About Southface

Southface promotes sustainable homes, workplaces and communities through education, research, advocacy and technical assistance.
Green Building Services

Training
Green Building: EarthCraft, LEED
Building Audits & Assessments
Charrettes
Sustainability Planning
Affordable Housing
Modeling
Thought-leading Keynote and Master Speakers, plus an additional 27 speakers already confirmed.

Keynote
Rob Watson,
“Father of LEED”

Master Speaker
Bill Reed

Master Speaker
Dr. Arthur C. Nelson

Master Speaker
Martin Holladay

Master Speaker
John Tooley

Save the Date
March 13-14, 2013
The building envelope consists of two elements: an air barrier and insulation that must be continuous and touching.
Gaps in exterior sheathing sealed
Sheathing penetrations sealed
• Penetrations through band area sealed
Penetrations through insulated subfloor sealed
Shower & tub drains sealed
Blower Door Testing

Provides a measurement of the actual infiltration rate

Helps identify leak paths

Tested homes can be compared to each other
Advantages of Air-tight Construction

1. Control Moisture
2. Improve Durability
3. Increase Comfort
4. Reduce Indoor Pollutants
5. Save Energy
Performance Testing

Duct Blaster
air handler and all duct connections sealed with mastic
Penetrations through insulated ceiling sealed
Positive Pressure Ventilation

- Tends to drive pollutants out
- Air enters from known source and is filtered and conditioned before being mixed with room air
Mechanical systems & exhaust fans can create pressure differentials
Proper Ventilation

Exhaust fans must vent to the exterior
Combustion Safety

Energy efficiency should not be a health hazard
A tight house can backdraft gas appliances more easily
Combustion Closets

Screened high and low combustion air ducts into equipment closet (extend 6 inches above insulation levels in attic)

Supply plenum sealed with mastic and insulated

Weatherstripping

Insulated walls between equipment closet and home

Seal gas and plumbing penetrations through walls

Sealed return plenum

Return grill with filter

Drywall

Seal penetrations and under bottom plate of walls

Solid door (non-louvered) must seal tightly against weatherstripping at top, bottom, and sides

Air from house

Warning: Do not store anything in this closet. Keep door shut.

Solid (non-louvered) door with weatherstripping

Vented exhaust pipe through roof

Insulated water heater

Bottom plate sealed

Door closes against solid threshold
Note: GA is in Climate Zone (CZ) 2, 3 and 4
Overview of Residential Code Requirements

Focus is on building envelope
  Ceilings, walls, windows, floors, foundations
  Sets insulation levels, window U-factors and SHGC
Infiltration control
  Caulk and seal to prevent air leaks
  Verify tight envelope with blower door

Limited Heating, Air Conditioning, and Water Heating requirements

Ducts
  No cavities as ducts
  Seal with mastic and insulate
  Verify tight with duct pressurization test

Lighting equipment
  50% of lamps to be high-efficacy lamps
  Lighting control options

No appliance requirements
Unique to Georgia

Ways we have made the code better

1. Improved Kneewalls
2. Consistent Windows
3. Air Sealing Graphics
4. Minimum Insulation Thresholds
5. Lighting Vacancy Sensor Credit
6. Better Ducts - Require Mastic
7. No Electric Furnaces
8. No Powered Attic Ventilators (except solar powered)
9. Mandatory Blower Door and Duct Blaster test
10. Qualifications of Verifiers—(who can do testing)
Appendix A - Air Sealing Blocking & Sheathing

Solid sheet behind tubs & showers on insulated walls (p. 19)

Call back waiting to occur

Call back prevention
402.2.1 - Ceilings with Attics

• R-30 (CZ2 & 3) or R-38 (CZ4) are prescriptive requirements
• GA: R-19 acceptable under HVAC attic platforms (32 s.f./platform + 32” walkway)
• Rulers required every 300 s.f.
402.2.2 - Ceilings without Attics

