARY OF COMMON REQUIREMENTS**  
**FOR SINGLE FAMILY RESIDENTIAL CONSTRUCTION**

IT'S EASIER TO SOLVE A PROBLEM AT THE PLAN STAGE THAN ON THE JOB  
PLEASE CONTACT THE BUILDING INSPECTION OFFICE WITH ANY QUESTIONS

**A. GENERAL**

- A1. This list is compiled for the purposes of summarizing some of the general requirements for single family residential and townhouse construction three stories or less. Following is information that needs to be understood at the plan stage of a residential project in order to avoid unnecessary expense and delay as the home is constructed. The information contained herein is taken from the [2015 International Residential Code](#) and Utah Amendments to the International Codes and the National Electrical Code. For simplicity, wording is not always verbatim from the code; the actual code should be used for the detailed, complete requirements, exceptions, and alternatives or specific applicable provisions from other regulations. This list is not intended to indicate any change in the codes by inference or omission.
- A2. Design for MURRAY CITY shall comply with the requirements for:
- |    |                               |                      |
|----|-------------------------------|----------------------|
| a. | Frost Line Depth              | 30 inches            |
| b. | Assumed Soil Bearing Pressure | 1,500 psf            |
| c. | Seismic Zone                  | D2                   |
| d. | Basic Wind Speed              | 115 mph (3 sec gust) |
| e. | Ground Snow Load              | 43 psf (Roof 30 psf) |
- A3. \* Plans shall be DRAWN TO SCALE, 1/4" = 1' or larger, and shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of the codes and all relevant laws, ordinances, rules and regulations. (*Murray Policy and R106.1.1*)

**B. SITE PLAN**

- B1. \* Building location must comply with all Murray zoning regulations.
- B2. \* A Height of Building @ means the vertical distance between a reference datum and the highest part of the building excluding roof structures such as chimneys, penthouses, towers and steeples. (*City Ord.17.08.020*) The reference datum shall be selected by one of the following:  
Please provide elevations at top of foundation and all lot corners,
- a. The average elevation of the top back of curb abutting the lot on which the building is to be built.
  - b. In the absence of curb and gutter, the average elevation of the center line of the street abutting the lot on which the building is to be built.
  - c. Where any part of the rear lot line is more than 6 feet above the average top back of curb, the average elevation of the perimeter of the lot on which the building is to be built.
- B3. Building walls closer than 5 feet to property line shall be of one-hour fire resistive construction. Windows or doors are not allowed if less than 3' to property line. (*Table 302.1(1)*)

- B4. Eaves, overhangs and projections shall conform to *Table 302.1(1)*.
- B5. Parapets or special roof construction is required on common walls for townhouses. (*R302.2.2*)
- B6. Building cannot be located on any easement or right of way.
- B7. \* Ground slopes may not exceed 2 horizontal to 1 vertical unless retained in an approved manner or a geotech report is provided justifying a steeper slope. (*IBC J106 & J107*)
- B8. \* Footings of structures located adjacent to slopes steeper than 3 horizontal to 1 vertical must be set back from the slope at least 1/3 the height of the slope if at the top, and ½ the height of the slope at the bottom. (*R403.1.7*)
- B9. **Site shall be graded such that the ground slopes away from the foundation dropping at least 6 inches within 10 feet of the foundation.** (*R401.3*)
- B10. \* Any retaining walls over 4 feet in height from the bottom of the footing to the top of the wall shall be of an approved design with engineer's details provided. (*R105.2 (3)*)
- B11. Cuts or fills are not permitted within 2 feet of the property line. (*IBC, J108*)
- B12. Drainage from the property may not exceed that which existed prior to development. Paved areas and roof drains may need to be supplied with appropriate sumps or other means of mitigating their flow. (*IBC, J109*)
- B13. Driveway shall have an all-weather driving surface. (*City Ord. 17.72.020*)
- B14. \* Some sites in Murray have poor soil conditions and require an observation report from a soils engineer. A recommendation to proceed is needed from the soils engineer prior to approval of a footing inspection. Foundation drains will be required, if indicated in the soils report. (*IBC, J104*)
- B15. Any subdivision of two or more lots shall require a soils report from a geotechnical engineer.
- B16. \* Water meter cannot be located in the driveway, sidewalk or similar area. Meter must be placed in landscaping area. Sewer line cannot be located under the driveway. (*Murray Water and Sewer Divisions*)
- B17. \* Homes located in potential flood hazard areas will be required to have elevation certificates prior to construction and after completion. (*R322*)
- B18. Addresses shall be provided which are plainly visible and legible from the street. (*R319*)

## C. FOOTING AND FOUNDATION PLAN

- C1. \* **In all cases perimeter footings shall be continuous** and extend below the 30" frost line depth measured from the bottom of the footing to finish grade. (*R403.1.2, R403.1.4.1*)

- C2. Foundations supporting wood walls shall extend at least 6 inches above adjacent finish grade or **4 inches** above grade with masonry veneer. (R404.1.6)
- C3. All foundation plates or sills shall be of treated wood or foundation redwood. (R317.1.) No more than two 2 x 4 or three 2 x 6 plates are permitted. (R602.3)
- C4. \* Connection of structure to foundation shall be adequate to transfer forces.
- Anchor bolts are to be minimum  $\frac{1}{2}$ " x 10" for single plates  $\frac{1}{2}$ "x 12" for double plates at 32" on center or obtain design from structural engineer. (State Amendment, R403.1.6)
  - Hold-downs shall be as required by engineer or as for alternate braced wall panels when conventional construction.
- C5. \* Foundation Reinforcement; The foundations for buildings which are constructed as light wood frame structures shall comply if they are constructed as follows:

