**RESNET® Off-Site Construction Advisory Group**

**Recommendations for a Pilot Program**

**Background and Overview**

Off-site residential construction is becoming an increasing trend in the home building industry. It is estimated that 25,000 (non-HUD code) homes were constructed off-site in 2023. This number will only grow as construction costs and labor challenges continue.

Currently due to the process of constructing off-site homes, there are challenges to have the homes rated through the current RESNET process. RESNET sees the expansion of HERS® Ratings of off-site construction as an important element in meeting the goal of a million ratings a year by the end of 2028.

To meet this challenge RESNET has appointed an Off-Site Construction Advisory Group. Steve Byers of EnergyLogic was appointed as the chair of the group.

Members of the advisory group are:

* Steve Byers – EnergyLogic (Chair)
* Bruce Bennett - GDS Associates Inc
* Chris Isom - Vederra
* Luke Lehman - ICC NTA
* Tony Lisanti - Integral Building + Design, Inc.
* Ryan Meres - RESNET
* Shanti Pless - NREL

The advisory group began meeting in July 2024 and presented its initial recommendations to the RESNET Board in August 2024. After receiving feedback from the Board, the advisory group revised its recommendations and developed additional recommendations for factory and on-site inspections.

The next step is to propose a recommendation for a RESNET pilot program to test the protocols for factory inspections by RESNET-accredited Rating Providers.

**Recommendations for a RESNET Pilot Program for Off-Site Construction**

The Off-Site Construction Advisory Group is recommending a 12-month pilot program to test new protocols for factory inspections of HERS Rated homes. The full list of factory inspection options are included in Attachment A. The advisory group recommends the following as part of this pilot program:

* RESNET should create a simple process for Rating Providers to sign up to participate in the pilot.
* Rating Providers shall be expected to follow the protocols and provide feedback to RESNET Staff and the advisory group throughout the pilot.
* RESNET staff should seek input from the ENERGY STAR and Zero Energy Ready Home programs on the off-site construction inspection and oversight protocols.
* Six months after the commencement of the pilot, RESNET staff and the advisory group should review all feedback and determine whether the inspection and oversight protocols should be revised.
* Upon completion of the pilot, the advisory group shall review all feedback and make a recommendation to the RESNET Board on necessary revisions to the protocols and whether to move forward with a change to RESNET standards.
* If no significant concerns are revealed through the pilot program, RESNET Rating Providers should be allowed to continue operating under the pilot protocols for off-site construction until any revisions to the RESNET standards are finalized.

The following guiding principles were used in the development of inspection protocols.

* Compliance with the intent of Standard 301 and MINHERS
* Verification must be by certified RESNET professionals (HERS Rater, RFI) via on-site inspections or remote/virtual protocols
* There should be comprehensive archiving of assessment/inspection data
* Pathways should be streamlined and compatible with off-site construction to not limit the applicability and the market for HERS and energy efficiency programs.
* Pathways should strive to attain a level playing field between off-site and on-site, neither advantaging nor disadvantaging either

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## **ATTACHMENT A**

## **Off-site/Modular Construction Inspection Options**

Off-site or modular construction companies come in many shapes and sizes. They can be broadly categorized as any form of construction that takes place primarily in a plant (or factory) setting as opposed to traditional on-site construction. It is important to recognize that different plants have different operating models, they are not monolithic. Most plants build volumetric modules for specific projects and are able to adapt to different codes and program requirements.

We are specifically not addressing manufactured homes with steel floor systems that are transported with wheels (HUD homes for example).

Plant operators have an interest in reducing barriers to successful completion of HERS Ratings on the homes they produce. The nature of the plant setting creates an obstacle to HERS Raters or RFI’s physically inspecting each unit. Obstacles include the distance of HERS Raters from factories, which are typically in more rural locations as well as the quick pace at which factories can produce modules.

These obstacles can make it cost-prohibitive for modular home builders to obtain HERS Ratings as well as other energy efficiency program certifications, based on RESNET’s current standards. For this reason, it is necessary for RESNET to consider innovative solutions that acknowledge the uniqueness of off-site construction practices.

The inspection options, presented below, were developed by RESNET’s Off-Site Construction Advisory Group as a way to streamline factory inspections while maintaining the intent of RESNET’s standards and quality assurance oversight.

# **Inspection Options**

### **Option 1 – Virtual/Remote Inspection of Factory Built Components**

### **Description:**

Many plants and factories are already operating with continuous or episodic video monitoring of workstations and have sophisticated digital management systems. Where that is true, it should be relatively easy for a HERS organization to perform inspections that are in essence the equivalent of being on-site full-time. Where that is not true, the plant operators would need to install such monitoring on the necessary workstations. It is important to note that, given the production line nature of these operations, the Rater or RFI will have to perform such inspections in a timely fashion. Just as with conventional construction, missed inspections that are subsequently covered up preventing visual verification will result in loss of certification.

The COVID pandemic provided a body of evidence and experience that remote inspections can work well.

## **Protocols for Virtual/Remote Inspections for Off-site Construction**

**Plant/Factory Requirements**

1. Continuous or near continuous recording of work performed at all stations that impact the HERS Ratings and any energy efficiency program (EEP) that is being considered for compliance.

a. Thermal envelope

b. Thermal air barrier

c. Insulation

d. Mechanical equipment and/or ductwork that will be inaccessible after shipment from plant

2. Maintain digital storage of all work performed at workstations as defined above

3. Education by Rating Provider on HERS and EEP requirements

a. Initial training

b. Annual update training

c. Continuous update training on material changes to HERS and/or EEP requirements

**HERS Provider Requirements**

* Initial and annual inspection of plant video monitoring setup and operation
* Perform quality assurance on all work done via virtual/remote inspections in alignment with RESNET standards for file and field reviews
* Maintain records of all inspections performed
* Maintain digital storage of all work performed in-plant at designated stations
* Verify the plant’s capabilities for video monitoring and documentation of required inspection components
* Work with plant owners or leadership to update their procedures to ensure the required inspection items are able to be reviewed remotely by a HERS Rater or RFI.
* Ensure plant leadership is aware of the required inspection items
* Train plant leadership and personnel on the remote/virtual inspection process
* Ensure rating staff are properly equipped to review video monitoring and documentation

### **Option 2 –Third-Party Inspectors certified as RFI’s**

### **Description:**

For many plants, there is an existing quality assurance structure in the form of a third-party inspector. These inspectors could be brought into the RESNET ecosystem as a Rating Field Inspector. Although this option could be implemented under current RESNET standards, it is being included here to explicitly call attention to this option for factory leadership.

**Requirements for Rating Providers:**

* Follow RESNET standards for certifying third-party plant inspectors as Rating Field Inspectors
* Ensure these RFIs understand RESNET’s standards and inspection requirements
* Educate plant leadership and personnel on the requirements of the RFI and required inspections
* Maintain records of all inspections performed
* Conduct quality assurance oversight of the RFI’s work

# **Option 3 – HERS Provider Protocols for Insulation Inspection**

### **Description:**

This option will allow factory-built homes to achieve Grade I or ‘Properly Installed’ insulation in accordance with ANSI/RESNET/ICC 301-2022, based on the following exception included in the standard:

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**Requirements for Rating Providers:**

* Train and educate factory leadership and staff on RESNET’s standards for inspections that will occur in the factory.
* Ensure the factory is in compliance with the requirements of the above exception if they plan to utilize it. Provider should verify proper documentation.
* Where remote/virtual inspections or on-site inspection options are used in the factory, insulation installation should be verified.