

Louisiana Developer Green Building Guide

Prepared for the Louisiana Housing Finance Agency by Global Green USA

I. Introduction

This guide offers both an explanation of green building concepts and strategies and a breakdown of the recently adopted green building section of Louisiana's Qualified Allocation Plan (QAP), as drafted by the Louisiana Housing Finance Agency (LHFA). It is a detailed and informative overview that will aid in smooth implementation of these standards. This guide discusses the glossary description of green building, provides examples of how to achieve points, and explains why the standards are important.

What is a Green Building?

A green building is an integrated approach to the design and construction of buildings and supporting infrastructure that minimizes the use of resources, reduces harmful effects on the environment, and creates healthier environments for people.

Why Build Green?

On average, the construction, maintenance and use of buildings account for 40% of all the energy used in the United States. The U.S. comprises only 5% of the world's population, but uses 25% of the world's energy resources and contributes more than 25% of the world's greenhouse gas emissions. Ultimately, buildings consume over ten percent of the world's freshwater withdrawals, twenty-five percent of its wood harvest, and forty percent of its material and energy flows (Roodman & Lenessen 1996)¹. Buildings contribute to the excessive consumption that is largely responsible for the worldwide depletion of natural resources and the acceleration of global warming.

In addition, buildings have an impact on the health of the occupants. The EPA states that the potential economic impact of indoor air pollution is quite high; preliminary estimates place potential impacts at tens of billions of dollars per year (EPA 1989)².

Benefits of Green Affordable Housing

Any type of building can be constructed using sustainable principles. Green affordable housing has the three-fold benefit of 1) creating healthier living environments for low-income people, 2) maximizing the financial resources of both residents and owners by lowering utility costs and operating expenses, and 3) minimizing local, regional, and global environmental impacts.

Utility costs for low-income households can be as much as 25% of expenses after rent, far greater than for middle-income households. This puts low-income residents at greater risk for default or eviction. With the funds saved through highly efficient homes, low-income residents are better able to invest in health care, education, more nutritious food, or towards the purchase of a home.

The long-term ownership of affordable housing also supports a life cycle design approach. Affordable housing projects are typically owned and operated by the same organization for at least 15 years. This timeframe matches the compliance period dictated for the low-income housing tax credit. Systems and materials with medium to long payback periods are therefore justified. For example, a high efficiency boiler with a seven-year payback is a viable choice in an affordable housing development. Community development corporations and other developers expect to operate the building for the long-term, and are therefore in the rare position to make long-term decisions. Project developers and operators gain both directly and indirectly through higher quality, more efficient and more durable projects.

Green affordable housing benefits the entire region. Solid waste management issues are reduced through construction waste recycling or use of recycled-content materials. Local water quality impacts are minimized through on-site treatment and retention of storm water.

II. Green Building Standards Included in Louisiana's Qualified Allocation Plan

The 2007 QAP for Louisiana tax credits states that 25 points can be received if all the buildings in a project are "green buildings". To qualify as a green building, the project must be constructed to either of the two standards referenced - LEED-NC or a menu of criteria named "Green Communities". The Green Communities criteria are made up of various green building practices and products that should be feasible, easy and cost-effective for the first-time green affordable housing developer to implement.

¹ Roodman, D. M. and Lenessen, N. (1995). *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction* (Worldwatch Paper 124). Worldwatch Institute. Washington, DC.

² U.S. Environmental Protection Agency (August 1989). *Report to Congress on Indoor Air Quality*. Environmental Protection Agency. Washington, DC.

The first of the two listed criteria for green building is the LEED (Leadership in Energy and Environmental Design) standard. The second is the Green Communities building criteria.

A. Leadership in Energy and Environmental Design (LEED) Standard

“LEED Criteria: Building design and construction emphasizing sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality that achieves the points necessary to qualify as LEED Certified (a minimum of 26 points under the LEED Green Building Rating System® for lodging);”

The most widely recognized green building standard nationally is the LEED (Leadership in Energy and Environmental Design) Green Building Rating System® developed by the US Green Building Council. While there are multiple versions of LEED, LEED-NC (New Construction) and LEED-EB (Existing Buildings) standards are referenced in the Louisiana QAP for 2007. Twenty-six points are required to gain a “certified” rating. The LEED-NC standard awards points to a project based on multiple requirements in six separate sections for a total of 69 points. Seven of the points are categorized as prerequisites and are not included in the 69 total points.

