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EarthCraft Multifamily Program Summary

The EarthCraft Multifamily Program, administered by Viridiant, is for developer certification of new construction, renovation and gut-rehab of low, mid and high-rise multifamily projects. The program is designed to accommodate both “affordable” and “market rate” project types.

The program is point-based and a project must accumulate a minimum number of points on the Multifamily scoring worksheet in order to certify as EarthCraft. Fresh air ventilation for each unit is a requirement of the program. Outside of these areas, the program is very flexible and can be customized by individual developers to suit their individual projects within the scoring system.



Typical approaches to reach EarthCraft efficiency requirements:

- Improve insulation levels and installation quality
- Better than “typical” low-e windows
- Advanced lighting
- Installation of ENERGY STAR rated appliances

Certified projects are typically more energy efficient and less costly to operate. There is less communication of air between units allowing for the isolation of odors and sounds between units, and EarthCraft Multifamily projects are more durable. These projects have a smaller environmental footprint both during the construction process and operation/occupancy.

Developers receive quality assurance and confirmation of program standards for the project through the work of the EarthCraft Technical Advisor and the benefits that come with that process.

Project Eligibility

All projects with stacked units (sharing a floor or ceiling) are eligible for participation in the EarthCraft Multifamily program; including both apartments intended for rental and condos intended for ownership purposes. Projects that only share a common wall between units, but not a floor or ceiling, such as townhomes and duplexes, are considered single family and as such should participate in the EarthCraft House program.

New construction, major renovation/gut-rehab and adaptive reuse projects must use the EarthCraft Multifamily New Construction worksheet. Renovation projects must use the EarthCraft Multifamily Renovation worksheet.

Adaptive Reuse and historic projects will be considered on a case by case basis after an analysis of the ability to improve the efficiency of the exterior shell of the building.

Mid-rise and high-rise projects must comply with additional industry standards set forth in the ENERGY STAR Multifamily High Rise program.

Viridiant will work with each project to determine the eligibility of that project within the EarthCraft family of programs.

EarthCraft Multifamily Project Process

Process Overview

All EarthCraft Multifamily Developers and Technical Advisors must follow a specific project process in order to certify EarthCraft Multifamily projects. All steps of the process must be completed, including individual unit and building-level inspections, in order for a project to be eligible for certification. Each step in the EarthCraft project process is defined in detail on the following pages.

Pre-Construction		Pre-Drywall		Project Closeout	
1	Project Registration	7	Kick-Off Meeting	15	Final Inspection(s)
2	Project Information Submittal	8	Kick-Off Meeting Report Submittal	16	Energy Model(s) Update
3	Preliminary Energy Model(s)	9	Air Sealing Inspection(s)	17	Final Package Submittal
4	Preliminary Energy Model(s) Report Submittal(s)	10	Air Sealing Inspection Report Submittal(s)	18	Certification
5	EarthCraft Design Review	11	HVAC Initial Diagnostics/Inspection(s)		
6	EarthCraft Design Review Report Submittal	12	HVAC Initial Diagnostics/Inspection Report Submittal(s)		
		13	Insulation Inspection(s)		
		14	Insulation Inspection Report Submittal(s)		

Step 1: Project Registration

To officially begin an EarthCraft Multifamily project, each project must be registered with Viridiant prior to the Design Review

EarthCraft Technical Advisor Responsibilities

Confirm project registration with Viridiant

EarthCraft Technical Advisors are responsible for ensuring that each project they provide services for is registered for the EarthCraft program with Viridiant.

Multifamily Developer Responsibilities

Register each project with Viridiant

Multifamily Developers are responsible for registering each project. This step may also be completed by the Owner or the Owner's Representative of the project, if applicable.

General Contractor Responsibilities

No responsibilities at this step in the process

Step 2: Project Information Submittal

Each EarthCraft Multifamily project must be inspected by an EarthCraft Technical Advisor throughout construction. The Multifamily Developer must contract with Viridiant and will be assigned an EarthCraft Technical Advisor. The project information submittal step provides the information necessary for subsequent steps in the process.

EarthCraft Technical Advisor Responsibilities

Follow-up with Viridiant Multifamily Team

- Review Project Information Submittal and ask questions about any items of concern
- Confirm preliminary EarthCraft Worksheet meets minimum program requirements
- Identify any appropriate points of clarification for the plans and specifications to support program compliance during construction

Multifamily Developer Responsibilities

Submit Project Information to Viridiant Multifamily Team

The following information must be submitted to the Viridiant Multifamily Team at least two weeks prior to the Design Review:

- Project Plans including:
 - Cover page
 - Site plan
 - Building plans
 - Unit floor plans
 - Unit schedule
 - Elevation(s)
 - Window/door schedule
- Construction Specification Sheet
- Load calculation (ACCA Manual J Version 8 or later or equivalent)
- Preliminary EarthCraft Worksheet
- Fresh Air Ventilation strategy to achieve ASHRAE 62.2 and EarthCraft Multifamily requirements
- Additional confirmation documentation as required by Viridiant Multifamily Team based on items identified by the Multifamily Developer on the EarthCraft Worksheet (e.g. Manual D duct design).

General Contractor Responsibilities

No responsibilities at this step in the process

Step 3: Preliminary Energy Model(s)

After receiving a complete Project Information Submittal package from the Multifamily Developer, the Viridiant Multifamily Team will develop the unit level energy models for the project.

Viridiant Multifamily Team Responsibilities

Develop preliminary energy model for unit level energy models

Use the worst case unit analysis defined by RESNET to determine which worst case units must be modeled to reach EarthCraft compliance. This worst case unit is defined as the unit with the highest window to floor ratio as well as by the unit's location within the building.

Determine project's ability to meet program requirements

- Identify effective cost trade-offs for improving building performance
- If ineligible, develop improvement analysis to reach EarthCraft Multifamily program requirements

Multifamily Developer Responsibilities

No responsibilities at this step in the process

General Contractor Responsibilities

No responsibilities at this step in the process.

Step 4: Preliminary Energy Model Report Submittal

Upon completion of the preliminary energy modeling, the Viridiant Multifamily Team is required to provide model reports and associated documents to the project team

Multifamily Developer Responsibilities

Follow-up with Viridiant Multifamily Team

- Read report and ask questions if there are any items of concern or confusion
- Request written report from Viridiant Multifamily Team if not received 5 business days ahead of the Design Review meeting

General Contractor Responsibilities

Follow-up with Viridiant Multifamily Team

- Read report and ask questions if there are any items of concern or confusion
- Request written report from Viridiant Multifamily Team if not received 5 business days ahead of the Design Review meeting

Step 5: EarthCraft Design Review

The EarthCraft Design Review is an opportunity to identify project goals and look carefully at the building and site plans to determine how the EarthCraft program can be best applied to meet the project goals. The EarthCraft worksheet and energy modeling results will be used to guide the discussion. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Design. An EarthCraft Design Review must be conducted on each multifamily project.

Scope

During the EarthCraft Design Review, the Multifamily Developer, General Contractor and EarthCraft Technical Advisor should discuss the program requirements for construction specifications, documentation and submittal timelines, inspection visits and testing, fees and payment timelines, and communication strategies. The Multifamily Developer, General Contractor and Viridiant Multifamily Team will review the building plans for project goals and EarthCraft criteria incorporation. If available, the Multifamily Developer, General Contractor and Viridiant Multifamily Team should also utilize the energy model to identify optimum building strategies and systems for maximizing energy performance while minimizing construction costs. Viridiant encourages the Multifamily Developer and General Contractor to invite other project team members to participate in the EarthCraft Design Review for maximum coordination and project communication of project goals, program requirements, and roles and responsibilities.

