



## **NOTICE OF PENDING ACTION**

### **Accessory Dwelling Unit, Coastal Appealable**

Any interested party may submit comments on the proposed project prior to the deadline. Comments may be submitted to the project planner via email, telephone or mail. The project plans may be viewed by contacting the project planner (see reverse). The comment period extends at least 15 working days from the mailing date of public notice. The County administrative decision must include findings as provided by Santa Cruz County Code § 13.20.110, 18.10.230 and Ch. 13.11. Interested parties may request to be notified when a decision is made. The applicant, owner or any aggrieved party may appeal the project decision by submitting a written request at the Planning Dept. Zoning Counter within 14 calendar days following the decision date, and paying an appeal fee. The appeal is heard by the Zoning Administrator per § 18.10.324. Within 7 calendar days after the local appeal period expires, if no appeal filed, a Final Notice of Local Action (FLAN), including conditions, if any, and findings, is sent by certified mail to any party who has specifically requested notice and to the Coastal Commission office at 725 Front Street, #300. The applicant, owner, any aggrieved person or any two members of the Coastal Commission may appeal the County action directly to the Coastal Commission. The appeal must be filed by 5 pm within 10 calendar days of Commission receipt of the FLAN. The permit shall not take effect until the Coastal appeals period expires or any appeal is resolved. Additional information regarding the appeal process or fees may be obtained by phoning (831) 454-2130, or the Coastal Commission at (831) 427-4863.

«APN»

«OWNER»

«STREET»

«CITY», «ZIP»

COUNTY OF SANTA CRUZ  
PLANNING DEPARTMENT  
701 Ocean Street, 4<sup>th</sup> Floor  
Santa Cruz, CA 95060 (831) 454-2580

**NOTICE OF PENDING ACTION:  
COASTAL DEVELOPMENT PERMIT  
FOR AN ACCESSORY DWELLING UNIT  
(COASTAL APPEALS JURISDICTION)**

The Planning Department has received the following application for development within the Coastal Zone. The identified planner may be contacted for specific information on this application.

**APPLICATION #: B-237132**

**APN: 043-232-03**

**APPLICATION DATE: 10/26/2023**

**PROJECT ADDRESS: 318 Cliff Drive, Aptos, 95003**

Proposal to convert an existing guest house into a one bed/one bath 463 square foot Accessory Dwelling Unit onsite with an existing Single-Family Dwelling. Project scope also includes replacing all windows, plumbing, doors, drywall, electrical, and insulated walls. Requires a Coastal Development Permit with public notice. Property located at 318 Cliff Drive in Aptos.

**OWNER: Michael and Corien Mojaver**

**APPLICANT: Robin Alaga**

**SUPERVISORIAL DISTRICT: 2**

**PLANNER: Rebecca Rockom**

**EMAIL: [Rebecca.Rockom@santacruzcountyca.gov](mailto:Rebecca.Rockom@santacruzcountyca.gov)**

**PHONE: (831) 454-3121**

**MAILING ADDRESS: 701 Ocean Street Room 400, Santa Cruz, CA 95060**

**Public comments must be received by 5:00 p.m. December 20, 2023.**

**A decision will be made on or shortly after December 21, 2023.**

**Appeals of the decision will be accepted until 5:00 p.m. two weeks after the decision date. Planner will provide notification of decision to any requesting party.**

Information regarding the appeal process, including required fees, may be obtained by phoning (831) 454-2130.

# GENERAL NOTES

- The code editions to be followed: Santa Cruz County Amendments  
California Plumbing Code 2022 Edition California Building Code 2022 Edition  
California Electrical Code 2022 Edition California Mechanical Code 2022 Edition  
California Energy Standards 2022 Edition California Green Building Standards Code 2022 Edition  
California Residential Code 2022 Edition California Fire Code 2022 Edition
- Hold down devices must be secured in place prior to foundation inspection.
- Fasteners in preservative-treated wood (Anchor bolts, nails, screws, etc.) shall be of an approved silicon bronze or copper, stainless steel or hot-dipped zinc coated steel.
- Foundation sills shall be a naturally durable wood or a preservative-treated wood.
- Anchor bolts shall be a minimum of 1/2 inch diameter in SDC D and 5/8 inch minimum diameter in SDC E.
- Anchor bolts shall be embedded a minimum of 7 inches into foundation.
- Anchor bolts shall not be spaced more than 6 feet apart in SDC D and no more than 4 feet apart in SDC E.
- There shall be a minimum of 2 bolts per sill piece with one bolt not located more than 12 inches or not less than 4 inches of each end of the sill piece.
- Washers for anchor bolts shall be a minimum of 3 inches by 3 inches by 0.229 inch thick. Steel plate washers may be slotted.
- Minimum compression strength of concrete shall be 2,500 psi.
- Reinforcing Steel to be a minimum of ASTM A615 Grade 60.
- Framing lumber shall be Douglas Fir #2 (unless noted otherwise).
- Wall framing shall comply with CBC Table 2308.5.1.
- Nailing shall be in compliance with CBC Table 2304.10.1.
- Foundation vents to be 6"x4" @ 8'-0" o.c. max.
- Block or double joist under all walls. Blocking at 8'-0" o.c. max (not applicable with T/Is).
- Attic and foundation venting shall be a minimum of 1/150 of the area to be vented.
- Smoke detectors and carbon monoxide alarms in new structures shall receive their primary power from the house primary wiring and shall have a battery backup.
- Egress requirements for sleeping rooms:  
a. Min. net clear operable dimension of 24" in height. b. Min. net clear operable dimension of 20" in width.  
c. Min. net clear operable dimension of 5.7 square feet d. Maximum distance to floor is 44"
- Joints and other openings in the building envelope that are potential sources of air leakage shall be caulked, gasketed, weather-stripped or otherwise sealed to limit infiltration and exfiltration.
- The first 5' of hot and cold water pipes from the storage tank from non-recirculating systems shall be thermally insulated with a minimum of 1" (75") thick insulation for hot (cold) water pipes with a diameter of less than or equal to 2" or 1.5" (1") for hot (cold) water pipes with a diameter of greater than 2" and conform to Cal Energy Code 150.00(12).
- The builder/contractor shall provide the owner and County Building Department a copy of the CF-2R Installation Certificate at the time of inspection.
- Air ducts installed under a floor in a crawl space shall be installed as to maintain a vertical clearance of 18" for all portions of the duct that would obstruct access to any part of the crawl space.
- Shower compartments and walls above bathtubs with installed shower heads shall be finished with a smooth, non-absorbent surface to a height of not less than 72" above finish floor. Ceramic tile is to be installed over fiber-cement or cementitious backer board.
- The maximum hot water temperature discharging from the bathtub, shower and whirlpool bathtub filler shall be limited to 120 degrees Fahrenheit. The water heater thermostat shall not be considered a control for the meeting of this provision.
- Plumbing fixtures are required to meet the following maximum flow rates: shower heads 1.8 gpm @ 80 psi, kitchen faucet 1.8 gpm @ 60 psi, lav faucets 1.2 gpm @ 60 psi and water closets 1.28 gallons per flush.
- The shower valve shall be a pressure balance type, thermostatic mixing type or a combination pressure balance/thermostatic mixing type.
- Fiber-cement, fiber-mat reinforced cementitious backer units, glass mat gypsum backers of fiber-reinforced gypsum backers in compliance with ASTM C 1288, C 1325, C 1178 or C 1278 respectively and installed in accordance with manufacturer's recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas [CRC R702.4.2].
- Ceramic tile surfaces shall be installed in accordance with ANSI A108.1, A108.4 through A108.6, A108.11, A118.1, A118.3, A136.1, and A137.1. [CRC R702.4.1].
- The waste outlet and tailpiece for the shower shall be a minimum 2" in diameter.

OWNER: Michael & Corlen Mojaver  
318 Cliff Drive  
Aptos, CA 95003

## PROJECT DATA:

A.P.N. 043 - 232 - 03  
Zoning R-1-6  
Occupancy Group R-3  
Construction Type VB Non-Sprinkled  
Parcel Size 6,100 sq. ft.  
Lot Coverage 2,001 sq. ft. (32.8 %)  
F.A.R. 1,701 sq. ft. (27.9 %)  
Existing Residence 1,118 sq. ft. (Assessor)  
Existing Carport 262 sq. ft.  
Existing Guest House 463 sq. ft.  
(to be converted to an ADU)  
Existing Storage lean-to 83 sq. ft.  
Existing Covered Porch 75 sq. ft.  
Area of remodel 463 sq. ft.

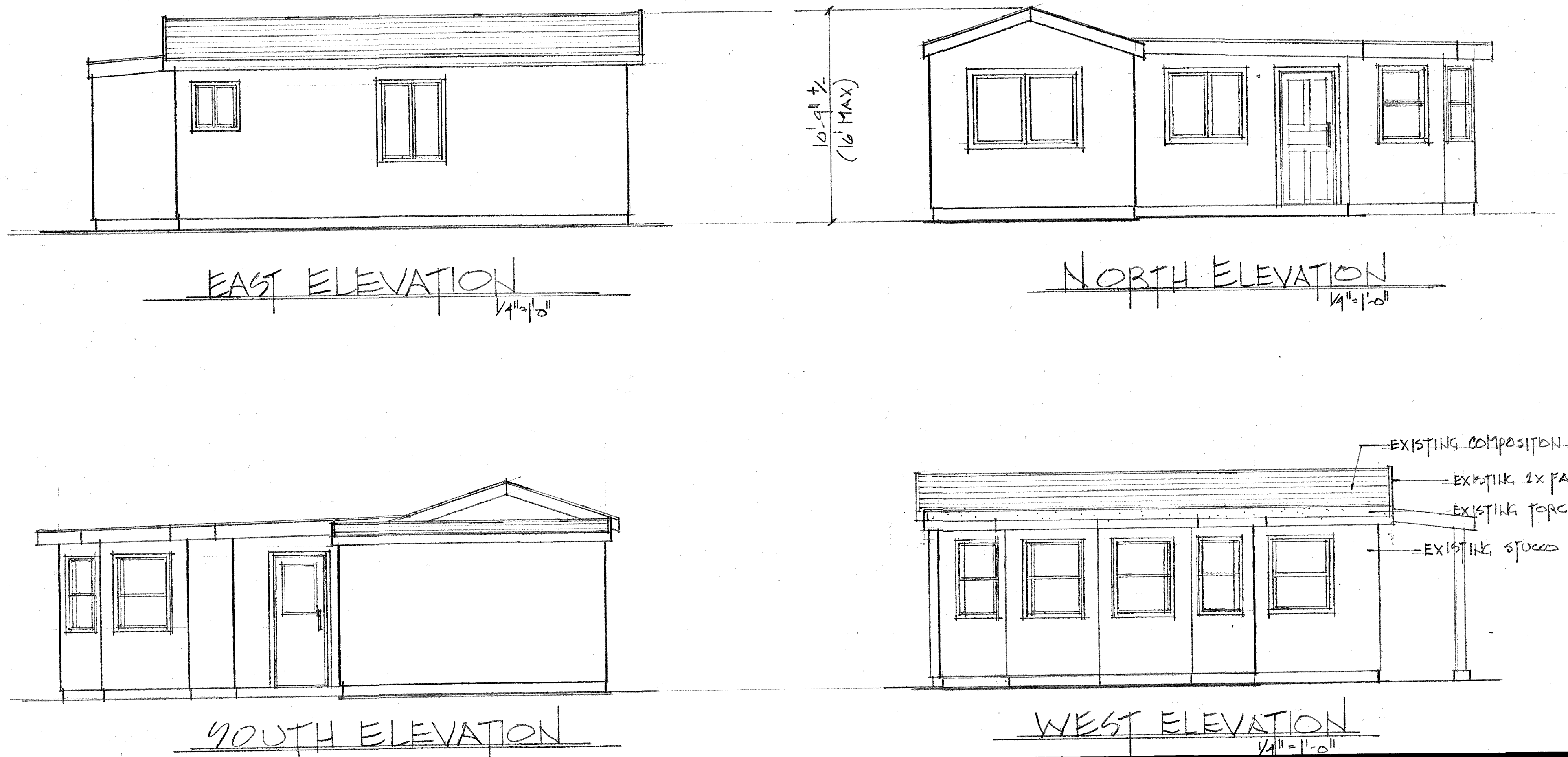
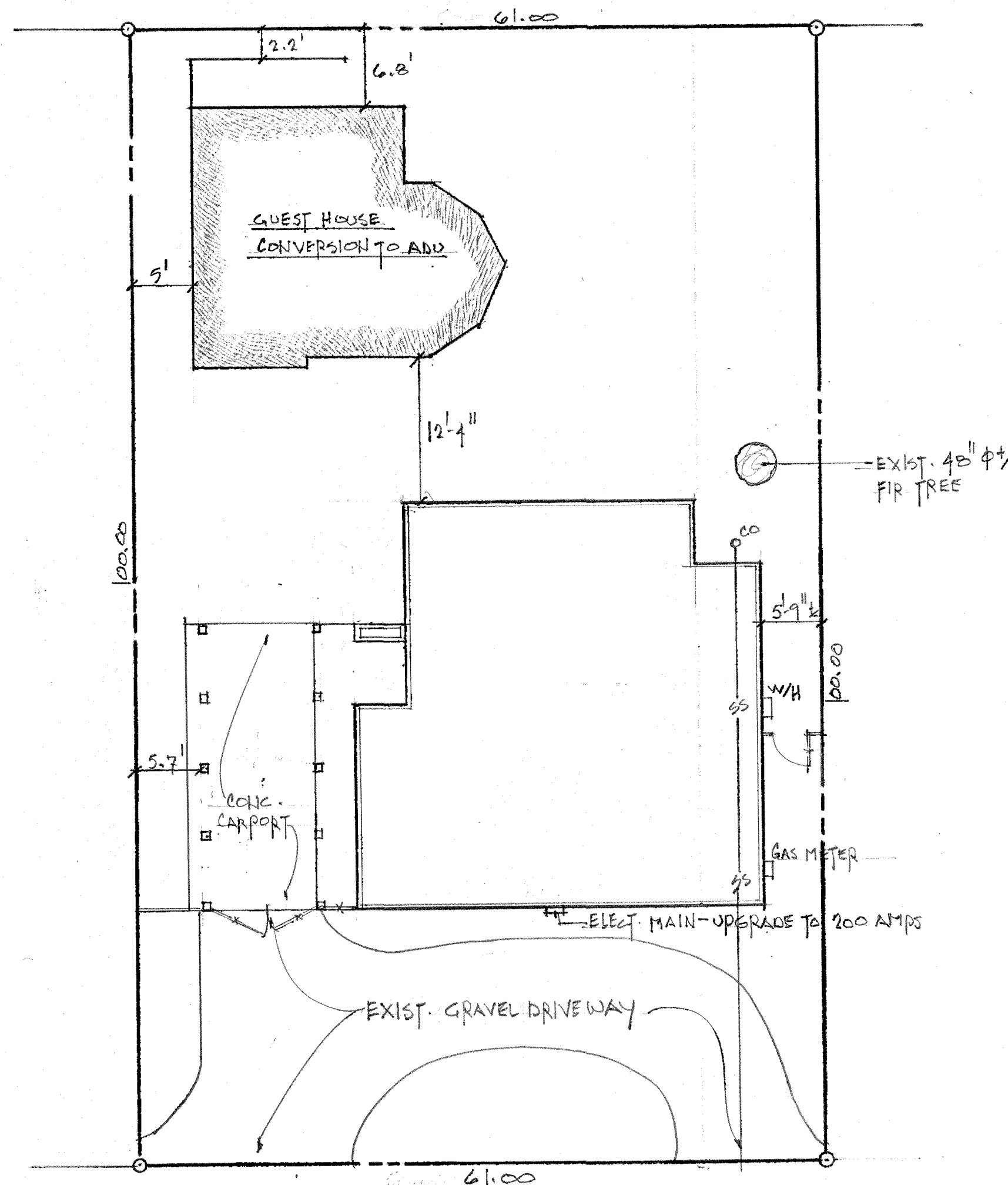
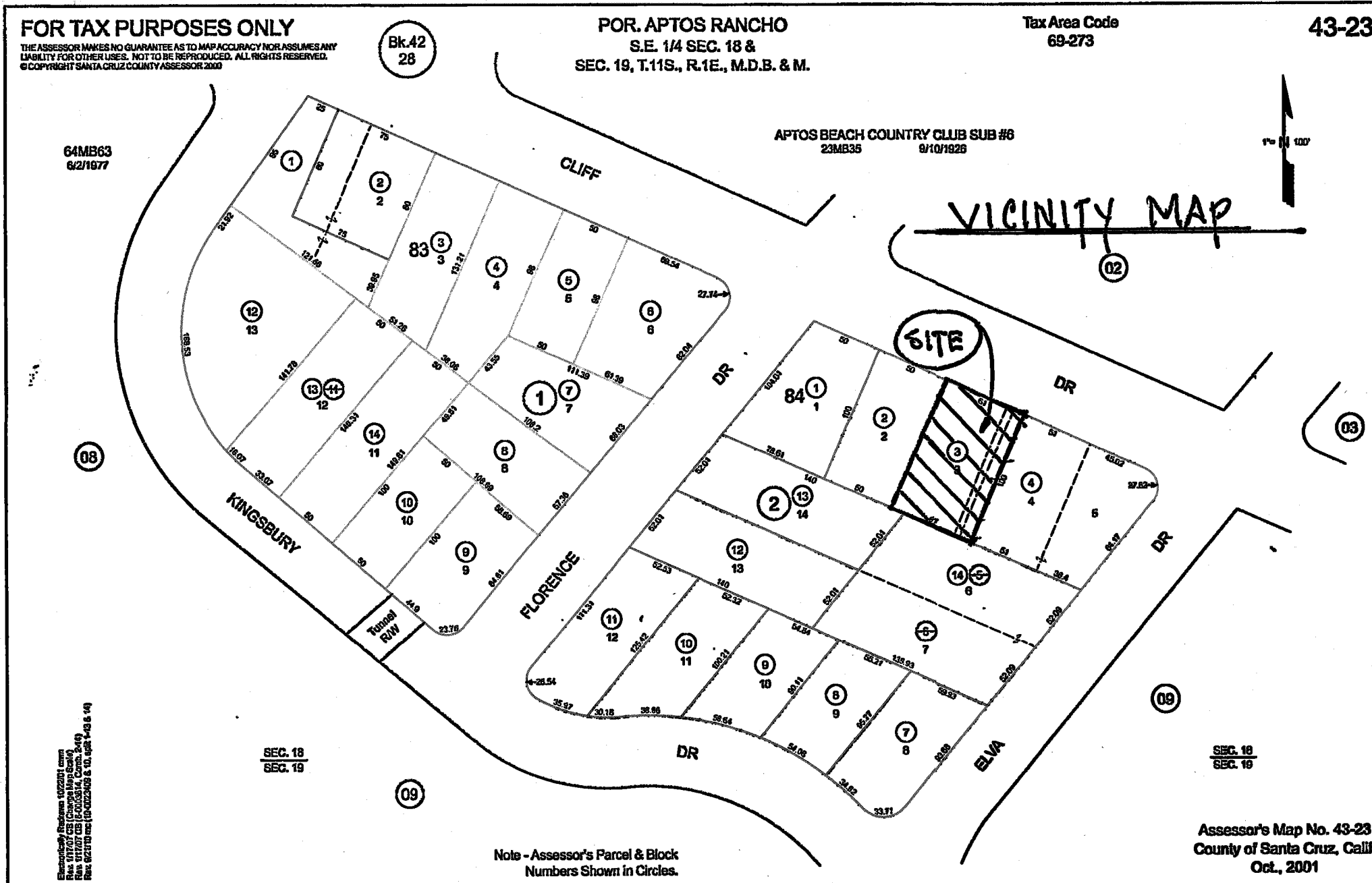
SCOPE OF WORK: Interior Remodel  
Convert an existing guest house to an ADU -  
Add a kitchen, replace all windows, electrical and plumbing. Insulate all walls and all new drywall.  
Upgrade electrical main to 200 amps.

