

Florida Green Building Coalition, Inc.

Florida Green Home Standard Reference Guide

Version 5

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This reference guide is intended to serve two purposes: to provide information on green home practices and to provide details on how to earn points for complying with the Florida Green Home Designation Standard. **Some items require submittals that are colored in red.** **Suggested submittals for other items are colored in green.** Note that it is possible to combine many submittals in one detailed plan. Letters or documented verbal communication from vendors can substitute for material / equipment cut sheets where required. No document produced by FGBC is intended to supercede or contradict the Florida Building Code.

Prerequisite 1: Swimming Pool / Spa

Although a popular amenity for homes in Florida, swimming pools and spas utilize precious fresh water resources and harmful chemicals in their operation and maintenance. If you do own a swimming pool or spa, simple steps can be taken to minimize or eliminate chemical usage, minimize energy used for pumping and heating, and reduce reliance on fresh water addition by minimizing evaporation. In order to qualify for the FGBC Green Home designation, pool owners must implement at least one of the following measures, or not have a pool or spa on the property.

Sanitation system that reduces / eliminates chlorine use (prereq): In order to maintain a sanitary swimming environment, pools generally require that chlorine levels be kept at a concentration of 2-4ppm (parts per million). Chlorine is generally added on a weekly basis, in relatively large quantities, in order to shock the pool. This high level of chlorine evaporates rather quickly, and the required constant level is maintained. There are swimming pool sanitation systems currently on the market that eliminate the use of liquid chlorine by recycling a salt alternative, or reduce the amount of liquid chlorine required by using ionization technology. There are also UV sterilization systems available that will also sterilize the water without the use of an chemicals using ultraviolet lights to perform the sterilization.

For more information on salt water systems visit www.ecomatic.com. For more information on ionization systems visit www.clearwaterpoolsystems.com/system.htm, www.floatron.com, www.halcyonrx.com. ****Suggested submittal: Cut sheet or photo of sanitation system.****

Pool cover (prereq): The greatest loss of heat and chemicals from a pool occurs from its surface due to evaporation. By reducing this evaporation loss, pool covers are effective in lengthening the swimming season. They also keep the pool clean, thereby reducing the costs associated with chemicals and filter maintenance. Pool covers also can reduce chlorine loss by blocking direct sunlight that leads to chlorine evaporation. Depending on materials and the amount of use, temperature increases of 5°F to 10°F may be expected from a pool cover. A 5°F increase is reasonable when the cover is used 12 hours a day, and a 10°F increase could be expected when it is used 20 hours a day. Transparent or lightly translucent covers work best because they allow solar energy to pass through and be absorbed by the pool water, and they also prevent heat loss at night. Opaque covers are best used in Florida at night to prevent heat loss. Various types of pool covers are available at your local pool supply store. ****Suggested submittal: Cut sheet or photo of cover.****

Solar pool heating system (prereq): The average yearly cost for heating a residential pool in Florida is approximately \$1,450 using electrical resistance (electricity at \$0.09/kWh), and often over \$500 using an electric heat pump or using natural gas. Liquid propane costs about the same as electrical resistance. A solar pool heating system is appropriate in our Florida climate, and can pay for itself in as little as two years. For information on the State of Florida solar pool heating testing and certification program and a list of all certified manufacturers, visit: www.fsec.ucf.edu/Solar/Apps/POOLHTG/Poolhtg.htm ****Suggested submittal: Cut sheet or photo of heating system.****

Efficient pool pumping (prereq): Pool pumping costs easily comprise 20% of total electricity use. One cost-effective way to reduce this expense is to use an oversized cartridge filter and 2" PVC piping rather than the standard 1 1/2" inch. Then locate a pump no larger than 1/2 hp per 10,000 gallons of pool volume. Set the pump on a timer to operate no more than six hours per day in summer and three hours in winter. Pool pumping is also a good application for photovoltaic technology. For more information visit: www.fsec.ucf.edu/Bldg/pubs/cr978/#Pool Pump Replacement ****Suggested submittal: Indicate pump hp and pool volume.****

Prerequisite 2: Waterfront Considerations

Waterfront Florida Yards present special challenges and responsibilities. Waterfront property owners have firsthand knowledge of the special contributions that the lagoon, rivers, streams and lakes add to our quality of life. However, a special responsibility goes along with the benefit of being a next-door neighbor to these natural resource treasures. Landscapes bordering our surface-water resources need to be designed with special sensitivity to the environment. Those landscapes also present some unique management challenges for the environmentally conscious homeowner. In order to qualify for the green designation, home sites that border water bodies must implement at least one of the following measures. For more information consult A Guide

to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook or visit <http://hort.ufl.edu/fyn/maintain17.htm>. Any criteria elected here except for “Home site does not border natural water body” must be verified by an FGBC Certifying Agent certified in the Water category.

Use of native aquatic plants in the shoreline area (prereq): Naturally sloping lagoon shorelines, particularly when buffered by a fringe of mangroves and/or marsh grass, help smooth out waves and reduce turbidity (cloudiness) in the water. Mangroves and other shoreline plants contribute to the lagoon's food web, attract wildlife, such as wading birds, and help prevent erosion of the shoreline. Such plants also contribute to the treatment of storm water runoff before it enters the water body. To receive the credit, 75% of your property's shoreline must be bordered by native aquatic plants. To find appropriate plant species for your area, contact your water management district or your local horticultural extension office. ****Suggested submittal: Photo and plant list.****

Low maintenance plants placed between lawn and shoreline; no turf adjacent to water (prereq): Erosion problems are typical along water bodies where vegetation has been disturbed by construction activities. Enhancing natural vegetation with additional native plantings and removing non-native, invasive plants can improve both the function and aesthetics of your shoreline. Native plantings require little maintenance in the form of fertilizer that can enter the water body via storm water runoff and encourage harmful algal blooms. Turf is an especially poor choice for the shoreline area due to high fertilizer use and potential for grass clippings to enter the water body. To receive the credit, no turf can be adjacent to the water. Instead, choose a low maintenance ground cover, or a mulched area with low maintenance plantings. To find appropriate plant species for your area, contact your water management district or your local horticultural extension office. ****Suggested submittal: Photo and plant list.****

Use of terraces, swales, or berms to slow storm water movement into water body and prevent erosion (prereq): Sloping shorelines with no aquatic plants in the littoral zone are pathways for storm water entry, along with contaminants it picks up along the way. There are various techniques to slow storm water movement into the water body, thereby allowing it to be treated naturally by the onshore environment, such as terraces, swales, and berms. Such structures should be placed landward of the mean high water line. A qualified individual should be consulted before changing drainage patterns along your shoreline. Contact your local water management district. ****Suggested submittal: Photo.****

Category 1: Energy

To account for changes involving HERS Ratings and the EPA Energy Star for Homes program it is proposed to merge the 2 existing categories dealing with energy issues into one category. HERS ratings now include credit for efficient lighting and appliances, therefore most existing criteria dealing with lighting and appliances is removed from the checklist and instead credited under the “Rating” section. There are a few exceptions that are addressed below.

Ratings

The word “Code” has been removed from this subcategory heading for it has been proposed to remove the 100 points for meeting the State Energy Code for New Construction and convert the program from a minimum of 200 points required to a minimum of 100 points required. Justification is that all credit for new homes should only be for going beyond code.

Confirmed Florida HERS Rating (2 points for every HERS point below 100.): The HERS Rating is now being calculated using the HERS Index as opposed to the HERS score, what is included in the HERS Index can be found on the cover of the checklist. Homes just meeting the state energy code will score approximately 100 on this new system. Points are awarded for being more energy efficient than code. Note that HERS Index is based on whole house energy use, including lighting and appliances, where HERS score was only based on heating, cooling, and water heating energy use. To find out more about Florida Energy Ratings, visit the Florida Solar Energy Center’s website at: <http://www.fsec.ucf.edu/ratings/>. This website contains priorities for designing an energy- efficient home in Florida, along with listings of local Energy Raters. ****Required submittal: Copy of signed HERS rating guide.****

Design, finishes, amenities

As previously mentioned, the HERS Rating System only takes into account certain measures that act to reduce the heating, cooling, and water heating demand of a home. FGBC has created this design section to award points for other energy conservation measures that are not taken into account within the HERS Rating System. Most of these measures involve proper design and layout of the home that can lead to energy savings through passive, rather than active action.

Document proper sizing of HVAC system (1 pt.): Often times, HVAC systems are oversized. An improperly sized system can result in comfort and humidity problems. To receive the point, a report from a software program or hand-calculation of the Air Conditioning Contractor’s Association (ACCA) Manual J method of determining system sizing must be included, and the components used as inputs must be shown. Interior set points must not be greater than 70 F for heating or lower than 75 for cooling. The installed cooling system size must be within ½-ton of the size closest to the Manual J value to claim this credit of one point. ****Required submittal: Manual J calculation and system cut sheet.****

Ductwork and joints sealed with mastic (1 pt.): Duct leakage significantly contributes to excessive energy use and can also cause pressure imbalances that lead to durability problems. Using mastic compound to seal all ductwork connections provides a seal that is much less prone to failure than tape. FGBC awards 1 point if all ductwork and joints are sealed with mastic. ****Suggested submittal: Photo of at least 1 properly sealed joint.****

Cross ventilation and ceiling fans code credits (1 pt.): In the HERS system, credit is awarded for incorporating either cross ventilation or ceiling fans, but not for both. Incorporating cross ventilation and ceiling fans into a home design encourages less reliance on air conditioning systems during periods of cooler ambient temperatures by circulating air more efficiently, and thus making the home more comfortable. FGBC awards 1 point for incorporating both ceiling fans and cross ventilation. To receive this point ceiling fans must be installed in each bedroom

and each major living area of the house, and all primary living areas and bedrooms must qualify as having cross ventilation with windows present on at least two walls of each room.

****Suggested submittal: Photos or floor plan showing locations of windows and installed ceiling fans.****

Roofed porch, min. 100 ft² and 3 sides open (1 pt.): Porches provide a comfortable outdoor living, cooking, and eating space during cooler months and reduce reliance on the home's air conditioning system. As with the rest of the home's design, providing shade with overhangs, keeping the roof cool, and installing a ceiling fan will further increase comfort. FGBC awards 1 point to a house that includes a minimum 100 ft² porch or outdoor living space. To receive the point, a minimum of 3 sides of the porch must be open or screened, meaning that it is not enclosed by solid walls. ****Suggested submittal: Photos or floor plan showing location of porch.****

Passive solar space heat system (1 pt.): A home designed for passive solar heating utilizes, and sometimes stores, energy from the sun during the winter months. South-facing windows receive significant winter sun and much less summer sun. Incorporating south-facing glass and placing the main living area on the south side of the home takes full advantage of this. Heat storage can be achieved by using a good conducting material on the slab floor, such as tile or slate, to provide for thermal mass. Concrete block and brick partition walls also provide good thermal mass, as do designs that incorporate water. Homes can also use this "mass" to preserve cool temperatures when the air conditioning system is operating. FGBC awards 1 point for a solar space heat system that incorporates 30 BTU/°F/ft² of storage for every square foot of south-facing glass. Credit not available (or appropriate) for homes in the South Florida climate zone. ****Suggested submittal: Details of storage system.****

Passive solar day-lighting (1 pt.): A home designed for passive solar day lighting allows sunlight to enter the home without excessive heat gain. Examples include north- and south-facing clerestory windows. Such windows should be operable to also provide a ventilation outlet. Skylights and other types of horizontal glass are not recommended, for they receive too much summer sun and are difficult to shade but will be allowed if they carry an Energy Star certification. Solar light tubes (domed glass roof fixtures coupled with an insulated reflective tube) are encouraged, and provide usable reflected light without the heat gain. Light-colored interior surfaces (walls, ceilings, floors) also aid with natural lighting by reflecting light rather than absorbing it. Light-colored surfaces are beneficial whether using natural or artificial lighting. FGBC awards 1 point to a home that incorporates solar day lighting with clerestory windows or light tubes. Light-colored interior surfaces are treated separately below. ****Suggested submittal: Photos or plan showing location of day-lighting features.****

Deciduous trees on south (1 pt.): Credits placement/preservation of trees that will shade south elevations during warm weather, but do not block heat/light during cool weather. Southern climate zone of state (as defined by DCA residential energy code) excluded from deciduous requirement. ****Suggested submittal: Photo or site plan showing locations of trees.****

House shaded on the East and West by trees (1-4 pts.): During the cooler seasons, a house can achieve a large solar heat gain during the morning and early evening hours as the sun rises and

sets. These times also correspond to peak demand placed on utilities. By providing shade trees on the east and west sides of the house, cooling demand can be significantly reduced, since a single mature tree can avert as much heat from a home site as two residential size central air conditioners. Placing deciduous trees on the south side of the house is also beneficial, as they provide shade in the summer and let in winter sunlight. Foundation plantings of smaller shrubs are also beneficial to keep the ground next to the house cool and to block re-radiation from adjacent hot surfaces (however, no plants should be placed within 24” of the foundation to prevent excess moisture from accumulating). Trees can also be used to shade the air conditioner condenser, which can further reduce cooling costs. To receive points, sum up the wall areas that are oriented within 45° of due east or west and that separate the conditioned area from the outside (omit garage and porch walls). Observe amount of wall area under full shade during the summer or use a sunpath tool (one is available at <http://fsec.ucf.edu/download/br/fenestration/software/>) FGBC awards 1 point for each 25% of the designated wall areas (average of east and west walls) that are shaded by trees. If trees are immature, no extrapolations are to be made to their adult size. Shade produced by balconies and other overhangs are not included here, for their influence is taken into account in the HERS rating system. ****Suggested submittal: Photo or site plan showing locations of trees.****

Washer and dryer outside of conditioned space (1 pt.): Washers and dryers emit large quantities of heat under operation. If located within the conditioned space, they represent an additional load on the home’s air conditioning system. FGBC awards 1 point if this equipment is located outside of the conditioned space—garage, unconditioned utility room, etc. The location must be separated from the main body of the home by an insulated wall. If the washer and dryer are located within the conditioned space, points can be achieved under Health-Ventilation by providing a make up air source. ****Suggested submittal: Photo or floor plan showing location of utility room.****

Floor joist perimeter insulated and sealed (1 pt.): In homes greater than 1 story, it is critical to ensure that the external perimeter of all framed floors are insulated, as well as sealed, to prevent leakage of unconditioned air and moisture into the floor cavity. Often times, forced air ductwork is located within this cavity, and can suffer significant efficiency loss through contact with the unconditioned air. FGBC awards 1 point if all framed floors are insulated and sealed around their perimeter. **One can not claim points in this category unless this home is greater than one story.** ****Suggested submittal: Photo or wall section detail.****

Light colored exterior walls (1 pt.): Dark colors absorb more heat from sunlight; in contrast, light-colored surfaces have been shown to reduce cooling costs. A code credit is currently available for homes in Florida that incorporate white metal or tile roofs. FGBC awards 1 point for having an exterior wall color with a reflectance of at least 50%. Generally such materials will be colored “white.” New paints are becoming available that offer adequate reflectance specs in colors other than “white.” ****Suggested submittal: Cut sheet showing reflectance spec.****

Light-colored interior walls, ceilings, carpet/floors (1-2 pts.): Light-colored interior surfaces increase lighting efficiency by reflecting and dispersing light rather than absorbing it. Light-colored surfaces are beneficial whether using natural or artificial lighting. FGBC awards 1 point if bedrooms and all major living spaces in the home have light-colored wall and ceiling surfaces

with a reflectance of at least 50%. Two points are available if bedrooms and all major living spaces have light-colored flooring. ****Suggested submittal: Photo or cut sheet of paint/surface used.****

