REGREEN – HOME AND INTERIORS ASSESSMENT

The goal of every home is to have comprehensive and continuous management of:
- Bulk water
- Air leakage
- Heat flow
- Vapor (and soil gases)
- Pests (insects, rodents, etc.)
- Wildfire (location-dependent)
- Indoor Air Quality

When we improve the energy efficiency of a home, we need to evaluate moisture management with the same degree of care. This worksheet systematically lists the items you need to check to understand how and well a home is performing in terms of energy, durability, and human health and safety.

The final section—Explanations/Resources—can help you with each item below.

RENOVATOR: ___________________________ INTERIOR DESIGNER: ___________________________
HOMEOWNER: ___________________________ ARCHITECT: ___________________________
HOUSE ADDRESS: ________________________ TRADES: ________________________________
______________________________________ DATE OF ASSESSMENT: ________________

EXISTING HOME
- # Stones: ______ Foundation Type: ________________
- Orientation: ______ Exterior Siding: ________________
- □ Garage (attached/detached)

Year House built: ______ # Years in house: ______

History

Complaints and Problems Noted

Comfort Issues

Summary of Scope of Work

The home assessment aspects are based on the EarthCraft House Renovation Assessment form; it is used/modified with EarthCraft House permission. The interiors assessment created for workshop.
SITE ASSESSMENT
Prevailing slope(s):

Irrigation system check:

Water table depth:

Landscape details:

Pervious/impervious surface details:

Notes on drainage issues:

INSULATION/AIR SEALING

<table>
<thead>
<tr>
<th>COMPONENT/ASSEMBLY</th>
<th>ORIGINAL HOUSE</th>
<th>EXISTING ADDITION</th>
<th>NOTES</th>
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<tbody>
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WINDOWS

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<thead>
<tr>
<th>TYPE</th>
<th>U VALUE</th>
<th>SHGC</th>
<th>NOTES</th>
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**MOISTURE MANAGEMENT**

Flashing – windows:

Flashing – doors:

Flashing – valleys:

Flashing – drip edge:

Gutters/downspouts:

Capillary breaks:

Roof ventilation:

**Vapor Profile – Foundation:**

**Vapor Profile – Above Grade Walls:**

**Vapor Profile – Roof:**

### MECHANICAL SYSTEMS

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>LOCATION</th>
<th>MODEL #/BRAND</th>
<th>FUEL, EFFICIENCY, CAPACITY</th>
<th>CONDITION/AGE/NOTES</th>
</tr>
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**DUCT SYSTEMS**

<table>
<thead>
<tr>
<th>AREA SERVED</th>
<th>LOCATION</th>
<th>TYPE</th>
<th>INSULATION</th>
<th>SUPPLY AGAINST WALLS?</th>
<th>RETURNS</th>
<th>OBSERVED LEAKAGE</th>
<th>NOTES</th>
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**EXHAUST VENTING**

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<th>VENTED TO OUTSIDE?</th>
<th>THROUGH WHERE?</th>
<th>NOTES</th>
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<tr>
<td>Dryer</td>
<td></td>
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<tr>
<td>Oven</td>
<td></td>
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<tr>
<td>Bath Fans</td>
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<tr>
<td>Kitchen range hood</td>
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**RADON**

Radon test performed? ______
Test kit left with owner ______
Radon Mitigation? __________

**OTHER:**

Fireplace (damper?) __________________________

Attic Access (sealed?) _______________________

Whole house fan? ____________________________

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HAZARDOUS MATERIALS
Lead paint

Asbestos

Pest Management Details:

Wildfire Management Details:

Building Performance/Conditions Metrics:
Whole building air tightness (blower door) -

HVAC duct tightness (Duct blaster) -

HVAC flow (air velocity) measurements -

Room-to-room pressure measurements -

Worst-case depressurization test:
Low-e window testing -

Infra-red imaging -

Humidity (air moisture) readings -

Moisture content (material moisture) readings -

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**REGREEN – INTERIOR ASSESSMENT & DESIGN PROCESS**

The interiors assessment requires a comprehensive evaluation of the interior and exterior living spaces to ensure that the home is fully utilized, meets sustainability goals and assesses interior components on a detailed level. This systematic, process oriented assessment will help to appraise and understand how the interior of the home functions, and how the home performs and integrates with the infra-structure/systems of the home.

