Transforming the conventional lawn into green outdoor living space complements the home and connects it with nature. New Jersey, with long summer days and cool autumn evenings, provides a perfect environment for outdoor living. As the primary connection to our natural surroundings, yards function as a beautiful, livable extension of the home. Whether planning your own outdoor project or hiring a professional, there are dozens of ways to implement renewable products, conserve resources, promote biodiversity and wildlife habitat, and reduce home heating, cooling, and water usage.

Outdoor Living and Landscaping

Photo: Michael Fleischacker

Outdoor Living and Landcaping

How to Use the Guidelines

Health and Safety

- HS1 - Nuisance and Toxic Dust Control
- HS2 - Cautious Materials -Asbestos & Lead
- HS3 - Mold
- HS4- Radon

Green Home Maintenance and Housekeeping

General Design and Construction

- Design to support connection with nature **[SS15]**

Site

- Minimize site disturbance **[SS29]**
- Conduct a soil test
- Start a compost pile
- Landscape for passive heating and cooling **[SS30-31/36]**
- Minimize impervious surfaces **[SS32]**
- Replace lawn with turf grass or groundcover **[SS34]**
- Provide wildlife habitat **[SS35]**
- Provide for edible plants in the landscape design **[SS37]**
- Utilize Integrated Pest Management **[SS38]**
- Provide rainwater collection system **[WE40]**

Outdoor Structures

- Use eco-friendly patio/decking materials **[MR111-113]**
- Properly detail between deck and house **[IDP28]**
- Plan projects for easy clean-up and disposal **[IEQ162]**
- Create a roof garden
- Choose eco-friendly pool/hot tub options **[EA97]**

Lighting and Electrical

- Use efficient lighting/minimize light pollution **[EA88-89]**

Furniture and Fittings

- Choose eco-friendly furniture/accessories **[MR154]**

Case Studies

Green Products and Services

Glossary of Terms

How to Use the Guidelines

Organization of the Guidelines

The Guidelines are organized into chapters by major project type: Kitchen, Bath and Living Spaces, Finished Basement and Major Addition, Weatherization and Energy, and Outdoor Living and Landscaping.

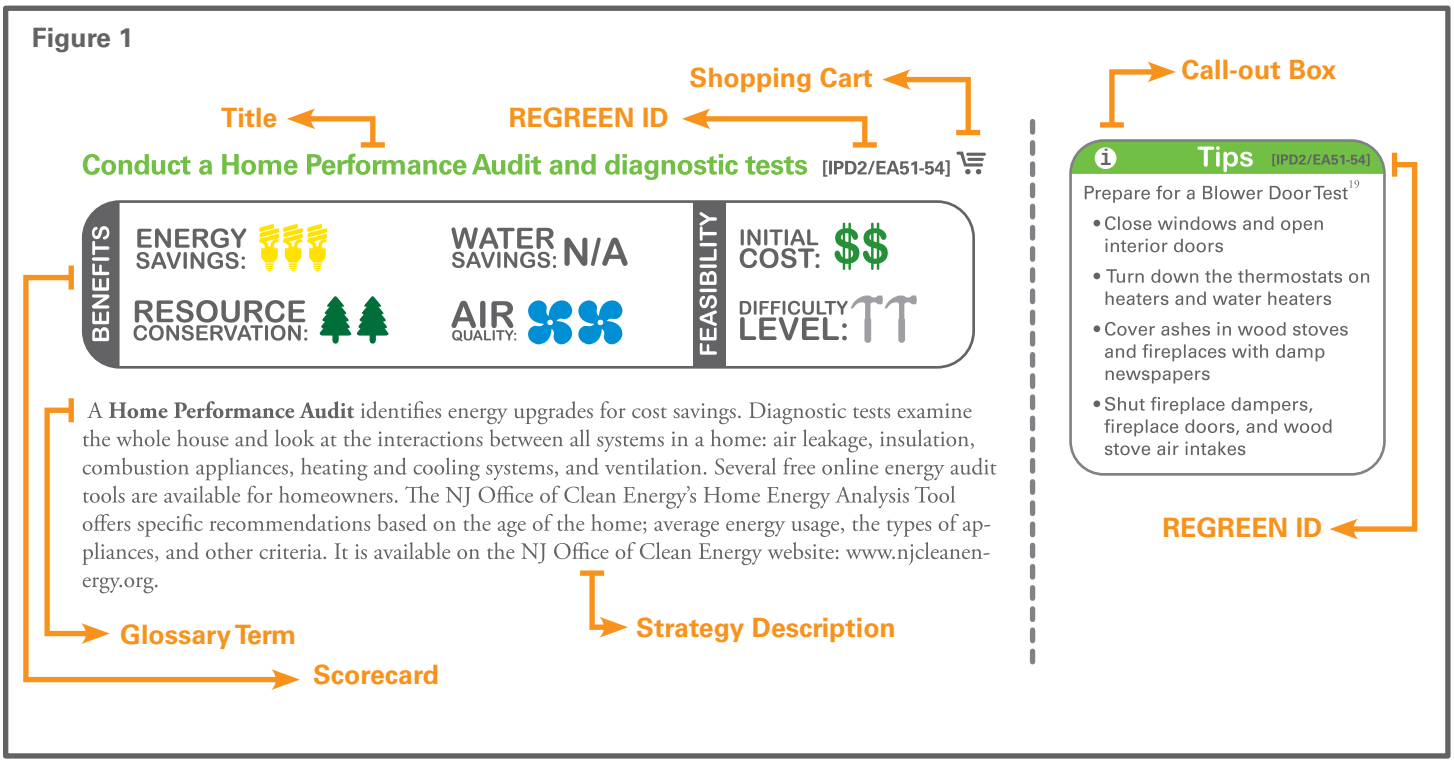
Each chapter includes the following:

- How to Use the Guidelines
- Health and Safety
- Green Home Maintenance and Housekeeping
- Best Practice Strategies
- Resources and References
- Case Studies
- Green Products and Services
- Glossary of Terms

Getting the Most from the Strategy Write-ups

The Guidelines provide information on best practice strategies for each project type. These strategy write-ups are organized by building system and follow the order of the 2008 REGREEN Residential Remodeling Guidelines (i.e., IDP2), which are incorporated with permission. **Figure 1** describes the information available.

Figure 1



Title and REGREEN Strategy ID – The strategies in the REGREEN Residential Remodeling Guidelines 2008 inspired most of the strategies in these Guidelines. Where appropriate, the strategy references the related REGREEN strategy ID.

Shopping Cart – The cart denotes entries in the Green Product and Service Guide located in the back of each project chapter.

Strategy Description – This write-up provides an overview of each strategy and its environmental benefits.

Glossary Term – Acronyms and green building terms are highlighted in bold and defined in a glossary at the back of each chapter.

Call-out Boxes - The call–out boxes in **Figure 2** highlight information of special importance. These include the following types of information:

- Tips - useful hints or practical facts for accomplishing a strategy
- Incentive - sources of financial assistance
- New Jersey Bio-Region - New Jersey has 5 bio-regions, each with unique elements and environmental features to consider when remodeling
- Building Age - a home's age can inform needed repairs and call out special circumstances
- Caution - on occasion, there are hazards associated, so items are called out for safety reasons

Hazard Symbol - Symbols were developed to advise users of certain health and safety threats related to specific strategies. The symbols, which appear below, reference the guidance on Health and Safety located at the beginning of each section.

HS1 – Nuisance and Toxic Dust Control HS1

HS2 – Hazardous Materials - Asbestos & Lead HS2

HS3 – Mold HS3

HS4 – Radon HS4

Web Link - When viewing this document electronically, the websites will hyperlink, however, occasionally website links change. In most cases, the site provides a seamless link to the new address. If this is not the case, users may need to copy and paste the link into the browser address bar. At the time of publication the hyperlinks in this report were all functional.

Scorecard - The scorecard, **Figure 3**, provides a snapshot of the environmental benefits, initial costs, and difficulty levels associated with a particular strategy. Both qualitative and quantitative information was used to assign scores to each strategy.

Figure 3

Conduct a Home Performance Audit and diagnostic tests [IPD2/EA51-54]

It is divided into two parts: 1) Benefits and 2) Feasibility.

Graphic icons were developed for each impact category.