R-30 for 20% (up to 500 s.f.) acceptable for CZ4
Vaulted ceilings and foam sprayed rooflines will need to perform an R-value trade-off (REScheck)
GA specific: Can trade down to R-19 if only spray foam insulation is used (air impermeable insulation)
402.2.3 - Attic Access

- Weather-strip and insulate access doors (GA clarification)
  - Vertical doors: R-5
  - Pull-down stairs: R-5
  - Hatches/scuttle hole covers: R-19

- If 990 s.f. = R-30, and 10 s.f. = R-1, Effective R-value = R-23!
402.2.9 Crawlspace Walls - 3 Options

Standard vented crawlspace - underfloor insulation

Closed crawlspace with wall insulation

Closed crawlspace underfloor insulation

• **Note**: all crawspaces must meet vapor retarder requirements, as per IRC
Closed Crawlspaces

Seal ground with plastic (6” up walls, 6” overlaps)
Insulate interior of walls to satisfy code
  (R-10 in CZ4, R-5 in CZ3, R-0 in CZ2)
Eliminate all vents and leaks (access doors)
Satisfy IRC exception to vent requirement (2006 IRC section R408.3)

**Venting Exceptions:**
- Continuous exhaust (radon)
- Direct condition crawlspace (supply)
- Direct condition (dehumidifier)

**Critical Details:**
- No drainage problems
- Use a sealed combustion / direct vent furnace or install a Heat Pump
- Pest Control and Code Official awareness
Low-e effectively required!

Maximum fenestration \( U\text{-factor} = 0.50 \)
in CZ 2&3 or \( = 0.35 \) in CZ4

Area weighted average of fenestration

Maximum \( \text{SHGC} = 0.30 \) for all *glazing*

Delayed effective date (July 1, 2011) for Climate Zone 4 only

Area weighted average of fenestration

1. Show compliance by having all glazing be \( \leq 0.30 \)
2. Perform REScheck weighted average trade-off
Mandatory Requirement:
**Programmable** thermostat required for furnace
Heat Pump requires smart thermostat or lockout feature to prevent unnecessary strip heat
REScheck™ Software

www.energycodes.gov
Software evaluates specific designs quickly
Demonstrates SHGC compliance
Allows trade-offs
Building envelope components
No longer for heating & cooling equipment efficiencies
GA specific version (coming soon)
EarthCraft House Project Registration and Certification Overview
EarthCraft

Regional Green Building Program
Partnership with Greater Atlanta HBA
Single and Multi-Family Residential (renovation + new), Communities, and Light Commercial Programs
Energy and Water Efficient Dwellings
Durable and Healthy
EarthCraft Programs

- EarthCraft House
- EarthCraft Multifamily
- EarthCraft Communities
- EarthCraft Renovation
- EarthCraft Light Commercial

Southface logo
## EarthCraft House Process

### Pre-Construction
1. Project Registration
2. Project Information Submittal
3. Preliminary Energy Model
4. EarthCraft Design Review

### Construction
5. Pre-Drywall Inspection
6. Pre-Drywall Inspection Report Submittal

### Project Closeout
7. Final Inspection
8. Confirmed Energy Model
9. Final Inspection Report Submittal
10. Certification
Step 4: Design Review

Builder Responsibilities:
• Schedule all attendees

Technical Advisor Responsibilities:
• Lead the meeting
EarthCraft House 2012 Guidelines

- Criteria
- Clarifications
- Definitions
- Example
- Additional Resources
- Confirmation
  - Builder
  - Technical Advisor
EarthCraft House Worksheet