<b>EMPIRICAL FOUNDATION WALLS (1,7,8)</b>							
Max. Height	Top Edge Support	Min. Thickness	Vertical Steel (2)	Horizontal Steel (3)	Steel at Openings (4)	Max. Lintel Length	Min. Lintel Length
2'(610 mm)	None	6"	(5)	2- #4 Bars	2- #4 Bars above 1- #4 Bar each side 1- #4 Bar below	2' (610 mm)	2" for each foot of opening width; min. 6"
3'(914 mm)	None	6"	#4@32"	3- #4 Bars	2- #4 Bars above 1- #4 Bar each side 1- #4 Bar below	2' (610 mm)	2" for each foot of opening width; min. 6"
4'(1,219 mm)	None	6"	#4@32"	4- #4 Bars	2- #4 Bars above 1- #4 Bar each side 1- #4 Bar below	3' (914 mm)	2" for each foot of opening width; min. 6"
6'(1,829 mm)	Floor or roof Diaphragm (6)	8"	#4@24"	5- #4 Bars	2- #4 Bars above 1- #4 Bar each side	6' (1,829 mm)	2" for each foot of opening width; min. 6"

					1- #4 Bar below		
8'(2,438 mm)	Floor or roof Diaphragm (6)	8"	#4@24"	6- #4 Bars	2- #4 Bars above 1- #4 Bar each side 1- #4 Bar below	6' (1,829 mm)	2" for each foot of opening width; min. 6"
9'(2,743 mm)	Floor or roof Diaphragm (6)	8"	#4@16"	7- #4 Bars	2- #4 Bars above 1- #4 Bar each side 1- #4 Bar below	6' (1,829 mm)	2" for each foot of opening width; min. 6"
Over 9'(2,743 mm), Engineering required for each column							

**Notes:**

- (1) Based on 3,000 psi (20.6 Mpa) concrete and 60,000 psi (414 Mpa) reinforcing steel.
- (2) To be placed in the center of the wall, and extend from the footing to within three inches (76 mm) of the top of the wall; dowels of #4 bars to match vertical steel placement shall be provided in the footing, extending 24 inches (610 mm) into the foundation wall.
- (3) One bar shall be located in the top four inches (102 mm), one bar in the bottom four inches (102 mm) and the other bars equally spaced between. Such bar placement satisfies the requirements of Section 1805.9. Corner reinforcing shall be provided so as to lap 24 inches (610 mm).
- (4) Bars shall be placed within two inches (51 mm) of the openings and extend 24 inches (610 mm) beyond the edge of the opening; vertical bars may terminate three inches (76 mm) from the top of the concrete.
- (5) Dowels of #4 bar at 32 inches on center shall be provided in the footing, extending 18 inches (457 mm) into the foundation wall.
- (6) Diaphragm shall conform to the requirements of Section 2308.
- (7) Footing shall be a minimum of nine inches thick by 20 inches wide.
- (8) Soil backfill shall be soil classification types GW, GP, SW, or SP, per Table 1610.1. Soil shall not be submerged or saturated in groundwater.

**NOTE: ALL REINFORCEMENT SHALL BE PROPERLY TIED AND CHAIRED TO INSURE MAINTENANCE OF PROPER PLACEMENT.**

- C6. Where ground slopes more than 1 foot in 10 feet, footings shall be stepped so both the top and bottom of the foundation are level. (R403.1.5)
- C7. Footings
- a. \* Footings shall be designed to minimize differential settlement. Spot footings shall be designed with soil bearing pressures no greater 1500 psf or as indicated in a soils report. (R401.4.1)
  - b. Footings shall be on undisturbed natural soils without organic or deleterious materials. Any fill placed under footings shall be properly compacted prior to footing inspection approval. (R403.1)
  - c. Where footings are dug rather than formed, soil must be stable enough to maintain near vertical slopes without sluffing or forms shall be used.
  - d. Perimeter and interior footings may be inspected at the same time or separately.

ALL FOOTINGS, INCLUDING INTERIOR FOOTINGS PLACED WITH THE BASEMENT SLAB, MUST BE INSPECTED AND APPROVED PRIOR TO CONCRETE PLACEMENT

- C8. Sloped or stepped footings shall be continuous. The upper portion of a stepped footing must include a vertical drop with continuous reinforcement. (R403.1.5)
- C9. Crawl Spaces
- a. Wood girders shall be located not less than 12" above the exposed ground and floor joists not less than 18" **unless pressure treated**. (R317)
  - b. Crawl spaces shall be provided with an 18"x 24" access. (R408.4)
  - c. If a furnace is located in the crawl space the minimum access shall be not less than 30"x 22" or size of the equipment if larger and within 20' of the furnace. (M1305.1.4)
  - d. Crawl space ventilation shall be provided by approved mechanical means or openings in the exterior foundation walls. Such openings shall have a net area of not less than 1 sq. ft. for each 150 sq. ft. of under floor area. Openings shall be located within 3' of each corner and shall provide cross-ventilation. Openings are to be provided with a  $\frac{1}{8}$ " corrosion resistant mesh. Where ground water is not a problem, the building official may allow operable louvers and may allow vent openings to be reduced to 10% of the requirement, provided the under-floor ground surface is covered with an approved vapor barrier. (R408.2)

