



Twin Springs

Technologies, Inc.

LEED Green Gut Remodel

Ellen Dibble, Twinsprings Technologies
Owner-builder with experience in low cost
passive solar design, sustainable building
and remodeling; and green living research
with LEED green rater expertise.

A close-up photograph of a solar collector, likely a flat-plate collector, mounted on a roof. The collector is a long, cylindrical metal tube with a dark, curved cover on top. The background is a plain, light-colored wall.

Earth Sheltered Passive Solar





Why LEED?

- ✓ Premier certifying agency for energy efficient building headquartered in Washington D. C.
- ✓ US Green Building Council est. 1993.
- ✓ LEED (Leadership in Energy and Environmental Design) 2000
- ✓ Improve quality of life by transforming places we live, learn, work and play in the space of a generation.

Checklist/Scoring System for Green Building



- ✓ Our house under LEED 2009
- ✓ Adopted LEED v4—some changes but can register under old program until 6/15.
- ✓ Several types of buildings are included.
- ✓ Homes have their own category.
 - ✓ Gut remodel is a type of home qualification
 - ✓ Must be a substantial remodel
 - ✓ Partial projects follow the ReGreen guidelines. <http://www.regreenprogram.org/>



Why Start a LEED Green Remodel?

- ✓ Trusted third party requirements and evaluation system (doesn't rely solely on contractors, vendors or suppliers!)
- ✓ Improve quality of living for you and your family within and around your home.
- ✓ Reduce energy use, become more environmentally responsible.
- ✓ Spread the word about the benefits of green building--create marketplace demand.







Getting Started

- ✓ Contact and engage a LEED Provider to evaluate your project. Energy Logic
- ✓ Understand the extent of a LEED “gut remodel project”.
- ✓ Put together a team to advise you.
- ✓ Prepare for “experts” trying to talk you out of it! (In my experience, they will all question your requirements.)

Charrette Partners

energyLogic
analysis. insight. answers.

 CITY OF ARVADA

Everbuild
PRO



Our Team of Experts

 **CROWN JADE**
DESIGN & ENGINEERING, INC.

**FREEDOM ENVIRONMENTAL
CONSULTANTS, INC.**



**HP
Geotech**

 **Deeper
Green**
Consulting

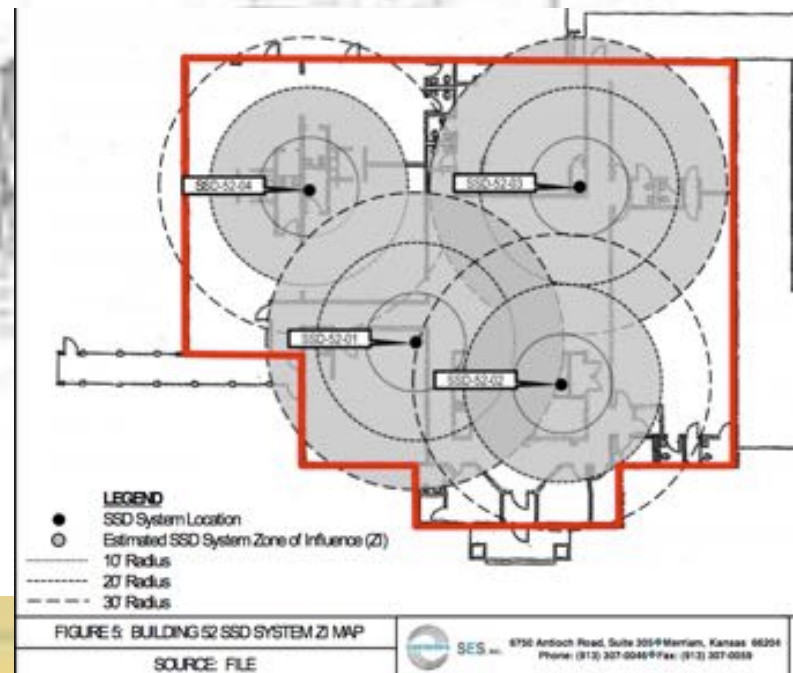
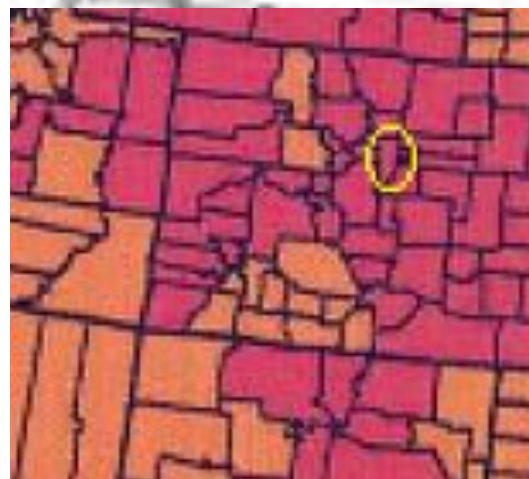
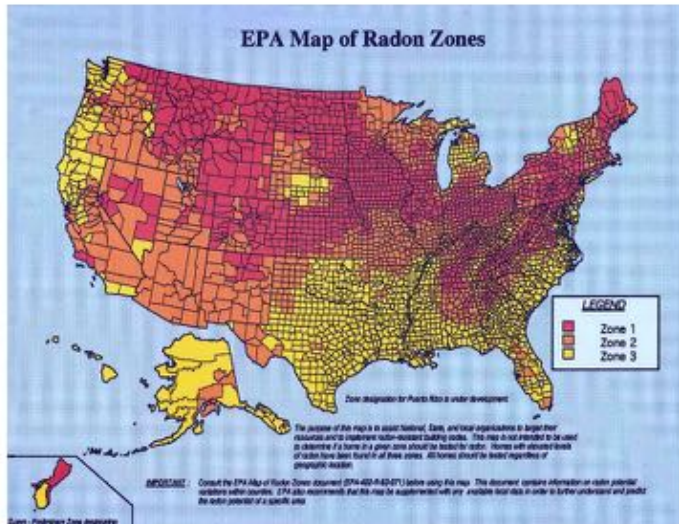
 **MILE HIGH
CONTRACTING
COMPANY**