The first, LEED-NC, portion of the QAP glossary description is as follows:

Example of Possible Points for LEED-NC Qualification

The sections are: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation and Design Process. Each section addresses a different aspect of sustainable buildings. Examples of some of the requirements under selected sections are provided below:

- *Sustainable Sites:* Brownfield Redevelopment
- *Water Efficiency:* Water use reduction – 20% reduction
- *Energy and Atmosphere:* Optimize energy performance - Points granted by percent reduced.
- *Materials and Resources:* Construction waste management - Divert 50% from disposal
- *Indoor Environmental Quality:* Low-emitting materials - Paints, adhesives, carpets, etc.
- *Innovation and Design Process:* This section allows for developer innovation. The developer is required to provide a description and justification for the specific measure they selected.

Detailed examples of how to meet requirements of three LEED categories are found in Attachment A to this guide. Examples are given for the Water Efficiency, Energy and Atmosphere, and Materials and Resources requirements. Please bear in mind that a developer may employ a number of strategies to achieve points in LEED categories. These are merely examples.

Complete information on LEED for New Construction, LEED-NC, is found at: www.usgbc.org/DisplayPage.aspx?CMSPageID=220

Complete information on LEED for Existing Buildings, LEED-EB, is found at: www.usgbc.org/DisplayPage.aspx?CMSPageID=221

B. Green Communities Criteria

The second option in the Louisiana 2007 QAP is called “Green Communities Criteria”. The menu of items listed were chosen because they are feasible, easy and cost-effective to implement. Possible points are separated into four sections outlined below.

****To verify that developers are meeting the Green Communities Criteria applicants will be required to fill out the Louisiana Housing Finance Agency Green Building Checklist. This checklist is included at the end of this document.**

“Green Communities Criteria (as adopted in the QAP): Building’s design, construction and location for energy, smart growth, health protection and resource conservation are as follows:”

Example of Possible Points for Green Communities Standard

- The Green Communities criteria included in the 2007 QAP has four sections:
- Energy Requirements
- Resource Conservation
- Reduced Use of Natural Resources
- Smart Growth

Here are selected examples of some of the requirements under each section:

- *Energy Requirements:* Meet Energy Star Home Standard
- *Resource Conservation:* Storm Water Protection Plan, Green Label Certified Floor Covering (this section also includes some items designed to protect indoor air quality)
- *Reduced Use of Natural Resources:* water efficient bathroom and kitchen fixtures
- *Smart Growth:* Siting projects close to transit and services

Energy Requirements: *A building that has a score of 20 or less on the 2006 Home Energy Rating System Index (NOTE: LHFA's Green Communities checklist that provides guidance for these criteria specifies that builders meet the Energy Star Home Standard which requires either: 1) a score of 85 or less on the 2006 Home Energy Rating System Index or 2) use of a Builder Option Package appropriate for the project's climate zone); provides Energy Star Domestic Appliances; heating and cooling loads per most recent Air Conditioning Contractors of America Manual J and size equipment using Manual S; Energy Star windows and sliding glass doors as standard; Energy Star defined to SEER 13;"*

NOTE:

The first subsection of the Green Communities criteria instructs the developer to use highly efficient appliances can make significant cuts in energy demand. Also, by ensuring the high quality of the building envelope through efficient windows, doors, skylights, and the correct sizing of equipment, a building's energy demand is reduced and the tenant and owner's utility bills lowered. Reduced energy demand results in increased energy reliability, since the infrastructure will be more easily able to meet demand. It will also reduce energy-related pollution that would otherwise have been produced to supply power for inefficient buildings.

