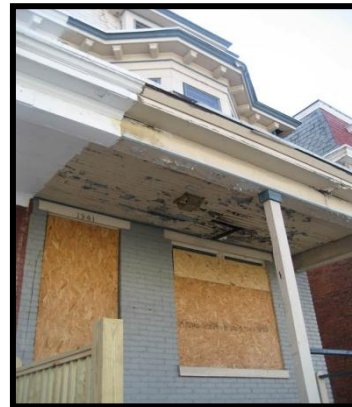




## Repair & Rehab Right

Guidelines and Toolkit for Habitat Affiliates  
Undertaking Repair, Retrofit, or Rehabilitation of  
Existing Homes



Before and during photos, courtesy of Harrisburg Area HFH, PA

FAS

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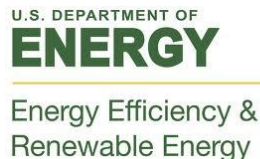


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## Introduction

Critical home repairs, weatherization, and rehabilitation projects are playing an increasingly significant role in the work of many Habitat affiliates. As DuPage HfH Executive Director Sarah Brachle states, “Rehabs are vital to a comprehensive approach to neighborhood revitalization.”

However, the assessment and construction skills needed to work in repair and rehabilitation are significantly different from those for new construction. Many affiliates have noted difficulty in defining an appropriate and cost effective scope of work for these projects. Lack of experience in detecting and addressing key safety issues in existing housing can lead to significant scope creep as additional safety, health, and sustainability challenges are discovered during the demolition and construction phases.

Habitat’s first rule of construction is to “do no harm.” All projects must not cause any safety and health hazards and must eliminate these hazards to the greatest extent possible. Beyond this, Habitat seeks to build housing that is livable, comfortable, affordable, and of high quality. Increasingly, these additional objectives are being defined through the lens of sustainability, defined by Habitat as “building practices that provide safe, comfortable, quality-built homes that are durable and constructed to minimize natural resource and energy use.”

Achieving these high performance objectives and still keeping within your affiliate’s budget and resource capacity requires systematic and integrated planning.

Referred to as an integrated design approach, in this process “project goals are identified early on and held in proper balance during the design process [...] interrelationships and interdependencies with all building systems are understood, evaluated, appropriately applied, and coordinated concurrently from the planning and programming phase.”<sup>1</sup> In other words, before rehab even begins, the affiliate identifies specific project objectives; approaches and analyzes the building as a system of interrelated components; and develops a complete and realistic scope of work that meets these objectives.



*High performance building attribute diagram*

<sup>1</sup> From “Whole Building Design,” by Don Prowler, FAIA.  
[http://www.wbdg.org/wbdg\\_approach.php](http://www.wbdg.org/wbdg_approach.php)

## Is this project a fit for your affiliate?

For affiliates new to rehab and repair work, case studies of other affiliates are useful in determining objectives and defining scopes of work; however, both objectives and capacity will differ significantly between affiliates. In order for your affiliate to develop a successful repair or rehabilitation program, for every individual project you undertake, your affiliate must be able to answer the following questions:

1. What are the affiliate's own internal capacity and goals?
2. What is the necessary minimum scope of work for the project?
3. What are the goals of the homeowner (if applicable) in the project?
4. Do all of these answers match up? Especially, can your affiliate achieve the minimum scope of work (eliminating critical safety, health, and livability hazards) without exceeding your budget, skill set, and ability to carry out future projects?

A useful approach to answering these questions is to convene a team of the invested parties and appropriate experts and review the project holistically to insure that all aspects of the project work well together. This process is referred to as an Integrated Design Plan (IDP), and is very effective in creating a plan that drives the project toward success.

The first step in this integrated design and planning process is to determine the construction deficiencies of a building. Habitat has developed tools to aid affiliates in carrying out the initial house assessment and the evaluation of construction deficiencies. These aids include the *Critical Home Repair Report Form* and the *Critical Home Repair Assessment Document*, both of which provide valuable guidance in determining what deficiencies and safety hazards to look for in an existing home.<sup>2</sup>

In addition, the "home complexity triage" process developed by Habitat (available in the myHabitat website's Knowledge Center) will aid you in determining if this project is appropriately complex for your affiliate's level of experience.

This *Rehab Right* guide and the accompanying *Rehab Recommendations* survey tool should be seen as an accompaniment to these resources. They aim to make undertaking retrofits easier by utilizing the concepts of integrated design processes and building best practices to develop a scope of work that is comprehensive, safe, sustainable, and that meets the needs and objectives of the affiliate, the homeowner, and the home itself.