## SHEET INDEX

SHEET 1: SITE PLAN, VICINITY MAP, ELEVATIONS & NOTES  
SHEET 2: EXISTING, PROPOSED & ELECTRICAL PLANS, NOTES & WALL SECTION  
SHEET EN.1: TITLE 24 ENERGY CALCULATIONS  
SHEET EN.2: TITLE 24 ENERGY CALCULATIONS  
SHEET GB.1: GREEN BUILDING NOTES & REQUIREMENTS

## HERS TESTING REQUIRED

- INDOOR AIR QUALITY VENTILATION
- KITCHEN RANGE HOOD



REVISIONS	BY

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MOJAVER ADU  
Michael & Corlen Mojaver 858.829.2222 cmojaver@gmail.com  
318 Cliff Drive Aptos, CA 95003  
A.P.N. 043 - 232 - 03

DRAWN	ROBIN
CHECKED	
DATE	17. OCT. 2023
SCALE	NOTED
JOB NO.	23-52
SHEET	
OF	
SHEETS	



ELECTRICAL NOTES

- Smoke alarms and carbon monoxide alarms shall receive their primary power from the house primary wiring, be interconnected and have a battery backup.
- The main electrical service panel shall be grounded. Concrete encased electrode, UFER grounding. The electrode shall be located within and near the bottom of the footing consisting of at least 20 feet of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bar at least 1/4 inches in diameter or consisting of at least 20 feet of bare copper conductor not smaller than a #4 wire.
- Arc fault interrupter circuits: All 120 volt, single phase, 15- and 20- ampere branch circuits supplying outlets installed in dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, recreation rooms or areas shall be protected by a listed Arc-Fault Circuit Interrupter, combination-type (AFCI), installed to provide protection of the branch circuit.
- All 125 volt, 15 and 20 ampere receptacle outlets shall be tamper resistant receptacles.
- Fixtures installed over a bathtub or shower shall be installed so that water cannot enter or accumulate in the wiring compartment or other electrical parts. All luminaires subject to shower spray shall be listed for use in wet locations.
- All recessed lighting fixtures shall be IC & AT rated and installed per manufacturers listing and installation instructions. All luminaires subject to shower spray shall be listed for use in wet locations. Thermal insulation shall not be installed above or within 3 inches of a recessed fixture unless it is identified as a Type IC fixture.
- One 30-amp electrical circuit shall be provided in the laundry area. This circuit shall have no other outlets.
- Bathroom electrical outlets shall be supplied by at least one 20-ampere branch circuit. The circuit shall have no other electrical outlets. Other equipment (lighting, exhaust fans). Within the same bathroom, may be supplied by the same branch circuit, where the branch circuit supplies a single bathroom only.
- In dwelling units, at least one GFCI protected wall receptacle outlet shall be installed in bathroom, within 36" of the outside edge of each basin. Outlets shall be located on the wall, or partition adjacent to the basin.
- Clothes dryers & electrical ranges shall have a 4-wire grounded electrical outlet.
- Bathroom fans shall be Energy Star rated and, unless functioning as a component of a whole house ventilation system, shall be controlled by a humidity control. Bathroom fan exhaust ducts shall terminate outside the building and be equipped with backdraft dampers.
- All lighting to be high efficacy.
- Vacancy sensors required in garages, bathrooms, laundry/mud rooms, and shops- min. one per room.
- An approved, readily accessible, and independent means of disconnect for the electrical supply to each piece of equipment shall be provided in sight of the equipment served.
- Branch circuits supplying receptacle outlets inside the garage shall not supply outlets on the exterior of the garage.
- Luminaires recessed into ceilings shall meet the following requirements:
  - For luminaires with hard wired ballasts or drivers, allow ballast or driver maintenance and replacement to be readily accessible to building occupants from below the ceiling without requiring the cutting of holes in the ceiling; and
  - Shall not contain screw base sockets; and
  - Shall contain light sources that comply with References Joint Appendix JAB, including the elevated temperature requirements, and that are marked "JAB-2019-E" as specified in Reference Joint Appendix JAB.
- Outdoor lighting fixtures shall be listed for damp or wet installation, as applies to the location of installation and degree of weather protection afforded by adjacent permanent construction.
- Outdoor lighting fixtures shall be high efficacy type and shall be controlled by a manual on-off switch that does not override to ON on the automatic actions of a motion sensor, photo-control, astronomical time clock device or ECMS, unless the override automatically reactivates to normal operation within 6 hours, or the device is automatically programmed to turn the light OFF during daylight hours.
- JAB marking is required for the following:
  - All light sources in ceiling recessed downlight luminaires. Note that ceiling recessed downlight luminaires shall not have screw bases regardless of lamp type as describe in Section 150.0101.C
  - Any light source not otherwise listed above, and certified to the Commission as complying with Joint Appendix B.
- Fixtures recessed into ceilings shall be listed for zero clearance insulation contact (IC), have a label that certifies that the fixture is airtight with air leakage less than 2.0 CFM at 75 Pascal's (AT), be sealed with a gasket or caulk to the ceiling, have accessible ballasts/drivers if hardwired, and not contain a screw based sockets. They shall contain light sources that comply with References Joint Appendix JAB, including the elevated temperature requirements, and that are marked "JAB-2019-E".
- In other than closets less than 70 square feet and hallways, dimmers or vacancy sensors shall control all luminaires required to have light sources compliant with Reference Joint Appendix JAB.

ELECTRICAL LEGEND

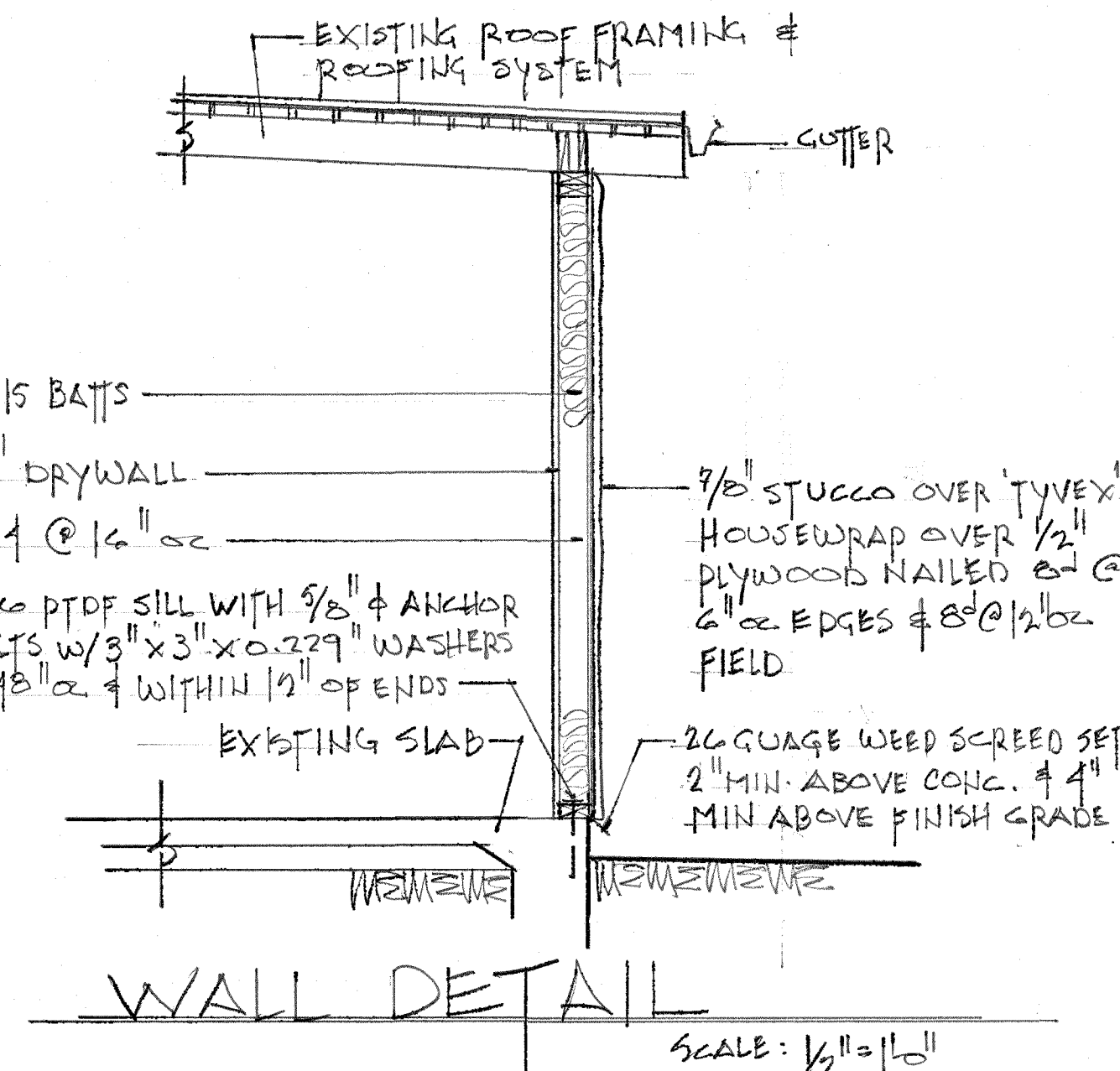
- Gas
- Duplex Outlet
- 4-Plex Outlet
- 220v 220v Outlet
- Light Switch
- Light Switch with Vacancy Sensor
- 3-Way Light Switch
- Light Switch w/ Dimmer
- 50 CFM Fan
- 80 CFM Fan with Humidistat Sensor
- Ceiling Mounted High Efficacy Light
- Recessed High Efficacy Light
- Under Cabinet High Efficacy Light
- Flood- High Efficacy Light
- 2' x 4' Ceiling Mounted High Efficacy Light
- Gas Line
- 110v Smoke Detector Interconnected with all Detectors w/ battery backup
- Battery Operated Smoke Detector
- Carbon Monoxide Alarm

NOTE

- REPLACE ALL WINDOWS & DOORS 'IN-KIND' UNLESS NOTED OTHERWISE
- REPLACE ALL PLUMBING FIXTURES
- INSULATE ALL EXTERIOR WALLS w/ R-15 BATTs
- ALL NEW ELECTRICAL & PLUMBING

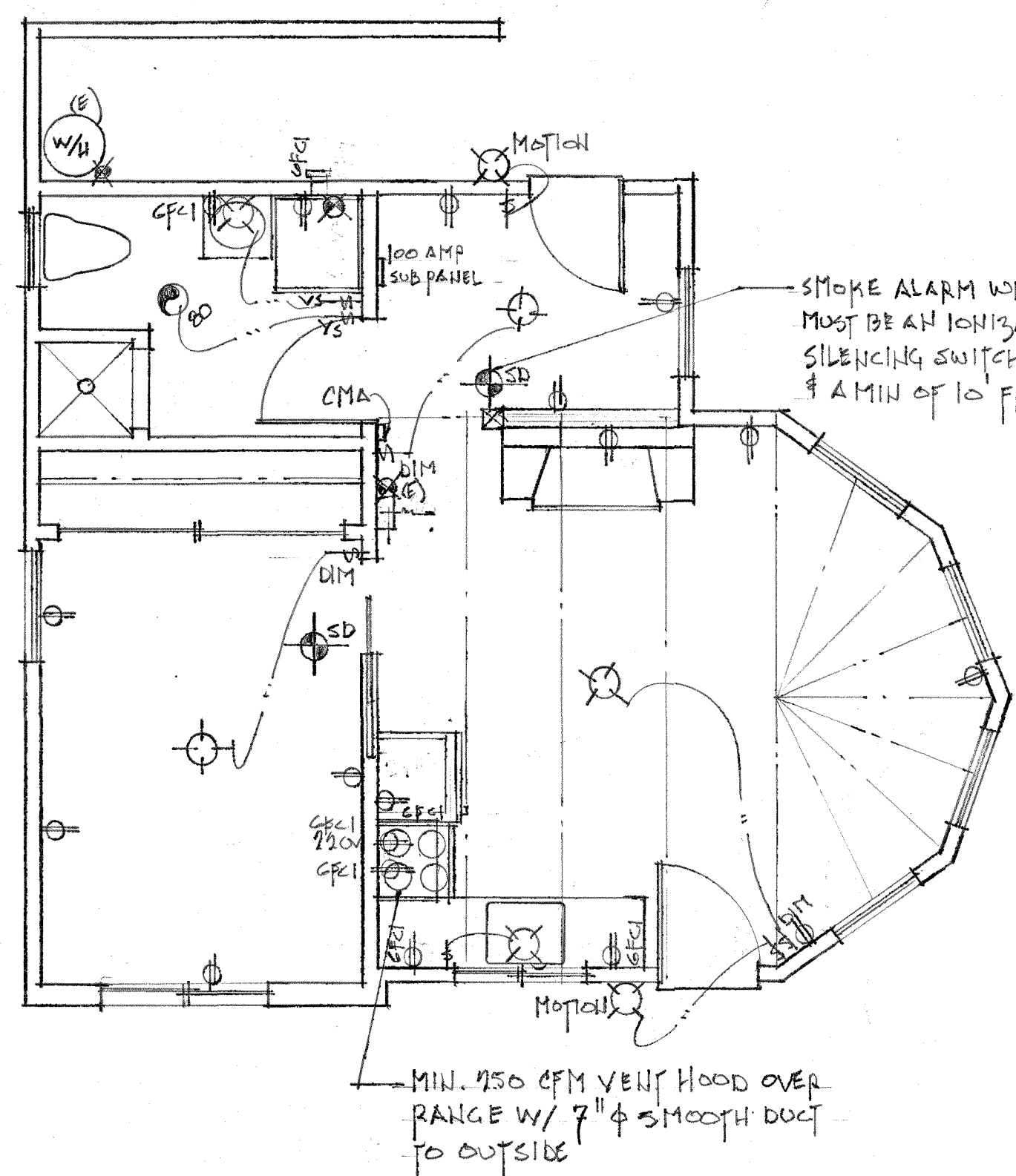
NOTE

- Doors and Windows shall be:
  - Tested and labeled to comply with AAMA standards per CRC, Sec.612.3
  - Safety Glazing tested and labeling per CRC, Sections. 308.1 & 308.4
  - Energy testing and certification per CEN, Sec. 110.6
  - Dual Paned, Low-E, Vinyl U=0.30 max.
- Showers and tub-showers shall be provided with individual control valves of the pressure balance thermostatic, mixing valve type that provide scald and thermal shock protection.
- All new appliances shall be 'Energy Star' rated.
- Plumbing fixtures are required to meet the following maximum flow rates: shower heads 1.8 gpm @ 80 psi, kitchen faucet 1.8 gpm @ 60 psi, lavatory faucets 1.2 gpm @ 60 psi and water closets 1.28 gallons per flush.