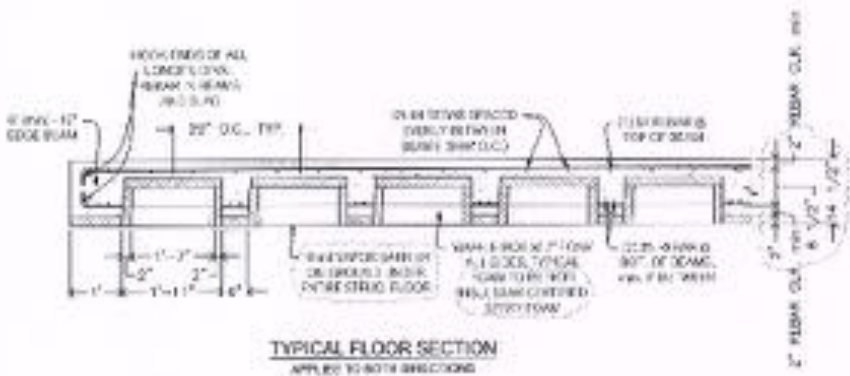
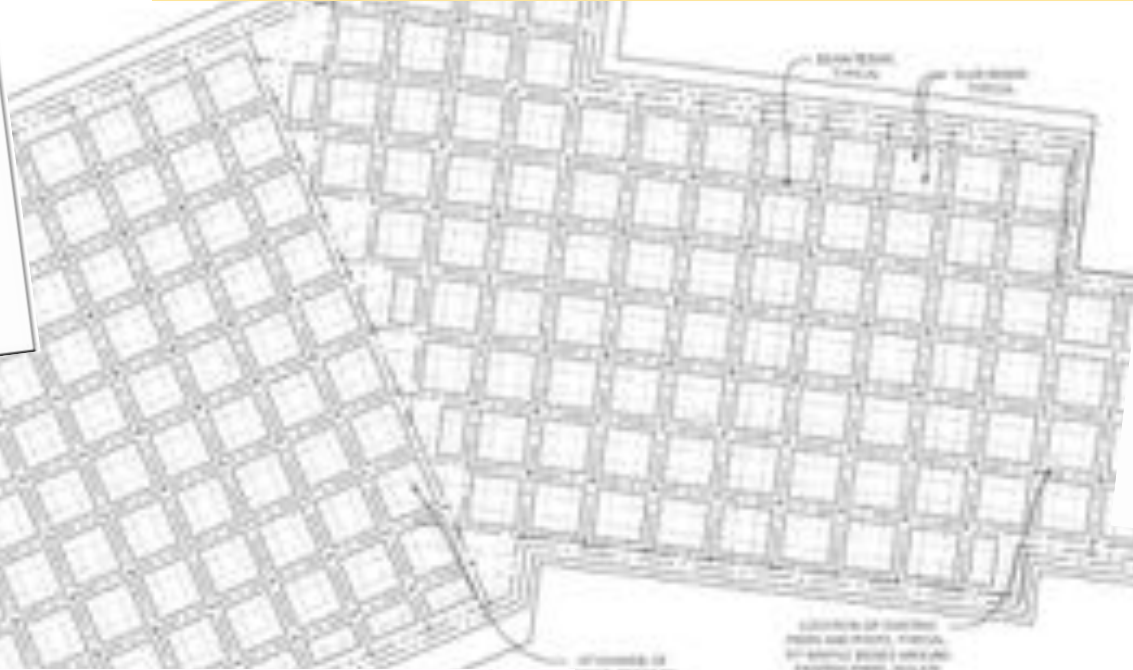
Innovation and Design

