



CHANDLER DESIGN-BUILD INC.

## Creating a great home-owners manual for your green homes



*Give them a printed owners manual,  
follow up with a walk-through,  
finish with a comprehensive  
Digital or bound owners manual.*

To meet NAHBgreen standard the manual **must include** all of the items below:

- Narrative detailing the importance of maintenance and operation of a green-built home.
- Local green building program certificate of bldr participation
- Household recycling opportunities.
- Information on how to enroll in a program to receive energy from a renewable energy provider.
- Explanation of the benefits of using compact fluorescent light bulbs in high usage areas.
- List of habits & actions to optimize water & energy use.
- Local public transportation options if applicable.
- Clearly labeled diagram showing safety valves and controls for major house systems.

To meet NAHBgreen standard the manual **must include** at least **five** of the below:

- A list of local service providers that focus on regularly scheduled maintenance and proper operation of equipment and the structure.
- A photo record of framing with utilities installed.  
Photos should be taken prior to insulation and clearly marked.
- A list of green home building guidelines items in the home.
- User-friendly maintenance checklist.
- Instructions for proper handling and disposal of hazardous materials'
- Information on organic pest control, fertilizers, de-icers, and cleaning products.
- Information about native or low-water landscape.
- Information on how to keep a home's relative humidity in the 30 - 60% range.  
(Humidistat from Radio Shack)
- Instructions for checking the crawlspace for termites.
- Instructions for keeping gutters clean to divert water at least 5' away from building.

**The NAHB green program allows extra points for providing a "Photo record of framing with utilities installed," it's not mandatory**

But it can create an atmosphere of transparency and trust with your homeowner, can be an invaluable resource for future trades working on the home and contribute to the ease of maintenance.

**It shows that I am so confident that I am building a home that reflects best practice within their price point that I'm willing to share the photos as well as the Green Scoring Tool and have brought an energy star auditor into the home to verify our attention to detail.**

*Of course, during the course of construction I use my digital camera to record items that need to be fixed or changed and these get edited out (mostly).*

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As you build the home it is common to accumulate PDF files along with the warrantee cards and installation manuals that apply to the appliances and equipment incorporated into the construction of the house.

Using the CD or memory stick format to organize the homeowners manual gives the builder an easy way to convey these files to the homeowner to add value at negligible cost.  
*Or you can just let them accumulate in the top drawer in the kitchen...*

The manual can provide an agenda for the final pre-occupancy walk through.  
Some builders include an agenda for the pre-construction meeting and introduce the manual at that time.

Referencing the home-owners manual during these critical interactions can help to educate the homeowner about the scope of the manual, especially if it is presented in a condensed print version with an expanded digital version referred to in a table of contents.

It gives the builder an opportunity to educate the client about the resources in the manual in hopes that they will be more inclined to actually use it.

## **Table of contents:**

**Welcome letter** (AKA Homeowners manual)

**Company brochure and slide show of completed homes**

**Final pre-occupancy photos**

*(to show off to folks at the office and family reunion.)*

**Faxable directions to site**

*(for house warming party, with home owners*

*new mailing address and contact info for homeowners including builder info.)*

**Preventive maintenance schedule.**

*Tie to the seasons, not date of occupancy*

**What makes this project green?**

*Answer sheet in simple bullet points like what we are doing for the Green Home Tour.*

**Energy Star Report**

Energy Star emissions report and Energy Star summary copy of the sticker.

**Green building checklists and verifiers reports**

Manual J HVAC calculation report

Local program green building report

National Green Building Program verifiers report

LEED-h or NC Healthy House green building report if applicable

**Signed construction contract**

Signed estimate appended to the construction contract

Copies of all signed change orders

Selections worksheet updated to as-built conditions

**Folder containing PDF scans of signed blueprints**

*(include copyright notice on every page to discourage un-authorized re-use.)*

Floor plan (dimensioned and “magazine version”)

Elevations North, West, South and East

Site plan, foundation survey, landscape plan.