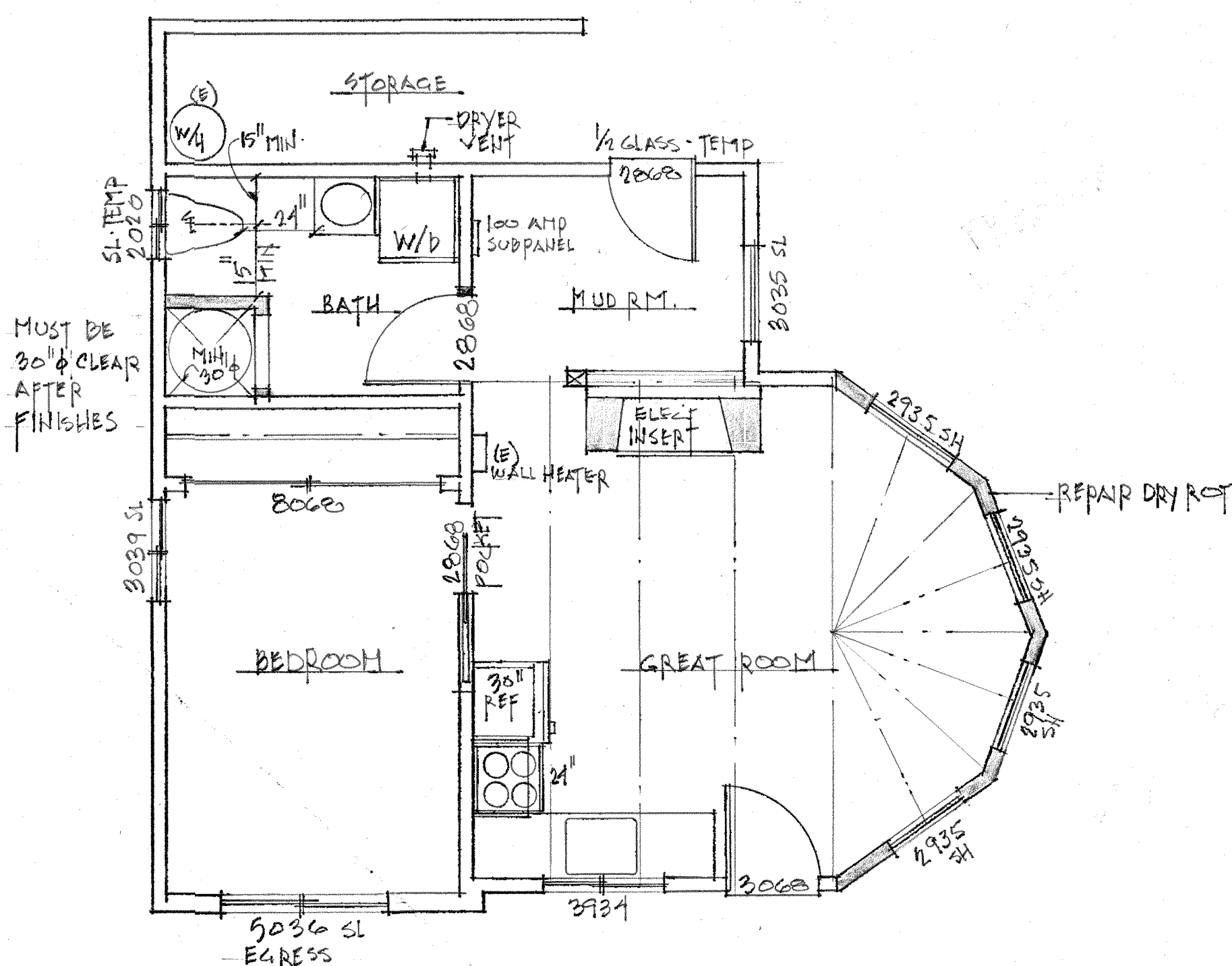
LEGEND

- PROPOSED WALL
- EXISTING WALL
- WALL/FIXTURE TO BE REMOVED
- (N) NEW
- (E) EXISTING
- (V.I.F.) VERIFY IN FIELD



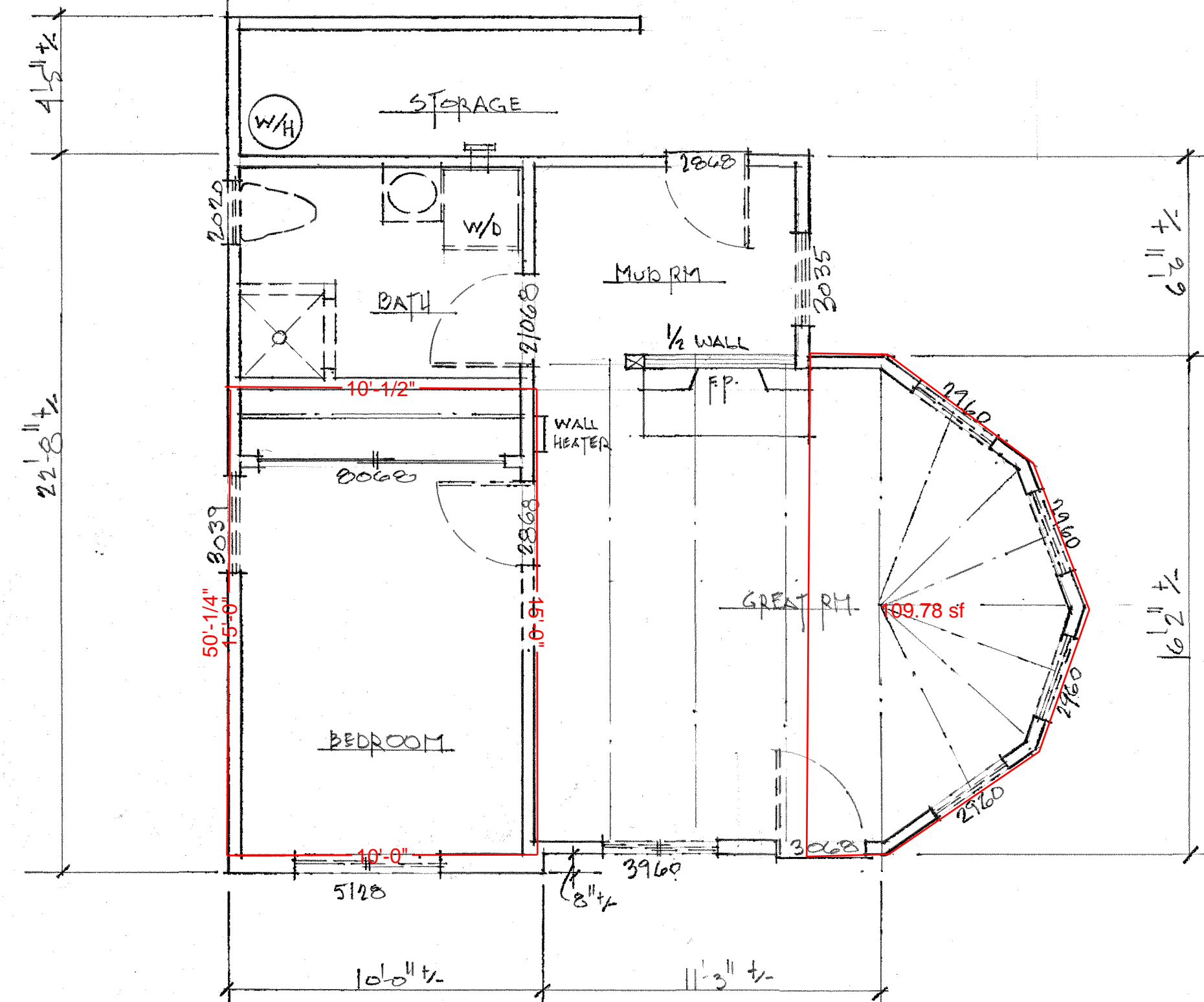
ELECTRICAL PLAN

SCALE: 1/4" = 1'-0"



PROPOSED PLAN

SCALE: 1/4" = 1'-0"



EXISTING/DEMO PLAN

SCALE: 1/4" = 1'-0"

REVISIONS	BY

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e-mail: alagabob@gmail.com

MOJAVER ADU  
Michael & Corlen Mojaver 858.829.2222 cmojaver@gmail.com  
318 Cliff Drive Aptos, CA 95003  
A.P.N. 043 - 252 - 03

DRAWN  
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1/4" = 1'-0"  
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23-52  
SHEET  
2  
OF  
SHEETS



CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: Mojaver ADU  
Calculation Description: Title 24 Analysis  
Calculation Date/Time: 2023-10-24T08:00:07-07:00  
Input File Name: Mojaver ADU\_V9 ID 8526.rbd22x  
CF1R-PRF-01E  
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GENERAL INFORMATION											
01	Project Name	Mojaver ADU									
02	Run Title	Title 24 Analysis									
03	Project Location	318 Cliff Dr									
04	City	Aptos		05	Standards Version	2022					
06	Zip code	95003		07	Software Version	EnergyPro 9.2					
08	Climate Zone	3		09	Front Orientation (deg/ Cardinal)	25					
10	Building Type	Single family		11	Number of Dwelling Units	1					
12	Project Scope	Addition and/or Alteration		13	Number of Bedrooms	1					
14	Addition Cond. Floor Area (ft²)	0		15	Number of Stories	1					
16	Existing Cond. Floor Area (ft²)	463		17	Fenestration Average U-factor	0.3					
18	Total Cond. Floor Area (ft²)	463		19	Glazing Percentage (%)	19.65%					
20	ADU Bedroom Count	1		21	ADU Conditioned Floor Area	463					
22	Fuel Type	Natural gas		23	Occupancy U	No					

COMPLIANCE RESULTS											
01	Building Complies with Computer Performance										
02	This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.										
03	Building does not incorporate Special Features										

Registration Number: 223-P016604564A-000-000-00000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance  
Registration Date/Time: 2023-10-24 08:13:42  
Report Version: 2022.0.000  
Schema Version: rev 20220901  
HERS Provider: CalCERTS, Inc.  
Report Generated: 2023-10-24 08:00:28

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: Mojaver ADU  
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CF1R-PRF-01E  
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OPAQUE SURFACES											
01	02	03	04	05	06	07	08	09	10	11	
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft²)	Window and Door Area (ft²)	Tilt (deg)	Wall Exceptions	Status	Verified Existing Condition	
Front Wall F1	1st Floor Zone Existing	R-15 Wall	25	Front	168	50	90	none	Altered	No	
Left Wall	1st Floor Zone Existing	R-15 Wall	115	Left	185	15	90	none	Altered	No	
Back Wall B1	1st Floor Zone Existing	R-15 Wall	205	Back	168	18	90	none	Altered	No	
Right Wall R1	1st Floor Zone Existing	R-15 Wall	295	Right	57	10	90	none	Altered	No	
Front Wall F2	1st Floor Zone Existing	R-15 Wall	345	n/a	48	9	90	none	Altered	No	
Back Wall B2	1st Floor Zone Existing	R-15 Wall	235	n/a	46	9	90	none	Altered	No	
Right Wall R2	1st Floor Zone Existing	R-15 Wall	265	n/a	39	9	90	none	Altered	No	
Right Wall R3	1st Floor Zone Existing	R-15 Wall	335	n/a	39	9	90	none	Altered	No	

OPAQUE SURFACES - CATHEDRAL CEILINGS													
01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	Zone	Construction	Azimuth	Orientation	Area (ft²)	Skylight Area (ft²)	Roof Rise (x in 12)	Roof Reflectance	Cool Roof	Status	Verified Existing Condition	Existing Construction	
Roof	1st Floor Zone Existing	R-0 Roof Cathedral	25	Front	463	0	1	0.1	0.85	No	Existing	No	

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(Page 7 of 9)

WATER HEATING SYSTEMS											
01	02	03	04	05	06	07	08	09	10	11	12
Name	System Type	Distribution Type	Water Heater Name	Number of Units	Solar Heating System	Compact Distribution	HERS Verification	Water Heater Name (lt)	Status	Verified Existing Condition	Existing Water Heating System
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)	Existing	No	

WATER HEATERS														
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Name	Heating Element Type	Tank Type	# of Units	Tank Vol. (gal)	Heating Efficiency Type	Efficiency	Rated Input Type	Input Rating or Pilot	Tank Insulation R-value (in/Ext)	Standby Loss or Recovery Eff	1st Hg. Rating or Flow Rate	Tank Location	Status	Verified Existing Condition
DHW Heater 1	Gas	Small Storage	1	50	EF	0.57	Btu/Hr	75000	0	78	n/a		Existing	No

WATER HEATING - HERS VERIFICATION						
01	02	03	04	05	06	07
Name	Pipe Insulation	Parallel Piping	Compact Distribution	Compact Distribution Type	Recirculation Control	Shower Drain Water Heat
DHW Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

SPACE CONDITIONING SYSTEMS											
01	02	03	04	05	06	07	08	09	10	11	12
Name	System Type	Heating Unit Name	Heating Equipment Count	Cooling Unit Name	Cooling Equipment Count	Fan Name	Distribution Name	Required Thermostat Type	Status	Verified Existing Condition	Existing HVAC System
Res HVAC1	Heating and cooling system other	Heating Component 1	1	Cooling Component 1	1	HVAC Fan 1	n/a	n/a	Existing	No	

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ENERGY USE SUMMARY						
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft² - yr)	Standard Design TDV Energy (EDR2) (kTDV/ft² - yr)	Proposed Design Source Energy (EDR1) (kBtu/ft² - yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft² - yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	0	132.73	0	124.66	0	8.07
Space Cooling	0	35.7	0	36.12	0	-0.42
IAQ Ventilation	0	5.19	0	5.19	0	0
Water Heating	0	214.17	0	214.17	0	0
Self Utilization/Flexibility Credit						
Efficiency Compliance Total	0	387.79	0	380.14	0	7.65
Photovoltaics	0		0			
Battery			0			
Flexibility						
Indoor Lighting	0	12.58	0	12.58		
Appl. & Cooking	0	97.17	0	97.22		
Plug Loads	0	82.52	0	82.52		
Outdoor Lighting	0	2.2	0	2.2		
TOTAL COMPLIANCE	0	582.26	0	574.66		

Registration Number: 223-P016604564A-000-000-00000000-0000  
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(Page 5 of 9)

FENESTRATION / GLAZING															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Name	Type	Surface	Orientation	Azimuth	Width (ft)	Height (ft)	Mult.	Area (ft²)	U-factor	U-factor Source	SHGC	SHGC Source	Exterior Shading	Status	Verified Existing Condition
Front Windows	Window	Front Wall F1	Front	25			1	30	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No
Left Windows	Window	Left Wall	Left	115			1	15	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No
Right Windows	Window	Right Wall R1	Right	295			1	10	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No
Front Windows 2	Window	Front Wall F2		345			1	9	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No
Back Windows	Window	Back Wall B2		235			1	9	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No
Right Windows 2	Window	Right Wall R2		265			1	9	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No
Right Windows 3	Window	Right Wall R3		335			1	9	0.3	NFRC	0.5	NFRC	Bug Screen	Altered	No

OPAQUE DOORS					
01	02	03	04	05	06
Name	Side of Building	Area (ft²)	U-factor	Status	Verified Existing Condition
Door	Front Wall F1	20	0.5	Existing	No
Door 2	Back Wall B1	18	0.5	Existing	No

Registration Number: 223-P016604564A-000-000-00000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance  
Registration Date/Time: 2023-10-24 08:13:42  
Report Version: 2022.0.000  
Schema Version: rev 20220901  
HERS Provider: CalCERTS, Inc.  
Report Generated: 2023-10-24 08:00:28

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: Mojaver ADU  
Calculation Description: Title 24 Analysis  
Calculation Date/Time: 2023-10-24T08:00:07-07:00  
Input File Name: Mojaver ADU\_V9 ID 8526.rbd22x  
CF1R-PRF-01E  
(Page 8 of 9)

HVAC - HEATING UNIT TYPES				
01	02	03	04	05
Name	System Type	Number of Units	Heating Efficiency	Heating Unit Brand
Heating Component 1	Gas wall furnace	1	AFUE - 70	n/a

HVAC - FAN SYSTEMS			
01	02	03	04
Name	Type	Fan Power (Watts/CFM)	Name
HVAC Fan 1	HVAC Fan	0.45	n/a

INDOOR AIR QUALITY (IAQ) FANS								
01	02	03	04	05	06	07	08	09
Dwelling Unit	Airflow (CFM)	Fan Efficacy (W/CFM)	IAQ Fan Type	Includes Heat/Energy Recovery?	IAQ Recovery Effectiveness - SRE	Includes Fault Indicator Display?	HERS Verification	Status
SfAM ADU IAQVentRpt	29	0.35	Exhaust	No	n/a / n/a	No	Yes	

HERS RATER VERIFICATION OF EXISTING CONDITIONS						
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INDOOR AIR QUALITY (IAQ) FANS - VERIFIED AND ALTERED						
01	02	03	04	05	06	07
Name	Airflow (CFM)	Fan Efficacy (W/CFM)	IAQ Fan Type	Includes Heat/Energy Recovery?	IAQ Recovery Effectiveness - SRE	IAQ Recovery Effectiveness - ASREIAQ Recovery Effectiveness - ASRE
Dwelling Unit 1/0	29	0.35	Exhaust	No	n/a	n/a

Registration Number: 223-P016604564A-000-000-00000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance  
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CF1R-PRF-01E  
(Page 3 of 9)

ENERGY USE INTENSITY				
	Standard Design (kBtu/ft² - yr )	Proposed Design (kBtu/ft² - yr )	Compliance Margin (kBtu/ft² - yr )	Margin Percentage
Gross EUI¹	130.37	128.3	2.07	1.59
Net EUI²	130.37	128.3	2.07	1.59
Notes 1. Gross EUI is Energy Use Total (not including PV) / Total Building Area. 2. Net EUI is Energy Use Total (including PV) / Total Building Area.				

REQUIRED SPECIAL FEATURES				
The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.				
* NO SPECIAL FEATURES REQUIRED				

HERS FEATURE SUMMARY	
<p>The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry</p>	
<ul style="list-style-type: none"><li>Indoor air quality ventilation</li><li>Kitchen range hood</li></ul>	



| <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>   
   
   
   
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| <div><div><div><div><div></div><div><div>NOTE: Single-family residential buildings subject to the Energy Codes must comply with all applicable mandatory measures, regardless of the compliance approach used. Review the respective section for more information.</div></div></div><div><div><div><div></div><div><div>04/2022</div></div></div><div><div><div><div></div><div><div>BUILDING Envelope:</div></div></div></div></div></div></div></div></div></div>  
   
   
   
