

SECTION 018113
Innis Road - Midrise
SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

GENERAL CONDITIONS

- A. The General Conditions, Modifications to General Conditions, Supplementary or Special Conditions and any Instructions to Bidders shall apply to all Divisions of work.
- B. The requirements of State, Local or appropriate codes applicable to the work, whichever is the most stringent is a requirement of all Divisions of work.

WORK OF THIS SECTION

- A. LEED Certification requirements
- B. The intent of this project is to achieve a **Silver- level** LEED certification under the **LEED BD+C Homes and Multifamily Midrise** rating system.
- C. Contractor shall coordinate work and requirements with Owner Contracted LEED Homes verification team comprising **LEED Provider and Green Rater**. Pertinent to LEED certifications the role of the verification team is to guide the construction team with certification process; review documentation, verify green requirements are met; and to perform third-party testing.

REFERENCES

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - 1. ASHRAE 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
 - 2. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality.
 - 3. ASHRAE 90.1 - Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.
 - 4. ASHRAE 129 - Measuring Air-Change Effectiveness.
- B. ASTM International:
 - 1. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
 - 2. ASTM E903 - Standard Test Method for Solar Absorption, Reflectance, and Transmittance of Materials Using Integrating Spheres.
- C. Bay Area Air Quality Management District: BAAQMD Regulation 8, Rule 51 –
- D. Adhesive and Sealant Products. Carpet and Rug Institute: CRI Green Label Testing Program.
- E. Forest Stewardship Council: FSC Guidelines- Forest Stewardship Council Guidelines.
- F. Green Seal: GS-11 - Product Specific Environmental Requirements.
- G. California Department of Public Health Standard Method V1.1–2010, using CA Section 01350, Appendix B.
- H. Sheet Metal and Air Conditioning Contractors: SMACNA IAQ - IAQ Guidelines for Occupied Buildings under Construction.
- I. South Coast Air Quality Management District: SCAQMD Rule 1168 - Adhesive and Sealant Applications.

- J. U.S. Environmental Protection Agency:
 - 1. EPA 832-R-92-005 - Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
 - 2. EPA Baseline IAQ - Testing for Indoor Air Quality, Baseline IAQ, and Materials Section 01445
 - 3. EPA 402-K-01-002 – A Step-by-Step Guide on how to Build Radon-Resistant Homes
- K. U.S. Green Building Council:
 - 1. LEED Version 4 - Reference Guide for Homes Design & Construction
 - 2. LEED v4 Multifamily Midrise Thermal Enclosure Checklist
- L. ENERGY STAR Qualified Homes
 - 1. Energy Star Water Management System Builder Checklist

SUBMITTALS

- A. The contractor shall submit the following items directly to the Green Rater.
 - 1. Attendee list of On-site LEED Trades Training meeting moderated by LEED Verification Team (LEED Green Rater and/or Provider-QAD)
 - 2. Energy Star Water Management System Builder Checklist signed and initialed by General Contractor.
- B. If tropical wood is used – Provide invoices for FSC certified wood with Chain of Custody Certificate number.
- C. Construction Waste Volume or Weight and Diversion Rate (Calculation and Waste Hauling Tickets)
- D. If applicable, provide documentation of dates and times of preoccupancy flush schedule to Green Rater.
- E. Signed LEED Accountability Form certifying that all products meet or exceed the specified requirements and the requirements of LEED, as noted with "LEED". Submit this information as part of the product submittals.
- F. The contractor shall submit cut-sheets of products intended to comply with Environmentally Preferable Products (EPP). See LEED checklist for list of products intended to meet this requirement. EPP criteria are as follows:
 - 1. Recycled Content Requirement:
 - a. Minimum 25% post-consumer or 50% post-industrial. OR
 - b. The product contains at least 25% reclaimed material, including salvaged, refurbished, or reused materials.
 - c. Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country.
 - d. Concrete that consists of at least 30% fly ash or slag used as a cement substitute and 50% recycled content or reclaimed aggregate OR 90% recycled content or reclaimed aggregate.
 - 2. Low Emissions Requirement– See specific requirements for Low-VOC paints, Adhesives and Sealants at end of this section.
 - 3. Local Production Requirement – Extracted, manufactured and fabricated (all processes) within 100 mile crow-fly distance of site.

QUALITY ASSURANCE

- 1. Perform work in accordance with the **LEED Version 4 - Reference Guide for Homes Design & Construction** for prerequisites and credits pertinent to this project listed in LEED Checklist included at the end of this section.

- A. Maintain one copy of LEED for Homes Rating System document on site. Download at <https://www.usgbc.org/resources/leed-v4-homes-and-multifamily-midrise-current-version>
- B. Perform inspections to assure conformance to Energy Star Checklists throughout construction of the project. A copy of all pertinent Energy Star Inspection Checklists is enclosed at end of this section.
- C. Monitor closely any requests for substitution for products that are related to LEED prerequisites and credits. Unless reviewed thoroughly substitutions may jeopardize projects' ability to obtain certification.
- D. Perform storm water management and erosion control Work in accordance with EPA Best Management Practices or local erosion and sedimentation control standards, whichever is more stringent.
- E. Perform Work to meet or exceed minimum energy efficiency and performance in accordance with Energy Star requirements and local energy code, whichever is more stringent.
- F. Perform Work without use of CFC based refrigerants in HVAC building systems.
- G. Perform ventilation Work in accordance with ASHRAE 62.
- H. Develop and implement construction indoor air quality management plan including the following:
 - 1. Comply with minimum requirements of SMACNA IAQ.
 - 2. Protect stored and installed absorptive materials from moisture damage.
 - a. Store materials on elevated platforms under cover, and in dry location.
 - b. When materials are not stored in enclosed location, cover tops and sides of material with secured waterproof sheeting.
 - 3. Protect HVAC equipment during construction.
 - a. Shut down return side of HVAC system whenever possible during heavy construction or demolition.
 - b. When HVAC system is operated during heavy construction, furnish disposable temporary filters.

PART 2 – PRODUCTS

PRODUCT SUBSTITUTION

- A. Monitor closely any requests for substitution for products that are related to LEED prerequisites and credits. Unless reviewed thoroughly substitutions may jeopardize projects' ability to obtain certification.

PART 3 - EXECUTION

LEED PREREQUISITES AND CREDITS (See enclosed LEED Checklist for more information)

INTEGRATIVE PROCESS

A. IP Credit 1.3 (option 3) – Trades Training

- 1. At the onset of construction organize a LEED trades training moderated by LEED Green Rater and/or Provider-QAD.
- 2. Following trades to attend - GC Project Manager, GC Site Superintendent, Mechanical-Electrical-Plumbing, Insulation, Framing, Drywall, Air-Infiltration Package.
- 3. Provide a minimum of 2-week notice to LEED Green Rater prior to training date.

SUSTAINABLE SITES

A. SS Prerequisite 1 - Construction Activity Pollution Prevention

1. Stockpile and protect disturbed topsoil from erosion (for reuse).
2. Control the path and velocity of runoff with silt fencing or comparable measures.
3. Protect on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures.
4. Provide swales to divert surface water from hillsides.
5. Use tiers, erosion blankets, compost blankets, filter socks, berms, or comparable measures to stabilize soils in any area with a slope of 15% (6.6:1) or more that is disturbed during construction.
6. Prevent air pollution from dust and particulate matter.
7. Construction sites larger than 1 acre must conform to the erosion and sedimentation requirements of the 2012 U.S. Environmental Protection Agency Construction General Permit or local equivalent, whichever are more stringent.

B. SS Prerequisite 2 - No Invasive Plants

1. Coordinate with Landscape Contractor to ensure no invasive plant species are introduced into landscape.

C. SS Credit 3 – Non-toxic Pest Control

1. Design a minimum 6-inch inspection space between the surface of the planned landscape grade and non-masonry siding.
2. Seal all external cracks, joints, penetrations, edges, and entry points with appropriate caulking. Install rodent and corrosion-proof screens (e.g., copper or stainless-steel mesh) on all openings greater than 1/4 inch, except where code prohibits their installation (e.g., dryer vents).
3. Design discharge points for rain gutters, air-conditioning condensation lines, steam vent lines, or any other moisture source such that discharge is at least 24 inches from the foundation.
4. Multifamily building projects **must** develop an integrated pest management policy that includes guidance for residents on pesticide use, housekeeping, and prompt reporting of pest problems; incorporate the policy in the Homeowner Education Manual.

WATER EFFICIENCY

A. WE Prerequisite 1 – Water Metering

1. Multifamily: Install a water meter for the entire building

B. WE Credit 2 – Indoor Water Use

Provide product data showing flow rates for following fixtures:

1. Average flow rate of lavatory faucets shall be 1.00 gallons per minute or less. Each lavatory faucet or faucet aerator must be WaterSense labeled.
2. Average flow rate of showers shall be 1.50 gallons per minute or less. Each showerhead fixture and fitting must be WaterSense labeled.

ENERGY & ATMOSPHERE

A. EA Prerequisite 1– Minimize Energy Performance (Multifamily Mid-rise)

1. Comply with Mandatory Provisions of ASHRAE 90.1, 2010.
2. Minimize envelope leakage
The following areas of building envelope and demising walls shall be sealed, caulked, gasketed, or weather-stripped to minimize envelope leakage:
 - a. Joints around windows and doors.
 - b. Joints between walls and foundation; between conditioned spaces and attics, demising walls, crawl spaces or garage.
 - c. Seal joints between sill plate and drywall.
 - d. Seal joints between top plate and drywall.
 - e. All mechanical, plumbing, and electrical penetrations in exterior and demising walls. Mechanical chase shall be sealed at crawl space ceiling.
 - f. Exterior sheathing and house wrap.
 - g. Minimize entry of air from outdoors, attic, garage, and crawl space into exterior wall and interior wall cavities to ensure passing of air infiltration test.
 - h. Batt insulation shall be stapled to face of stud to ensure full contact of insulation with face of drywall. Cut insulation around all mechanical, plumbing, and electrical work.
3. Where applicable appliances must be ENERGY STAR qualified and installed in each dwelling unit: refrigerator; dishwasher; clothes washer.
4. All duct runs must be fully ducted (i.e., building cavities may not be used as ducts).
5. Reduced Heating and Cooling Distribution System Losses for In-unit HVAC. - The tested leakage-to-outside rate must be less than 4.0 cfm25 per 100 square feet of conditioned floor area for each installed system, verified by a qualified energy rater. For units smaller than 1200 square feet tested leakage must be less than 6.0 cfm25 per 100 square feet. Total duct leakage for in-unit systems must not exceed 8 cfm25 per 100 square feet of conditioned floor area. Testing is waived if the air-handler unit and all ductwork are visibly within the unit's envelope (i.e., no ducts are hidden in walls, chases, floors, or ceilings).
6. Thermal Bypass Inspection -
The Green Rater will conduct a visual Thermal Bypass Inspection to inspect proper installation and continuity of thermal insulation and air-tightness of envelope. This inspection must take place after exterior envelope insulation has been installed, but prior to and installation of any drywall. One inspection per floor shall be conducted. If additional inspections are deemed necessary due construction sequencing, Contractor shall notify the Architect and Green Rater immediately. Contractor shall schedule the inspection with no less than two-week notice to the Green Rater. Contractor shall provide access to each unit and cooperate with conducting of the test. Additional inspections necessary due to incomplete work shall be back charged to the Contractor. A sample Thermal Bypass Inspection Checklist is enclosed in section 018113.
7. Final Inspections -
Upon substantial completion and prior to occupancy, the Green Rater will conduct a visual Final Inspection to verify green requirements incorporated in the project. The contractor shall notify the Green Rater at least four (4) weeks prior to the anticipated date for such inspection. Contractor shall provide access to each unit and cooperate with conducting of the test. Additional inspections necessary due to incomplete work shall be back-charged to the Contractor.
8. Third-Party Testing -
Third-party Testing is to be scheduled and conducted in conjunction with the final inspection. The contractor shall notify the Green Rater at least four (4) weeks prior to the anticipated date for such inspection. Contractor shall provide access to each unit and cooperate with conducting of the test. The following tests shall be conducted by Green Rater:

- a. Air Infiltration Test (Blower door Test) – Mandatory – Measures air leakage through unit enclosure such as exterior walls, demising walls, ceilings, chases, etc.
 - b. Distribution Loss Test (Duct Blaster Test) – Mandatory – Measures leakage through the mechanical distribution system
 - c. Exhaust Test - Measures exhaust rate for bathroom fans and kitchen fans.
 - d. Flow Test and Balancing – Measure air flow at each supply register and pressure differential between rooms.
9. Testing & Balancing Common Areas central systems
HVAC Contractor to hire a separate Testing and Balancing Agency to verify start-up and balance central commercial heating, cooling, water heating and ventilation systems. Submit Testing and Balancing report to Green Rater.
10. Fundamental Commissioning of Central HVAC Systems - HVAC Contractor to schedule walkthrough with Green Rater/Verifier to review start-up, operations, system verification for all central and common area HVAC systems.

B. EA Prerequisite 2 – Energy Metering

For Multifamily Buildings

- 1. Install an electricity meter or submeter for each residential unit and a gas meter for the entire building, or a gas meter or sub-meter for each unit. Single room–occupancy units, transitional and temporary housing, and designated supportive housing buildings do not need an energy meter in each unit but must have a whole-building energy meter.

C. EA Prerequisite 3 – Education of the Homeowner, Tenant, or Building Manager

- 1. General Contractor to provide to Owner or Owner's Building Management an operations and maintenance manual, binder, or CD that includes all the following items:
 - a. the completed checklist of LEED-related features;
 - b. a copy of each signed accountability form;
 - c. copies of all ENERGY STAR for Home, version 3, checklists;
 - d. product manufacturers' manuals for all installed equipment, fixtures, and appliances;
 - e. general information on efficient use of energy, water, and natural resources;
 - f. operations and maintenance guidance for any installed equipment, including space heating and cooling, mechanical ventilation, humidity control, radon protection, renewable energy, and irrigation, rainwater harvesting, or graywater systems (following 2009 EPA WaterSense Single-Family New Home Specifications, item 5.0, Homeowner Education);
- 2. LEED Green Rater to assist with following items for inclusion in manuals:
 - a. guidance on occupants' activities and choices, including cleaning materials and methods, water-efficient landscaping, integrated pest management, effects of chemical fertilizers and pesticides, irrigation, lighting selection, and appliance selection;
 - b. information on local green power options; and
 - c. information on sharing utility data with USGBC via a USGBC-approved third party.
- 3. General Contractor to conduct a minimum one-hour walkthrough of the home with Owner and/or building manager. The walkthrough must feature the following:
 - a. identification of all installed equipment;
 - b. instruction in how to use and operate the equipment; and
 - c. information on its maintenance.

MATERIALS & RESOURCES

A. MR Prerequisite 1 – Certified Tropical Wood

- 1. All wood in the building must be non-tropical, reused or reclaimed, or certified by the Forest Stewardship Council, or USGBC-approved equivalent.
- 2. If tropical wood is used it must be FSC Certified. Provide vendor's chain-of-custody certificate number must be shown on any invoice that includes FSC-certified products.

B. MR Prerequisite 2 – Durability Management

1. Meet the requirements of the ENERGY STAR for Homes, version 3, water management system builder checklist attached at end of this section.
2. Install all the applicable indoor moisture control measures:
 - a. Area directly above bathtub, spa, or shower (extending to ceiling), exposed wall or area behind fiberglass enclosure if wallboard is installed - Use non-paper-faced backer board or paper-faced product or coating over wallboard that meets standard ASTM D 3273 standard
 - b. Kitchen, bathroom, laundry room, spa area - Use water-resistant flooring; do not install carpet.
 - c. Install water resistant flooring (not carpet) within 3 feet of exterior doors accessible from ground.
 - d. Tank water heater in or over living space - Install drain and drain pan, drain pan and automatic water shut-off or flow restrictor, or floor drain with floor sloped to drain.
 - e. Clothes washer (or condensing clothes dryer) in or over living space - Install drain and drain pan, drain pan and automatic water shut-off or flow restrictor, or floor drain with floor sloped to drain.
 - f. Conventional clothes dryer - Exhaust directly to outdoors

C. MR Credit 1 – Durability Management Verification

1. LEED verification team (Green Rater) to inspect and verify each measure listed in the ENERGY STAR for Homes, version 3, water management system builder checklist.
2. Allow Green Rater access to the premise to inspect items in ENERGY STAR for Homes, version 3, water management system builder checklist.

D. MR Credit 2 – Environmentally Preferable Products

1. Option 1 - Local Production - Use products that were extracted, processed, and manufactured locally within 100 miles of site and for the following components (at least 50% of the component). Contractor to provide documentation proving compliance with Environmentally Preferable Product requirements for the following products:
 - a. Aggregate for concrete and foundation
2. Option 2 – Environmentally Preferable Products – Use products that contain at least 25% **postconsumer** or 50% **preconsumer** content. Use synthetic gypsum board products that contain at least 95% recycled content and non-synthetic gypsum board products that contain at least 10% post-consumer recycled content. Contractor to provide documentation proving compliance with Environmentally Preferable Product requirements for the following products:
 - a. Insulation
 - b. Drywall, Interior Finish

INDOOR ENVIRONMENTAL QUALITY

A. EQ Prerequisite 1 – Ventilation

Multifamily

1. Local Exhaust
 - a. Design and install local exhaust systems in all bathrooms (including half-baths) and the kitchen to meet the requirements of ASHRAE Standard 62.2–2010, Sections 5 and 7 or local equivalent, whichever is more stringent. Provide minimum intermittent local exhaust flow rates of 100 cfm or 5ACH in kitchen, and 50 cfm in bathrooms.
 - b. Exhaust air to the outdoors. Do not route exhaust ducts to terminate in attics or interstitial spaces. Just recirculating range hoods or recirculating over-the-range microwaves do not satisfy the kitchen exhaust requirements.
 - c. Use ENERGY STAR–labeled bathroom exhaust fans in all bathrooms.
 - d. For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), provide makeup air at a rate approximately equal to the exhaust

air rate. Makeup air systems must have a means of closure and be automatically controlled to start and operate simultaneously with the exhaust system.

2. Ventilation
 - a. Fresh air ventilation to dwelling units shall comply with ventilation requirements of ASHRAE 62.2–2010.
 - b. Do not use systems that rely on transfer air from pressurized hallways or corridors, adjacent dwelling units, attics, etc.
 - c. Project teams using exhaust-only ventilation systems must comply with flow rate required by ASHRAE 62.2–2010. If bathroom exhaust fan is used for exhaust-only fresh-air ventilation, then refer to HVAC drawings for exhaust fan run-time and controls. Coordinate continuous / intermittent fan run-time and controls with HVAC and Electrical contractor. Provide dual-speed bathroom exhaust fan with continuous speed set to 30 cfm in 1-Bedroom units, 45 cfm in 2-Bedroom units, 45 cfm in 3-Bedroom units, and 60 cfm in 4-bedroom units.
 - d. Continuous in-unit ventilation fans must be rated for sound at a maximum of 1.0 sone, per ASHRAE 62.2–2010, Section 7.2.1. Remote mounted fans need not meet these sound requirements.
 - e. Locate air inlets that are part of the ventilation design at least 10 feet (3 meters) from known sources of contamination, such as a stack, vent, exhaust hood, or vehicle exhaust. Place the intake such that entering air is not obstructed by snow, plantings, or other material. Forced air inlets must be covered by screens to exclude rodents and insects (mesh not larger than 1/2 inch or 13 millimeters).
3. For all non-unit spaces, meet the minimum requirements of ASHRAE Standard 62.1–2010 or local equivalent, whichever is more stringent, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata). Mechanically ventilated spaces must be designed using the ventilation rate procedure or the applicable local code, whichever is more stringent. Ventilation fans that penetrate rated assemblies may require radiation and fire dampers to meet local building and fire codes.

B. EQ Prerequisite 2 – Combustion Venting

1. Do not install any unvented combustion appliances (ovens and ranges excluded).
2. Install a carbon monoxide (CO) monitor on each floor, hard-wired with a battery backup. In multifamily buildings, install a CO monitor on each floor of each unit.
3. For all fireplaces and woodstoves inside the building, provide doors that close or a solid glass enclosure. Interior fireplaces and woodstoves that are not closed-combustion or power-vented must pass BPI or RESNET combustion safety testing protocols to ensure that depressurization of the combustion appliance zone is less than 5 Pa.
4. Space- and water-heating equipment that involves combustion must meet one of the following:
 - a. it must be designed and installed with closed combustion (i.e., sealed supply air and exhaust ducting);
 - b. it must be designed and installed with power-vented exhaust; or
 - c. it must be located in a detached utility building or open-air facility.

C. EQ Prerequisite 3 – Garage Pollutant Protection

1. Place all air-handling equipment and ductwork outside the fire-rated envelope of the garage.
2. Tightly seal shared surfaces between the garage and conditioned spaces, including all of the following:
 - a. In conditioned spaces above the garage, seal all penetrations and all connecting floor and ceiling joist bays.
 - b. In conditioned spaces next to the garage, weather-strip all doors, install carbon monoxide detectors in rooms that share a door with the garage, seal all penetrations, and seal all cracks at the base of the walls.