- ✓ Design team -- Need a LEED AP at least at the beginning.
- ✓ Opening meeting--Design Charrette
Getting your team to collaborate
- ✓ Durability Issues--
 - ✓ Radon (number one risk in most of Colorado)
 - ✓ Moisture Intrusion (heaved slab)
 - ✓ Air intrusion (initial Energy Audit)

Radon Mitigation



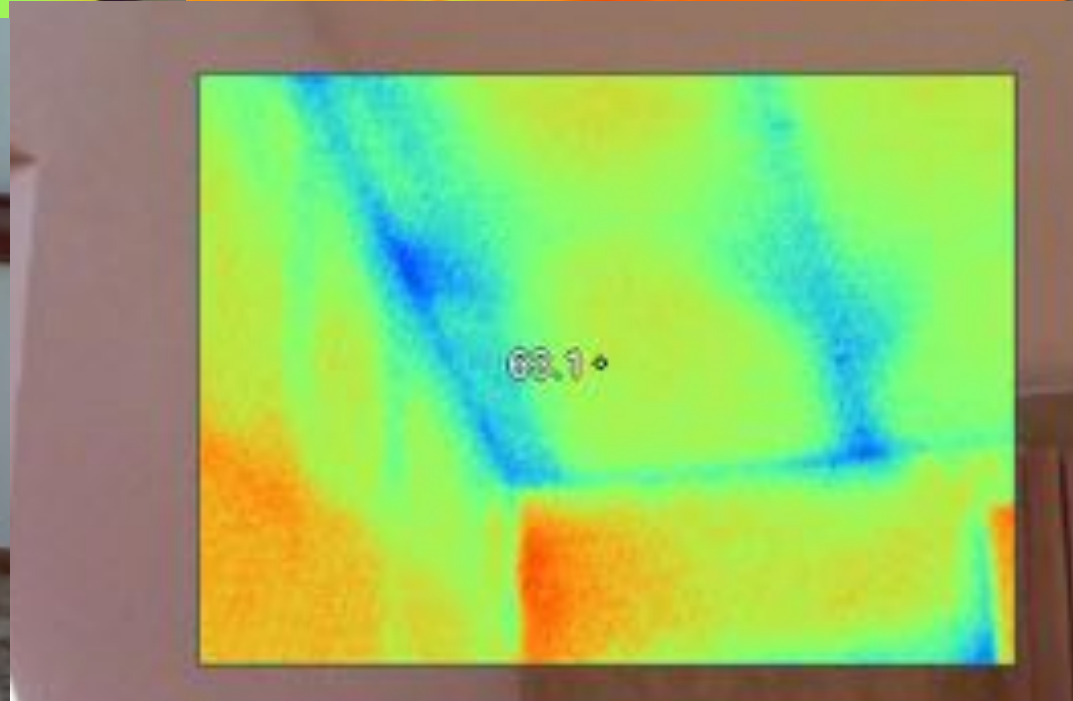