Max 100w fixtures in bathrooms (1 pt.): Typically bathrooms have lighting fixtures that contain 4 or 5 incandescent bulbs. Such fixtures can add excessive heat to the conditioned space, and the amount of light output is generally excessive. A fixture as defined by FGBC is any amenity or system that uses lights and operates on a single switch, these include items such as recessed cans, vanities, lights, mirror fixtures, etc. FGBC awards 1 point if all bathroom light fixtures assigned to a single switch are designed to use a maximum total of 100 watts. Multiple switches may be incorporated into the bathroom, however each switch must have only 100 watts assigned per switch. Also multiple bulbs can be used provided they are compact fluorescent or LED. ****Suggested submittal: Photo of light fixtures.****

South roof area for future solar use (1 pt.): The best efficiency of a solar system, whether using collectors or modules, is obtained by facing the system south. FGBC awards 1 point if provisions are made such that there is available south-facing roof area for future installation of a PV system or solar water heating system. At least 75 ft² of roof facing within 20° of due south must be provided. This point is not available if a system is installed. Systems that are actually installed are given credit either within the HERS rating system or in the General category. ****Suggested submittal: Photo or plan that shows south facing roof area.****

Pre-plumb for solar hot water (1 pt.): Besides providing south-facing roof area, the next step in preparing for a future solar hot water system is to install plumbing from the hot water tank location up to the roof. FGBC awards 1 point for this, acknowledging that it will be easier to install a solar system in the future. Plumbing must be copper pipe or CPVC. This point is not available if a system is installed. Systems that are actually installed are given credit either within the HERS rating system or in the General category. ****Suggested submittal: Photo or plumbing plan.****

Compact hot water distribution (1 pt.): By centrally locating the water heater, heat losses can be minimized by minimizing piping runs. FGBC awards 1 point if the water heater is installed in a central location (between locations that use hot water), rather than on one end of the home. For standard series/branch configurations, longest run from water heater must be ≤ 20 ft. For central manifold systems, longest run must be ≤ 10 ft (15 ft for homes > 1 story). For systems that include an on demand recirculation pump, longest run must be < 10 ft. ****Suggested submittal: Floor plan that shows location of water heater.****

Insulate all hot water piping (1 pt.): All hot water piping (including that which is buried) must be insulated with a minimum of ½" insulation. Insulating the piping will minimize heat losses while water is flowing through, or remaining stagnant inside the pipes. ****Required submittal: Photo of the buried insulated lines or a receipt for the appropriate amount of pipe insulation must be provided.****

Energy-efficient clothes dryer (1 pt.): The clothes dryer is typically the second-biggest electricity-using appliance after the refrigerator. Some new clothes dryers remove moisture more efficiently, have moisture sensors, and have automatic shut-off controls to avoid over-drying. The efficiency of clothes dryer is measured by a term called the energy factor. This factor is somewhat similar to ‘miles per gallon’ for a car, but in this case the measure is pounds of clothing per kilowatt-hour of electricity. The minimum rating for a standard capacity electric dryer is 3.01; for gas dryers, the minimum energy factor is 2.67. The rating for gas dryers is provided in kilowatt-hours even though the primary source of fuel is natural gas. Unlike most other appliances, energy consumption does not vary significantly among clothes dryers, and clothes dryers are not required to display EnergyGuide labels.

- Look for clothes dryer with a moisture sensor that automatically shuts off the machine when your clothes are dry. Not only will this save energy, it will reduce the wear and tear on clothes from over-drying. The best dryers have moisture sensors in the drum for sensing dryness, while most only infer dryness by sensing the temperature of the exhaust air. Compared with timed drying, you can save about 10% with a temperature sensing control, and 15% with a moisture sensing control.
- Look for a dryer with a cycle that includes a cool-down period, sometimes known as a “perma-press” cycle. In the last few minutes of the cycle, cool air, rather than heated air, is blown through the tumbling clothes to complete the drying process.
- Gas dryers are usually less expensive to operate than electric dryers. The cost of drying a typical load of laundry using an electric dryer is 30-40 cents compared to 15-20 cents using a gas dryer.

FGBC awards 1 point if a clothes dryer with a moisture sensor is installed.

Suggested submittal: Photo or cut sheet of appliance.

Energy-efficient oven/range (1 pt.): Conventional ovens must first heat up about 35 pounds of steel and a large amount of air before they heat up the food. Tests indicate that only 6% of the energy output of a typical oven is actually absorbed by the food. New ovens have additional insulation and tighter-fitting oven door gaskets and hinges to save energy.

- For gas ovens, new electronic pilot-less ignitions reduce gas usage by about 30% over a constantly burning pilot light. These are also more convenient, eliminating the need to restart a standing pilot light. About 58% of American households cook with electricity, but gas cooking is making a steady comeback. Gas ovens use much less energy compared to their electric counterparts because the fuel is used directly for cooking. A gas appliance costs less than half as much to operate as an electric one, provided it is equipped with electronic ignition instead of a pilot light.
- Consider buying a self-cleaning oven. They use less energy for normal cooking because of higher insulation levels. However, if you use the self-cleaning option more than once a month, you will end up using more energy than you will save from the extra insulation.
- With electric cook tops, there are a number of new types of burners on the market: solid disk elements, radiant elements under glass, halogen elements, and induction elements. Solid disk elements and radiant elements under glass are easier to clean, but they take longer to heat up and use more electricity. Halogen elements and induction elements are more efficient than

conventional electric coil elements. Induction elements require that you use only iron or steel pots and pans. Aluminum cookware will not work with induction elements.

- The range hood should ventilate to the outside and not simply re-circulate and filter the cooking fumes. This is especially important with gas ranges. But also be careful about the sizes of fans—too large a fan can waste energy and cause back-drafting of combustion gases into the house. This is a major concern with large downdraft ventilation fans used with some cook-tops and ranges. Ask about make-up air ducts available for these models. Points are awarded for exterior vented range hoods under the Health section.

FGBC awards 1 point if the oven is: self-cleaning or pilotless gas, **and** the cook top is pilot less gas or has halogen, solid disk, radiant, or induction elements. ****Suggested submittal: Cut sheet for each appliance.****

ENERGY STAR[®] clothes washer (1 pt.): Appliances labeled with the EPA ENERGY STAR[®] label use less energy and water than other products, save money on utility bills, and help protect the environment. Although energy-efficient models sometimes cost more to purchase initially, any extra up-front cost can often be made up with savings on your utility bill. Also, check with your local utility; some may offer rebates on the purchase of ENERGY STAR[®]-rated appliances. FGBC awards 3 points for an ENERGY STAR[®] labeled clothes washer. For more information, visit the ENERGY STAR[®] web page at: www.energystar.gov/products/appliances.shtml.

ENERGY STAR[®] clothes washers use superior designs that require less water to get clothes thoroughly clean. These machines use sensors to match the hot water needs to the load, preventing energy waste. ENERGY STAR[®] washers use nearly 50% less water and 30%-40% less energy per load. The washer design also causes less wear and tear on clothes. In addition, better water extraction means less drying time, which yields further energy savings. There are two designs, top-loading and front-loading. They are described in more detail as follows:

Front-loading ENERGY STAR[®] models are similar in design to washers used in laundromats. These horizontal-axis or tumble-action machines repeatedly lift and drop clothes, instead of moving clothes around a central axis.

Top-loading ENERGY STAR[®] washers use sensor technology to closely control incoming water temperature. To reduce water consumption, they spray clothes with repeated high-pressure rinses to remove soap residues rather than soaking them in a full tub of rinse water.

To receive the 1 point, the Energy Star[®] model chosen must have a Water Factor (WF) less than 9.5. The WF is a metric that allows for comparison of clothes washer water consumption independent of clothes washer capacity. The WF equals the total weighted per-cycle water consumption divided by the capacity of the washer. Since energy savings in an efficient clothes washer are primarily governed by the amount of water that needs to be heated, conserving water also conserves energy. Manufacturers must submit their water consumption factors with their Energy Star[®] qualified clothes washers. However, neither the federal standard nor the Energy Star[®] criteria require a maximum WF. The WF may not be found on the Energy Guide label,

and should be identified through the Energy Star® website for a particular model: http://www.energystar.gov/ia/products/prod_lists/clotheswash_prod_list.pdf.

****Suggested submittal: Photo or cut sheet for each appliance.****

Buyer given information on Energy Star appliances if none installed (1 pt.): If no ENERGY STAR® or energy-efficient appliances are installed at the time of occupancy, FGBC will still award 1 point if the builder gives the homeowner printed information about available models. The information contained in this reference book may be used, or information can be obtained from www.energystar.gov. ****Suggested submittal: Indicate what materials were given to homeowner.****

Efficient well pumping (1 pt.): FGBC awards 1 point if steps are taken to minimize electricity used for well pumping. Only homes whose potable water is served by a deep well are eligible for this point. To receive the point power to the pump must be 220V, and the system must contain a storage tank with a volume greater than 35 gallons. Larger storage volumes will minimize the number of times the pump must cycle on/off, thereby minimizing the large amount of energy needed to start the pump motor. You may also receive a point if the pump is powered by photovoltaics. ****Suggested submittal: Include details of pump/storage system.****

Efficient envelope volume (1 pt.): Some home designs minimize the amount of outside surfaces while others have shapes that have many projections. Although many projections may help for cross ventilation, minimal outside surface area is beneficial for times when air conditioning or heating is occurring. FGBC provides 1 credit point if the:

$$\left(\frac{\text{Total gross wall area}}{\sqrt{(\text{Conditioned square footage}) * (\text{Number of stories})}} \right) < 43$$

Total gross wall area refers to the walls, windows and doors that separate the conditioned space from the non-conditioned space. ****Suggested submittal: Floor plan and calculation.****

Dwelling unit attached; zero lot-line; row house (1 pt.): FGBC awards 1 point if the home has an attached dwelling unit such as an apartment, is a zero lot-line, or is a row house. Residences bound by other conditioned spaces on any or all sides use less energy for cooling and heating than residences bound by unconditioned or spaces. ****Suggested submittal: Photo or site plan.****

Recessed, sealed, insulated IC fixtures (2 pts.): Recessed IC fixtures refer to fixtures installed flush with the ceiling that is rated for insulation contact. Sealed IC fixtures have no penetrations and do not permit air to exchange between the conditioned space and the attic. During installation, it is important that the gap between the can and the ceiling material be sealed also to prevent conditioned air from leaking through this gap, and/or to prevent hot attic air from entering into the conditioned space. FGBC awards 2 points if all recessed light fixtures are sealed IC fixtures and insulated to the same amount as the rest of the ceiling. Alternatively, the 2 points can be obtained with unsealed units if installed in an unvented attic. In this case, air exchange between the conditioned living area and the unvented attic is warranted. For

information regarding unvented attics, please visit: www.fsec.ucf.edu/pubs/energyqa/q8.htm
****Suggested submittal: Cut sheet of can lights used or photos of unvented attic.****

Energy Star Advanced Lighting Package (3 pts): Even though lighting credited through HERS rating it is not tied to fixtures. This is a comprehensive package that includes ceiling fans, indoor lighting, and outdoor lighting. Also includes ventilating fans. The Energy star lighting package requires that Energy Star fixtures be installed, rather than just efficient bulbs, this acts as “bonus credit” for using this comprehensive package. ****Suggested submittal: None required – visual inspection by Certifying Agent.****

Outdoor lights are energy efficient (2 pts.): Outdoor lighting, including exterior house, path, and driveway lights, typically consumes a great deal of energy, especially when left on throughout the entire night. Suggested choices for brightly lit outdoor spaces like patios include using fluorescent bulbs and fixtures with electronic ballasts (more efficient than magnetic type), low-pressure sodium, or mercury vapor lamps. Photovoltaic systems are a good choice for walkways, driveways, and landscaping. Most available units have storage batteries that will charge during daylight hours and power the lights all night; some will even provide power for 2 to 3 days in case the weather is cloudy. Motion sensors are recommended for outdoor lighting, particularly if incandescent floodlights are used. Low voltage landscape lights that operate on a timer will also qualify. FGBC awards 2 points if *each* exterior light employs one or more of these lighting conservation strategies. ****Suggested submittal: None required – visual inspection by Certifying Agent.****

Category 2: Water

Fixtures

This section primarily deals with indoor water fixtures and other water using devices connected to them. Most major water consuming appliances are covered under Category 1: Energy - for their water savings results in direct energy savings by placing a lower demand on the water heater.

Water saving clothes washer (1-3 pts.): To receive 2 points, the Energy Star[®] model chosen must have a Water Factor (WF) less than 8.0, to receive 3 points, the Energy Star[®] model chosen must have a Water Factor (WF) less than 6. The WF is a metric that allows for comparison of clothes washer water consumption independent of clothes washer capacity. The WF equals the total weighted per-cycle water consumption divided by the capacity of the washer. Since energy savings in an efficient clothes washer are primarily governed by the amount of water that needs to be heated, conserving water also conserves energy. Manufacturers must submit their water consumption factors with their Energy Star[®] qualified clothes washers. However, neither the federal standard nor the Energy Star[®] criteria require a maximum WF. The WF may not be found on the Energy Guide label, and should be identified through the Energy Star[®] website for a particular model:

http://www.energystar.gov/index.cfm?fuseaction=clotheswash.display_products_excel

****Suggested submittal: Photo or cut sheet for each appliance.****

Low-flow showerheads (1 pt.): The Florida Building Code and National Energy Policy Act of 1992 (EPACT) require that all installed showerheads and faucets be rated at a maximum flow rate of 2.5 gallons/minute at 80 psi water pressure. There are available fixtures on the market today that exceed these standards. FGBC awards 1 point if all showerheads installed in the home are rated at a flow rate lower than that mandated by the EPACT. Laminar flow controls may also be used that deliver a precise volume of water at faucets, showerheads, and hose outlets. Unlike conventional water-saving fixtures that deliver varying flow rates in response to varying line pressure, fixtures equipped with laminar flow controls deliver a constant rate, lower than that mandated by EPACT. More info on laminar flow controls can be found at:

www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=1455&DocumentID=2131

****Suggested submittal: None required – visual inspection by Certifying Agent.****

All showers equipped with 1 showerhead (1 pt.): Although EPACT sets a maximum limit on flow per showerhead; building codes do not set a limit on the number of showerheads that can be used. FGBC awards 1 point if each shower in the home is equipped with only one showerhead.

****Suggested submittal: Photo of each shower showing showerhead.****

No garbage disposal (2 pts.): Although a popular item that increases the convenience of food cleanup, garbage disposals are notorious for wasting water and adding to the load placed on waste water treatment plants. A much better choice for disposal of food scraps is composting, discussed in more detail later. FGBC awards 2 points to a home that does not have a garbage disposal. ****Suggested submittal: None required – visual inspection by Certifying Agent.****

Dual flush or low-flow toilets (2 pts.): Toilets represent the largest source of indoor water use in the home, accounting for up to 30%-40% of water demand. The Florida building code and National Energy Policy Act of 1992 (EPACT) require that all installed toilets be rated at a maximum flow rate of 1.6 gallons/flush. There are toilets on the market today that exceed these standards, by allowing one to select low (0.8 gal/flush) or high (1.4 gal/flush) flush volumes. For a home built after 1992, FGBC awards 2 points if all toilets installed in the home permit one to flush at volumes lower than required by EPACT. Please visit

www.terrylove.com/wc/caroma/index.htm for more info. A good source for information on low-flow toilets in general is www.terrylove.com. ****Suggested submittal: New home – cut sheet for toilet, existing home - None required – visual inspection by Certifying Agent.****

Toilets with UNAR Map rating (350gpf) (1 pt.): Toilets that have a MaP Rating of 350 grams per flush or greater will receive this point. Visit www.ci.santa-cruz.ca.us/wt/wtcon/Toilet%20rebate%20program%20page_files/ToiletPerformanceRatings2005.pdf for more information. This will allow for a better functioning toilet that will not require multiple flushes. ****Suggested submittal: New home – cut sheet for toilet, existing home - None required – visual inspection by Certifying Agent.****

Greywater reuse

Greywater is generally defined as domestic wastewater from any source except toilets and the kitchen sink—this includes laundry, shower/bath, faucets, and dishwasher. It can also include air conditioner condensate. Reusing greywater for landscape irrigation presents an exciting

opportunity for water conservation. Statistics show that 50-75% of the water consumption in an average Florida home is for exterior landscape irrigation, and generally our precious potable water resource is used for this purpose. Greywater is rich in nutrients, and many landscape plants and grasses will thrive when watered with greywater. In turn, the terrestrial environment acts to naturally purify this waste stream, without chemicals or added energy, and returns the water to its natural cycle. FGBC awards 3 points if a greywater system are installed that disperses water from laundry, shower/bath, faucets or dishwasher to the landscape.