**OPTIMIZING INTERIOR SPACE**

As part of the design process consider current and future needs for the following:

1) Function and Layout of Rooms:
   a) What rooms work, are enjoyed and fully utilized?

   b) What rooms don’t work, are under-utilized and out-dated?

   c) Key adjacencies and space relationships:

   d) Reconfigure, linkage and efficient use of space:

   e) Flexibility and adaptability for future needs:

   f) Closet and storage needs; daily and seasonal:

   g) Balance family needs with market trends:

2) Life Style Patterns and Activities:
   a) Living
   b) Playing
   c) Working
   d) Children
   e) Pets
   f) Views
   g) Connecting with family and friends
   h) Connection with nature
   i) Outdoor living


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OPTIMIZING INTERIOR SPACE (cont)

3) Aging in Place / Universal Design:
   a) Accessibility
   b) Future users
   c) Multi-use space

4) Health, Safety and Welfare:
   a) Indoor air quality
   b) Ergonomics
   c) Security
   d) Egress
   e) Privacy
   f) Comfort

ADDRESS SUSTAINABILITY METRICS
As part of the design process establish goals/metrics for the following:

1) Water Efficiency and Reduction:
   a) Plumbing fixtures and fittings
   b) Appliances
   c) Filtration

2) Energy Efficiency and Reduction:
   a) Appliances
   b) Decorative lighting
   c) Office/Entertainment equipment

3) Materials and Resource Efficiency:
   a) Reduce, reuse, recycle, repurpose
   b) Building reuse
      Reuse of existing floors, walls, doors, windows, etc.
      Deconstruction options vs. demolition
   c) Construction waste management plan
   d) Materials reuse - reuse of existing finishes, cabinetry, trim, millwork
   e) Regional materials
   f) Reclaimed materials
   g) Recycled content materials
   h) Rapidly renewable materials
   i) FSC Certified wood
4) Indoor Environmental Quality:
   a) Environmental tobacco smoke
   b) Low-emitting finishes, paint, wood finishes, caulks, construction adhesives
   c) Hazardous materials, formaldehyde, lead, asbestos, radon, etc...
   d) Chemical and pollutant source control
      Tracking in contaminants
      Asbestos (vinyl flooring, patch compounds, textured paints, ceilings, insulation)
      Dust (carpet, upholstered furniture, pets, fireplaces, heating ducts)
      Lead (old paint, ceramic, pottery)
      Carbon monoxide
      Pesticides (herbicides, insecticides, fungicide)
      Vinyl Chloride (flooring, adhesives, upholstery, wall coverings, window coverings, countertops)
      Mold (basement, kitchen, bathrooms, carpets and rugs on cold floors, wall cavities, closets, plumbing leaks)

5) Controllability of Systems:
   a) Lighting
   b) Acoustics
   c) Thermal comfort
      i) Ventilation
      ii) Drafty rooms
      iii) Comfort levels
   d) Day lighting

6) Durability and Longevity:
   a) Product performance, low maintenance, durability
   b) Timeless design, longevity
   c) Quality vs. quantity

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**APPLYING SUSTAINABILITY TO INTERIOR COMPONENTS**

Research, specify and install environmentally preferable products for the following:

1) Interior Fixtures and Finishes:
   a) Wood /Composite Trim and Millwork

   b) Interior Doors, Door Hardware and Windows

   c) Finishes (Consider reflectance values to support passive solar and daylighting strategies)
      **Floors**
      - Material
      - Substrates
      - Install methods
      - Adhesives, sealers

      **Walls**
      - Interior sheathing
      - Wall covering materials, adhesives, finishes

      **Paints, finishes, coatings,**

      **Tile**

      **Ceiling**

   d) Specialties
      - Fireplace(s)
      - Shower enclosure(s)
APPLYING SUSTAINABILITY TO INTERIOR COMPONENTS (cont)

1) Interior Fixtures and Finishes: (cont)

e) Appliances and Equipment
   Kitchen
   Laundry
   Office/Entertainment

f) Plumbing Fixtures and Fittings
   Toilets
   Tubs
   Showerheads
   Faucets – kitchen and bath

g) Electrical
   Lamping
   Fixtures
   Systems and Controls
   Foot candle levels