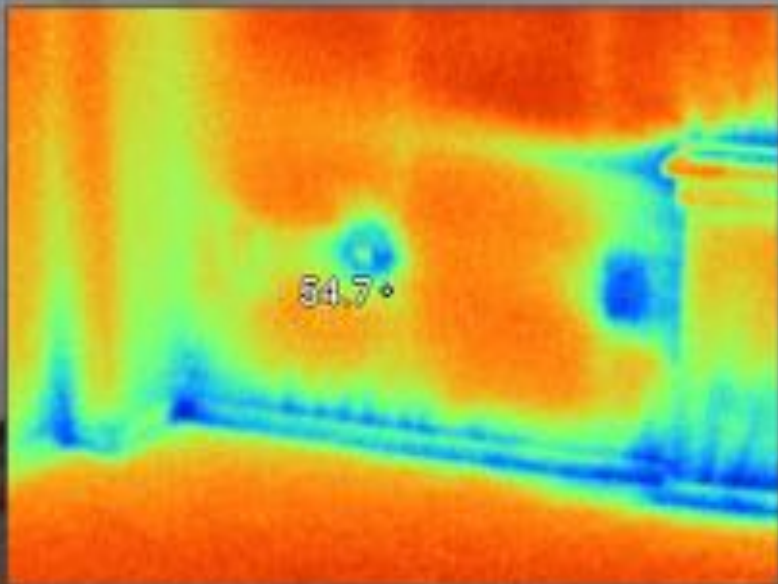
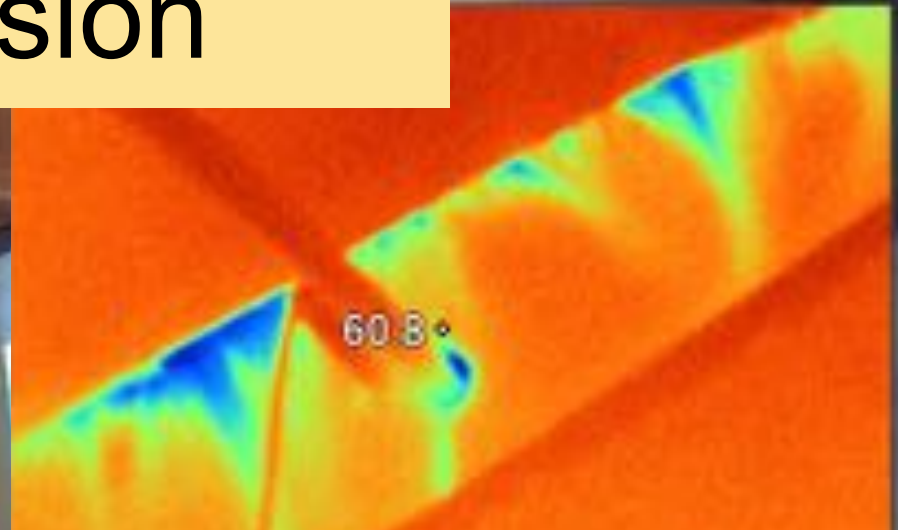
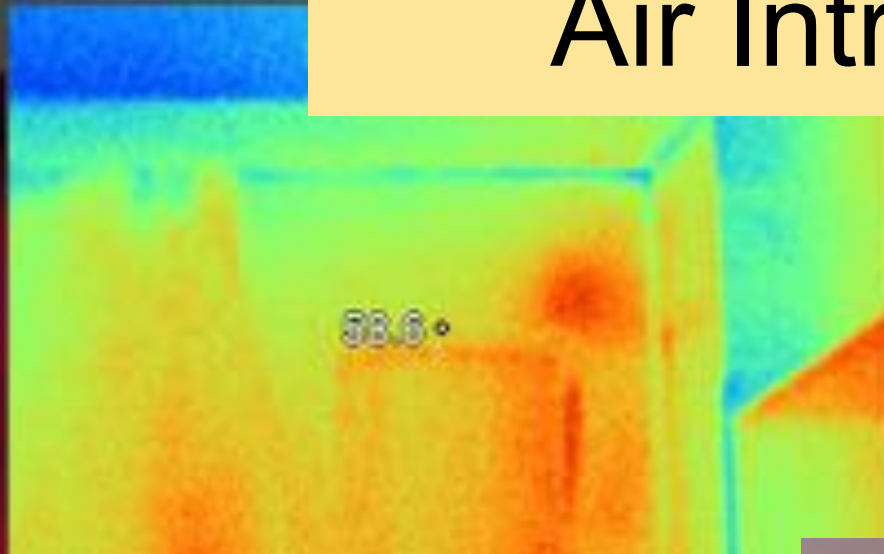
Moisture Intrusion



STRUCTURAL FLOOR
10' x 11'

- 8000 PSI CONCRETE
- GRADE 60 REBAR
- GRADE 60 REBAR
- APPROX 200 WAFFLE BONES
- ALL 40 REBAR TO BE SPACED AT 16"
- ALL 40 REBAR TO BE SPACED AT 16"

Air Intrusion





Research!