Greywater differs from blackwater (water from toilets and kitchen sink), in that it is free of pathogens and solids. Greywater only contains 1/10 the amount of nitrogen as blackwater, and the organic content of greywater typically decomposes much faster than that of blackwater. Although inherently safer than blackwater, greywater cannot be considered as potable, and, therefore, landscape application must take place subsurface, and cannot be used with sprayers or rotors. To utilize greywater from household fixtures, plumbing in the home must separate drains from blackwater and greywater sources. For new construction, a reuse system should be planned during the design stage. Since laundry equipment generally has drain hoses that are not fixed, washing machines are an excellent source of reuse water.

Two excellent greywater resources are the book entitled “Create an Oasis with Greywater” by Art Ludwig, and the Oasis Design website, located at: www.oasisdesign.net. Another good source of information is the City of Austin’s Sustainable Building Sourcebook at: www.greenbuilder.com/sourcebook/greywater.html. The Florida Department of Health regulates the installation and use of greywater and onsite systems, and the specifics are defined in rule 64E-6. This rule is available for download from the Department’s web site: www.doh.state.fl.us. Details concerning greywater reuse system appear in the 2001 Florida Building Code. For more info visit:

www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=1402&DocumentID=2137

A under vanity water reservoir system used for the collection of vanity sink water to later be used for the flushing of the adjacent toilet is also another source of greywater and can save a significant amount of water each year especially in homes with families. FGBC will award 2 points for at least one of these systems installed.

Air conditioner condensate can also be considered a source of greywater. Annual air conditioner condensate volume can average between 1500 and 3500 gallons. Inexpensive purification devices are available that make the water useable for pool refilling, irrigation, or make-up water for water cooled air conditioning units. Information for one example of such a device can be found here: www.acaquifer.com. FGBC awards one point for incorporating a means to reuse air conditioner condensate water.

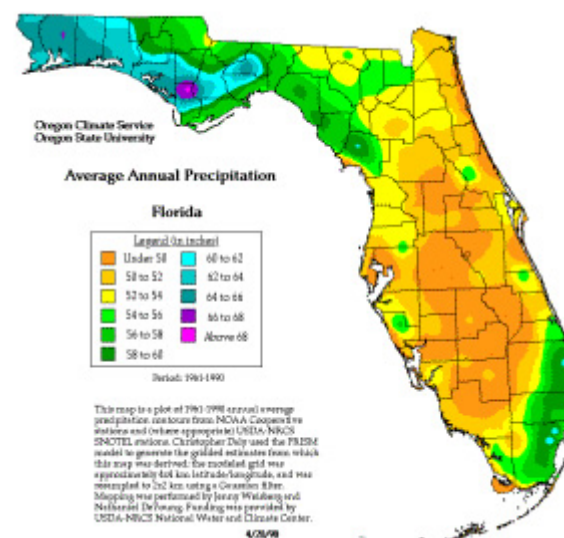
****Suggested submittal: Schematic of system design.****

Rainwater harvesting

With an average rainfall of 54 inches/year in the state of Florida (compared to the national average of 27 inches/year), harvested rainwater is an excellent source of water for landscape irrigation. The equipment is readily available and of relatively low complexity. Rainwater harvesting is now mandated for new construction in Bermuda and the U.S. Virgin Islands.

Rainwater is generally harvested from a roof surface, and system components include properly designed gutters, piping, roof washers, screens, and a storage tank/cistern. System capacities can range from thousands of gallons to trashcan-sized rain barrels. Harvested rainwater could also be a good source for toilet flushing, but it is unclear at this point if it will be allowed to be plumbed into the home without disinfection. FGBC awards 2 points are available for an installed system with a dedicated indoor or outdoor use. System must be capable of collecting and storing a minimum of 50% of the runoff from the roof based on a $\frac{3}{4}$ inch rainfall event.

1 point available for a system of gutters installed along with a simple collection system such as a rain-barrel. Gutter leaf screen requirement removed. For more information consult [A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook](#) or visit hort.ufl.edu/fyn/create6.htm. Another source for information is. ****Suggested submittal: Schematic of system design.****



Good information on rainwater harvesting can be found at: www.greenbuilder.com/sourcebook/Rainwater.html#contents and www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=1402&DocumentID=2129

Reclaimed water reuse

Reclaimed water is wastewater that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility. Reclaimed water is not potable, but is made available by municipalities and wastewater utilities for purposes such as irrigation and toilet flushing. Although infrastructure costs can be high to arrange for reclaimed water service, once available the actual cost for the water is relatively inexpensive. Reuse of reclaimed water provides a useful method for treatment facilities to dispose of their treated wastewater. FGBC awards 2 points if reclaimed water is used for all of the home's irrigation needs. Two points are available if the home's use of reclaimed water is metered. Even though reclaimed water is considered an alternative source, it is still available in limited supply. Whether or not the homeowner is charged based on the meter, a meter will still allow the homeowner to monitor their water use. Two additional points are available if a volume based pricing arrangement is in place, to discourage excessive use. If reclaimed water is used for toilet flushing in the home, two points are available. ****Suggested submittal: Documentation that describes reclaimed water use agreement.****

Installed Landscape

Plant selection is an important part of landscaping your yard. The plants you select determine the wildlife value of your yard, the level of maintenance that will be required, how much money you will be spending on water or electricity to run a sprinkler pump, and how much fertilizer or pesticide may be required. Stormwater runoff, or rain that falls on yards, roads, and parking lots and then washes into water bodies, carries pollutants such as fertilizers, pesticides, soil, and

petroleum products. Fertilizers and pesticides from residential areas can be serious threats to the health of Florida's waters. Plant selection will also determine how long your landscape will last. Fast growing plants often have a shorter life span than slower growing species. More people are conserving water both inside and outside the home, and interest is growing in landscaping with native and other beneficial trees, shrubs, and ground covers. Homeowners are choosing plants that blend beauty and environmental benefits. Many of these benefits to the environment also save time and money while enhancing our special Florida lifestyle. For more information consult A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook or visit hort.ufl.edu/fyn/hand.htm. Another good source of information on this subject is Waterwise Florida Landscapes publication from Florida's water management districts. An electronic version is available for download at www.sjr.state.fl.us/.

****Some of the criteria in this section, along with one criterion in the Site Category, require inspection by a Florida Yards and Neighborhoods (FY&N) Professional. This especially applies to existing landscapes, where plant identification can be difficult. Indicate the name of the professional used in the space provided on the checklist. The FY&N Program is operated by county horticultural extension, and is a free service. FY&N operates a separate certification program specific to landscaping issues, and will certify the property as a Florida Friendly Yard. FGBC strongly encourages all applicants to seek this certification. To locate an FY&N professional for your area, contact the extension service or FGBC, Inc.****

Drought tolerant turf in sunny areas only; no turf in densely shaded areas (2 pts.): Turf is generally the largest consumer of water in the landscape, and most types will not flourish in shady areas. FGBC awards 2 points if Bahia, Zoysia, or Bermuda grass is used in sunny areas (<20% shade on June 21) and if no turf is used in densely shaded areas (>60% shade on June 21). ****Suggested submittal: Landscaping plan.** **FY&N inspection required for existing turf.****

50%/80%/100% of plants/trees from local drought tolerant list (1-3 pts.): Drought-tolerant plants and trees are able to survive on rainfall with little or no supplemental irrigation. FGBC awards 1 point if at least 50% of the plants and trees incorporated into the landscape are from a local drought tolerant list; 2 points are available if 80% are from such a list; and 3 points are available if 100% of the plants and trees are from such a list. There must be a minimum of twelve total plants to qualify for the credit. To obtain a list of drought tolerant plants and trees for your area, contact your local water management district, consult the Waterwise Florida Landscapes publication, or consult with a FY&N professional. ****Suggested submittal: Landscaping plan and source of drought tolerant plant list.** **FY&N inspection required for existing plants/trees.****

All plants/trees selected to be compatible with local environment/microclimate (2 pts.): Even if preferred native, drought tolerant, and low maintenance plants are selected for the landscape, many times the plants are installed in areas of the landscape where they are not likely to remain healthy, due to various sun/shade and soil type requirements, therefore causing need for over watering and over fertilizing. FGBC awards 2 points if all plants (including shrubs, groundcovers, and vines) and trees are compatible with the area of the landscape they are

installed in. ****Suggested submittal: Landscaping plan.**** ****FY&N inspection required for existing plants/trees.****

Turf less than 50% of landscape (3 pts.): As previously mentioned, lawns are generally the largest consumers of water in the landscape. Minimizing the amount of turf in your yard by confining it to play, pet, or entertainment areas will greatly reduce your yard's burden on Florida's limited freshwater resource. FGBC awards 3 points if turf is planted on less than 50% of the landscape. ****Suggested submittal: Landscaping plan.****

Evenly shaped turf areas; no turf on berms (2 pts.): Evenly-shaped turf areas are easier to water efficiently and easier to maintain. Turf planted on berms requires more water to remain healthy, due to water run-off from the slope. FGBC awards 2 points if 100% of turf is planted in evenly-shaped areas (such as circles, ovals, and large rectangular areas rather than in long thin strips) and if no turf is planted on berms. ****Suggested submittal: Landscaping plan.****

Plants with similar maintenance requirements grouped together (2 pts.): Grouping plants with similar maintenance requirements together increases irrigation efficiency. Lawns that require a lot of water from sprayers and rotors should not be watered in the same irrigation zone as drought-tolerant plants that require less water and that can be efficiently irrigated with micro-irrigation such as drip systems or soaker hoses. FGBC awards 2 points if the landscape is planned and installed according to plant maintenance requirements. ****Suggested submittal: Landscaping plan.**** ****FY&N inspection required for existing plants/trees.****

Mulch applied 3-4" deep around plants (2 pts.): In addition to preventing weed growth, a thick layer of mulch will help retain soil moisture, retard erosion, cool the soil surface, and reduce some soil pests. Mulching around trees also reduces damage from mowers and line trimmers. FGBC awards 2 points if 3-4" of mulch are placed around plants and trees (extending out to drip line) and in landscaped beds. It is important to leave ample open space close to the plant stems and trunks. ****Suggested submittal: Landscaping plan.****

Non Cypress mulch used (2 pts.): FGBC awards 2 points if all mulch used is an alternative type such as melaleuca, pine straw, bark, recycled, eucalyptus, etc. Brazilian pepper, Australian pines, and palms should not be used as mulch and are not given credit. ****Suggested submittal: Landscaping plan.****

Soil tested and amended where necessary (2 pts.): In some areas of Florida, native soil is very sandy and porous, and does not retain water or nutrients well, this often results in the need for excessive irrigation and fertilization to maintain a healthy landscape. The simplest way to avoid these problems in the landscape is to use only plants that are compatible with the site. However, in the case of a vegetable or flower garden a soil amendment such as compost (or other organic matter) may be mixed with the native soil to improve moisture and nutrient retention. Also requires that soil be tested for pH, lime requirements, soil fertility, and water infiltration to show that amendment is necessary and type of amendment chosen. FGBC awards 2 points if highly permeable soil is appropriately tested and amended where necessary. ****Suggested submittal: Landscaping plan and soil test.****

No Permanent Installed Irrigation System (10pts): The most effective outdoor water conservation strategy to employ is to design the landscape in such a way that it exists primarily on natural rainfall, and no permanent irrigation system is required. A temporary irrigation system may be set up during establishment. Such a landscape is awarded 10 points, regardless of its size. ****Required submittal: New Homes - Irrigation system design drawing as installed. Existing Homes – None required.****

Innovative irrigation technology (2pts): FGBC encourages innovative technologies to conserve water. Recent technologies such as soil moisture sensors or weather based controllers are ways of conserving irrigation water. FGBC will award 2 points for soil moisture sensor or weather based controller. ****Suggested submittal: None required – visual inspection by Certifying Agent.****

Meet or exceed Florida WaterStar standards (5 pts): 5 Points for meeting this new program. See website for more details on the standards and how to qualify.

<http://www.sjrwmd.com/floridawaterstar/certifiers/resources.html>

****Suggested submittal: signature, letter, or certificate showing completion of standard.****

Installed irrigation

Homeowners in some parts of Florida are becoming accustomed to restrictions that limit irrigation to certain days and times. Still, most of us are watering too much. Overwatering depletes our water supply, often makes plants pest prone, and adds to stormwater runoff that pollutes our natural waters. By choosing and operating an irrigation system correctly, you can reduce water bills, fungal diseases, and maintenance requirements. Coupled with appropriate plant selection, implementing efficient irrigation techniques can reduce outdoor water use anywhere from 20% - 60%.

The St. Johns River Water Management District; the Southwest Florida Water Management District and the University of Florida have developed a Water Star certification program for homes. Irrigation is one component of this program. A number of individuals knowledgeable in irrigation system design, installation, and efficiency developed a list of measures that will ensure irrigation systems not only fulfill their intended purpose, but do so effectively and efficiently. These items are integrated into the FGBC standards specified below.

FGBC awards points to a home that adheres to all of the requirements of this list. Points are awarded according to the area that is irrigated, with more points awarded to smaller irrigated areas:

- 1 point for > 10,000 sqft irrigated to FGBC standards
- 2 points for 7,500 – 9,999 sqft irrigated to FGBC standards
- 3 points for 5,000 – 7,499 sqft irrigated to FGBC standards
- 4 points for 2,500 – 4,999 sqft irrigated to FGBC standards
- 5 points for 1 – 2,499 sqft irrigated to FGBC standards

****Required submittal: New Homes - Irrigation system design drawing as installed. Existing Homes – None required.****

To receive points for Installed Irrigation, each system must have the following features.

Utilize a professional designer and installer and/or follow design standards: this criterion is waived for existing homes. For new homes, irrigation supply companies often maintain lists of qualified irrigation contractors. Some Florida counties have a licensing program for irrigation contractors. One design standard can be found in Appendix F of the 2001 Florida Building Code at:

http://www.sbcci.org/Florida_Building_Code/plumbing/Apen%20F/fpc%20apen%20f.pdf

In the case of a new home, the name of the professional designer and installer must be included with the submitted irrigation design drawing.

Irrigation system design capabilities are matched with plant needs: Due to varied requirements for a multitude of landscape plants and turf, compliance is to be judged by system designer/auditor. However, it is recommended that the irrigation systems be calibrated to supply less than $\frac{3}{4}$ " of water per zone, per application. Even during the summer, turf areas—which generally require the most water of all landscape features—will not benefit from more than $\frac{3}{4}$ " of water per application. Applying more than $\frac{3}{4}$ " will result in excess water being lost to evaporation, runoff, or percolation through the soil. Over-watering turf also allows weeds such as dollarweed to become established. Many landscape plants do not require as much water as turf, and their zone can be set for less than $\frac{3}{4}$ " of water per application. An easy way to determine this is to place small containers (i.e. paper cups) throughout each zone and take note of the time it takes for the cups to accumulate the desired amount of water. Then, set your irrigation controller to operate for no longer than that time in each zone.

Separate irrigation zones for turf/landscape beds: In addition to grouping plants with similar maintenance requirements together, it is important to design the irrigation system to deliver the appropriate amount of water for each plant type. This includes installing a multiple program controller that can divide the landscape into zones and operate the different zones for different lengths of time. In this way, lawns that require a large amount of water from sprayers or rotors can be separated from more drought-tolerant plants that require little or no water. In contrast, a single program controller is often set for the watering requirements of the least drought-tolerant landscape feature, and the rest of the landscape ends up being over-watered—which can lead to problems such as root rot in some plants.