Objectives

Successful EarthCraft Design Reviews will accomplish the following objectives:

- Establish rapport between EarthCraft Multifamily Developer, General Contractor and Viridiant Multifamily Team, and other team members
- Define a communication strategy
- Develop EarthCraft compliance strategies as well as roles and expectations

Agenda

Every EarthCraft Design Review should include the following agenda items and additional items as identified by the Multifamily Developer, General Contractor, Viridiant Multifamily Team and project team members:

- EarthCraft Program Introduction/Summary
 - Review design review packet
 - Confirmation that the project can meet mandatory items and minimum point requirements in every program category
- Review EarthCraft documentation requirements, including EarthCraft forms
- Requirements:
 - Kick Off meeting
 - Air sealing inspections
 - Discussion on air sealing requirements
 - HVAC rough in tests
 - Discussion on duct sealing requirements
 - Insulation inspections
 - Discussion on insulation requirements
 - Final inspections
- Sampling procedures (if applicable)
- Review of load calculation (Manual J) and most current fresh air requirements
 - Confirmation that the HVAC load calculation is appropriate and accurate
 - Confirmation that the fresh air ventilation strategy is appropriate
- Review of preliminary energy model
 - HERS or energy consumption report and summary
 - Construction Specification Sheet
- Review of selected items on the EarthCraft Multifamily worksheet
- Questions

Viridiant Multifamily Team Responsibilities

Preparation

In preparation for the EarthCraft Design Review, the Viridiant Multifamily Team must:

- Confirm Multifamily Developer has completed Step 1: Project Registration
- Confirm Multifamily Developer has completed Step 2: Project Information Submittal
- Complete Step 3: Preliminary Energy Model(s)
- Complete Step 4: Preliminary Energy Model Report Submittal

Facilitate meeting

Review and explain each item in the agenda (see above)

Hand out documentation to all design review participants

- VHDA Developer Amenities (if applicable)
- Worksheet
- Preliminary energy modeling information

Discuss Preliminary Energy Model results

Notification of the project's:

- Eligibility to meet program requirements
 - Projects meeting program requirements and seeking to advance their construction practices may work on additional variations in construction techniques to further improve the energy efficiency, comfort and durability of the project
- Effective cost trade-offs for improving building performance
- Options developed to meet program requirements if a project is ineligible

Multifamily Developer Responsibilities

Preparation

In preparation for the Design Review, the Multifamily Developer must:

- Complete Step 1: Project Registration
- Complete Step 2: Project Information Submittal
- Confirm Viridiant has completed Step 3: Preliminary Energy Model
- Determine project goals and probable strategies for EarthCraft compliance

Schedule the EarthCraft Design Review

The Multifamily Developer is responsible for scheduling the EarthCraft Design Review with the Viridiant Multifamily Team and other project team members prior to construction starting on the project. EarthCraft Design Reviews typically take two to three hours depending on project size, Multifamily Developer's and General Contractor's prior experience working with energy efficiency or green building programs, and Multifamily Developer's and General Contractor's knowledge and familiarity with EarthCraft Multifamily Program.

Arrange for all relevant stakeholders to attend the meeting:

- Required
 - Multifamily Developer (and Owner's Representative, if applicable)
 - General Contractor
 - Project Manager
 - Site Supervisor
 - Quality Assurance Designee
 - Architect
 - Mechanical Engineer
- Optional, but strongly recommended
 - Trade representatives
 - Air Sealing
 - Insulation
 - Framing
 - HVAC

- Weather Barrier/Window flashing
- Other consultants involved in the development process

Attendance

Attend meeting

General Contractor Responsibilities

Attendance

Attend meeting

Step 6: EarthCraft Design Review Report Submittal

Upon completion of the Design Review Meeting, the Viridiant Multifamily Team will provide meeting minutes to the Multifamily Developer, General Contractor and Viridiant Technical Advisor. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Design Review as reported and discussed by the EarthCraft Technical Advisor.

Viridiant Multifamily Team Responsibilities

Submit documents to the Multifamily Developer and the General Contractor

Submit the following documents to the Multifamily Developer and the General Contractor within ten business days of the Design Review that include:

- Meeting minutes
 - Summary of suggested modifications that should be incorporated to reach certification and hold meeting with stakeholders for any needed clarification.
 - Updated summary of information on construction specifications that affect the energy model
 - General information about the Kick-Off Meeting and inspection scheduling
 - Additional clarification on load calculation and fresh air requirements, as applicable
 - Sampling protocol information, as applicable
- Updated EarthCraft Multifamily Worksheet
- Sign In Sheet

Multifamily Developer Responsibilities

Follow-up with Viridiant Multifamily Team

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report if not received within 10 business days of the meeting

General Contractor Responsibilities

Follow-up with Viridiant Multifamily Team

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report if not received within 10 business days of the meeting
- Schedule Kick-off Meeting with Technical Advisor

Step 7: Kick-Off Meeting

All EarthCraft Multifamily projects must have a Kick-Off meeting, led by an EarthCraft Technical Advisor, (Viridiant Multifamily Team is available for support) during the Site Preparation stage of the project's construction and prior to the completion of framing, mechanical, electrical and plumbing rough in. During this on-site meeting, EarthCraft requirements and guidelines are reviewed with the general contractor's project manager and site supervisor, and all subcontractors whose work will be impacted by EarthCraft standards. This meeting provides an on-site review of EarthCraft details, techniques, expectations, and specification requirements at the commencement of construction.

EarthCraft Technical Advisor Responsibilities

Review project on-site with General Contractor and the following subcontractors during early stages of construction

All participants

- Identify possible building envelope issues not noted at the plan review stage and work with General Contractor and appropriate subcontractor to suggest appropriate modifications or corrections.
- Review design expectations and specifications with HVAC, insulation, air sealing, framing, and weather barrier subcontractors prior to commencement of their work to ensure compliance with all applicable program standards.
- Meet with all appropriate contractors to outline expectations and answer questions.

General Contractor, Site Supervisor and General Contractor Quality Assurance Designee

- Review inspection forms and Quality Assurance responsibilities
- Review required inspections at each phase and determine scheduling

Framing Contractor

- At commencement of framing confirm implementation of appropriate and specified framing details and techniques to ensure compliance with all applicable program standards.
- Confirm utilization of appropriate and specified framing details and techniques

Air Sealing and Insulation Contractor

- Review design expectations and specifications at commencement of their work to ensure compliance with all applicable program standards.
- If necessary, identify building envelope issues not noted at the plan review stage and work with the General Contractor to suggest appropriate modifications or corrections.

HVAC Contractor

- Review design expectations and specifications at commencement of their work to ensure compliance with all applicable program standards.

Multifamily Developer Responsibilities

Follow-up with General Contractor

Contact General Contractor if Kick-Off meeting has not been scheduled and held prior to initial inspections on the first unit in the first building

General Contractor Responsibilities

Schedule and ensure attendance

Arrange for all relevant stakeholders to attend the meeting:

- All trades listed in the section below
 - Framing
 - Weather Barrier/Window flashing
 - Insulation
 - Air Sealing
 - HVAC

- Plumbing
- Electrician
- EarthCraft Technical Advisor and Viridiant administrative/program staff if desired.

Notify Multifamily Developer

Notify Multifamily Developer of date and time of meeting

Ensure project is ready for meeting

Coincide with the project pre-construction meeting; if no project meeting is scheduled, this meeting should occur after all trades are under contract, but prior to construction commencement.

Attendance

Attend meeting

Step 8: Kick-off Meeting Report Submittal

Upon completion of the Kick-off Meeting, the EarthCraft Technical Advisor provides meeting minutes reporting to the Multifamily Developer, General Contractor and all meeting attendance and Viridiant. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Kick-Off Meeting as reported by the EarthCraft Technical Advisor.

EarthCraft Technical Advisor Responsibilities

Submit documents to Viridiant, the Multifamily Developer, and the General Contractor

Submit the following documents to Viridiant, the Multifamily Developer, and the General Contractor within ten business days of the Kick-off Meeting that include:

- Meeting minutes
- General information about the inspection scheduling
- Updated preliminary EarthCraft Multifamily Worksheet

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 10 business days of the meeting

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 10 business days of the meeting

Step 9: Air Sealing Inspections

All EarthCraft Multifamily projects must pass Air Sealing Inspections conducted by an EarthCraft Technical Advisor on each individual unit. The Air Sealing Inspection provides an on-site evaluation of the unit in terms of the EarthCraft Multifamily guidelines, including a visual inspection of the air sealing. This inspection occurs before insulation is installed to inspect for required air sealing measures including plumbing and electrical penetrations, window and door rough openings, chases, band area and exterior sheathing penetrations, etc. The Air Sealing Inspection provides opportunities to identify additional construction considerations that may impact the performance of the building.