Foundation plan

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Roof plan  
Building sections and details  
Electrical plan updated to as-built  
Termite report and certification  
Foundation survey  
Manual J report  
Structural engineers report  
Wall panel elevations and Wall panel layout  
Roofing supplier foam insulation certification letter  
Cabinet supplier low VOC plywood certification letter  
Appliance owners/ installation manuals on PDF  
HVAC equipment specifications and serial numbers  
Fireplace / wood stove brochure and installers / owners manuals  
Photos of labels  
    Paint can labels, roof shingle labels, tile and tile grout labels,  
Folder with construction photos  
    showing excavation, footing steel reinforcement,  
    drainage and waterproofing,  
    pre-insulation photos showing advanced energy framing and  
    location of wires and plumbing as well as  
    pre-plumbing for solar water heater,  
Photos of the people who formed the team that built the house  
    **(labeled w/ names & roles, looking happy to be part of the team)**

## **Value added section:**

Recipes for Non-toxic home cleaning supplied  
Information on becoming a backyard wildlife habitat  
Key community phone numbers for services the owners might need.  
Info on recycling, LED and CFL lighting.  
Info on what the next step might be to go even deeper green.

## **Annual Service calendar**

### **Fall**

Check or exchange glass and screens in storm doors and windows  
Check smoke detectors, carbon monoxide detectors and radon detectors for proper operation. Be sure to carefully clean the unit and replace batteries twice a year  
Inspect the roof for damage and attic space for leaks; repair if necessary  
Remove hose connections and store hose to avoid freezing  
Seal concrete surfaces to prevent freeze/thaw damage  
Inspect all doors and windows for proper operation and a tight fit.  
Make a careful safety inspection of your home, inside and out, to seek out problem areas.  
Check stairs, steps and ladders for broken or hazardous areas that could cause an accident.  
Check handrails for sturdiness and reliability  
Check salt in water softener, fill per specifications if necessary

### **Winter**

Remove hose connections and store hose to avoid freezing

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Clean window tracks, clean and adjust door thresholds,  
Check weather stripping on windows and doors (including garage doors).  
Have HVAC system serviced and/or repaired.  
Replace air filters per manufacturer's instructions or every three months  
Check caulking around all tubs, showers, sinks and other plumbing connections.  
Check for leaks around all plumbing connections and repair  
Check for evidence of termites  
For security systems, check that the alarm and circuits are working properly  
Make periodic checks of storage areas, backs of closets, etc. to be sure no oily rags, unvented gas cans, painting supplies, or flammable cleaning materials have been forgotten. These items could be a fire hazard and should be discarded  
Check salt in water softener, fill per specifications if necessary

## Spring

Check or exchange glass and screens in storm doors and windows  
Check the condition of windows, seals, caulking and exterior paint. Replace or paint as needed  
Perform building performance inspection to make sure systems are working properly, test electrical system for fire hazards, check plumbing and possible water damage areas  
Inspect the roof for damage and attic space for leaks; repair if necessary  
Check interior paint and repaint when necessary.  
Check smoke detectors, carbon monoxide detectors and radon detectors for proper operation. Be sure to carefully clean the unit and replace batteries twice a year  
Check salt in water softener, fill per specifications if necessary

## Summer

Have HVAC system serviced and/or repaired.  
Replace air filters per manufacturer's instructions or every three months  
Check all connections in your electrical system to correct any possible hazards.  
Do not overload extension cords or surge protectors esp. kids bedrooms and home office.  
Check water filter and silt screen at water heater intake, clean or replace as necessary.  
Check salt in water softener, fill per specifications if necessary  
Check crawlspace for moisture.  
Monitor indoor humidity w/ humidistat to maintain 60% humidity or less.

*Some buyers don't buy for the green features  
but become raving fans as they discover how clean and healthy the green home building practices are.  
**Give them the knowledge to become green advocates.***

[www.NAHBgreen.org](http://www.NAHBgreen.org) National Green Building Program  
[www.USGBC.org](http://www.USGBC.org) LEED-h green building program  
[www.ChandlerDesignBuild.com](http://www.ChandlerDesignBuild.com) green building details  
[www.GreenBuildingAdvisor.com](http://www.GreenBuildingAdvisor.com) ongoing education  
[www.MemorySuppliers.com](http://www.MemorySuppliers.com) source for logo USB drives

The home-owners manual will remain in the home after the buyer has recycled your tri-fold brochure.  
A good home-owners manual can continue to reflect well on your company after the home is occupied.