## D. FLOOR PLANS

- D1. Fire Separation between House and Garage
- a. The garage shall be separated from the residence and its attic area by not less than  $\frac{1}{2}$ " gypsum board applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable spaces above by not less than  $\frac{5}{8}$ " type X gypsum board or equivalent. (R302.6)
  - b. Where the separation is a floor/ceiling assembly, the structure supporting the separation shall also be protected by not less than  $\frac{1}{2}$ " gypsum board or equivalent. (R302.6)
  - c. \* Any door between the house and garage shall be a tight fitting, solid wood door,  $1\frac{3}{8}$ " thick or a 20 minute labeled door with self-latching hardware. (R302.5.1)
  - d. Duct penetrations shall be by minimum 26 gauge sheet metal, **no openings into the garage are permitted**. (R302.5.2)
  - e. No windows are permitted in garage separation wall or in door between the house and garage. (R302.5)
  - f. Penetrations in rated walls or floor ceiling assemblies shall be protected in accordance with section (R302.4)
  - g. Separation need not be provided between a house and a carport having no enclosed uses above, provided the carport is entirely open on two or more sides. (R309.2)
  - h. Under no circumstances shall a garage have any openings into a room used for sleeping purposes. (R302.5.1)
  - i. Townhouses and two family dwellings shall be separated by a rated fire resistance rated wall or floor ceiling assembly per section R302.
- D2. Stairways
- a. \* Stair treads shall have a maximum **RISE of 8"** and a minimum rise of 4". The minimum **RUN shall be 9"**. Length of tread is measured from nose to nose. The largest tread run or riser within any flight of stairs shall not exceed the smallest by more than  $\frac{3}{8}$ ". **For treads less than 10", nosings**

**are required not less than  $\frac{3}{4}$ " nor more than  $1\frac{1}{4}$ " with an edge radius not greater than  $\frac{9}{16}$ ". (R311.7.5 & State Amendment)**

- b. \* Winder treads shall have a minimum tread depth of 10 inches measured as above at a point 12 inches from the side where the treads are narrower. Winder treads shall have a minimum tread depth of 6 inches at any point. Within any flight of stairs, the greatest winder tread depth at the 12 inch walk line shall not exceed the smallest by more than  $\frac{3}{8}$  inch. (R311.7.5 & State Amendment)
- c. \* Stairways in homes shall not be less than 36" in width. (R311.7.1)
- d. \* Every stairway and ramp shall have a landing with a dimension of at least 36" measured in the direction of travel. (R311.7.6 & R311.8.2)
- e. \* Stairways with **4 or more risers** shall have at least one handrail. Handrails shall be placed 34" to 38" above the nose of the treads vertically to the top of the rail. They shall be continuous the full length of the stairs. The handgrip portion shall be not less than  $1\frac{1}{4}$ " nor more than **2"** in cross-sectional dimension. Handrails projecting from a wall shall have a space of not less than  $1\frac{1}{2}$ " between the wall and the handrail. Ends shall be returned to the wall or terminate in newel posts or safety terminals. (R311.7.8)

**Exception:** Non-circular handrails may have a maximum cross sectional dimension of  $3\frac{1}{4}$ " measured 2 inches down from the top of the crown. The handrail is required to have an indentation on both sides between  $\frac{5}{8}$ " and  $\frac{1}{2}$ " down from the top or crown of the cross section. The indentation shall be a minimum of  $\frac{1}{4}$ " deep on each side and shall be at least  $\frac{1}{2}$ " high. (State Amendment)

- f. \* Stairs shall have a headroom clearance of not less than 6'-8". Clearance is measured vertically from a line along the tread nosing to the soffit above at all points. (R311.7.2)
- g. Enclosed accessible space under stairs shall have the walls and soffit protected on the enclosed side with  $\frac{1}{2}$ " sheetrock. (R302.7)
- h. \* 36" high guards shall be provided on porches, balconies and raised floor surfaces located more than 30" above the floor or grade below. Open sides of stairs with a total rise of 30" above the floor or grade below shall have guards at least 34" high. Guards will have an ornamental pattern such that a sphere 4" in diameter cannot pass through. The triangular space created by the stair and a bottom rail may be constructed so a 6" sphere will not pass through. (R312)
- i. Ramps cannot be steeper than 1 vertical to 8 horizontal. A handrail is required if the ramp is steeper than 1 vertical to 12 horizontal. (R311.8)

### D3. Exit Facilities

- a. \* All houses shall have at least one swinging type exit door to the exterior and shall provide a minimum clear width of 32". Any lock shall be operable from the inside without a key. (R311.2)
- b. \* Landings are required on both sides of exterior doors. Door may open at a landing that is not more than 8" lower than the floor level, provided the door does not swing over the landing. Landing shall be at least 36" deep. (R311.3.2 & State Amendment)
- c. \* Hallways shall be not less than 36" wide. (R311.6)
- d. Hallways shall have a clear ceiling height of not less than 7' measured to the lowest projection. (R305.1)
- e. \* Basements, habitable attics and every sleeping room shall have at least one operable, exterior window or door for emergency escape or rescue. The units shall be operable from the inside to provide a full clear opening without the use of tools. ALL of the following apply. (R310)

1. Minimum net clear opening of 5.7 sq. ft. (**Opening at grade level floor may be 5.0 Sq. Ft.**)
2. Minimum net clear opening height dimension of 24"
3. Minimum net clear opening width dimension of 20"
4. Maximum finished sill height of 44" above the floor
- 5.\* All doors or windows provided for emergency escape or rescue shall open directly to a street, alley, yard or court.
- 6.\* Window wells for emergency escape and rescue windows shall have a net clear opening of 9 sq. ft. with a minimum projection and depth of 36". Window wells deeper than 44" shall have a permanent ladder accessible from the window when fully open. **Ladders shall be at least 12" wide and 3" from the well with rungs no more than 18" apart.**
7. Emergency escape windows are allowed to be installed under decks and porches provided the location of the deck allows the emergency escape window to be fully opened and provides a path not less than 36 inches in height to a court or yard. (R310.2.4)