Rotor heads and fixed pattern spray sprinklers installed on separate zones: When spaced properly, rotors and spray heads have different application rates. Rotors typically have application rates of 0.1 – 0.75 inches of water per hour, while spray heads typically have application rates of 1.0 – 1.5 inches of water per hour. If rotor heads and spray heads are mixed, the design will result in non-uniform distribution.

Zones with rotor or spray heads are spaced for head to head coverage: Many irrigation system designs incorporate spray/rotor head pattern overlap, to ensure complete coverage. In order to minimize overwatering in the overlap zone, one emitter's coverage pattern should not extend past adjacent emitters.

Pop-up rotors and spray heads rise above typical grass height: Pop-up rotors and spray heads should rise above typical grass height; not only to decrease problems with deflection, but also due to the head "sinking" over time because of equipment running over it, etc. Typical spray heads have 4, 6, or 12 inch bodies or pull heads; consider 6 inch installed at grade or provide a reason as to why it is not needed.

Narrow areas (4 ft wide or less) are not irrigated unless micro-irrigation is used: Narrow areas are difficult to irrigate effectively with rotor or spray heads, for most patterns are greater than 4 feet in diameter. Micro-irrigation is a better choice for irrigating narrow areas.

Use of micro-irrigation in landscape beds: Landscape features other than turf can be watered much more efficiently by using micro-irrigation rather than sprayers and rotors. Equipment such as drip emitters, bubblers, micro-spray jets, and soaker hoses deliver water precisely where it is needed. In contrast, much of the water emitted from sprayers and rotors is blown away by wind or evaporates.

Automatic irrigation controller is equipped with functioning rain sensor device installed in an operable location: Rain shut-off devices are required by Florida Statute 373.62 for all newly installed irrigation systems (some municipalities require them on existing systems as well). These devices automatically turn off the irrigation system if it is operating during a rain event. For proper operation ensure that the rain sensor is placed in an operable location, and not in a location shielded from rain, such as under a roof overhang, etc.

Irrigation/sprinkler system located > 2 ft from house foundation, water does not hit house while operating: All irrigation system piping, and emitters must be installed at a distance greater than 2 feet from the house foundation. This will ensure excessive moisture does not accumulate near the foundation due to system leaks. One must also ensure that no irrigation water is directed to the walls of the house.

Irrigation system tested and oversprays on impermeable surfaces minimized: The irrigation system must be visually inspected while operating to ensure that no irrigation water is directed to areas not intended to be watered (driveway, street, etc.).

In poor drainage (low) areas, heads are installed with check valves: Equipment with check valves must be used in some areas to prevent low pressure drainage. Low pressure drainage is a situation in which the system drains to the lowest head and resultant water flows onto or over adjacent property, non-irrigated areas, walks, roadways, or structures. Not only could this be a localized wet spot problem, but it also wastes the water that is in the zone piping each time the system runs. To help prevent this situation, heads with check valves need to be installed if there is over an 18 inch difference in elevation or if there is undulating terrain.

Automatic irrigation controller includes a battery backup to retain system settings: An automatic irrigation controller with a battery backup must be installed. The battery does not operate the system, but retains system settings in the event of a power failure, such that the system does not revert to wasteful operation. The battery should be changed regularly.

Audit of irrigation system conducted to ensure it performs as designed: A dedicated individual must audit the system once completely installed to visually verify that all aspects of the design are operating as planned. This individual must sign the checklist in the space provided. Any of the following individuals can perform the audit on both new and existing homes: Mobil Irrigation Lab, irrigation evaluation specialist, Florida Yards & Neighborhoods Personnel, Certifying Agent, or the system designer/installer. Mobil Irrigation Labs are available in certain areas of Florida at no or minimal cost, and can issue a written report that details system effectiveness. To find out about Mobil Irrigation Labs in your area, check with you local water management district:

<http://www.dep.state.fl.us/secretary/watman/index.htm>

Written operating information is provided to the homeowner: The eventual homeowner should receive a copy of as built plans, operating manuals, and warranties. The package should also include a general irrigation schedule with recommendations and instructions on modifying the schedule for local climatic and growing conditions.

Category 3: Lot Choice

House built within designated FGBC green development (1 – 6 pts.): Receive 1 point if the home is built within a designated FGBC Green Land Development. Receive 1 bonus point for each 20% the land development scores beyond the minimum compliance of the FGBC Land Development Standard. A maximum of 6 points is available for this item. ****Suggested submittal: Name of development.****

House within a certified green local government (4 pts.): Receive 4 points if the home is built within a designated FGBC Green Local Government. ****Suggested submittal: Name of Local Government.****

Build on an infill site (2 pts.): If the lot being built on is on a street where the majority of adjacent sites have homes that are ten or more years old, the site shall qualify as an infill site and two points may be scored. ****Suggested submittal: None.****

Site located within 1/2 mile of existing infrastructure (2 pts.): If there is existing water and sewer within 1/2 mile from the house, FGBC will award 2 points. ****Suggested submittal: None.****

Site located within 1/4 mile walk to mass transit (2 pts.): If there is a safe (sidewalk or other pedestrian path) to a city bus stop or other mass transit station and the mass transit station is within ¼ mile from the house, FGBC will award 2 points. ****Suggested submittal: None.****

Site located within 1/2 mile of public open/green space (2 pts.): If there is Public Park and recreational land within 1/2 mile from the house, FGBC will award 2 points. ****Suggested submittal: None.****

Site located within 1/4 mile of basic community resources (2 pts.): If there is walk able access to seven (within ¼ mile) or eleven (within ½ mile) basic community resources. FGBC will award 2 points. ****Suggested submittal: None.****

Site located in TND or small-lot cluster development (2 pts.): If the lot is located in a traditional mixed-use development whereby there are at least five commercial establishments within a safe 1/4 mile walk, then score 2 points. Alternatively, if the site is in a development that has clustered the houses into lots that are 5000 square feet or less and has preserved for the common good over 50% of the total acreage, score 2 points. ****Suggested submittal: None.****

Brownfield site (2 pts.): If the lot has ever been designated a brownfield site by a state or federal agency then score two points. Brownfields are defined by the EPA as abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. ****Suggested submittal: Documentation of brownfield status.****

Category 4: Site

Native tree and plant preservation

Several studies have shown that trees can increase the value of a home anywhere from 5% - 20%. Trees can also offer energy savings by providing considerable shade. In order to protect this investment, it is always more economical to prevent tree damage than to remedy it. Trees are often damaged during home construction by accidental cutting, mechanical equipment, grade changes, excavation, and chemical substances. For more information consult the Florida Department of Forestry's Tree Protection Manual for Home Builders. Contact info for local arborists can be found here: www.isa-arbor.com/arborists/arbsearch.html.

No invasive exotic plant species (2 pts.): Often times, exotic plants that are not native to Florida's environment are not suited to local rainfall conditions, and require more water to remain healthy. In addition, invasive species sometimes crowd out our natural vegetation. FGBC awards 2 points if no invasive exotic species are included in the landscape. A list of such plants can be found at: www.fleppc.org and www.dep.state.fl.us/lands/invaspec/index.htm. ****Suggested submittal: Landscape plan.**** ****FY&N inspection required for existing plants/trees.****

Maximize tree/native plant survivability (2 pts.): Two points will be awarded if all of the following techniques are employed to at least 12 inches of tree caliber measured at chest height

(i.e. four 3-inch trees, two 6-inch trees, etc.) per acre. Here, FGBC is looking to see the plan developed in the previous criteria implemented. ****Suggested submittal: Example photo or other documentation of each technique.****

- 1) To avoid accidental cutting of trees, clearly mark the trees to be cut with paint at eye level, and also on the ground to make it easier to see if unmarked trees have been cut. Also, make sure the cut trees will not damage other trees when they fall.
- 2) Construct barricades around trees or groups of trees to be preserved at their dripline to prevent mechanical damage. Mechanical damage can be caused by heavy equipment, carelessness with tools, soil compaction, and improper cutting of roots. Make sure the barriers are tall enough to be seen by equipment operators. Use hand tools when removing brush and weeds around a tree.
- 3) Plan for tree survival when making grade changes, for filling can damage trees. Fill may raise the water table or cause surface drainage to puddle over the roots. A light fill of porous or gravel material up to 6 inches in depth will usually do little harm, however heavier or more impervious fills such as clay and marl will harm the tree. It is often advantageous to install an aeration system before the fill is added, to maintain a normal balance of air and water around the roots. Consult with a tree expert or the Florida Division of Forestry for more information regarding construction of an aeration system which generally includes installing tile for drainage and aeration, constructing a drywell, and filling.
- 4) Minimize damage to roots during excavation:
 - a. Cut roots cleanly and retrim after excavation.
 - b. Treat cuts in larger roots (1/4 inch and up) with wound dressing.
 - c. Refill the excavation as soon as possible or construct retaining walls.
 - d. Avoid leaving air pockets when refilling.
 - e. Mix peat moss or other soil amendment with fill soil to promote new growth.
 - f. Top-prune to aid in maintaining tree vigor.
 - g. If cables or piping must be laid through the tree root zone, it is better to tunnel underneath it rather than trench through it.
- 5) Keep the soil within the dripline undisturbed and free from building materials and harmful runoffs to avoid chemical damage. Do not use areas near trees as dump or storage areas. Do not use herbicides or pesticides, or fertilizers containing herbicides, near any of the vegetation you are trying to preserve.
- 6) Provide a survey of the property that identifies all trees 2 inches in diameter at greater than breast height (4.5feet) and all native plant communities. Identify areas to be preserved and develop a strategy for avoiding mechanical and chemical damage, grade changes, trenching, and compaction. See the next criteria for suggestions. Also provide a strategy to identify and remove invasive species. Two points will be awarded for development of a plan that preserves 10% of the site or at least 12 inches of tree caliber measured at chest height (i.e. four 3-inch trees, two 6-inch trees, etc.). ****Required submittal: Tree survey and preservation plan. Must submit species list and photo documentation of no disturbance zone prior to any clearing/grading. Survey does not need to be professionally done, can be hand drawn.****

Minimize soil compaction (2 pts): Restrict all construction equipment from driving on site during construction except for area of future driveway. This will allow soil to remain uncompacted allowing for better percolation and plant and turf growth ****Suggested submittal: Photos of barricaded site****

25% of site protected from mechanical soil compaction via barrier (1 pt): Restrict all construction equipment from driving on site during construction except for area of <25% of site. This will allow soil to remain uncompacted allowing for better percolation and plant and turf growth ****Suggested submittal: Photos of barricaded site****

Replant or donate removed vegetation (2 pts.): If native vegetation must be removed, receive 2 points if it is taken offsite (i.e. to a plant nursery) and then after construction brought back and planted onsite. Alternatively, transplant the removed material to another site. Either transplants 10% of the site or at least 12 inches of tree caliber measured at chest height (i.e. four 3-inch trees, two 6-inch trees, etc.) ****Suggested submittal: Name and location or nursery or alternate site.****

Preserve or create wildlife habitat or shelter (1-9 pts.): Preserve existing plant communities in their undisturbed state or if there is no existing native plant community, then create one that will survive on natural rainfall, soil nutrients, and pest control. One point is awarded for each contiguous 10% of property. For more information see A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook (page 21) or visit hort.ufl.edu/fyn/maintain17.htm. ****Suggested submittal: Photo or description of effort.****

On-site use of cleared materials

Use offsite salvaged/remanufactured material (1 pt): Similar to below but with material not originating on site. ****Suggested submittal: Describe reuse strategy and amount of material reused.****

Mill cleared trees (2 pts.): Mill all removed trees greater than 4 inches in diameter that will not be replanted or donated into lumber. If logs are milled they could represent a cost effective lumber source. Two points are available. ****Suggested submittal: Describe number and size of trees that were milled and describe lumber produced.****

Reuse cleared material for mulch/landscape (1 pt.): Reuse all removed stumps, limbs greater than 2 inches in diameter, and trees (that will not be replanted or donated) in the landscape. Examples include grinding for mulch, use as landscape decorations and fences, etc. One point is available. No credit is given for reusing Brazilian pepper or Australian pines. Palms should not be ground for mulch. ****Suggested submittal: Describe reuse strategy and amount of material reused.***

Erosion Control and Topsoil Preservation

Trees and plants depend upon nutrients in the soil. Often when a new home is constructed the entire lot is cleared and then the topsoil is washed away by rain and blown away by wind. Not only is it a valuable resource by leaving it on the site, but it may end up clogging drainage areas

and mucking water bodies. Hang on to the soil! More details and examples of criteria in this section can be found at www.co.broward.fl.us/dni00835.htm.

Soil costs \$5 to \$10/yard. Left unprotected, a significant amount of soil can be washed away from a typical ¼ acre lot with a downpour. This could be worse over an extended period or on lots with slopes.

Develop an erosion control site plan (2 pts.): Applicant shall submit documentation of a site plan for erosion and sedimentation control to be implemented before the site is cleared or graded including areas where topsoil will be removed, contours of slopes to be cleared, location and type of erosion control measures, stormwater and sediment management systems, and a vegetative plan for temporary and permanent stabilization. Two points are available.
****Required submittal: Detailed plan.****

Stabilize disturbed soil (1 pt.): Document the use of Best Management Practices (BMPs) for soil stabilization, such as silt screens, hydro mulch, non-floatable conventional or alternative mulch, groundcovers, rye grass or millet, and retaining walls. One point is available. ****Suggested submittal: Photo or other documentation of BMPs employed.****

Stage disturbance (2 pts.): When a lot is cleared or extensive landscaping is to be done, staging the work so that only part of the site is disturbed at one time allows existing plants to retain some of the soil that may be lost from erosion during the project construction period.

To qualify for the 1 point, no more than 60% of the site or no more than ¼ acres (whichever is less) can be disturbed at one time. Existing vegetation must remain in tact on the undisturbed part until at least 40% of the site is landscaped.

Create a temporary physical barricade around the section of the site to be protected. If the undisturbed area needs to be disturbed, complete the work on the existing disturbed section and then landscape that section before removing the barricade.
****Suggested submittal: Photo or other documentation of staging.****

Control sediment runoff during construction (1 pt.): Document the use of Best Management Practices to control sediment runoff/transport during construction including using a temporary gravel construction entrance/exit, straw bale barriers, silt fences, sediment traps, etc. Two points are available. ****Suggested submittal: Photo or other documentation of BMPs employed.****



Save and reuse all removed topsoil (1 pt.): Save and reuse any removed topsoil as the final top layer on site following construction. The soil must be covered and protected from weather until used. Organic soils lose their nutrients if left exposed to the elements. One point is available.
****Suggested submittal: Photo of covered soil.****



Drainage/retention

More details and examples of criteria in this section can be found at www.co.broward.fl.us/dni00835.htm.