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## Jonathan and Vicky Bryant Welcome Letter

(AKA homeowners manual)

### Names and Numbers

Paul Lloyd & Sons	942-5555	Chainsaw work, gravel on drive, box blade, bush hog, bobcat loader, backhoe, septic system pumping and service.
Acme Well	919-544-5555	Well Drilling
Eddie's Pump Svc.	919-918-5555	Well pump service water testing and water softeners.
Alamance County	336-228-5555	Water Quality Testing by Environmental Health Dept
Watson Electric	336-226-5555	Johnny Eatmon, Electrical work.
West Star HVAC	732-5555	Bobby Penland, annual Fall check-up for HVAC system.
Charles O'Quin	919-477-5555	Sheetrock work.
Hunter Harrellson	336-376-5555	Landscape Materials, Mulch, & Stone.
Claire Gardener	919-933-5555	Oak Floor maintenance.
Terry McCormick	226-5555	American Pest Control, termite inspections
Cabinet's	933-5555	Jonathan Quick at Stock-Ferguson HDS
Cates Sawmill	732-5555	Johnny, Custom sawing of timbers
Solar Consultants	919-836-5555	Solar Panel Maintenance

### Elements of your house that require maintenance:

By far the biggest call back item in terms of cost is the damage that can occur if you forget to remove the garden hoses from the freeze-proof hose outlets in freezing weather. Ice can form in the hoses and run up into the building and damage the faucet in a way that only leaks when the water is turned on. Spring comes, homeowner buys plants, turns on the garden hose and floods the house while out enjoying the day in the garden. Just remember to disconnect the garden hoses in freezing weather and everything will be okay. The two rain gardens under the bed on the west side of the drive and under the vegetable garden don't require any maintenance at all. More information about them can be found on my website at <http://www.chandlerdesignbuild.com/files/rainGardenComplete.pdf>

We don't want you to have to call in the middle of the night asking about locations of critical shut offs for water, gas, and electricity. The electrical shut off is outside the laundry at the breaker panel on the wall next to the AC unit. The Gas shut off is on the kitchen wall to the left of the HVAC unit, There is also a gas shutoff at the water heater in the solar tank closet, in the garage next the water heater there and under the dual fuel range. While it is easy

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to shut off the water by turning off the breaker to the well pump and then draining the water by opening a hose bib, there is a more instantaneous way to turn the water off by turning the valve at the blue tank in the garage.

The plumbing system may develop slow leaks over time as things settle in. If you see any dampness under the sinks or behind toilets (other than normal condensation on the toilet tanks) please call me as soon as possible to allow me to fix the leaks before they become a problem for the cabinetry. The back-up water heater is a super efficient condensing type by Quietside located on the wall in the back of the solar tank closet. A 2" pipe gathers this condensation along with the condensation from the Zoned Bypass air conditioning and dehumidification system and drops it into the gutter drain system next to the gas shut-off. It will be normal to expect this pipe to be dripping and the ground under it to be wet.

The Quietside water heater controls are next the unit in the solar tank closet. If it has problems there are diagnostic codes that will appear in the display to help with service. There is a whole house anti-scald device that prevents the water from exceeding 120 degrees. If you need the water hotter than this give us a call and we can set it to a higher temperature for you.

The Solar H2OT solar water heater should be maintenance free but we have written key diagnostic information on the equipment so that one of our crew can quickly diagnose any issues that may develop. Southern Energy Management has a good service crew if we are unavailable for any reason. It's an old-school drainback system so you will be able to hear the hot water draining from the three panels down to the giant storage tank in the closet when you are generating heat from the sun. That is a good sign, not to be alarmed about unless you hear it running at night or don't hear it on a sunny day.

The radiant floor system is isolated from the water in your shower through the use of a heat exchanger. You never will need to worry about the water that circulates in your floor or solar panels or the huge 160 gallon SST thermal storage tank contaminating the hot water you wash or cook with. The system was designed in consultation with Roy Schmidt at Roycotech and he has incorporated an outdoor re-set sensor that measures the temperature near the ceiling in the porch over the front door. This helps the system to back off on the heat going to the floor as the day warms up and ramp it up when the night starts to cool down.

The sheetrock will definitely develop surface cracks and bubbles during the first year as the building settles. Doors will stick and they are very easy to adjust, don't be shy about asking for service but also please understand that I often will not be able to schedule non-emergency repairs as quickly as I would like. If something is an emergency to you and I don't seem to see it as an emergency just tell me about it. Your satisfaction is my best advertising. In general, written requests for warrantee service are far better than verbal requests. Please collect a written list of these cosmetic repairs for us to address at the one month and one-year service visits. I prefer to receive them by e-mail but faxes, postcards, notes taped to the office door, or letters are fine.