D. EQ Prerequisite 4 – Radon-Resistant Construction

New Construction

1. Provide a Passive or Active Radon Mitigation System per following requirements:
 - a. Install polyethylene sheeting or extruded polystyrene (XPS) insulation beneath concrete slabs, including basement floors. Ensure sheeting is in direct contact with the concrete slab above. Install a capillary break at all crawlspace floors using ≥ 6 mil polyethylene sheeting, lapped 6 to 12 in.
 - b. Under the polyethylene sheeting or extruded polystyrene (XPS) insulation installed to meet ENERGY STAR Water Management System Builder Checklist Item 1.3:
 - i. Install a 4 in. layer of 1/2 in. diameter or greater clean aggregate; OR
 - ii. Install a 4 in. uniform layer of sand, overlain with either a layer of geotextile drainage matting throughout or strips of geotextile drainage matting along the perimeter installed according to the manufacturer's instructions.
 - c. A 3 or 4 in. diameter gas-tight vertical vent pipe, clearly labeled to conform with the radon-resistant standard used, e.g., "Radon Reduction System" or "Radon Pipe" or "Radon System." The vent pipe shall be connected to an open T-fitting in the aggregate layer (or connected to geotextile drainage matting according to the manufacturer's instructions) beneath the polyethylene sheeting, extending up through the conditioned spaces and terminating a minimum of 12 in. above the roof opening. For crawlspaces, install at least 5 ft. of horizontal perforated drain tile on either side of the T-fitting, attached to the vertical radon vent pipe beneath the sheeting and running parallel to the long dimension of the house.
 - d. Radon fan installed in the attic (i.e., an active system) OR an electrical receptacle installed in an accessible attic location near the radon vent pipe (i.e., a passive system) to facilitate future fan installation if needed.
2. The requirements for radon protection are automatically satisfied if the building is elevated by at least 2 feet (600 millimeters), with open air space between the building and ground. An enclosed vented crawlspace does not qualify. A garage under a building is an acceptable alternative.
3. Foundation air sealing with polyurethane caulk or the equivalent at all slab openings, penetrations and control or expansion joints.

E. EQ Prerequisite 5 – Air Filtering

1. Install air filters with a minimum efficiency reporting value (MERV) of 8 or higher on all recirculating space conditioning systems, per ASHRAE 62.2–2010. Design ductwork and specify the central blower to account for the pressure drop across the filter. Air filter housings must be airtight to prevent bypass or leakage.
2. Non-ducted systems are exempt from the minimum MERV 8 requirements but must have an internal air filter in the air-handling unit.
3. Install air filters rated MERV 6 or higher for mechanically supplied outdoor air for systems with 10 feet (3 meters) of ductwork or more, per ASHRAE 62.2–2010, Section 6.7.

F. EQ Prerequisite 6 – Environmental Tobacco Smoke

1. Provide signage to:
 - a. prohibit smoking in common areas,
 - b. prohibit smoking within 25 feet of building entrances.
 - c. or prohibit smoking on the entire property.

G. EQ Prerequisite 7 – Compartmentalization

1. Compartmentalize each residential unit to minimize leakage between units. Minimize uncontrolled pathways for environmental tobacco smoke and other indoor air pollutants between units by sealing penetrations in walls, ceilings, and floors and by sealing vertical chases (including utility chases, garbage chutes, mail drops, and elevator shafts) adjacent to the units.

2. Weather-strip all doors in the residential units leading to common hallways to minimize air leakage into the hallway. Weather-strip all exterior doors and operable windows to minimize leakage from outdoors.
3. Demonstrate acceptable sealing of residential units by a blower door test. Follow the procedure described by RESNET or the ENERGY STAR Multifamily High Rise Program Testing and Verification Protocols, Version 1.0, with an allowable maximum leakage of 0.30 cfm50 per square foot (0.07 cmm50 per square meter) of enclosure (i.e., all surfaces enclosing the apartment, including exterior and party walls, floors, and ceiling) for new construction buildings
4. Third-party Testing is to be scheduled and conducted in conjunction with the final inspection. The contractor shall notify the Green Rater at least four (4) weeks prior to the anticipated date for such inspection. Contractor shall provide access to each unit and cooperate with conducting of the test. The following tests shall be conducted by Green Rater:
 - a. Air Infiltration Test (Blower door Test) – Mandatory – Measures air leakage through unit enclosure.

H. EQ Credit 1.1 (option 1) – Enhanced Ventilation - Enhanced Local Exhaust

1. Use one of the following strategies in every bathroom with a shower, bathtub, or spa (i.e., half-baths are exempt) to control the use of the local exhaust fan:
 - a. an occupancy sensor;
 - b. an automatic humidistat controller;
 - c. a continuously operating exhaust fan; or
 - d. a delay timer that operates the fan for at least 20 minutes

I. EQ Credit 1.2 (option 2) – Enhanced Ventilation - Enhanced Whole-House Ventilation

1. Install a balanced whole-house ventilation system (not just exhaust only or supply only) that meets the minimum ventilation requirements of ASHRAE Standard 62.2–2010, Sections 4 and 7, or local equivalent whichever is more stringent. Program the system such that it does not exceed the standard's requirements by more than 10%.

J. EQ Credit 3.1 (option 1) – Balancing of H&C Distribution Systems - Multiple Zones

1. Multifamily buildings whose average unit size is less than 1,200 square feet (110 square meters) automatically meet the requirements of this credit.

K. EQ Credit 3.3 (option 3) – Balancing of H&C Distribution Systems - Pressure Balancing

1. Facilitate for Green Rater or a Third-Party to test each bedroom for pressure difference of more than 3 Pa (0.012-inch w.c.) with respect to the main body of the house when doors are closed, and the air handler is operating on highest speed.

L. EQ Credit 5 – Enhanced Combustion Venting

1. For any wood- or pellet-burning stoves, install equipment that is EPA certified. For wood-burning fireplaces, install equipment that is EPA qualified. Provide power or direct venting.
2. For any natural gas, propane, or alcohol stoves, install equipment listed by an approved safety testing facility. The stove must have a permanently fixed glass front or gasketed door and an electronic pilot. Provide power or direct venting.

M. EQ Credit 6 – Enhanced Garage Pollutant Protection

1. For garages that accommodate more than three cars, meet the requirements of ASHRAE 62.1-2010.
 - a. Exhaust the garage sufficiently to create negative pressure with respect to adjacent spaces with the doors to the garage closed.
 - b. Provide self-closing doors and deck-to-deck partitions or a hard lid ceiling.
 - c. The pressure differential with the surrounding spaces must be at least 5 Pascals (Pa) (0.02-inch w.c.) when all doors are closed.

- d. The exhaust fan may either run continuously, or on a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm.

N. EQ Credit 7 – Low Emitting Products

1. In the interior of the home, use products that have been tested and found compliant with the California Department of Public Health Standard Method V1.1–2010, using CA Section 01350, Appendix B, New Single-Family Residence Scenario, for emissions testing guidance. At least 90% of a component must meet the requirements to earn credit.
 - a. For site-applied interior paints and coatings, meet the requirements of CA Section 01350.
 - b. For flooring, meet the requirements of CA Section 01350.
 - c. For insulation, meet the requirements of CA Section 01350.

TABLE 1. Acceptable certifications for emissions and content requirements		
CERTIFICATION	TESTING STANDARD REFERENCED IN LEED	APPLICABLE CATEGORIES
SCS Indoor Advantage Gold	CDPH Standard Method v1.1 ANSI/BIFMA M7.1-2011	General Emissions Evaluation (many product categories), Furniture
FloorScore	CDPH Standard Method v1.1	Flooring
Carpet and Rug Institute (CRI) Green Label Plus	CDPH Standard Method v1.1	Carpeting, carpet padding, adhesives
Greenguard Children and Schools	CDPH Standard Method v1.1	General Emissions Evaluation (many product categories including exterior applied products)
Collaborative for High Performance Schools (CHPS)	CDPH Standard Method v1.1	General Emissions Evaluation (many product categories)
CARB ULEF label	N/A	Composite Wood

O. EQ Credit 8 – No Environmental Tobacco Smoke

1. Install No Smoking signage. Coordinate quantity and location with Owner, Management, and Architect. Signage should indicate no smoking is permitted within 25 feet of the building.
2. Any designated smoking areas should be greater than 25 feet from building entries, outdoor air intakes and operable windows.

ENCLOSURES

1. LEED for Homes Scorecard and Credit Categories
2. LEED v4 Multifamily Midrise Thermal Enclosure Checklist
3. Energy Star Water Management System Builder Checklist

END OF SECTION

Innis Road Scorecard (ID:)

Project Address , Innis Road, 2150 Innis Road Columbus, OH

Note: The information on this tab is READ-ONLY. To edit this information, see the Credit Category tabs.

Total		Certification Level:		Not Certified		Verified		0	
	Integrative Process		Preliminary	Y	2 of 2	M	0	Verified	0
	IPc	Integrative Process			2 of 2	0			
	Location and Transportation		Preliminary	Y	9 of 15	M	2	Verified	0
	LTp	Floodplain Avoidance			Required			Not Verified	
	LTc	LEED for Neighborhood Development			0 of 15	0			
	LTc	Site Selection			6 of 8	2			
	LTc	Compact Development			1 of 3	0			
	LTc	Community Resources			2 of 2	0			
	LTc	Access to Transit			0 of 2	0			
		Sustainable Sites		Preliminary	Y	1.5 of 7	M	2.5	Verified
SSp		Construction Activity Pollution Prevention			Required			Not Verified	
SSp		No Invasive Plants			Required			Not Verified	
SSc		Heat Island Reduction			0 of 2	0			
SSc		Rainwater Management			0 of 3	2			
SSc		Nontoxic Pest Control			1.5 of 2	0.5			
	Water Efficiency		Preliminary	Y	4 of 12	M	3	Verified	0
	WEp	Water Metering			Required			Not Verified	
	WEc	Total Water Use			0 of 12	0			
	WEc	Indoor Water Use			4 of 6	1			
	WEc	Outdoor Water Use			0 of 4	2			
	Energy and Atmosphere		Preliminary	Y	13 of 37	M	4	Verified	0
	EAp	Minimum Energy Performance			Required			Not Verified	
	EAp	Energy Metering			Required			Not Verified	
	EAp	Education of the Homeowner, Tenant or Building Manager			Required			Not Verified	
	EAc	Annual Energy Use			13 of 30	0			
	EAc	Efficient Hot Water Distribution System			0 of 5	4			
	EAc	Advanced Utility Tracking			0 of 2	0			



Materials and Resources		Preliminary	Y	3.5 of 9	M	2	Verified	0
MRp	Certified Tropical Wood	Required		Not Verified				
MRp	Durability Management	Required		Not Verified				
MRc	Durability Management Verification	1 of 1		0				
MRc	Environmentally Preferable Products	2.5 of 5		0				
MRc	Construction Waste Management	0 of 3		2				



Indoor Environmental Quality		Preliminary	Y	12 of 18	M	1.5	Verified	0
EQp	Ventilation	Required		Not Verified				
EQp	Combustion Venting	Required		Not Verified				
EQp	Garage Pollutant Protection	Required		Not Verified				
EQp	Radon-Resistant Construction	Required		Not Verified				
EQp	Air Filtering	Required		Not Verified				
EQp	Environmental Tobacco Smoke	Required		Not Verified				
EQp	Compartmentalization	Required		Not Verified				
EQc	Enhanced Ventilation	3 of 3		0				
EQc	Contaminant Control	0 of 2		0.5				
EQc	Balancing of Heating and Cooling Distribution Systems	2 of 3		1				
EQc	Enhanced Compartmentalization	0 of 3		0				
EQc	Combustion Venting	2 of 2		0				
EQc	Enhanced Garage Pollutant Protection	1 of 1		0				
EQc	Low-Emitting Products	3 of 3		0				
EQc	No Environmental Tobacco Smoke	1 of 1		0				