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| <div><div><div><div><div>§ 110.6.(a)1:</div><div><b>Air Leakage.</b> Manufactured fenestration, exterior doors, and exterior pel doors must limit air leakage to 0.3 CFM per square foot or less when tested per NFRC-400, ASTM E263, or AIAA/WDMA/CSA 1011.5.2/A440-2011. *</div></div></div><div><div><div>§ 110.6.(a)5:</div><div><b>Labeling.</b> Fenestration products and exterior doors must have a label meeting the requirements of § 10-11(a).</div></div></div><div><div><div>§ 110.6.(b):</div><div><b>Field fabricated exterior doors and fenestration products</b> must use U-factors and solar heat gain coefficient (SHGC) values from Tables 110.6.4, 110.6.8, or JAW.4.5 for exterior doors. They must be caulked and/or weather-stripped.</div></div></div><div><div><div>§ 110.7:</div><div><b>Air Leakage.</b> All joints, penetrations, and other openings in the building envelope that are potential sources of air leakage must be caulked, gasketed, or weather stripped.</div></div></div><div><div><div>§ 110.8.(a):</div><div><b>Insulation Certification by Manufacturers.</b> Insulation must be certified by the Department of Consumer Affairs, Bureau of Household Goods and Services (BHGS).</div></div></div><div><div><div>§ 110.8.(g):</div><div><b>Insulation Requirements for Heated Slab Floors.</b> Heated slab floors must be insulated per the requirements of § 110.8.(g).</div></div></div><div><div><div>§ 110.8.(i):</div><div><b>Roofing Products Solar Reflectance and Thermal Emittance.</b> The thermal emittance and aged solar reflectance values of the roofing material must meet the requirements of § 110.8.(i) and be labeled per § 10-113 when the installation of a cool roof is specified on the CF1R.</div></div></div><div><div><div>§ 110.8.(j):</div><div><b>Radiant Barrier.</b> When required, radiant barriers must have an emittance of 0.05 or less and be certified to the Department of Consumer Affairs.</div></div></div><div><div><div>§ 150.0.(a):</div><div><b>Roof Deck, Ceiling and Rafter Roof Insulation.</b> Roof decks in newly constructed attics in climate zones 4 and 8-16 area-weighted average U-factor not exceeding U-0.184. Ceiling and rafter roofs minimum R-22 insulation in wood-frame ceiling; or area-weighted average U-factor must not exceed U-0.435. Rafter roof alterations minimum R-19 or area-weighted average U-factor of 0.054 or less. Attic access doors must have mechanically attached insulation using adhesive or mechanical fasteners. The attic access must be gasketed to prevent air leakage. Insulation must be installed in direct contact with a roof or ceiling which is sealed to limit infiltration and exfiltration, as specified in § 110.7, including but not limited to placing insulation either above or below the roof deck or on top of a drywall ceiling. *</div></div></div><div><div><div>§ 150.0.(b):</div><div><b>Loose-fill Insulation.</b> Loose fill insulation must meet the manufacturer's required density for the labeled R-value.</div></div></div><div><div><div>§ 150.0.(c):</div><div><b>Wall Insulation.</b> Minimum R-13 insulation in 2x4 inch wood framing wall or have a U-factor of 0.102 or less, or R-20 in 2x6 inch wood framing or have a U-factor of 0.071 or less. *Opaque non-framed assemblies must have an overall assembly U-factor not exceeding 0.102. Masonry walls must meet Tables 150.1-A or B. *</div></div></div><div><div><div>§ 150.0.(d):</div><div><b>Raised-floor Insulation.</b> Minimum R-19 insulation in raised wood framed floor or 0.037 maximum U-factor. *</div></div></div><div><div><div>§ 150.0.(f):</div><div><b>Slab Edge Insulation.</b> Slab edge insulation must meet all of the following: have a water absorption rate, for the insulation material alone without facings, no greater than 0.3 percent; have a water vapor permeance no greater than 2.0 perm per inch; be protected from physical damage and UV light deterioration; and, when installed as part of a heated slab floor, meet the requirements of § 110.8.(g).</div></div></div><div><div><div>§ 150.0.(g)1:</div><div><b>Vapor Retarder.</b> In climate zones 1 through 16, the earth floor or unvented crawl space must be covered with a Class I or Class II vapor retarder. This requirement also applies to controlled ventilation crawlspace for buildings complying with the exception to §150.0.(d).</div></div></div><div><div><div>§ 150.0.(g)2:</div><div><b>Vapor Retarder.</b> In climate zones 14 and 16, a Class I or Class II vapor retarder must be installed on the conditioned space side of all insulation in all exterior walls, vented attics, and unvented attics with air-permeable insulation.</div></div></div><div><div><div>§ 150.0.(g):</div><div><b>Fenestration Products.</b> Fenestration, including skylights, separating conditioned space from unconditioned space or outdoors must have a maximum U-factor of 0.45, or area-weighted average U-factor of all fenestration must not exceed 0.45.</div></div></div><div><div><div><b>Fireplaces, Decorative Gas Appliances, and Gas Log:</b></div><div><div>§ 110.5(e)</div><div><b>Pilot Light.</b> Continuously burning pilot lights are not allowed for indoor and outdoor fireplaces.</div></div><div><div>§ 150.0.(e)1:</div><div><b>Closable Doors.</b> Masonry or factory-built fireplaces must have a closable metal or glass door covering the entire opening of the firebox.</div></div><div><div>§ 150.0.(e)2:</div><div><b>Combustion Intake.</b> Masonry or factory-built fireplaces must have a combustion outside air intake, which is at least six square inches in area and is equipped with a readily accessible, operable, and tight-fitting damper or combustion-air control device.</div></div><div><div>§ 150.0.(e)3:</div><div><b>Flue Damper.</b> Masonry or factory-built fireplaces must have a flue damper with a readily accessible control. *</div></div></div><div><div><div><b>Space Conditioning, Water Heating, and Plumbing Systems:</b></div><div><div>§ 110.0-§ 110.3:</div><div><b>Certification.</b> Heating, ventilation, and air conditioning (HVAC) equipment, water heaters, showerheads, faucets, and all other regulated appliances must be certified by the manufacturer to the California Energy Commission. *</div></div><div><div>§ 110.2.(a):</div><div><b>HVAC Efficiency.</b> Equipment must meet the applicable efficiency requirements in Table 110.2-A through Table 110.2-N. *</div></div><div><div>§ 110.2.(b):</div><div><b>Controls for Heat Pumps with Supplementary Electric Resistance Heaters.</b> Heat pumps with supplementary electric resistance heaters must have controls that prevent supplementary heater operation when the heating load can be met by the heat pump alone; and in which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.</div></div><div><div>§ 110.2.(c):</div><div><b>Thermostats.</b> All heating or cooling systems not controlled by a central energy management control system (EMCS) must have a setback thermostat. *</div></div><div><div>§ 110.3.(c):</div><div><b>Insulation.</b> Unfired service water heater storage tanks and solar water-heating backup tanks must have adequate insulation, or tank surface heat loss rating.</div></div><div><div>§ 110.3.(c)6:</div><div><b>Isolation Valves.</b> Instantaneous water heaters with an input rating greater than 6.8 kBtu per hour (2 kW) must have isolation valves with hose bibbs or other fittings on both cold and hot water lines to allow for flushing the water heater when the valves are closed.</div></div></div></div></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(k)1G:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1H:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1I:</div><div><b>Light Sources in Drawers, Cabinets, and Linen Closets.</b> Light sources internal to drawers, cabinetry or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors provided that they are rated to consume no more than 5 watts of power, emit no more than 150 lumens, and are equipped with controls that automatically turn the lighting off when the drawer, cabinet or linen closet is closed.</div></div></div><div><div><div>§ 150.0.(k)2A:</div><div><b>Interior Switches and Controls.</b> All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.</div></div></div><div><div><div>§ 150.0.(k)2B:</div><div><b>Interior Switches and Controls.</b> Exhaust fans must be controlled separately from lighting systems. *</div></div></div><div><div><div>§ 150.0.(k)2A:</div><div><b>Accessible Controls.</b> Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *</div></div></div><div><div><div>§ 150.0.(k)2B:</div><div><b>Multiple Controls.</b> Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function if the dimmer or sensor is installed to comply with § 150.0.(k).</div></div></div><div><div><div>§ 150.0.(k)2C:</div><div><b>Mandatory Requirements.</b> Lighting controls must comply with the applicable requirements of § 110.9.</div></div></div><div><div><div>§ 150.0.(k)2D:</div><div><b>Energy Management Control Systems.</b> An energy management control system (EMCS) may be used to comply with
dimming, occupancy, and control requirements if it provides the functionality of the specified control per § 110.9 and the physical controls specified in § 150.0.(k)2A.</div></div></div><div><div><div>§ 150.0.(k)2E:</div><div><b>Automatic Shutoff Controls.</b> In bathrooms, garages, laundry rooms, utility rooms and walk-in closets, at least one installed luminaire must be controlled by an occupancy or vacancy sensor providing automatic-off functionality. Lighting inside drawers and cabinets with opaque fronts or doors must have controls that turn the light off when the drawer or door is closed.</div></div></div><div><div><div>§ 150.0.(k)2F:</div><div><b>Dimmers.</b> Lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens, and bedrooms) must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.</div></div></div><div><div><div>§ 150.0.(k)2K:</div><div><b>Independent controls.</b> Integrated lighting of exhaust fans shall be controlled independently from the fans. Lighting under cabinets or shelves, lighting in display cabinets, and switched outlets must be controlled separately from ceiling-installed lighting.</div></div></div><div><div><div>§ 150.0.(k)3A:</div><div><b>Residential Outdoor Lighting.</b> For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must have a manual on/off switch and either a photocell and motion sensor or automatic time switch control) or an astronomical time clock. An energy management control system that provides the specified control functionality and meets all applicable requirements may be used to meet these requirements.</div></div></div><div><div><div>§ 150.0.(k)4:</div><div><b>Internally illuminated address signs.</b> Internally illuminated address signs must either comply with § 140.8 or consume no more than 5 watts of power.</div></div></div><div><div><div>§ 150.0.(k)5:</div><div><b>Residential Garages for Eight or More Vehicles.</b> Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.</div></div></div></div></div><div><table><tr><td><div><div><div><div><div></div><div><div>Solar Readiness:</div></div></div><div><div><div>§ 110.10.(a)1:</div><div><b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *</div></div></div><div><div><div>§ 110.10.(b)2:</div><div><b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.</div></div></div><div><div><div>§ 110.10.(b)3A:</div><div><b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *</div></div></div><div><div><div>§ 110.10.(b)3B:</div><div><b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *</div></div></div><div><div><div>§ 110.10.(b)4:</div><div><b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.</div></div></div><div><div><div>§ 110.10.(c):</div><div><b>Interconnection Pathways.</b> The construction documents must indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.</div></div></div><div><div><div>§ 110.10.(d):</div><div><b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10.(b)-(c) must be provided to the occupant.</div></div></div><div><div><div>§ 110.10.(e)1:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.</div></div></div><div><div><div>§ 110.10.(e)2:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."</div></div></div></div></div><div><p>Electric and Energy Storage Ready:</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div><div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div><div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div><div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div><div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div><div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div></td></tr></table></div><div><table><tr><td><div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be
sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div><div><p>*Exceptions may apply.</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div></td></tr></table></div><div><p>Ventilation and Indoor Air Quality:</p></div><div><table><tr><td><div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div><div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div><div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div><div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by
§150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div></td></tr></table></div><div><p>Pool and Spa Systems and Equipment:</p></div><div><table><tr><td><div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div><div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div><div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div><div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div><div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div><div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div></td></tr></table></div><div><p>Lighting:</p></div><div><table><tr><td><div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div><div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div><div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div><div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div><div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th colspan="10">HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY</th></tr><tr><td colspan="5">Project Name<br/>Mojaver ADU</td><td colspan="5">Date<br/>10/24/2023</td></tr><tr><td colspan="5">System Name<br/>Res HVAC</td><td colspan="5">Floor Area<br/>463</td></tr><tr><th colspan="5">ENGINEERING CHECKS</th><th colspan="5">SYSTEM LOAD</th></tr><tr><th colspan="5">Number of Systems</th><th colspan="5">1</th></tr><tr><th colspan="5">Heating System</th><th colspan="5">COIL COOLING PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Output (Btu/h/sqft)</th><th colspan="5">32.4</th></tr><tr><th colspan="5">Cooling System</th><th colspan="5">COIL HTG. PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Tons)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (Btu/h/sqft)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (sqft/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Air System</th><th colspan="5">HVAC EQUIPMENT SELECTION</th></tr><tr><th colspan="5">CFM per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm)</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Airflow (cfm/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Outside Air (%)</th><th colspan="5">0.0%</th></tr><tr><th colspan="5">Outside Air (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Note: values above given at ARI conditions</th><th colspan="5">TIME OF SYSTEM PEAK</th></tr><tr><th colspan="5"></th><th colspan="5">Aug 3 PM</th></tr><tr><th colspan="5"></th><th colspan="5">Jan 1 AM</th></tr><tr><th colspan="10">HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)</th></tr><tr><td colspan="10"><div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div></td></tr><tr><th colspan="10">COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)</th></tr><tr><td colspan="10"><div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div></td></tr></table></div><div><h2>ENERGY NOTES:</h2></div><div><p><b>Attention designers, owners, builders.</b> It is your responsibility to review the T24 documents for the required building features, and HERS measures.</p></div><div><p>If you have any questions, call before you build or buy.</p></div><div><p><b>Electric Ready &amp; Renewables- New Construction :</b> §150.0—Each electric ready item requires breaker space and labeling in panel. Single Family: Electric Ready 150.0.(n) Water Heaters: Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a Heat Pump Water Heater (2.5' x 2.5' x 7'). Within 3 ft of water heater 10/3 electrical feed. More than 3 ft 240 volt / 30 amp electrical feed. 150.0.(t) Furnaces. Provide a 240 volt / 30 amp electrical feed to the furnace for future heat pump. 150.0.(u) Cooktops. Include 240 volt / 50 amp feed for future cooktop 150.0.(v) Dryers. Include 240 volt / 30 amp feed for dryer if the unit has a gas line for a dryer.</p></div><div><p><b>Solar Access Roof Area (SARA) - New Construction</b> §140.10(a) / §170.2(f)</p></div><div><p>SARA includes: The area of a building's roof space capable of structurally supporting a PV system AND: □ The area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per CA Building Code §1511.2 □ Exceptions: □ Any roof area that has &lt; 70% annual solar access □ Occupied roof areas as specified by CA Building Code §503.1.4 □ Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.</p></div><div><p><b>Single Family: Solar Photovoltaic (PV) section §150.1(c)14</b> See section for solar sizing and exceptions</p></div><div><p><b>Energy Storage System (Battery Ready) - New Construction</b> §150.0(s)</p></div><div><p>At least one of the following shall be provided: Interconnection equipment with a minimum backed up capacity of 60 amps. Or A dedicated raceway from the main service to a subpanel that supplies the branch circuits. Or A minimum of four branch circuits shall be identified—feeding: □ Refrigerator □ One lighting circuit near the
primary egress □ A sleeping room receptacle outlet □ Main panel must be minimum 225 amps □ Sufficient space shall be reserved to allow future installation of a system isolation equipment or transfer switch within three feet of the main panelboard □ Raceways shall be installed between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.</p></div><div><p>ACCA Manual J, D&amp;S calculations are required to be submitted for plan review, followed by installing contractor and field inspected for compliance. T24 Load calc is based on ACCA J and may be used as sizing reference only. The load calc from the T24 doesn't include duct loss. See the T24 load calc page.</p></div><div><p><b>SAMPLE EQUIPMENT (Use any equipment that matches the min efficiencies)</b></p></div><div><p><b>Indoor Air Quality (IAQ) House Fan: Per ASHRAE 62.2</b></p></div><div><p><b>25 CFM / 1 Sones Sound Rating Max / Sample Model # Broan QTXE0</b></p></div><div><p>If this project is an addition under a 1,000 sf, the IAQ fan is not required.</p></div><div><p><b>For New Kitchen Hood sizing see Table 160.0-G</b></p></div><div><table><tr><th>Dwelling Unit Floor Area (ft²)</th><th>Hood Over Electric Range</th><th>Hood Over Natural Gas Range</th></tr><tr><td>&gt; 1500</td><td>50% CE or 110 CFM</td><td>70% CE or 180 CFM</td></tr><tr><td>&gt; 1000-1500</td><td>50% CE or 110 CFM</td><td>80% CE or 250 CFM</td></tr><tr><td>750-1000</td><td>55% CE or 130 CFM</td><td>85% CE or 280 CFM</td></tr><tr><td>&lt;750</td><td>65% CE or 160 CFM</td><td>85% CE or 280 CFM</td></tr></table></div><div><p>HVAC: Existing  AFUE: NA</p></div><div><p>Water Heater: Existing   EF: NA</p>&lt;/</div></div></td></tr></table></div></td></tr></table></div></div></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>   
   