Guidelines to achieve these requirements:

Home Energy Rating System:

- The Home Energy Rating System (HERS) is an analysis of the construction plans of a home to determine its expected energy performance. Each 1% increase in energy efficiency over the base reference home corresponds to a one point reduction in the HERS score below 100. A HERS score of 85 means that the home is 15% more efficient than the base reference home.

Energy Star Appliances, Windows and Doors:

- Select appliances, windows and sliding doors with the Energy Star label. A list of Energy Star products and store locations can be found at www.energystar.gov. The "Products" menu is found on the left side of the homepage.
- SEER means the Seasonal Energy Efficiency Ratio. It measures the energy efficiency for the seasonal cooling performance of central air conditioners. All air conditioners sold in the U.S. after January 23, 2006 across the nation are required to meet SEER 13 standards.

HVAC Systems:

- ACCA Manual J and Manual S: These two manuals are the industry standard for selecting the right heating, ventilation and air-conditioning (HVAC) system. They are companion guides. Manual J is used to calculate the appropriate heating and cooling loads on a building-by-building basis. Manual J considers all factors that could impact the heating and cooling load of a building including, but not limited to, exterior shading and local climate. Manual S shows how to select and size heating and cooling equipment to meet loads calculated using Manual J. Both guides are found at www.acca.org.

“(ii) **Resource Conservation:** Implements storm water protection Best Management Practices outlined in EPA’s Guidance for Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters; carpet systems meet or exceed the Carpet and Rug Institute Green Label Plus program Air Quality Test Program; cabinets, counter substrates and trim materials have no added urea formaldehyde or are fully sealed on all six surfaces; bathroom fans exhaust to the outside and are connected to either a timer or a humidistat sensor;”

The second subsection of the Green Communities criteria addresses water conservation and materials for a healthy and high quality indoor living environment. It details the standards that a project must meet in order to qualify for points within this section. Non-point source pollution from street runoff can be greatly reduced with the creation of a storm water protection plan, which benefits local water quality. The use of low-flow appliances and fixtures can lead to a significant reduction in water usage. Installing efficient toilets, showers, faucets, and irrigation systems (or even the elimination of the need of such systems) can qualify a developer for points under the listed standards. The use of other certified sustainable and/or recycled materials such as carpet, can also help a developer meet the listed standards. The conservation of water and material usage help lower the utility bills of the tenants and owner, more than paying off the additional up front cost within the lifetime of the product.

Guidelines to achieve these requirements:

Carpets:

- Specify carpet, adhesives, cushion, and vacuum cleaners displaying the Carpet and Rug Institute (CRI) “Green Label” IAQ Testing Program logos. A directory of CRI Green Label Plus Program approved products is found at: www.carpet-rug.com/drill_down_2.cfm?page=8&sub=17.

Guidance for Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters:

General descriptions of which measures to implement follow:

- “Site plan review and conditioned approval to ensure that the integrity of environmentally sensitive areas and areas necessary for maintaining surface water quality will not be lost;
- Requirements for erosion and sediment control plan review and approval prior to issuance of appropriate development permits;
- Guidance on appropriate pollution prevention practices to be incorporated into site development and use;
- During site development, disturb the smallest area necessary to perform current activities to reduce erosion and offsite transport of sediment;
- Avoid disturbance of unstable soils or soils particularly susceptible to erosion and sediment loss, and favor sites where development will minimize erosion and sediment loss;
- Where appropriate, protect and retain indigenous vegetation to decrease concentrated flows and to maintain site hydrology;
- Minimize, to the extent practicable, the percentage of impervious area on-site;
- Properly manage all maintained landscapes to avoid water quality impacts;
- Avoid alteration, modification, or destruction of natural drainage features on-site; and
- Design sites so that natural buffers adjacent to coastal water bodies and their tributaries are preserved.³”
- Substitute traditionally paved surfaces (driveways, walkways and patios) with grasses and natural ground cover, such as wood, gravel, brick and rock.
- Locate septic systems away from trees and tree root systems and in a location where the ground above will not endure pressure. Inspect and empty septic systems every 3 to 5 years.

³ The measures listed are as listed in the EPA’s Guidance for Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters, and are not exhaustive.