Innovation		Preliminary	Y	4 of 6	M	0	Verified	0
INp	Preliminary Rating	Required		Not Verified				
INc	Innovation	3 of 5		0				
INc	LEED Accredited Professional	1 of 1		0				



Regional Priority		Preliminary	Y	3 of 4	M	1	Verified	0
RPc	Regional Priority	3 of 4		1				

Point Floors

The project earned at least 8 points total in Location and Transportation and Energy and Atmosphere

No

The project earned at least 3 points in Water Efficiency

No

The project earned at least 3 points in Indoor Environmental Quality

No

Total

Preliminary Y 52 of 110 M 16 Verified 0

Certification Thresholds Certified: 40-49, Silver: 50-59, Gold: 60-79, Platinum: 80-110

Integrative Process

Preliminary Y 2 Maybe 0 Verified 0

IP Credit Integrative Process

Up to 2 points

Exemplary Performance: Achieve all three options

Preliminary Y 2 M 0 Verified 0

Option 1. Integrative Project Team (1 point)

Y 1 M V

True

Team members, in addition to the builder and verification team, include capabilities in at least three of the following skill sets: architecture or residential building design; mechanical or energy engineering; building science or performance testing; green building or sustainable design; and civil engineering, landscape architecture, habitat restoration, or land-use planning.

True

All team members referenced above were involved in at least three of the following phases of the design and construction process: conceptual or schematic design; LEED planning; preliminary design; energy and envelope systems analysis or design; design development; and construction.

True

Meetings were conducted with the project team at least monthly to review project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify next steps.

AND/OR

Option 2. Design Charrette (1 point)

Y 1 M V

True

A full-day workshop (or two half-day workshops) was conducted with the project team, as defined in Option 1, no later than the design development phase.

Date(s)

Duration

AND/OR

Option 3. Trades Training (1 point)

Y 1 M V

True

At least eight hours of training on the green aspects of the project and how the trades can contribute to achieving each LEED for Homes prerequisite and attempted credit was conducted before construction but after trades have been hired for the project.

Date(s)

Duration

Trainer

Location and Transportation

Preliminary Y 9

Maybe 2

Verified 0

LT Prerequisite Floodplain Avoidance

Required

Select one of the following:

☐ True

The project is not built on land within a flood hazard area.

☐

The project is built on land within a flood hazard area and in accordance with flood provisions.

☐

The project is built on land within a flood hazard area and is a previously developed building and hardscape.

Verified

LT Credit LEED for Neighborhood Development

15 points

Preliminary Y

M

Verified

Name of LEED for Neighborhood Development project

LEED ND project ID number

Rating system and version

LEED ND certification date

LT Credit Site Selection

Up to 8 points

Exemplary Performance: Earn all 9 points

Preliminary Y

M

Verified

Option 1. Sensitive Land Protection (3-4 points)

Y

M

V

Path 1. Previously Developed (4 points)

Y

M

V

2.19

Total buildable land area (acre or sq ft)

2.19

Previously developed buildable land area (acre or sq ft)

100.00%

Percentage of lot previously developed (%)

OR

Path 2. Avoidance of Sensitive Land (3 points)

Y

M

V

All new buildings, hardscapes, roads, or parking areas of the project are located on land that meets the following criteria:

☐

Does not consist of prime farmland, unique farmland, or farmland of statewide or local importance.

☐

Was not public parkland prior to acquisition.

☐

Is not in a flood hazard area shown on a legally adopted flood hazard map or otherwise legally designated by the local jurisdiction or state.

☐

Is not on land specifically identified as habitat for species listed in the U.S. Endangered Species Act; the state's endangered species act; NatureServe GH, G1, or G2 lists; or those listed under local equivalent standards (for projects outside the U.S.) that are not covered by NatureServe data.

☐

Is not on land within 50 ft (15 m) of wetlands or within the setback distance from wetlands prescribed by local, state or national regulations, whichever is more stringent.

☐

Is not on land within 100 ft (30 m) of water bodies, including seas, lakes, rivers, streams and tributaries.

AND/OR

Option 2. Infill Development (2 points)

Y M V

Percent of land within a 1/2 mile (800 meters) from the project boundary that is previously developed

Alternatively, for projects within city limits of towns with populations less than 20,000

Percent of land adjacent to the project boundary that is previously developed

AND/OR

Option 3. Open Space (1 point)

Y M V

Select one of the following:

Built within 1/2 mile (800 meters) of open space that is at least 3/4 acres (0.3 hectares)

Create publicly available open space on the project site

AND/OR

Option 4. Street Network (1 point)

Y M V

Qualifying intersection density (intersections per square mile)

AND/OR

Option 5. Bicycle Network and Storage (1 point)

Y M V

Bicycle Network

Select one of the following. The project has a functional entry and/or bicycle storage within 200 yd (180 m) of a bicycle network that connects to:

At least 10 uses

A school or employment center

A bus rapid transit stops, rail stations, and/or ferry terminals

Bicycle Storage for Multifamily Buildings

Number of building occupants

Number of residential units

Number of short-term spaces provided

Number of short-term spaces required

Number of long-term spaces provided

Number of long-term spaces required

Bicycle Storage for Single Family Homes

The project is a single family home with garage.

LT Credit Compact Development

Up to 3 points

Exemplary Performance for Single and Multifamily Lowrise Only: 35 DU/acre (86.5 DU/hectare)

Preliminary Y M Verified

Total project boundary area (acre)

Buildable land area (acre)

Number of dwelling units

DU/acre of buildable land

LT Credit Community Resources

Up to 2 points

Exemplary Performance: 16 uses for 1/2 point, 20 uses for 1 point.

Preliminary Y M Verified

Number of community resources within a 1/2 mile (800 meters) walking distance

LT Credit Access to Transit

Up to 2 points

Exemplary Performance: For multiple transit types, 720 weekday trips and 432 weekend trips; For commuter rail or ferry, 120 weekday trips.

For projects with multiple transit types

Number of weekday trips

Number weekend day trips

For projects with commuter rail or ferry service only

--

Number of weekday trips

Preliminary	Y	<table border="1"><tr><td></td></tr></table>		M	<table border="1"><tr><td></td></tr></table>		Verified	<table border="1"><tr><td></td></tr></table>	

Sustainable Sites

Preliminary Y 1.5 Maybe 2.5 Verified 0

SS Prerequisite Construction Activity Pollution Prevention

Required

Verified

Confirm all of the following measures were implemented on the project, as applicable:

- | | |
|-----------------------------------|--|
| <input type="text" value="True"/> | Stockpiled and protected disturbed topsoil from erosion. |
| <input type="text" value="True"/> | Controlled the path and velocity of runoff with silt fencing or comparable measures. |
| <input type="text" value="True"/> | Protected on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures. |
| <input type="text" value="True"/> | Provided swales to divert surface water from hillsides. |
| <input type="text" value="True"/> | Used tiers, erosion blankets, compost blankets, filter socks, berms, or comparable measures to stabilize soils in any area with a slope of 15% (6.6:1) or more that was disturbed during construction. |
| <input type="text" value="True"/> | Prevented air pollution from dust and particulate matter. |

For construction sites larger than 1 acre

Select one of the following:

- | | |
|-----------------------------------|---|
| <input type="text" value="True"/> | The project team created an implemented an Erosion and Sedimentation Control (ESC) plan that conforms to the requirements of the 2012 U.S. Environmental Protection Agency Construction General Permit (CGP). |
| <input type="text"/> | The project team created an implemented an Erosion and Sedimentation Control (ESC) plan that conforms to local standards and codes, which are as or more stringent than the 2012 EPA Construction General Permit (CGP). |

SS Prerequisite No Invasive Plants

Required

Verified

- | | |
|-----------------------------------|--|
| <input type="text" value="True"/> | No invasive plant species have been introduced into the landscape. |
|-----------------------------------|--|

SS Credit Heat Island Reduction

Up to 2 points

Option 1. Shading and Option 2. Nonabsorptive Materials (1-2 points)

Preliminary Y M Verified

Hardscapes

- | | |
|--------------------------------|---|
| <input type="text"/> | Area of shaded hardscapes (sq ft) |
| <input type="text"/> | Area of unshaded paving materials with an initial SR value of at least 0.33 (sq ft) |
| <input type="text"/> | Area of unshaded vegetation in open pavers (sq ft) |
| <input type="text"/> | Remaining hardscape area (not earning credit) (sq ft) |
| <input type="text" value="0"/> | Total hardscape area (driveways, walkways, patios, etc.) (sq ft) |

Roof

- | | |
|---|---|
| <input type="text"/> | Area of ENERGY STAR qualified roof (sq ft) |
| The ENERGY STAR roofing program had a sunset date effective June 1, 2022. Single family projects can use the LEED v4.1 Single Family pathway for 'High-Reflectance Roof. Use roofing materials that have an aged SRI equal to or greater than the values in Table 1. See the rating system for Table 1.' LEED v4 Multifamily projects can pursue the LEED v4.1 Multifamily credit substitution approach as outlined in the LEED v4.1 Guide. | |
| <input type="text"/> | Area of vegetated roof (sq ft) |
| <input type="text"/> | Remaining roof area (not earning credit) (sq ft) |
| <input type="text" value="0"/> | Total roof area (sq ft) |
| <input type="text" value="0%"/> | Percentage of area with shading or nonabsorptive material (%) |

SS Credit Rainwater Management

Up to 3 points

Preliminary Y M Verified

Exemplary Performance: For Case 1, manage 100% of all stormwater on-site.

Case 1. Low Impact Development (1-3 points)Y M V **Site Characteristics** 0 Total lot area (sq ft)**Roof**

	Vegetated roof area (sq ft)
	Roof area directed to a qualifying infiltration feature (sq ft)
	Remaining roof area (not earning credit) (sq ft)
0	Total roof area (sq ft)

Non-roof Site Area**Softscape** Total landscape softscape area (sq ft)**Hardscape**

	Permeable paving (sq ft)
	Qualifying open pavers (sq ft)
	Hardscapes directed to qualifying infiltration features (sq ft)
	Remaining hardscape area (not earning credit) (sq ft)
0	Total hardscape area (driveways, walkways, patios, etc.) (sq ft)

Qualifying area, as a percentage of total lot area 0.0% Qualifying area, as percentage of total lot area (%)**Reduction of total impermeable area**

0	Total impermeable area of the project (sq ft)
#N/A	Reference home size (sq ft)
0.0%	Impermeable area as a percentage of reference home size

OR

Case 2. NPDES Projects (2-3 points)Y M 2 V Percentile rainfall event

SS Credit Nontoxic Pest Control

Up to 2 points

Exemplary Performance: Projects that achieve 2 points can earn another ½ point for each additional strategy, up to a total of 1 point.