Onsite designated retention area (2 pts.): Two points are awarded if a designated retention area(s) is constructed to retain the first 1 inch of rainfall onsite. This could be a single retention area or system of berms/swales. ****Suggested submittal: Photo or plan layout of strategy.****

Direct filtered rooftop runoff to planted area(s) (2 pts.): Two points are available for this criterion. Flow must be disbursed at least 2 feet from the building using an infiltration system that spreads runoff over a large area and eliminates focused flow that might cause erosion. ****Suggested submittal: Photo or plan layout of strategy.****

Maintain pervious surface area (1-4 pts.): For each point received, 20% of the site should be 100% pervious. For semi-pervious sections use the following equation to determine equivalent pervious area:

$$(\% \text{ perviousness of material}/100) \times (\text{coverage area}) = \text{equivalent pervious area}$$

Add the coverage areas of 100% pervious materials and the equivalent area of the semi-pervious materials and divide by the total lot area. Then, divide this result by 0.2 to obtain the eligible points. Consult [A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook](#) for more information. ****Suggested submittal: Submit similar diagram and calculation.****

Example (All units are ft unless specified):

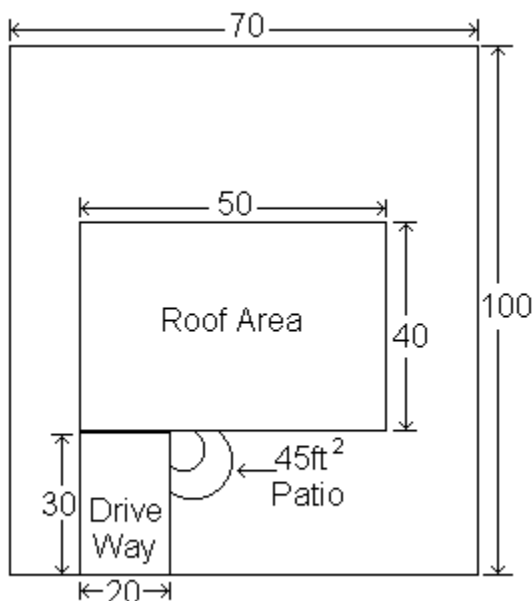
1) The 100% pervious area would be:

$$\begin{aligned} &= (70 \times 100) - (40 \times 50) - 45\text{ft}^2 - (20 \times 30) \\ &= 7000\text{ft}^2 - 2000\text{ft}^2 - 45\text{ft}^2 - 600\text{ft}^2 = 4355\text{ft}^2 \end{aligned}$$

2) If the driveway is 30% pervious then we add:

$$\begin{aligned} &(30/100) \times 600\text{ft}^2 = 180\text{ft}^2 \\ &4355\text{ft}^2 + 180\text{ft}^2 = 4535\text{ft}^2 \end{aligned}$$

3) Total available points are calculated as follows:



Total equivalent pervious area / total area = $4535\text{ft}^2 / 7000\text{ft}^2 = 0.648$

$0.648 / 0.2 = 3.24 = 3$ available points (always truncate to the lower whole number)

Category 5: Health

Combustion

This section primarily deals with techniques used to prevent dangerous products of combustion from entering into the conditioned environment of the home. Combustion takes place in gas appliances as well as automobiles, which are often running in the garage of the home.

Detached garage, carport, or no garage (3 pts.): Often times, toxic fumes from automobiles and chemicals stored in the garage can be transferred into the living space of a home when it has an attached garage. FGBC awards 3 points if the home has a detached garage that does not share any common walls or enclosed passageways with the primary living space, or has a carport with no garage, or no carport/garage at all. ****Suggested submittal: Photo or floor plan showing garage / carport / no garage detail.****

Attached garage with air barrier between garage and living space, including attic (2 pt.): FGBC awards 2 points if penetrations between a home and its attached garage are sealed properly. An air barrier must be created to restrict air exchange between attic over the garage and the attic over the living space. This can be accomplished by caulking and sealing of the top and bottom wall plates of the shared garage-living space walls, constructing an airtight partition between the garage attic space and the attic space over the living area, and weather stripping the garage door. An automatic door closer should also be added for the door that connects the living space to the garage. Sealing of walls and attic partition can be accomplished with open-cell expanding foam insulation (i.e. Icynene, Demilec Sealection 500, Healthy Seal, etc.). ****Suggested submittal: Photos or plan detail.****

Attached garage – exhaust fan on motion sensor and timer (1 pt.): Install a fan capable of fully exchanging the garage air with the outside air in 15 minutes or less. A typical 20ft x 20ft x 8ft garage would require a 220 cfm fan. The fan must run for a sufficient amount of time to fully exchange the garage air every four hours on a timer, and when activated via a motion sensor to exhaust carbon monoxide fumes from automobiles. Fan must exhaust to the outside. One point is available. ****Suggested submittal: Photos, cut sheet of fan, or plan detail.****

Direct vent, sealed combustion fireplace with electronic ignition, or no fireplace present (1 pt.): The direct vent fireplace is an important standard when a fireplace is desired. Direct venting eliminates the threat of harmful combustion gases from entering the home. If a fireplace is not properly vented and sealed, the fireplace can produce harmful combustion pollutants which may be emitted into the home such as carbon monoxide, nitrogen dioxide, and sulfur dioxide. To achieve the available point a direct vent sealed combustion fireplace must be used and be properly vented to the outside. The fireplace should also be equipped with electronic ignition.

The point is also available for homes that do not have a fireplace. For more information on this subject visit www.healthhouse.org. Some suppliers of this equipment include Heatalitor and Majestic. ****Suggested submittal: Photo, plan detail, or cut sheet of fireplace.****

No unsealed space or water heating equipment located inside the conditioned area – or electric (1-2 pts.): Sealed combustion appliances eliminate the threat of harmful combustion by-products from entering the home due to the fact that they contain their own air supply directly vented into the appliance for combustion and a sealed vent for exhausting the combustion gases to the exterior of the home. One point is available for use of a sealed combustion furnace, or use of an electric heating system, such as a heat pump. One point is also available for use of a sealed combustion water heater, or use of an electric water heating system. If more than one heating or water heating system is installed in the home, all must be of a qualifying type. ****Suggested submittal: Cut sheet of furnace.****

If a sealed combustion or electric furnace or water heater is not used, points are also available if any non-sealed equipment is isolated from the conditioned area. Installation of a non-sealed combustion furnace must be located in a sealed combustion closet. Points are not awarded if the furnace is located outside of the conditioned area (such as in the garage), due to negative energy implications. Installation of a non-sealed combustion water heater can either be in a sealed combustion closet, or outside of the conditioned area (such as in a garage). To receive the point for the sealed closet one must:

- Insulate the four walls of the combustion closet.
- Finish the walls and ceiling with drywall.
- Seal all holes and air leakage pathways through the walls, floor, and ceiling that can connect the closet to the rest of the house (plumbing, gas lines, wiring, and bottom plate).
- Install a non-louvered door that is weatherstripped and equipped with a properly adjusted threshold.
- Install two ducts in the closet, extending to the outside or to a ventilated attic or crawlspace, to provide outside air for combustion. Seal the ducts to the ceiling.
- If a return plenum for a furnace is built below the closet, completely seal the plenum including plenum walls, plumbing, and connection of the furnace to the plenum.
- Seal the ceiling around the flue using sheet metal.
- The area must not be depressurized by more than 3 Pa.

****Suggested submittal: Photos or plan detail of closet.****

Carbon monoxide alarm (1 pt.): These devices provide advanced warning to the homeowner of any intrusion of carbon monoxide to the living area of the home before becoming dangerously toxic. Carbon monoxide is a product of the combustion of fuel used for appliances, as well as automobile exhaust. To receive the point, detectors should be installed at the entrance to each sleeping area and, if the home has an attached garage, one on the living area side of garage door entrance to living area within the conditioned space. One detector can be used for adjacent bedrooms. The detectors must be line powered with a battery backup. Carbon Monoxide detectors are available at most local hardware stores. See Consumer Reports Jan 2001 for an excellent review of these devices. ****Suggested submittal: Photos, electrical plan, or cut sheet.****

Moisture Control

By managing moisture properly the potential for growth of mold, mildew, and dust mites will be reduced. As a result the quality of the health of the occupants will be improved leading to less respiratory problems, etc. The durability of the home will also improve. Some other important moisture control strategies that relate to the exterior of the home can be found under Materials – Durability.

Drainage tile around and on top of footing (1 pt.): By draining water away from the foundation of the home moisture intrusion will be minimized. The necessity of this criterion depends on soil type in your area and the foundation type of your home. It is most appropriate for basements and crawl spaces located in North Florida. One point is available.

There are several types of drainage tile that may be used to facilitate this undertaking. The easiest to install and the most readily available is constructed of PVC. It is black and is perforated with a fabric cover. This should be placed around or on top of footing. Crushed stone of approximately 6 in. thick should be installed under the pipe with then more stone being used to cover the pipe after installation. The pipe should then be drained to a retention area away from the home. ****Suggested submittal: Photo or plan detail of drainage strategy.****

Drainage board for below grade walls (1 pt.): Drainage board for below grade walls is not common to Florida due to the fact that basements are limited due to the high water table. It is most appropriate for homes located in North Florida. If used, it should be used in conjunction with drain tile. This will allow water to drain down the drain board on top of the drain tile, which will then take the water away from the home. One point is available. ****Suggested submittal: Photo or plan detail of drainage strategy.****

Gravel bed beneath slab on grade floors (1 pt.): Installing a gravel bed beneath slab on grade floors will be very beneficial to the reduction of moisture trapped beneath the slab and reduce capillary action of water into the slab. Gravel should be a minimum of 6 inches deep but preferably 12 inches deep. The gravel should be placed under the complete slab including footings. All footings should be dug larger to allow for the gravel placement. It is also recommended that several drain tile pipes (4 inch PVC) be installed under the slab and extend to the exterior of the slab to allow water that has accumulated to drain to the exterior of the slab. One point is available. The necessity of this criterion depends on soil type in your area. ****Suggested submittal: Photo or plan detail of drainage strategy.****

Seal slab penetrations (1 pt.): After the slab has substantially cured, any penetration through the slab such as piping or conduit shall be sealed around its perimeter with an elastomeric or vulcum type sealer. This will reduce the moisture and pests from entering the home. One point is awarded. ****Suggested submittal: Photo or plan detail of drainage strategy.****

Capillary break between foundation and framing (1 pt.): A capillary break should be installed between a concrete foundation and sill plate for all wood framed exterior walls. One point is awarded. A complete framed wall width sill gasket, EPDM-type rubber, or other suitable membrane shall be installed. Alternatively, prior to installing exterior sill plates a generous bead of quality silicone sealant should be applied to bottom side of the sill plate and then secure the

sill plate into place. These techniques prevent moisture from wicking through the foundation into the framing. ****Suggested submittal: Photo or plan detail of drainage strategy.****

Central dehumidification system (3 pts.): Install a central dehumidification system to work in conjunction with the home's HVAC system. The unit should be professionally installed by a local HVAC contractor. 3 points are awarded. Most central dehumidification equipment also permits the intake of fresh, outside air, thereby improving ventilation in the home. Points are awarded for this strategy under Ventilation. ****Suggested submittal: Photo or cut sheet of equipment.****

No vapor barrier on the inside of assemblies (1 pt.): Receive one point if no material with a rating of less than 1 perm is used on the inside of any wall, floor, or roof assembly. Such materials include foil and kraft insulation facing, vinyl wallpaper, and vinyl floor covering. Vapor barriers prevent moisture that has penetrated the exterior of the assembly to pass through the assembly where it can be removed by the home's air conditioner. ****Suggested submittal: None, visual inspection by certifying agent.****

Source Control

Volatile organic compounds (VOCs), especially formaldehyde, and other chemical substances contained within building materials can be injurious to lung health and can be odorous. The best strategy is to select materials with low to zero quantities of such chemicals to minimize the source of emission. In selecting low VOC materials, good rules of thumb are to choose water based products and products with a low odor. Pet dander, dust mites and other allergens can be of concern for sensitive persons, and persons with asthma. Regular cleaning practices with effective equipment and the minimization of materials where such contaminants can accumulate can alleviate potential problems.

No exposed urea-formaldehyde particleboard (1 pt.): One point is awarded if all particleboard used that contains urea-formaldehyde is sealed on all sides (top, bottom, and edges) with a laminate or other suitable sealer. The point is also available if no particleboard is used at all. Common replacements for particleboard in cabinets include solid wood, and a common replacement for particleboard in countertops is Corian or granite. Wire shelving can replace particleboard in other shelving areas. Another strategy, although not as effective as sealing or not using particleboard, is to choose particleboard made with phenol-formaldehyde resin rather than urea formaldehyde. ****Suggested submittal: None – visual inspection by certifying agent.****

Zero VOC paints, stains, and finishes (2 pts.): Use only zero VOC paints, stains, and other finish coatings. They are now available from several manufacturers including Sherwin Williams (Harmony), ICI (Lifemaster), and PPG (Pure Performance). To receive the two points, 100% of all paint, stains, and other finish coatings used in the interior of the home must be certified as having zero VOCs.

Depending on the goals of the project, one may want to select points for recycled content paints listed under the Materials category rather than this healthy paint criterion. Points are not available for both criteria. ****Suggested submittal: Cut sheet of all finish coatings used.****

Low VOC paints, stains, and finishes (1 pt.): One point is available if 100% of all paints, stains, and other finish coatings used contain less than 150 grams/liter of VOCs per gallon. This category of Low VOC paints only pertains to paint used on the interior of the home.

Depending on the goals of the project, one may want to select points for recycled content paints listed under the Materials category rather than this healthy paint criterion. Points are not available for both criteria. ****Suggested submittal: Cut sheet of all finish coatings used.****

Low VOC sealants and adhesives (1 pt.): One point is available if 100% of all sealants and adhesives used are water based rather than solvent based. Most construction adhesives offer adequate bond strengths in water-based varieties. ****Suggested submittal: Cut sheet of all sealants and adhesives used.****

Minimize carpet use (1 pt.): One point is awarded if carpet is used on less than 50% of all interior flooring. Certain types of carpet, carpet pad, tack strips, and carpet glues emit VOCs that can contribute to poor indoor air quality. Carpets also have been found to accumulate various allergens unless frequently vacuumed with high efficiency equipment. A good reference on carpet can be found on Green Seal's website: www.greenseal.org/cgrs/Carpet_CGR.pdf
****Suggested submittal: None – visual inspection by certifying agent.****

Healthy flooring (1 pt.): One point is available if 100% of all finished flooring used is listed here:

- Carpet with Carpet and Rug Institute (CRI) green seal of approval (www.carpet-rug.com) that also uses a synthetic fiber or virgin urethane pad and no glues used for installation.
- Linoleum or cork tile/sheet with water based adhesive.
- Ceramic tile.
- Hard surface flooring (wood, bamboo, etc) that is mechanically fastened attached with a water based adhesive.
- Laminate flooring (wood, cork, etc.) with no urea-formaldehyde and glueless or water based glue installation.
- Concrete (stamped, stained, etc.)
- Flooring listed under the RFCI floor score program

Depending on the goals of the project, one may want to select points for Eco-friendly flooring listed under the Materials category rather than this Health flooring criteria. Points are not available for both criteria. **Suggested submittal: Listing of types of flooring and accessories (glues, etc.) used and installation methods.******

Healthy Insulation (1 pt.): One point is available if 100% of all insulation used is listed here:

- Water sprayed foam insulation (Icynene, Demilec, Healthy Seal, Soy based foam, etc.)
- Formaldehyde-free fiberglass insulation (Johns Manville, etc.)
- Expanded Polystyrene (EPS) (Dow, Owens Corning, etc.)
- GREENGUARD certified insulation
- Cotton (Bonded Logic, etc.)

Depending on the goals of the project, one may want to select points for Eco-friendly insulation listed under the Materials category rather than this Health insulation criterion. Points are not available for both criteria. ****Suggested submittal: Listing of types of insulation used.****

Protect ducts during construction (1 pt.): One point is awarded if all duct register boxes and other openings are sealed off with tape or other suitable method directly following mechanical rough in. Ducts must remain sealed until HVAC system start-up. If interior finish work (painting, etc.) continues after HVAC start up, ducts must be re-sealed until work is complete. ****Suggested submittal: Photo.****

Integrated pest management (3 pts.): Integrated pest management (IPM) is a process for achieving long term, environmentally sound pest suppression through the use of a wide variety of technological and management practices. Control strategies in an IPM program extend beyond the application of pesticides to include structural and procedural modifications that reduce the food, water, harborage, and access used by pests. IPM can reduce the use of chemicals and provide economical and effective pest suppression. IPM does not involve the complete elimination of the use of pesticides, nor does it involve solely substituting “good” pesticides for “bad” pesticides. IPM attempts to achieve a balance of both chemical and non-chemical methods to control pest problems. Integrated pest management (IPM) can reduce or eliminate the need for chemicals to control pests inside and outside of the house. IPM may benefit both the environment and the health of the occupants, especially children.

