Twin Springs Technologies, Inc.

Design Charrette

LEED for Homes Gut Remodel

April 23rd, 2012

Introduction of Design Team

- James Plagman--HumanNature Architecture
- Shane Gring--BOULD
- Annette Garrigues--Conservation Seeding and Restoration

Design Charrette:
Integrate green strategies across all aspects of the building design, drawing on the expertise of all participants.

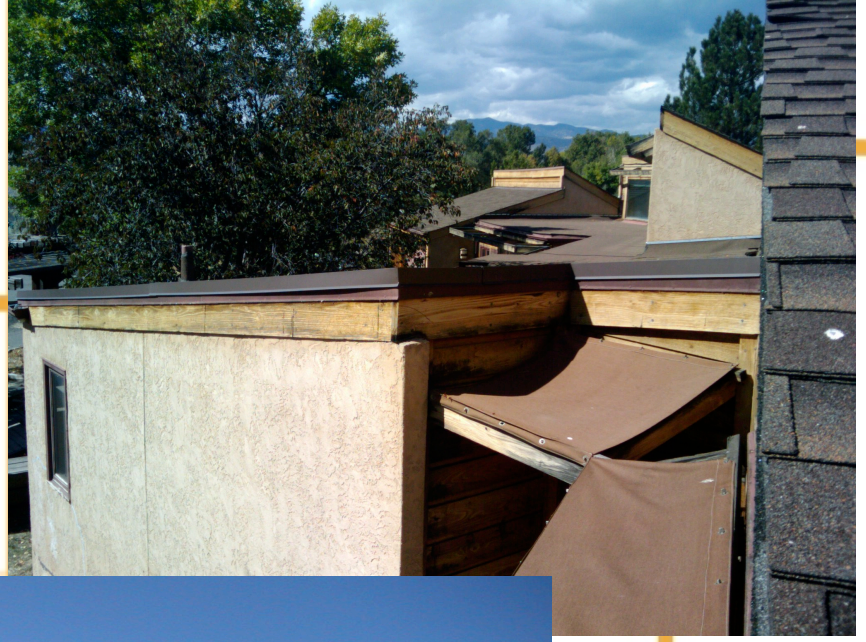
Three Phases

- Planning
- Energy Modeling
- Implementation/Construction

Plan to meet monthly during active project using Anymeeting.com

The Project

- 2213 Square Ft. in two parts--slab on grade and crawlspace.



Outside Photos








Inside Photos

Building Orientation

- Within 15° of due East West Axis

From Survey

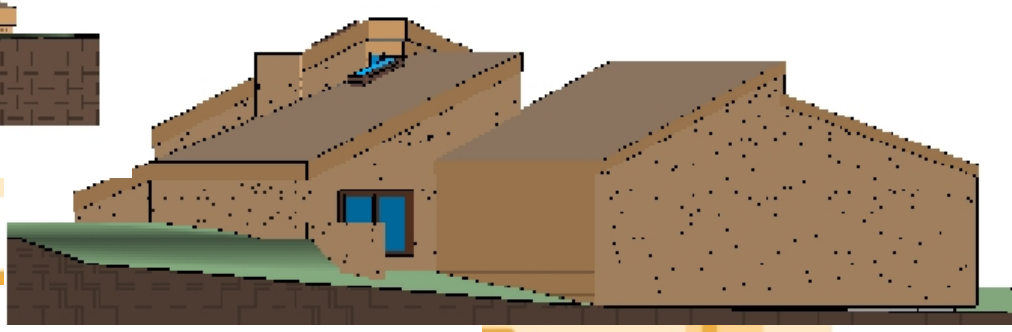
Less than 15 degrees from East West Axis

Project Design

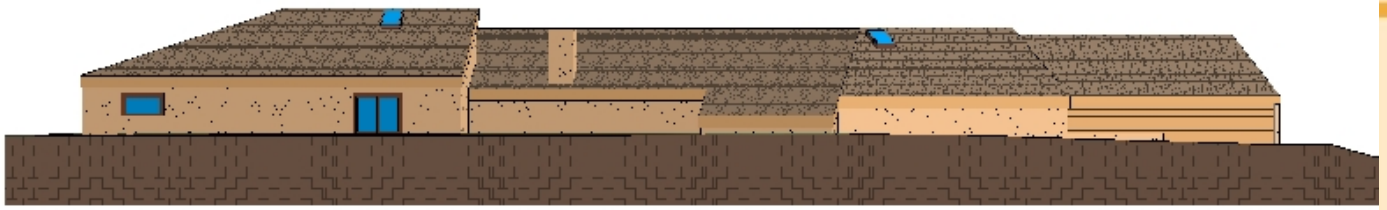
- South facing windows
- 450 Sq. Ft of south facing roof