Select all of the following that have been included in the project.

Preliminary Y 1.5 M 0.5 Verified

- | | |
|--|--|
| ☐ | Install a steel mesh barrier termite control system. (1 point) |
| ☐ | Install a physical termite barrier system (e.g., basaltic rock) approved by code. (1 point) |
| ☐ | For below-grade walls, use solid concrete foundation walls, masonry walls with a course of solid block bond beam, or concrete-filled block. (0.5 point) |
| ☐ | Install post-tension slabs. (0.5 point) |
| ☐ | Treat all cellulosic structural material (e.g., wood framing) with a registered pesticide containing borates, following the manufacturer's directions for preconstruction treatment. (0.5 point) |
| ☐ | Use noncellulosic material for all structural elements. (0.5 point) |
| ☐ | Install ports or openings for all plumbing elements that penetrate the slab, to allow access for inspection and treatment of pest infestations. (0.5 point) |
| ☐ | Install a registered termite bait system and provide for ongoing maintenance as required by the manufacturer. (0.5 point) |
| <input type="checkbox" value="Yes"/> | Design a minimum 6-inch (150 millimeters) inspection space between the surface of the planned landscape grade and nonmasonry siding. (0.5 point) |
| <input type="checkbox" value="Yes"/> | Seal all external cracks, joints, penetrations, edges, and entry points with appropriate caulking. Install rodent- and corrosion-proof screens (e.g., copper or stainless steel mesh) on all openings greater than ¼ inch (6 millimeters), except where code prohibits their installation. (0.5 point) |
| <input type="checkbox" value="Yes"/> | Design discharge points for rain gutters, air-conditioning condensation lines, steam vent lines, or any other moisture source such that discharge is at least 24 inches (600 millimeters) from the foundation. (0.5 point) |
| <input type="checkbox" value="maybe"/> | Design landscape features to provide a minimum 18-inch (450 millimeters) space between the exterior wall and any plantings. (0.5 point) |

For multifamily projects

- | | |
|--------------------------------------|---|
| <input type="checkbox" value="Yes"/> | Develop an integrated pest management policy. The policy must include guidance for residents on pesticide use, housekeeping, and prompt reporting of pest problems. The policy must be incorporated in the Homeowner Education Manual. (Required) |
|--------------------------------------|---|

Water Efficiency

Preliminary Y 4 Maybe 3 Verified 0

WE Prerequisite Water Metering

Required

Verified

OR

Case 2. Multifamily

V

True

A water meter or submeter is installed for each unit.

A water meter or submeter is installed for the whole building.

WE Credit Total Water Use

Up to 12 points

Exemplary Performance: 70% reduction of indoor and outdoor water consumption

Preliminary Y M Verified

0.00%

Total reduction of indoor and outdoor water consumption as calculated in the [Water Reduction Calculator](#) (%)

For single family projects

--

The water pressure does not exceed 60 psi (415 kPa). There are no detectable water leaks. Any installed water softeners are demand initiated.

For multifamily projects

--

There are no detectable water leaks. Any installed water softeners are demand initiated.

WE Credit Indoor Water Use

Up to 6 points

Preliminary Y 4 M 1 Verified 0

OR

Case 2. Multifamily and Midrise

Y

4

M

1

V

True

There are no detectable water leaks.

Note: No additional credit is awarded if the fixtures and fittings in non-unit spaces are more efficient than those of in-unit spaces.

Meet any of the following for in-unit spaces and non-unit spaces:

Lavatory Faucet (1-2 points)

True
1.00

All installed lavatory faucets and/or faucet aerators are WaterSense labeled.

Average rated flow volume across all lavatory faucets (gpm)

Showerheads (1-2 points)

True
1.50

All installed showerhead fixtures and fittings are WaterSense labeled.

Average rated flow volume per shower compartment (gpm)

Toilets (1 point)

maybe - 1.1

All installed toilet fixtures and fittings are WaterSense labeled.

Average rated flush volume across all toilets (gpf)

Clothes Washers (1 point)

--

All clothes washers are ENERGY STAR qualified or performance equivalent

WE Credit Outdoor Water Use

Up to 4 points

Preliminary Y M 2 Verified

Turf grass area as a percentage of total landscape softscape area (%)

Native or adapted plant area as a percentage of total landscape softscape area (%)

Energy and Atmosphere

Preliminary Y 13 Maybe 4 Verified 0

EA Prerequisite Minimum Energy Performance

Required

ENERGY STAR

Verified

	Is the project pursuing LEED 10492, 10491, or 10486?
	If pursuing ENERGY STAR MFNC, which version did the project earn?
	If pursuing ENERGY STAR SNFH, which version did the project earn?

ENERGY STAR Qualified Appliances

Whole-Building Energy Simulation

	Target Finder (Optional). Enter energy performance rating target (kBtu/sq ft per year)
	The project meets the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010 (with errata)
	Total energy cost savings (%)
	Total source energy savings (%)
	Total greenhouse gas emissions savings (%)

Commissioning

Verified

Option 1. Commissioning using ENERGY STAR Protocols.

V

	The project meets the ENERGY STAR Qualified Multifamily High Rise Buildings Testing and Verification Protocols.
	The project meets the ENERGY STAR Multifamily New Construction (MFNC) National Program Requirements for design review, field checklists, and functional testing checklists.

OR

Option 2. Commissioning using Prescriptive Path

V

1. Reduced Heating and Cooling Distribution System Losses for In-Unit HVAC

	Duct leakage rate does not exceed 4.0 cfm25 per 100 sq ft (1.2 cmm at 25 Pa per 100 sq m) of conditioned floor area.
	Duct leakage rate in units smaller than 1,200 sq ft (110 sq m) does not exceed 6.0 cfm25 per 100 sq ft (1.7 cmm at 25 Pa per 100 sq m) of conditioned floor area.
	Total duct leakage rate in-unit systems does not exceed 8.0 cfm25 per 100 sq ft (2.4 cmm at 25 Pa per 100 sq m) of conditioned floor area.
	The air-handler unit and ductwork are visibly within the unit's envelope.

2. Fundamental Commissioning of Central HVAC Systems

	The project meets the performance testing and ongoing maintenance requirements of LEED v4 New Construction EA Prerequisite Fundamental Commissioning and Verification for central commercial heating, cooling, water heating and ventilation systems.
----------------------	---

3. Construction Document Specifications

	The following details were included in the bid documents: Elements to be sealed, air barrier sheet and compartmentalization sheet.
----------------------	--

4. LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist

	The LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist has been completed.
	The project is a certified Passive House project.

EA Prerequisite Energy Metering

Required

Verified

Case 1. Single Family

V

A whole-house electric meter is installed.

A whole-house gas meter is installed.

OR

Case 2. Multifamily

V

Electric submeters are installed in each residential unit.

A whole-building gas meter or submeter for each residential unit is installed.

EA Prerequisite Education of Homeowner, Tenant, or Building Manager

Required

Verified

An operations and maintenance manual, binder, or CD has been/will be provided to all individuals or organizations responsible for the maintenance of the home.

A minimum one-hour walkthrough of the home with the occupants has been conducted.

EA Credit Annual Energy Use

Up to 30 points

Preliminary Y M V

Exemplary Performance: For projects registered on or before March 1, 2024, 65% or better reduction from ASHRAE 90.1-2010. For projects registered after March 1, 2024, 100% percentage improvement using a metric of cost or source energy.

For projects registered on or before March 1, 2024:

Preliminary Y M V

	Percent reduction from ASHRAE 90.1-2010
	Points earned
0.0	Average home size point adjustment (from the Multifamily HSA tab)
0.0	Final points earned

OR

For projects registered after March 1, 2024:

Preliminary Y M V

0%	Percentage improvement by cost or source energy
0%	Percentage improvement by greenhouse gas emissions
	Points earned
0.0	Average home size point adjustment (from the Multifamily HSA tab)
0.0	Final points earned

EA Credit Efficient Hot Water Distribution System

Up to 5 points

Preliminary Y M Verified **Option 1. Efficient Hot Water Distribution (2 points)**Y M V

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

For projects using circulating systems (required for both Path 1 AND Path 2 below)

- Circulating pump does not operate continuously, is not on a timer, or is not on a water temperature sensor.
- Circulating pump is demand activated by a momentary contact switch, motion sensor, flow switch, door switch or voice command.
- After the pump starts, the controls allow the pump to operate until the water temperature in the return pipe rises not more than 10°F (6 °C) above the initial temperature of the water in the pipe. Controls limit the water temperature to a maximum of 105°F (40 °C). Controls limit pump operation to not more than 5 minutes per activation in the event that both means of shutting off the pump have failed.
- Circulating hot water systems have with an automatic or readily accessible manual switch to turn off the hot water circulating pump when not in use.

For projects using heat-traced piping systems

- Piping is insulated.

Path 1. Maximum Allowable Pipe Length (2 points)Y M V

	Pipe or tube length installed (ft)
	Nominal pipe size (in)
	Maximum pipe or tube length allowed for water heaters, boilers with no circulation loop or heat traced pipe or in multifamily buildings a central circulation loop or heat traced pipe (ft)
	Maximum pipe or tube length allowed for circulation loop or heat traced pipe serving a single unit or house (ft)

OR

Path 2. Maximum Allowable Pipe Volume (2 points)Y M V

- Volume of hot or tempered water from source to termination (oz)

OR

Option 2. Performance Test (3 points)

Y M V

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

For projects using circulating systems (required for both Case 1 AND Case 2 below)

Circulating pump does not operate continuously, is on a timer, or is on a water temperature sensor.

Circulating pump is demand activated by a momentary contact switch, motion sensor, flow switch, door switch or voice command.

After the pump starts, the controls allow the pump to operate until the water temperature in the return pipe rises not more than 10°F (6 °C) above the initial temperature of the water in the pipe. Controls limit the water temperature to a maximum of 105°F (40 °C). Controls limit pump operation to not more than 5 minutes per activation in the event that both means of shutting off the pump have failed.

Circulating hot water systems have with an automatic or readily accessible manual switch to turn off the hot water circulating pump when not in use.

For projects using heat-traced piping systems

Piping is insulated.

Case 1. Hot water source is a water heater or boiler with no circulation loop or heat traced pipe; or in multifamily buildings a central circulation loop or heat traced pipe.

Y M V

Meets WaterSense Labeled New Homes requirements

OR

Tested volume of water stored in piping (gal)

OR

Case 2. Hot water source is a circulation loop or heat traced pipe serving a single unit or house

Y M V

Tested volume of water stored in piping (gal)

AND/OR

Y M V

Option 3. Pipe Insulation (2 points)

Insulation R-value

EA Credit Advanced Utility Tracking

Up to 2 points

Preliminary Y M **Verified**

Exemplary Performance: Meter separate energy usage information for at least four end uses.