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<sup>2</sup> Both of these documents are contained in the *Critical Home Repair Guide*, at: <http://my.habitat.org/download/g34a78/Critical-Home-Repair-Guide>. More information and resources on setting up a successful rehabilitation project can be found in the *Home Rehabilitation Guide*, at: <http://my.habitat.org/download/g34a77/Home-Rehabilitation-Guide>.

## Why Use this Guide and Toolkit?

The *Repair and Rehab Right* guide introduces the reader to the concepts of integrated design and systems thinking in repair and rehabilitation projects. This section teaches how to think about and approach existing houses as systems of interrelated components, how to determine whether a project is a good fit for your affiliate, and how to go through the step-by-step planning process of developing an integrated and complete scope of work.

Once you are comfortable with the basic idea of integrated design for repair and rehab, the *Rehab Recommendations* tool makes integrated planning design easier and more effective. This tool: assesses the hazards and risks associated with your chosen repair options, gives safety and sustainability recommendations that go beyond code minimums, and helps the user to develop an appropriate and complete scope of work.

## Step-by-Step: Approaching an Existing House Project

Approach each existing house with a systematic process that looks at the house as a system of interrelated and interdependent components. Systems Planning allows the user to determine in advance how changing or repairing one aspect of the house impacts other aspects and components. This section will teach you, step-by-step, how to carry out a systems planning analysis of a project. Learn to evaluate each decision in terms of the impact on safety, livability and sustainability to the house as a whole, insuring that the resulting change is positive.

## Step 1: What are my objectives and resources? And do they fit the homeowners' objectives?

The first step in approaching any repair or rehab project is to identify the affiliate's objectives, resources, and capabilities. Evaluate these answers in relation to Habitat's housing solutions to define the category of work the affiliate is comfortable addressing. Determine the affiliate's resources and capabilities to undertake the project, including: money and financing, time, labor, skills and experience of volunteer and staff, donated materials, homeowner involvement, ability of homeowner to maintain a project after completion, and climate or project specific needs and advantages (i.e., do you live in a climate where mechanical AC is not necessary?)

If the house is homeowner occupied, the homeowner is a key stakeholder in this process. Consult with the homeowner to determine if their objectives for the project (including cost, scope of work, and outcome) match the objectives and resources of your affiliate. If the objectives differ and the homeowner is unwilling to negotiate, this may not be an appropriate project to undertake. Failure to decide and sign off on a scope of work with the homeowner prior to undertaking work has been a significant cause of scope creep for many affiliates.

If the house is not occupied by a family prior to the repair or retrofit project taking place, the future homeowner will be consulted to the same degree that the affiliate consults with any Habitat homeowner.

**Step 2: What are the primary construction deficiencies in this project?**

Assess the project for major construction deficiencies that detract significantly from livability, especially those related to safety, health, and sustainability. (Use the triage process described in the *Critical Home Repair Assessment Document* to complete this step.) Even if you are only doing a basic project such as *A Brush with Kindness*, you should always do a full interior, exterior, and foundation assessment before committing to a project. The triage process will help determine the difficulty of a project, but only by building a full and realistic scope of work (which this process will help with) can you make the decision if a project is suitable for your affiliate.

**Step 3: How complex is the structure of this building?**

Determine the structural difficulty level or rating of the house. In this step you are answering how complex the house is as a first step in determining whether this is an appropriate project for your affiliate to tackle. Complete the *CHR Home Complexity Triage* worksheet and figure out the level of difficulty (1-12) of this project. If you are new to rehabs, weatherization, and repair work it is recommended that you only tackle simple or moderate (1-6) projects. More complex structures are likely to be more difficult to assess, model, and repair without causing additional safety and livability deficiencies.

*For critical repairs it may be possible to go into these houses as long as scope creep is diligently avoided. Affiliates inexperienced in repair and rehab should stay away from energy, air and pressure, moisture, and mechanical systems work, including: insulating, air*

*sealing, moisture management, combustion appliance installation, electrical work, and duct work in limited access attics and crawl spaces. For inexperienced affiliates, developing partnerships with building and rating professionals is an excellent resource for assistance in evaluating projects and improving affiliate capacity to perform more complex retrofit work. Many of them may be willing to do pro bono or discounted work with Habitat affiliates. Professionals to contact for assistance and partnership include:*

- *Home Inspectors. Find a National Academy of Building Inspection Engineers certified engineer here: <http://www.nabie.org/search.php> or an American Society of Home Inspectors professional here: <http://www.ashi.org/find/default.aspx>.*
- *Building Performance Institute, Inc. (BPI) contractors are certified in energy efficiency and weatherization work. You can search for a certified contractor here: [http://www.bpi.org/tools\\_locator.aspx?associateTypeID=CTR](http://www.bpi.org/tools_locator.aspx?associateTypeID=CTR).*
- *Resnet energy auditors can provide valuable weatherization and energy retrofit information and guidance. The RESNET directory of raters is located at: <http://www.resnet.us/trade/find-raters-auditors>.*

**Step 4: What are the appropriate repair options for the project’s construction deficiencies?**

For each identified construction deficiency look at all possible repair, modification, and improvement options and evaluate which of these is the best fit for your affiliate’s capabilities and resources (which you should have determined in Step 1). If none of the repair options are a good fit, this may not be a project for your affiliate to address. List all these primary critical repairs in the scope of work.