- ✓ Design Team Members want to stick to their specialties--ask them questions
- ✓ Need Green Building materials and solutions--look for ideas, consult books, blogs and building science websites
- ✓ Innovation means using a new idea, new approach, new product not doing what vendors have “always done.”

Twinsprings Solutions

- ✓ Radon Mitigation--active system for high levels
- ✓ Waffle mat--to alleviate moisture intrusion causing slab heave
- ✓ Radiant heat and energy efficient boiler installation--Manual J
- ✓ Improvements in passive solar design/ building envelope
- ✓ Water usage—Hot water loop, landscape native planting, irrigation

Radon Mitigation

SUB-SLAB DEPRESSURIZATION SYSTEM DESIGN AND INSTALLATION

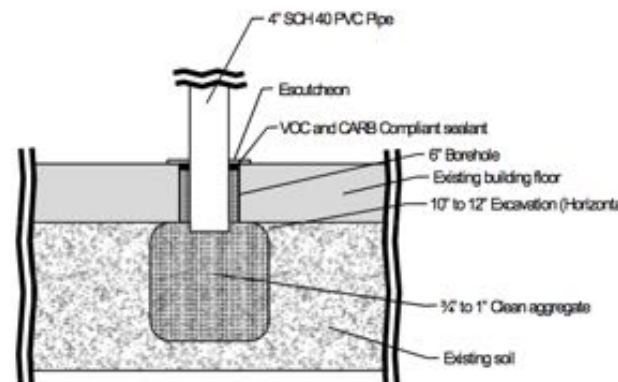
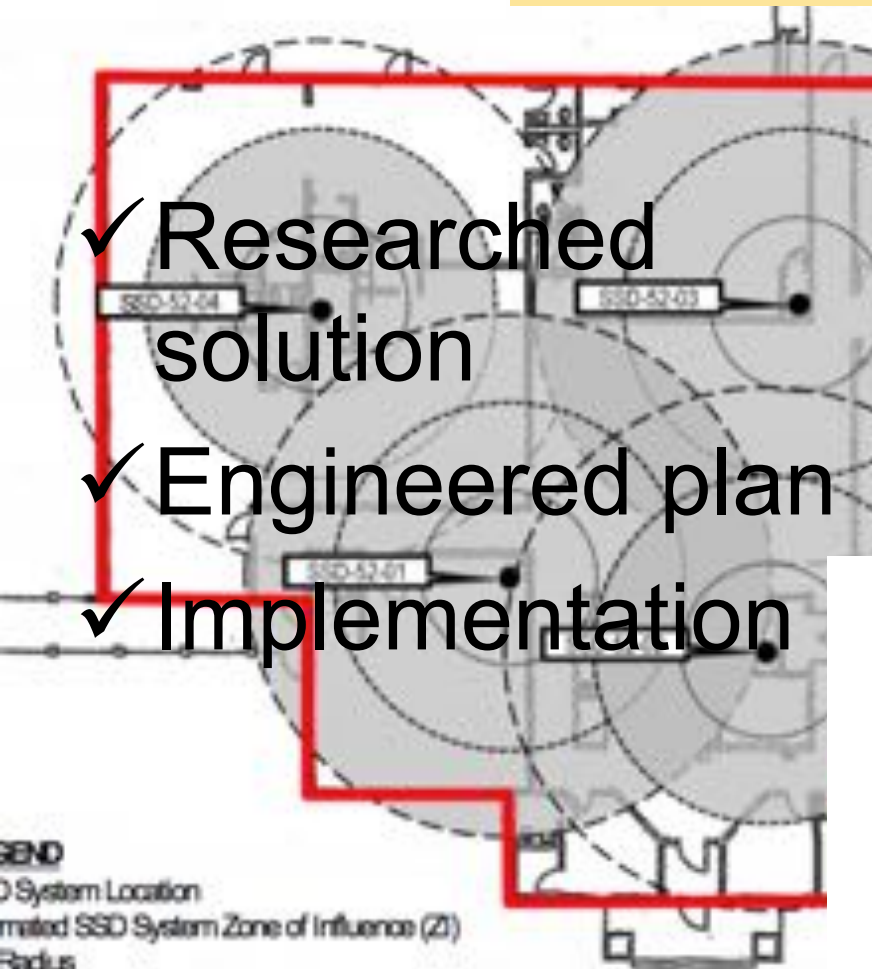
BUILDINGS 50 AND 52