Case 1. Single Family

Y M V

Option 1. Electric and Water (1 point)

Select one of the following:

Y M V

A permanent energy-monitoring system that records at intervals of one hour or less has been installed.

The house has an automatic in-ground irrigation system and landscaped irrigated area larger than 1,000 sq ft (93 sq m) and has installed a submeter to monitor all irrigation system components.

AND/OR

Option 2. Third-Party Utility Reporting (1 point)

Y M V

The homeowner has shared all applicable utility data with USGBC via a USGBC-approved third-party.

Case 2. Multifamily

Y M V

Option 1. Electric and Water (1 point)

Select one of the following:

Y M V

A permanent energy-monitoring system that records at intervals of one hour or less has been installed in each unit.

The project has an automatic in-ground irrigation system and landscaped irrigated area larger than 1,000 sq ft (93 sq m) and has installed a submeter to monitor all irrigation system components.

AND/OR

Option 2. Third-Party Utility Reporting (1 point)

Y M V

Path 1. Whole-Building Master Meter

Y M V

The building owner has shared all applicable utility data with USGBC via a USGBC-approved third-party.

OR

Path 2. Individual Unit Meters

Y M V

At least 50% of unit owners or occupants have shared all applicable utility data with USGBC via a USGBC-approved third-party.

Preliminary Y M **Verified**

Meet at least one of the following:

ENERGY STAR–qualified refrigerator(s) are installed. (1 point)

ENERGY STAR–qualified ceiling fans are installed. (0.5 point)

ENERGY STAR–qualified dishwasher(s) are installed. (0.5 point)

Materials and Resources

Preliminary Y 3.5 Maybe 2 Verified 0

MR Prerequisite Certified Tropical Wood

Required

Verified

True

All wood in the building is nontropical, reused or reclaimed, or certified by the Forest Stewardship Council, or USGBC-approved equivalent.

MR Prerequisite Durability Management

Required

Verified

True

ENERGY STAR for Homes, version 3, water management system checklist is collected from builder.

Confirm all of the following have been implemented on the project:

True

Nonpaper-faced backer board, or a product or coating over wallboard that meets standard ASTM D 3273 standard, was installed on the area above bathtub, spa or shower, and in areas behind fiberglass enclosures where wallboard is installed.

True

Water-resistant flooring was installed in the kitchen, bathroom(s), laundry room, spa area(s). No carpet was installed in these areas.

True

Water-resistant flooring was installed in entryways within 3 feet of exterior door(s).

True

A drain and drain pan, drain pan and automatic water shut-off or flow restrictors, or floor drain with floor sloped to drain was installed for all tank water heaters in or over living space.

True

A braided washer hose, drain and drain pan, drain pan and automatic water shut-off or flow restrictors, or floor drain with floor sloped to drain was installed for clothes washer in or over living space.

True

Conventional clothes dryers exhaust directly to outdoors.

MR Credit Durability Management Verification

1 point

Preliminary Y 1 M Verified

True

Each measure in the ENERGY STAR for Homes, version 3, water management system builder checklist was verified by the verification team.

MR Credit Environmentally Preferable Products

Up to 5 points

Preliminary Y 2.5 M 0 Verified 0

Exemplary Performance: For Option 2, achieve a minimum of 4 points to earn another 2 points for purchasing products that meet the requirements.

Option 1. Local Production

Preliminary Y 0.5 M Verified

Select which the following were extracted, processed, and manufactured within 100 miles (160 km) of the project site:

100.00

Percentage of locally produced framing (%) (0.5 point)

Percentage of locally produced aggregate for concrete and foundation (%) (0.5 point)

Percentage of locally produced drywall and interior sheathing (%) (0.5 point)

AND/OR

Option 2. Environmentally Preferable Products

Preliminary Y

2

M

Verified

Select the criteria met by at least 90% of the component:

No Floor Covering (2 points)	
Floor Covering (1 point)	
Insulation (1 point)	At least 25% postconsumer or 50% preconsumer recycled content
Sheathing (1 point)	
Framing (1 point)	
Drywall (1 point)	For synthetic, 95% recycled content (pre-, post-, or combination)
Concrete (1 point)	
Roofing (1 point)	
Siding (1 point)	

Select criteria met for at least 3 of the following additional components by at least 90% of the component (1 point):

Doors	
Cabinets	
Counters	
Interior Trim	
Decking/Patio	
Windows	

MR Credit Construction Waste Management

Up to 3 points

Exemplary Performance: For renovation projects, track and divert at least 50% of demolition waste.

Preliminary Y

2

M

Verified

	LEED Reference Home Baseline Waste (lbs)
	Total Construction Waste (including recycled waste) (lbs)
	Recycled Waste (lbs)
0.00	Project Construction Waste (lbs)
	Percent reduction below baseline (%)

Indoor Environmental Quality

Preliminary Y 12 Maybe 1.5 Verified 0

EQ Prerequisite Ventilation

Required

Verified

Case 1. Single Family

V

☐ The project has earned the EPA Indoor airPLUS label

OR

Local Exhaust

Confirm all of the following have been implemented on the project:

☐ Local exhaust systems meeting the requirements of ASHRAE Standard 62.2-2010, Sections 5 and 7 or local equivalent, whichever is more stringent, were installed in all bathrooms (including half-baths) and the kitchen.

☐ Local exhaust systems exhaust air directly to the outdoors.

☐ All bathroom exhaust fans are ENERGY STAR-labeled or an HRV or ERV is used.

Note that an HRV or ERV can be used to exhaust single or multiple bathrooms if it has an efficacy level meeting the ENERGY STAR Technical Specifications for Residential Heat-Recovery Ventilators and Energy-Recovery Ventilators (H/ERVs) Version 2.0 as certified by HVI.

☐ For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), makeup air is provided at a rate approximately equal to the exhaust air rate.

Makeup air systems have a means of closure and can be automatically controlled to start and operate simultaneously with the exhaust system.

AND

Whole House Mechanical Ventilation

☐ The building meets ASHRAE Standard 62.2-2010 Sections 4 and 7 or local equivalent, whichever is more stringent.

OR

Case 2. Multifamily

V

Local Exhaust

Confirm all of the following have been implemented on the project:

☐ True Local exhaust systems meeting the requirements of ASHRAE Standard 62.2-2010, Sections 5 and 7 or local equivalent, whichever is more stringent, were installed in all bathrooms (including half-baths) and the kitchen.

☐ True Local exhaust systems exhaust air directly to the outdoors.

☐ True All bathroom exhaust fans are ENERGY STAR-labeled or an HRV or ERV is used.

☐ True For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), makeup air is provided at a rate approximately equal to the exhaust air rate. Makeup air systems have a means of closure and can be automatically controlled to start and operate simultaneously with the exhaust system.

Whole Unit Mechanical Ventilation

☐ True The project meets ASHRAE Standard 62.2-2010 Sections 4 and 7 or local equivalent, whichever is more stringent.

Non-Unit Spaces

☐ True The project meets the minimum requirements of ASHRAE Standard 62.1-2010 Sections 4 -7 or local equivalent, whichever is more stringent.

☐ The project is located in a nonattainment area for PM2.5. The project has installed MERV 11 or higher filters.

☐ The project is located in a nonattainment area for ozone.

EQ Prerequisite Combustion Venting

Required

Verified

☐ The project has earned the EPA Indoor airPLUS label

OR

☐ True No unvented combustion appliances were installed (ovens and ranges excluded).

☐ True A carbon monoxide (CO) monitor is installed on each floor, hard-wired with a battery backup.

For projects with fireplaces or woodstoves installed

☐ N/A Provide doors that close or a solid glass enclosure.

N/A	Closed-combustion, power-vented or passes BPI or RESNET combustion safety protocols
-----	---

For projects where space and water heating equipment involving combustion are installed

Select one of the following:

N/A	Equipment is installed with closed combustion (i.e. sealed supply air and exhaust ducting)
-----	--

	Equipment is installed with power-vented exhaust
--	--

	Equipment is located in a detached utility building or open-air facility
--	--

EQ Prerequisite Garage Pollutant Protection

Required

Verified

- The project has earned the EPA Indoor airPLUS label
- OR
- True All air-handling equipment and ductwork is placed outside the fire-rated envelope of the garage.
- True Shared surfaces between the garage and conditioned spaces are tightly sealed.

Conditioned Spaces Above Garage

- All penetrations and all connecting floor and ceiling joist bays are sealed.

Conditioned Spaces Next to Garage

- N/A All doors are weather-stripped.
- N/A Carbon monoxide detectors are installed in rooms that share a door with the garage.
- N/A All penetrations and all cracks at the base of the walls are sealed.

EQ Prerequisite Radon-Resistant Construction

Required

Verified

Exemplary Performance: For projects in radon zones 2 and 3, install a qualifying passive radon ventilation system.

EPA Indoor airPLUS label

V

- The project has earned the EPA Indoor airPLUS label

OR

Case 1. New Construction

V

- 1 EPA radon zone

For projects in EPA radon zone 1

- True There is a capillary break per the Indoor airPLUS specifications.
- True An electrical outlet has been provided near vent piping in the attic to facilitate future fan installation.
- True A gas-tight vertical vent pipe extending up through the conditioned spaces and terminating above the roof opening has been installed.

OR

- The house is elevated by at least 2 feet (600 millimeters) with open air space between building and ground or there is a garage under the building.

OR

Case 2. Renovation of Existing Building

V

- EPA radon zone

For renovation projects in EPA radon zone 1 with no slab work being performed

- Radon test results (pCi/L)
- If results are greater than 4 pCi/L, an active ventilation system has been installed.

EQ Prerequisite Air Filtering

Required

Verified

- The project has earned the EPA Indoor airPLUS label
- OR
- 8 MERV rating of filters on recirculating space conditioning systems
- 6 MERV rating of filters on mechanically supplied outdoor air systems with 10 ft (3 m) or more of ductwork

EQ Prerequisite Environmental Tobacco Smoke

Required

Verified

For multifamily projects

☐ True Smoking is prohibited in all common areas of the building.

☐ True Smoking is prohibited outside the project building(s) except in designated smoking areas located at least 25 ft (7.5 m) from all entries, outdoor air intakes, and operable windows.

☐ True Signage communicating the smoking policy has been installed.

EQ Prerequisite Compartmentalization

Required

For multifamily and attached single-family projects

☐ True Each residential unit has sealed penetrations through walls, ceilings, and floors and vertical chases adjacent to units.

☐ True All doors in the residential units leading to common hallways have weather-stripping.

☐ True All exterior doors and operable windows have weather-stripping.