#### D4. Light, Ventilation and Sanitation

- a.\* All habitable rooms (bedrooms, living rooms, dining rooms, family rooms, etc.) shall be provided with natural light from windows with an area of not less than **8% or artificial light producing 6 ft. candles throughout.** (R303.1)
- b.\* All habitable rooms shall be provided with natural ventilation by means of exterior openings with an area of not less than **4%** of the floor area of each room. (R303.1). In lieu of natural ventilation, habitable rooms may be provided with mechanical ventilation capable of **0.35 air changes per hour** with 15 cfm of outside air per occupant. (M1507)
- c. For the purpose of light and ventilation, a room may be considered as a portion of an adjoining room when  $\frac{1}{2}$  of the area of the common wall is open and unobstructed and provides an opening of not less than  $\frac{1}{10}$ th of the floor area of the interior room or 25 sq. ft., whichever is greater. (R303.2)
- d. Bathrooms shall have ventilation provided by an exterior window with an area of 3 sq. ft., but not less than  $1\frac{1}{2}$  sq. ft. openable. A fan providing **50 cfm intermittent or 20 cfm continuous** may be substituted. Fan must discharge directly to the outside. (R303.3 & M1507)
- e. Every house shall have at least one water closet, lavatory, bathtub or shower, and kitchen sink equipped with hot and cold running water connected to an approved water/sewage system. (R306)
- f.\* Enclosed attics and enclosed rafter spaces shall have ventilation for each separate space by ventilating openings protected against rain or snow. Openings shall be covered with a  $\frac{1}{16}$ " to  $\frac{1}{4}$ " mesh. The net free ventilating area shall be not less than  $\frac{1}{150}$  of the area of the space ventilated, or  $\frac{1}{300}$  if 40% to 50% is located in the upper 3' of the attic and the remainder is provided by soffit vents. Where soffit vents are used, an insulation dam must be provided between every truss and or rafter. Attic ventilation may also be  $\frac{1}{300}$  when a vapor barrier is used at the warm side of the ceiling. (R806)
- g. An attic access 22"x 30" shall be provided at roof/ceiling areas and shall be located in a corridor, hallway, of other readily accessible location. There shall be 30" of headroom over the opening. If there is less than 30" maximum height in the attic, access need not be provided. (R807)

#### D5. Glazing

- a. Glass in doors shall be safety glazed. (R308.4.1)

- b. \* Glazing adjacent to a door within a 24" arc of either door edge when closed, must be safety glazed if the bottom edge is within 60" of the floor or walking surface. (R308.4.2).
- c. Glazing panels larger than 9 sq. ft. located less than 18" above & within 36" horizontally of a floor or walking surface shall be safety glazed. In lieu of safety glazing, glass may be protected by a horizontal member 1 1/2" in width, capable of resisting 50 lbs. per lineal foot, located between **34" and 38"** above walking surface. (R308.4)
- d. \* Glazing in shower and bathtub **rooms** within 60" above standing or walking surface, including any walls, windows in walls and doors shall be safety glazed. (R308.4.5)
- e. \* Glazing within 5' horizontally and 60" vertically of an indoor or outdoor pool or spa deck area or bathtub, shower, steam room or sauna shall be safety glazed. (R308.4.5)
- f. \* Glazing at walls enclosing stairs and landings (and for 5' beyond the top or bottom of the stair) shall be safety glazed if less than 36" above the walking surface. (R308.4.6)
- g. Glass in railings shall be tempered or laminated. (R308.4.4)
- h. Safety glazing material shall be permanently labeled. (R308.1.1)

#### D6. Room Dimensions/Miscellaneous

- a. \* Ceiling height is required to be a minimum of **7'-0"** in all rooms, halls and basements. See exceptions. (305.1)
- b. Habitable rooms shall have an area of not less than 70 sq ft. No portion of a room may be used to compute minimum area where the ceiling is less than 5'. (R304)
- c. Habitable rooms other than kitchens shall be not less than 7' in any dimension. (R304.3)

### E. ROOFING

- E1. Roofing materials must have an approval by an approved testing agency. (R904). Roof slope will determine the types of roofing that can be used. Roofing materials shall be installed per manufacturers' instructions. Asphalt shingles on roofs less than 4/12 pitch must be over an approved water shield. Asphalt shingles cannot be used for slopes less than 2/12. (R905)
- E2. Ice and water shield shall be used at roof eaves from eave edge to 24" inside the exterior wall. (R905)
- E3. Step flashing shall be used where the roof meets a vertical surface. Counter flashing shall be installed at roof and wall junctures. (R905)

### F. MASONRY

- F1. See IRC Section R606 for reinforced masonry construction.
- F2. Wood members shall not be used to permanently support the load of any masonry or concrete except nonstructural floor or roof surfacing not more than 4" thick. (R606)

- F3. **Brick and stone veneer are only permitted on the first floor above grade** unless all provisions of the state amendment for additional bracing are met. Veneer shall be attached with corrosion resistant sheet metal ties 22 ga. x  $\frac{7}{8}$ " or 9 ga. wire. Stud spacing shall be a maximum of 16" on center. Tie spacing shall be such that no more than 2 sq. ft. of wall is supported (16" on center both ways). A #9 ga. wire shall be provided as horizontal bed joint reinforcement to ties. Brick ties shall engage the #9 wire. (R703.8)
- F4. Stone units, 5" maximum thickness, may be applied with a 1" minimum grouted backing space which is reinforced by not less than 2"x 2" 16 ga. galvanized wire mesh placed over waterproof paper backing and anchored directly to studs spaced no more than 16" on center. Mesh must be furred out from sheathing for embedment in grout. (R703.8 & R703.12)
- F5. Fireplace and Chimney
- a. Masonry and Concrete Fireplaces. (R1001 & R1003)
  - b. Factory-Built Chimneys and Fireplaces
    1. Factory-built chimneys and fireplaces shall be listed by an approved testing agency and have an ICC ES approval number. They shall be installed in exact accordance with the terms of their listings and the manufacturers' instructions. Specific approval numbers and installation standards must be made available to the building inspector. (R1004)
    2. Fire blocking with non-combustible material is required at spaces between floors and ceilings through which chimneys pass. (R1003.19)
    3. Hearth extensions of listed factory built fireplaces shall conform to the conditions of listing and manufacturers installation instructions. (R1004.2)
  - c. Fireplace chimneys shall extend at least 2' above the roof, any opening or any part of the building within 10'. (Figure R1001.1, R1003.9)