**Step 5: Will my selected repairs in any way negatively impact the house system’s performance or safety?**

\*\*At this step, you can begin using the online *Rehab Recommendations* tool, which offers safety and sustainability recommendations for the most common repairs and construction deficiencies that Habitat affiliates are likely to face. For directions on how to use the tool, see [www.fas.org/rehabright/tool.html](http://www.fas.org/rehabright/tool.html) or the section below “How to Use the Rehab Recommendations Tool.”\*\*

Each repair you make will alter how the house functions and operates. Some of these changes will be positive, but others have the potential to negatively impact livability, safety and sustainability. For each repair noted in your home assessment determine what hazards or negative effects may result from the repair. List out (or select if using the tool) all of these hazards. For guidance on what hazard risks each critical repair poses, use the *Rehab Recommendations* tool and/or see the [DOE Workforce Guidelines for Home Energy Upgrades](#). (To be available for a second round of public review in early 2012.)

*Example of a hazard risk determination: affiliate X has finished assessing an old one-story house. One of their findings is that the building is very energy inefficient and uncomfortable due to air leakage from an un-insulated attic and poor air sealing. As a first step in making this house more efficient and comfortable, the affiliate insulates and air seals the attic. While this step will reduce electricity bills and increase comfort by reducing leakage from the building envelope, this repair may have negative hazard risks including: moisture buildup in the walls and attic, reduced indoor air quality if the mechanical ventilation system is inadequate for the newly tightened house, and deadly back drafting from combustion appliances as the air flow changes create a low pressure zone inside the house.*

**Step 6: Do the potential negative impacts identified in Step 5 pose critical safety and livability risks to occupants and what repairs do I use to overcome these risks?**

Determine which of the hazard risks are critical to address in your scope of work. Critical hazard risks include those with severe livability and safety consequences or that will dramatically increase the operating cost (in terms of either money or time) of the house. As with the initial assessed construction deficiencies, decide which repair or mitigation strategy is appropriate for your affiliate; add these secondary critical repairs to the scope of work (as in Step 4).

**Step 7: Do I understand how this building operates as a system? Do I feel that my scope of work covers all major hazards? And if so, is this project appropriate for my affiliate? Does it meet my affiliate’s objectives and the objectives of the homeowner?**

By the end of this process, the majority of critical safety, health, and livability hazards should have been incorporated into the scope of work. At this point, you should have a good picture of how the systems and components of the house interact, the extent of the scope of work, and whether the needs of the project fit with the objectives and resource capacity of your affiliate and homeowner (if applicable). If there is alignment, use the scope of work you have generated here as a guide for further construction planning and design.

**Step 8: How can I make this project more sustainable?**

As you are undertaking repairs and replacements, consider how to make the house healthier, more cost effective to operate, and more sustainable. Along with critical safety and health suggestions, the *Rehab Recommendations* tool will provide sustainability recommendations for each construction deficiency identified in the assessment. Suggestions will include materials and appliance choices, processes, and testing and certification.

## How to Use the Recommendations Tool

For common Habitat repairs the *Rehab Recommendations* tool offers advice on likely safety hazards and sustainability opportunities. The goal of this tool is to provide affiliates with a better understanding of the whole house safety and sustainability issues associated with existing housing, and to aid affiliates in building more realistic and comprehensive scopes of work.

This web-based tool is housed at: [www.fas.org/rehabright](http://www.fas.org/rehabright). From this site you will have access to the toolkit, as well as links to Habitat existing house resources and documents.

Once you have completed a full house assessment:

1. Go to: [www.fas.org/rehabright](http://www.fas.org/rehabright).
2. Click on the “Use Rehab Right Tool” button.
3. Select all construction deficiency categories that you found in the house assessment, click “Next,” and answer all questions about that deficiency.
4. At the end of each category, click “Next” and once you have answered questions for all assessed deficiencies, click “Next” to read your personalized safety and sustainability recommendations.
5. Print or email yourself the recommendations and, determine where you can integrate them into your scope of work.
6. For further retrofit and rehab guidance and specifications, view the [DOE Workforce Guidelines](#).



## **The Role of Building Codes**

Note that none of the recommendations included in this document or tool is intended to replace your local building code, but to offer guidance on how to retrofit existing housing to better than code. Follow all local building codes, which supplant these recommendations when conflicts arise.