As Built Drawings

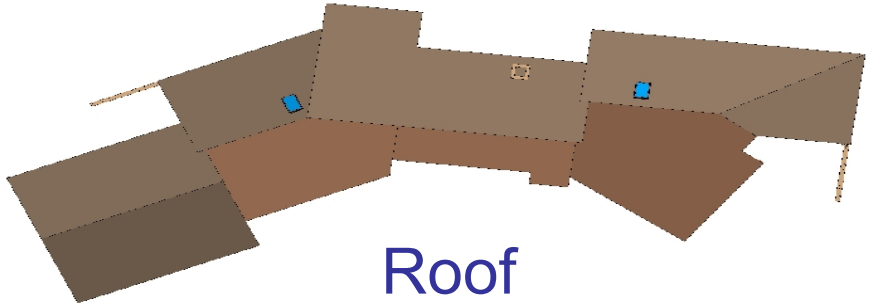
East



West



North



Roof

Existing Floorplan

Demo Floorplan

Durability Evaluation

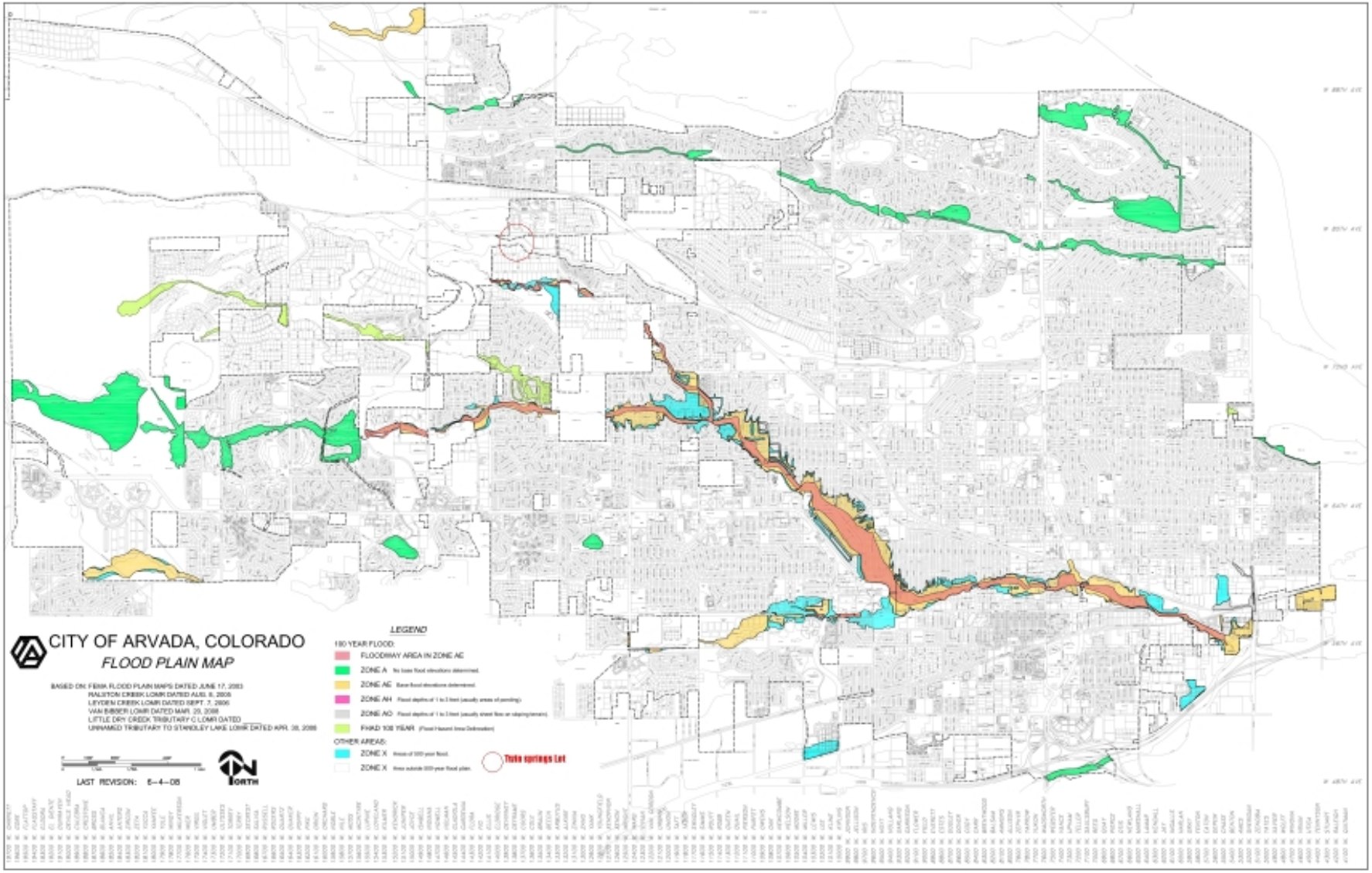
Home					
Building type:	***Single detached***	Floor area:	***2213***	Structure type:	***Earth Bermed Masonry***
Project type:	***Custom***	# of bedrooms:	***3***	Exterior roofing:	***Asphalt***
Number of stories:	***1***	Number of full bathrooms:	***3***	Garage:	***2 car attached***
Site					
EPA Radon Zone:	***1***		Type of soil:	*Denver Kutch Clay Loam 5-9% slopes*	
Terrain / topography:	*Gentle slope*		Depth of soil to bedrock:	*>80 inches*	
Predominant landscaping:	*Scrub grass, deciduous and evergreen trees and bushes*		Depth of ground water below structure:	*Varies*	
Common regional pests:	*Mice, rabbits*		Proximity to bodies of water?	*150 ft to canal*	
Other significant features:	*Earth berm*		Above FEMA 100-year floodplain?	*Yes*	
Climate					
IECC 2004 Climate Zone:	***5***	Annual rainfall (inches/yr):		***14.92***	
Heating degree days (HDD):	***6059***	Max annual wind speed (mph):		***74 mph max gust 2011***	
Cooling degree days (CDD):	***769***	Avg annual solar radiation (kWh/m^2/day):		***4.6***	
Natural disaster	***Tornados, earthquakes, wildfires, blizzards***				

