



Construction Training and Monitoring

Lesson Careful construction crew training, supervision, and monitoring is key to successful energy efficiency and moisture control, as small details can get missed. It helps everyone on the development team work toward the same set of goals and learn skills to ensure a quality product.

Goal Ensure the building is completed as designed, energy efficient, and durable.

What Happened On The Wellstone, construction monitoring identified—and inexpensively remedied—problems with insulation and duct installation, air sealing, exterior penetrations, and moisture management. On-site construction crew training minimized installation errors on particularly challenging details.

Enterprise funded third-party design review, construction monitoring, and performance testing. The process began with a pre-construction meeting of the development team including the architect, engineers, general contractor, and framers. Expectations, baselines, and guidelines were defined, and all meeting attendees committed to the expectations up front. During construction they worked to achieve them. The developer reported, “This meeting was the best thing that happened.”

There were on-site demonstrations for building assemblies before work began. This included foundation waterproofing as well as window installation and flashing for the entire crew. This allowed the architect and general contractor to ensure detailing was accurately communicated to installers, and gave installers a chance to ask questions.

Center for Energy and Environment monitored construction. They dropped in on-site unannounced and provided reports with pictures showing details that needed to be fixed. They identified some problems with air bypasses, caulking, duct grills, insulation installation, and a number of other details. The feedback was useful training for crews and will transfer to other projects.

On the Wellstone, this process resulted in excellent building performance. Not only did units meet the targeted air tightness standard, their typical leakage was 50 percent better than the target.

Relevant Green Communities Criteria:

While there are no specific criteria associated with this lessons learned sheet, three demonstration projects have learned that successfully implementing the Green Communities criteria is easier with on-site crew training and feedback from monitoring. It is most successful when included as part of the integrated design process.



Construction monitoring verifies that a gap between party walls has been sealed air tight with closed cell foam.

Photo courtesy of Center for Energy and Environment

Continued on back

What Happened
(continued)

In contrast, on Viking Terrace there were a number of issues that came up that could have been identified and fixed during construction with expert monitoring of energy efficiency detailing. These issues were instead discovered during post-construction testing. Some were fixed at a greater cost, and others were cost-prohibitive or impossible to repair and left as they were. As a result, the developer is implementing construction monitoring on future projects.

Recommendations

When possible, hire a construction crew experienced in green development and a verification team because many important construction details can't be seen and are not intuitive. Hold a pre-construction meeting with crew leaders, the general contractor, and other key team members to communicate expectations and get commitments to achieve them.

To ensure quality, train trades on-site and monitor and verify installation of critical systems to guarantee work is being completed as intended. Pre-installation training should include detailing on air sealing, window flashing, exterior penetrations, and other important construction assemblies. Hire or assign an individual experienced in building performance to monitor work during construction and identify issues needing correction prior to closing up walls. They should photograph problems and clearly communicate changes to the general contractor and owner.

Take Away

It is useful to test performance and evaluate construction after completing each of the first few units—single family homes or multifamily units—for air tightness, duct sealing, and ventilation rates. This provides immediate feedback to the general contractor or builder and trades on what needs improvement and what is successful.

Construction training and monitoring can significantly improve building durability and performance at a low cost. The lack of monitoring can result in mistakes which reduce the life of the building or the comfort of the units and are costly or impossible to correct once construction is complete.

For more information on construction training and monitoring, see related Lessons Learned fact sheet: Integrated Design.

LESSONS LEARNED Minnesota Green Communities Demonstration Projects

This publication is part of a series of lessons learned originating from Minnesota Green Communities demonstration projects. The Minnesota Green Communities initiative is currently the largest green building program in Minnesota, with 497 units completed, 908 under construction, and another 1,645 under development. Eight demonstration projects were funded through the Minnesota Green Communities program. The initiative is completing building performance testing on the demonstration projects, and has gathered lessons learned in several areas.

The Lessons Learned series includes the following publications: Integrated Design, Multifamily Green Rehabilitation, Construction Training and Monitoring, Ductwork, Duct Design, Duct Sealing, Kitchen Ventilation, Radon Testing and Mitigation, Pressure Balancing Between Rooms, Water Efficiency, and Cost Increase Triggers in Plans and Specifications. All publications can be found online at www.mngreencommunities.org.



Minnesota Green Communities, a collaboration of the Greater Minnesota Housing Fund, the Family Housing Fund, and Enterprise, is an initiative designed to foster the creation of affordable, healthier, and more energy-efficient housing throughout Minnesota. The initiative will support the production of affordable housing with markedly reduced energy costs, use of materials beneficial to the environment, conservation-minded land use planning, and attention to the creation of healthy environments and lifestyles for individuals, children, families, and communities. For more information, please visit www.mngreencommunities.org.

Minnesota Green Communities c/o Greater Minnesota Housing Fund

332 Minnesota Street, Suite 1201 East • St. Paul, MN 55101 • Tel: 651-221-1997 or 1-800-277-2258 • Fax: 651-221-1904