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the Air Sealing Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the Air Sealing Inspection, EarthCraft Technical Advisors must:

- Visually inspect each unit prior to insulation application to identify potential air sealing issues.
- Review identified issues on site with General Contractor, and appropriate subcontractor if available.
- Confirm that plans represent project as constructed.
- Confirm that the Construction Specification Sheet represents project as constructed.
- Confirm that items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer at the inspection).

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule Air Sealing Inspections

The General Contractor is responsible for scheduling the inspection.

- General Contractor notifies EarthCraft Technical Advisor that project will be ready for inspection at least 1 week in advance.

Ensure project is ready for inspection

- Air Sealing is complete on all building envelope penetrations at the unit and building level
- All required confirmation documentation is ready for the EarthCraft Technical Advisor to review onsite as specified on the EarthCraft Worksheet and in the EarthCraft Multifamily Guidelines

Step 10: Air Sealing Inspection Report Submittal

Upon completion of the Air Sealing Inspection, EarthCraft Technical Advisors are required to provide inspection reporting to the Multifamily Developer, General Contractor and Viridiant. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Sealing/Insulation Inspection as reported by the EarthCraft Technical Advisor.

EarthCraft Technical Advisor Responsibilities

Submit documents to Viridiant, Multifamily Developer, and General Contractor

Submit the following documents to Viridiant, Multifamily Developer, and General Contractor within one business day of each Air Sealing Inspection:

- Pre-Drywall Inspection report

Verbally inform General Contractor of inspection results

- Inform the General Contractor of the inspection results verbally, immediately following the inspection.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with Viridiant (as necessary)

- Please contact Viridiant directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with Viridiant (as necessary)

- Please contact Viridiant directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

Step 11: HVAC Initial Diagnostics/Inspection

All EarthCraft Multifamily projects must pass a HVAC Initial Diagnostics/Inspection conducted by an EarthCraft Technical Advisor. The HVAC Initial Diagnostics/Inspection provides an on-site evaluation of the unit in terms of the EarthCraft Multifamily guidelines, including a visual inspection of duct sealing as well as Duct Blaster diagnostic testing of each unit type in that section of the building. The HVAC Initial Diagnostics/Inspection provides opportunities for identifying additional construction considerations that may impact the performance of the unit. When the first floor or section of the first building is roughed-in, the project is ready for an EarthCraft Technical Advisor to visit the site, pressure test the duct systems, and inspect for mastic sealing.

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the HVAC Initial Diagnostics/ Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the HVAC Initial Diagnostics/ Inspection, EarthCraft Technical Advisors must inspect and confirm:

- Every unit
 - Every unit's HVAC equipment and duct systems at rough-in for sizing compliance (based on load calculation), Energy Code compliance, and installation design recommendations. A minimum of one connection in each system must be visually inspected for proper mastic sealing details.
 - Plans, Construction Specification Sheet, and Building report represent home as constructed.
 - Items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer at the Inspection).
- Selected units
 - A minimum of 10% of total units to include one of each unit type per section/floor shall be tested. Minor variations in unit layout or square footage will not be considered as additional unit types.
 - Total leakage duct pressure tests on a portion of systems. Quantify total duct loss, identify leaks and note any possible "weak points" in the sampled systems.
 - Review the identified issues with the General Contractor and HVAC subcontractor on site.

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule HVAC Initial Diagnostics/Inspections

The General Contractor is responsible for scheduling the HVAC Initial Diagnostics/Inspection to occur after HVAC, ductwork and system are installed, but before drywall is installed, providing adequate notification to the EarthCraft Technical Advisor to prevent construction delays.

General Contractor notifies EarthCraft Technical Advisor that project will be ready for inspection at least 1 week in advance, and schedules a specific timeframe for the Pre-Drywall Inspection.

Ensure project is ready for inspection

The General Contractor is responsible for ensuring their projects are ready for inspections. Failure to be prepared for an inspection may result in a re-inspection with additional fees. Common phases of construction that must be completed in preparation for a HVAC Initial Diagnostics/Inspection include:

- HVAC Rough-ins complete
- All required confirmation documentation is ready for the EarthCraft Technical Advisor to review onsite as specified on the EarthCraft Worksheet and in the EarthCraft Multifamily Developer Guidelines

General Contractors are encouraged to work with EarthCraft Technical Advisors to ensure the project is ready for inspection prior to the inspection date.

Ensure relevant contractors are on the job-site and available for inspection:

- HVAC contractor must be present for the first visit and may be required at subsequent inspections based on the discretion of both the EarthCraft Technical Advisor and General Contractor QA designee.

Step 12: HVAC Initial Diagnostics/Inspection Report Submittal

Upon completion of the HVAC Initial Diagnostics/Inspection, EarthCraft Technical Advisors are required to provide inspection reporting to the Multifamily Developer, General Contractor and Viridiant. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the HVAC Initial Diagnostics/Inspection as reported by the EarthCraft Technical Advisor.

EarthCraft Technical Advisor Responsibilities

Submit documents to Viridiant, Multifamily Developer, and General Contractor

Submit the following documents to Viridiant, Multifamily Developer, and General Contractor within one business day of each HVAC Initial Diagnostics/Inspection:

- HVAC Initial Diagnostics Testing Sheet

Verbally inform General Contractor of HVAC Initial Diagnostics/Inspection Results

- Inform the General Contractor of the inspection results verbally, immediately following the HVAC Initial Diagnostics/Inspection.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with Viridiant (as necessary)

- Please contact Viridiant directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with Viridiant (as necessary)

- Please contact Viridiant directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

Step 13: Insulation Inspections

All EarthCraft Multifamily projects must pass an Insulation Inspection conducted by an EarthCraft Technical Advisor on every individual unit. The Insulation Inspections provide an on-site evaluation of the unit in terms of the EarthCraft Multifamily guidelines, including a visual inspection of insulation. The Insulation Inspections provides opportunities to identify additional construction considerations that may impact the performance of the building. After insulation is installed the EarthCraft Technical Advisor will visit the site to grade the installation of the insulation (this may affect the energy model results).

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the Insulation Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the Insulation Inspection, EarthCraft Technical Advisors must:

- Visually inspect and grade each unit at insulation application to identify possible insulation coverage and envelope issues
- Review identified issues on site with General Contractor and appropriate contractor if available
- Confirm that plans represent unit as constructed
- Confirm that the Construction Specification Sheet represents home as constructed
- Confirm that items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer or General Contractor at the inspection)

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule HVAC Initial Diagnostics/Inspections

The General Contractor is responsible for scheduling the inspection.

- General Contractor notifies EarthCraft Technical Advisor that project will be ready for inspection at least 1 week in advance.

Ensure project is ready for inspection

- Insulation is complete
- All required confirmation documentation is ready for the EarthCraft Technical Advisor to review onsite as specified on the EarthCraft Worksheet and in the EarthCraft Multifamily Guidelines

Step 14: Insulation Inspection Report Submittal

Upon completion of the Insulation Inspection, EarthCraft Technical Advisors are required to provide inspection reporting to the Multifamily Developer, General Contractor, and Viridiant. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Insulation Inspection as reported by the EarthCraft Technical Advisor.

EarthCraft Technical Advisor Responsibilities

Submit the following documents to Viridiant within one business day* of each Insulation Inspection:

- Pre-Drywall Inspection Report

Inform Multifamily Developer and General Contractor of inspection Results

- Inform the General Contractor of the inspection results verbally, immediately following the inspection.
- Provide Multifamily Developer and General Contractor a copy (either electronic or paper) of all reports submitted to EarthCraft.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical Advisor may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with Viridiant (as necessary)

- Please contact Viridiant directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical Advisor may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with Viridiant (as necessary)

- Please contact Viridiant directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

Step 15: Final Inspections

All EarthCraft Multifamily projects must pass a Final Inspection on a minimum of the agreed upon sampling of units. During the Final Inspection, an EarthCraft Technical Advisor confirms all program criteria through visual inspection, documentation review and diagnostic testing of the building. The Multifamily Developer and General Contractor provide project documentation to support the final inspection. When an entire floor or section is ready, an EarthCraft Technical Advisor will visit the site and conduct final testing. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Final Inspection as reported by the EarthCraft Technical Advisor as the project cannot be certified until all issues are remedied.