Durability Issues

Issue Type	Risk Level	Checklist
Exterior Water	High	Replace slab
Air Infiltration	Medium	Thermal bypass
Heat Loss	Medium	Insulate
Pests	Low	Caulk
Interior Moisture	Low	Energy Star
Intersitial Condensation	Low	Air filtration
Ultraviolet radiation	Low	

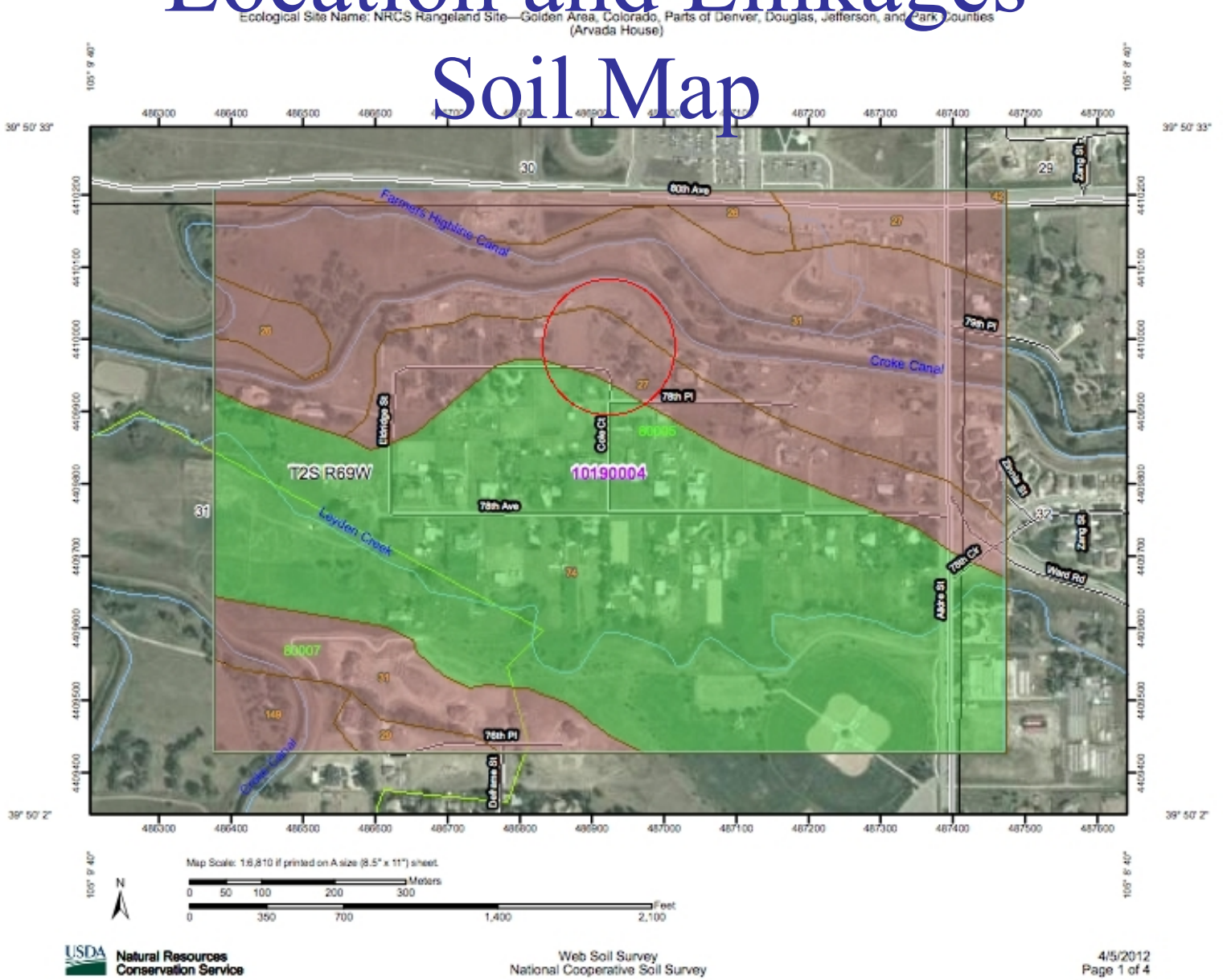
Location and Linkages

Floodplain

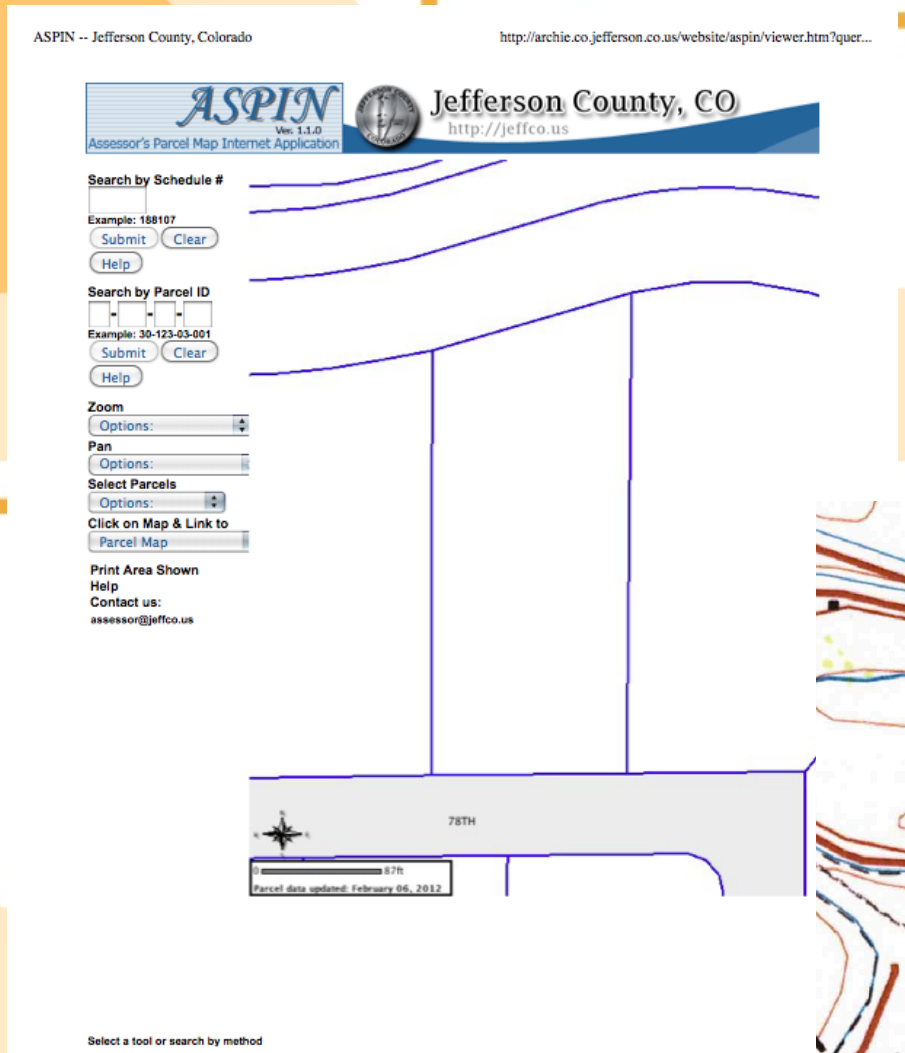


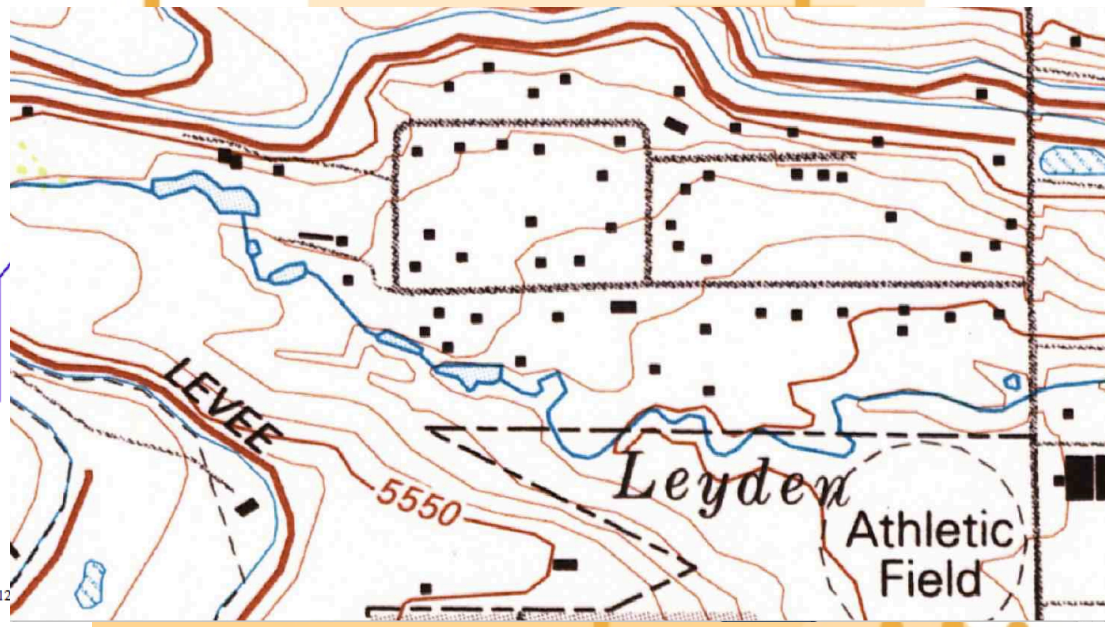
Location and Linkages

Soil Map



Location and Linkages
Existing Lot





Sustainable Sites

- Meet erosion control prerequisites
- Where the site is previously developed, meet all the following:
  - Develop tree / plant preservation plan with "no-disturbance" zones AND
  - Rehabilitate lot; undo soil compaction and remove invasive plants AND
  - Meet the requirements of SS 2.2

Landscaping

a) Any turf must be drought-tolerant.

b) Do not use turf in densely shaded areas.

c) Do not use turf in areas with slope of 25%.