BENEFIT Key

1 icon = low benefit, 2 icons = medium benefit, 3 icons = high benefit

FEASIBILITY Key

$ low initial cost, $$ medium initial cost, $$$ high initial cost

T low difficulty level, TT medium difficulty level, TTT high difficulty

The icons above have been developed to graphically describe the ratings that follow.

BENEFITS

Energy Savings

To help meet its greenhouse gas reduction responsibility, in 2007 New Jersey passed **carbon dioxide** (CO_2) reduction goals, i.e., achieve 1990 emission levels by 2020, followed by a further reduction of emissions to 80 percent below 2006 levels by 2050. The state has also established renewable energy and energy efficiency targets. Green remodeling strategies utilize renewable energy sources such as solar, geothermal, and wind to net a lower CO_2 footprint.

Figure 2

Tips [EA49]

Use the U.S. Department of Energy's Zip-Code Insulation Program to determine how much insulation to add and where to achieve the recommended insulation levels for maximum energy efficiency www.ornl.gov/~roofs/Zip/ZipHome.html

Incentive [EA49]

Federal tax credits may be available for added insulation to walls, ceilings, or other part of the **building envelope**. See the Tax Incentive Assistance Project: www.energytaxincentives.org/general/legislative.php.

NJ Bio-Region [EA49]

In colder climates, adding extra insulation is more cost effective than installing a **radiant barrier.**[26]

Building Age [EA49]

Insulation in older homes will have settled and at best be dusty or dirty so new attic insulation is typically installed on top of old insulation.

Caution [EA49]

Vermiculite Insulation was used in attics until it was discovered that vermiculite ores from some sources have naturally occurring **asbestos** in trace amounts. This type of insulation is only a health concern when someone comes into contact with it; while it is contained, it is not determined to be a health risk. If a remodeling or renovation project involves removal of this type of insulation, certified professionals will be needed to safely remove or contain the material. For more information, see **EPA** website: www.EPA.gov/asbestos/pubs/verm.html

Water Savings

Water conservation reduces water use both inside and outside the home. Within the home this may include low-flow fixtures. Outside the home this may refer to using **native plants** that have lower watering requirements or rain barrels to collect rainwater for reuse on the lawn and garden. Water management includes providing proper moisture control at footings, slab perimeter, and foundation walls as well as using porous paving materials to encourage stormwater recharge for reduced runoff.

Air Quality

Americans spend up to 90 percent of their time indoors where air quality can be more polluted than outdoors. Pollutants range from allergens such as mold, mildew, fungus, and dust mites to toxins, such as asbestos, and volatile organic compounds like formaldehyde and benzene found in building materials and a number of household items including pressed-wood furniture, computer ink, carpeting, and conventional household cleaners and cosmetics.

Resource Conservation

Resource conservation means using materials that are durable and easy to maintain with low embodied energy (the energy used in resource extraction, manufacturing, shipping). These come from renewable sources or are produced from waste, recycled materials, or salvaged from other uses. Avoiding building materials that deplete natural resources, such as old-growth timber, and materials made from toxic or hazardous substances improves nature's ability to provide goods and services.

FEASIBILITY

$ Initial Cost

Cost is always a consideration for remodeling projects. Evaluating the cost of a recommended green remodeling strategy provides homeowners with a better sense of the relative costs and benefits of each recommended measure.

Costs come in two forms, so it is important to consider both in assessing feasibility. The first reflects initial costs of the strategy compared to conventional practices. A second consideration to make is the pay-back period or life-cycle cost. The pay-back costs are less obvious and are often project specific, but they can have significant environmental and economic value that factor into the overall cost. For more information on average costs, savings, and payback periods of typical energy efficiency improvements, see the Energy Efficient Rehab Advisor at (www.rehabadvisor.pathnet.org/). For customized results, have an energy professional conduct a thorough energy audit of your home.

$ Less than $500

$$ $500-$5,000

$$$ Greater than $5,000

Difficulty Level

Time is money and expertise is gained over time. Some people may consider a Home Performance Audit strategy in the 'medium' category because although relatively straightforwardto act on, it requires experts with custom equipment to prepare an accurate assessment. Implementing the findings from a Home Performance Audit becomes a 'high' difficulty category as space heating and cooling systems, ventilation, water heating, appliances, climate and even site factors need to be integrated to assure desired energy improvements across 'ALL loads' and to avoid negative unintended consequences. It is expected that 'high' difficulty strategies may also be dangerous for the basic homeowner to undertake.

T Easy to Do It Yourself (DIY) - little previous knowledge necessary

TT Task for an Experienced DIYer or Professional - may require additional effort and higher learning curve than conventional strategy it replaces

TTT Task for an Expert/Certified Professional - high learning curve; new technique; requires specific green knowledge

Notes: [1] U.S. Environmental Protection Agency 2008. Healthy Buildings, Healthy People: A Vision for the 21st Century

Health and Safety

Green remodeling poses hazards typical of many other home renovation or remodeling projects because of the age of the homes (given that they are more likely to contain older and use more hazardous materials) and the incentive for green remodeling to replace older or damaged building systems.

New Jersey homeowners considering green remodeling should anticipate potential emissions of hazardous air contaminants during removal of old building materials. The risks associated with improper removal of materials containing **asbestos**, lead, mold or even fiberglass insulation are minimized by understanding and following the steps listed here prior to initiating work. For complex situations, consider hiring professionals.

General hazard recognition and risk reduction information for the following potential renovation-related risks are contained in this section:

HS1 – Nuisance and Toxic Dust Control

HS2 – Hazardous Materials - Asbestos & Lead

HS3 – Mold

HS4 – Radon

HS1 – Nuisance and Toxic Dust Control

Construction projects involving demolition of existing sheetrock, plaster, wood, brick or concrete products in ceilings, walls or floors of a home will release dust as these materials are ripped, sanded, ground, pulverized or crushed. Control of dust emissions during the pouring of solids or from transferring of small particles is controlled in industrial facilities. Homeowners planning renovation projects should also consider steps to minimize the release and maximize control of dust in the environment. These nuisance dusts, when released from the point of origin into the air of the home, tend to remain suspended in the air for very long periods of time, and as such, will be transported with air currents caused by open doors, cracks around and beneath doorways, forced air heating and cooling ductwork, and even by the air currents caused by persons walking in and out of dusty areas, to other areas of the home. At a minimum, allowing the uncontrolled release of nuisance dusts from any demolition project, as well as those created from sawing, sanding, or grinding of newly constructed materials (e.g., sheetrock, spackling, wood dust etc.) presents unnecessary and difficult dust cleanup demands for affected living spaces. At their worst, susceptible occupants of homes where uncontrolled nuisance dusts are allowed to escape into adjacent living spaces may temporarily experience eye, nose, or throat irritation. Asthmatics may experience adverse respiratory distress when exposed to high levels of nuisance dust particles.

There are several simple steps to minimize potential hazards of nuisance dust during remodeling.

1. Remove unnecessary porous and non-porous materials (e.g., draperies, bedding, upholstered furniture, children's toys, clothing, etc.) from the project area.
2. Seal the project area from the remainder of the home using polyethylene sheeting at doorways and at inlets to any forced air supply or **return registers** within the project space.
3. Consider installing **HEPA filtered air scrubbers** in the project area and discharging the exhaust air through an adjacent window using a tight fitting flexible duct through a sealed window opening (consider surrounding security requirements). Use a lightweight section of facial tissue at the doorways to confirm that air pressure is moving from the clean adjacent living space and into the project area (not the other direction) so that air leaks from the clean home into the dirty renovation area. This will reduce any potential for dusts from the renovation area to enter the adjacent areas of the home.
4. Periodically during the work session and after every work session, **HEPA vacuum** the renovation area following renovations to remove accumulated surface dust, without re-suspending it into the air.

HS2 – Hazardous Materials - Asbestos & Lead

When removing old building materials, know that they contain hazardous materials, which while intact present little to zero risk to occupants, but when removing can create airborne emissions and increase health and safety risks. This is especially true of **asbestos** and lead, and, possibly to a lesser extent, fiberglass. Removal of **asbestos**, lead or fiberglass needs to be planned and conducted with care to minimize exposures to airborne dust from these materials.

