PlayHaven Farm LLC & Green Building Project

Greenovation / Residential -- PlayHaven East

PLEASE NOTE:

Everything included in "Greenovation of an Existing Residential Building -- PlayHaven East" has been transposed directly from the website. That includes references to the PlayHaven Farm LLC and Green Building Project (PHF&GBP) website pages, external websites, links to documents, etc. Because of how quickly things change on the internet, there are NO links from this document.

(Visit PROJECTS for Current Projects of the Renovation.)

Goals

- Determine what the needs are for the house and the garage.
- Prioritize and deal with the most pressing issues (safety first).
- Make appropriate upgrades to the house so that it would qualify for Energy Star.
- Add a concrete floor to the garage and weatherize the structure so that it is suitable for storing materials.
- Evaluate the acreage and determine appropriate use areas for livestock, vegetable gardens, orchard, etc.
- Increase the size of the pond to the south of the house.
- Add renewable energy production.

This information is provided as an example of data collection and goal setting regarding any construction project. It is important that the way you live and what your goals are (not only in the resulting building project, but in life as well) is understood by the other members of your project team.

Site

The site is a 10-acre lot located in a rural part of Lafayette County, MO which is zoned agricultural/residential. It is part of a subdivision of 5-acre and 10-acre lots surrounded by farm land. The absence of strict regulations makes this a good choice for the innovative construction techniques of sustainable "green" building. (In the photo it is the lot on the right with the house and barns.)

The 10-acre lot is situated on the south side of the road and is rectangular (330 ft by 1370 ft). It is a gently rolling field with a difference of approximately 30 feet from its highest point in the northwest to the lowest point in the southeast. Prevailing winds during the summer months are from the south/southwest and shift to the north/northwest during the winter months.

The site has full solar access. It also has sufficient wind capacity for a residential wind turbine. The site is also conducive to both underground storm water storage and geothermal heating/cooling.

The top soil at the site is rich and favorable for organic farming.

The house is connected to a rural water utility.

There is electricity to both the house and the garage (Missouri allows for net metering).

Client

The client is a middle-aged couple without children who do not feel middle-aged. The couple enjoys living with and training their Newfoundland Dogs in obedience, conformation and working activities (draft and water rescue).

The husband enjoys woodworking and will be maintaining the grounds and requires an area adjacent to the garage which allows for these activities and to store equipment. **UPDATE, 2016** He is also an avid beekeeper.

UPDATE, 2016 The wife has a degree in Commercial Art in addition to being the Owner/Manager of PlayHaven Farm LLC and works from a home office when not working on the farm itself. She requires an area that has excellent lighting without being hot during the day. She is also an avid environmentalist and proponent of sustainable building and renewable energy production. She is a co-author of the DYO® Kits “The Green Building Decision Kit”. It is her intention to provide tours of the PlayHaven Farm and the Green Building Project to show the average person how they can get involved in both Sustainable Farming and Sustainable Building, while showing them a range of options they can incorporate into their own farming, new building or remodeling ventures.

The couple intends to reside at PlayHaven East (or PlayHaven West, when built) for the remainder of their lives. To do this, accommodations have been considered and features planned to handle compromised mobility. Among these compromised mobility features are a ramped entry, dumbwaiter and stair lifts. The house is intended to qualify for the American Lung Association’s Healthy® House program.

The couple enjoys entertaining and desires the common areas of the house to be open and inviting.

Design

SITE

The existing house is a white with green trim, **DONE!!** House Repainted 1-1/2 story structure with a basement located approximately 300 feet south of the road and centered a bit closer to the west lot line than to the east line. It has a red brick chimney with a wood stove insert in the fireplace on the first floor and a wood stove in the basement. **DONE!!** Chimney Repaired. There are two bedrooms on the 2nd floor and a bathroom with a shower stall. On the 1st floor is the living room, kitchen/dining room, full bath, guest bedroom, front hall, master bedroom/bathroom. The basement is partially finished with a metal siding and drywall and a mechanicals/laundry/storage area. There is no egress from the basement. **UPDATE, 2016** Remodeling plans include each bathroom (beginning with the full bath on the 1st floor), the basement to incorporate a root cellar (with external entrance) and pantry, the kitchen to provide better use of space and storage with a eating porch added to the east side of the house with an external door.