**DURABILITY AND MOISTURE MANAGEMENT (DU)**

<table>
<thead>
<tr>
<th>DU 2: MOISTURE MANAGEMENT</th>
<th>Points</th>
<th>Planned</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REQUIRED AT ALL LEVELS</strong></td>
<td></td>
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<tr>
<td>DU 2.0 Gravel bed beneath sub-grade slabs</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DU 2.1 Capillary break and vapor barrier beneath all slabs</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DU 2.2 Foundation drain on top of sub-grade footing</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>DU 2.3 Patio slabs, walks and driveways sloped ≥2% away from home for ≥10’ or to the edge of the surface, whichever is less</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>DU 2.4 ≥5% sloped grade away from home for ≥10’</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>DU 2.5 100% coverage of vapor barrier in crawlspace or beneath slab ≥6 mil</td>
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<tr>
<td>DU 2.6 Do not install wet or water-damaged building materials</td>
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<tr>
<td>DU 2.7 Moisture-resistant backing material behind tubs and showers</td>
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<td>-</td>
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<tr>
<td>DU 2.8 No wall-to-wall carpet within 3’ of toilets, tubs and showers</td>
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<td><strong>REQUIRED AT PLATINUM AND GOLD, OPTIONAL AT CERTIFIED</strong></td>
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<tr>
<td>DU 2.9 Foundation drain at outside perimeter edge of footing surrounded with 6&quot; clean gravel and fabric filter</td>
<td>4</td>
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<tr>
<td>DU 2.10 Drainage board and damp proofing for below-grade walls</td>
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<tr>
<td>DU 2.11 Gravel bed beneath on-grade or raised slabs</td>
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<tr>
<td>DU 2.12 Drain or sump pump in basement/crawlspace with sealed cover</td>
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<tr>
<td>DU 2.13 Select HVAC equipment SHR ≤ design SHR or install whole-house ENERGY STAR dehumidifier</td>
<td>3</td>
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<tr>
<td><strong>REQUIRED AT PLATINUM, OPTIONAL AT GOLD AND CERTIFIED</strong></td>
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<tr>
<td>DU 2.14 Capillary break: Select all that apply:</td>
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<tr>
<td>1. Between footing and foundation</td>
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<tr>
<td>2. Between foundation and framing for all walls</td>
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<td>DU 2.15 Insulate condensate discharge piping ≥R-2</td>
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<td>DU 2.16 Slope corrosion-resistant HVAC drain pan to drainage system</td>
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<tr>
<td>DU 2.17 Additional dehumidification system: Select one:</td>
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</tr>
<tr>
<td>A. Humidistat or thermostat used with whole-house variable speed cooling system</td>
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<tr>
<td>B. Basement or sealed crawlspace system</td>
<td>2</td>
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<td>2</td>
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<tr>
<td><strong>OPTIONAL AT ALL LEVELS</strong></td>
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<tr>
<td>DU 2.18 Slab or crawlspace vapor barrier ≥10 mil or reinforced</td>
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<tr>
<td>DU 2.19 Wall cavity insulation without a vapor retarder or kraft paper</td>
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<td>1</td>
<td>1</td>
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<tr>
<td><strong>DURABILITY AND MOISTURE MANAGEMENT TOTAL</strong></td>
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<td>0</td>
</tr>
</tbody>
</table>

- Each category & subcategory broken up by when it is required
- Each line item has a number that corresponds to the guidelines
- Sub-items:
  - Numbered= additive
  - Lettered=either/or
Builder Responsibilities:
• Builder needs to download from EarthCraft.org website
• Builder needs to fill out
• Required before any work can be done by the Technical Advisor

Certified
• 100 points

Gold
• 150 points
• ENERGY STAR Certified

Platinum
• 200 points
• ENERGY STAR Certified
• Indoor airPLUS
• WaterSense

No point minimums per category at any level
How EarthCraft House™ Works

Training
Design Review
Preliminary Inspections
Final Inspections
Categories and Subcategories

1. Site Planning
   - Site Selection
   - Site Design
   - Site Preparation and Preservation Measures

2. Construction Waste Management

3. Resource Efficiency
   - Resource Efficient Design
   - Advance Framing Products
   - Local, Recycled and/or Natural Content Materials