Asbestos

Asbestos is a mineral that has been mined in the U.S. since the early 1900's. Its superior heat resistance properties, combined with its lightweight, high-tensile strength, and non-corrosive qualities, made it an ideal building material for buildings constructed between 1940 and the late 1980's. **Asbestos** was banned as a building material in the U.S. after scientists concluded studies linking long-term occupational exposures to damaging respiratory health including asbestosis (scarring of the lung), lung cancer, and mesothelioma (cancer of the lining of the lung). Because intact **asbestos** presents no increased health risk, there is no requirement for removing it from existing homes. However, when it is disrupted, pulverized or suspended in air, the potential for inhalation of **asbestos** fibers increases risks of exposure. While health effects develop only after decades of long-term occupational or environmental exposure, homeowners should take particular care to prevent unintentional release of **asbestos** into the air of their homes during green remodeling efforts so that children and others are not exposed.

Asbestos is commonly found in older homes (constructed between 1940 and the late 1980's) in the following building materials:

- Pipe and boiler insulation
- Sprayed on fireproofing insulation
- Acoustical tiles and wall coverings
- Floor tiles
- Roof shingles
- Siding shingles

There is no requirement that homeowners remove **asbestos**-containing materials from homes. However, if removal is part of a green building remodeling project, material should be tested by a New Jersey licensed **asbestos** control monitor, and if determined to contain **asbestos**, be removed by a New Jersey licensed **asbestos** contractor. The number of the state program to contact for assistance in identifying qualified personnel to assist homeowners to safely address any possible **asbestos** concerns is (609) 292-7837.[5] General information about asbestos and its proper management and disposal can be found at the Department of Health website: www.state.nj.us/health/iep/asbestos.shtml and the Department of Environmental website: www.nj.gov/dep/dshw/rrtp/asbestos.htm.

Lead

Lead was in residential paints prior to 1978. It was banned after that time due to the significant health affects to children inhaling or consuming dusts from lead-based paints. Because of the hazards posed by dusts and chips of lead-painted surfaces, any remodeling or renovation which impacts painted surfaces of homes constructed prior to 1978 needs to be inspected by a New Jersey licensed lead inspector. If lead paint is identified, it should be safely removed by a state of New Jersey licensed contractor. They can safely remove lead-based paint and conduct follow-up surface lead testing to confirm that the removal was successful. Information on lead-based paint and qualifications for lead inspectors and contractors can be found at: www.state.NJ.us/health/iep/documents/pb_advisory_bulletin.pdf.

Contact the New Jersey Department of Health and Senior Services at (609) 292-7837 with any questions.

Fiberglass

Fiberglass insulation is a manufactured glass-wool-like material used as an insulation and sound absorption material in homes, schools, automobiles and consumer products since the 1970's. Fiberglass insulation can be safely installed if handled properly; any prolonged skin, eye or respiratory contact with fiberglass can cause temporary irritation. During renovation, wear loose fitting clothing and gloves to reduce skin contact, eye glasses or goggles to reduce eye exposure, and N95 disposable respirators (available from any home improvement store) if high levels of fiberglass dust are expected during removal or installation. More information on fiberglass safety precautions and handling recommendations can be found at the American Lung Association website at: www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=35439
or call the American Lung Association in New Jersey at (908) 687-9340.

HS3 – Mold

Mold contamination of building materials is not limited to older homes. Homes of any age can develop mold if moisture from leaky pipes, roofs, foundations, accumulates in the presence of dust, wood, paper or other **cellulose**-containing materials at normal room temperatures or high relative humidity (76 percent) for as little as 48 hours. Standing moisture around building materials such as wallboard, carpets, insulation, wood or other **cellulose** containing materials can cause mold. Many mold spores are known human allergens and produce toxins which may cause irritation or central nervous system effects. Because of vast differences in susceptibility, or if individual health impacts related to elevated mold spore exposure are of concern, consult a trained and experienced occupational/environmental health physician.

In addition to the above, mold damage can occur if flooding from faucets, showers, toilets (above the trap), is not completely dried within 48 hours of the incident. Floods from dirty water sources such as washing machines, dishwashers or sewers may contain high levels of bacteria, viruses, and protozoa which, along with potential mold growth, present additional risks.

If **mold amplification sites** occur, remove the affected material using methods that prevents unintentional dispersal of mold spores and the source of moisture intrusion. The U.S. **Environmental Protection Agency** indicates that small areas of mold growth (less than 10 square feet) can be cleaned or removed by homeowners themselves using precautions to prevent exposure and reduce spread of spores to adjacent areas. When mold contaminated areas exceed 10 square feet, special precautions including erecting containment barriers and the use of specialized **HEPA vacuum** devices should be used by trained professionals. When mold contamination occurs in excess of 100 square feet, professionals need to clean using full containment of the area (see www.epa.gov/mold/moldguide.html).

If mold growth from dirty water floods occurs, take special precautions to prevent skin, eye, oral and inhalation contact, and hire trained professionals to clean up in accordance with U.S. **EPA**: www.epa.gov/iaq/flood/index.html and IICRC S500 guidelines

Homeowners should anticipate that the amount of mold contamination shown on the outside of a piece of drywall or paneling may be less than the amount that will be exposed when wall cavities are opened up. If there is any doubt, consider hiring a professional Certified Industrial Hygienist (CIH) to evaluate the extent of damage before attempting to remove contaminated building materials yourself.

HS4 – Radon

Radon is a radioactive gas that comes from the natural decay of uranium in the ground. It is odorless, tasteless and invisible, and can only be detected through specialized tests. **Radon** enters homes through openings such as cracks and joints in the foundation, sump pits and openings around pipes. The home traps radon inside and it can build up to high levels.

Radon is the second leading cause of lung cancer in the United States, resulting in 15,000 to 22,000 deaths annually. It is the leading cause of lung cancer for non-smokers.

Radon concentrations can vary from house to house. The radon concentration in a home depends on a number of factors, including the amount of uranium present in the soil, the permeability of the soil, the number of openings in the foundation and air pressure differentials. Any home can have a **radon** problem, regardless of whether it is old or new, well sealed or drafty, or with or without a basement.

The New Jersey Department of Environmental Protection recommends radon testing for all homes in New Jersey. If the **radon** concentration is 4 pCi/L or higher, a **radon** mitigation system is recommended. There is no safe level of **radon** since lung cancer can result from very low exposures to **radon**, however, the risk decreases as the **radon** concentration decreases. f the **radon** concentration is less than 4 pCi/L, a mitigation company can be consulted to determine whether the **radon** level can be brought down still further. **Radon** levels have been brought to less than 1 pCi/L in sixty percent of the homes mitigated in New Jersey. Mitigation systems can also help reduce the potential for accumulation of volatile organic compounds that may be released from soil water vapor in areas where ground water contamination is an issue.

Radon test kits are commercially available at most home improvement stores, however, test conditions and locations may make data interpretation difficult or inaccurate. Carefully follow the kit directions to ensure proper use and confidence in the results. The New Jersey Department of Environmental Protection has issued licensing requirements for **radon** testing firms, and has a list of qualified professionals to perform **radon** testing and mitigation, see www.njradon.org.