The roof is dark green standing seam metal (8 years old). There is a gutter on the south slope next to the chimney. **DONE!!** Roof Replaced.

There is a rain garden 'pond' surrounded by a 'U' drive on the north side of the house. There are mature trees along the east, south and west lot lines and along the driveway.

Views are to the south, west and north.

The garage is a metal, gambrel building with a white roof located just west of the house. Area to the north and south of the garage/workshop is suitable for livestock.

The septic system is located to the northeast of the house. A fruit tree orchard is planned to the north of this area. **DONE!!** Orchard Planted.

The area to the south and southeast of the house will be fenced and designated as a dog yard. The areas to the north and east of the house will also be fenced and have vegetable, herb and flower gardens. **DONE!!** Yards fenced.

The rest of the lot (to the south of the complex) will be cross fenced and is suitable for pasture. **DONE!!** Pasture cross fenced. There are 2 small livestock ponds and a 4-stall horse barn near the southern edge of the property.

See the Status Reports and individual project pages for more information on our progress renovating PlayHaven East. (All information prior to 2016 is available in Adobe Reader files (PDFs) from the General Store.)

ACCESSIBILITY

As needs change, it is important to incorporate accessibility into home design, a concept that strives to incorporate characteristics for access into products, elements and spaces that can be used by everyone.

Because this home was not designed for a middle-aged couple desiring to stay in the house through their senior years, the house contains many opportunities to make it accessible should their health become compromised.

House:

- Kitchen is currently wide enough to accommodate wheelchairs and walkers.
- Interior Doorways have a flat threshold but many are very narrow.
- Hallways and stairs are wide, stair risers are shallow, and stair lifts can be installed.

Lighting:

- Daylighting is not a dominant feature in this house. Natural lighting reduces energy use and increases the comfort level of the inhabitants.
- Artificial lighting will be a combination of CFL and LED technology to reduce heat gain and energy use. **DONE!!** Lighting Updated.
- Sensors and timers will be used in appropriate areas, i.e. closets, passageways, etc.

Appliances:

- All new appliances will be Energy Star rated (as possible).

Bathtubs & Showers:

- Tubs and showers will be equipped with grab bars, hand held showerheads, and non-slip flooring.

Systems

VENTILATION

As the house becomes more tightly constructed, an High Efficiency Recirculation and Ventilation system will be used to introduce fresh air into the house when the weather does not permit opening the windows. An ERV (Energy Recovery Ventilator) will be used to retrieve heat and moisture and transfer it from the exhaust air stream to the incoming air stream during the heating season (and vice versa during the cooling season). The ERV also includes a high efficiency filter to reduce air-borne pathogens, producing a better indoor air quality.

HEATING

The house is heated with LPG (liquid propne gas) and has an older furnace and water heater. Plans are to replace it with a geothermal system with a programmable thermostat. **DONE!!** Geothermal Installed.

COOLING

The house is cooled by a 9 SEER central air conditioner. Plans are to replace it with a geothermal system with a programmable thermostat. **DONE!!** Geothermal Installed.

Energy Efficiency

INSULATION

The house is standard stick-frame construction with fiberglass batt insulation. It has a radiant barrier on the exterior walls beneath the composite siding. The attic insulation is fiberglass batt between the ceiling joists with a layer of drywall nailed to the top of the ceiling joists and another 4 inches of blown in fiberglass on top of that. Plans are to remove this insulation and replace it with dense packed cellulose. **DONE!!** Insulation Updated.

Exterior windows and doors are double paned. Additionally, the windows on the main level are generally protected and shaded by the south and north porches. There are only three small windows on the east and west sides.

RENEWABLE ENERGY PRODUCTION

Plans are to incorporate photovoltaic (PV) products on the roof of the house for year-round production of electricity. Storage of electricity via batteries is desired by not feasible at this time..

The 10-acre lot is large enough to accommodate a residential-size wind turbine.

APPLIANCES

The house will utilize Energy Star rated appliances the greatest extent possible.

Energy Star qualified refrigerators use up to 40 percent less energy than the conventional models sold in 2001 and at least 15 percent less energy than models built to current federal standards. These refrigerators feature high-efficiency compressors, improved insulation, and more precise temperature and defrost mechanisms. **DONE!!** Refrigerators Updated.

Energy Star qualified freezers use at least 10 percent less energy than required by current federal standards. **DONE!!** Freezers Updated.