Your septic system should require very little maintenance. I do recommend that you use Roebic Brand compost activator once a year to maintain the biological health of the system. This is a concentrated compost starter that you flush down the toilet. Once every 4-5 years you will need to have Paul Lloyd bring his pumper truck out to pump the residue out of the bottom of the septic tank. Do not install a garbage disposal. Pumping usually costs about \$180.00, its cheap insurance.

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The soil around the house has been treated with a very benign termite proofing by American Pest Control, Terry McCormick, 336-226-3455. ("Talstar One .06%" -flea collar stuff) He would be the best to suggest follow up treatment if needed. The top soil/mulch around the house is intended to help control mud and keep the tree roots moist to maximize the possibility that the trees will survive the compaction of their roots during construction.

The heating and air system usually gets a check up once a year. This is optional and many folks go every other year especially when the house is new. Typically the guy comes and charges \$150.00 to look at the system for 15 minutes and pronounce everything to be in good shape and I always feel ripped off. I still think it's a good idea just because if the system was to have a slow leak in the Freon tubing (the most common system failure) it would operate at reduced efficiency for a long time before actually stopping all together and I think it's better to check the Freon level on an annual basis. Zoned Bypass systems like yours can be prone to "short Cycling" in humid weather. If you hear it turning itself on and off in cycles less than three or four minutes in duration please call for service. The company to call for this service is West Star HVAC 732-5713 Bobby Penland and his son Mickey. Mickey looks a little scary with all his tattoos but is a very knowledgeable heating and air technician.

The air handler is in the AC closet behind the dressing room and the compressor is outside the back of the house. They have separate double pole breakers in the breaker panel. It is common for the reset circuitry in the outside unit to get hung in the same way a computer will occasionally get hung as these things all have computers in them now. When this happens the system needs to be "re-booted" in the same way you occasionally need to re-start a computer. Simply turn both breakers off for a few minutes and then back on again. Leave the thermostat inside the house alone while you do this. The system will think you had a power failure and re-initialize itself when you turn the power back on.

You have a very special type of air conditioning system called a "Zoned Bypass" system that is optimized for drying the air in the summer and for delivering warmer air at a lower wind velocity in winter when operating on one zone. Both zones share the same network of return air grills to enhance air circulation when only one zone is supplying conditioned air. Zoned-bypass heat pumps are typically used in very well insulated homes with the tendency towards excess humidity problems during the summer cooling season. All the zones of the house are served by a single air handler with zone valves controlling which part of the house gets conditioned air.

When one of the zones reaches its desired temperature it sends a signal to close an electric damper to stop air from being sent to that zone. When this happens a weighted passive "barometric damper" opens allowing the excess air to flow through a "bypass duct" back to the return air manifold. This cooled air mixes with the air returning from the return air ducts in all the zones and pre-cools it before it reaches the cooling coil. The cooling coil is thus better able to drop the temperature of the air to the dew-point and extract more humidity from it so it greatly enhances the de-humidification and comfort of the air. By pulling return air from all the return air registers it mixes the air in the building minimizing stagnant areas. In the winter the returning air is pre-heated when the bypass is activated leading to warmer air at the supply registers.

The installation is complicated compared to a conventional two-heat-pump system as it involves enhanced implementation of the electronic controls incorporating a frost sensor on the cooling coil, the damper controls, and simply routing all the different zone ducting unless the designer builds the room for it into the plans. (Good thing I'm married to my architect, therein lies true integrated project management.)

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The electrical breaker panel labeling may seem obscure and trying to figure which breaker controls a certain switch or outlet can be frustrating. I like to use a portable radio plugged into the outlet you are trying to locate. When you turn off the breaker for that outlet the radio turns off which allows you to figure the breaker location out without shouting back and forth across the house. If a breaker is tripped you have to switch it all the way to the off position before you can turn it back on.

Some of the outlets have GFCI type Ground Fault Circuit Interrupters- these are typically in wet locations. Bedroom circuits have Arc Fault Circuit Interrupters that help prevent fires. Familiarize yourself with these super fast tripping safety outlets as they typically are run in strings so a tripped GFCI in the kitchen or bath could keep the porch outlet from getting electricity. If an outlet is dead and none of the breakers are tripped it is probably due to a tripped GFCI and you will have to locate the GFCI and re-set it. For additional electrical work such as adding a more outlets, etc. you will probably want to contact Watson Electric directly, 336-226-4441.