Appendix

HS1= NUISANCE AND TOXIC DUST CONTROL

Fly ash Properties

www.austinenergy.com/energypercent20Efficiency/Programs/Greenpercent20Building/Sourcebook/flyashConcrete.htm

www.oikos.com/library/betterconcrete/index.html

HS2= HAZARDOUS MATERIALS - LEAD AND ASBESTOS

N.J. Department of Health Indoor Environments Program

www.state.NJ.us/health/iep/index.shtml

Agency for Toxic Substances and Disease Registry, New Jersey

www.atsdr.cdc.gov/Asbestos/sites/national_map/fact_sheets/trentonnj.html

N.J. Department of Environmental Protection, Guidelines for Disposal of Asbestos Containing Materials

www.state.NJ.us/dep/dshw/rrtp/Asbestos.htm

U.S. EPA Asbestos Caution Regulations adopted in New Jersey

www.EPA.gov/r02earth/ahera/ahera.htm

N.J. Department of Community Affairs Lead Testing and Abatement

www.state.NJ.us/dca/codes/code_services/xls/clc.shtml

New Jersey (NJ) Department of Health and Senior Services

http://www.state.nj.us/health/

Lead in Paint, Dust, and Soil (USEPA)

http://www.epa.gov/lead/

The Leadsafe NJ Program (NJDCA)

http://www.state.nj.us/dca/dcr/leadsafe/

HS3 = MOLD

USEPA Guide to Mold in Your Home

www.EPA.gov/mold/moldguide.html

USEPA Flood Clean-up Guidelines

www.EPA.gov/iaq/flood/index.html

N.J. Department of Health and Senior Services Indoor Environments Program

www.state.NJ.us/health/iep/index.shtml

HS4 = RADON

N.J. Radon Soil Gas Map

www.EPA.gov/radon/zonemap/newjersey.htm

N.J. Department of Environmental Protection Radon tiers by County

www.state.NJ.us/dep//rpp/radon/radonin.htm

N.J. Radon Levels

www.NJradon.info/NJ_counties.html

N.J. Radon Testing Guidelines

www.NJ.gov/dep/rpp/radon/radontes.htm

Green Home Maintenance and Housekeeping

Introduction

Your home is one of the biggest investments of your life. Can 'going green' protect your investment and make it safer, more enjoyable and save you money? Yes.

This guide to Green Home Maintenance and Housekeeping practices will improve the health, comfort and environment for your family, and save you money, most directly by reducing your utility bills. The guide's focus on 'Energy' savings, improvements to 'Indoor Air Quality', effective and efficient 'Household Waste Management' and conserving 'Water' all add measurable benefits to you and high return on your investment. Routine checks and repairs will ensure your home's appearance and proper function. By following these recommendations, you will also prevent more expensive damage from occurring.

Outdoor Living and Landscaping

Smart decisions about lawn maintenance and landscaping techniques improve water quality and local habitat. Environmentally-responsible landscaping increases native plant diversity, and reduces stormwater runoff that deposits sediment and pollutants into local rivers and streams.

1. Lawn and landscape care.
   - Perform a soil test to determine **pH** and nutrient availability (test for lead near highways and near old buildings).
   - Evaluate site conditions for sunlight, drainage and space requirements for plants.
   - Improve poor soil conditions with **organic amendments** or quality **topsoil**. Adjust **pH** and add nutrients or install soil drainage systems.
   - Select a diversity of plants adapted to site conditions (soil, light, drainage and space), adding native or pest resistant plants to your landscape design.
   - Select low maintenance cultivars and use proper maintenance to reduce unnecessary pesticide and fertilizer use.
   - For lawns, recycle clippings, keep mower at 2 ½ inches, water early morning and **de-thatch** if **thatch** reaches more than ½ inch in thickness.
   - Landscape to maximize energy efficiency for heating and cooling of home and surroundings.
2. Tips for yard irrigation.
   - Start a **compost pile** and use compost in the garden and landscape to improve soil and provide nutrients to plants.
   - Install a **rain garden** or water collection barrels to reduce the amount of potable water used in your garden and prevent **runoff**.
   - **Drip-irrigate** beds. Line gardens with soaker hoses – no sprinklers, no hassle.
   - Use the proper thickness (3 inches) of natural mulches or dark stone (with landscape fabric) around trees and shrubs to conserve moisture and protect roots from excessive hot or cold temperatures.
   - Chip woody waste and tree clippings into mulch for use on-site.

Design to support connection with nature [SS15]

Fostering **biophilia** through design beautifies space and promotes health and well-being. Inside the home, use indoor plants to provide visual connections to the outdoors through large well-placed windows. Use and enjoy outdoor spaces through the addition of porches, patios, and decks.[1]

A great way to better utilize and appreciate a backyard is to treat it as an extension of the home. By creating different spaces in a yard through the use of hedges, fences, or outdoor elements like gazebos or gliders, homeowners can create beautiful spaces that encourage outdoor living. When designing outdoor spaces, consider the intended functions: play areas, meditation areas, outdoor dining areas, etc. It is important to incorporate as many green strategies as possible.

Time spent outdoors can also help reduce energy consumption and household maintenance costs. There are many do-it-yourself guides to creating outdoor living spaces, or invest in a landscape architect or other professional who specializes in designing green outdoor space. Both will add value to the home landscape and add aesthetic benefits for the homeowner.

Tips [SS15]

Too few guides to creating and designing outdoor living spaces focus on green strategies. Be sure to incorporate strategies from these Guidelines into your plans to enjoy green outdoor living.

Minimize site disturbance [SS29]

For any home remodeling work, minimizing site disturbance is essential to protect the existing natural environment and prevent soil **erosion**, particularly in New Jersey's suburban, rural, and shore communities. Before beginning a project, consult with the contractor to develop a comprehensive plan for site protection. The NJDEP has established **Erosion** Control Standards for the state. Check with your New Jersey local conservation district office or the Natural Resource Conservation Service for information about strategies for soil **erosion** prevention (such as silt fencing, mulching, etc.) as well as any applicable laws pertaining to your project. Designate off-site parking and a controlled location for building materials when possible. Smaller sites, such as those found in urban areas, may require additional planning for proper movement of materials on and off of the site.

Carefully provide for protection of trees and vegetation. The **drip line**, a vertical plane going from the perimeter of the crown to the ground, contains the minimum area around a tree that should be undisturbed. However, the shallow root system found in the **topsoil** extends further out from the **drip line**, so preserving extra area beyond the **drip line** minimum is critical. If work requires use of heavy equipment, ask for adequate layers of straw or other material to absorb and distribute the weight to prevent soil compaction. Create **tree wells** for changes in grading around trunks and root systems. Consider establishing a system of incentives and penalties with the contractor for protection of existing trees and shrubs.

Planning for minimizing site disturbance conserves resources by reducing the need for new soil and plantings as well as reducing use of excavation equipment. Protecting and/or transplanting existing vegetation avoids the costs of additional future landscaping. Reducing disturbance and stress on trees and plants will reduce additional watering needs. A pre-construction low impact checklist is provided in the Resource section.

Tips [SS29]

Mulch around the base of trees will suppress weeds and retain moisture.
However, "volcanoes" of mulch built-up around the trunk of a tree will weaken and eventually can kill a tree, so keep mulch to the minimal amount needed.

Tips

The best time to conduct a soil sample test is in the fall after harvest or in the spring before fertilization. Sampling should not be done shortly after fertilization or in wet conditions. For lawn care, summer sampling may be conducted to prepare for fertilization in the fall. It is recommended that soil testing be done every 2 to 3 years.

Caution

Gardens with edible components should be grown away from the home as it is less likely that lead and other contaminants may be present in the soil.

Tips

The Rutgers New Jersey Agricultural Experiment Station (NJAES), "Home Composting" article in the Resources section is an excellent guide for constructing, maintaining, and troubleshooting a **compost pile**.

Consult with your County Master Gardeners on good composting strategies and demonstration sites in your area.

Incentive

Check with County/Municipal Recycling Department for free or reduced cost compost bins.

Caution

Open compost piles may attract black bears in northern and central New Jersey. Be careful not to put too much fruit or vegetable waste in an open compost pile if you live in a black bear habitat region.

Tips [SS30]

Keeping foundation plants a few feet away from the home improves air flow. Select low-growing shrubs or flowers to avoid blocking your windows. This allows for a clear line of vision into the landscape and adequate air circulation when windows are open.

Conduct a soil test

BENEFITS			FEASIBILITY	
ENERGY SAVINGS:	WATER SAVINGS:		INITIAL COST:	$
RESOURCE CONSERVATION:	AIR QUALITY: N/A		DIFFICULTY LEVEL:	

Soil testing determines the fertility and **pH** level, and detects levels of metals such as lead in the soil. To best facilitate new plant and garden growth, one should always first conduct a soil test to determine the optimum level of fertilization needed. Excessive fertilization of nutrients and/or lime can be detrimental to plant growth and may lead to contamination of water resources by nitrates, phosphorus, and other chemicals. In addition, understanding the composition of your soil can help to assess the need for any improvements to facilitate water infiltration of stormwater runoff.

Using a sampling probe, trowel, or spade, collect ten to fifteen cores or slices of soil six inches in length from the surface in the area that is being tested. Mix all of the soil samples in a bucket and put two cups into a plastic bag. This sample can then be sent to a soil sample laboratory for testing. Separate samples should also be gathered in areas where different species of plants are grown.