Prepared for:

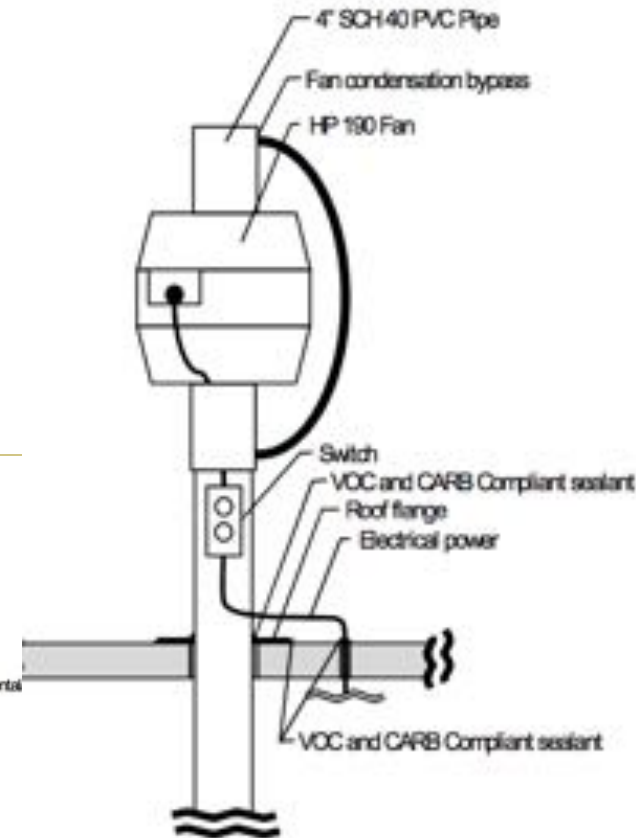


US GENERAL SERVICES ADMINISTRATION
1500 East Bannister Road, Room 2101
Kansas City, Missouri, 64131-3088