## G. ELECTRICAL

- G1. Lighting Outlets
- a. At least one wall switch controlled lighting outlet shall be installed in every habitable room; in bathrooms, hallways, stairways, attached garages and detached garages with electric power; and at outdoor entrances (not including garage overhead or vehicle doors). In habitable rooms, other than kitchens and bathrooms, receptacles controlled by a wall switch is permitted in lieu of lighting outlets. (E3903)
  - b. At least one switch controlled, lighting outlet is required at the entry of attic, crawl space, utility room or basement with storage or equipment. The lighting outlet shall be provided at or near any equipment requiring servicing. (E3903.4)
  - c. Lighting is required for all interior and exterior stairways. Lighting outlets at stairs shall be switched at each floor level where the difference between floor levels is six steps or more. (E3903.3)
  - d. Incandescent fixtures in closets shall be a minimum of 12" from any shelf edge, measured horizontally (6" for fluorescent fixtures). The dimension for shelves less than 12" wide will be 24" from the wall. (E4003.12)
  - e. Fixtures cannot be located within 3 feet horizontally or 8 feet vertically of bathtubs or showers. (E4003.11)
  - f. Halide lights shall have a containment barrier. (Cover) (E4003.8)
  - g. Switches shall not be installed in tub or shower spaces. (E4001.7)

- G2. Receptacle Outlets
- a. In every kitchen, family room, dining room, living room, parlor, library, den, sun room, bedroom, recreation room, or similar room receptacle outlets shall be installed so that no point along the floor line in any wall space is more than 6' from an outlet (measured horizontally). The wall space afforded by fixed room dividers, such as, free-standing counters or railings shall be included in the 6' measurement. Any wall or space 2' or more wide shall be considered as another wall space within the room. *(E3901.2)*
  - b. Kitchen, pantry and dining area counter tops shall have receptacle outlets at each counter space wider than 12". Receptacles shall be installed so that no point along the wall line is more than 24" from an outlet. One outlet is required for island and peninsular counter tops which shall be installed above or within 12" below the counter top. Receptacles shall not be installed in a face-up position. *(E3901.4)*
  - c. 120V receptacles for service and maintenance shall be located within 25' of furnaces and air conditioning equipment in attics and crawlspaces. *(E3901.12)*
  - d. Outlets shall be installed in bathrooms within 36" of the outside edge of the basin on the wall adjacent to the basin. *(E3901.6)*
  - e. At least two outlets accessible at ground level shall be installed outdoors. There shall be a minimum of one outlet at the front and one outlet at the back of dwelling within 6'-6" of grade. Balconies and Decks > 20sq.ft shall have one outlet within the perimeter. *(E3901.7)*
  - f. At least one outlet shall be installed for the laundry. *(E3901.8)*
  - g. At least one outlet, in addition to any provided for laundry, shall be installed in each basement and each attached garage, and in each detached garage with electric power. *(E3901.9)*
  - h. For hallways 10' or more long, one outlet shall be provided. *(E3901.10)*
  - i. Outlets installed in garages must be at least 18" above the floor.
  - j. *(IMC 304.3)*
  - k. General purpose receptacles 125 volt 15 & 20 amp shall be tamper proof. *(E4002.14)*
- G3. Ground fault circuit interrupters (GFCI) are required in the following locations. *(E3902)*
- a. Receptacles in bathrooms.
  - b. Receptacles in garages and accessory structure.
  - c. Receptacles outdoors.
  - d. Receptacles in crawl spaces and unfinished basements.
  - e. All receptacles serving kitchen counter tops and within 6' of outside edge of sink.
  - f. Receptacles for hot tubs. *(E4208)*
  - g. Hydro-massage bathtubs/bond all metal parts, pump motors, etc., with #8 solid conductor. *(E4209)*
  - h. Outlets within 6 feet of laundry, utility & bar sinks.
- G4. Permanent access must be provided to all hot tub and whirlpool tub electrical equipment requiring service and shall be located within 12" of access opening. *(E4209.3)*
- G5. Smoke and multiple station smoke alarms. *(R314)*
- a. \* In new construction, the smoke alarms shall receive their primary power from the building wiring and be equipped with a battery back-up. *(R314.6)*
  - b. \* Smoke alarms shall be installed in each bedroom; immediately outside of each bedroom area; and on each level. In dwellings or dwelling units

with split levels and without an intervening door between the adjacent levels, a smoke installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level. (R314.3)

- d. Detectors shall be interconnected so that all alarms will activate simultaneously. (R314.4)
- e. Carbon monoxide alarms shall be located in the immediate vicinity outside the bedrooms, shall be interconnected with battery back-up. Combination of smoke and carbon monoxide may be used. (R315.3)

G6. The electrical panel shall have a clear working space 30" wide, 36" deep and 6'-6" high in front. (E3405.2)

G7. The meter base main breaker and service shall be located within fifteen feet of the front outside surface or face of the structure unless otherwise approved by the metering supervisor in the power department. The meter base must be attached to the structure. A fence or similar structure may not obstruct access to the meter from the street. (Ord. 15.20.230)

## H. PLUMBING AND MECHANICAL

H1. Each water closet shall be located in a clear space not less than 30" in width (15" from the center to any obstruction) and have a clear space in front not less than **21"**. (Figure 307.1)

H2. A shower compartment shall have at least **900** square inches of interior cross-sectional area and be of sufficient size to provide 30" finished dimension in front of valves and shower head. (P2708.1)