   
   | <div><div><div><div><div>§ 150.0.(k)1G:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1H:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1I:</div><div><b>Light Sources in Drawers, Cabinets, and Linen Closets.</b> Light sources internal to drawers, cabinetry or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors provided that they are rated to consume no more than 5 watts of power, emit no more than 150 lumens, and are equipped with controls that automatically turn the lighting off when the drawer, cabinet or linen closet is closed.</div></div></div><div><div><div>§ 150.0.(k)2A:</div><div><b>Interior Switches and Controls.</b> All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.</div></div></div><div><div><div>§ 150.0.(k)2B:</div><div><b>Interior Switches and Controls.</b> Exhaust fans must be controlled separately from lighting systems. *</div></div></div><div><div><div>§ 150.0.(k)2A:</div><div><b>Accessible Controls.</b> Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *</div></div></div><div><div><div>§ 150.0.(k)2B:</div><div><b>Multiple Controls.</b> Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function if the dimmer or sensor is installed to comply with § 150.0.(k).</div></div></div><div><div><div>§ 150.0.(k)2C:</div><div><b>Mandatory Requirements.</b> Lighting controls must comply with the applicable requirements of § 110.9.</div></div></div><div><div><div>§ 150.0.(k)2D:</div><div><b>Energy Management Control Systems.</b> An energy management control system (EMCS) may be used to comply with dimming, occupancy, and control requirements if it provides the functionality of the specified control per § 110.9 and the physical controls specified in § 150.0.(k)2A.</div></div></div><div><div><div>§ 150.0.(k)2E:</div><div><b>Automatic Shutoff Controls.</b> In bathrooms, garages, laundry rooms, utility rooms and walk-in closets, at least one installed luminaire must be controlled by an occupancy or vacancy sensor providing automatic-off functionality. Lighting inside drawers and cabinets with opaque fronts or doors must have controls that turn the light off when the drawer or door is closed.</div></div></div><div><div><div>§ 150.0.(k)2F:</div><div><b>Dimmers.</b> Lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens, and bedrooms) must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.</div></div></div><div><div><div>§ 150.0.(k)2K:</div><div><b>Independent controls.</b> Integrated lighting of exhaust fans shall be controlled independently from the fans. Lighting under cabinets or shelves, lighting in display cabinets, and switched outlets must be controlled separately from ceiling-installed lighting.</div></div></div><div><div><div>§ 150.0.(k)3A:</div><div><b>Residential Outdoor Lighting.</b> For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must have a manual on/off switch and either a photocell and motion sensor or automatic time switch control) or an astronomical time clock. An energy management control system that provides the specified control functionality and meets all applicable requirements may be used to meet these requirements.</div></div></div><div><div><div>§ 150.0.(k)4:</div><div><b>Internally illuminated address signs.</b> Internally illuminated address signs must either comply with § 140.8 or consume no more than 5 watts of power.</div></div></div><div><div><div>§ 150.0.(k)5:</div><div><b>Residential Garages for Eight or More Vehicles.</b> Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.</div></div></div></div></div> <div><table><tr><td><div><div><div><div><div></div><div><div>Solar Readiness:</div></div></div><div><div><div>§ 110.10.(a)1:</div><div><b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *</div></div></div><div><div><div>§ 110.10.(b)2:</div><div><b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.</div></div></div><div><div><div>§ 110.10.(b)3A:</div><div><b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *</div></div></div><div><div><div>§ 110.10.(b)3B:</div><div><b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *</div></div></div><div><div><div>§ 110.10.(b)4:</div><div><b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.</div></div></div><div><div><div>§ 110.10.(c):</div><div><b>Interconnection Pathways.</b> The construction documents must indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.</div></div></div><div><div><div>§ 110.10.(d):</div><div><b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10.(b)-(c) must be provided to the occupant.</div></div></div><div><div><div>§ 110.10.(e)1:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.</div></div></div><div><div><div>§ 110.10.(e)2:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."</div></div></div></div></div><div><p>Electric and Energy Storage Ready:</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§
110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div><div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div><div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div><div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div><div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div><div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div></td></tr></table></div><div><table><tr><td><div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling
units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div><div><p>*Exceptions may apply.</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div></td></tr></table></div><div><p>Ventilation and Indoor Air Quality:</p></div><div><table><tr><td><div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div><div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div><div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div><div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div></td></tr></table></div><div><p>Pool and Spa Systems and Equipment:</p></div><div><table><tr><td><div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div><div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div><div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div><div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div><div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div><div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div></td></tr></table></div><div><p>Lighting:</p></div><div><table><tr><td><div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div><div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div><div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div><div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div><div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th colspan="10">HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY</th></tr><tr><td colspan="5">Project Name<br/>Mojaver ADU</td><td colspan="5">Date<br/>10/24/2023</td></tr><tr><td colspan="5">System Name<br/>Res HVAC</td><td colspan="5">Floor Area<br/>463</td></tr><tr><th colspan="5">ENGINEERING CHECKS</th><th colspan="5">SYSTEM LOAD</th></tr><tr><th colspan="5">Number of Systems</th><th colspan="5">1</th></tr><tr><th colspan="5">Heating System</th><th colspan="5">COIL COOLING PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Output (Btu/h/sqft)</th><th colspan="5">32.4</th></tr><tr><th colspan="5">Cooling System</th><th colspan="5">COIL HTG. PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Tons)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (Btu/h/sqft)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (sqft/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Air System</th><th colspan="5">HVAC EQUIPMENT SELECTION</th></tr><tr><th colspan="5">CFM per
System</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm)</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Airflow (cfm/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Outside Air (%)</th><th colspan="5">0.0%</th></tr><tr><th colspan="5">Outside Air (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Note: values above given at ARI conditions</th><th colspan="5">TIME OF SYSTEM PEAK</th></tr><tr><th colspan="5"></th><th colspan="5">Aug 3 PM</th></tr><tr><th colspan="5"></th><th colspan="5">Jan 1 AM</th></tr><tr><th colspan="10">HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)</th></tr><tr><td colspan="10"><div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div></td></tr><tr><th colspan="10">COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)</th></tr><tr><td colspan="10"><div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div></td></tr></table></div><div><h2>ENERGY NOTES:</h2></div><div><p><b>Attention designers, owners, builders.</b> It is your responsibility to review the T24 documents for the required building features, and HERS measures.</p></div><div><p>If you have any questions, call before you build or buy.</p></div><div><p><b>Electric Ready &amp; Renewables- New Construction :</b> §150.0—Each electric ready item requires breaker space and labeling in panel. Single Family: Electric Ready 150.0.(n) Water Heaters: Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a Heat Pump Water Heater (2.5' x 2.5' x 7'). Within 3 ft of water heater 10/3 electrical feed. More than 3 ft 240 volt / 30 amp electrical feed. 150.0.(t) Furnaces. Provide a 240 volt / 30 amp electrical feed to the furnace for future heat pump. 150.0.(u) Cooktops. Include 240 volt / 50 amp feed for future cooktop 150.0.(v) Dryers. Include 240 volt / 30 amp feed for dryer if the unit has a gas line for a dryer.</p></div><div><p><b>Solar Access Roof Area (SARA) - New Construction</b> §140.10(a) / §170.2(f)</p></div><div><p>SARA includes: The area of a building's roof space capable of structurally supporting a PV system AND: □ The area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per CA Building Code §1511.2 □ Exceptions: □ Any roof area that has &lt; 70% annual solar access □ Occupied roof areas as specified by CA Building Code §503.1.4 □ Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.</p></div><div><p><b>Single Family: Solar Photovoltaic (PV) section §150.1(c)14</b> See section for solar sizing and exceptions</p></div><div><p><b>Energy Storage System (Battery Ready) - New Construction</b> §150.0(s)</p></div><div><p>At least one of the following shall be provided: Interconnection equipment with a minimum backed up capacity of 60 amps. Or A dedicated raceway from the main service to a subpanel that supplies the branch circuits. Or A minimum of four branch circuits shall be identified—feeding: □ Refrigerator □ One lighting circuit near the primary egress □ A sleeping room receptacle outlet □ Main panel must be minimum 225 amps □ Sufficient space shall be reserved to allow future installation of a system isolation equipment or transfer switch within three feet of the main panelboard □ Raceways shall be installed between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.</p></div><div><p>ACCA Manual J, D&amp;S calculations are required to be submitted for plan review, followed by installing contractor and field inspected for compliance. T24 Load calc is based on ACCA J and may be used as sizing reference only. The load calc from the T24 doesn't include duct loss. See the T24 load calc page.</p></div><div><p><b>SAMPLE EQUIPMENT (Use any equipment that matches the min efficiencies)</b></p></div><div><p><b>Indoor Air Quality (IAQ) House Fan: Per ASHRAE 62.2</b></p></div><div><p><b>25 CFM / 1 Sones Sound Rating Max / Sample Model # Broan QTXE0</b></p></div><div><p>If this project is an addition under a 1,000 sf, the IAQ fan is not required.</p></div><div><p><b>For New Kitchen Hood sizing see Table 160.0-G</b></p></div><div><table><tr><th>Dwelling Unit Floor Area (ft²)</th><th>Hood Over Electric Range</th><th>Hood Over Natural Gas Range</th></tr><tr><td>&gt; 1500</td><td>50% CE or 110 CFM</td><td>70% CE or 180 CFM</td></tr><tr><td>&gt; 1000-1500</td><td>50% CE or 110 CFM</td><td>80% CE or 250 CFM</td></tr><tr><td>750-1000</td><td>55% CE or 130 CFM</td><td>85% CE or 280 CFM</td></tr><tr><td>&lt;750</td><td>65% CE or 160 CFM</td><td>85% CE or 280 CFM</td></tr></table></div><div><p>HVAC: Existing  AFUE: NA</p></div><div><p>Water Heater: Existing   EF: NA</p>&lt;/</div></div></td></tr></table></div> | <div><div><div><div><div></div><div><div>Solar Readiness:</div></div></div><div><div><div>§ 110.10.(a)1:</div><div><b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *</div></div></div><div><div><div>§ 110.10.(b)2:</div><div><b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.</div></div></div><div><div><div>§ 110.10.(b)3A:</div><div><b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *</div></div></div><div><div><div>§ 110.10.(b)3B:</div><div><b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *</div></div></div><div><div><div>§ 110.10.(b)4:</div><div><b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.</div></div></div><div><div><div>§ 110.10.(c):</div><div><b>Interconnection Pathways.</b> The construction documents must indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.</div></div></div><div><div><div>§ 110.10.(d):</div><div><b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10.(b)-(c) must be provided to the occupant.</div></div></div><div><div><div>§ 110.10.(e)1:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.</div></div></div><div><div><div>§ 110.10.(e)2:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."</div></div></div></div></div><div><p>Electric and Energy Storage Ready:</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool
and spa heaters. *</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div><div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div><div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div><div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div><div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div><div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div></td></tr></table></div><div><table><tr><td><div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a
double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div><div><p>*Exceptions may apply.</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div></td></tr></table></div><div><p>Ventilation and Indoor Air Quality:</p></div><div><table><tr><td><div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div><div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div><div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div><div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div></td></tr></table></div><div><p>Pool and Spa Systems and Equipment:</p></div><div><table><tr><td><div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div><div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div><div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div><div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div><div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div><div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div></td></tr></table></div><div><p>Lighting:</p></div><div><table><tr><td><div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div><div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div><div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div><div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div><div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th colspan="10">HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY</th></tr><tr><td colspan="5">Project Name<br/>Mojaver ADU</td><td colspan="5">Date<br/>10/24/2023</td></tr><tr><td colspan="5">System Name<br/>Res HVAC</td><td colspan="5">Floor Area<br/>463</td></tr><tr><th colspan="5">ENGINEERING CHECKS</th><th colspan="5">SYSTEM LOAD</th></tr><tr><th colspan="5">Number of Systems</th><th colspan="5">1</th></tr><tr><th colspan="5">Heating System</th><th colspan="5">COIL COOLING PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Output (Btu/h/sqft)</th><th colspan="5">32.4</th></tr><tr><th colspan="5">Cooling System</th><th colspan="5">COIL HTG. PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Tons)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (Btu/h/sqft)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (sqft/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Air System</th><th colspan="5">HVAC EQUIPMENT SELECTION</th></tr><tr><th colspan="5">CFM per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm)</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Airflow (cfm/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Outside Air (%)</th><th
colspan="5">0.0%</th></tr><tr><th colspan="5">Outside Air (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Note: values above given at ARI conditions</th><th colspan="5">TIME OF SYSTEM PEAK</th></tr><tr><th colspan="5"></th><th colspan="5">Aug 3 PM</th></tr><tr><th colspan="5"></th><th colspan="5">Jan 1 AM</th></tr><tr><th colspan="10">HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)</th></tr><tr><td colspan="10"><div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div></td></tr><tr><th colspan="10">COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)</th></tr><tr><td colspan="10"><div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div></td></tr></table></div><div><h2>ENERGY NOTES:</h2></div><div><p><b>Attention designers, owners, builders.</b> It is your responsibility to review the T24 documents for the required building features, and HERS measures.</p></div><div><p>If you have any questions, call before you build or buy.</p></div><div><p><b>Electric Ready &amp; Renewables- New Construction :</b> §150.0—Each electric ready item requires breaker space and labeling in panel. Single Family: Electric Ready 150.0.(n) Water Heaters: Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a Heat Pump Water Heater (2.5' x 2.5' x 7'). Within 3 ft of water heater 10/3 electrical feed. More than 3 ft 240 volt / 30 amp electrical feed. 150.0.(t) Furnaces. Provide a 240 volt / 30 amp electrical feed to the furnace for future heat pump. 150.0.(u) Cooktops. Include 240 volt / 50 amp feed for future cooktop 150.0.(v) Dryers. Include 240 volt / 30 amp feed for dryer if the unit has a gas line for a dryer.</p></div><div><p><b>Solar Access Roof Area (SARA) - New Construction</b> §140.10(a) / §170.2(f)</p></div><div><p>SARA includes: The area of a building's roof space capable of structurally supporting a PV system AND: □ The area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per CA Building Code §1511.2 □ Exceptions: □ Any roof area that has &lt; 70% annual solar access □ Occupied roof areas as specified by CA Building Code §503.1.4 □ Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.</p></div><div><p><b>Single Family: Solar Photovoltaic (PV) section §150.1(c)14</b> See section for solar sizing and exceptions</p></div><div><p><b>Energy Storage System (Battery Ready) - New Construction</b> §150.0(s)</p></div><div><p>At least one of the following shall be provided: Interconnection equipment with a minimum backed up capacity of 60 amps. Or A dedicated raceway from the main service to a subpanel that supplies the branch circuits. Or A minimum of four branch circuits shall be identified—feeding: □ Refrigerator □ One lighting circuit near the primary egress □ A sleeping room receptacle outlet □ Main panel must be minimum 225 amps □ Sufficient space shall be reserved to allow future installation of a system isolation equipment or transfer switch within three feet of the main panelboard □ Raceways shall be installed between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.</p></div><div><p>ACCA Manual J, D&amp;S calculations are required to be submitted for plan review, followed by installing contractor and field inspected for compliance. T24 Load calc is based on ACCA J and may be used as sizing reference only. The load calc from the T24 doesn't include duct loss. See the T24 load calc page.</p></div><div><p><b>SAMPLE EQUIPMENT (Use any equipment that matches the min efficiencies)</b></p></div><div><p><b>Indoor Air Quality (IAQ) House Fan: Per ASHRAE 62.2</b></p></div><div><p><b>25 CFM / 1 Sones Sound Rating Max / Sample Model # Broan QTXE0</b></p></div><div><p>If this project is an addition under a 1,000 sf, the IAQ fan is not required.</p></div><div><p><b>For New Kitchen Hood sizing see Table 160.0-G</b></p></div><div><table><tr><th>Dwelling Unit Floor Area (ft²)</th><th>Hood Over Electric Range</th><th>Hood Over Natural Gas Range</th></tr><tr><td>&gt; 1500</td><td>50% CE or 110 CFM</td><td>70% CE or 180 CFM</td></tr><tr><td>&gt; 1000-1500</td><td>50% CE or 110 CFM</td><td>80% CE or 250 CFM</td></tr><tr><td>750-1000</td><td>55% CE or 130 CFM</td><td>85% CE or 280 CFM</td></tr><tr><td>&lt;750</td><td>65% CE or 160 CFM</td><td>85% CE or 280 CFM</td></tr></table></div><div><p>HVAC: Existing  AFUE: NA</p></div><div><p>Water Heater: Existing   EF: NA</p>&lt;/</div></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  
  | <div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div> <div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div> <div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div> <div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div> <div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div> <div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div>   | <div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  | <div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to
allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div> <div><p>*Exceptions may apply.</p></div> <div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  | <div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div>  | <div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div> <div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div> <div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div> <div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation
systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div> | <div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div> <div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div> <div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div> <div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div> <div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div> <div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div> | <div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div> <div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div> <div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div> <div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div> <div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div> <div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div> <div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div> | HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY |  |  |  |  |  |  |                             |                             |  | Project Name<br>Mojaver ADU |  |                    |                    |  | Date<br>10/24/2023 |  |                         |                         |  | System Name<br>Res HVAC |  |                   |                   |  | Floor Area<br>463 |  |                    |                    |  | ENGINEERING CHECKS |  |             |             |  | SYSTEM LOAD |  |                   |                   |  | Number of Systems |  |   |   |  | 1 |  |                |                |  | Heating System |  |                   |                   |  | COIL COOLING PEAK |  |                   |                   |  | Output per System |  |        |        |  | 15,000 |  |                      |                      |  | Total Output (Btu/h) |  |        |        |  | 15,000 |  |                     |                     |  | Output (Btu/h/sqft) |  |      |      |  | 32.4 |  |                |                |  | Cooling System |  |                |                |  | COIL HTG. PEAK |  |                   |                   |  | Output per System |  |   |   |  | 0 |  |                      |                      |  | Total Output (Btu/h) |  |   |   |  | 0 |  |                     |                     |  | Total Output (Tons) |  |     |     |  | 0.0 |  |                           |                           |  | Total Output (Btu/h/sqft) |  |     |     |  | 0.0 |  |                         |                         |  | Total Output (sqft/Ton) |  |     |     |  | 0.0 |  |            |            |  | Air System |  |                          |                          |  | HVAC EQUIPMENT SELECTION |  |                |                |  | CFM per System |  |   |   |  | 0 |  |               |               |  | Airflow (cfm) |  |   |   |  | 0 |  |                    |                    |  | Airflow (cfm/sqft) |  |      |      |  | 0.00 |  |                   |                   |  | Airflow (cfm/Ton) |  |     |     |  | 0.0 |  |                 |                 |  | Outside Air (%) |  |      |      |  | 0.0% |  |                        |                        |  | Outside Air (cfm/sqft) |  |      |      |  | 0.00 |  |  |  |  | Note: values above given at ARI conditions |  |                     |                     |  | TIME OF SYSTEM PEAK |  |  |  |  |  |  |          |          |  | Aug 3 PM |  |  |  |  |  |  |          |          |  | Jan 1 AM |  |  |  |  | HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak) |  |  |  |  |  |  |  |  |  | <div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div> |  |  |  |  |  |  |  |  |  | COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak) |  |  |  |  |  |  |   |   |  | <div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div> |  |  |  |  |  |  |                                |                                |                             | Dwelling Unit Floor Area (ft²) | Hood Over Electric Range | Hood Over Natural Gas Range | > 1500            | 50% CE or 110 CFM | 70% CE or 180 CFM | > 1000-1500       | 50% CE or 110 CFM | 80% CE or 250 CFM | 750-1000          | 55% CE or 130 CFM | 85% CE or 280 CFM | <750              | 65% CE or 160 CFM | 85% CE or 280 CFM |
| <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>   
   
   
   