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the Final Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the Final Inspection, EarthCraft Technical Advisors must inspect and confirm:

All units

- Plans represent the project as constructed
- Requirements in the EarthCraft Multifamily Worksheet are fulfilled and that no items confirmed as compliant during pre-drywall have changed
- Items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer at the final inspection)
- Visual inspection and confirmation of fixtures and appliances consistent with efficiencies specified for the project for EarthCraft Multifamily certification in units tested

Sampled units

- Building envelope and duct system meet program criteria for performance:
 - Pressure testing of a sampling of units (one of each unit type in the various configurations within the building not to total fewer than 30% of total number of units) to confirm units meet or surpass established infiltration goals and duct leakage requirements. Sample set must include a minimum of 50% of units with ductwork located outside of the building envelope.
 - If each dwelling unit within the building meets the diagnostic testing goals, then no further diagnostic testing will be necessary.
 - Should a unit fail, then 2 additional units will be required to be tested.
 - This additional pressure testing is not included in the standard scope and will add additional cost per unit tested.
 - If both of the 2 additional units fail or any other items fail, then 7 dwelling units in a row will be subjected to diagnostic testing before sampling can continue and the General Contractor will be directed to correct all the failed dwelling units. If any of the 7 units fail or additional items fail, sampling will cease until a root cause analysis has been completed and all failures corrected. This additional testing is not included in the standard scope and will add additional cost per unit tested.

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Inform General Contractor of inspection results

- The EarthCraft Technical Advisor should inform the General Contractor of the inspection results verbally, immediately following the final inspection
 - Diagnostic results
 - Documentation review of worksheet line items

Review EarthCraft Project Documentation

Upon receipt from the General Contractor, review all required documentation for credit specific confirmation. Notify General Contractor of items outstanding or not in compliance with program requirements.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule Final Inspection

The General Contractor is responsible for scheduling the final inspection once the building, floor, or section is ready for occupancy and all EarthCraft measures have been completed. The General Contractor should then:

- Notify the EarthCraft Technical Advisor that project will be ready for final inspection at least one week in advance.
- Request that a Multifamily Developer representative will be available onsite if desired
- Make sure that no conflicting trades are working onsite, e.g. floor finishers, touch-up painters, carpet installers, etc.

Notes:

Occupied Final Inspections – NO EXCEPTIONS

In the event that an occupied final inspection must be performed, the following rules apply:

- General Contractor must be onsite the entire time
- All pets crated or removed from the home
- All ducts must be accessible; EarthCraft Technical Advisors may not move occupants' personal belongings
- Conversations are between the EarthCraft Technical Advisor, Multifamily Developer and the General Contractor; the General Contractor is responsible for all conversations with occupants; and EarthCraft Technical Advisors should avoid talking to the occupant about the certification, and should never discuss the unit's performance with the occupant.

Ensure project is ready for inspection

Units ready to receive a Certificate of Occupancy are typically ready for a final inspection. The General Contractor identifies a building, section, or floor in which all of the units have the following items complete prior to the final inspection:

- All windows and doors installed
- All exterior doors weather-stripped
- Thresholds installed on all exterior doors and entrance doors
- All ceiling penetrations in mechanical closet sealed including plenum penetration through ceiling
- All plumbing penetrations are air sealed at drywall
- All light fixtures and additional ceiling penetrations sealed where insulation is in contact with dwelling unit
- All HVAC boots penetrations are sealed at interior finish
- All bath fans are sealed to drywall at rough opening through walls or ceilings.

Complete EarthCraft Project Documentation

Specific line items in the EarthCraft Multifamily program require documentation to confirm the credit intent has been met. Prior to the first Final Inspection, submit all required documentation to the EarthCraft Technical Advisor for review.

At the completion of the final inspections, the Multifamily Developer is required to:

- Sign the final version of the EarthCraft Worksheet acknowledging project's compliance with EarthCraft program guidelines and requirements

Step 16: Confirmed Energy Model(s)

After the final inspection, the Viridiant Multifamily Team develops a finalized energy model for each project.

Viridiant Multifamily Team Responsibilities

Finalize energy model for project

The Viridiant Multifamily Team must:

- Revise the energy model at project completion to reflect as-built conditions
- Determine project's ability to meet program requirements
- Develop options to meet program requirements if a project is ineligible

Multifamily Developer Responsibilities

No responsibilities at this step in the process

General Contractor Responsibilities

No responsibilities at this step in the process

Step 17: Final Inspection Report Submittal

EarthCraft Technical Advisors are required to submit final inspection reports to the Multifamily Developer, General Contractor and Viridiant.

EarthCraft Technical Advisor Responsibilities

The EarthCraft Technical Advisor must submit the following documents to Viridiant within twenty business days of each final inspection:

- Final Inspection Testing Sheet

The EarthCraft Technical Advisor must submit the following documents to Viridiant within 30 business days of the last final inspection of the project:

- Final EarthCraft Worksheet
- EarthCraft Worksheet Cover signed by Multifamily Developer, General Contractor, and EarthCraft Technical Advisor
- AHRI Certificates or Manufacturer equivalent
- Unit matrix indicating unit types in each building and corresponding unit numbers

Projects seeking Energy Star certification (in addition to list above)

- Rater Design Review Checklist and Rater Field Checklist
- HVAC Design Report
- HVAC Commissioning Checklist
- Water Management System Builder Requirements

Inform Multifamily Developer and General Contractor of Final Inspection Results

- Provide Multifamily Developer and General Contractor a copy (either electronic or paper) of all reports submitted to Viridiant.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.
- Sign the EarthCraft Multifamily Worksheet Cover Page once the Technical Advisor provides it and return it to the Technical Advisor

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical Advisor may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.
- Sign the EarthCraft Multifamily Worksheet Cover Page once the Technical Advisor provides it and return it to the Technical Advisor

Step 18: Certification

Final certification is approved by the EarthCraft Technical Advisor working with the Viridiant staff.

Viridiant Multifamily Team Responsibilities

Provide EarthCraft Multifamily Developer with certificate upon receipt from Viridiant

The Viridiant Multifamily Team is responsible for providing the Multifamily Developer the EarthCraft Multifamily certificate for the project. EarthCraft Multifamily Developer can expect to receive the certificate within 14 business days of Viridiant receiving all required project documentation and contract payment.

General Contractor Responsibilities

No responsibilities at this step in the process

Additional Steps

The process outlined above illustrates a project that is a repeat project between a Multifamily Developer, General Contractor and an EarthCraft Technical Advisor that does not run into any major problems. As every project is unique, there are additional steps that may be required in order for a project to become EarthCraft Certified.

Re-Inspection

If a project does not meet the criteria for the EarthCraft program at the time of the inspection, the Multifamily Developer has the option of making improvements to the project in order to meet the guidelines. In order to certify the unit at this point, the Multifamily Developer must contact their EarthCraft Technical Advisor for a re-inspection. There is typically additional cost for re-inspections.

Note:

The EarthCraft Technical Advisor will determine whether the issues identified within the project may realistically be improved and therefore whether a re-inspection is appropriate for the project. Some projects may be ineligible for re-inspections due to the inability to meet program criteria.

Cancellation

To prevent cancellations, EarthCraft Technical Advisors and Multifamily Developers are encouraged to stay in touch in the days and hours leading up to an inspection to confirm the project is still on track and will be ready for the inspection. To avoid cancellation fees, it is the General Contractor's responsibility to cancel an inspection according to the cancellation policy of each EarthCraft Technical Advisor.

Project Close-Out

Multifamily Developers are responsible for ensuring that all projects seeking EarthCraft Multifamily certification comply with project certification requirements. However, not all projects that were registered with Viridiant will meet these requirements. Viridiant has the authority to determine that projects cannot meet requirements of the program.