Soil sample kits may be purchased from your local Rutgers Cooperative Extension county office, garden center, or online. It is imperative to collect soils following the correct procedures to achieve accurate results.[2] Check the Resources section to find your local Rutgers Cooperative Extension county office. Further information on soil testing can be obtained from these offices.

Start a compost pile

BENEFITS			FEASIBILITY	
ENERGY SAVINGS: N/A	WATER SAVINGS:		INITIAL COST:	$
RESOURCE CONSERVATION:	AIR QUALITY: N/A		DIFFICULTY LEVEL:	

Start a **compost pile** and use compost in the garden and landscape to improve soil health and provide nutrients to plants. Compost piles contain materials like vegetable scraps, grass clippings, leaves, and sawdust that decompose into natural fertilizer. C**ompost** recycles nutrients back into the earth, eliminating the need for store-bought fertilizers and helping the natural environment. Compost also helps the soil retain moisture, aiding **infiltration** and protects roots from excessive hot or cold temperatures.

Homeowners can construct their own compost structures or purchase bins. A **compost pile** in an inconspicuous part of the yard will eventually decompose, but many prefer bins. Bins not only keep the pile neat and deter animals, they also facilitate the decomposition process. Several New Jersey counties offer tours of different types of compost bins and workshops for composting.

Landscape for passive heating and cooling [SS30-31/36]

BENEFITS			FEASIBILITY	
ENERGY SAVINGS:	WATER SAVINGS:		INITIAL COST:	$$
RESOURCE CONSERVATION:	AIR QUALITY:		DIFFICULTY LEVEL:	

Proper placement of trees and landscaping beautifies outdoor space and reduces heating and cooling costs. Taller **deciduous trees** on the southeast, south and southwest side of a house provide shading from the high summer sun and allow low winter sun to filter into the home. Hardy **evergreen trees** and shrubs placed at the northeast and northwest corners of the landscape can reduce heating costs by blocking or redirecting cold winter winds over or around the home. On west walls, incorporate **trellises**, **arbors**, and **planting beds** for tall **annuals**, which provides shading of west-facing windows where summertime heat gain is the biggest problem.

Select site-appropriate plants including **native trees** that may reduce watering needs once they are established. Any newly planted tree will require watering, but smaller trees will adapt much faster to site conditions. Larger trees will cost more and take longer to establish in the landscape. **Evergreens** (trees or large shrubs) provide greater protection from wind and noise.

It is always important to consider **genetic diversity** in the design to minimize potential disease and insect problems. Also see The Tree Guide at www.Arborday.org, listed in the Resources section, for growth rate and **crown size** information for specific tree species. Check with New Jersey arborists or your county Master Gardeners' office to choose the right plant for the particular home and lot size. It is important to balance shading with solar access, especially for systems (like solar panels) that require the sun's energy.

Distance from homes and structures are important considerations. In general, medium to large trees should be placed at least 20 feet away from the house. Trees that will be smaller at maturity can be placed closer to the house, but be mindful of the breadth of the full-grown crown of the tree to maintain both energy and aesthetic value.

Make protection of existing trees and shrubs a priority. When possible, consider transplanting rather than complete removal. If trees or large limbs require pruning, use the tree materials for firewood, mulch, or **trellis** construction. When transplanting, remember, that they, too, require plenty of water until they are established (generally through at least one season, depending on size).

NJ Bio-Region [SS30]

The Cape May Plant Materials Center (www.plant-materials.nrcs.usda.gov/njpmc/) provides specific planting ideas that control wind **erosion** using windbreaks and herbaceous wind barriers.

Caution [SS30]

Trees and large limbs can be unwieldy. Removal is best handled by a certified **arborist**.

Minimize impervious surfaces [SS32]

BENEFITS			FEASIBILITY	
ENERGY SAVINGS:	WATER SAVINGS:		INITIAL COST:	$$
RESOURCE CONSERVATION:	AIR QUALITY:		DIFFICULTY LEVEL:	T T

Stormwater **runoff** from **impervious surfaces** can cause flooding, **erosion**, and surface water contamination. Limiting paved surfaces and providing permeable drainage areas aids natural groundwater **infiltration**. **Porous** paving materials, **vegetative swales**, **rain gardens**, and other landscape features will improve **infiltration**.

An overall reduction in paved surfaces prevents **runoff**, allows for stormwater recharge, and mitigates the **heat island effect**, reducing home **cooling loads**. Aiding **infiltration** of groundwater alleviates possible moisture and mold problems that can impact indoor air quality as well.

Problems associated with water **runoff** are most prevalent in areas where there is a large percentage of **impervious** surfaces or in flood prone areas where **runoff** quickly collects, causing flood hazards. In those areas, or for homes with flat roofs, consider **creating a roof garden** to absorb stormwater on site. If a home relies on downspouts, direct them away from nonporous surfaces to allow water to infiltrate into the ground without creating **runoff**.

Rain gardens are depressed areas of the landscape containing various native plant species and are an effective way to reduce **runoff** and promote **infiltration**. Directing stormwater to these areas allows the plants and soil to naturally absorb and filter excess water.

The cost to replace, remove or modify existing paved areas can be significant, but it will mitigate hazards and provide various environmental benefits. See the Resources section for information regarding New Jersey's stormwater regulations, and check with municipal offices for any specific policies.

Tips [SS32]

Some **porous** paving systems may not be appropriate for New Jersey's climate. See the "Standard for Pervious Paving Systems" from the NJDEP Stormwater Best Practices Manual in the Resources section, and be sure to check with an expert if you are unsure about the compatibility of a particular product.

Replace lawn with turf grass or groundcover [SS34]

BENEFITS			FEASIBILITY	
ENERGY SAVINGS:	WATER SAVINGS:		INITIAL COST:	$$
RESOURCE CONSERVATION:	AIR QUALITY:		DIFFICULTY LEVEL:	T

The costs—financially and environmentally—of maintaining a conventional lawn are considerable. Irrigation of landscaped areas accounts for 30 percent of residential water or roughly 7 billion gallons every day.[3] Gas-powered lawnmowers create more air pollution per unit of gasoline than cars.

Tips [SS34]

For lawns, recycle clippings, keep mower at 2 ½ inches, water in the early morning and **de-thatch** if thatch reaches more than ½ inch in thickness.

Every county in New Jersey has a Master Gardener program. These trained volunteers provide guidance on lawn alternatives through the County Extension Office.

Tips [SS35]

See the National Wildlife Federation's "Create a Certified Wildlife Habitat" website for information on native plant species and a wealth of other tips.

Incentive [SS35]

The New Jersey Natural Resources Conservation Service runs a Wildlife Habitat Incentives Program (WHIP) that "provides technical and financial assistance for creating, enhancing, and maintaining wildlife habitat on non-federal lands."[4]

NJ Bio-Region [SS35]

Suburban and rural areas may allow for more elaborate habitats, but urban areas benefit too. Even small habitats within their cities add value for nature.

Caution [SS35]

Certain animals, especially bees and wasps, will defend their nests or dens but only if provoked. Protect your wildlife habitat from human or pet intrusion.

Tips [SS37]

Call your County Extension Office for free advice from the county Master Gardener Program.

www.njaes.rutgers.edu/county

NJ Bio-Region [SS37]

The northwestern and shoreline areas of New Jersey have slightly cooler and warmer year-round climates, respectively, than the rest of the state. Check with a local expert if you are unsure about growing specific plants in those bio-regions.

Caution [SS37]

Before deciding to grow your own produce, you may want to test your soil for possible contaminants, such as lead, which could be harmful. The NJAES's Soil Testing Laboratory provides information on contaminants and how you can test your soil for them.

Groundcovers and garden beds are but a few of the many alternatives to the conventional lawn. Naturalizing with **native plants** and creating wildlife habitats are gaining popularity in neighborhoods across the country. Where complete removal of lawn area is undesirable, consider replacing the current grass with low-maintenance **turf grass** varieties, such as **tall fescue** and **fine fescue** that require less water, chemical applications, and less frequent mowing.

Rather than a complete overhaul of the yard, consider creating a gradual plan to reduce lawn area, which will help keep cost to a minimum.