Measures in this section to address indoor air quality issues:

Cabinets, counter substrates and trim materials have no added urea formaldehyde⁴ or are fully sealed on all six surfaces:

- No added urea formaldehyde: These materials include Medite (MDF), Slag Blend (particleboard), or agri-fiberboard with urea formaldehyde-free glues. This is not an exhaustive list.
- Alternatively, the developer may install fixtures that are sealed on all exposed sides with laminate or low-VOC sealer.

Bathroom fans exhaust to the outside and are connected to either a timer or a humidistat sensor: Bathroom ventilation that meets this description is important to reduce moisture and interior resulting mold and mildew.

*“(iii) **Reduced Use of Natural Resources:** Kitchen and bathroom fixtures exceed 1992 Energy Policy Act gallons/minute requirement; high-efficiency or dual-flush toilets; water resistant materials in first floor living spaces;”*

The third subsection of the Green Communities criteria as stated in the 2007 QAP includes possible points in the areas of water conservation and the use of materials.

Guidelines to achieve these requirements:

Purchase and install kitchen and bathroom fixtures that exceed minimum requirements:

- Faucets and showerheads: Lavatory and kitchen faucets and showerheads = less than 2.5 gallons per minute.
- Toilets: Gravity tank-type, flushometer tank, electromechanical hydraulic and dual flush toilets = less than 1.3 gallons per flush (gpf). For urinals = less than 1.0 gpf.

Water resistant materials on first-floor living spaces:

- Specify water-resistant flooring, such as tile or sealed concrete floors. Consider building the first floor of concrete block or other water resistant material. Doing so will alleviate mold and mildew problems in the event of flooding.

*“(iv) **Smart Growth:** Located on site that is within _ mile of public transit or within _ mile of 5 basic community services (i.e. grocery store, bank, place of worship, pharmacy, post office, etc.).”*

The fourth subsection listed in the 2007 Louisiana QAP includes points for locating and developing close to public facilities and businesses that could serve residents, thereby decreasing the need for vehicle use and demand for new infrastructure. Environmental impact of construction is minimized when building occurs in developed areas where infrastructure and utilities are already available.

III. How to Select the Best Standard for a Project

Consider and select either of these two criteria on a project-to-project basis as each project has a different set of needs and capabilities. Begin by reviewing the requirements, keeping in mind that a project must meet all the Green Communities criteria. If there are any sections that you positively cannot fill, then do not use that standard for your project. Due to the mandatory nature of all the Green Communities requirements, it is impossible to use that standard if you are not able to meet all of them. The Green Communities criteria dictates certain standards for HVAC, plumbing fixtures and appliances, site selection, and materials and resources.

There are many benefits to setting the bar as high as the LEED standard, and it is the ultimate goal to reach that level of sustainability. However, the Green Communities criteria as listed in the LHFA 2007 QAP was designed explicitly as a stepping-stone along the way. For developers who are working for the first time with green building standards, the Green Communities criteria is probably the more feasible of the two options.

¹ Roodman, D. M. and Lenssen, N. (1995). *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction* (Worldwatch Paper 124). Worldwatch Institute. Washington, DC.

IV. Sample Costs

The cost of installing green appliances and fixtures can cover a large range, depending on the sizes and location of a project. These costs vary based on location, size/quantity, model selected, and regional availability. Also the cost-savings are directly linked to local or regional utility rates. In most cases, the upfront costs will be re-cooped through lower utility costs to both the owner and tenant as well as through lower replacement costs. A table of example approximate costs for some green appliances and measures compared to their conventional counterparts is below.

The costs below are estimates and are provided for comparison purposes only; they may not be exactly accurate for your building or region.