It's a good idea to rinse the pollen and spider webs off your house at least once a year. Fitch Lumber sells a product called Bix house wash and one called Bix Window wash that attach to the end of a garden hose and do a very good job for very little money. Lowes has little home-owner type electric pressure washers for under \$200 that are nice for washing cars and boats and getting the pollen off the house as well. Just remember to have someone follow the pressure washer around inside the house to check for any water getting through under doors or through the windows etc. I would also recommend one of those extension wand dusters for knocking down spider webs in the eaves throughout the year.

You have the full service recycling center (including Hazardous waste such as paints, electronic equipment, including computers and CFL bulbs, and batteries) at the Orange county landfill and at the convenience center at Bradshaw Quarry Rd. They are not open on Wednesdays. Plastic bags need to be taken to Food Lion or Harris Teeter. We have used as many compact fluorescent bulbs as we thought would not detract from the aesthetics of your home. The environmental benefits of compact fluorescent bulbs are well documented and I encourage you to continue to use as many of them as you can stand.

If you want to buy power generated from sustainable sources I recommend NC Green Power. [www.ncgreenpower.org/](http://www.ncgreenpower.org/) ( you can even buy green power gift cards for Christmas stocking stuffers as a good alternative for lumps of coal.) If you want to offset your travel energy usage please look into buying green points from a group like TerraPass [www.terrapass.com/flight](http://www.terrapass.com/flight)

Each of these quick, simple lifestyle changes has a solid, measurable impact—immediately contributing to a reduction in carbon dioxide production, which contributes to global warming.

- Turn off computer when not in use (about 20 hours per day): 1,460 pounds
- Reduce garbage by half of one large trash bag per week: 1,100 pounds
- Unplug unused electronics: 1,000 pounds
- Eliminate phantom loads: 840 pounds
- Hang clothes out to dry in summer months: 779 pounds
- Replace six of your most-used light bulbs with compact fluorescents: 566 pounds
- Keep water heater thermostat no higher than 120 degrees: 550 pounds
- Lower thermostat in winter by 2 degrees: 353 pounds
- Increase AC temperature by 3 degrees: 339 pounds
- Turn off unneeded lights: 376 pounds
- Wash clothes in cold water: 327 pounds

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- Turn off outside light at night: 210 pounds
- Replace one interior light bulb with compact fluorescent: 210 pounds
- Cooking: put a lid on the pot when boiling water, use a Crock pot or microwave whenever possible (instead of the oven), clean burners so they reflect more heat, transfer coffee to thermos and turn off coffeepot: 165 pounds
- Buy 25 percent of produce from local, organic sources: 150 pounds
- Run dishwasher only with a full load: 100 pounds

Sources: Rocky Mountain Institute, [www.StopGlobalWarming.org](http://www.StopGlobalWarming.org)

We've sited your home to minimize the need for landscape watering and eliminate lawn mowing. Native plants are available very nearby at Niche Gardens <http://www.nichegardens.com>

While my warrantee is a one year warrantee and I want to be sure that I make a concerted effort at the end of the first year to take care of the various small things that will have developed, I also realize that it is good business to take care of my customers beyond the limit of the warrantee. If you have problems after the warrantee is up please don't hesitate to call me and let me know. I may fix it for free or not per my sense of responsibility but I will certainly give it my best attention and do all I can to keep you happy about your choice to have Chandler Design-Build as your builder and designer.

Thanks again. Beth and I hope you have many happy years in your new home.

Michael and Beth

In the attached keychain drive you will find

[Building Contract](#)

[Original Estimate](#)

[Final draw request](#)

[Building plans](#)

[Building specifications](#)

[Selection information](#)

[Appliance information](#)

[Cabinet information & green certification letter](#)

[Schedule](#)

[Engineering Documents](#)

[Photos during construction and behind sheetrock](#)

[NAHB green scoring report](#)

[Engineering and HVAC design documents](#)

[Termite treatment report](#)

[Energy Star certificate and report](#)

[Wood stove installation files](#)

[Landscape plan, foundation survey and rain Garden information](#)

[Spider insulation information](#)

[Solar collector and water heater information](#)

[Home electronic information](#)

Plus a collection of cool homes we've built ["the CDB screensaver"](#)