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| <div><div><div><div><div>§ 150.0.(k)1G:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1H:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1I:</div><div><b>Light Sources in Drawers, Cabinets, and Linen Closets.</b> Light sources internal to drawers, cabinetry or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors provided that they are rated to consume no more than 5 watts of power, emit no more than 150 lumens, and are equipped with controls that automatically turn the lighting off when the drawer, cabinet or linen closet is closed.</div></div></div><div><div><div>§ 150.0.(k)2A:</div><div><b>Interior Switches and Controls.</b> All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.</div></div></div><div><div><div>§ 150.0.(k)2B:</div><div><b>Interior Switches and Controls.</b> Exhaust fans must be controlled separately from lighting systems. *</div></div></div><div><div><div>§ 150.0.(k)2A:</div><div><b>Accessible Controls.</b> Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *</div></div></div><div><div><div>§ 150.0.(k)2B:</div><div><b>Multiple Controls.</b> Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function if the dimmer or sensor is installed to comply with § 150.0.(k).</div></div></div><div><div><div>§ 150.0.(k)2C:</div><div><b>Mandatory Requirements.</b> Lighting controls must comply with the applicable requirements of § 110.9.</div></div></div><div><div><div>§ 150.0.(k)2D:</div><div><b>Energy Management Control Systems.</b> An energy management control system (EMCS) may be used to comply with dimming, occupancy, and control requirements if it provides the functionality of the specified control per § 110.9 and the physical controls specified in § 150.0.(k)2A.</div></div></div><div><div><div>§ 150.0.(k)2E:</div><div><b>Automatic Shutoff Controls.</b> In bathrooms, garages, laundry rooms, utility rooms and walk-in closets, at least one installed luminaire must be controlled by an occupancy or vacancy sensor providing automatic-off functionality. Lighting inside drawers and cabinets with opaque fronts or doors must have controls that turn the light off when the drawer or door is closed.</div></div></div><div><div><div>§ 150.0.(k)2F:</div><div><b>Dimmers.</b> Lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens, and bedrooms) must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.</div></div></div><div><div><div>§ 150.0.(k)2K:</div><div><b>Independent controls.</b> Integrated lighting of exhaust fans shall be controlled independently from the fans. Lighting under cabinets or shelves, lighting in display cabinets, and switched outlets must be controlled separately from ceiling-installed lighting.</div></div></div><div><div><div>§ 150.0.(k)3A:</div><div><b>Residential Outdoor Lighting.</b> For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must have a manual on/off switch and either a photocell and motion sensor or automatic time switch control) or an astronomical time clock. An energy management control system that provides the specified control functionality and meets all applicable requirements may be used to meet these requirements.</div></div></div><div><div><div>§ 150.0.(k)4:</div><div><b>Internally illuminated address signs.</b> Internally illuminated address signs must either comply with § 140.8 or consume no more than 5 watts of power.</div></div></div><div><div><div>§ 150.0.(k)5:</div><div><b>Residential Garages for Eight or More Vehicles.</b> Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.</div></div></div></div></div> <div><table><tr><td><div><div><div><div><div></div><div><div>Solar Readiness:</div></div></div><div><div><div>§ 110.10.(a)1:</div><div><b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *</div></div></div><div><div><div>§ 110.10.(b)2:</div><div><b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.</div></div></div><div><div><div>§ 110.10.(b)3A:</div><div><b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *</div></div></div><div><div><div>§ 110.10.(b)3B:</div><div><b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *</div></div></div><div><div><div>§ 110.10.(b)4:</div><div><b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.</div></div></div><div><div><div>§ 110.10.(c):</div><div><b>Interconnection Pathways.</b> The construction documents must indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.</div></div></div><div><div><div>§ 110.10.(d):</div><div><b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10.(b)-(c) must be provided to the occupant.</div></div></div><div><div><div>§ 110.10.(e)1:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.</div></div></div><div><div><div>§ 110.10.(e)2:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."</div></div></div></div></div><div><p>Electric and Energy Storage Ready:</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div><div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div><div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div><div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div><div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or
Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div><div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div></td></tr></table></div><div><table><tr><td><div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div><div><p>*Exceptions may apply.</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div></td></tr></table></div><div><p>Ventilation and Indoor Air Quality:</p></div><div><table><tr><td><div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in
Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div><div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div><div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div><div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div></td></tr></table></div><div><p>Pool and Spa Systems and Equipment:</p></div><div><table><tr><td><div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div><div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div><div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div><div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div><div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div><div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div></td></tr></table></div><div><p>Lighting:</p></div><div><table><tr><td><div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div><div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div><div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div><div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div><div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th colspan="10">HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY</th></tr><tr><td colspan="5">Project Name<br/>Mojaver ADU</td><td colspan="5">Date<br/>10/24/2023</td></tr><tr><td colspan="5">System Name<br/>Res HVAC</td><td colspan="5">Floor Area<br/>463</td></tr><tr><th colspan="5">ENGINEERING CHECKS</th><th colspan="5">SYSTEM LOAD</th></tr><tr><th colspan="5">Number of Systems</th><th colspan="5">1</th></tr><tr><th colspan="5">Heating System</th><th colspan="5">COIL COOLING PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Output (Btu/h/sqft)</th><th colspan="5">32.4</th></tr><tr><th colspan="5">Cooling System</th><th colspan="5">COIL HTG. PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Tons)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (Btu/h/sqft)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (sqft/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Air System</th><th colspan="5">HVAC EQUIPMENT SELECTION</th></tr><tr><th colspan="5">CFM per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm)</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Airflow (cfm/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Outside Air (%)</th><th colspan="5">0.0%</th></tr><tr><th colspan="5">Outside Air (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Note: values above given at ARI conditions</th><th colspan="5">TIME OF SYSTEM PEAK</th></tr><tr><th colspan="5"></th><th colspan="5">Aug 3 PM</th></tr><tr><th colspan="5"></th><th colspan="5">Jan 1 AM</th></tr><tr><th colspan="10">HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)</th></tr><tr><td colspan="10"><div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div></td></tr><tr><th colspan="10">COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)</th></tr><tr><td colspan="10"><div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div></td></tr></table></div><div><h2>ENERGY NOTES:</h2></div><div><p><b>Attention designers, owners, builders.</b> It is your responsibility to review the T24 documents for the required building features, and HERS measures.</p></div><div><p>If you have any questions, call before you build or buy.</p></div><div><p><b>Electric Ready &amp; Renewables- New Construction :</b> §150.0—Each electric ready item requires breaker space and
labeling in panel. Single Family: Electric Ready 150.0.(n) Water Heaters: Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a Heat Pump Water Heater (2.5' x 2.5' x 7'). Within 3 ft of water heater 10/3 electrical feed. More than 3 ft 240 volt / 30 amp electrical feed. 150.0.(t) Furnaces. Provide a 240 volt / 30 amp electrical feed to the furnace for future heat pump. 150.0.(u) Cooktops. Include 240 volt / 50 amp feed for future cooktop 150.0.(v) Dryers. Include 240 volt / 30 amp feed for dryer if the unit has a gas line for a dryer.</p></div><div><p><b>Solar Access Roof Area (SARA) - New Construction</b> §140.10(a) / §170.2(f)</p></div><div><p>SARA includes: The area of a building's roof space capable of structurally supporting a PV system AND: □ The area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per CA Building Code §1511.2 □ Exceptions: □ Any roof area that has &lt; 70% annual solar access □ Occupied roof areas as specified by CA Building Code §503.1.4 □ Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.</p></div><div><p><b>Single Family: Solar Photovoltaic (PV) section §150.1(c)14</b> See section for solar sizing and exceptions</p></div><div><p><b>Energy Storage System (Battery Ready) - New Construction</b> §150.0(s)</p></div><div><p>At least one of the following shall be provided: Interconnection equipment with a minimum backed up capacity of 60 amps. Or A dedicated raceway from the main service to a subpanel that supplies the branch circuits. Or A minimum of four branch circuits shall be identified—feeding: □ Refrigerator □ One lighting circuit near the primary egress □ A sleeping room receptacle outlet □ Main panel must be minimum 225 amps □ Sufficient space shall be reserved to allow future installation of a system isolation equipment or transfer switch within three feet of the main panelboard □ Raceways shall be installed between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.</p></div><div><p>ACCA Manual J, D&amp;S calculations are required to be submitted for plan review, followed by installing contractor and field inspected for compliance. T24 Load calc is based on ACCA J and may be used as sizing reference only. The load calc from the T24 doesn't include duct loss. See the T24 load calc page.</p></div><div><p><b>SAMPLE EQUIPMENT (Use any equipment that matches the min efficiencies)</b></p></div><div><p><b>Indoor Air Quality (IAQ) House Fan: Per ASHRAE 62.2</b></p></div><div><p><b>25 CFM / 1 Sones Sound Rating Max / Sample Model # Broan QTXE0</b></p></div><div><p>If this project is an addition under a 1,000 sf, the IAQ fan is not required.</p></div><div><p><b>For New Kitchen Hood sizing see Table 160.0-G</b></p></div><div><table><tr><th>Dwelling Unit Floor Area (ft²)</th><th>Hood Over Electric Range</th><th>Hood Over Natural Gas Range</th></tr><tr><td>&gt; 1500</td><td>50% CE or 110 CFM</td><td>70% CE or 180 CFM</td></tr><tr><td>&gt; 1000-1500</td><td>50% CE or 110 CFM</td><td>80% CE or 250 CFM</td></tr><tr><td>750-1000</td><td>55% CE or 130 CFM</td><td>85% CE or 280 CFM</td></tr><tr><td>&lt;750</td><td>65% CE or 160 CFM</td><td>85% CE or 280 CFM</td></tr></table></div><div><p>HVAC: Existing  AFUE: NA</p></div><div><p>Water Heater: Existing   EF: NA</p>&lt;/</div></div></td></tr></table></div>   
   | <div><div><div><div><div></div><div><div>Solar Readiness:</div></div></div><div><div><div>§ 110.10.(a)1:</div><div><b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *</div></div></div><div><div><div>§ 110.10.(b)2:</div><div><b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.</div></div></div><div><div><div>§ 110.10.(b)3A:</div><div><b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *</div></div></div><div><div><div>§ 110.10.(b)3B:</div><div><b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *</div></div></div><div><div><div>§ 110.10.(b)4:</div><div><b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.</div></div></div><div><div><div>§ 110.10.(c):</div><div><b>Interconnection Pathways.</b> The construction documents must indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.</div></div></div><div><div><div>§ 110.10.(d):</div><div><b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10.(b)-(c) must be provided to the occupant.</div></div></div><div><div><div>§ 110.10.(e)1:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.</div></div></div><div><div><div>§ 110.10.(e)2:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."</div></div></div></div></div><div><p>Electric and Energy Storage Ready:</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div><div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div><div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div><div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div><div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div><div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div></td></tr></table></div><div><table><tr><td><div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is
used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div><div><p>*Exceptions may apply.</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div></td></tr></table></div><div><p>Ventilation and Indoor Air Quality:</p></div><div><table><tr><td><div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div><div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div><div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div><div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with
Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div></td></tr></table></div><div><p>Pool and Spa Systems and Equipment:</p></div><div><table><tr><td><div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div><div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div><div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div><div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div><div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div><div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div></td></tr></table></div><div><p>Lighting:</p></div><div><table><tr><td><div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div><div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div><div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div><div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div><div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th colspan="10">HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY</th></tr><tr><td colspan="5">Project Name<br/>Mojaver ADU</td><td colspan="5">Date<br/>10/24/2023</td></tr><tr><td colspan="5">System Name<br/>Res HVAC</td><td colspan="5">Floor Area<br/>463</td></tr><tr><th colspan="5">ENGINEERING CHECKS</th><th colspan="5">SYSTEM LOAD</th></tr><tr><th colspan="5">Number of Systems</th><th colspan="5">1</th></tr><tr><th colspan="5">Heating System</th><th colspan="5">COIL COOLING PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Output (Btu/h/sqft)</th><th colspan="5">32.4</th></tr><tr><th colspan="5">Cooling System</th><th colspan="5">COIL HTG. PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Tons)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (Btu/h/sqft)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (sqft/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Air System</th><th colspan="5">HVAC EQUIPMENT SELECTION</th></tr><tr><th colspan="5">CFM per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm)</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Airflow (cfm/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Outside Air (%)</th><th colspan="5">0.0%</th></tr><tr><th colspan="5">Outside Air (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Note: values above given at ARI conditions</th><th colspan="5">TIME OF SYSTEM PEAK</th></tr><tr><th colspan="5"></th><th colspan="5">Aug 3 PM</th></tr><tr><th colspan="5"></th><th colspan="5">Jan 1 AM</th></tr><tr><th colspan="10">HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)</th></tr><tr><td colspan="10"><div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div></td></tr><tr><th colspan="10">COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)</th></tr><tr><td colspan="10"><div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div></td></tr></table></div><div><h2>ENERGY NOTES:</h2></div><div><p><b>Attention designers, owners, builders.</b> It is your responsibility to review the T24 documents for the required building features, and HERS measures.</p></div><div><p>If you have any questions, call before you build or buy.</p></div><div><p><b>Electric Ready &amp; Renewables- New Construction :</b> §150.0—Each electric ready item requires breaker space and labeling in panel. Single Family: Electric Ready 150.0.(n) Water Heaters: Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a Heat Pump Water Heater (2.5' x 2.5' x 7'). Within 3 ft of water heater 10/3 electrical feed. More than 3 ft 240 volt / 30 amp electrical feed. 150.0.(t) Furnaces. Provide a 240 volt / 30 amp electrical feed to the furnace for future heat pump. 150.0.(u) Cooktops. Include 240 volt / 50 amp feed for future cooktop 150.0.(v) Dryers. Include 240 volt / 30 amp feed for dryer if the unit has a gas line for a dryer.</p></div><div><p><b>Solar Access Roof Area (SARA) - New Construction</b> §140.10(a) / §170.2(f)</p></div><div><p>SARA includes: The area of a building's roof space capable of structurally supporting a PV system AND: □ The area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per CA Building Code §1511.2 □ Exceptions: □ Any roof area that has &lt; 70% annual solar access □ Occupied roof areas as specified by CA Building Code §503.1.4 □ Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.</p></div><div><p><b>Single Family: Solar Photovoltaic (PV) section §150.1(c)14</b> See section for solar sizing and exceptions</p></div><div><p><b>Energy Storage System (Battery Ready) - New Construction</b> §150.0(s)</p></div><div><p>At least one of the following shall be provided: Interconnection equipment with a minimum backed up capacity of 60 amps. Or A dedicated raceway from the main service to a subpanel that supplies the branch circuits. Or A minimum of four branch circuits shall be identified—feeding: □ Refrigerator □ One lighting circuit near the primary egress □ A sleeping room receptacle outlet □ Main panel must be minimum 225 amps □ Sufficient space shall be reserved to allow future installation of a system isolation equipment or transfer switch within three feet of the main panelboard □ Raceways shall be installed
between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.</p></div><div><p>ACCA Manual J, D&amp;S calculations are required to be submitted for plan review, followed by installing contractor and field inspected for compliance. T24 Load calc is based on ACCA J and may be used as sizing reference only. The load calc from the T24 doesn't include duct loss. See the T24 load calc page.</p></div><div><p><b>SAMPLE EQUIPMENT (Use any equipment that matches the min efficiencies)</b></p></div><div><p><b>Indoor Air Quality (IAQ) House Fan: Per ASHRAE 62.2</b></p></div><div><p><b>25 CFM / 1 Sones Sound Rating Max / Sample Model # Broan QTXE0</b></p></div><div><p>If this project is an addition under a 1,000 sf, the IAQ fan is not required.</p></div><div><p><b>For New Kitchen Hood sizing see Table 160.0-G</b></p></div><div><table><tr><th>Dwelling Unit Floor Area (ft²)</th><th>Hood Over Electric Range</th><th>Hood Over Natural Gas Range</th></tr><tr><td>&gt; 1500</td><td>50% CE or 110 CFM</td><td>70% CE or 180 CFM</td></tr><tr><td>&gt; 1000-1500</td><td>50% CE or 110 CFM</td><td>80% CE or 250 CFM</td></tr><tr><td>750-1000</td><td>55% CE or 130 CFM</td><td>85% CE or 280 CFM</td></tr><tr><td>&lt;750</td><td>65% CE or 160 CFM</td><td>85% CE or 280 CFM</td></tr></table></div><div><p>HVAC: Existing  AFUE: NA</p></div><div><p>Water Heater: Existing   EF: NA</p>&lt;/</div></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  
   
   
  | <div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div> <div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div> <div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div> <div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div> <div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div> <div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div>  
   
   
   | <div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet
the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  | <div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div> <div><p>*Exceptions may apply.</p></div> <div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div>  | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  | <div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div>  
  | <div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div> <div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div> <div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div> <div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div> | <div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div> <div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div> <div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div> <div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div> <div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div> <div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div>  | <div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div> <div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div> <div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div> <div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div> <div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div> <div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div> <div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div>  
   | HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY   |  |   |  |  |  |  |  |  |                             | Project Name<br>Mojaver ADU |  |                             |  |                    | Date<br>10/24/2023 |  |                    |  |                         | System Name<br>Res HVAC |  |                         |  |                   | Floor Area<br>463 |  |                   |  |                    | ENGINEERING CHECKS |  |                    |  |             | SYSTEM LOAD |  |             |  |                   | Number of Systems |  |                   |  |   | 1 |  |   |  |                | Heating System |  |                |  |                   | COIL COOLING PEAK |  |                   |  |                   | Output per System |  |                   |  |        | 15,000 |  |        |  |                      | Total Output (Btu/h) |  |                      |  |        | 15,000 |  |        |  |                     | Output (Btu/h/sqft) |  |                     |  |      | 32.4 |  |      |  |                | Cooling System |  |                |  |                | COIL HTG. PEAK |  |                |  |                   | Output per System |  |                   |  |   | 0 |  |   |  |                      | Total Output (Btu/h) |  |                      |  |   | 0 |  |   |  |                     | Total Output (Tons) |  |                     |  |     | 0.0 |  |     |  |                           | Total Output (Btu/h/sqft) |  |                           |  |     | 0.0 |  |     |  |                         | Total Output (sqft/Ton) |  |                         |  |     | 0.0 |  |     |  |            | Air System |  |            |  |                          | HVAC EQUIPMENT SELECTION |  |                          |  |                | CFM per System |  |                |  |   | 0 |  |   |  |               | Airflow (cfm) |  |               |  |   | 0 |  |   |  |                    | Airflow (cfm/sqft) |  |                    |  |      | 0.00 |  |      |  |                   | Airflow (cfm/Ton) |  |                   |  |     | 0.0 |  |     |  |                 | Outside Air (%) |  |                 |  |      | 0.0% |  |      |  |                        | Outside Air (cfm/sqft) |  |                        |  |      | 0.00 |  |      |  |  | Note: values above given at ARI conditions |  |  |  |                     | TIME OF SYSTEM PEAK |  |                     |  |  |  |  |  |  |          | Aug 3 PM |  |          |  |  |  |  |  |  |          | Jan 1 AM |  |          |  |  | HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak) |  |  |  |  |  |  |  |  |  | <div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div> |  |  |  |  |  |  |  |  |  | COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak) |  |  |  |  |  |  |  |  |   | <div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div> |  |   |  |  |  |  |  |  |                                | Dwelling Unit Floor Area (ft²) | Hood Over Electric Range    | Hood Over Natural Gas Range    | > 1500                   | 50% CE or 110 CFM           | 70% CE or 180 CFM | > 1000-1500       | 50% CE or 110 CFM | 80% CE or 250 CFM | 750-1000          | 55% CE or 130 CFM | 85% CE or 280 CFM | <750              | 65% CE or 160 CFM | 85% CE or 280 CFM |                   |                   |
| <div><div><div><div><div></div><div><div>Solar Readiness:</div></div></div><div><div><div>§ 110.10.(a)1:</div><div><b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *</div></div></div><div><div><div>§ 110.10.(b)2:</div><div><b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.</div></div></div><div><div><div>§ 110.10.(b)3A:</div><div><b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *</div></div></div><div><div><div>§ 110.10.(b)3B:</div><div><b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *</div></div></div><div><div><div>§ 110.10.(b)4:</div><div><b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.</div></div></div><div><div><div>§ 110.10.(c):</div><div><b>Interconnection Pathways.</b> The construction documents must indicate a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.</div></div></div><div><div><div>§ 110.10.(d):</div><div><b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10.(b)-(c) must be provided to the occupant.</div></div></div><div><div><div>§ 110.10.(e)1:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.</div></div></div><div><div><div>§ 110.10.(e)2:</div><div><b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."</div></div></div></div></div><div><p>Electric and Energy Storage Ready:</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div><div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div><div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div><div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div><div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div><div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div><div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div></td></tr></table></div><div><table><tr><td><div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor
barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div><div><p>*Exceptions may apply.</p></div><div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div></td></tr></table></div><div><p>Ventilation and Indoor Air Quality:</p></div><div><table><tr><td><div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div><div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div><div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div><div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div><div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div></td></tr></table></div><div><p>Pool and Spa Systems and Equipment:</p></div><div><table><tr><td><div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div><div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div><div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div><div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div><div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div><div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div></td></tr></table></div><div data-bbox="1489 748 1526 764"
data-label="Text"><p>Lighting:</p></div><div><table><tr><td><div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div><div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div><div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div><div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div><div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div><div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div><div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div></td></tr></table></div><div><p>5/6/22</p></div><div><table><tr><th colspan="10">HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY</th></tr><tr><td colspan="5">Project Name<br/>Mojaver ADU</td><td colspan="5">Date<br/>10/24/2023</td></tr><tr><td colspan="5">System Name<br/>Res HVAC</td><td colspan="5">Floor Area<br/>463</td></tr><tr><th colspan="5">ENGINEERING CHECKS</th><th colspan="5">SYSTEM LOAD</th></tr><tr><th colspan="5">Number of Systems</th><th colspan="5">1</th></tr><tr><th colspan="5">Heating System</th><th colspan="5">COIL COOLING PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">15,000</th></tr><tr><th colspan="5">Output (Btu/h/sqft)</th><th colspan="5">32.4</th></tr><tr><th colspan="5">Cooling System</th><th colspan="5">COIL HTG. PEAK</th></tr><tr><th colspan="5">Output per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Btu/h)</th><th colspan="5">0</th></tr><tr><th colspan="5">Total Output (Tons)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (Btu/h/sqft)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Total Output (sqft/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Air System</th><th colspan="5">HVAC EQUIPMENT SELECTION</th></tr><tr><th colspan="5">CFM per System</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm)</th><th colspan="5">0</th></tr><tr><th colspan="5">Airflow (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Airflow (cfm/Ton)</th><th colspan="5">0.0</th></tr><tr><th colspan="5">Outside Air (%)</th><th colspan="5">0.0%</th></tr><tr><th colspan="5">Outside Air (cfm/sqft)</th><th colspan="5">0.00</th></tr><tr><th colspan="5">Note: values above given at ARI conditions</th><th colspan="5">TIME OF SYSTEM PEAK</th></tr><tr><th colspan="5"></th><th colspan="5">Aug 3 PM</th></tr><tr><th colspan="5"></th><th colspan="5">Jan 1 AM</th></tr><tr><th colspan="10">HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)</th></tr><tr><td colspan="10"><div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div></td></tr><tr><th colspan="10">COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)</th></tr><tr><td colspan="10"><div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div></td></tr></table></div><div><h2>ENERGY NOTES:</h2></div><div><p><b>Attention designers, owners, builders.</b> It is your responsibility to review the T24 documents for the required building features, and HERS measures.</p></div><div><p>If you have any questions, call before you build or buy.</p></div><div><p><b>Electric Ready &amp; Renewables- New Construction :</b> §150.0—Each electric ready item requires breaker space and labeling in panel. Single Family: Electric Ready 150.0.(n) Water Heaters: Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a Heat Pump Water Heater (2.5' x 2.5' x 7'). Within 3 ft of water heater 10/3 electrical feed. More than 3 ft 240 volt / 30 amp electrical feed. 150.0.(t) Furnaces. Provide a 240 volt / 30 amp electrical feed to the furnace for future heat pump. 150.0.(u) Cooktops. Include 240 volt / 50 amp feed for future cooktop 150.0.(v) Dryers. Include 240 volt / 30 amp feed for dryer if the unit has a gas line for a dryer.</p></div><div><p><b>Solar Access Roof Area (SARA) - New Construction</b> §140.10(a) / §170.2(f)</p></div><div><p>SARA includes: The area of a building's roof space capable of structurally supporting a PV system AND: □ The area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per CA Building Code §1511.2 □ Exceptions: □ Any roof area that has &lt; 70% annual solar access □ Occupied roof areas as specified by CA Building Code §503.1.4 □ Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.</p></div><div><p><b>Single Family: Solar Photovoltaic (PV) section §150.1(c)14</b> See section for solar sizing and exceptions</p></div><div><p><b>Energy Storage System (Battery Ready) - New Construction</b> §150.0(s)</p></div><div><p>At least one of the following shall be provided: Interconnection equipment with a minimum backed up capacity of 60 amps. Or A dedicated raceway from the main service to a subpanel that supplies the branch circuits. Or A minimum of four branch circuits shall be identified—feeding: □ Refrigerator □ One lighting circuit near the primary egress □ A sleeping room receptacle outlet □ Main panel must be minimum 225 amps □ Sufficient space shall be reserved to allow future installation of a system isolation equipment or transfer switch within three feet of the main panelboard □ Raceways shall be installed between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.</p></div><div><p>ACCA Manual J, D&amp;S calculations are required to be submitted for plan review, followed by installing contractor and field inspected for compliance. T24 Load calc is based on ACCA J and may be used as sizing reference only. The load calc from the T24 doesn't include duct loss. See the T24 load calc page.</p></div><div><p><b>SAMPLE EQUIPMENT (Use any equipment that matches the min efficiencies)</b></p></div><div><p><b>Indoor Air Quality (IAQ) House Fan: Per ASHRAE 62.2</b></p></div><div><p><b>25 CFM / 1 Sones Sound Rating Max / Sample Model # Broan QTXE0</b></p></div><div><p>If this project is an addition under a 1,000 sf, the IAQ fan is not required.</p></div><div><p><b>For New Kitchen Hood sizing see Table 160.0-G</b></p></div><div><table><tr><th>Dwelling Unit Floor Area (ft²)</th><th>Hood Over Electric Range</th><th>Hood Over Natural Gas Range</th></tr><tr><td>&gt; 1500</td><td>50% CE or 110 CFM</td><td>70% CE or 180 CFM</td></tr><tr><td>&gt; 1000-1500</td><td>50% CE or 110 CFM</td><td>80% CE or 250 CFM</td></tr><tr><td>750-1000</td><td>55% CE or 130 CFM</td><td>85% CE or 280 CFM</td></tr><tr><td>&lt;750</td><td>65% CE or 160 CFM</td><td>85% CE or 280 CFM</td></tr></table></div><div><p>HVAC: Existing  AFUE: NA</p></div><div><p>Water Heater: Existing   EF: NA</p>&lt;/</div></div>  
   
  | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>   
   
   
   | <div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div> <div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div> <div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div> <div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div> <div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div> <div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div>   
   
   
  | <div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§
150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div>   
   
   | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>  
  | <div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div> <div><p>*Exceptions may apply.</p></div> <div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div> | <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>   | <div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div> | <div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div> <div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation
systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div> <div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div> <div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div>   | <div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div> <div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div> <div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div> <div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div> <div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div> <div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div>   | <div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div> <div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div> <div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div> <div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div> <div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div> <div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div> <div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div> | HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY   
   |   |  |   |  |  |  |  |  |  | Project Name<br>Mojaver ADU |                             |  |                             |  | Date<br>10/24/2023 |                    |  |                    |  | System Name<br>Res HVAC |                         |  |                         |  | Floor Area<br>463 |                   |  |                   |  | ENGINEERING CHECKS |                    |  |                    |  | SYSTEM LOAD |             |  |             |  | Number of Systems |                   |  |                   |  | 1 |   |  |   |  | Heating System |                |  |                |  | COIL COOLING PEAK |                   |  |                   |  | Output per System |                   |  |                   |  | 15,000 |        |  |        |  | Total Output (Btu/h) |                      |  |                      |  | 15,000 |        |  |        |  | Output (Btu/h/sqft) |                     |  |                     |  | 32.4 |      |  |      |  | Cooling System |                |  |                |  | COIL HTG. PEAK |                |  |                |  | Output per System |                   |  |                   |  | 0 |   |  |   |  | Total Output (Btu/h) |                      |  |                      |  | 0 |   |  |   |  | Total Output (Tons) |                     |  |                     |  | 0.0 |     |  |     |  | Total Output (Btu/h/sqft) |                           |  |                           |  | 0.0 |     |  |     |  | Total Output (sqft/Ton) |                         |  |                         |  | 0.0 |     |  |     |  | Air System |            |  |            |  | HVAC EQUIPMENT SELECTION |                          |  |                          |  | CFM per System |                |  |                |  | 0 |   |  |   |  | Airflow (cfm) |               |  |               |  | 0 |   |  |   |  | Airflow (cfm/sqft) |                    |  |                    |  | 0.00 |      |  |      |  | Airflow (cfm/Ton) |                   |  |                   |  | 0.0 |     |  |     |  | Outside Air (%) |                 |  |                 |  | 0.0% |      |  |      |  | Outside Air (cfm/sqft) |                        |  |                        |  | 0.00 |      |  |      |  | Note: values above given at ARI conditions |  |  |  |  | TIME OF SYSTEM PEAK |                     |  |                     |  |  |  |  |  |  | Aug 3 PM |          |  |          |  |  |  |  |  |  | Jan 1 AM |          |  |          |  | HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak) |  |  |  |  |  |  |  |  |  | <div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div> |  |  |  |  |  |  |  |  |  | COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak) |  |  |  |  |  |  |  |  |  | <div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div> |   |  |   |  |  |  |  |  |  | Dwelling Unit Floor Area (ft²) | Hood Over Electric Range       | Hood Over Natural Gas Range | > 1500                         | 50% CE or 110 CFM        | 70% CE or 180 CFM           | > 1000-1500       | 50% CE or 110 CFM | 80% CE or 250 CFM | 750-1000          | 55% CE or 130 CFM | 85% CE or 280 CFM | <750              | 65% CE or 160 CFM | 85% CE or 280 CFM |                   |                   |                   |
| <div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div>   
   
   
   
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| <div><div><div>§ 110.5:</div><div><b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas, fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour ); and pool and spa heaters. *</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0.(h)2.</div></div></div> <div><div><div>§ 150.0.(h)3A:</div><div><b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.</div></div></div> <div><div><div>§ 150.0.(h)3B:</div><div><b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.</div></div></div> <div><div><div>§ 150.0.(i)1:</div><div><b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code.</div></div></div> <div><div><div>§ 150.0.(j)2:</div><div><b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by §120.3.(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.</div></div></div> <div><div><div>§ 150.0.(h)1:</div><div><b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5 x 2.5 x 7.7 suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.</div></div></div> <div><div><div>§ 150.0.(h)3:</div><div><b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&amp;T), or by a listing agency that is approved by the executive director.</div></div></div>  
   
   
   
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| <div><div><div><b>Ducts and Fans:</b></div><div><div>§ 110.8.(d)3:</div><div><b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.</div></div></div><div><div><div>§ 150.0.(m)1:</div><div><b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-2006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/4". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *</div></div></div><div><div><div>§ 150.0.(m)2:</div><div><b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.</div></div></div><div><div><div>§ 150.0.(m)3:</div><div><b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.</div></div></div><div><div><div>§ 150.0.(m)7:</div><div><b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.</div></div></div><div><div><div>§ 150.0.(m)8:</div><div><b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.</div></div></div><div><div><div>§ 150.0.(m)9:</div><div><b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.</div></div></div><div><div><div>§ 150.0.(m)10:</div><div><b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.</div></div></div><div><div><div>§ 150.0.(m)11:</div><div><b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupied space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.</div></div></div><div><div><div>§ 150.0.(m)12:</div><div><b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0.(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *</div></div></div></div>   
   
   
   
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| <div><div><div><div><div>§ 150.0.(s):</div><div><b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS-supplied branch circuits, or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0.(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.</div></div></div><div><div><div>§ 150.0.(t):</div><div><b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(u):</div><div><b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div><div><div><div>§ 150.0.(v):</div><div><b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready," and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."</div></div></div></div></div> <div><p>*Exceptions may apply.</p></div> <div><table><tr><th><div><div><div><div></div></div></div><div>2022 Single-Family Residential Mandatory Requirements Summary</div></div></th></tr><tr><td><div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div></td></tr></table></div>  
   
   
   
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| <div><div><div>§ 150.0.(m)13:</div><div><b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≥ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *</div></div></div>  
   
   
   
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| <div><div><div>§ 150.0.(o)1:</div><div><b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0.(o)1. *</div></div></div> <div><div><div>§ 150.0.(o)1B:</div><div><b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0.(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and/or controlled per §150.0.(o)1Biii&amp;iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)1C:</div><div><b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floor with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0.(o)1C-iii.</div></div></div> <div><div><div>§ 150.0.(o)1G:</div><div><b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0.(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0.(o)1Giv-iv. Airflow must be measured by the installer per §150.0.(o)1Gv, and rated for sound per §150.0.(o)1Gvi. *</div></div></div> <div><div><div>§ 150.0.(o)1H&amp;I:</div><div><b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0.(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0.(o)1C.</div></div></div> <div><div><div>§ 150.0.(o)2:</div><div><b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0.(o)1G</div></div></div>  
   
   
   
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| <div><div><div>§ 110.4.(a):</div><div><b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDOS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *</div></div></div> <div><div><div>§ 110.4.(b)1:</div><div><b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filler and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.</div></div></div> <div><div><div>§ 110.4.(b)2:</div><div><b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.</div></div></div> <div><div><div>§ 110.4.(b)3:</div><div><b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.</div></div></div> <div><div><div>§ 110.5:</div><div><b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.</div></div></div> <div><div><div>§ 150.0.(p):</div><div><b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *</div></div></div>  
   
   
   
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| <div><div><div>§ 110.9:</div><div><b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *</div></div></div> <div><div><div>§ 150.0.(k)1A:</div><div><b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, excepting lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.</div></div></div> <div><div><div>§ 150.0.(k)1B:</div><div><b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JAB. *</div></div></div> <div><div><div>§ 150.0.(k)1C:</div><div><b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.</div></div></div> <div><div><div>§ 150.0.(k)1D:</div><div><b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.</div></div></div> <div><div><div>§ 150.0.(k)1E:</div><div><b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.</div></div></div> <div><div><div>§ 150.0.(k)1F:</div><div><b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0.(k).</div></div></div>   
   
   
   
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| <div><div><div>27 °F</div><div>68 °F</div><div>105 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Heating Coil</div><div>ROOM</div><div>68 °F</div></div></div>   
   
   
   
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| COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)   
   
   
   
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| <div><div><div>88 / 67 °F</div><div>75 / 62 °F</div><div>55 / 54 °F</div></div><div><div>Outside Air</div><div>0 cfm</div><div>Cooling Coil</div><div>ROOM</div><div>75 / 62 °F</div></div></div>  
   
   
   
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| Dwelling Unit Floor Area (ft²)   
   
   
   
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| > 1000-1500  
   
   
   
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CALIFORNIA	MANDATORY	GREEN	MEASURES

4.504.2.1 Adhesives, sealants and caulks.

Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards unless more stringent local or regional air pollution or air quality management district rules apply. 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits, as shown in Table 4.504.1, or 4.504.2, as applicable. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and tri-n-butylamine), except for aerosol products, as specified in Subsection 2 below. 2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than 1 pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.

4.504.2.2 Paints and coatings.

Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Suggested Control Measure, as shown in Table 4.504.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definition for specialty coatings is shown in Table 4.504.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-high gloss coating, based on its gloss, as defined in subsections 4.21, 4.36, and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-high Gloss VOC limit in Table 4.504.3 shall apply.

4.504.2.3 Aerosol paints and coatings.

Aerosol paints and coatings shall meet the Product-weighted MIR limits for ROC in Section 9452(a)(2) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 9452(a)(1) and (f)(1) of California Code of Regulations, Title 17, commencing with Section 94520, and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8, Rule 49.

4.504.2.4 Verification.

Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following: 1. Manufacturer's product specification. 2. Field verification of on-site product containers

4.504.3 Carpet systems.

Carpet systems. All carpet installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350). See California Department of Public Health's website for certification programs and testing labs. <https://www.cdph.ca.gov/Programs/CID/DCDC/EHLBIA/Pages/VOC.aspx>

4.504.3.1 Carpet cushion.

Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350). See California Department of Public Health's website for certification programs and testing labs. <https://www.cdph.ca.gov/Programs/CID/DCDC/EHLBIA/Pages/VOC.aspx>

4.504.3.2 Carpet adhesive.

All carpet adhesive shall meet the requirements of Table 4.504.1.

4.504.4 Resilient flooring systems.

Where resilient flooring is installed, at least 80 percent of the resilient flooring shall comply with one or more of the following: 1. Products compliant with the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.1, February 2010 (also known as Specification 01350), certified as a CHPS Low-Emitting Material in the Collaborative for High Performance Schools (CHPS) High Performance Products Database. 2. Products certified under UL GREENGUARD Gold (formerly the Greenguard Children & Schools program). 3. Certification under the Resilient Floor Covering Institute (RFCI) Floor Score program. 4. Meet the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.1, February 2010 (also known as Specification 01350).

4.504.5 Composite wood products.

Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (T17 (C93120 et seq.)), or before the dates specified in those sections, as shown in Table 4.504.5.

4.504.5.1 Documentation.

Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following: 1. Product certifications and specifications. 2. Chain of custody certificates. 3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.). 4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2289, European EN 336, and Canadian CSA 0121, CSA 0151, CSA 0153 and CSA 0325 standards. 5. Other methods acceptable to the enforcing agency.

4.505.1 General.

Buildings shall meet or exceed the provisions of the California Building Standards Code.

4.505.2 Concrete slab foundations.

Concrete slab foundations required to have a vapor retarder by the CBC, Chapter 19 or concrete slab-on-ground floors required to have a vapor retarder by the California Residential Code, Chapter 5, shall also comply with this section.

4.505.2.1 Capillary break.

A capillary break shall be installed in compliance with at least one of the following: 1. A 4-inch-thick (101.6 mm) base of 1/2 inch (12.7 mm) or larger clean aggregate shall be provided with a vapor retarder in direct contact with concrete and a concrete mix design, which will address bleeding, shrinkage and curing, shall be used. For additional information, see American Concrete Institute, ACI 302.2R-02. 2. Other equivalent methods approved by the enforcing agency. 3. A slab design specified by a licensed design professional.

4.505.3 Moisture content of building materials.

Building materials with visible signs of water damage shall not be installed. Wall and floor framing shall not be enclosed when the framing members exceed 19-percent moisture content. Moisture content shall be verified in compliance with the following: 1. Moisture content shall be determined with either a probe-type or contact-type moisture meter. Equivalent moisture verification methods may be approved by the enforcing agency and shall satisfy requirements found in Section 101.8 of this code. 2. Moisture readings shall be taken at a point 2 feet (610 mm) to 4 feet (1219 mm) from the grade stamped end of each piece to be verified. 3. At least three random moisture readings shall be performed on wall and floor framing with documentation acceptable to the enforcing agency provided at the time of approval to enclose the wall and floor framing. Insulation products which are visibly wet or have a high moisture content shall be replaced or allowed to dry prior to enclosure in wall or floor cavities. Wet-applied insulation products shall follow the manufacturers' drying recommendations prior to enclosure.

4.506.1 Bathroom exhaust fans.

Each bathroom shall be mechanically ventilated and shall comply with the following: 1. Fans shall be ENERGY STAR compliant and be certified to terminate outside the building. 2. Unless functioning as a component of a whole house ventilation system, fans must be controlled by a humidity control. A humidity controls shall be capable of adjustment between a relative humidity range of 5 to 50 percent to a maximum of 80 percent. A humidity control may utilize manual or automatic means of adjustment. 3. A humidity control may be a separate component to the exhaust fan and is not required to be integral (i.e., built-in). **Notes:** 1. For the purposes of this section, a bathroom is a room which contains a bathtub, shower, or tub/shower combination. 2. Lighting integral to bathroom exhaust fans shall comply with the California Energy Code.

4.507 Heating and air-conditioning system design.

Heating and air-conditioning systems shall be sized, designed and have their equipment selected using the following methods: 1. The load and heat gain is established according to ANSI/ACCA 1 Manual J-2016 (Residential Load Calculations) or ASHRAE handbooks or other equivalent design software or methods. 2. Duct systems are sized according to ANSI/ACCA 1 Manual D-2016 (Residential Duct Systems). ASHRAE handbooks or other equivalent design software or methods. 3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S-2014 (Residential Equipment Selection) or other equivalent design software or methods. **Exception:** Use of alternate design temperatures necessary to ensure the systems function are acceptable.

4.106.4.3 New hotels and motels.

All newly constructed hotels and motels shall provide EV spaces capable of supporting future installation of EVSE. The construction documents shall identify the location of the EV spaces.

Notes:

1. Construction documents are intended to demonstrate the project's capability and capacity for facilitating future EV charging. 2. There is no requirement for EV spaces to be constructed or available until EV chargers are installed for use.

Division 4.5 ENVIRONMENTAL QUALITY

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4.501.1 Scope.

The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating and/or harmful to the comfort and wellbeing of a building's installers, occupants and neighbors.

4.503.1 General.

Any installed gas fireplace shall be a direct vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.

4.504.1 Covering of duct openings and protection of mechanical equipment during construction.

At the time of rough installation, during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of water, dust and debris, which may enter the system.

4.504.2 Finish material pollutant control.

Finish materials shall comply with this section.

TABLE 4.504.1

ADHESIVE VOC LIMIT:

Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS

CURRENT VOC LIMIT

Indoor carpet adhesives

50

Outdoor carpet adhesives

150

Wood flooring adhesive

100

Rubber floor adhesives

60

Subfloor adhesives

50

Ceramic tile adhesives

65

VCT and asphalt tile adhesives

50

Drillwall and panel adhesives

50

Cove base adhesives

50

Multipurpose construction adhesives

70

Structural glazing adhesives

100

Single-ply roof membrane adhesives

250

Other adhesives not specifically listed

50

SPECIALTY APPLICATIONS

PVC welding

490

CPVC welding

510

ABS welding

325

Plastic cement welding

250

Adhesive primer for plastic

550

Contact adhesive

250

Special purpose contact adhesive

250

Structural wood member adhesive

140

Top and trim adhesive

250

SUBSTRATE SPECIFIC APPLICATIONS

Metal to metal

30

Plastic foams

50

Porous material (except wood)

30

Wood

30

Fiberglass

80

If an adhesive is used to bond dissimilar substrates together, the adhesive with the highest VOC content shall be allowed.

2. For additional information regarding methods to measure the VOC content specified in this table, see "South Coast Air Quality Management District Rule

TABLE 4.504.3

FORMALDEHYDE LIMITS:

Maximum Formaldehyde Emissions in Parts per Million

PRODUCT

CURRENT LIMIT

Hardwood plywood veneer core

0.05

Hardwood plywood composite core

0.05

Particleboard

0.09

Medium density fiberboard

0.11

Thin medium density fiberboard

0.13

1. Values in this table are derived from those specified by the California Air Resources Board, Air Toxics Control Measure for Composite Wood as tested in accordance with ASTM E1333. For additional information, see California Code of Regulations, Title 17, Sections 93120 through 93120.12.

2. Thin medium density fiberboard has a maximum thickness of 5/16 inch (9 mm).

TABLE 4.504.3

VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS

COATING CATEGORY

EFFECTIVE 1/1/2012

Flat coatings

50

Nonflat coatings

100

Nonflat-high gloss coatings

150

Aluminum roof coatings

400

Basement specialty coatings

400

Bituminous roof coatings

50

Bituminous roof primers

350

Bond breakers

350

Concrete curing compounds

350

Concrete/masonry sealers

350

Driveway sealers

50

Dry fog coatings

150

Fire finishing coatings

350

Fire resistive coatings

350

Floor coatings

100

Form-release compounds

400

Graphic arts coatings (sign paints)

400

High temperature coatings

500

Industrial maintenance coatings

250

Low solids coatings

450

Magnesium cement coatings

450

Mastic texture coatings

100

Metallic pigmented coatings

450

Multicolor coatings

250

Pretreatment wash primers

420

Primers, sealers, and undercoaters

100

Reactive penetrating sealers

350

Recycled coatings

250

Roof coatings

50

Rust preventative coatings

250

Clear Shellacs

550

Opaque Shellacs

750

Specialty primers, sealers and undercoaters

100

Stains

300

Stone consolidants

450

Swimming pool coatings

340

Traffic marking coatings

300

UV and UV-light curable coatings

420

Waterproofing membranes

275

Wood preservatives

775

Zinc-rich primers

340

1. Grams of VOC per liter of coating, including water and including exempt compounds.

2. The specified limits remain in effect unless revised limits are listed in subsequent columns in this table.

3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

TABLE 4.504.2

SEALANT VOC LIMIT

SEALANTS

CURRENT VOC LIMIT

Architectural

250

Marine deck

750

Nonmembrane roof

250

Roadway

250

Single-ply roof membrane

450

Other

420

SEALANT PRIMERS

Architectural

Nonporous

250

Porous

775

Modified bituminous

500

Marine deck

750

Other

750

Division 4.3 – WATER EFFICIENCY & CONSERVATION

Division 4.3 – WATER EFFICIENCY & CONSERVATION

Division 4.3 – WATER EFFICIENCY & CONSERVATION

Division 4.3 – WATER EFFICIENCY & CONSERVATION

4.301.1 Scope.

The provisions of this chapter shall establish the means of conserving water used indoors, outdoors and in wastewater conveyance.