Registered projects that have no activity for a period of nine months will be automatically closed-out by Viridiant staff. In order to re-open closed projects, a fee of \$125 will be charged to the party that registered the project.

Projects that do not ultimately become certified are not refunded any fees (including registration fees). All projects closed by Viridiant staff will receive an email notification to the Multifamily Developer and EarthCraft Technical Advisor.

Scopes of Work

All EarthCraft Multifamily projects must be contracted for all of the scopes of work described below under All Projects. Renovation projects, defined as those that do not expose framing during the construction process, require additional steps as listed in the Renovation projects section; Gut-rehab projects do not qualify to utilize the Multifamily Renovation worksheet.

All Projects

Energy Modeling

- Develop unit level energy models to assess energy performance meets EarthCraft requirements.
- Provide additional recommendations to further optimize the energy performance of the buildings to reach program compliance.
- Produce improvement report of further steps that could enhance energy performance and, if not already meeting this goal, recommend steps to reach benchmark. Review necessary and suggested components with appropriate stakeholders in pre-construction meeting not to exceed two (2) hours in length.

Design Review

- Review plans prior to submittal for incorporation of recommended EarthCraft Multifamily concepts and consistency with sustainability objectives.
- Meet with stakeholders to discuss comments and clarify any detail questions. Establish existing benchmarks and energy goals for the project.
- Produce report summarizing suggested modifications that should be incorporated to reach certification and hold meeting with stakeholders for any needed clarification.

Kickoff Meeting

- During preconstruction kickoff meeting review EarthCraft measures with general contractor's project manager and site supervisor, and any subcontractors whose work are impacted by EarthCraft standards:
 - Confirm utilization of appropriate and specified framing details and techniques
 - Identify possible building envelope issues not noted at the plan review stage and work with General Contractor and appropriate subcontractor to suggest appropriate modifications or corrections.
 - Review design expectations and specifications with HVAC, electrical, insulation, and air sealing subcontractors prior to commencement of their work to ensure compliance with all applicable program standards.
 - Meet with all appropriate contractors to outline expectations and answer questions.
- During early stages of construction review project on site with appropriate stakeholders and subcontractors
 - At commencement of framing confirm implementation of appropriate and specified framing details and techniques with the framing contractor to ensure compliance with all applicable program standards.
 - Review design expectations and specifications with the air sealing and insulation subcontractors at commencement of their work to ensure compliance with all applicable program standards, and if necessary to identify building envelope issues not noted at the plan review stage and work with the General Contractor to suggest appropriate modifications or corrections.
 - Review design expectations and specifications with HVAC subcontractor at commencement of their work to ensure compliance with all applicable program standards.
- Produce written reports noting deficiencies and recommended corrective measures for each site visit and provide copies of report for Developer, General Contractor and the appropriate sub contractors.

Air Sealing Inspections

- Visual inspection of each unit prior to insulation application to identify potential air sealing issues. Review identified issues on site with General Contractor, and appropriate subcontractor if available.
- Produce a written report noting any specific deficiencies, identifying problem areas, and suggesting corrective measures as well as review this report with General Contractor, developer and appropriate contractors.

HVAC Initial Diagnostics/Inspections

- Visually inspect each unit's HVAC equipment and duct systems at rough-in for sizing compliance, and installation design recommendations. A minimum of one connection in each system will be visually inspected for proper mastic sealing details.
- Perform total leakage duct pressure tests on a sampling of systems. Quantify total duct loss, identify leaks and note any possible "weak points" in the sampled systems. Review the identified issues with the HVAC subcontractor on site.
- Produce written reports noting deficiencies and recommended corrective measures for each site visit and provide copies of report for Developer, General Contractor and the appropriate sub-contractors.

Insulation Inspections

- Visual inspection of each unit at insulation application to identify possible insulation coverage and envelope issues. Review identified issues on site with General Contractor and appropriate contractor if available.
- Produce a written report noting any specific deficiencies, identifying problem areas, and suggesting corrective measures as well as review this report with General Contractor, developer and appropriate contractors.

Final Inspections

- Pressure testing of all units in the project unless approved for sampling. If approved for sampling, pressure testing of a sampling of units (one of each unit type in the various configurations within the building not to total fewer than 30% of total number of units) to confirm units meet or surpass established infiltration goals and duct leakage requirements. Identification of problem areas, if necessary. Communication with General Contractor and Developer to address issues. Produce a written report of results to be provided to the General Contractor and Owner. Testing failures will require the testing of additional units, which is outside of the scope of work and will incur additional fees.
- Visual inspection and confirmation of fixtures and appliances consistent with efficiencies specified for the project for EarthCraft Multifamily certification in all units.

Renovation Projects (Gut-Rehab not included)

Pre-Renovation Assessment

- Determine current energy performance of various existing unit level envelopes to assess current energy performance and measure units against current energy code compliance.
 - Access to a sampling of units prior to any demolition to conduct an inspection for purposes of establishing the performance benchmarks of lighting and plumbing fixtures as well as all appliances. These inspections will include one of each unit type in its worst case condition within the building.
 - Duct Blaster and Blower Door measurements will be performed on the sampling for an establishment of baseline measurements required for the energy model.
 - Review existing conditions and note any areas of concern related to building condition or improvement strategy. Identify other opportunities for energy and/or durability improvements.
- Provide recommendations to optimize the energy performance of the building. Produce a report on envelope and systems improvement identifying further steps that could enhance energy performance and prioritize measures in terms of impact with an overall goal of achieving an EarthCraft certification.
- Produce a copy of the EarthCraft worksheet that prioritizes recommended improvements and provides template for meeting EarthCraft House certification.

EarthCraft Multifamily Project Quality Assurance and Minimum Standards for Sampling

Overview

Each EarthCraft Multifamily project is subject to a Quality Assurance review. This review will be conducted by Viridiant staff trained in the multifamily inspection process and may include an onsite visit, at the discretion of Viridiant. Scheduling of this visit is the responsibility of the EarthCraft Technical Advisors and must allow for units to be inspected at both pre-drywall and final inspection phases. Any exceptions to this policy must be approved, in advance, by the Viridiant Multifamily Program Manager.

Viridiant will require and verify that an energy rating model is provided for each option package for each unit type, that each rating is set to worst case orientation, and that all location related characteristics are set to worst case.

We will require and verify that all rating files are set to the worst case threshold specifications for that unit type and that copies of all inspection and test sheets for all sampled units be provided for verification that each unit meets or exceeds the worst case threshold specifications. In addition, we will require that all units receive sampling disclosure labels per RESNET Standards.

We will require that the builder qualify for sampling for each project by completing sampling controls on 7 consecutive units without incidence of failure and that all subsequent sample sets be located within the same qualifying project. We will require that any new project be required to qualify for sampling by completing sampling controls on 7 consecutive units without incidence of failure.

We will only allow sampling controls for the purpose of performing blower door and duct blaster testing for units taking credit for reduced infiltration and duct leakage. We will require that all units within a sample set be clearly defined and that a full set of controls be performed at a rate of not less than 1 in 3 units. Also, all tested units must be tracked and test sheets filled out and submitted to Provider to verify that the test results meet or exceed the minimum threshold specifications for that unit type.

All failures are required to be documented and reported to Provider within 20 business days. If an item fails, the two additional units within the sample subset of 3 units must have the failed item(s) tested or inspected and the initial failed unit must be retested or inspected after the builder has been notified of failure and the failure has been remediated. If an additional failure of the same item occurs in one of the two additional units, the failure must be remediated in both units and retested or re-inspected. If both of the two units have a failure of the same item or if additional failures occur, 7 units in a row must successfully pass testing or inspection for sampling to continue. If any additional failures occur in those 7 units, testing must cease until a root-cause analysis is performed by builder and submitted for review, all failures have been corrected, and the builder re-qualifies for sampling in the project by completing sampling controls on 10 consecutive units without incidence of failure. If three additional failures occur within a 90 calendar day period for the same item, that item must be inspected or tested for 100% of the sample set, with a minimum of 7 units. If the three additional failures within a 90 calendar day period occur for different items, the sampling process must begin again and 7 consecutive units must pass for all items before sampling may commence again.