2) Interior Furnishings:
   a) Cabinetry Built-ins/Closets/Storage
   b) Countertops
   c) Textiles/Fabrics/Leathers
   d) Case Pieces
   e) Upholstery
   f) Bedroom/Bath Linens
   g) Area Rugs
   h) Window Treatments
   i) Art, Framing, Accessories & Artifacts

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APPLYING SUSTAINABILITY TO INTERIOR COMPONENTS (cont)

3) Outdoor Living and Landscaping:
   a) Patios, porches, decks, gazebos, etc...

   b) Plantings - resource efficient, regional, non-invasive and drought tolerant
      Perennial species

      Shade trees

      Compost/mulch beds

      Turf

   c) Irrigation system

   d) Lighting

   e) Rainwater collection

4) Operation and Maintenance:
   a) Client education

   b) Recycling and composting center

   c) Maintenance/cleaning preference

   d) Indoor air quality testing

   e) Monthly, quarterly, annual systems maintenance

   f) Automated systems
Explanations/Resources

Site Details:
- Prevailing Slope: Does the site drain, in general, towards or away from the structure?
- Irrigation System Check: If the home has an irrigation system, check to make sure all heads or dispensers are turned away from the structure.
- Water Table Depth: The homeowner or a local county extension agent or planning/building department may have information on water table depth. The importance of this is determining how it relates to the foundation's depth and whether the foundation ever sees hydrostatic pressure.
- Landscape Details: Does the landscape help manage soil and water or encourage run-off and soil erosion?
- Pervious/Impervious surface details: Are soils and paved or driveways areas pervious; do they promote infiltration or ponding of water?
- Notes on drainage issues: The soil just around the building foundation is often fill that may be very different than the rest of the site. Check to see what this soil is like—sandy, clayey, silty, loamy, well-draining or dense and poorly draining. The ability of the site to handle its water load is based in part on the drainage characteristics of site soil. For the 1st 10 feet or so around the structure, is the grade away from the building or towards, or flat? A 5% grade (6 inches in 10 feet) is recommended around the structure. Are there neighboring site features that affect the performance of the home: shading trees, steeped sites onto property, etc.?

Insulation/Air sealing:
- You can check framed walls for insulation by drilling a small hole and inserting a coat hanger "hook" to gauge the depth of insulation and pull out a small sample.
- Carefully removing a window jamb casing can give you a great portal into how water, air and heat are being managed at the most common of wall penetrations, windows. Pick the least sheltered window if possible, in terms of overhang, and most likely windward side of the home.

Windows:
- Glazing properties: The 4 major properties of glazing are U-value, Solar Heat Gain Coefficient (SHGC), Visible Transmittance (VT) and Air Leakage (AL). The single best source of information on window and glazing properties is the Efficient Windows Collaborative: http://efficientwindows.org/.
- Glazing area: as a percent of floor area, this can be an important aspect of excessive heat loss or gain. Passive solar homes can have as little as 7% glazing with typical homes having around 14% glazing (aspect of course is important too).

Moisture Management:
- Flashing: All of the protection systems—drainage plane (WRB), air barrier, and thermal barriers can be challenged here, at the transition from the top of the foundation wall to the start of the framed assemblies. Inspect from both the exterior and the interior to see if this transition area is continuously protected, including how penetrations are flashed and/or sealed.
- Decks are another very common problem area—how they attach and are (or are not) properly flashed.
- Gutters/downspouts: how is the roof load managed? Gutters and downspouts? Are there surface-level French drains handling water off the sills? Are gutter system leaders connected to perimeter drainage? Do splashblocks and run-ons move the roof load 2 or more feet away from the building?

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• Capillary breaks: a free-draining air space or any non-porous material breaks the capillarity of water and stops wicking of water up and into building assemblies. The most common capillary breaks are between masonry and wood and between wood and soil. Inspect any ground contact of claddings and inspect mudflor contact with concrete foundations.

A capillary break between the soil and the concrete floor could be any non-porous or free-draining material such as polyethylene sheeting, rigid insulation, or gravel (no fines). One indication of these, since you may not be able to inspect, is to use the ASTM D2713 Polyethylene Sheet Test [http://www.nrmca.org/aboutconcrete/epa106.pdf]. Check the basement or crawl space floor for penetrations, both as potential problem areas but also as inspection spots.