4.303.1 Water conserving plumbing fixtures and fittings.

Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with Sections 4.303.1.1, 4.303.1.2, 4.303.1.3, and 4.303.1.4. Note: All noncompliant plumbing fixtures in any residential real property shall be replaced with water-conserving plumbing fixtures. Plumbing fixture replacement is required prior to issuance of a certificate of final completion, certificate of occupancy, or final permit approval by the local building department. See Civil Code Section 1101.1, et seq., for the definition of a noncompliant plumbing fixture, types of residential buildings affected and other important enactment dates.

4.303.1.1 Water closets.

The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA Water Sense Specification for Tank-Type Toilets. Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

4.303.1.2 Urinals.

The effective flush volume of wall mounted urinals shall not exceed 0.125 gallons per flush. The effective flush volume of all other urinals shall not exceed 0.5 gallons per flush.

4.303.1.3.1 Single showerhead.

Showerheads shall have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA Water Sense Specification for Showerheads.

4.303.1.3.2 Multiple showerheads serving one shower.

When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time. Note: A hand-held shower shall be considered a showerhead.

4.303.1.4.1 Residential lavatory faucets.

The maximum flow rate of residential lavatory faucets shall not exceed 1.2 gallons per minute at 60 psi. The minimum flow rate of residential lavatory faucets shall not be less than 0.8 gallons per minute at 20 psi.

4.303.1.4.2 Lavatory faucets in common and public use areas.

The maximum flow rate of lavatory faucets installed in common and public use areas (outside of dwellings or sleeping units) in residential buildings shall not exceed 0.5 gallons per minute at 60 psi.

4.303.1.4.3 Metering faucets.

Metering faucets when installed in residential buildings shall not deliver more than 0.2 gallons per cycle.

4.303.1.4.4 Kitchen faucets.

The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi. Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

4.303.2 Standards for plumbing fixtures and fittings.

Plumbing fixtures and fittings shall be installed in accordance with the California Plumbing Code, and shall meet the applicable standards referenced in Table 1701.1 of the California Plumbing Code.

4.304.1 Outdoor potable water use in landscape areas.

Residential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent. **Notes:** 1. The Model Water Efficient Landscape Ordinance (MWELO) is located in the California Code of Regulations, Title 23, Chapter 2.7, Division 2. MWELO and supporting documents, including a water budget calculator, are available at: <https://www.water.ca.gov/>

4.305.1 Recycled water supply systems.

Newly constructed residential developments, where disinfected recycled water is available from a municipal source to a construction site, may be required to have recycled water supply systems installed, allowing the use of recycled water for residential landscape irrigation systems. See Chapter 15 of the California Plumbing Code.

Division 4.4 – MATERIAL CONSERVATION & RESOURCE EFFICIENCY

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4.401.1 Scope.

The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture, construction waste diversion, employment of techniques to reduce pollution through recycling of materials; and building commissioning or testing, adjusting and balancing.

4.406.1 Rodent proofing.

Annular spaces around pipes, electric cables, conduits or other openings in sole/ bottom plates at exterior walls shall be protected against the passage of rodents by dosing such openings with cement mortar, concrete masonry or a similar method acceptable to the enforcing agency.

4.408.1 Construction waste management.

Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4, or meet a more stringent local construction and demolition waste management ordinance. **Exceptions:** 1. Excavated soil and land-clearing debris. 2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist or are not located reasonably close to the jobsite. 3. The enforcing agency may make exceptions to the requirements of this section when isolated jobsites are located in areas beyond the haul boundaries of the diversion facility.

4.408.2 Construction waste management plan.

Submit a construction waste management plan in conformance with Items 1 through 5. The construction waste management plan shall be updated as necessary and shall be available during construction for examination by the enforcing agency. 1. Identify the construction and demolition waste materials to be diverted from disposal by recycling, reuse on the project or salvage for future use or sale. 2. Specify if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream). 3. Identify diversion facilities where the construction and demolition waste material will be taken. 4. Identify construction methods employed to reduce the amount of construction and demolition waste generated. 5. Specify that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

4.408.3 Waste management company.

Utilize a waste management company, approved by the enforcing agency, which can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with Section 4.408.1. **Note:** The owner or contractor may make the determination if the construction and demolition waste materials will be diverted by a waste management company.

4.408.4 Waste stream reduction alternative (LRI).

Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed 3.4 pounds per square foot of the building area shall meet the minimum 65-percent construction waste reduction requirement in Section 4.408.1.

4.408.4.1 Waste stream reduction alternative.

Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed 2 pounds per square foot of the building area, shall meet the minimum 65-percent construction waste reduction requirement in Section 4.408.1.

4.408.5 Documentation.

Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 4.408.2, Items 1 through 5, Section 4.408.3 or Section 4.408.4. **Notes:** 1. Sample forms found in "A Guide to the California Green Building Standards Code (Residential)" located at <http://www.hcd.ca.gov/building-standards/cagreen/cg-green-form-shrtr> may be used to assist in documenting compliance with this section. 2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

4.410.1 Operation and maintenance manual.

At the time of final inspection, a manual, compact disc, web-based reference or other media acceptable to the enforcing agency which includes all of the following shall be placed in the building: 1. Directions to the owner or occupant that the manual shall remain with the building throughout the life cycle of the structure. 2. Operation and maintenance instructions for the following: a. Equipment and appliances, including water-saving devices and systems, HVAC systems, photovoltaic systems, electric vehicle chargers, water-heating systems and other major appliances and equipment. b. Roof and rainwater drainage, including gutters and downspouts. c. Space conditioning systems, including condensers and air filters. d. Landscape irrigation systems. e. Water reuse systems. 3. Information from local utility, water and waste recovery providers on methods to further reduce resource consumption, including recycle programs and locations. 4. Public transportation and/or carpool options available in the area. 5. Educational material on the positive impacts of an interior relative humidity between 30–60 percent and what methods an occupant may use to maintain the relative humidity level in that range. 6. Information about water-conserving landscape and irrigation design and controllers which conserve water. 7. Instructions for maintaining gutters and downspouts and the importance of diverting water at least 6 feet away from the foundation. 8. Information on required routine maintenance measures, including, but not limited to, caulking, painting, grading around the building, etc. 9. Information about state solar energy and incentive programs available. 10. A copy of all special inspection verifications required by the enforcing agency or this code. 11. Information from the Department of Forestry and Fire Protection on maintenance of defensible space around residential structures. 12. Information and/or drawings identifying the location of grab bar reinforcements.

4.410.2 Recycling by occupants.

Where 5 or more multifamily dwelling units are constructed on a building site, provide readily accessible area(s) that serves all buildings on the site and are identified for the depositing, storage and collection of nonhazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste and metals, or meet statewide best practices regarding recycling, or more restrictive (Exception: Rural jurisdictions that meet and apply for the exemption in Public Resources Code Section 42649.82 (a)(2)(A) et seq. are not required to comply with the organic waste portion of this section.

Division 4.1 – Site & EV Charging

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4.101.1 Scope.

The provisions of this division outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

4.106.1 General.

Preservation and use of available natural resources shall be accomplished through evaluation and careful planning to minimize negative effects on the site and adjacent areas. Preservation of slopes, management of storm water drainage and erosion controls shall comply with this section.

4.106.2 Storm water drainage and retention during construction.

Projects which disturb less than one acre of soil and are not part of a larger construction project of development which in total disturbs one acre or more, shall manage storm water drainage during construction. In order to manage storm water drainage during construction, one or more of the following measures shall be implemented to prevent flooding of adjacent property, prevent erosion and retain soil runoff on the site. 1. Retention basins of sufficient size shall be utilized to retain storm water on the site. 2. Where storm water is conveyed to a public drainage system, collection point, gutter or similar disposal method, water shall be filtered by use of a barrier system, wattle or other method approved by the enforcing agency. 3. Compliance with a lawfully enacted storm water management ordinance. Note: Refer to the State Water Resources Control Board for projects which disturb one acre or more of soil, or are part of a larger construction project of development which in total disturbs one acre or more of soil. (Website: [https://www.waterboards.ca.gov/water\\_issues/programs/stormwater/construction.html](https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html))

4.106.3 Grading and paving.

Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following: 1. Swales 2. Water collection and disposal systems 3. French drains 4. Water retention gardens 5. Other water measures which keep surface water away from buildings and aid in groundwater recharge. **Exception:** Additions and alterations not altering the drainage path.

4.106.4 Electric vehicle (EV) charging for new construction.

New construction shall comply with Section 4.106.4.1, 4.106.4.2, or 4.106.4.3, to facilitate future installation and use of EV chargers. Electric vehicle supply equipment (EVSE) shall be installed in accordance with the California Electrical Code, Article 625. **Exceptions:** 1. On a case-by-case basis, where the local enforcing agency has determined EV charging and infrastructure are not feasible based upon one or more of the following conditions: 1.1. Where there is no commercial power supply; 1.2. Where there is evidence substantiating that meeting the requirements will alter the local utility infrastructure design requirements on the utility side of the meter so as to increase the utility side cost to the homeowner or the developer by more than \$400.00 per dwelling unit. 2. Accessory Dwelling Units (ADU) and Junior Accessory Dwelling Units (JADU) without additional parking facilities.

4.106.4.1 New one- and two-family dwellings and townhouses with attached private garages.

For each dwelling unit, install a listed raceway to accommodate a dedicated 208/240-volt branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or other enclosure in close proximity to the proposed location of an EV charger. Raceways are required to be continuous at enclosed, inaccessible or concealed areas and spaces. The service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved for preinstallation of a branch circuit overcurrent protective device.

4.106.4.1.1 Identification.

The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging as "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as "EV CAPABLE".

4.106.4.2 New multifamily dwellings.

If residential parking is available, ten (10) percent of the total number of parking spaces on a building site, provided for all types of parking facilities, shall be electric vehicle charging spaces (EV spaces) capable of supporting future EVSE. Calculations for the required number of EV spaces shall be rounded up to the nearest whole number. **Notes:** 1. Construction documents are intended to demonstrate the project's capability and capacity for facilitating future EV charging. 2. There is no requirement for EV spaces to be constructed or available until EV chargers are installed for use.

4.106.4.2.1 Electric vehicle charging space (EV space) locations.

Construction documents shall indicate the location of proposed EV spaces where common use parking is provided at least one EV space shall be located in the common use parking area and shall be available for use by all residents.

4.106.4.2.1.1 Electric vehicle charging stations (EVCS).

When EV chargers are installed, EV spaces as required by Section 4.106.4.2.2, Item 3, shall comply with at least one of the following options: 1. The EV space shall be located adjacent to an accessible parking space meeting the requirements of the CBC, Chapter 11A, to allow use of the EV charger from the accessible parking space. 2. The EV space shall be located on an accessible route, as defined in the CBC, Chapter 2, to the building. **Exception:** Electric vehicle charging stations designed and constructed in compliance with the building, Chapter 11B, are not required to comply with Section 4.106.4.2.1.1 and Section 4.106.4.2.2, Item 3. Note: Electric vehicle charging stations serving public housing are required to comply with the CBC, Chapter 11B.

4.106.4.2.2 Electric vehicle charging space (EV space) dimensions.

The EV spaces shall be designed to comply with the following: 1. The min length of each EV space shall be 18 feet (5486 mm). 2. The minimum width of each EV space shall be 7 feet 4 inches (2235 mm). 3. One in every 25 EV spaces, but less than one, shall also have an 8-foot (2438 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted provided the minimum width of the EV space is 12 feet (3658 mm). A surface slope for this EV space and the aisle shall not exceed 1 unit vertical in 48 units horizontal (2.083 percent slope) in any direction.

4.106.4.2.3 Single EV space required.

Install a listed raceway capable of accommodating a 208/240-volt dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or enclosure in close proximity to the proposed location of the EV space. Construction documents shall identify the raceway termination point. The service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved for preinstallation of a branch circuit overcurrent protective device.

4.106.4.2.4 Multiple EV spaces required.

Construction documents shall indicate the raceway termination point and proposed location of future EV spaces and EV chargers. Construction documents shall also provide information on ampereage of future EVSE, raceway methods, wiring schematics and electrical load calculations to verify the electric load, electric service capacity and electrical service capacity (including distribution transformer(s)), have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rated ampereage of the EVSE. Plan design shall be based upon a 40-ampere minimum branch circuit. Required raceways and related components that are planned to be installed under, enclosed, inaccessible or in concealed areas and spaces shall be installed at the time of original construction.

4.106.4.2.5 Identification.

The service panel or sub-panel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging purposes as "EV CAPABLE" in accordance with the California Electrical Code.

INSTALLER AND SPECIAL INSPECTOR QUALIFICATIONS

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702.1 Installer training.

HVAC system installers shall be trained and certified in the proper installation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installation work under the direct supervision and responsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following: 1. State certified apprenticeship programs. 2. Public utility training programs. 3. Training programs sponsored by trade, labor or statewide energy consulting or verification organizations. 4. Programs sponsored by manufacturing organizations. 5. Other programs acceptable to the enforcing agency.

702.2 Special inspection [HQC].

When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be considered by the enforcing agency when evaluating the qualifications of a special inspector: 1. Certification by a national or regional green building program or standard published by a statewide energy consulting or verification organization, such as HERs raters, building performance contractors, and home energy auditors. 3. Successful completion of a third party apprentice training program in the appropriate trade. 4. Other programs acceptable to the enforcing agency. **Notes:** 1. Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code. 2. HERs raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS).

[BSC-CG]

When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, and be verified by the local agency. The area of certification shall be clearly labeled the primary job function, as determined by the local agency. Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.

703.1 Documentation.

Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, bidder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in the appropriate section or identified in the application checklist.

## Construction Waste Management Plan (CWMP)

Construction Waste Management Plan can be deferred submittal until such a time as a contractor is chosen

<b>Project:</b> Mojaver ADU 318 Cliff Dr Aptos, CA 95003	<b>Building Permit #:</b> _____  <b>Square Footage:</b> 463 sf  <b>Phone:</b> 858.829.2222
<b>Owner:</b> Michael & Corlen Mojaver	
<b>Project Manager / Contractor :</b> Michael & Corlen Mojaver	
<b>Phone:</b> _____	<b>Cell:</b> 858.829.2222 <b>email:</b> cmojaver@gmail.com
<b>Waste Hauling Company:</b> Michael & Corlen Mojaver	
<b>Disposal Service Company:</b> Michael & Corlen Mojaver	
<b>Phone:</b> 858.829.2222	
<b>Sub Contractor :</b> _____	
<b>Phone:</b> _____	<b>Cell:</b> _____ <b>email:</b> _____
<b>Sub Contractor :</b> _____	
<b>Phone:</b> _____	<b>Cell:</b> _____ <b>email:</b> _____
<b>Sub Contractor :</b> _____	
<b>Phone:</b> _____	<b>Cell:</b> _____ <b>email:</b> _____

<b>Responsible Designer's Declaration Statement</b> I hereby certify that this project has been designed to meet the requirements of the 2022 California Green Building Standards Code.	<b>Contractor Declaration Statement</b> I hereby certify, as the builder or installer under the permit listed herein, that this project will be constructed to meet the requirements of the California Green Building Standards Code.
<b>Name:</b> Robin Alaga	<b>Name:</b> _____
<b>Signature:</b> <i>Robin Alaga</i>	<b>Signature:</b> _____
<b>Date:</b> 24 October 2023	<b>Date:</b> _____
<b>Company:</b> Robin Alaga Residential Design	<b>License:</b> _____
<b>Address:</b> 250 Evening Hill Ln	<b>Address:</b> _____
<b>City:</b> State: Zip: Corralitos CA 95076	<b>City:</b> State: Zip: _____

The purpose of this plan is to identify and outline the methods to be used as the minimum requirements for a construction waste management plan when the local jurisdiction does not have a construction and demolition waste management ordinance per Section 4.408.2.

1. The method of waste tracking to be used on this project will be: (Check one box)
 

☐ **Volume**
☐ **Weight**
☐ **4 Lbs. per Sq. Ft.**
☐ **Recycling Facility**
2. Construction waste generated on this project for transport to a recycling facility will be: (Check appropriate box)
 

☐ **Sorted on-site (Source-separated)**
☐ **Bulk mixed (Single stream)**
3. The facility (or facilities) where the construction waste material will be taken is:
 

**Name of Facility:** County of Santa Cruz Landfill  
**Address:** 1283 Buena Vista Watsonville CA  
**Telephone:** 831.454.5153  

(Attach separate sheet for additional facilities)
4. The following construction methods will be used to reduce the amount of waste generated: (Check all that apply)
 

☒ Efficient design (dimensions of building components are designed to available material sizes or standard sizes).  
☒ Careful and accurate material ordering.  
☒ Careful material handling and storage.  
☐ Panelized or prefabricated construction.  
☐ Other \_\_\_\_\_  
☐ Other \_\_\_\_\_
5. Waste reduction and recycling strategies shall be discussed at periodic project meetings. Each new Contractor that comes onto the site shall be provided with a copy of the CWMP, which shall also be posted in the project office. The Project Manager shall also instruct all Subcontractors as to the location and proper use of debris boxes for disposal of construction waste materials.
6. Every effort should be made to use recycling and/or reuse (diversion) measures to reduce the amount of construction waste and other materials sent to landfills. Whenever possible, site sorted debris boxes shall be used to segregate construction waste materials to maximize the diversion rate.
7. The Contractor shall provide debris boxes for materials sorted on-site (source-separated) and/or bulk mixed (single stream) waste for all construction related waste generated on this project. Mixed construction waste shall be taken to a recycling facility that has a diversion rate of at least 65 percent. In the event that a Subcontractor provides their own debris box, they shall be responsible for providing the Contractor with a monthly report of the total Recycled and Reused (Diverted) and the total Non-Recycled (Disposed) materials to be included in the project's overall waste management/waste reduction program.
8. Any Supplier hauling away packaging or waste materials shall notify the Contractor of the amount of these materials and how they will be disposed of (reused, recycled, salvaged, or taken to landfill).
9. Identified below are the construction waste materials that will be reused and/or recycled during the course of this project and how they will be diverted:

Material	Diversion Method: (Recycle/Reuse)
CONCRETE / ASPHALT	
LUMBER	
CARPET / PAD	
INSULATION	
METAL	
SHEETROCK	
CARDBOARD	
TRASH	

(See Construction Waste Management Worksheets for examples of common materials. )

10. The Waste Hauler shall track the total amount of construction waste leaving the project by weight or by volume and supply the Contractor with copies of tickets or detailed receipts from all loads of construction waste removed from the jobsite.
- 11 . The Contractor shall monitor the process of waste management, recycling, and reuse of construction waste materials to ensure compliance with the CWMIP during the course of the project.
12. The Contractor shall ensure that all supporting documentation which demonstrates compliance with the waste management plan is provided to the local enforcement agency upon completion of the project.