We will not allow a "root-cause analysis" to be performed as an exception. We will require that the failure be corrected and inspected in all units in the sample set. Additionally, we will require a "root-cause analysis" as a requirement before allowing the builder to resume sampling.

Units that are seeking verification through means other than performance testing will not be eligible for sampling under our Providership. Therefore, blower door testing and duct testing will be required sampling controls under our Providership.

What to expect in EarthCraft Multifamily

For all projects

Site Planning

The Site Planning section will be very different from single family. The EarthCraft Technical Advisor will need to confirm all site planning points being tracked. Additionally, certain items on the worksheet can only be confirmed in the earliest stages of construction. These items such as slab insulation or drainage planes which are installed prior to inspections can be confirmed through other means (pictures, details on architectural/civil plans, product receipts).

Fresh Air Intake Strategy

Fresh air ventilation implementation in multifamily can be accomplished in several different ways, including supply only ventilation ducted to individual air handlers, central dedicated outside air systems, or ERVs in each unit. Viridiant will work closely with each project team to determine a strategy that meets the goal of providing fresh air at a minimal energy penalty, while working within code and budget constraints.

Air Sealing and Insulation

Multifamily protocol will require a separate air sealing and insulation inspection for each building section. Each unit within a predefined building section/floor must be inspected and any deficiency should be clearly identified on the inspection report.

While working on EarthCraft projects the EarthCraft Technical Advisor will fill out inspection documents developed by Viridiant specific to EarthCraft Multifamily.

HVAC Initial Diagnostics/Inspection

Multifamily inspections will require a visual inspection of appropriate duct sealing in all units of the building. The inspection process also requires a sampling of pre-drywall HVAC tests to ensure duct sealing is being completed in accordance with EarthCraft duct testing requirements. During HVAC Initial Diagnostic tests, the EarthCraft Technical Advisor will test a minimum of 10% of systems at rough in. At this time each unit tested should be achieving 10% total duct leakage or less to provide confidence the unit will pass all final duct testing requirements. When total duct leakage is above this percentage the EarthCraft Technical Advisor should identify potential issues and provide feedback to the site supervisor to ensure the HVAC sealing requirements are reached.

Final Testing Requirements

Current requirements for final diagnostic testing are different between single family and multifamily projects. For EarthCraft multifamily one-third of all units (subject to sampling protocol requirements) must be tested for duct leakage and air infiltration compliance.

Blower Door requirement:

- All units must meet the required infiltration rate
- Bonus points may be awarded when 80% or more of all units tested achieve the level of infiltration designated on the worksheet
- All dwelling units must be completely compartmentalized from one another to ensure infiltration goals are achieved at final tests. Available strategies will be influenced by the type of fire separation system utilized for the project. Please consult with the project design team to understand the planned fire system and contact Viridiant for further advice on achieving appropriate compartmentalization under specific scenarios. Common options may include draft blocking between units and between the unit and corridors/breezeways or air tight drywall approach employed at each unit when draft stopping is not part of the fire separation requirement.

Duct Blaster requirements:

- When testing open returns it is often possible to pressurize directly into the open return in the mechanical closet. If the return is blocked by a low-boy water heater it will be necessary to tape off the return and pressurize through a supply.

Common Areas including Community Centers

Common areas must comply with all thermal bypass requirements for air sealing, insulation, and HVAC, and EarthCraft Multifamily worksheet items, excluding diagnostic testing requirements.

Confirming the Worksheet

The EarthCraft Technical Advisor has the same responsibilities at this step as in the EarthCraft House project process.

Common Multifamily Obstacles

Fresh air ventilation

To ensure compliance with EarthCraft Multifamily standards, please review the current fresh air ventilation requirement located on the Viridiant website.

This duct run must be horizontal in order to prevent stack effect and the duct must draw from a clean point source a minimum of 10 feet from any pollutant sources including dryer and bath exhaust, roof tops, breezeways facing parking garages, and vehicle idling zones.

Fresh air extended through soffit

All fresh air intakes must be permanently affixed to the exterior when run to the soffit vent in the attic.

Exhaust fans and fresh air extended through soffit

All exhaust fans including bath fans, dryers, range hoods, must be extended to the exterior of the building on all levels. If run to the soffit in the attic, these exhaust fans must be permanently affixed to the exterior of the soffit.



The vent is extended to the soffit but not extended and permanently affixed through the soffit.

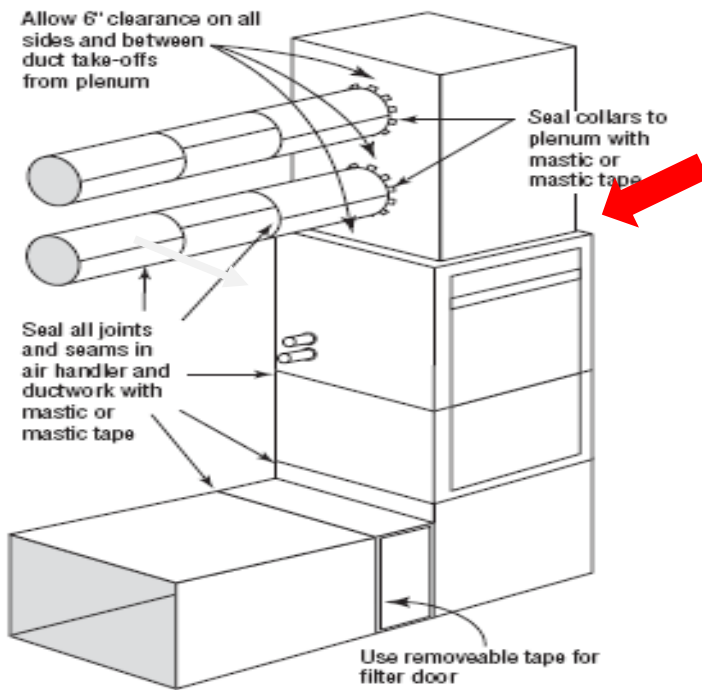
Sealing penetrations in mechanical closet

Mechanical closets can represent areas of high air infiltration and/or duct loss. Paying special attention to sealing all penetrations in the mechanical closet is an essential component of reducing air infiltration rates.

Sealing air handler to plenum

In multifamily settings, a common area causing high duct leakage and failure on duct leakage tests is the plenum connection to the air handler on the back side of the plenum. This area is hard to reach and it is common for a ¼ to ½ inch gap to be left open, leading to failures in test results at final diagnostic testing. Special attention should be given to sealing this area during installation,

and if necessary, space planning should consider adding room to properly seal and maintain hard to reach areas within the mechanical closet.