- ✓ Researched solution
- ✓ Engineered plan
- ✓ Implementation



TYPICAL EXCAVATION



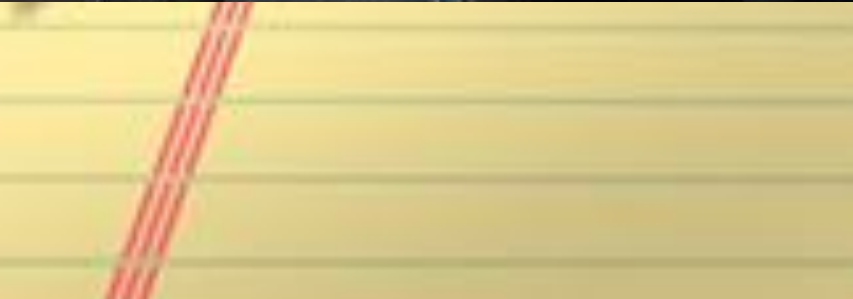
TYPICAL FAN INSTALLATION - BUILDING 50



Radon Mitigation



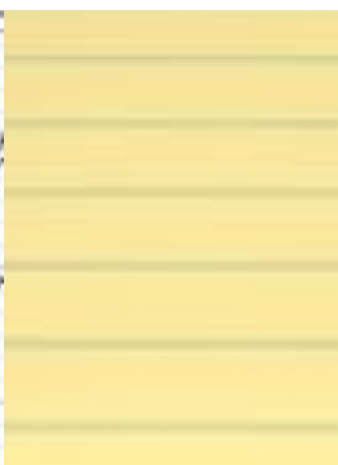
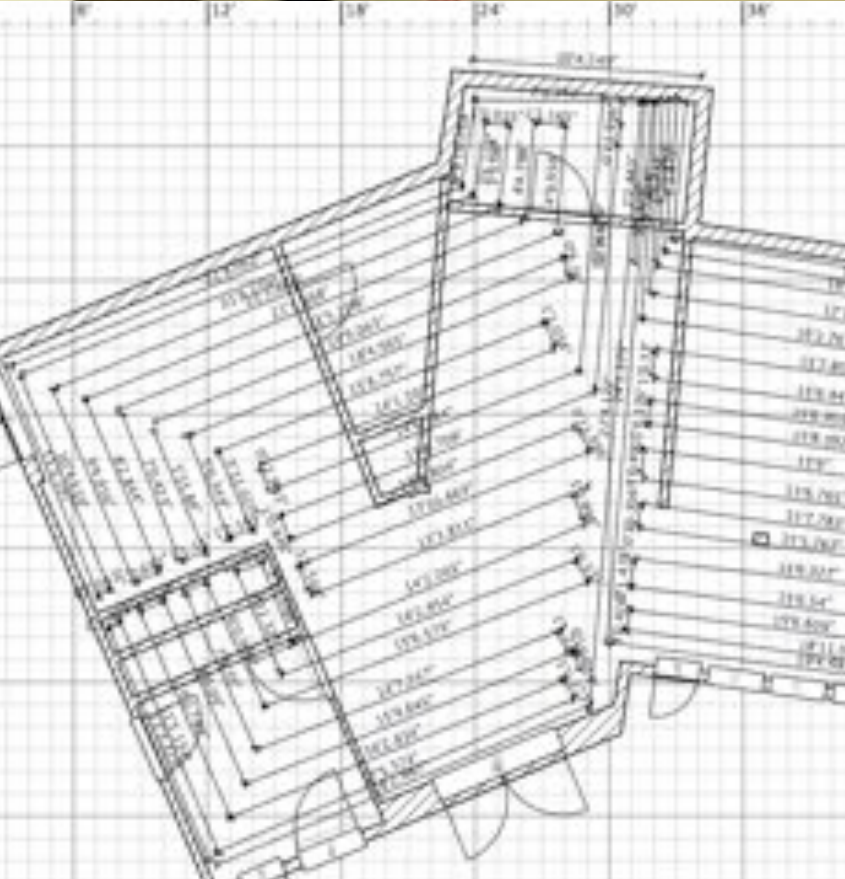
Waffle Mat!



Waffle Mat



Radiant Heat Design



Combo Condensing Boiler



Challenger COMBI
Combination High Efficiency Boiler and Domestic Water Heater

HEAT and Hot Water
.... TOGETHER in one Appliance

Glycol Compatible



Features

- » High Efficiency - 95% AFUE
- » Inputs to 124,000 Btu/Hr
- » Whisper Quiet
- » On demand plentiful Hot Water
- » Eliminates need for DHW Tank
- » Reliable - 10 year Heat Exchanger Warranty
- » Low NOx
- » DHW Low Lead Content Certified