Provide wildlife habitat [SS35]

BENEFITS			FEASIBILITY	
ENERGY SAVINGS:	WATER SAVINGS:		INITIAL COST:	
RESOURCE CONSERVATION:	AIR QUALITY: N/A		DIFFICULTY LEVEL:	

Creating a wildlife habitat can be a fun, rewarding, and educating experience. It allows for greater appreciation of nature, encourages outdoor living, offers a host of ecological benefits and contributes to natural water **infiltration** and a reduction in lawn area.

Providing a natural habitat for wildlife helps increase local biodiversity and ecosystem stability. It also can facilitate **natural pest management**, reducing the need for pesticides and other higher cost interventions. In New Jersey specifically, there is a need for providing habitats for honey bees, whose numbers have been in decline. Fostering natural habitats for bees could have a significant impact on local pollination and food production in the state.

In designing a natural wildlife habitat, select a diversity of plants from different families that are adapted to site conditions (soil, light, drainage and space). Select plants that are pest resistant and whenever possible use **native plants** in the design. Incorporate sources of food, water, and shelter: bird houses, feeders, and baths; logs and rocks for ground dwellers; and plenty of shaded areas. It is important to remember that creating a "natural" habitat may not be exactly like the original environment and will take some time for species to adapt to the site.

Incorporate edible plants into landscape design [SS37]

BENEFITS			FEASIBILITY	
ENERGY SAVINGS:	WATER SAVINGS:		INITIAL COST:	
RESOURCE CONSERVATION:	AIR QUALITY: N/A		DIFFICULTY LEVEL:	

The Garden State is ideal for growing edible plants at home. Growing even small amounts of fruits or vegetables encourages healthy eating and sustainable lifestyles, protects the environment, and gives gardeners a sense of personal satisfaction.

Food-producing plants require watering, but may require less than a conventional lawn. Incorporating edible plants such as blueberries or raspberries along with ornamentals contributes to overall lawn reduction and less mowing. Growing one's own food not only saves money at the grocery store, it helps protect the environment by reducing energy use and overall pollution associated with the transportation of food products. Consider using **indoor sunspaces** or insulated porches for winter growing as well.

There are a wide variety of vegetables, fruits, and herbs that grow well in New Jersey's climate. Best of all, the seeds and small plants needed to get started are very inexpensive and widely available. Keep in mind that some food-producing plants may need as much water, fertilizer and pesticides as a lawn. For example, vegetables like sweet corn, tomatoes, and melons and fruits such as peaches and apples can be higher maintenance crops. Information on species that grow well in New Jersey, as well as strategies for incorporating edible plants properly into your yard, is available in the Resources section. One may also want to consider protecting their fruits and vegetables from being eaten by animals (ie., deer, gophers, voles) with a fence. There are also some natural organic repellents that use various smells and tastes to keep pests out of the garden.

Practice Integrated Pest Management [SS38]

BENEFITS: ENERGY SAVINGS: | WATER SAVINGS: | RESOURCE CONSERVATION: | AIR QUALITY:
FEASIBILITY: INITIAL COST: $ | DIFFICULTY LEVEL:

Chemicals from pesticide applications enter our **watersheds** as **runoff** and **infiltrate** underground **aquifers**. They are tracked into our homes by shoes and pets, compromising the safety of our indoor environment. Their toxicity is dangerous to people, children, and wildlife, and they contribute to an overall unhealthy natural world. Therefore, in landscaping, an essential strategy must be to require minimal, if any, chemicals, pesticides, or artificial fertilizers.

Integrated Pest Management includes best practices to minimize environmental impacts by using eco-friendly methods to control pests. **IPM**'s prevention, monitoring, and control techniques offer an alternative to chemical pesticides. **IPM** techniques enhance sustainability of vital natural systems, promote insect and disease resistant lawns, trees and shrubs, protecting beneficial insects and wildlife. **IPM** reduces threats to water quality from chemicals that would otherwise reach our drinking and recreational water resources.

Select low maintenance turf grasses and plant cultivars and use **IPM** approaches to reduce unnecessary pesticide and fertilizer use.

Provide rainwater collection system [WE40]

BENEFITS: ENERGY SAVINGS: | WATER SAVINGS: | RESOURCE CONSERVATION: | AIR QUALITY: N/A
FEASIBILITY: INITIAL COST: $ | DIFFICULTY LEVEL:

Utilizing a **rainwater collection system** can be a simple inexpensive way to control **runoff** and greatly reduce outdoor water use. Add a rain barrel under the roof's downspout to collect and store rainwater. In the case of significant rainfall events, connect another rain barrel to the system for overflow protection. With the addition of a hose or a spigot, the water is easily used in the yard or garden. Rain barrels can be either homemade or store-bought. See the Resources section for links to step-by-step instructions for constructing your own. More sophisticated systems can store collected rainwater in large underground or above ground tanks, where it is then recycled for irrigation.

This strategy is particularly cost-effective in suburban and rural parts of New Jersey where there is considerable outdoor watering. In all areas, however, **rainwater collection** is important since it helps alleviate **runoff** problems.

Check with your local municipality for any restrictions and regulations concerning **rainwater collection systems**.

Use eco-friendly patio/decking materials [MR111-113]

BENEFITS: ENERGY SAVINGS: N/A | WATER SAVINGS: N/A | RESOURCE CONSERVATION: | AIR QUALITY:
FEASIBILITY: INITIAL COST: $$ | DIFFICULTY LEVEL:

A deck or patio is an important aspect of creating an outdoor living space. Fortunately, consumers have many alternatives for environmentally-responsible materials to create these central features. For wooden decks, consider choosing locally grown cedar or **pressure-treated lumber**, the best of which is treated with sodium silicate and heat. If this is unavailable, other treatments include copper, **borates**, and **Light Organic Solvent Preservatives** (**LOSPs**). Alternatives to wooden decks are plastic and wood-plastic composite decks. These products are often made from recycled material and generally last longer than wooden decks.

Tips [SS38]

The foundation is the primary entry point for insects so follow the **Integrated Pest Management (IPM)** best practice and keep untreated wood and vegetation at least a foot away from the soil line and foundation walls.

The County Extension Offices in New Jersey have gardener hotlines staffed all year long by trained Master Gardener Volunteers. They can answer all your questions about companion plantings, lawn alternatives and **Integrated Pest Management**.

Caution [WE40]

Rain barrels should be securely covered to protect children and animals from accidental drowning and to reduce egg-laying potential of mosquitoes. It only takes a few days for mosquitoes to go from egg to adult.

Caution [MR111-113]

Cooking on an outdoor grill over plastic deck materials can be a potential fire hazard, as hot coals may quickly ignite these kinds of decks.

Tips [IDP28]

Depending on the decking material, special fasteners may be necessary. For example, copper based preserved lumber is corrosive to steel.

Caution [IDP28]

The REGREEN Guidelines provide instruction on how to properly detail the connection, but if you are not comfortable, consider hiring a professional who can do the work properly.

Tips [IEQ162]

An overall reduction in waste materials requires less transport of waste from your home, saving energy and money.

Add sawdust from untreated lumber to your compost pile along with leaves and household vegetable waste.

Caution [IEQ162]

In older homes, concerns about **asbestos** and lead paint should be referred to a professional.

NJ Bio-Region

Urban areas in particular can benefit greatly from roof gardens, as they generally contain more flat roof area and less green space at the ground level.

Caution

Do not underestimate the combined weight of soil, plants, and even fruits or vegetables; all roofs, especially those of older structures, need to be examined carefully for structural soundness before attempting this strategy.

The greenest option is to choose a stone or brick patio over a deck when possible. Patios last longer and can reduce the potential for water damage to the house. Reuse salvaged stone or brick to conserve resources, especially when these materials are obtained locally. **Porous** pavement is another option. Instead of concrete, fill the space around the paving elements with sand to facilitate filtration and reduce **runoff**. Some local public works departments may have facilities where bricks are recycled, so check there if planning to build a brick patio. While the up-front costs for environmentally-friendly materials can be higher, the durability requires less maintenance and replacement.