H3. Glass mat gypsum, fiber-reinforced gypsum, non-asbestos fiber-cement, Non-asbestos fiber mat reinforced cementitious backer panels shall be installed per their listing as backers for wall tile in shower areas. (Table R702.4.2)

H4. All appliances (water heater, boiler, etc.) which require pressure relief and/or temperature valves shall be provided with a full sized drain which shall extend from the valve to an indirect waste, such as a floor drain. All floor drains shall have trap primers or barrier type trap seal. (P2803.6.1 & P3201.2.1.4)

H5. Gas fired furnaces and water heaters shall not be located in a sleeping room, bathroom, storage closet, **toilet room** or in any enclosed space with access only through such a room or space. (G2406.2 Except listed direct vent appliances)

H6. Equipment and appliances located in garages having an ignition source shall be installed at least 18" above the floor level. (G2408.2)

H7. Appliances installed in garages or other areas where they may be subject to motor vehicle damage shall be suitably guarded against such damage. (G2408.3)

H8. Appliances installed in a compartment alcove, basement or similar space shall have an opening or door with a continuous passageway at least 2' in width and large enough to permit removal of the largest equipment in the room. (M1305.1.2)

- H9. It shall be possible to remove appliances without first removing any permanent part of the structure. *(M1305)*
- H10. An unobstructed working space at least 30" X 30" deep and the height of the furnace or water heater shall be provided along the entire front or firebox side of the furnace. *(M1305.1)*
- H11. Combustion air for all fuel-burning appliances shall be from the outdoors. When combustion air is taken from the attic, full ventilation must be from gable end type vents. Combustion air openings shall not be dampered. Combustion air openings shall be located within the upper 12" of the appliance area. One vertical or horizontal duct shall be provided in the enclosure with 1 sq. inch per 3,000 Btu/h input but no smaller than the vent flow area. IRC Ch 17 {When calculating free area of louvers and grilles, it may be assumed that wood louvers will have 25% free area and metal louvers and grilles will have 75% free area. *(G2407)*
- H12. A furnace shall not be installed in a closet or alcove less than 12" wider than the furnace and shall provide a minimum working space of 3" along the sides, back, and top. *(M1305)*
- H13. A furnace shall not be installed with a clearance of less than 6" along the combustion chamber opening side. *(M1305)*
- H14. Ducts used for kitchen range, dryer, bathroom and laundry room ventilation shall have a smooth, noncombustible, non-absorbent surface. Ducts shall terminate outside the building and shall be equipped with back draft dampers. Flexible ducts are allowed for bathroom exhaust fans, but must be tested to UL181 and installed in accordance with the listing. Vents cannot terminate in soffits, attics, crawl spaces or ridge vents. *(M1501)*
- H14.\* The minimum diameter of a dryer exhaust duct shall be per the manufactures' recommendation, but at least the diameter of the outlet. Maximum length is 35' to be reduced 2' 6" for each 45° bend and 5' for each 90° bend. Where dryer exhaust duct is concealed, a permanent label or tag shall identify total equivalent length. *(M1502.4.4 & M1502.4.5)*
- H16. Cooking appliances shall be tested, listed and labeled as household type for domestic use and installed per the manufacturers' instructions. *(G2447, ANSI Z21.1 or Z21.58 Tested)*
- H17. An evaporative cooler must be located a minimum of 10' from all vents, flues and exhaust terminations. Flues may be extended 3' above intake opening of evaporative cooler in lieu of 10' horizontal separation. *(M1413)*
- H18. Water service shall be a minimum of 1". *(Ord.13.08.090)*
- H19. Water closets shall have a maximum flow rate of 1.6 gallons per flush. Shower heads shall have a maximum flow rate of 2.5 gpm. *(Table P2903.2)*
- H20. Water hammer arresters are required for appliances to control the flow velocity and to reduce the possibility of water hammering. *(P2903.5. Conform to ASSE 1010)*
- H21. The hot water supplied to bathtubs and whirlpool tubs shall be limited to a

maximum temperature of 120 F by a water temperature limiting device that conforms to ASSE 1016, where such protection is provided by a combination tub/shower valve in accordance with *Section P2708.4*.

- H22. Fixtures that have flood level rims located below the elevation of the next upstream manhole cover of the public sewer serving such fixtures shall be protected from backflow or sewage by installing an approved backwater valve. (*P3008.1*)
- H23. Heating and cooling equipment shall be sized in accordance ACCA Manual J or other approved heating and cooling methodologies. (*M1401.3*) The load calculations performed on a room by room basis shall be submitted for review.
- H24. The Manual J summary worksheet shall be completed and submitted for review. All of the equipment brands, types and sizes listed in the worksheet shall be noted on the plans.
- H25. The Manual D calculations and summary worksheet shall be completed and submitted for review. The manufacturers supporting data shall be included.
- H26. The duct supply and return system shall be sized in accordance with Manual D. (*M1601.1*). At a minimum, a one line duct design diagram showing all the duct sizes, duct lengths and fittings with their equivalent lengths shall be submitted for review.
- H27. Ducts in enclosed areas shall be a minimum of 28 gauge for ducts >8" and <15", ducts 16" to 18" shall be 26 gauge and ducts 20" and greater shall be 24 gauge. (*Table 1601.1.1(1) & State Amendment 15A-3-204*)
- H28. A gas line sizing diagram with the pipe sizes, lengths and BTU rating of all the proposed appliances shall be submitted for review. (*G2413.3*)
- H29. The mechanical sizing information form shall be completed and submitted for review.

## J. CONSTRUCTION DETAILS

- J1. \* Any trusses to be used must have details provided for the specific house. (*R502.11*)
  - a. \* A truss layout indicating locations and orientation of all types of trusses must be provided from the truss manufacturer before a review can be completed. This information is necessary to accurately determine loading of structural members.
  - b. Details are required for ALL types of trusses used (scissor, mono, girder, etc.).
  - c. Truss details must be provided from an approved fabricator. Homemade trusses are not acceptable unless designed, stamped and inspected by a structural engineer.
  - d. All details must indicate correct design snow loads for the area.
  - e. Specific engineered design for connections of trusses to each other and other framing members which are supported by trusses must accompany the details.
  - f. Details must be stamped by a Utah registered structural engineer.