Air sealing at bath fans

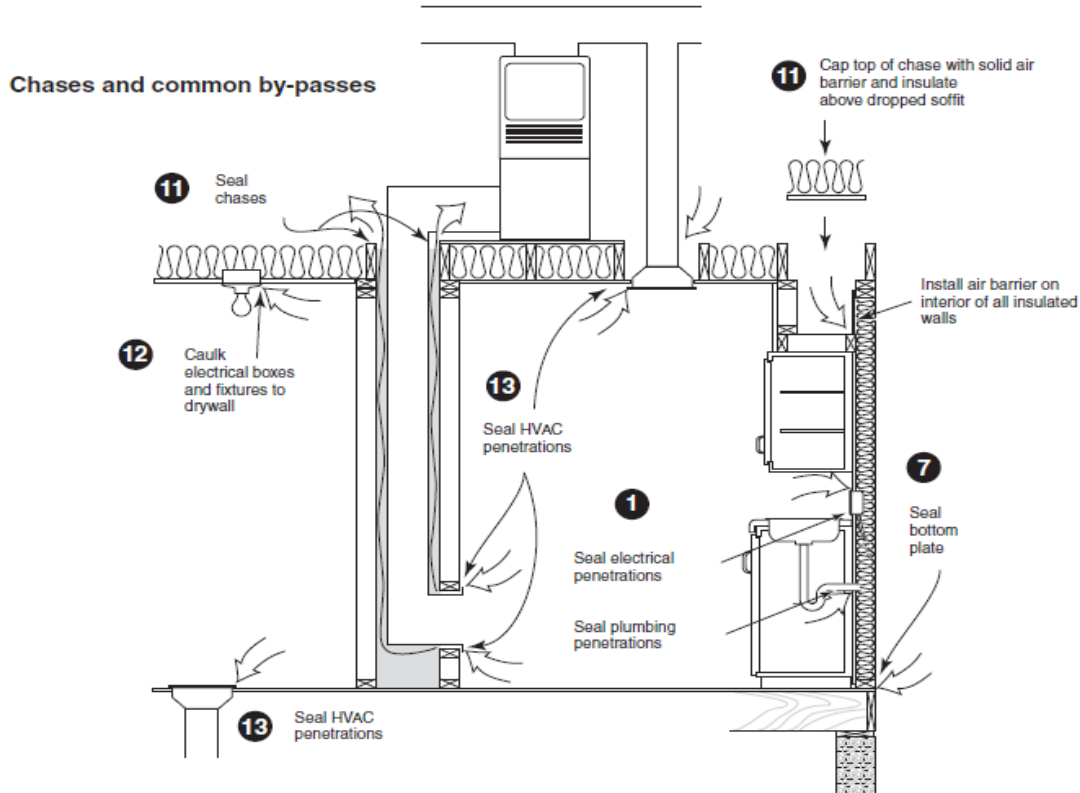
Bath fans must be sealed to drywall for penetrations in ceilings and/or walls on each level of the building. Bath fans must be sealed in all common area restrooms.



Ceiling penetrations air sealed

Gaps around ceiling fans and light fixtures must be sealed at any level in contact with attic space. If the attic space is conditioned it is best practice to seal these areas to reduce air infiltration rates during final testing, resulting from pulling large quantities of air from the attic space. HVAC boots must be sealed at all levels in both units and common areas to prevent air infiltration and reduce

duct leakage caused by substantial quantities of air “bouncing” off the back of the register back into the floor cavity or attic.



Air sealing wall penetrations

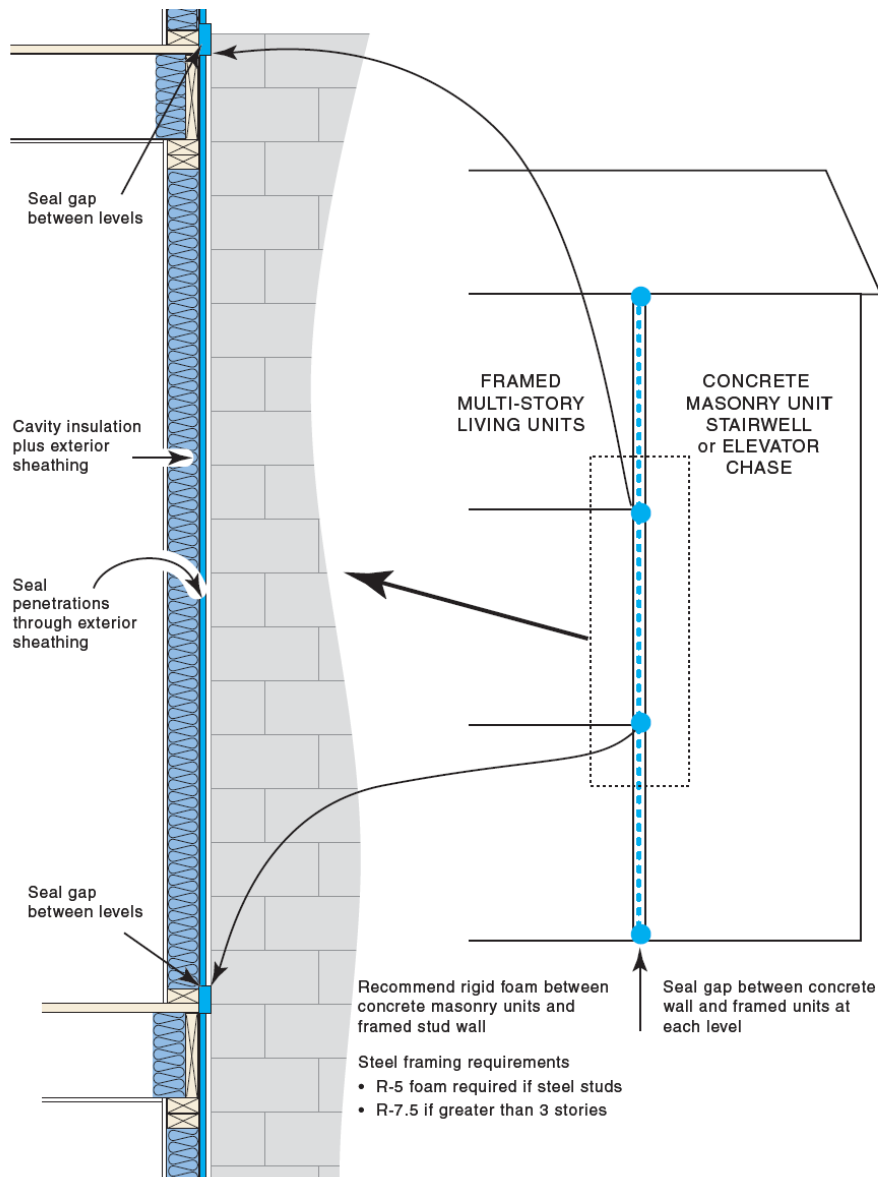
To completely air seal wall penetrations a putty pack must be applied to the back of the junction box and a bead of caulk must seal the junction box to the drywall.

Scheduling inspections

While EarthCraft Technical Advisors make all efforts to accommodate any site visit, it is important to provide as much lead time as possible while scheduling inspections. Busy work schedules may cause delays if scheduling is not provided in advance of necessary inspections. Please provide a week advance notice for inspection needs. Best practices in scheduling would include placing EarthCraft inspections on a master schedule at the beginning of construction and updating the EarthCraft Technical Advisor as inspection needs change. Other best practices include informing the EarthCraft Technical Advisor when air sealing, HVAC, or insulation is scheduled to be completed on site and setting up an appropriate day for inspections of the given section/level.

Air leakage at stairwells, firewalls, elevator shafts, foundation walls

Areas of high air infiltration can be found adjacent to stairwells, firewalls, poured foundations, and elevator shafts. These conditions for air loss can be even greater at top floor units adjacent to stairwells, firewalls, and elevator shafts. Special attention should be given to air sealing corners, top plates, and bottom plates at these areas. Best practice at these areas would be using an air tight drywall approach for the unit. Viridian can provide further details on using air tight drywall systems.



Sealing air barrier at chases

Although blocking of chases is a common practice, builders commonly miss critical air sealing details around the air barrier material. To properly seal the chase at the ceiling height, air sealant should be applied to the perimeter of the air barrier material. This is most important where chases are located at attic spaces.

Protecting Indoor coils during construction

The EarthCraft program requires all HVAC boots be protected during construction and all indoor coils be protected until the finished floor of the unit is in place. This will prevent large amounts of construction debris from collecting on the coil, which can cause poor equipment performance and lead to poor indoor air quality for tenants.