Because IPM methods and techniques vary according to location and building details, to receive 3 points the applicant must consult with a pest control professional that is skilled in IPM. They must then work together to develop and implement a plan. Details of the plan must be submitted along with the Green Home application. The plan must address how the IPM strategy considers the following important aspects of IPM:

- Monitoring and prevention of pest populations.
- Application of pesticides only “as needed” after prevention and physical controls have been implemented.
- Selecting the least hazardous pesticides for control of targeted pests.
- Precision targeting of pesticides to areas not contacted or accessible to the occupants.

To properly implement IPM, there are maintenance issues that need to be undertaken by the homeowner after construction, therefore an IPM maintenance plan should be developed and included in a homeowner’s manual that is presented to the homeowner. An excellent source of information on IPM is the Sustainable Building Sourcebook by Austin Energy, Austin, TX. It can be found on the internet at www.greenbuilder.com/sourcebook/termite.html. Another source of information is “Integrated Pest Management for Schools: A Catalog of Resources”, put together by the University of Florida Institute of Food and Agricultural Sciences, and available at: http://schoolipm.ifas.ufl.edu/school_ipm.pdf.

****Required submittal: IPM plan and copy of section from homeowner’s manual.****

Cleanability

A home that is easily cleaned is not only less maintenance for the homeowner, but the indoor air quality can be improved due to less accumulation of allergens and pollutants. This section contains suggestions on use of effective cleaning equipment, along with design issues that will improve the effectiveness of cleaning.

Central vacuum system (1-2 pts.): One point is available for system rough-in and two points are available for the installation of a central vacuum system with the vent from the dust canister exhausting to the outside of the conditioned space. Alternatively, the points can be obtained if the unit vents inside the home through a HEPA filter. Due to their ease of use, central vacuums tend to be used more often than uprights. Their main benefit is the ability for the system to exhaust all air to a canister or bag located outside of the conditioned space. ****Suggested submittal: Photo or cut sheet of system.****

Grout lines <1/4" (1 pts.): All grout lines between tiles must be less than 1/4 inches wide. One point is awarded. Grout tends to harbor bacteria and other indoor air pollutants due to its porosity. ****Suggested submittal: Photo.****

Useable entry area (1 pt.): Dust and pollen tracked indoors on shoes and outerwear is a major source of allergen. The best strategy is to prevent it from entering the home, or keep it contained to a particular area that can be cleaned frequently. Provide a well defined area in the garage and/or main entry where shoes and outerwear can be comfortably removed and stored. Provide a track off mat, a bench to sit down on in this area, and shoe and outerwear closets nearby. One point is awarded. ****Suggested submittal: Photo or plan detail.****

Low dust collecting window coverings (1 pt.): Install only low dust collecting window coverings, or window coverings that are easily cleanable. Do not use mini-blinds as they not only accumulate dust, but are difficult to clean. One point is available. ****Suggested submittal: Photo or list of window coverings.****

Universal Design

Universal design/independent living is a concept referring to the design of different products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The intent of the universal design concept is to simplify life for everyone by making products, communications, and the built environment usable by more people at little or no extra cost. The universal design concept targets all people of all ages, sizes, and abilities. Universally planning the home will create a safer space for all users. Many universal design features are no-cost options. They may only require different product choices or design decisions. Some general guidelines on features to include are listed below.

Barrier free entrance (1 pt.): One point is awarded if at least one entrance to the home conforms to the following specifications:

- Curb cut from the street level to sidewalk
- Level walks
- Wide doorway – 36 inch entry from exterior
- Covered stoop

- Front door package shelf outside
- ½ inch maximum vertical edge at threshold

****Suggested submittal: Photos or detailed plans.****

Universally designed living area (1-3 pts.): A total of three points are possible for this criterion. One point is available if at least one bathroom on the first floor conforms to the following specifications:

- Ample clear floor space (5 x 5 foot turning radius) to ensure maneuverability at lavatories, toilets, and tubs/showers
- The bathroom walls must be reinforced for grab bars which are installed at commode, tub, and shower (according to state building code height and size specifications).
- 32 inch minimum door width; 36 inches preferred
- 24 inch space on latch side of doors
- Light switches 38 inches above the floor
- Lever handles on doors or doors without latches
- Rocker or touch switches
- Include at least one of the following options
 - Standard tub with a fold-up seat
 - Tub with a transfer seat
 - Whirlpool tub
 - 3 x 3 foot transfer shower
 - 5 x 5 foot roll-in shower

Two points are available if the bathroom specs are met and at least one bedroom on the first floor must conform to the following specifications:

- 32 inch minimum door width; 36 inches preferred
- 24 inch space on latch side of doors
- Light switches 38 inches above the floor
- Electrical outlets 18 inches above the floor
- Lever handles on doors or doors without latches
- Rocker or touch switches

Three points are available if the bathroom and bedroom specs are met and the entire first floor living space conforms to the following specifications:

- 32 inch minimum door width; 36 inches preferred
- 24 inch space on latch side of doors
- 32 inch wide circulation path
- 48 inch clearance in hallway
- 5 x 5 foot turning radius in activity areas
- Light switches 38 inches above the floor
- Electrical outlets 18 inches above the floor
- Lever handles on doors or doors without latches
- Rocker or touch switches

****Suggested submittal: Photos and detailed plans.****

Ventilation

New homes are being constructed “tighter” than ever before. This can be beneficial in terms of energy efficiency, for less exchange occurs between the conditioned air inside the home and unconditioned air outside of the home. From a health aspect however, tighter homes do not allow enough air exchange to provide adequate ventilation, and remove various indoor air pollutants such as VOC’s, allergens, etc. A home must be designed and constructed to not only permit enough air exchange, but in addition the exchange must take place in a controlled fashion, either through mechanical or natural means. For health and durability concerns, it is imperative that air entering the home should travel through a desired, predefined pathway. This will ensure that the air remains clean, and depending on the strategy, often be conditioned for temperature and humidity concerns.

Controlled Mechanical ventilation (4 pts.): The most effective way to ensure that enough air exchange takes place within a home is to institute a controlled, mechanical ventilation strategy. Positive ventilation is preferable over whole house exhaust in a humid climate, for it causes the house to be under positive pressure with respect to the outdoors, minimizing the uncontrolled intrusion of outside air. At a minimum, such a system must contain a fresh air duct to the outside of the home with a backdraft damper. Delivery of the outside air can be controlled by the home’s HVAC system, or by another device such as an energy recovery ventilator, or a central dehumidification system. The outside air duct must also have a damper that allows a desired flow to be set, and that also allows for full shut off in the event of unfavorable outside conditions (forest fire, etc.). It is strongly recommended that the outside air be filtered before entering the duct. To receive the 4 points, the strategy must bring the conditioned area of the home (not garage and exterior porches) to at least +0.5 Pascals with respect to the outdoors while the home’s air handler is running and any continuous forced exhaust systems are running. Bathroom exhaust fans and kitchen range hoods are considered temporary exhaust devices rather than continuous. ****Required submittal: Schematic or plan detail of system.****

Radon/soil gas vent system installed (1 pt.): One point is awarded if a radon/soil gas vent system is installed in the home. Examples of such a system are described below. Another way to achieve the same result without the expense of an active system is to ensure that all slab penetrations are sealed, a vapor barrier is installed under the slab (code required) and the house is at positive pressure with respect to the outdoors. Points for these criteria are available under Health – Ventilation and Moisture Control. If all of these points are selected, points for installation of a soil gas vent system are not available.

Slab on grade: The least expensive way of venting for radon gases under a slab on grade would be to install a series of passive vent stacks (2 – 3 per home) that, in the event radon gas is present, will allow any trapped gas to vent thru the path of least resistance, using 3” PVC piping venting thru the roof. This is accomplished by installing the pipes prior to slab pour, in a dry well made of crushed stone. The end of the pipe must be capped with a well point or screen then buried in the stone. PVC should extend vertically above slab level and be temporarily capped to prevent being plugged by construction debris. Once home has been framed and is in the rough

plumbing stage, the pipe should be extended thru the roof and finished in the same manner as a plumbing vent stack.

Slab with stemwalls: See slab on grade method above

Foundation and Basement or Crawl space: Can be accomplished in the same manner as slab on grade but insuring that pipe still extends completely thru roof. Basements and crawl spaces should also be ventilated in the sidewalls using windows, foundation vents, or some type of mechanical ventilation system.

Most items are available through local home center or plumbing supplier. If unfamiliar, it is recommended that the installation be performed by licensed plumber.

Floor drains sealed (1 pt.): FGBC awards one point for insuring the sealing of all floor drains (tub, shower, etc.) with any non-asphalt based or equally flexible moisture resistant sealer. All areas around drains must be completely and permanently sealed to prevent any intrusion of foreign gases or vapors from beneath the slab. ****Suggested submittal: Photo and cut sheet of sealing product used.****

If radon and other soil gases are not a concern in your area, consider using termite barrier sand for this job, like the US Navy does. Points are awarded for using sand under Integrated Pest Management.

Energy Star bathroom exhaust fans w/ timer or humidistat: (1 pt.): FGBC awards 1 point for the installation of high efficiency, low noise bathroom exhaust fans with timers or humidistats (an advanced control that operates the fan based on humidity levels) in each bathroom throughout the home. Such advanced controls are important, for often times fans are not left on long enough to remove sufficient moisture, and other times fans are inadvertently left on for long periods of time due to their quiet operation. Fans must vent to the exterior. For a product to qualify it must move 1 cfm of air per 0.30 Watts (e.g., a 50 cfm fan must use less than 15 Watts, a 70 cfm fan must use less than 21 Watts) and be HVI certified to produce less than 1.0 sones. ****Suggested submittal: Cut sheet of fan and control.****

Advanced controls and fans are available at many local home centers or electrical parts suppliers. Other sources of products include www.sheltersupply.com, www.tamtech.com, and www.panasonic.com/consumer_electronics/bp_ventilation_fans/default.asp.

Kitchen range hood vented to exterior (1 pt.): FGBC will award 1 point to a home equipped with a range hood vented to the exterior of the home. Non-vented or ductless range hoods are not eligible for the point. Hood ducting must be of building code-approved materials and completely sealed to prevent leakage. Exterior of vent must also contain building code approved termination cover. FGBC recommends use of a quiet energy efficient model, but does not require it. A source for such products can be found here: <http://www.venmar-ventilation.com/english/hottes/index.html>. ****Suggested submittal: Cut sheet of hood.****

Laundry rooms inside conditioned spaces must have window or other make-up air source (1 pt.):

FGBC will award 1 point for a home with an inside laundry room that contains an operable window or other make-up air source. When a clothes dryer is running it pulls a great quantity of air from the interior of the home. The purpose of this criterion is to maintain equalized air pressure in the Laundry Room when dryer is running even when the Laundry Room door is closed. If the laundry room is separated from the main portion of the home by an insulated wall and has no ducted supply of conditioned air, it is considered outside of the conditioned space and can receive points in the Energy category. The make-up air source can be any of the following: window, through the wall vent or jump duct from adjoining room in home, or pressure activated fan to bring in air as pressure drops in room when dryer is activated. ****Suggested submittal: Plan detail of strategy.****

Whole house filtration (3 pts.): FGBC will award 3 points for the use of a high efficiency whole house filtration system. To qualify, the system must be greater than 95% efficient at removing pm 0.025 (particulate matter greater than 0.025 microns in diameter). The system must have at least one dedicated intake from the interior of the home, and can supply filtered air through a dedicated supply vent, or utilize the HVAC supply system. The system should have its own fan, and not rely on the fan in the home's HVAC system. Some dedicated dehumidification equipment contains such a filtration device. ****Suggested submittal: Cut sheet of system.****

Efficient HVAC filter (1-2 pt.): FGBC will award 1 point for min MERV 8 and 2 points for min MERV 10 to a home that contains an electronic filter in line with the home's HVAC system or 1" or greater pleated media filter with a minimum 30% dust spot efficiency (DSE) as its primary air filter. Passive electrostatic filters may not be used. If the home contains more than 1 HVAC system, a filter must be installed on each unit. Filters must be maintained as per manufacturer's specifications. Pleated media filters greater than 1" are available, however can lead to excessive pressure drop across the filter. Such filters are also more expensive and more difficult to find. Contact a local HVAC contractor for recommendations. Pleated media filters are available at most local home improvement stores, and have a longer life than standard HVAC filters. An example of such filters is www.3m.com/us/home_leisure/filtrete/index.jhtml. ****Suggested submittal: Cut sheet of filter.****

HVAC filter easily accessible (1 pt.): FGBC awards 1 point if the HVAC filter is installed in a location easily accessible by the homeowner. The Certifying Agent will interpret the criteria, but as an example, the homeowner must be able to change the HVAC filter without the use of any tools, or ladders. HVAC filter maintenance is important to not only maintain the equipment itself, but also for maintaining a healthy living environment. ****Suggested submittal: None – visual inspection by Certifying Agent.****

Install screens on all windows and doors (1 pt.): FGBC will award 1 point to a home that contains screens for all windows and doors to allow for adequate passive ventilation as needed. A screen enclosure surrounding a pool will suffice for windows and doors contained in this space. Does not include front door. ****Suggested submittal: None – visual inspection by certifying agent.****

No air handler or return ducts in garage (3pts): Alleviates potential for fumes and other contaminants to be pulled into the air conditioning system via leaks. If a sealed combustion or electric furnace is not used, points are also available if any non-sealed equipment is isolated from the conditioned area. Installation of a non-sealed combustion furnace must be located in a sealed combustion closet. Points are not awarded if the furnace is located outside of the conditioned area (such as in the garage), due to negative energy implications. To receive the point for the sealed closet one must:

- Insulate the four walls of the combustion closet.
- Finish the walls and ceiling with drywall.
- Seal all holes and air leakage pathways through the walls, floor, and ceiling that can connect the closet to the rest of the house (plumbing, gas lines, wiring, and bottom plate).
- Install a non-louvered door that is weather-stripped and equipped with a properly adjusted threshold.
- Install two ducts in the closet, extending to the outside or to a ventilated attic or crawlspace, to provide outside air for combustion. Seal the ducts to the ceiling.
- If a return plenum for a furnace is built below the closet, completely seal the plenum including plenum walls, plumbing, and connection of the furnace to the plenum.
- Seal the ceiling around the flue using sheet metal.
- The area must not be depressurized by more than 3 Pa.

****Suggested submittal: None – visual inspection by certifying agent.****

Written plan for the location of exhaust and intake vents (1 pt.): FGBC will award 1 point for a home that has a written plan for the location of all exhaust and intake vents and has installed them according to the plan. All exhaust and intake vents *must* be located at a minimum of 10 feet from each other as to not cross contaminate the air being moved. It is also important that all intake vents be as far from the garage, dryer vent, and air conditioning condenser units as possible. ****Suggested submittal: Plan or hand drawn location of all exhausts and intakes.****

Manual D duct design (1pt): Gives 1 point to those that properly size and layout duct system to deliver the proper room by room cfm as calculated by Manual J. ****Required submittal: calculations, layout plan for entire duct system.****

Category 6: Materials

The criteria in this section give examples on the use of resource efficient materials and techniques. Such materials include materials with recycled content, materials that are easily recyclable, and materials/techniques that produce less waste when implemented. Also included are examples to improve the durability of the structure.

Components

Recycled content roof material (1 pt.): To receive the one point, roofing must be made of 100% recycled rubber and plastic or 100% recycled polymer and rubber or 100% recycled wood and plastic. Roofing may also be metal with 70% recycled content or fiber cement with recycled content. For more product information see the National Association of Home Builders Web site at <http://www.nahb.org>. Manufacturers include, but are not limited to

www.oikos.com/products/moisture/ecostar/, www.ecoshake.com, and www.authentic-roof.com/.