Appliance Type	Conventional Appliance Cost	Green Appliance Cost
<i>Refrigerator</i> ⁵	\$600/unit \$568 lifetime energy cost \$1,168 = total lifecycle cost	\$700/unit \$382 lifetime energy cost \$1,082 = total lifecycle cost
<i>Freezer</i> ⁶	\$329/unit \$411 lifetime energy cost \$740 = total lifecycle cost	\$362/unit \$370 lifetime energy cost \$732 = total lifecycle cost
<i>Clothes Washer</i> ⁷	\$450/unit \$925 lifetime energy & water cost \$1,375 = total lifecycle cost	\$750/unit \$452 lifetime energy & water cost \$1,202 = total lifecycle cost
<i>Natural Gas Tank Water Heater</i> ⁸	\$269-370/unit \$3,300-3,500 lifetime energy cost \$3,569 - \$3870 = total lifecycle cost	Tankless: \$600-650/unit \$2,800 lifetime energy cost \$3,400 - \$3,450 = total lifecycle cost Solar: \$2,500 - \$4,000/unit \$1,020 lifetime energy cost \$3,520-\$5,020 = total lifecycle cost
<i>HVAC System</i>	\$1,738 in annual energy cost	\$1,195 in annual energy cost
Measure Type	Conventional Measure Cost	Green Measure Cost
<i>Roofing</i>	\$3-9/ft2	\$3-9/ft2 – White Roof \$1,000-\$2,000 lifetime energy savings
<i>Carpet</i>	New, Unrecycled: \$2 – 4.00/ft2	CRI Green Label: \$1.13 – 2.63/ft2
<i>Flooring</i>	Vinyl: \$2.50/ft2 5-7 year lifetime	Linoleum: \$6/ft2 20-30 year lifetime
<i>Lumber</i>	Virgin lumber: \$8-\$10/ft2	Engineered lumber: \$14-\$19/ft2
<i>Insulation</i>	Fiberglass (1-inch thick): \$.77/ft2	Icynene Foam: \$1.50-2/ft2 Biobased Foam: \$1.75-3.50/ft2 Cellulose: \$1.05-1,10/ft2

⁵ Estimated refrigerator prices from appliance store sources for 18.2 cubic foot refrigerators. Assumed 10-year life, and the national average electricity rate of \$.086 cents/kilowatt-hour.

⁶ Estimated freezer prices from appliance store sources for 8.8 cubic foot freezers. Assumed 10-year life, and the national average electricity rate of \$.086 cents/kilowatt-hour.

⁷ Energy Star. www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers.

⁸ Minnesota Green Affordable Housing Guide. www.greenhousing.umn.edu/comp_domesticwater.html. Prices listed are for 40 gallon tank water heaters.

V. Resources and Contacts

There are a variety of resources available should you have any questions or require additional information.

Green Building Basics

Global Green USA – Green Building Resource Center:

<http://www.globalgreen.org/gbrc>
310.452.7677

Global Green USA – New Orleans Resource Office and Center

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Enterprise Community Partners

Michelle Whetten, Director, Gulf Coast Rebuilding Initiative
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U.S. Department of Energy – Energy Efficiency and Renewable Energy:

www.eere.energy.gov/buildings

Building America Best Practices Series – Hot and Humid Climates

www.eere.energy.gov/buildings/building_america/hot_humid_best_practices.html

U.S. Housing and Urban Development Department

www.huduser.org/publications/destech/moisturehomes.html
Best Practice Guide for moisture control in new homes, targeted to builders and designers..

United States Green Building Council:

www.usgbc.org
Creators and Certifiers of the Leadership in Energy and Environmental (LEED) standards.

Green Building Tools

Green Communities Initiative Criteria

www.enterprisefoundation.org/resources/green/index.asp

EarthCraft House:

www.earthcrafthouse.com

Whole Building Design Guide:

www.wbdg.org

Third Party Certified Materials & Resources

Forest Stewardship Council:

www.fscus.org

GreenGuard:

www.greenguard.org
The Greenguard Environmental Institute™ is an industry-independent, non-profit organization that oversees the GreenGuard Certification Program.

Green Seal:

www.greenseal.org
Independent non-profit organization that promotes the manufacture, purchase, and use of sustainable products. Includes a database of certified products.