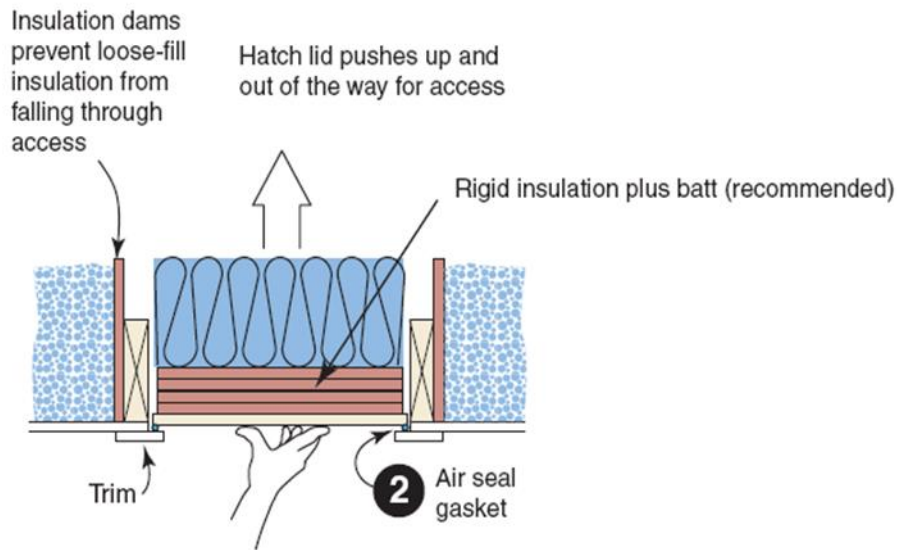
Block exterior wall at cantilevered floors

Blocking above cantilevers will improve ability to insulate band area, reduces air flow from expansion gaps that can cause air infiltration issues within the unit, and isolates unit from exterior conditions which would otherwise be connected through the cantilevered floor.

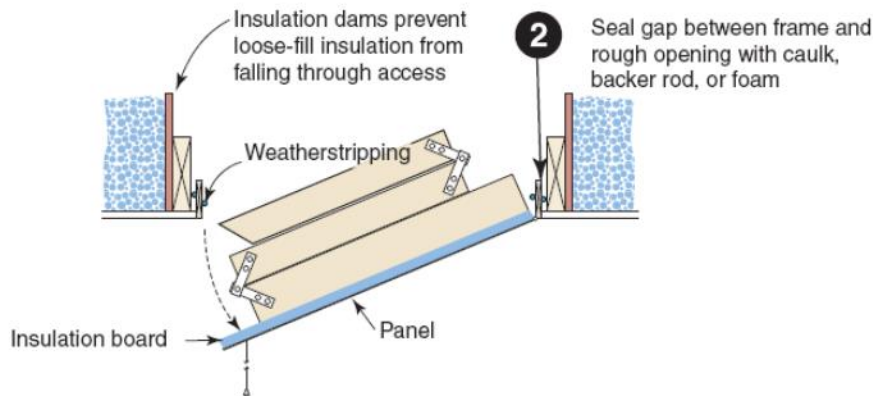


Sealing and insulating attic access within units

It is important to pay close attention to required air sealing elements and insulation requirements for attic access stairs and attic access scuttle hole doors. These areas can lead to higher air infiltration rates and comfort issues if not appropriately covered. Air sealing considerations include weather-stripping and air sealing at rough opening of at scuttle holes/pull down stairs. Insulation considerations include R-38 for attic pull down stairs and scuttle holes. Compressed batts are not acceptable for this application.



Attic pull-down stairs



Keeping construction waste separated from recycling

EarthCraft Technical Advisors will be inspecting for recycling compliance while on site. It is important to develop a plan for waste management and clearly identify recycling requirements through posted signs on site and within contracts with all trades.

Contracting EarthCraft Multifamily items with Sub-Contractors

It is important to ensure all EarthCraft Multifamily requirements are clearly identified in contracts with sub-contractors. Some of the biggest hold ups are created when certain air sealing, insulation, or HVAC elements are not clearly identified within the sub-contractors scope of work. Use the EarthCraft Multifamily program worksheet as a guide to ensure the appropriate elements are transferred to the contract with each sub-contractor.

Sampling Quality Management Guidelines

Relationship between Quality Management and Sampling Protocol

Many general contractors have existing and well-developed quality management plans. Other general contractors do not have one. Sampling is a process whereby the responsibility for quality management is shared between the general contractor and the EarthCraft Technical Advisor. The general contractor's quality management plan is the general contractor's commitment to their share of the quality management process. The sampling protocol is the EarthCraft Technical Advisor's commitment to their share of the quality management process - which is highly dependent on the general contractor's ability and commitment.

A general contractor that chooses to use this sampling protocol should have a quality management plan. If the general contractor does not have one, the first step is to create one. Basic elements of a quality management plan include:

1. Designate and train general contractor's in-field supervisors on their specific oversight and sign-off responsibilities
2. Develop detailed scopes of work for each trade that are focused on quality-critical tasks;
3. Include scopes of work, and compliance requirements in all trade contracts
4. Plan and conduct kick-off meetings for each project where performance goals and consequences of missing performance goals are clearly specified
5. Provide appropriate training on green home building, inspections, and performance testing requirements to all trades before starting work on the project
6. Require trade and general contractor supervisor approval and sign-off on all quality-critical measures
7. Schedule the EarthCraft Technical Advisor to be on-site during the completion of each measure (that requires testing or inspection) in the first unit in sample set

ENERGY STAR Qualifying Units in Multiple Family Buildings

EPA's eligibility requirements for qualifying individual Multifamily units under the ENERGY STAR New Homes program are as follows:

- All units in Multifamily buildings three-stories or less can qualify for ENERGY STAR.
- Units in four- and five-story Multifamily buildings may qualify for ENERGY STAR if:
 - The structure is permitted as residential by the local building department
 - Each residential unit has its own heating, cooling, and hot water systems, separate from other units
 - The phrase, "permitted as residential structures," is intended to represent units that either fall within the scope of the residential building energy code or are permitted as having a residential use-group, even under conditions where the commercial building energy code applies
- Multifamily units that are located on top of commercial spaces (e.g., retail, restaurant, etc.) may be qualified as ENERGY STAR even if the structure is permitted as commercial, as long as:
 - The entire structure is five stories or less
 - Each residential unit has its own heating, cooling, and hot water systems, separate from other units

Specifications

ENERGY STAR specifications can be determined through a performance path custom analysis, which requires RESNET-approved HERS software to be used. Each unit can be modeled individually, or the unit with the highest percentage of exposed wall area can be used as a proxy for all other units if the other units have the same or less window-to-floor area ratio, and the same or more stringent energy features. At minimum, the worst case unit of each unit type should be modeled.

Field Confirmation

The same field confirmation requirements required for single-family homes apply to Multifamily buildings. This includes field inspecting and testing each individual unit, or using the RESNET Sampling Protocol.

ENERGY STAR Policy for Attached Housing – Version 2

Attached housing is defined as one dwelling that shares a common floor, ceiling, or wall with one or more adjacent dwellings. Common examples include condominiums, apartments, townhomes, and duplexes.

This sector of housing has certain characteristics that make it unique with consideration to energy policy. First, the common surfaces are generally adiabatic, making the homes more efficient than an equivalent detached home. Second, due to fewer windows, smaller conditioned floor areas, and the common surfaces, HVAC loads are typically small, making high-efficiency HVAC systems less cost-effective.

To address these unique characteristics, EPA has developed the following modified performance and prescriptive path for qualifying such homes with the ENERGY STAR mark.

ENERGY STAR Attached Housing Performance Requirements

To qualify an attached house in the performance path, the house must meet the minimum requirements specified in the ENERGY STAR New Homes National Performance Path Requirements, with the one following exception — all dwellings on the same level and within the same structure may be qualified if the following conditions are met:

- The dwelling with the highest percentage of exposed wall area meets the required HERS index
- The other dwellings have equal or lesser window area to floor area ratio
- The other dwellings use the same, or more stringent, energy efficiency features as the dwelling identified in item 1
- All dwellings are confirmed in accordance with EPA verification requirements for ENERGY STAR Qualified Homes
- The entire structure falls within the scope of the residential code where it is built. Most residential building codes apply to structures up to three stories tall. However, depending on the jurisdiction where the building is constructed, apartment or condominium buildings up to five stories tall may be constructed using the residential building code and be eligible to use this policy.

For example, for a three-story building with condominiums, all condos on the same level shall meet the ENERGY STAR attached housing performance requirements if the condo with the highest percentage of exposed wall area on that level meets the required HERS index; the other condos on that level have equal or lesser window area to floor area ratio; the other condos on that level use the same, or more stringent, energy efficiency features as the condo with the highest percentage of exposed wall area; all condos are confirmed and field-tested in accordance EPA verification requirements. Note that the condo with the highest percentage of exposed wall area on the top level cannot be used to qualify condos on the first or second level and vice versa.