Properly detail between deck and house [IDP28]

Fasten and seal decks properly to prevent structural damage from water flowing into the **ledger plate** and **rim joists** of the house. A poor connection will shorten the life of the deck and require replacement or repairs far sooner. Carefully detailed connections seal water away from the structure of the house, which also can help protect indoor air from the mold and mildew problems associated with moisture.

Correctly connected decks are especially important in wet and flood-prone and coastal regions of New Jersey, as well as on older homes where age could contribute to structural concerns. A well-constructed connection means a deck will last considerably longer, reducing the need for repair and replacement. This saves money and conserves natural resources.

Plan projects for easy clean-up and disposal [IEQ162]

When planning for any outdoor construction, it is important to anticipate sawdust and other waste products and have a strategy for controlling and disposing them properly. Sawdust in particular can be dangerous if it gets into the water system where it can affect water quality for aquatic animals.

Proper removal of sawdust prevents it from polluting the water system or from getting indoors and into the air you breathe. When possible, recycling of waste products will save future resources.

The extra planning necessary for proper waste material management is not difficult, but it does require careful consideration.

Create a roof garden

Any flat or gently sloping roof (including those on garages and sheds) can potentially accommodate a **green roof**. This centuries-old practice has received renewed interest due not only to its aesthetic quality but also the environmental benefits associated with **green roofs**. **Green roofs** greatly reduce stormwater **runoff**, reduce the **heating and cooling loads** of a building, and help to increase the life span of the roof itself. Moreover, they increase green space and provide a habitat for birds, small animals, and insects.

Green roofs are known by many names - eco-roofs, rooftop gardens, vegetated rooftops, sky gardens, etc. Most **green roof** systems fall into two categories, **extensive** and **intensive**. This

categorization is based on soil depth, but determines a variety of factors including weight, cost, maintenance, plant selection, and function. Not all residential buildings may be structurally designed to handle intensive **green roof** systems (those that contain several feet of soil and can grow large plants and trees). Extensive **green roofs**, therefore, may be a more viable option. These **roof gardens** can contain a wide variety of plants that require minimal care: mosses, lichens, sedums, wildflowers, meadow grasses, etc.. While more limited in the range and size of plant species as a more intensive roof garden, they are cheaper both to create and maintain and provide many of the same environmental benefits.

Another avenue to pursue is a **container garden** that will allow a homeowner to grow a variety of vegetables and fruits in raised **planting beds** and plant containers. Growing tomatoes, cucumbers, or peppers in a **roof garden** is an excellent way for a homeowner to enjoy greater use of the roof.

Choose eco-friendly pool/hot tub options [EA97]

Swimming pools and hot tubs make great recreational additions to any home, but consume high levels of water and energy. Fortunately there are ways to minimize the environmental damage of pools and hot tubs.

Use a swimming pool cover for a simple, affordable way to prevent evaporation, the biggest source of energy loss in the pool. Prices vary as do styles, so homeowners should expect to spend more on certain alternatives, like a **solar cover**. The return on investment for a solar pool cover, however, will defray the up-front cost in greatly reduced heating costs. Hot tubs should be well-insulated and have a tight cover to reduce heat loss and evaporation.

Another popular option is to install a **solar pool heating system**. Swimming pools require simpler solar heating systems than homes due to their design, seasonal use, and lower temperature requirements. The cost for purchasing and installing a solar heating system can be high, but since such a system significantly reduces energy use thus eliminating all future pool heating bills, the payback period improves dramatically.

When possible, consider alternatives to high chlorination for swimming pools and hot tubs. **Copper/silver electrolysis**, **ionization**, and **UV** technologies offer alternatives to chemically-treated water. Saltwater pools are also viable alternatives, but may be subject to local prohibitions.

Use efficient lighting/minimize light pollution [EA88-89]

In recent decades, nighttime **light pollution** has become an increasing concern. While many cite safety as the main reason to keep areas lit at night, there are a host of problems associated with outdoor lighting. Not only does it block out the view of the night sky, it negatively impacts sleeping patterns and disturbs the natural cycles of plants and animals. In addition, too much nighttime lighting may actually reduce overall visibility. Excessive use of nighttime lighting puts additional energy cost burdens on both individual owners and to municipal and state governments. **Light pollution** is a major concern in densely-populated New Jersey, especially in its urban areas; our state's residents should seek opportunities to reduce their individual contributions to this problem.

Fortunately there are ways to reduce **light pollution**. Motion sensors provide light only when needed, which cuts overall lighting and saves electricity. Also, **full cut-off fixtures** limit light above or to the side of the fixture. These features are commonly available and, once installed, do not require daily maintenance. Consider replacing old light fixtures with **Energy Star®**-rated ones. Choose solar powered lamps as alternatives for lighting along driveways and walkways. These units store energy during the day, are easy to install and do not require any electricity or wiring.

Tips [EA88]

Since outdoor motion sensor lighting requires lamps that turn on instantaneously, incandescent bulbs are more appropriate than **CFLs** in those types of fixtures. Advances in **LED** lighting will make them more affordable than they currently are and a greener option for outdoor lighting.[4]

NJ Bio-Region [EA88]

In New Jersey, many municipalities and counties (including Eatontown, Hopewell Township, Moorestown, and Hunterdon County) have enacted outdoor lighting ordinances intended to control light pollution. More locations may follow suit as public awareness of the problems associated with light pollution increases. Be sure to check local ordinances for outdoor lighting requirements or restrictions.

Caution [EA88]

CFLs contain small amounts of mercury. Therefore, they need to be recycled properly. See the Resources section for information on how to clean up a broken **CFL**.

Choose eco-friendly furniture/accessories [MR154]

BENEFITS

ENERGY SAVINGS: N/A

WATER SAVINGS: N/A

RESOURCE CONSERVATION:

AIR QUALITY:

FEASIBILITY

INITIAL COST: $$

DIFFICULTY LEVEL:

Choosing outdoor furniture is difficult since weather degrades many materials. Furniture made from **virgin plastic** and **PVC** (vinyl) is generally inexpensive but degrades in sunlight, requiring more frequent replacement and creates solid waste problems. Therefore, consider locally-grown cedar products, **FSC-certified wood** furniture or furniture made from **High-Density Polyethylene (HDPE)** composite material.

For other outdoor equipment, look for durable products designed to withstand the elements, including stainless steel grills and terra-cotta fire pots. Whenever possible, consider using salvaged wood and other products for furniture or accessories. With a little creativity, salvaged products can make attractive outdoor accessories.

Tips [MR154]

Cover your outdoor furniture or store it indoors when not in use to protect it from New Jersey's extreme winter and summer weather.

General Design and Construction

Design to support connection with nature [SS15]

Resources:

HGTV: Outdoor Rooms

www.hgtv.com/gl-design-small-space/outdoor-rooms/index.html

References:

[1]**REGREEN Residential Remodeling Guidelines 2008**

www.regreenprogram.org/documents/regreen_guidelines.pdf

Site

Minimize site disturbance [SS29]

Resources:

NJDEP (2004) New Jersey Stormwater Best Management Practices Manual: Low Impact Checklist

www.state.nj.us/dep/stormwater/tier_A/pdf/Nj_SWBMP_A.pdf

NJDEP, New Jersey Erosion Control Standards

www.nj.gov/agriculture/divisions/anr/nrc/njerosion.html

NJDEP, Conservation Districts in New Jersey

www.nj.gov/agriculture/divisions/anr/nrc/conservdistricts.html

Rutgers New Jersey Agricultural Experiment Station: Transplanting Trees and Shrubs

www.njaes.rutgers.edu/pubs/publication.asp?pid=fs376

Controlling Soil Erosion and Sediment During Construction,
www.sanjuanislandscd.org/Information/Articles/assets/04-06percent20Erosionpercent20Controlpercent20Duringpercent20Construction.pdf

Conduct a soil test

Resources:

Rutgers: If Plants Could Talk

www.ifplantscouldtalk.rutgers.edu/

Rutgers New Jersey Agricultural Experiment Station: Soil Testing Laboratory

www.njaes.rutgers.edu/soiltestinglab/

Rutgers New Jersey Agricultural Experiment Station: Cooperative Extension County Offices

www.njaes.rutgers.edu/county/

References:

[2]**Rutgers Cooperative Research and Extension. Heckman, Joseph R., Lance-Scibilia, Susan and Murphy, Stephanie. 2004.**