Energy Star qualified dishwashers use at least 25 percent less energy and up to 40 percent less water than standard models and can save more than $25 a year in energy and water costs. These dishwashers use “smart” features such as effective washing action, energy-efficient motors, and sensors that determine the necessary cycle length and water temperature. **DONE!!** Dishwasher Updated.

Energy Star qualified clothes washers use up to 50 percent less energy and about one-third less water than standard washers. As a result, expect to save up to $75 per year on utility and water bills with additional savings from using less detergent. Most Energy Star qualified washers extract more water during the spin cycle, providing further energy savings when using a clothes dryer because drying time will be shorter. The client will see less wear and tear on clothes from front loading model(s), which do not need an agitator. Since there is not Energy Star rating for clothes dryers, a unit that matches the clothes washer will be purchased. Additionally, clothing will be dried outside using the sun and wind whenever feasible. **DONE!!** Clothes Washer Updated.

LIGHTING

Artificial lighting will be a combination of CFL and LED technology to reduce heat gain and energy use. **DONE!!** Lighting Updated.

Sensors and timers will be used in appropriate areas, i.e. closets, passageways, etc.

Exterior steps will be well lit with solar powered LED lighting. **DONE!!** Lighting Updated.

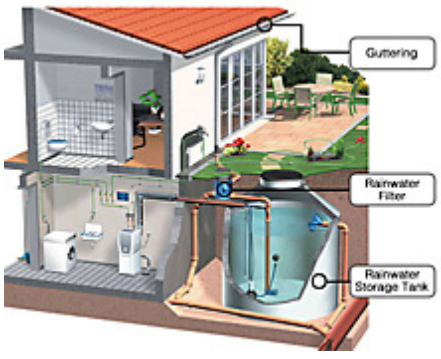
SUSTAINABILITY

ENERGY STAR ‘COOL’ ROOF

The plan is to replace the dark green metal roof with an Energy Star ‘Cool’ Roof. **DONE!!** Roof Replaced.

WATER COLLECTION SYSTEM

Gutters will be added to harvest rain water and will be collected in at least one underground cistern. This water will be used for tertiary uses e.g., watering plants.



Rain barrels will be added at each down spout.

The use of rain water not only promotes water conservation, but it also promotes an aspect of sustainable development of such an irreplaceable resource.

REUSE AND RECYCLE

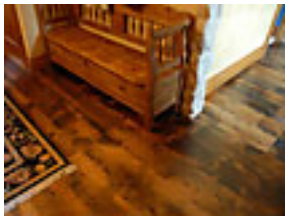
The PlayHaven Green Building Project will incorporate as much reused, reclaimed and recycled material/products as possible.

The interior of the house is designed to be simple aesthetically so that unique architectural salvage may be incorporated into it over time. Habitat for Humanity's ReStore is one such resource for recycled materials and products.

New, recycled products that are planned for inclusion are:

- Countertops made from recycled glass aggregate, and
- A variety of floorings including recycled PET carpeting, reclaimed timber, stained concrete, cork, natural linoleum, and porcelain tile.

The porches on the exterior of the house will use recycled composite decking and railing products. This type of decking and railing products are made from a unique combination of reclaimed wood and plastic, giving you the best qualities of both materials.

ECO-FRIENDLY PRODUCTS

It is important to maintain a healthy indoor air quality; therefore, the PlayHaven Green Building Complex will use:

- low and no-VOC paints, stain, varnishes, and sealants, **DONE!!**
- FSC certified interior wood and panel products, and
- Environmentally-friendly cleaning products. **DONE!!**

ENERGY AUDIT - PRIOR TO PURCHASE (MARCH 2008)

Preliminary Energy Audit Report (800 KB) : March 2008 -- This document when combined with the Energy Rating Results is the baseline. With it we know what needs to be done and can make intelligent priority decisions about the order in which repairs are made. (File attached to this PDF.)

The Energy Rating Report (138 KB) : April 2008 -- Results were surprisingly positive after reading the preliminary report. The structure is only 4 points away from qualifying to earn an Energy Star rating (if that were available to an existing structure). And while the insulation product itself is less than desirable at this time, the building is tight enough as is to update other things first... this is rather unusual in that insulation is normally the first thing a homeowner should correct. (File attached to this PDF.)