Products and Materials

Carpet and Rug Institute – CRI:
www.carpet-rug.com

Energy Star Appliances:
www.energystar.gov

Leadership in Energy and Environmental Design (LEED):
www.usgbc.org/LEED

U.S. Environmentally Preferable Products Database:
www.epa.gov/opptintr/epp

Green Building Case Studies

Affordable Housing Design Advisor:
www.designadvisor.org

Resources and in-depth examples of affordable housing, with a section devoted to green affordable housing. Includes projects selected by the annual AIA Show Your Green Awards.

American Institute of Architects Top Ten Green Projects:
www.aiaopten.org/hpb

Annual selection by AIA's Committee on the Environment of the top projects in terms of resource and energy efficiency and other green design criteria.

Appendix A: LEED Examples

Example 1: LEED-NC Water Efficiency Requirement Implementation

LEED points are achieved through reducing water usage by 20% below the calculated baseline usage for the building after meeting the Energy Policy Act of 1992 (with additional points for a 30% reduction). A simple way to accomplish this is through low-flow toilets, urinals, sinks, and shower fixtures. Low-flow toilets are typically models that utilize 1.6 gallons per flush or less, and low-flow showerheads on average use no more than 2.5 gallons per minute. High-efficiency clothes washers and low water consumption kitchen appliances also improve water use efficiency⁹. LEED-NC also grants points for water efficient landscaping, which can be realized by eliminating the need for irrigation through planting native vegetation. The building of a grey water management system would also qualify a project for innovative wastewater technology points.

Water conservation is imperative because of current scarcity and ever-increasing demand. Water-efficient fixtures and appliances will eventually pay for themselves through reduction in water consumption, pumping and treatment, and in energy used to heat water. An Energy Star dishwasher saves about \$100 in utility bills over its lifetime because it uses less hot water than conventional models. Water conservation also benefits the community and the planet by reducing pressure on watersheds. The savings on reduced utility bills can also benefit the owner of the project, as the rent furnished by the tenants will be able to cover more of the operating costs of the building.

Example 2: LEED-NC Energy & Atmosphere Requirement Implementation

LEED-NC grants points for optimizing energy performance in a project. The developer chooses how to bring this about on his or her own. Energy performance should be quantified and compared to usage in a baseline building. The larger the percent reduction below the baseline building performance, the higher the number of points granted to a project. This cutback in usage could be from the installation of energy-efficient kitchen and bathroom appliances (such as EPA-certified Energy Star appliances) or the installation of sensor-controlled or timed lighting in low-use areas. Energy Star compact refrigerators and freezers use at least 20% less energy than required by current federal standards. At present, the market has shifted dramatically and Energy Star refrigerators have become the norm and cost the same as inefficient refrigerators. These standards can be met with zero to low additional cost.

⁹ The State of California has noted that high-efficiency clothes washers use 35 to 50 percent less water than older models and, compared to a model manufactured before 1994, an Energy Star clothes washer can save up to \$110 per year on utility bills.

Installing energy efficient windows and ensuring the building is well insulated can greatly reduce the cost to heat or cool the space. Potential strategies would be to design the building envelope and systems to maximize energy performance. A Habitat for Humanity project in Greene County, Pennsylvania focused on reducing air leakage in the building envelope and HVAC (heating, ventilation, and air conditioning) systems and found that gas bills for heat and hot water were reduced by approximately 50 to 70%. Merely changing out old cooling and heating equipment with Energy Star qualified models can reduce annual energy costs by 20%. This planning approach can be done at the initial stages for little cost, whereas implementing the changes post-construction could prove more expensive. The use of a computer simulation model to assess the energy performance and identify the most cost-effective energy efficiency measures may be useful.

Example 3: LEED-NC Materials & Resources Requirement Implementation

A project earns points under this section of LEED-NC by diverting 50% of construction, demolition, and land-clearing debris from landfill and incinerator disposal. Additional points can be earned for 75% diversion. The recycling of cardboard, metal, brick, concrete, plastic, wood, glass, and carpet, amongst other things, can result in the awarding of points in this section. A developer can meet this requirement by recycling and/or salvaging at least 50% of their non-hazardous construction waste. Suggested steps to follow to help achieve this requirement:

- Identify which facilities will accept construction waste for recycling and the type of waste they accept. Acquire their guidelines for separation and delivery or pick-up of materials... Diversion may also include the donation of materials to charitable organizations.
- Develop and implement a construction waste management plan. This plan should, at a minimum, identify the materials to be diverted and whether the materials will be sorted on-site or co-mingled until after transport.
- Train construction personnel in material sorting policy.
- Set-up and clearly label containers for material recycling on site.
- Monitor bins periodically to separate waste from trash thrown into bins from crews or passersby.