****Suggested submittal: Material cut sheet.****

Engineered wood products for roof and/or floor (1-2 pts.): Representative materials include wood I-joists and wood trusses. Most engineered lumber is a more resource efficient replacement for solid dimensional lumber. Some engineered lumber is comprised of small chips of wood, often reclaimed from another manufacturing process. Wood trusses often use a lower grade of lumber, and can replace solid dimensional rafters. One point is given when at least 80% (or as much as code will allow) of the floor structure uses engineered wood products. One point is given when at least 80% (or as much as code will allow) of the roof structure uses engineered wood products. Two points total are possible. ****Suggested submittal: photo or material cut sheets.****

Certified sustainable lumber (2-3 pts.): Certified sustainable lumber originates from a sustainably managed forest. To receive the points, wood must be certified by a sustainable forestry certification agency such as the Forest Stewardship Council, Certified Forest Products Council, or the Ecoforestry Institute. Three points are available if the home has at least 1 story with wood frame exterior walls, and 80% of all lumber used in the home is certified. Two points are available if the home does not have any wood frame exterior walls, yet 80% of all lumber used for the home is certified. ****Suggested submittal: Documentation of forest certification.****

Engineered/alternative material for outdoor living (1 pt.): One point is available if a minimum of 100ft² or 50% of all outdoor structures, whichever is greater, shall be of a product using 50% or more of recycled content material. Such materials utilize less virgin lumber, and are generally more durable. Manufacturers include but are not limited to www.trex.com and www.usplasticlumber.com. ****Suggested submittal: Photo or material cut sheet.****

Concrete with fly ash (1 pt.): One point is awarded if all concrete used for the construction of the home has a minimum of 18% of the total cement composed of fly ash or blast furnace slag. Such materials are the waste product of power production. ****Required submittal: Material cut sheet.****

Recycled content siding or soffit material (1 pt.): House uses siding or soffit material with recycled content of at least 70%. Example materials include aluminum or pre-primed fiber cement. One point is available. ****Suggested submittal: Material cut sheet.****

Eco-friendly insulation (1 pt.): One point is available if 100% of all insulation used is listed here:

- Recycled cellulose insulation
- Recycled cotton denim insulation
- Recycled mineral wool insulation
- Recycled perlite composite board

Depending on the goals of the project, one may want to select points for Healthy insulation listed under the Health category rather than this resource efficient insulation criterion.

Points are not available for both criteria. ****Suggested submittal: Listing of types of insulation used.****

Recycled content drywall (1 pt.): Sources of recycled drywall are becoming available in Florida. Such manufacturers recycle scrap drywall into new product. The usefulness of this criterion may depend on the home's proximity to a source of recycled product. One point is awarded if all drywall used contains recycled drywall content. ****Suggested submittal: Material cut sheet and vendor.****

Recycled content paint (1 pt.): Using recycled paint offers energy savings from the manufacture of the virgin material and often added durability. To receive the one point, 100% of all paint used (interior and exterior) must have 75% post consumer recycled content and be reformulated with mildewcides, surfactants, etc. as specified for original manufacturing. (If you are chemically sensitive you may wish to have no mildewcides or surfactants added.)

Depending on the goals of the project, one may want to select points for low or zero VOC paints listed under the Health category rather than this resource efficient paint criteria. Points are only available for one selection. ****Suggested submittal: Material cut sheets.****

Recycled content air conditioner condenser pad (1 pt.): One point is given if all air conditioner condenser pads are constructed with 100% recycled PET plastic. ****Suggested submittal: Photo.****

Finger jointed or laminated products (1 pt.): One point is given when a minimum 80% of the following building components are finger-jointed or laminated materials, or a combination thereof: studs, top plate, headers, rim joists, beams, and columns. Finger-jointed material is lumber that is made of short lengths of off-cuts from truss and other manufacturing processes that is finger jointed and glued together to make usable lengths of lumber. Finger-joint lumber may only be used for structural applications when used vertically such as stud framing. Laminated veneer lumber is composed of thin layers or veneers of wood glued together and sawn to make dimensional lumber; it can be used in any position. ****Suggested submittal: Listing of types of materials used for listed applications.****

Eco-friendly trim (1 pt.): One point is given when a minimum of 80% of the interior trim is finger jointed. Finger jointed trim is generally paint grade only. ****Suggested submittal: Indicate where finger jointed trim has been used.****

Steel interior studs (1 pt.): One point is awarded if 80% of all interior studs are made from recycled steel. Steel studs are recyclable again after they have been used. ****Suggested submittal: Photo.****

Eco-friendly flooring (1 pt.): One point is available if 100% of all finished flooring used is listed here:

- Domestically produced hardwood materials from sustainably managed forests.
- Bamboo flooring.

- Reuse of salvaged wood.
- Floor tiles made from recycled glass or other 100% recycled content material
- Cork flooring.
- Natural linoleum.
- Concrete (stamped, stained, etc.)
- Recycled content carpet/carpet pad and rugs: Carpets/rugs must have a minimum recycled content of 80% with 60% post consumer recycled content or be 100% PET plastic. Carpet pads must have 80% total recycled content. Examples include 80% post consumer tires, 80% nylon, 100% recycled newsprint and 80% textile waste.
- Natural content carpet/carpet pad and rugs: Carpets/rugs must be composed of 100% natural materials such as wool, sisal, jute, and hemp. Carpet pad must also be of a natural material such as 85% recycled burlap bags made from fibrous jute plants.

Depending on the goals of the project, one may want to select points for Healthy flooring listed under the Health category rather than this resource efficient flooring criteria. Points are not available for both criteria. **Suggested submittal: Listing of types of flooring and accessories (glues, etc.) used and installation methods.******

Eco-friendly ceiling materials (1 pt.): One point is given if 80% of the ceiling material installed has recycled content, is sustainably harvested, or is reused. Examples include (materials can be combined to achieve 80%):

- Domestically produced hardwood materials from sustainably managed forests
- Material consisting of 60% recycled content of mineral wool and cellulose fiber (sample product names include Ultima, Crossgate, Stratus, Cirrus, and Sanserra).
- Material consisting of 25% recycled content glass (sample product names include Random Fissured, Optima, Panted Nubby.)
- Reuse of salvaged wood.

****Suggested submittal: Listing of all ceiling materials used.****

Locally produced materials (1-2 pts.): One point given when a minimum 80% of all new windows and doors are from Florida manufacturers and are operable. Another point is available when 50% of all doors are reused doors or 50% of all windows are reused windows. Other materials now apply to this category such as: concrete, block, roofing materials, etc...

****Suggested submittal: Name of manufacturer and/or source of reused doors/windows, or other materials.****

Waste Reduction

Resource efficient wall system with integral insulation (3 pts.): To receive the 3 points, one or a combination of the following materials must be used at a minimum for 80% of the first floor living area exterior walls.

Autoclaved aerated concrete blocks are solid blocks composed of cement, sand, lime, and an aerating agent, which is baked in an autoclave oven. The result is a very lightweight insulated

concrete product. Blocks and panels are stacked similar to bricks and held together with adhesive.

Insulated concrete forms are a family of exterior wall systems that provide the strength of structural concrete walls with the thermal performance of integral insulation and high thermal mass. Generally a Styrofoam form is filled with poured concrete, or concrete is used to surround a Styrofoam core.

Structural Insulated Panels (SIP's) consist of two (outer) layers of oriented strand board and foam core, ranging from 2 to 12 inches thick. They can be used to build exterior walls, roofs, and floors. To receive points SIP walls must be elevated minimum 24" above soil grade.

****Suggested submittal: Photo, detailed plans, or material cut sheets.****

Develop a construction and demolition waste management plan (2 pts.): Two points are awarded if the contractor submits a written plan that consists of the following items:

- Estimated amount of waste and types of materials from project.
- Names/locations of waste disposal companies, recyclers, reuse centers for waste materials from project located within the project's county or neighboring county.
- Estimated costs of hauling and disposal, recycling, and revenues from reuse and recycling for major waste materials from project.
- Goals for waste diversion by amount (weight or volume) and types of materials.

****Required submittal: Detailed waste management plan.****

Implement job site waste management (2-4 pts.): Two points are awarded if at least two of the following are implemented. Three points are awarded if 3-5 of the following are implemented. Four points are awarded if greater than 6 of the following are implemented. In order to receive the credit one individual must be designated as job-site "environmental manager" to inspect job-site roll-offs and other materials handling strategies to prevent commingling, damage, other waste creation activities.

- Contractor writes into specifications/contracts with sub-contractors and vendors to be responsible for and remove materials and systems packaging upon either delivery or installation of products.
- Contractor writes into specifications/contract with drywall sub-contractor a price by the square foot of finished drywall wall/ceiling area.
- Clean drywall waste is used as soil amendment on-site where allowable and in proper quantities as approved by county extension service and/or landscape architect.
- Clean and dry drywall scraps are securely placed in interior wall cavities where additional sound-proofing may be desirable using techniques as recommended by the NAHB Research Center.
- A covered area or container is provided, with adequate separation from the ground, labeled as wood off-cuts for reuse in project.
- Individually labeled roll-offs are placed on site for separation of C&D waste materials, for at least 2 different materials, for example, metals, cardboard, concrete, brick, wood, and solid waste recyclables such as cans, plastic bottles.
- Job-site trailer or office implements paper, plastic bottle, and can recycling bins.

- Materials to be stored on site are kept off the ground and protected from weather, machinery, dust, and vehicle routes.
- Job-site fabrication stations or areas implement ground covering, magnets, bins or other means to collect nails, screws, plates, clips, off-cut rebar, electrical wiring, sheet metal off-cuts for metals recycling.
- Use of job site framing plan and cut list.
- Use of concrete formwork that has been used at least once before or is reused/reusable by contractor.
- Separation and removal of leftover paint to local paint recycling facility.

****Suggested submittal: Indicate which options chosen and provide name and contact of designated job-site environmental manager.****

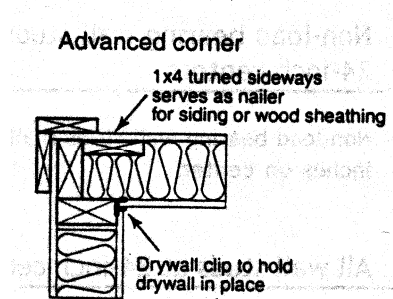
Compost bin/built in collection of recyclables (1 pt.): One point is awarded if the homeowner is provided with a pre-fabricated compost bin (includes wire mesh type) or if the home has built in (i.e. permanent) recycle bins. Points for built in recycle bins are only awarded if the home is served by a municipal curbside recycling program. ****Suggested submittal: Photo.****

Perimeter adheres to 2 ft. dimensions (1 pt.): One point is awarded if the exterior layout of the home adheres to 2 ft. dimensions. Adhering to 2 ft dimensions reduces waste and allows for easier future addition.

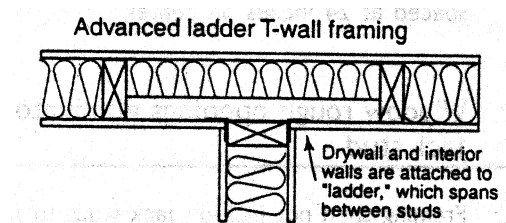
Interior floor plan adheres to 2 ft. dimensions (1 pt.): One point is given when over 50% of the interior rooms adhere to a 2-foot layout.

Stacked Framing (1 pt.): First floor, second floor, and roof framing line up horizontally and single top plate is used.

2 stud corners with drywall clips (1 pt) Corner framing shall eliminate non-structural studs and allow for full corner insulation through the use of drywall clips, horizontal nailers, or other means to support drywall.



T walls with drywall clips (1 pt) The intersection of exterior and interior walls shall eliminate non-structural studs and allow for full exterior wall insulation through the use of advanced ladder T-wall framing or other technique.



****Suggested submittal: Indicate which options chosen. Submit photos or detailed plans.****

Durability

3 in 12 ≤ roof slope ≤ 6 in 12 (1 pt.): To receive the point, roof slope shall be less than 6 in 12 to reduce wasted material in the attic and to help “throw” water further away from the building walls, but greater than 3 in 12 for roofs with low or no slopes do not shed rainwater well which can lead to leaks during heavy storm events. Such roofs also allow strong winds to pass over them at high velocities which can create uplift forces likely to damage your roof, especially if fenestrations (windows and doors) have been damaged. Roof slopes of at least 5 in 12 may be best suited for uplift resistance during hurricane force winds. ****Suggested submittal: Photo or detailed plans.****

Large overhangs (eave and gable) (1 pt.): One point is awarded if overhangs are 1 ft on gable ends and at least 2 ft everywhere else. Large overhangs help shed rain water away from the walls and foundation. ****Suggested submittal: Photos or detailed plans.****

Air admittance vents (1 pt.): One point is available if all plumbing penetrations through the roof are replaced with the use of air admittance vents. Air admittance valves are pressure-activated, one-way mechanical venting ports, used in a plumbing system to eliminate the need for conventional pipe venting and roof penetrations. Wastewater discharges cause the AAV to open, allowing air to circulate for proper drainage. Otherwise, the valve remains closed, preventing the escape of sewer gas and maintaining the trap seal. Using air admittance vents can significantly reduce the amount venting materials needed for a plumbing system, increase plumbing labor efficiency, allow greater flexibility in the layout of fixtures, and reduce long-term maintenance problems where conventional vents break the roof surface. Visit:

www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=1402&DocumentID=2127 for more information. ****Suggested submittal: Photo or equipment cut sheet.****

Wood frame house uses vented rain screen (1 pt.): Providing an air gap between siding and house wrap/building paper will allow water to drain down the wrap and out at the bottom more effectively, producing a more durable structure. Drainage plane must be 2 layers of 15lb felt or house wrap installed shingle style. To provide the air space, generally furring strips are installed to the exterior of the drainage plane, before the installation of siding. One point is available. ****Suggested submittal: Photo or detailed plans.****

Siding and exterior trim primed all sides (1 pt.): All siding material and exterior trim should be pre-primed before installation on all sides, including cut edges. This practice will retard moisture penetration into the material. One point is available. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

Window and door flashing (1 pt.): FGBC awards one point for proper flashing of all exterior windows and doors. For concrete block, ICF, SIP, and AAC walls adhere to the recommendations in the EEBA builder's guide. Proper flashing in such walls involves using a "seat" in the concrete slab to act as a pan flashing for doors, and a precast masonry sill with rib for pan flashing for windows. Also, jambs are to be caulked to walls. For wood frame walls, adhere to the flashing detail developed by NAHB Research Center which involves creating a head and pan flashing with building paper, house wrap, or self adhering membrane. For more details visit:

www.tyvek.com/na/homewrap/english/products/install.htm

www.buildingscience.com/housesthatwork/hothumid/default.htm

www.nahbrc.org/docs/mainnav/moistureandleaks/792_moisture.pdf ****Suggested submittal: Photo or detailed plans.****

Plants/turf minimum of 2 ft. from foundation (1 pt.): To prevent water from accumulating around foundation keep all plants and turf at least 2 feet from the foundation. Inorganic ground covers such as stones or rocks work well beside the foundation. One point is awarded. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

Use armored/metal hoses from service to all fixtures/appliances (1 pt.): Water consuming fixtures and appliances typically use unarmored hoses for their water supply. Plastic and rubber hoses have a finite life, and are likely to eventually fail, potentially causing flooding and unnecessary water use, especially if not discovered immediately. FGBC awards 1 point if all such appliances (clothes washer, refrigerator, faucets, toilets, etc.). ****Suggested submittal: None – visual inspection by Certifying Agent.****

Automatic in home water sensors/shutoff system installed (2 pts.): If water using appliances such as clothes washers and water heaters are installed inside the conditioned space, leaks and failures can cause severe damage due to flooding. Receive two points if a sensor/shutoff system is installed to cut off water supply to a clothes washer and water heater located inside conditioned space. Alternatively, two points are available for a whole house system that detects any sign of water leakage anywhere inside the conditioned space, and cuts off the main water supply to the house. ****Suggested submittal: Cut sheet of sensor/shutoff system.****

Access panel to each non-accessible plumbing fixture installed (1 pt.): Typically, access to piping that supplies water to tubs and showers must be accessed by creating a hole in the wall when there is a problem. Installing an access panel provides for easier repair and monitoring. FGBC awards 1 point to a home that has access panels installed for each shower and tub. ****Suggested submittal: Photo of access panel.****

User-friendly (lever style) washer water shutoff valves (1 pt.): Typically, water supply shutoff for clothes washers is installed in a difficult to reach location behind the appliance, and valves

typically require several turns of the handle before water supply is effectively cut off. Installing lever style shutoff valves that only require 90o of turn are much easier to handle, and can even be operated with a reaching tool (or broom handle) if located in a difficult to reach location. Valves that are easy to operate are more likely to be turned off before extended periods of non-use (vacations), thereby minimizing potential flooding and high water use concerns in the event of hose or connection failure. Insurance companies report that washing machine failure is a common claim. FGBC awards 1 point for a home that has user-friendly washer water shutoff valves. ****Suggested submittal: Photo of valves.****

Laundry room below living floor or drain installed (1pt): Added as a durability measure against bursting hoses and other issues.