4. Durability and Moisture Management
   - Products and Applications
   - Moisture Management

5. Indoor Air Quality
   - Combustion Safety
   - Indoor Pollutant Control

6. High Performance Building Envelope
   - Air Sealing Measures
   - Blower Door Test Results
   - Insulation
   - Windows and Doors
   - Roof

7. Energy Efficient Systems
   - Heating and Cooling Equipment
   - Ductwork/Air Handler
   - Duct Leakage Test Results
   - Ventilation
   - Water Heater
   - Lighting/Appliances

8. Water Efficiency
   - Indoor Water Use
   - Outdoor Water Use

9. Education and Operations
   - Education
   - Operations and Management
   - Third Party Programs

10. Innovation
Scoring a House

12 categories
Minimum total of 150 points
Combination of energy efficiency and environmentally responsible practices
Innovation encouraged
EarthCraft Multifamily

Certification standard for sustainable multifamily projects
Intended for low-rise projects with a maximum of 4 stories
Provides a marketing and permitting tool for developers and field support during construction
Provides a legitimate, third-party standard for buyers and other stakeholders
Scoring a Project

12 categories
Minimum total of 200 points
Combination of energy efficiency and environmentally responsible practices
Innovation encouraged
Additional Program Integration
Third Party Programs

- EPA Indoor AirPLUS Qualified Homes
- Energy Star
- WaterSense
Qualified Allocation Plan (QAP)

2008 - ECC and LEED ND added

2010 - 100% of the projects funded are pursuing green building!
Evolution of ECC

1999

2005
Project Types

[possible]

[preferred]
Considerations

- Grey Area
- Ownership
- Phased Development
- Boundary Lines
Boundaries
Prior to Submitting to DCA

- **Registration**
  - **SLL Prerequisite Review**
- **STAGE 1:** Conditionally Approved Plan
- **STAGE 2:** Pre-Certified Plan
- **STAGE 3:** Certified Neighborhood Development
Even Better

ECC Design Review

1. Submit ECC Site Analysis Packet
2. Engage Community Participation
3. Hold Design Team Charrette
4. ECC Kickoff Meeting

Design Worksheet Approved & Returned

6. Submit Design Worksheet
7. Construction Begins
8. Site Visits
9. ECC TA
10. Complete Infrastructure
11. Submit Construction Worksheet
12. Project Certification

STAGE 1:
Conditionally Approved Plan

STAGE 2:
Pre-Certified Plan

STAGE 3:
Certified Neighborhood Development
Immediately After Funding is Awarded

1. ECC Design Review
2. Submit ECC Site Analysis Packet
   + Engage Community Participation
   + Hold Design Team Charrette
   + ECC Kickoff Meeting
3. Design Worksheet Approved & Returned
4. Submit Design Worksheet
5. Construction Begins
6. ECC TA Site Visits
7. Project Certification
8. Complete Infrastructure
9. Submit Construction Worksheet

STAGE 1: Conditionally Approved Plan

STAGE 2: Pre-Certified Plan

STAGE 3: Certified Neighborhood Development

Registration → SLL Prerequisite Review
Site Selection
Planning and Design: Wildlife Habitat

Sensitive Wildlife Map:
Consult with the state Natural Heritage Program or Fish and Wildlife Service (FWS) Division to determine the likelihood of federally threatened or endangered species existing on site.

If it is determined that species are likely to exist on site, hire a qualified biologist to conduct a site analysis and produce a habitat conservation plan per the Endangered Species Act.

If it is determined that no federally threatened or endangered species exist on site, hire a qualified biologist, work with a conservation NGO, or work with a local or state agency to produce a map of any additional wildlife habitats found onsite.
Development Form
Housing + Transportation Affordability

Housing Costs - % Income

- Less than 30%
- 30% and greater

Housing + Transportation Costs - % Income

- Less than 45%
- 45% and greater

*Maps showing the distribution of housing and transportation costs across different regions.*