The cost of meeting the requirements for this section are minimal. The developer may even save some money through the salvaging and reuse of materials from the former structure. The amount of reusable material and cost of transport will vary from site to site based on the condition, location, and size of the original building development.

Louisiana Housing Finance Agency Green Building Checklist (Adapted from Green Communities Criteria)

Integrated Design Process

Y	N	Item	Item Title
		1.1	Green Development Plan Submit document outlining options explored in the design phase with multi-disciplinary team including at least one green design expert

Location and Neighborhood Fabric

Y	N	Item	Item Title
		2.1a	Smart Site Location — Proximity to Existing Development Locate on site with access to existing water, sewers and other infrastructure within or contiguous to existing development
		2.1b	Smart Site Location — Protecting Environmental Resources Do not locate new development within 100 feet of wetlands; 1,000 feet of a critical habitat; or on steep slopes; prime farmland; or park land
		2.1c	Smart Site Location — Proximity to Services Locate projects within a _ mile of at least two, or _ mile of at least four community and retail facilities
		2.2	Compact Development Achieve densities for new construction of at least 6 units per acre for detached/semi-detached houses; 10 for townhomes; 15 for apartments
		2.3	Walkable Neighborhoods Include sidewalks or suitable pathways within a multifamily property or single-family subdivision linking residential development to public spaces, open spaces and adjacent development

Site Improvements

Y	N	Item	Item Title
		3.1	Environmental Remediation Conduct a Phase I Environmental Site Assessment. Provide a plan for abatement if necessary
		3.2	Erosion and Sedimentation Control Implement EPA's Best Management Practices for erosion and sedimentation control during construction
		3.3	Landscaping Select native trees and plants that are appropriate to the site's soils and microclimate and locate to provide shading in the summer and allow for heat gain in the winter

Water Conservation

Y	N	Item	Item Title
		4.1a	Water-Conserving Fixtures Install water-conserving fixtures: Toilets – 1.6 gallons per flush or better; Showerheads – 2.0 gallons per minute or better; Kitchen faucets – 1.5 GPM or better; Bathroom faucets – 2.0 GPM or better.
		4.2	Efficient Irrigation If irrigation is necessary, use recycled gray water, roof water, collected site run-off or an irrigation system that will deliver up to 95% of the water supplied.

Energy Efficiency

Y	N	Item	Item Title
		5.1a	Efficient Energy Use – New Construction Meet or exceed one of the following: Energy Star standards; ASHRAE 90.1 by 30%
		5.1b	Efficient Energy Use – Moderate Rehab Perform an energy analysis of existing building condition, estimate costs of improvements, and make those with a 10-year or shorter payback
		5.2	Energy Star Appliances Provide Energy Star-labeled appliances
		5.3a	Efficient Lighting – Interior Install Energy Star-labeled lighting fixtures and use Energy Star or high-efficiency commercial grade fixtures in all common areas
		5.3b	Efficient Lighting – Exterior Install Energy Star lighting outdoors with daylight sensors or timers
		5.4	Electricity Meter (Except for Zero bedroom dwelling units) Install individual or sub-metered electric meters.