- J2. \* Joist spans shall be accordance with *Table R502.3.1* or designed under IBC criteria. The attached JOIST SPANS chart is a condensation of the tables and can be used for Douglas Fir #2 and Hem Fir #2. Cantilevered joists should be designed.
- J3. \* Bearing partitions perpendicular to solid sawn joists shall not be offset from supporting girders, walls or partitions more than the joist depth. Bearing partitions over 'I' joists may not be offset from bearing below unless engineered.
- J4. \* The attached RAFTER SPANS table are a condensation of the IRC tables and can be used for Douglas Fir #2 and Hem-Fir #2.
- J5. \* Beams must all be carefully sized. Lumber suppliers can usually help suggest beams for simple span, uniform loads. The Building Inspection Division will check beams shown on the plan. Beams or girders with concentrated point loads, cantilevers or any special condition should be designed by a structural engineer. (*R502.1*)
- J6. There are currently many good, manufactured, wood products available for building framing. Any product used should be approved as an alternate by an ICBO Evaluation Report. Span charts, details and installation recommendations are readily available from lumber suppliers and local factory representatives.
- J7. Walls
- a. \* Walls supporting two floors shall be 2 x 6 or 3 x 4 studs at not less than 16" oc. Stud height in bearing walls cannot exceed 10'. Stud height in non-bearing wall cannot exceed 14' for 2 x 4's or 20' for 2 x 6's unless engineered. (*Table R602.3(5)*)
  - b. \* When cripple walls exceed 4' in height, they shall be framed of studs having the size as required for an additional story. Walls having a stud height exceeding 14" shall be considered to be a first story for the purpose of determining required bracing (see next item). Studs in bearing walls shall be at least 14" in length. Solid blocking or plywood sheathing nailed at 6" oc may be used to brace cripple walls with studs less than 14". (*R602.9*)
  - c. \* Wall bracing shall be accordance with R602.10. Braced wall lines must be provided a minimum of every **25 feet** each direction at the interior and exterior of the building (**except spacing may 35 feet for one 900 sf room**). Braced wall lines shall be offset no more than 4'. Braced wall panels shall be located within 8' (**or 12' with a collector**) of each end of a braced wall line. Braced wall panels shall be installed no more than 25' on center (**18' on center for cripple walls**). The braced panel must be at least 48" in width to provide required bracing. Braced wall panels cannot occur over cantilevered 2X8 joists. All vertical joints of panel sheathing shall occur over studs. Horizontal joints shall occur over blocking equal in size to the studding. Let-in diagonal braces are not permitted. Braced wall panels shall be indicated on the floor plans. Homes which do not provide the minimum bracing will need to have a design by an engineer for lateral strength. (*R602.10*)
  - d. Alternate braced wall panels may be used as a replacement for braced wall panels. (Detail available from inspection office) R602.10
  - e. \* All openings in bearing walls shall be provided with headers. See *Table R502.5(1)* using the 50 psf column. Headers with concentrated loads may require engineering.
- J8. \* Columns must be of sufficient size and strength to resist forces imposed and shall be restrained at the bottom. (*R407*)

- J9. \* Subfloor and roof sheathing should be in accordance with *R503* and *R803*.
- Note:* All sheathing manufacturers recommend spaces between sheathing sheets of at least 1/8". This should always be done and is very important when using an inflexible final finish such as stucco.
- J10. All weather exposed surfaces shall have a weather-resistive barrier to protect the walls under finish material. The most common type is a waterproof building paper or felt applied weatherboard fashion, lapped at least 2" at horizontal joints and at least 6" at vertical joints. "One coat" stuccos require 2 layers. (*R703.2*)
- J11. Stucco system shall be installed in accordance with *R703.7* or shall be an approved system with an ICBO Evaluation Service number. All "systems" must be applied in strict compliance with the manufacturers' recommendations including requirements for self-furring lath, flashing, corner treatment, expansion control joints, and drainage system.
- Note:* There is currently no EIFS type stuccos approved for wood frame construction without a drainage system.
- J12. Engineered Design
- a. \* Any house deemed by the building official to be of unusual shape, size or split-level may require design by a registered professional structural engineer. Some guidelines for determining a building of unusual shape are any of the following:
    1. When there are out of plane offsets of braced wall panels from the foundation to the top story.
    2. When a section of floor or roof is not laterally supported by braced wall lines at all edges.
    3. When braced wall panels extend more than 1' into an opening below except if there is at least a 4" X 12" header and the opening below is 8' or less.
    4. When an opening in a floor or roof exceeds the lesser of 12' or 50% of the least floor or roof dimension.
    5. When portions of floors are offset vertically and cannot be adequately tied together unless directly supported by foundations.
    6. When braced wall lines do not occur in two perpendicular directions.
    7. **When shear walls or braced wall lines are constructed of dissimilar systems.**
    8. Other configurations which create irregularities or discontinuities. (*R301*)
  - b. Stick framed roofs, other than those with symmetrical gables and hips which comply with the conventional framing provisions of IRC Chapter 8 and the referenced tables shall be designed by a structural engineer.
  - c. When a structure does not have required braced wall lines and braced wall panels, a lateral design from a registered structural engineer is needed. (*R301*)
  - d. \* Any component of a house which does not fall under the provisions for IRC conventional construction may require structural engineering. (*R301.2*)

**K. ENERGY ANALYSIS-RES-CHECK COMPLIANCE**

Provide prescriptive insulation and window values or an energy compliance analysis.  
(ResCheck Utah 2018)