• Vapor Profile: This is a layer by layer accounting for relative vapor permeability of building assemblies to determine how they are specified to keep the assembly from getting wet AND to account for how the assembly can dry should (or more likely when) it gets wet. For detailed information on this topic, see this Building Science Corp. web resource: [http://www.buildingscience.com/documents/scied/bsc-106-understanding-vapor-barriers?topic=/resources/vapor-barrier-code-chances].

Mechanical System Details

• Combustion sources: wood stoves, gas cooktops, fireplaces, unvented space heaters are all open combustion devices. This is atmospheric-ventilated boilers, furnaces and gas water heaters. They should be evaluated for back-drafting potential. See the worst-case depressurization test below.

• Heating and Cooling details: Check maintenance schedule, confirm when each system was last inspected, maintained.

• Dehumidifier/humidifier: Hygrometers or relative humidity (RH) sensors for most dehumidifiers and humidifiers are notoriously inaccurate. Each should be supported by more accurate RH assessment (electronic hygrometer) or spot-checked against a sling psychrometer. The need for either or both dehumidification or humidification should be evaluated based on whole-house performance and overall moisture management. Both treat the symptoms and not the cause of moisture levels.

• Ventilation System: Is there a whole-house ventilation system? Any home with air tightness of 0.65 MCH (natural air changes per hour) or less should have a fresh-air whole-house mechanical ventilation system: exhaust, supply, or balanced heat recovery system.

• Water heating: Check gas water heaters for evidence of roll-out back drafting, check water heater for evidence of leaks.

Ducting Details

• Ducting details: Are all ducts in conditioned space? Are ducts and the air handler cabinet, return and supply trunks all sealed?

Exhaust Venting

• Spot exhaust: Every room with a moisture load (bathrooms, kitchen, laundry) should have a functioning spot exhaust system, ducted to the outdoors. You can qualitatively check the "draw" of bath and laundry room exhaust fans by holding up two-ply toilet tissue—if the tissue "sticks" to the exhaust grille when the fan is operating, it has sufficient draw; if not, check the ducting or considering replacing the fan.

Radon/Hazardous Materials

• Hazardous materials assessment: Lead paint test sticks are carried by local hardware stores (EPA lead guide: [http://www.epa.gov/lead/pubs/leadtest.pdf]). Radon test kits are
available on-line or from many state/local agencies
(http://www.epa.gov/radon/pubs/citiguide.html), and asbestos testing requires a lab,
although a list of common materials containing friable asbestos can be found here:

Pest Management

- Pest management details: Insects—mainly termites and carpenter ants—can be big
problems; their management is well-covered by fact sheets from Dr. Mike Potter of the
University of Kentucky extension office:
http://www.ca.uky.edu/entomology/dept/entfacts.asp. Check around the building for
branches that make contact with the structure and then around the perimeter at grade
looking for woody debris or other woody materials (firewood, for example) that is stored
close to or actually against the building. Squirrels seem to be a big problem for some
homes; management advice can be found here:

Wildfire Management: In areas where wildfire is a threat, use these resources to check
hazards and counter measures: http://firecenter.berkeley.edu/housedemo/.

Building performance metrics:

- For a good explanation of how blower doors work -
- For an explanation of house pressure measurements, including room-to-room
measurements (doors closed) -
- For an explanation of the worst-case depressurization test -
www.affordablecomfort.com/aff/EAR_5_Cox_Worst_Case_Depressurization.pdf.
- Examples of low-e window testing equipment -
http://www.jdm.com/j1_LowE_Deflection.htm?kk=%20ow%29a&_k=c31d5d5d5-
d79c-d19c-9775-270e05f98683e6 Shamid=CLtjlnTOr5wCfZM5Qdls0H10kQ?1.
- For information on electronic hygrometers, go here:
http://www.greenbuildingadvisor.com/blog/dept/building-science/moisture-sources-
relative-humidity-and-mold.
- For more information on moisture meters, go here:
http://www.greenbuildingadvisor.com/blogs/dept/building-science/tools-trade-moisture-
meters.

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