Healthy Living Environment

Y	N	Item	Item Title
		7.0	Mold Mitigation In rehabs, mitigate mold hazards using proven, safe methods
		7.1	Low / No Volatile Organic Compounds(VOC) Paints and Primers Specify that all interior paints and primers must contain low or no VOC
		7.2	Low / No VOC Adhesives and Sealants Specify that all adhesives and sealants must contain low or no VOC
		7.3	Formaldehyde-free Composite Wood Do not use any composite wood that has exposed particleboard (which contains added urea-formaldehyde), unless the exposed area has been sealed.
		7.4	Green Label Certified Floor Covering Do not install carpets in basements, entryways, laundry rooms, bathrooms or kitchens. If using carpet, use the Carpet and Rug Institute’s Green Label-certified carpet and pad.
		7.5a	Exhaust Fans – Bathroom Install Energy Star-labeled bathroom fans that exhaust to the outdoors which has a humidistat sensor or timer, or operates continuously
		7.5b	Exhaust Fans – Kitchen Install Energy Star-labeled power vented fans or range hoods that exhaust to the exterior
		7.6	Ventilation Install a ventilation system for the dwelling unit that provides 15 cubic feet per minute of fresh air, per occupant.
		7.7	HVAC Sizing Size heating and cooling equipment in accordance with the Air Conditioning Contractors of America Manual, Parts J and S
		7.8a	Water Heaters – Mold Prevention Use tankless hot water heaters or install conventional hot water heaters in rooms with drains or catch pans piped to the exterior of the dwelling and with non-water sensitive floor coverings
		7.9	Cold Water Pipe Insulation Insulate exposed cold water pipes in climates and building conditions susceptible to moisture condensation
		7.10a	Materials in Wet Areas – Surfaces In wet areas, use materials that have smooth, durable, cleanable surfaces. Do not use mold-propagating materials such as vinyl wallpaper and unsealed grout.
		7.10b	Materials in Wet Areas – Tub and Shower Enclosure Use one-piece fiberglass or similar enclosure or, if using any form of grouted material, use backing materials such as cement board, fiber cement board, fiberglass-reinforced board or cement plaster.
		7.11a	Basements and Concrete Slabs – Vapor Barrier Provide vapor barriers under all slabs
		7.11b	Basements and Concrete Slabs – Radon In EPA Zone 1 areas, install passive radon resistant features below the slab along with a vertical vent pipe with junction box available, if an active system should prove necessary

Healthy Living Environment (continued)

Y	N	Item	Item Title
		7.12	Water Drainage Provide drainage of water to the lowest level of concrete away from windows, walls and foundations. Foundation walls should be carefully waterproofed on the exterior to avoid moisture migration
		7.13	Garage Isolation Provide a continuous air barrier between the conditioned (living) space and any unconditioned garage space. In single-family houses with attached garages, install a CO alarm inside the house on the wall that is attached to the garage or is outside the sleeping area
		7.14	Clothes-Dryer Exhaust Clothes dryers must be exhausted directly to the outdoors
		7.15	Integrated Pest Management Seal all wall, floor and joint penetrations to prevent pest entry. Provide rodent and corrosion proof screens (e.g., copper or stainless steel mesh) for large openings
		7.16	Lead-Safe Work Practices For properties built before 1978, use lead-safe work practices during renovation, remodeling, painting and demolition

Safe Living Environment

Y	N	Item	Item Title
		SL.1	Flood Protection Follow requirements of the National Flood Insurance Program as adopted by the local jurisdiction; and in parishes where FEMA “advisories” have been issued, follow them. Buildings with over 50% damage should be elevated to meet these requirements
		SL.2	Hurricane Wind Protection – New Construction Follow local codes or the best available guidance on construction that will be resistant to predicted storm wind velocities at the site – whichever is stricter
		SL.3	Hurricane Wind Protection – Rehab To the extent feasible, follow local codes or the best available guidance on retrofit measures that will be resistant to predicted storm wind velocities at the site – whichever is stricter

Operations and Maintenance

Y	N	Item	Item Title
		8.1	Building Maintenance Manual for Owner Provide a manual that includes instructions for operating all mechanicals, educating tenants about proper use and maintenance of all building systems and maintaining the green features of the site
		8.2	Occupant’s Manual Provide a guide for homeowners and renters that explains the intent, benefits, use and maintenance of green building features, and encourages additional green activities such as recycling, gardening and use of healthy cleaning materials
		8.3	Homeowner and New Resident Orientation Provide a walk-through and orientation to the homeowner or new resident that reviews the building’s green features, operations and maintenance