Blower door test results (cfm50)

Envelope enclosure area (sq ft)

0.00 Leakage per area of enclosure (cfm50/sq ft)

Verified

EQ Credit Enhanced Ventilation

Up to 3 points

Preliminary Y 3 M 0 Verified 0

Option 1. Enhanced Local Exhaust (1 point)

Y 1 M V

automatic humidistat controller

Bathroom exhaust fan control type in every bathroom with a shower, bathtub, or spa

AND/OR

Option 2. Enhanced Whole-House Ventilation (2 points)

Y 2 M V

☐ True A balanced whole-house ventilation system was designed and installed that meets ASHRAE 62.2-2010 sections 4 and 7 in each home or unit.

☐ True The system does not exceed ASHRAE 62.2-2010 requirements by more than 10%.

EQ Credit Contaminant Control

Up to 2 points

Preliminary Y 0 M 0.5 Verified 0

Exemplary Performance: Achieve a minimum of 2 1/2 points to earn another 1/2 point.

Option 1. Walk-off Mats (0.5 point)

Y M V

☐ For all primary entryways, a permanent walk-off mat that is at least 4 feet (1.2 meters) long and allows access for cleaning has been installed.

For multifamily projects

☐ For exterior entryways in common areas, permanent systems that are at least 10 feet (3 meters) long have been installed.

AND/OR

Option 2. Shoe Removal and Storage (0.5 point)

Y M V

☐ A shoe removal and storage space is near the primary entryway.

☐ No conventional carpet is installed in shoe removal and storage area.

AND/OR

Option 3. Preoccupancy Flush (0.5 point)

Y M V

The project has earned the EPA Indoor airPLUS label
OR

At installation, all permanent ducts and vents were sealed to minimize contamination from construction.

After construction ends and before occupancy

Any dust and debris was removed from ducts.

The home was flushed out for 48 hours, with all windows open, a fan run continuously or all HVAC fans and exhaust fans.

AND/OR

Option 4. Air Testing (1 point)

Y M V

The building was tested for indoor air contaminants and maximum concentrations were not exceeded.

EQ Credit Balancing of Heating and Cooling Distribution Systems

Up to 3 points

Preliminary Y M **Verified**

Case 1. Forced-Air Systems

Y M V

Option 1. Multiple Zones (1 point)

Y M V

A system with at least two space-conditioning zones with independent thermostatic controls has been installed.
OR

The project is a single family home less than 800 sq ft (74 sq m) or a multifamily building whose average unit size is less than 1,200 sq ft (110 sq m).

AND/OR

Option 2. Supply Air-Flow Testing (1 point)

Y M V

The supply air-flow rates are within +/- 20% (or +/- 25 cfm or 11 lps) of calculated values from ACCA Manual J.

AND/OR

Option 3. Pressure Balancing (1 point)

Y M V

The pressure differential between bedroom and rest of the house is less than 3 Pa.

OR

Case 2. Radiative Systems

Y M V

Option 1. Multiple Zones (1 point)

Y M V

A system with at least two zones with independent thermostatic controls has been installed
Each zone has a separate loop and pump controlled automatically by a thermostat control.
OR

The project is a single family home less than 800 sq ft (74 sq m) or a multifamily building whose average unit size is less than 1,200 sq ft (110 sq m).

AND/OR

Option 2. Room-by-Room Controls (2 points)

Y M V

Room-by-room thermostatic controls are installed.

EQ Credit Enhanced Compartmentalization

3 points

Preliminary Y M Verified 0.00 Leakage per area of enclosure (cfm50/sq ft)**EQ Credit Enhanced Combustion Venting**

Up to 2 points

Preliminary Y 2 M 0 Verified 0**Option 1. No Fireplace or Woodstove (2 points)**Y 2 M V No fireplaces or woodstoves have been installed.

OR

Option 2. Enhanced Combustion Venting Measures (1 point)Y M V The project has earned the EPA Indoor airPLUS label

OR

 EPA qualified wood- or pellet-burning fireplaces with either power or direct venting have been installed.
 A natural gas, propane, or alcohol stove approved by a safety testing facility and has power or direct venting has been installed.
 A natural gas, propane, or alcohol stove has a permanently fixed glass front or gasketed door and an electronic pilot.**EQ Credit Enhanced Garage Pollutant Protection**

1 point

Preliminary Y 1 M 0 Verified 0**Option 1. Exhaust Fan on Controls in Garage (1 point)**Y M V All of the requirements in ASHRAE 62.1-2010 for garage ventilation have been met.
 The garage has sufficient exhaust to create negative pressure with respect to adjacent spaces with the doors to the garage closed.
 Self-closing doors have been installed. Deck-to-deck partitions or a hard lid ceiling have been installed.
 The exhaust fan either runs continuously or is on a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm.

OR

Option 2. Detached Garage or No Garage or Carport (1 point)Y 1 M V No garage has been constructed.
 A detached garage has been constructed**EQ Credit Low-Emitting Products**

Up to 3 points

Preliminary Y 3 M Verified

Select all that apply. At least 90% of a component must meet the requirement:

 True Site-applied interior paints and coatings have been tested and meet the requirements of CA Section 01350. (0.5 point)
 True Flooring has been tested and meets the requirements of CA Section 01350. (0.5 point)
 True Insulation has been tested and meets the requirements of CA Section 01350. (0.5 point)
 Site-applied adhesives and sealants have been tested and meet the requirements of CA Section 01350. (0.5 point)
 Composite wood products have been tested and meet the California Air Resources Board requirements for ultra-low-emitting formaldehyde (ULEF) resins or no-added formaldehyde based resins. (1 point)

Innovation

Preliminary Y 4

Maybe 0

Verified 0

IN Prerequisite Preliminary Rating

Required

Verified

☐ True

Preliminary rating and meeting are complete.

IN Credit Innovation

To achieve all five innovation points, a project team must achieve at least one pilot credit, at least one innovation credit and no more than two exemplary performance
Up to 5 points

Preliminary Y M Verified

Option 1. Innovation (1 point)

Describe the intent of the proposed innovation credit.

Y M V

affordable

AND/OR

Option 2. Pilot (1 point)

Y M V

design for accessibility

Pilot credit name

AND/OR

Option 3. Additional Strategies (0.5-3 points)

Y M V

Exemplary Performance: 1-2 points

Strategy	Innovation
Credit name	IP

Strategy	
Credit name	

Strategy	
Credit name	

Strategy	
Credit name	

Strategy	
Credit name	

Strategy	
Credit name	

IN Credit LEED Accredited Professional

1 point

Preliminary Y M Verified

Sol

Name of credential holder

Regional Priority

Preliminary Y 3 Maybe 1 Verified 0

RP Credit Regional Priority

Up to 4 points

Preliminary Y 3 M 1 Verified

Regional priority credits may be found on www.usgbc.org/rpc.

Regional Priority Credit Name	Required Threshold
Heat Island Reduction	2
Site Selection (yes)	4
Advanced Utility tracking	1
Durability management verification (yes)	1
Rainwater Management (maybe)	2
Annual Energy Use (yes)	13



LEED v4 Multifamily Midrise Thermal Enclosure Checklist

This document is based off of the ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 8) Rater Field Checklist. Project teams may elect to use that document, and complete sections 1.3, 2 and 4. Consult [that document](#) for further clarifications, including numerous footnote that provide details and alternative compliance paths.

Thermal Enclosure System	Must Correct	Builder Verified	Rater Verified	N/A
1. High-Performance Fenestration & Insulation				
1.3 All insulation achieves RESNET-defined Grade I installation.	☐	☐	☐	-
2. Fully-Aligned Air Barriers At each insulated location below, a complete air barrier is provided that is fully aligned as follows:				
<u>Ceilings:</u> At interior or exterior horizontal surface of ceiling insulation in Climate Zones 1-3; at interior horizontal surface of ceiling insulation in Climate Zones 4-8.				
2.1 Dropped ceilings / soffits below unconditioned attics, and all other ceilings	☐	☐	☐	☐
<u>Walls:</u> At exterior vertical surface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in Climate Zones 4-8				
2.2 Walls behind showers, tubs, staircases, and fireplaces	☐	☐	☐	☐
2.3 Attic knee walls and skylight shaft walls	☐	☐	☐	☐
2.4 Walls adjoining porch roofs or garages	☐	☐	☐	☐
2.5 Double-walls and all other exterior walls	☐	☐	☐	-
<u>Floors:</u> At exterior vertical surface of floor insulation in all climate zones and, if over unconditioned space, also at interior horizontal surface including supports to ensure alignment.				
2.6 Floors above garages, floors above unconditioned basements or crawlspaces, and cantilevered floors	☐	☐	☐	☐
2.7 All other floors adjoining unconditioned space (e.g., rim / band joists at exterior wall or at porch roof)	☐	☐	☐	☐
4. Air Sealing (Unless otherwise noted below, "sealed" indicates the use of caulk, foam, or equivalent material)				
4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed	☐	☐	☐	-
4.2 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and gasketed. Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to $\geq R-10$ in CZ 4-8.	☐	☐	☐	☐
4.3 Above-grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to cond. space	☐	☐	☐	☐
4.4 Continuous top plate or blocking is at top of walls adjoining unconditioned space, and sealed	☐	☐	☐	☐
4.5 Drywall sealed to top plate at all unconditioned attic / wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material. Either apply sealant directly between drywall and top plate or to the seam between the two from the attic above.	☐	☐	☐	☐
4.6 Rough opening around windows & exterior doors sealed	☐	☐	☐	-
4.7 Walls that separate attached garages from occupiable space sealed and, also, an air barrier installed and sealed at floor cavities aligned with these walls	☐	☐	☐	☐
4.8 In multifamily buildings, the gap between the common wall (e.g. the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries	☐	☐	☐	☐
4.9 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with weatherstripping or equivalent gasket	☐	☐	☐	☐
4.10 Attic access panels, drop-down stairs, & whole-house fans equipped with durable $\geq R-10$ cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated.	☐	☐	☐	☐



ENERGY STAR Certified Homes, Version 3 (Rev. 07)