d) Add mulch or soil amendments as appropriate.

e) All compacted soil must be tilled to at least 6 inches.

- Percentage of designed landscape softscape area that is turf.
- Percentage of installed plants that are drought-tolerant.
- Percentage reduction in estimated irrigation water demand.

Other Site Concerns

- Reduce Local Heat Island Effects
  - Locate trees / plantings to provide shade for 50% of hardscapes
- Permeable hardscapes
- Nontoxic pest control.
  - Caulk and seal, install screens, consider removing all planting within 24" (Is garage planting included?)

Water Efficiency

- Possible designs for water use as it flows off roof (no physical retention).
- Possible graywater system.
- Requirements of irrigation system design.
- Meet indoor water use requirements (low flow faucets, toilets, etc.)

Energy Efficiency

1. Optimize Energy Use
2. Insulation Interior or exterior?
3. Air Infiltration (can we meet the thermal barrier requirements for a gut remodel?)
4. Effective windows—Energy Star rating. Design for solar gain in winter
5. Design of heating and cooling system New boiler for hot water and heat with solar preheated tank. Pipes in non-conditioned spaces insulated to requirement.
6. Very high efficiency boiler
7. Water heating pipe insulation and efficient heater—not structured plumbing?
8. Install all energy efficient lighting
9. Purchase all energy efficient appliances.

Materials and Resources

- Reuse--Studs, ReStore materials
- Reduce--Fewer interior walls
- Recycle--Carpet, concrete
- Local sourcing whenever possible--lumber, granite, paving, stone

Awareness and Education

- blog.twinsprings.com
- Newspaper article?
- Signs?
- Workshop?
- House manual

Afternoon @ Site

- Group tour
- Identify major hurdles
- Brainstorming session/Solutions
- Observations
- Next Steps
  - Phase 2: Design Development/Energy Modeling
  - Phase 3: Final Design/Implementation/Construction