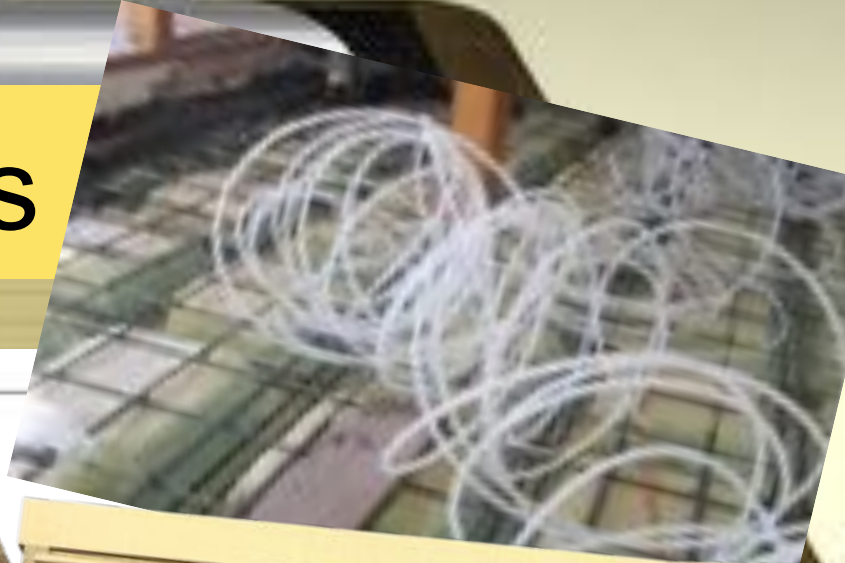
CONDENSES IN BOTH SPACE HEATING AND DOMESTIC HOT WATER MODES



Hot Water Loop/ Recirculation



Solutions



Keeping Score

- ✓ LEED Excel Spreadsheet Checklist
- ✓ Lots of photos--Google Maps/Earth
- ✓ Receipts--measure recycled and landfill
- ✓ Plan for each LEED point category--
 - ✓ How to duct an ERV/HRV system?
 - ✓ Airlock entry--shoe storage
 - ✓ Will I install a whole house vacuum?
- ✓ Energy Star--Thermal Bypass, AirPlus, Appliances, Boilers, Water Sense
- ✓ Blog--blog.twinsprings.com--tell your story, list your resources, be a resource

Sample Documentation



From Survey

Less than 15 degrees
from East West Axis



LEED Spreadsheet



for Homes

LEED for Homes Project Checklist

| | |
|-----------------------------------|--|
| Builder Name: | T&O |
| Project Team Leader: | Ellen Dibble, Twinsprings Research Institute |
| Home Address (Street/City/State): | 13673 78th Pl, Arvada, Colorado |

Project Description

Building Type: Single detached
of Bedrooms: 3

Project type: Custom
Floor Area: 2,213

Adjusted Certification Thresholds

Certified: 49.0 Gold: 79.0
Silver: 64.0 Platinum: 84.0

Project Point Total

Prelim: 83.5 + 14 maybe pts Final: 26

Certification Level

Prelim: Gold Final: Not Certified

Final Credit Category Point Totals

ID: 0 SS: 0 EA: 26 EQ: 0
LL: 0 WE: 0 MR: 0 AE: 0

Minimum Point Thresholds not met for Final Rating

Date Most Recently Updated: 3/25/12 Updated by: Ellen

Indicates that an Accountability Form is required.

| Innovation & Design Process (ID) | Max Pts. Available | Preliminary Rating Y / No | Waybe | No | Notes | Project Points |
|---|--------------------|---------------------------|-------------|----|---------------------------------|-----------------|
| Innovation & Design Process (ID) (Minimum 0 ID Points Required) | Max: 11 | Y: 6 | N: 1 | | | Final: 0 |
| I. Integrated Project Planning | | | | | | |
| 1.1 Preliminary Rating | | | | | | |
| Target performance tier: | | | | | | |
| | | | | | | |
| 1.2 Integrated Project Team (meet all of the following) | 1 | 0 | 1 | | | 0 |
| <input checked="" type="checkbox"/> (a) Individuals or organizations with necessary capabilities | | | | | | |
| <input checked="" type="checkbox"/> (b) All team members involved in various project phases | | | | | | |
| <input type="checkbox"/> (c) Regular meetings held with project team | | | | | | |
| 1.3 Professional Credentialed with Respect to LEED for Homes | 1 | 1 | 0 | | please see ID 01-06 for details | 0 |
| 1.4 Design Charrette | 1 | 1 | 0 | | | 0 |
| 1.5 Building Orientation for Solar Design (meet all of the following) | 1 | 1 | 0 | | | 0 |
| <input checked="" type="checkbox"/> (a) Clearing area on north/south walls 10% greater than on east/west walls | | | | | | |
| <input checked="" type="checkbox"/> (b) East-west axis is within 15 degrees of due east-west | | | | | | |
| <input checked="" type="checkbox"/> (c) At least 450 sq. ft. of south-facing roof area, oriented for solar applications | | | | | | |
| <input checked="" type="checkbox"/> (d) 90% of south-facing glazing is shaded in summer, unshaded in winter | | | | | | |

Staying Sane and on Target

- ✓ Communicate with your Provider
 - ✓ Work out issues together
 - ✓ Don't interpret the rules without checking--check more than one source.
- ✓ Consult vendors--don't be put off by their questioning of your sanity.
- ✓ Do it yourself--sometimes if you want it done right...
- ✓ Have someone to talk to about details
- ✓ Be willing to make mistakes

Questions?

- ✓ Good Luck
- ✓ Build Green
- ✓ Have Fun



The logo for Twin Springs Technologies, Inc. is centered at the top of the page. It features the text "Twin Springs" in a blue serif font above a stylized blue wave graphic, with "Technologies, Inc." in a blue serif font below the waves. The logo is set against a white rectangular background.

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