Category 7: Disaster Mitigation

Hurricane (wind, rain, storm surge)

Details on many of the following recommendations can be found in the following FEMA publications:

www.fema.gov/pdf/hazards/agstwnd.pdf

Safe room (3 pts.): FGBC awards 3 points if a safe room is constructed in accordance with the guidelines set forth in the FEMA publication 320: “Taking shelter from the storm, building a safe room inside your house.” These shelters are designed to provide near absolute protection to you and your family from the high winds expected during tornadoes and hurricanes and from associated flying debris, such as wood studs, that tornadoes and hurricanes usually create. The FEMA publication is available at www.fema.gov/fima/tsfs02.shtm complete with construction plans, specifications, and cost estimates. ****Suggested submittal: Detailed plans of safe room.****

Baffled roof vents or unvented attic (2 pts.): FGBC awards 2 points if a home contains a baffled roof vent system or designed and built as an unvented attic. The unvented attic is achieved by installing an open cell foam insulation on the underside of the roof deck creating an attic that is sealed from the outside environment. This in-turn allows all of the HVAC duct systems to be housed in “conditioned” space as well as minimizing the risk of air infiltration which has been proven to increase the risk of roof uplift during a hurricane. ****Suggested submittal: Photos of attic.****

Window and skylight protection or impact resistant type (2 pts.): FGBC awards 2 points if all windows, skylights, sliding glass doors, and other doors comprised of at least 60% glass in the home are protected with a Dade County approved shutter or screen product or are classified by Dade County as impact resistant. A list of approved shutter and impact resistant products can be found at www.buildingcodeonline.com. If unsure whether a particular product is approved, just ask the manufacturer. Strengthening of existing skylights may include repair of surrounding roof. ****Suggested submittal: Photos of shutters or window cut sheets.****

Attached garage and exterior door protection or impact resistant type (1 pts.): FGBC awards 1 point if all exterior doors of the home are protected with a Dade County approved shutter or screen product or are classified by Dade County as impact resistant. At least one door must be impact resistant, and not have a shutter or screen, to provide a means of egress from the house. (It is best to have at least two means of egress from the home, which may mean also installing at least one impact resistant window rather than shuttering them all.) All attached garage doors must also be classified as impact resistant or be reinforced (braced) according to Dade County specifications. A note on garage doors can be found here: www.fema.gov/fima/how2016.shtm. If the home has a detached garage, points are still available for exterior door bracing. ****Suggested submittal: Photos of shutters or door cut sheets.****

Exterior structures properly anchored (2 pts.): FGBC awards 2 points if exterior structures, such as air conditioning condensers and sheds, are properly anchored to a foundation or the building itself. The anchoring must be specified or certified by an engineer (i.e. during wind load calculations). ****Suggested submittal: Copy of certifications/specifications for the specific anchored structures.****

Secondary water protection installed on roof (2 pts.): FGBC awards 2 points if the entire roof has a self adhering polymer bitumen roofing underlayment (thin rubber or asphalt sheets with peel and stick underside located beneath the roof covering and on top of the sheathing) or a foamed polyurethane adhesive that is applied to seal all joints in the sheathing to protect from interior water intrusion. Joints may also be sealed with a self-adhering polyethylene or rubberized asphalt tape that has a minimum width of 6 inches. Roofing felt or similar paper based products alone are not eligible for secondary water resistance points. ****Suggested submittal: Photos or cut sheets for sealing materials used.****

Adhesive applied to roof sheathing (2 pts.): FGBC awards 2 points if a spray on adhesive is applied to the underside of the roof sheathing from the attic such that a positive bond between the joists and the sheathing is formed. The applied adhesive shall have a minimum uplift capacity of 260 psf for a 4x8 ft panel as determined by laboratory testing. The adhesive should be applied continuously to within at least one foot of the eaves. ****Suggested submittal: Photos or cut sheet of adhesive used.****

Roof covering above and below flashing (2 pts.): Two points are awarded if roof flashing is installed on top of the final roofing with a secondary cover of roofing on top of it. Clips must also be installed periodically along the flashing to anchor it to the roof. Flashing is likely to be peeled off by high winds, and if it installed on top of the roof felt, with a single layer of roof covering installed over it, it is likely to take this part of roof covering with it when it blows off. With final roof covering installed above and below the flashing, if the flashing blows off, there is still waterproof material to provide resistance to water intrusion. ****Suggested submittal: Photo or detailed plans.****

Meet Fortified for Safer Living Standards (5 pts.): Credits compliance with this Institute for Home and Business Safety program. <http://www.ibhs.org/about> ****Suggested submittal: Copy of certification.****

Flood

Receive 3 points for incorporating all of the following criteria:

Finished floor level at least 12” above 100 yr. flood plain: The finished floor level must be at least 12” above the 100-year flood plain as determined by the water management district or the local building department. ****Suggested submittal: None.****

Bottom of slab or first floor at least 8” above the top of backfilled dirt, graded for proper drainage: The bottom of the slab (or in the case of a crawlspace, the floor) must be at least 8” above the adjacent dirt level. This strategy may help with flooding and termite inspections. Please check with appropriate civil engineer to verify if this strategy is appropriate for the given foundation and home. ****Suggested submittal: Photo or detailed plans.****

Grade slopes away from building on all sides: Grade must be sloped away from the building on all sides to allow water to drain away from the home. ****Suggested submittal: Photo or detailed plans.****

Garage floor and driveway properly sloped to drain out. Garage floor at least 4” lower than living floor: The garage and driveway must have a slope of 1” per twenty feet minimum, and the average height in the garage must be 4” lower than the lowest location on the first floor. ****Suggested submittal: Photo or detailed plans.****

Wild Fire

Receive 3 points for incorporating all 3 of the following criteria:

Fire resistant exterior wall cladding: An exterior cladding other than wood or vinyl must be used on all exterior walls. Examples include stucco, unfinished CBS, brick, aluminum, stone and fiber-cement. ****Suggested submittal: Photo or material cut sheet.****

Fire resistant roof covering or sub-roof: A roof covering other than asphalt shingles or wood shakes must be used on the entire roof. Examples include metal, concrete, fiber-cement, and tile. Credit is also available if the sub-roof (roof deck) is of a fire resistant material, instead of the covering. ****Suggested submittal: Photo or material cut sheet.****

Fire resistant soffit and vent material: A soffit and vent material other than wood or vinyl must be used. When these parts of the home are compromised, embers from nearby fires can enter into the attic. Examples include aluminum and fiber-cement. ****Suggested submittal: Photo or material cut sheet.****

Termites

Receive 10 points for incorporating all of the following requirements. Depending on the goals of the project, one may elect to receive 10 points for construction of a termite resistant structure, described below. Points are not available for both criteria.

The following co-requisites from other sections must be incorporated:

Seal slab penetrations (Health/Moisture Control)

Plants/turf minimum of 2 ft. from foundation (Materials/Durability)

Grade slopes away from building on all sides (Flood)

The following additional criteria must also be incorporated:

Exterior cladding installed to prohibit intrusion. The exterior cladding of the home must terminate at least 8" above grade. This will help prevent termites from entering the home undetected. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

Rain gutters installed or meet the "Large Overhangs" co-requisite under Materials/Durability: Rain gutters must be installed to collect water from all roof slopes and convey it away from the building foundation. Alternatively, credit can be obtained for incorporating the "Large Overhangs" criteria listed under Materials/Durability. Keeping moisture away from the foundation discourages termite nesting in that vicinity. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

If present, downspouts must discharge 3 or more feet from building: If rain gutters have been installed, the downspouts must discharge 3 or more feet from the building to keep moisture away from the building's foundation. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

If installed, irrigation/sprinkler system located 2 or more feet from building, water shown not to hit building while operating: This criteria will again reduce moisture levels in the vicinity of the building foundation, discouraging termites from nesting there. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

Condensate line(s) discharge 2 or more feet from building and are located 5 or more feet from dryer vent: Condensate drainage must be done away from the building. High humidity, temperature and moisture all contribute to potential termite infestation. By keeping condensate lines and dryer vents apart, the likelihood of termite problems may be decreased. ****Suggested submittal: Photo or visual inspection by Certifying Agent.****

Damage replacement warranty issued and available for annual renewal: Florida law requires that a contract be issued whenever a termite treatment is conducted. A "full" or "unlimited" warranty requires the pest control company to restore any property damaged by wood-destroying organisms during a specified period after the treatment. Generally, for this to be in effect with new construction, the first warranty issued (with the pre-construction treatment) must be a full or unlimited warranty that can be renewed by the homeowner. The duration of post-construction contracts and warranties can vary from one year to five years depending on the policy of the pest control company. Normally, the annual renewal fee will remain the same during the term of the contract. If a "limited" guarantee or warranty is issued, the pest control company promises only to provide additional treatment if an infestation occurs during a specified period after treatment. A full or unlimited warranty is required for this credit. ****Suggested submittal: Copy of termite warranty.****

Termite Resistant Structure

In lieu of complying with all of the above requirements, an applicant may receive 10 points if the entire structure of the home is constructed of termite-resistant materials. This includes all roof, floor, and exterior/interior wall framing, sheathing, decking, siding, soffit, fascia, and other exterior trim. Example materials include concrete, metal, borate or ACQ treated lumber/OSB, fiber cement, Chemical soil treatment must be avoided, and a Florida Building Code approved method of foundation protection must be employed such as Termimesh (www.termimesh.com).

****Required submittal: Detailed plans showing construction materials and materials list.****

Category 8: General

There are a variety of items that do not apply to any one category or apply across many categories that have been grouped under this category.

Small house credit

Conditioned house size (0 - 40 pts.): Small homes use less material for construction, less energy for heating and cooling, and occupy a smaller footprint than similar larger homes, this is why, FGBC provides the following points for small houses (maximum 40 points):

Conditioned House Size (square feet)	Points
< 1000	40
1000 - 1099	36
1100 - 1199	32
1200 - 1299	28
1300 - 1399	24
1400 - 1499	20
1500 - 1599	16
1600 - 1699	12
1700 - 1799	8
1800 - 1899	4

****Suggested submittal: Indication of home's square footage.****

Adaptability

Roof trusses designed for addition (2 pts.): Two points are available for a home that has the roof trusses designed in such a way that a room can be added to the attic space. To qualify for the two points, minimum room size must be 100 square feet with an average finished height of at least seven feet. ****Suggested submittal: Photo or detailed plans.****

Unfinished rooms (1- 2 pts.): Receive one point for each 100 square feet of unconditioned, unfinished space that is built such that it can easily be finished at a later time. A maximum of two points are available. ****Suggested submittal: Photo or detailed plans.****

Pre-wired for security, sound, automation (1 pt.): Receive one point if the house includes central pre-wiring for at least 2 of the following: security, house automation, computer network, or central sound system. Pre wiring during construction prevents the need for renovation later. ****Suggested submittal: Electrical Plan or description of wiring.****

Renewable Power Generation

Reduce peak demand (0 – 5 pts.): FGBC will award points for renewable power systems (photovoltaic's, fuel cell, micro turbine, geothermal power systems, etc.) installed at the site that meet loads not specifically described and credited under different categories (e.g., outside lighting). The calculation to determine the photovoltaic contribution will be based on measured or estimated peak demand or annual electric loads for the home. Receive 1 point for each 10% contributed towards either peak demand or annual load. ****Required submittal: Cut sheet of equipment used.****

Remodel

Remodeling of an existing structure (10 pts.): Once a home or other structure is built it may not have any improvements made upon the existing structure in either an energy efficiency or landscaping capacity, until several years later if at all. . Anyone who performs remodeling is saving resources by not building new and by overcoming barriers put in place many years before. To be considered a remodel the house must have been issued a certificate of occupancy at least two years before the date of the Green Home Standard application. Earn 10 points for a home that is at least 2 years old and has achieved a HERS Index fewer than 100. ****Suggested submittal: Proof of age of home such as property appraiser report.****

Toilets 1.6 gpf & showers 2.5 gpm or less (3 pts.): 3 points if all water fixtures in home meet current code (e.g., 1.6 or less water use per gallon with a UNAR MaP rating of 350 grams per flush, 2.5 gallon per minute showerhead) ****Suggested submittal: Manufacturers specs****

Upgraded irrigation system (1-2 pts) 1 point if irrigation system is upgraded to FGBC new home guidelines and rain sensor installed OR home has no installed irrigation system and < 50 turf and appropriate plants and 1 additional point if soil moisture sensor is installed in addition to above. ****Suggested submittal: Manufacturers specs****

Other

Home builder/designer/architect/landscape architect member of FGBC (1-2 pts.): FGBC members are aware of a variety of issues and solutions to problems that may occur in building green. This will likely translate in performing the job better than it may otherwise occur. Receive one point if at least one member of the design /construction team is members of FGBC. Receive two points maximum for two or more of the design/construction team being members of FGBC. ****Suggested submittal: Names of persons on the construction team that are FGBC members.****

Homeowner's manual given to homeowner (2 pts.): The homeowner has received a manual that will help him or her understand how to operate the house and take care of the landscape so that the intended benefits of a green home are realized for the customer and the earth. Two points are available. ****Suggested submittal: Copy of homeowner's manual.****

Educational material given to homeowner (2 pts.): The homeowner has received a manual that will help him or her understand how to operate the house and take care of the landscape so that the intended benefits of a green home are realized for the customer and the earth. Two points are available for a builder going beyond the standard homeowner's manual. ****Suggested submittal: Copy of homeowner's manual and additional information.****

Training provided to homeowner (2 pts.): The homeowner has received onsite that will help him or her understand how to operate the house and take care of the landscape so that the intended benefits of a green home are realized for the customer and the earth. Two points are available for a builder providing a homeowner with "green maintenance" training. ****Suggested submittal: Copy of training offered****

Plan for edible landscape/food garden (2 pts.): Homeowner food production is often organic, requiring less fertilizer and pesticide use, and is free from pollution associated with transporting the produce. FGBC awards 2 points if a minimum of 50 square feet is dedicated to edible landscape plants. The 50 sqft can be a combination of garden space, area under fruit/nut tree drip lines, and shrubs. To estimate area under tree drip line, measure the distance from the outer leaves to the trunk. This is the radius of the tree. For immature trees, use the 1/5 of the mature tree radius (1/2 the published diameter or "width" as given in plant directories). This is the effective radius. Then calculate the area using the actual radius or the effective radius, whichever is greater.

Area under tree = 3.1413 x radius x radius

Homeowner also must be in possession of, or receive at closing, a one-page handout on growing fruit/vegetables organically, available form the local extension service or other suitable source, in order to claim credit. ****Suggested submittal: Landscaping plan, copy of handout.****

Guaranteed energy bills (2 pts.): To be eligible for the two points, the home must have its energy bills guaranteed by the builder or another entity not to exceed a maximum amount for at least two years. In most guarantee programs, the entity guaranteeing the bills agrees to pay the

difference for any energy bill that exceeds the predetermined maximum amount. ****Suggested submittal: Copy of written guarantee.****

Cooling system uses non-hcfc refrigerant (2 pts.): FGBC awards two points to a home that has a cooling system with a non-hcfc refrigerant such as Puron. HCFC refrigerants are suspected of contributing to ozone depletion in the earth's upper atmosphere and are being phased out of production. ****Suggested submittal: Cooling system cut sheet.****