Water Management System Builder Checklist^{1,2}

Home Address: _____ City: _____ State: _____ Zip Code: _____				
1. Water-Managed Site and Foundation	Must Correct	Builder Verified	Rater Verified	N/A
1.1 Patio slabs, porch slabs, walks, and driveways sloped ≥ 0.25 in. per ft. away from home to edge of surface or 10 ft., whichever is less. ³	☐	☐	☐	☐
1.2 Back-fill has been tamped and final grade sloped ≥ 0.5 in. per ft. away from home for ≥ 10 ft. See Footnote for alternatives. ³	☐	☐	☐	☐
1.3 Capillary break beneath all slabs (e.g., slab on grade, basement slab) except crawlspace slabs using either: ≥ 6 mil polyethylene sheeting, lapped 6-12 in., or ≥ 1 in. extruded polystyrene insulation with taped joints. ^{4, 5, 6}	☐	☐	☐	☐
1.4 Capillary break at all crawlspace floors using ≥ 6 mil polyethylene sheeting, lapped 6-12 in., & installed using one of the following opt's: ^{4, 5, 6}				
1.4.1 Placed beneath a concrete slab; OR,	☐	☐	☐	☐
1.4.2 Lapped up each wall or pier and fastened with furring strips or equivalent; OR,	☐	☐	☐	☐
1.4.3 Secured in the ground at the perimeter using stakes.	☐	☐	☐	☐
1.5 Exterior surface of below-grade walls of basements & unvented crawlspaces finished as follows: a) For poured concrete, masonry, & insulated concrete forms, finish with damp-proofing coating. ⁷ b) For wood framed walls, finish with polyethylene and adhesive or other equivalent waterproofing.	☐	☐	☐	☐
1.6 Class 1 vapor retarder not installed on interior side of air permeable insulation in ext. below-grade walls. ⁸	☐	☐	☐	☐
1.7 Sump pump covers mechanically attached with full gasket seal or equivalent.	☐	☐	☐	☐
1.8 Drain tile installed at the exterior side of footings of basement and crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor. Drain tile surrounded with ≥ 6 in. of $\frac{1}{2}$ to $\frac{3}{4}$ in. washed or clean gravel and with gravel layer fully wrapped with fabric cloth. Drain tile level or sloped to discharge to outside grade (daylight) or to a sump pump. ⁹	☐	☐	☐	☐
2. Water-Managed Wall Assembly				
2.1 Flashing at bottom of exterior walls with weep holes included for masonry veneer and weep screed for stucco cladding systems, or equivalent drainage system. ¹⁰	☐	☐	☐	☐
2.2 Fully sealed continuous drainage plane behind exterior cladding that laps over flashing in Item 2.1 and fully sealed at all penetrations. Additional bond-break drainage plane layer provided behind all stucco and non-structural masonry cladding wall assemblies. ^{10, 11}	☐	☐	☐	☐
2.3 Window and door openings fully flashed. ¹²	☐	☐	☐	☐
3. Water-Managed Roof Assembly				
3.1 Step and kick-out flashing at all roof-wall intersections, extending ≥ 4 " on wall surface above roof deck and integrated shingle-style with drainage plane above; boot / collar flashing at all roof penetrations. ¹³	☐	☐	☐	☐
3.2 For homes that don't have a slab-on-grade foundation and do have expansive or collapsible soils, gutters & downspouts provided that empty to lateral piping that discharges water on sloping final grade ≥ 5 ft. from foundation, or to underground catchment system not connected to the foundation drain system that discharges water ≥ 10 ft. from foundation. See Footnote for alternatives & exemptions. ^{4, 14}	☐	☐	☐	☐
3.3 Self-sealing bituminous membrane or equivalent at all valleys & roof deck penetrations. ⁴	☐	☐	☐	☐
3.4 In 2009 IECC Climate Zones 5 & higher, self-sealing bituminous membrane or equivalent over sheathing at eaves from the edge of the roof line to > 2 ft. up roof deck from the interior plane of the exterior wall. ⁴	☐	☐	☐	☐
4. Water-Managed Building Materials				
4.1 Wall-to-wall carpet <i>not</i> installed within 2.5 ft. of toilets, tubs, and showers.	☐	☐	☐	☐
4.2 Cement board or equivalent moisture-resistant backing material installed on all walls behind tub and shower enclosures composed of tile or panel assemblies with caulked joints. Paper-faced backerboard shall not be used. ¹⁵	☐	☐	☐	☐
4.3 In Warm-Humid climates, Class 1 vapor retarders not installed on the interior side of air permeable insulation in above-grade walls, except at shower and tub walls. ⁸	☐	☐	☐	☐
4.4 Building materials with visible signs of water damage or mold <i>not</i> installed or allowed to remain. ¹⁶	☐	☐	☐	☐
4.5 Framing members & insulation products having high moisture content <i>not</i> enclosed (e.g., with drywall) ¹⁷	☐	☐	☐	☐
Builder Employee: _____ Builder Signature: _____ Date: _____				
Builder has completed Builder Checklist in its entirety, except for items that are checked in the Rater Verified column (if any) ² Rater Signature: _____ Date: _____				

Notes:

1. The specifications in this Checklist are designed to help improve moisture control in new homes compared with homes built to minimum code. However, these features alone cannot prevent all moisture problems. For example, leaky pipes or overflowing sinks or baths can lead to moisture issues and negatively impact the performance of this Checklist's specified features.



ENERGY STAR Certified Homes, Version 3 (Rev. 07)

Water Management System Builder Checklist^{1,2}

2. Upon completion, the builder shall return the Checklist to the Rater for review. Alternatively, at the discretion of the builder and Rater, the Rater may verify any item on this Checklist. When this occurs, the Rater shall check the box of the verified items in the Rater Verified column. The Rater is only responsible for ensuring that the builder has completed the Builder Checklist in its entirety and for verifying the items that are checked in the Rater Verified column (if any). The Rater is not responsible for assessing the accuracy of the field verifications for items in this Checklist that are not checked in the Rater Verified column. Instead, it is the builder's exclusive responsibility to ensure the design and installation comply with the Checklist.
3. Swales or drains designed to carry water from foundation are permitted to be provided as an alternative to the slope requirements for any home, and shall be provided for a home where setbacks limit space to less than 10 ft. Also, tamping of back-fill is not required if either: proper drainage can be achieved using non-settling compact soils, as determined by a certified hydrologist, soil scientist, or engineer; OR, the builder has scheduled a site visit to provide in-fill and final grading after settling has occurred (e.g., after the first rainy season).
4. Not required in Dry (B) climates as shown in 2009 IECC Figure 301.1 and Table 301.1.
5. Not required for raised pier foundations with no walls. To earn the ENERGY STAR, EPA recommends, but does not require, that radon-resistant features be included in homes built in EPA Radon Zones 1, 2 & 3. For more information, see www.epa.gov/indoorairplus.
6. For an existing slab (e.g., in a home undergoing a gut rehabilitation), in lieu of a capillary break beneath the slab, a continuous and sealed Class I or Class II Vapor Retarder (per Footnote 8) is permitted to be installed on top of the entire slab. In such cases, up to 10% of the slab surface is permitted to be exempted from this requirement (e.g., for sill plates). In addition, for existing slabs in occupiable space, the Vapor Retarder shall be, or shall be protected by, a durable floor surface. If Class I Vapor Retarders are installed, they shall not be installed on the interior side of air permeable insulation or materials prone to moisture damage.
7. Interior surface of existing below-grade wall (e.g., in a home undergoing a gut rehab.) listed in Item 1.5a is permitted to be finished by:
 - Installing a continuous and sealed drainage plane, capillary break, Class I Vapor Retarder (per Footnote 8) and air barrier that terminates into a foundation drainage system as specified in Item 1.8; OR
 - If a drain tile is not required as specified in Footnote 9, adhering a capillary break and Class I Vapor Retarder (per Footnote 6) directly to the wall with the edges taped/sealed to make it continuous.

Note that no alternative compliance option is provided for existing below-grade wood-framed walls in Item 1.5b.

8. The 2009 IRC defines Class I vapor retarders as a material or assembly with a rating of ≤ 0.1 perm, as defined using the desiccant method with Procedure A of ASTM E 96. The following materials are typically rated at ≤ 0.1 perm and therefore shall not be used on the interior side of air permeable insulation in above-grade exterior walls in warm-humid climates or below-grade exterior walls in any climate: rubber membranes, polyethylene film, glass, aluminum foil, sheet metal, foil-faced insulating sheathings, and foil-faced non-insulating sheathings. These materials can be used on the interior side of walls if air permeable insulation is not present (e.g., foil-faced rigid foam board adjacent to a below-grade concrete foundation wall is permitted).

Note that this list is not comprehensive and other materials with a perm rating ≤ 0.1 also shall not be used. Also, if manufacturer specifications for a specific product indicate a perm rating above 0.1, then the material may be used, even if it is in this list. Also note that open-cell and closed-cell foam generally have perm ratings above this limit and may be used unless manufacturer specifications indicate a perm rating ≤ 0.1 . Several exemptions to these requirements apply:

- Class I vapor retarders, such as ceramic tile, may be used at shower and tub walls;
 - Class I vapor retarders, such as mirrors, may be used if mounted with clips or other spacers that allow air to circulate behind them.
9. Alternatively, either a drain tile that is pre-wrapped with a fabric filter or a Composite Foundation Drainage System (CFDS) that has been evaluated by ICC-ES per AC 243 are permitted to be used to meet this Item. Note that the CFDS must include a soil strip drain or another ICC-ES evaluated perimeter drainage system to be eligible for use. In an existing home (e.g., in a home undergoing a gut rehab.) a drain tile installed only on the interior side of the footings is permitted. Additionally, a drain tile is not required when a certified hydrologist, soil scientist, or engineer has determined that a crawlspace foundation, or an existing basement foundation (e.g., in a home undergoing a gut rehab.), is installed in Group I Soils (i.e. well-drained ground or sand-gravel mixture soils), as defined by 2009 IRC Table R405.1.
 10. These Items not required for existing structural masonry walls (e.g., in a home undergoing a gut rehabilitation). Note this exemption does not extend to existing wall assemblies with masonry veneers.
 11. Any of the following systems may be used: a monolithic weather-resistant barrier (i.e., house wrap) shingled at horizontal joints and sealed or taped at all joints; weather resistant sheathings (e.g., faced rigid insulation) fully taped at all "butt" joints; lapped shingle-style building paper or felts; or other water-resistive barrier recognized by ICC-ES or other accredited agency.
 12. Apply pan flashing over the rough sill framing, inclusive of the corners of the sill framing; side flashing that extends over pan flashing; and top flashing that extends over side flashing or equivalent details for structural masonry walls.
 13. Intersecting wall siding shall terminate 1 in. above the roof or higher, per manufacturer's recommendations. Continuous flashing shall be installed in place of step flashing for metal and rubber membrane roofs.
 14. The assessment of whether the soil is expansive or collapsible shall be completed by a certified hydrologist, soil scientist, or engineer. As an alternative, a roof design is permitted to be used that deposits rainwater to a grade-level rock bed with a waterproof liner and a lateral drain pipe that meets discharge requirements per Item 3.2. As another alternative, a rainwater harvesting system is permitted to be used that drains overflow to meet discharge requirements per Item 3.2.
 15. In addition to cement board, materials that have been evaluated by ICC-ES per AC 115 may also be used to meet this requirement. Monolithic tub and shower enclosures (e.g., fiberglass with no seams) are exempt from this backing material requirement unless required by the manufacturer. Paper-faced backerboard may only be used behind monolithic enclosures or waterproof membranes that have been evaluated by ICC-ES per AC 115, and then only if it meets ASTM mold-resistant standards ASTM D3273 or ASTM D6329.
 16. If mold is present, effort should be made to remove all visible signs of mold (e.g., by damp wipe with water and detergent). If removal methods are not effective, then the material shall be replaced. However, stains that remain after damp wipe are acceptable. Lumber with "sap stain fungi" is exempt from this Item as long as the lumber is structurally intact.
 17. For wet-applied insulation, follow manufacturer's drying recommendations. EPA recommends that lumber moisture content be $\leq 18\%$.