**RESIDENTIAL JOIST SPANS**

Live Load Dead Load Description		40 PSF 10 PSF Residential Floor		10 5 PSF Uninhabitable attics no storage	
Member Size	Member Spacing	DF #2	HF #2	DF #2	HF #2
<b>2 x 4</b> <i>(#2 Grade Lumber)</i>	<b>12" OC</b>	6' - 10"	6' - 4"	12' - 5"	11' - 7"
	<b>16" OC</b>	6' - 3"	5' - 9"	11' - 3"	10' - 6"
	<b>24" OC</b>	5' - 5"	5' - 1"	9' - 10"	9' - 2"
<b>2 x 6</b>	<b>12" OC</b>	10' - 9"	10' - 0"	19' - 6"	18' - 2"
	<b>16" OC</b>	9' - 9"	9' - 1"	17' - 8"	16' - 6"
	<b>24" OC</b>	8' - 1"	7' - 11"	14' - 10"	14' - 5"
<b>2 x 8</b>	<b>12" OC</b>	14' - 2"	13' - 2"	25' - 8"	24' - 0"
	<b>16" OC</b>	12' - 7"	12' - 0"	23' - 0"	21' - 9"
	<b>24" OC</b>	10' - 3"	10' - 2"	18' - 9"	18' - 6"
<b>2 x 10</b>	<b>12" OC</b>	17' - 9"	16' - 10"	n/a	n/a
	<b>16" OC</b>	15' - 5"	15' - 2"	n/a	n/a
	<b>24" OC</b>	12' - 7"	12' - 5"	22' - 11"	22' - 7"
<b>2 x 12</b>	<b>12" OC</b>	20' - 7"	20' - 4"	n/a	n/a
	<b>16" OC</b>	17' - 10"	17' - 7"	n/a	n/a
	<b>24" OC</b>	14' - 7"	14' - 4"	n/a	n/a

DF = Douglas Fir  
HF = Hem Fir

**RAFTER SPANS**

Live Load Dead Load Description		30 PSF 10 PSF Shingles/No Ceiling		30 PSF 15 PSF Shingles/drywall		30 PSF 20 PSF Tile or Slate Roof	
Member Size	Member Spacing	DF #2	HF #2	DF #2	HF #2	DF #2	HF #2
<b>2 x 4 (#2 Grade Lumber)</b>	<b>12" OC</b>	7' - 8"	7' - 5"	7' - 3"	6' - 9"	7' - 1"	6' - 9"
	<b>16" OC</b>	6' - 8"	6' - 7"	6' - 7"	6' - 2"	6' - 2"	6' - 1"
	<b>24" OC</b>	5' - 5"	5' - 5"	5' - 5"	5' - 4"	5' - 0"	4' - 11"
<b>2 x 6</b>	<b>12" OC</b>	11' - 3"	11' - 1"	11' - 3"	10' - 8"	10' - 5"	10' - 3"
	<b>16" OC</b>	9' - 9"	9' - 7"	9' - 9"	9' - 7"	9' - 0"	8' - 11"
	<b>24" OC</b>	7' - 11"	7' - 10"	7' - 11"	7' - 10"	7' - 4"	7' - 3"
<b>2 x 8</b>	<b>12" OC</b>	14' - 3"	14' - 0"	16' - 5"	16' - 3"	13' - 2"	13' - 0"
	<b>16" OC</b>	12' - 4"	12' - 2"	14' - 3"	14' - 0"	11' - 5"	11' - 3"
	<b>24" OC</b>	10' - 1"	9' - 11"	11' - 8"	11' - 6"	9' - 4"	9' - 2"
<b>2 x 10</b>	<b>12" OC</b>	17' - 5"	17' - 2"	20' - 1"	19' - 10"	16' - 1"	15' - 10"
	<b>16" OC</b>	15' - 1"	14' - 10"	17' - 5"	17' - 2"	13' - 11"	13' - 9"
	<b>24" OC</b>	12' - 4"	12' - 1"	14' - 2"	14' - 0"	11' - 5"	11' - 3"
<b>2 x 12</b>	<b>12" OC</b>	20' - 2"	19' - 11"	23' - 4"	23' - 0"	18' - 8"	18' - 5"
	<b>16" OC</b>	17' - 6"	17' - 3"	20' - 2"	19' - 11"	16' - 2"	15' - 11"
	<b>24" OC</b>	14' - 3"	14' - 1"	16' - 6"	16' - 3"	13' - 2"	13' - 0"

**MURRAY CITY**  
**ENERGY CHECKLIST**

If an energy analysis is not provided, this form shall be filled out so we can complete the plan review. All buildings shall comply with the IECC.

<u><b>BUILDING COMPONENT</b></u>	<u><b>INSULATION VALUE</b></u>	<u><b>AREA/PERIMETER</b></u>
CEILING WITH ATTIC	R-VALUE= _____	_____ SQ.FT.
CEILING WITHOUT ATTIC	R-VALUE= _____	_____ SQ.FT.
EXTERIOR WALL (Less window area)	R-VALUE= _____	_____ SQ.FT.
GLAZING (To include basement windows)	U-VALUE= _____	_____ SQ.FT.
(If basement walls are insulated)	U-VALUE= _____	_____ SQ.FT.
EXTERIOR DOORS	R-VALUE= _____	_____ SQ.FT.
FLOORS (Over unheated spaces)	R-VALUE= _____	_____ SQ.FT.
(Over outdoor air)	R-VALUE= _____	_____ SQ.FT.
SLABS (Not basement)	R-VALUE= _____	_____ LIN.FT.
BASEMENT WALLS (If floor over unheated space is not insulated)	R-VALUE= _____	_____ LIN.FT.
FURNACE:	MAKE: _____	
	MODEL: _____	
	EFFICIENCY RATING: _____	