Soil Testing for Home Lawns and Gardens
www.njaes.rutgers.edu/pubs/publication.asp?pid=fs797

Start a compost pile

Resources:

Rutgers New Jersey Agricultural Experiment Station (New Jersey Agricultural Experiment Station), Home Composting

www.njaes.rutgers.edu/pubs/publication.asp?pid=FS811

USEPA: Composting

www.EPA.gov/osw/conserve/rrr/composting/index.htm

New Jersey's Manual on Composting Leaves and Management of Other Yard Trimmings

www.nj.gov/dep/dshw/rrtp/compost/front.htm

New Jersey Agricultural Experiment Station: Backyard Leaf Composting

www.njaes.rutgers.edu/pubs/publication.asp?pid=fs074

New Jersey Agricultural Experiment Station: County Master Gardeners Office

www.njaes.rutgers.edu/county

Landscape for passive heating and cooling [SS30-31/36]

Resources:

The Tree Guide

www.arborday.org/treeguide/growth.cfm

N.J. Agricultural Experiment Station: Transplanting Trees and Shrubs

www.njaes.rutgers.edu/pubs/download-freeasp?strPubID=FS376

New Jersey Agricultural Experiment Station: How to Hire a Tree Care Professional

www.njaes.rutgers.edu/pubs/download-free.asp?strPubID=FS019

NJDEP: A Quick Reference to New Jersey's Biotic Forest Health Threats

www.nj.gov/dep/parksandforests/forest/forest_health_threats.pdf

New Jersey Agricultural Experiment Station: Plant and Pest Advisory

www.njaes.rutgers.edu/pubs/plantandpestadvisory/2001/ln0726.pdf

New Jersey Pest Management Association

www.njpma.com/consumers/index.html

Trees ROI Calculator

www.greenandsave.com/landscaping/gardens/trees.html

Minimize impervious surfaces [SS32]

Resources:

NJDEP: New Jersey Stormwater Best Management Practices Manual, Standard for Pervious Paving Systems

www.state.Nj.us/dep/**watershed**mgt/DOCS/BMP_DOCS/bmpfeb2004pdfs/feb2004chap9_7.pdf

Polluted Runoff: Sewage: Your Environmental Impacts

www.lowimpactliving.com/pages/your-impacts/**runoff**

New Jersey Agricultural Experiment Station : Rain Gardens

www.water.rutgers.edu/Fact_Sheets/fs513.pdf

New Jersey Agricultural Experiment Station : New Jersey's Stormwater Regulations

www.water.rutgers.edu/Fact_Sheets/fs556.pdf

Wisconsin Department of Natural Resources: Rain Gardens – A how-to manual for homeowners

www.dnr.state.wi.us/org/water/wm/dsfm/shore/documents/rgmanual.pdf

Replace lawn with turf grass or groundcover [SS34]

Resources:

Rubin, Carole et al. *How to Get Your Lawn Off Grass.* Harbour Publishing, 2002.

Rutgers New Jersey Agricultural Extension Service: Landscaping for Water Conservation

www.njaes.rutgers.edu/pubs/download-free.asp?strPubID=E080

Lawn Alternatives

www.eartheasy.com/grow_lawn_alternatives.htm

Reducing Lawn Area

www.recycleworks.org/greenbuilding/sus_lawnarea.html

References:

[3] USEPA WaterSense: Outdoor Water Use in the United States

www.epa.gov/watersense/pubs/outdoor.htm

Provide wildlife habitat [SS35]

Resources:

New Jersey Audubon Society: Backyard Habitat

www.njaudubon.org/Education/BackyardHabitat/

National Wildlife Federation: Create a Certified Wildlife Habitat

www.nwf.org/backyard/

USDA NCRS: Backyard Conservation – Wildlife Habitat

www.nrcs.usda.gov/feature/backyard/pdf/Wildlife.pdf

New Jersey Agricultural Experiment Station: Crop Profiles for Honey Bees in New Jersey

www.pestmanagement.rutgers.edu/njinpas/CropProfiles/NJHoneyBeeCP.pdf

New Jersey NCRS: Wildlife Habitat Incentives Program

www.nj.nrcs.usda.gov/programs/whip/

New Jersey Agricultural Experiment Station: County Extension

www.njaes.rutgers.edu/county

References:

[4] WHIP – New Jersey NCRS

www.nj.nrcs.usda.gov/programs/whip/

Provide for edible plants in landscape design [SS37]

Resources:

New Jersey Agricultural Experiment Station: Planning a Vegetable Garden

www.njaes.rutgers.edu/pubs/publication.asp?pid=FS129

New Jersey Agricultural Experiment Station: Varieties for New Jersey Vegetable Gardens

www.njaes.rutgers.edu/pubs/publication.asp?pid=FS681

N.J. Agricultural Experiment Station: Selecting Blueberry Varieties for the Home Garden

www.njaes.rutgers.edu/pubs/publication.asp?pid=FS419

New Jersey Agricultural Experiment Station, Lead Contaminated Soil: Minimizing Health Risks

www.njaes.rutgers.edu/pubs/publication.asp?pid=FS336

New Jersey Agricultural Experiment Station: Soil Testing Laboratory

www.njaes.rutgers.edu/soiltestinglab/

Virginia Cooperative Extension, Intensive Gardening Methods

www.ext.vt.edu/pubs/envirohort/426-335/426-335.html

Utilize Integrated Pest Management [SS38]

Resources:

National Sustainable Agriculture Information Service, Companion Planting: Basic Concepts and Resources

www.attra.ncat.org/attra-pub/complant.html

USEPA, Integrated Pest Management

www.EPA.gov/agriculture/tIpm.html

New Jersey Agricultural Experiment Station, Cooperative Extension Pest Management Office

www.pestmanagement.rutgers.edu/index.htm

Washington Toxics Coalition, Lawn and Garden Chemicals

www.watoxics.org/homes-and-gardens/lawn-and-garden

Association of New Jersey Environmental Commissions, Integrated Pest Management

www.anjec.org/html/ipm.htm.

Division of Parks & Forestry – Tree Care & Pests and Diseases

www.state.nj.us/dep/parksandforests/forest/community/Tree_care.htm

Provide rainwater collection system [WE40]

Resources:

Chesapeake Bay Foundation: Build Your Own Rain Barrel

www.cbf.org/site/DocServer/rain_barrel_guide-web.pdf?docID=2868

Mid-America Regional Council: Build Your Own Rain Barrel

www.marc.org/Environment/Water/buildrainbarrel.htm

Home & Garden Television: Rain Barrels

www.hgtv.com/landscaping/rain-barrels/index.html

Rainwater Collection

www.greenandsave.com/utility_savings/water/rain_water_collection.html

Green Values Stormwater Calculator

www.greenvalues.cnt.org/calculator

NJ Department of Agriculture – Jersey Grown

www.jerseygrown.nj.gov/

Outdoor Structures

Use eco-friendly patio/decking materials [MR111-113]

Resources:

REGREEN Product Checklist

www.regreenprogram.org/documents/product_checklist.pdf

Green Living Ideas – Sustainable Decking Solutions

www.greenlivingideas.com/decking/sustainable-decking-solutions.html

Decking

www.greenandsave.com/landscaping/patio_deck/decking.html

Properly detail between deck to house [IDP28]

Resources:

U.S. Forest Service, Details for a Lasting Deck

www.fpl.fs.fed.us/documnts/pdf1997/falk97d.pdf

This Old House, Building a Safe Deck

www.thisoldhouse.com/toh/article/0,,212625,00.html

REGREEN Guidelines, IDP 28 Deck Attachment at Band Joist, p.143

www.regreenprogram.org/

Plan projects for easy clean-up and disposal [IEQ162]

Resources:

Lumber Pressure Treated with CCA

www.dec.ny.gov/chemical/8790.html#epaalt

Create a roof garden

Resources:

The Environment Site Green Living Guides – Building a Roof Garden

www.theenvironmentsite.org/guides/eco-friendly-roof/building-a-roof-garden/

Green Roofs for Healthy Cities, greenroofs.org/

USEPA: Green Roofs

www.EPA.gov/hiri/strategies/greenroofs.html

Earth Pledge – About Green Roofs

www.earthpledge.org/gr/more-about-green-roofs

Michigan State University - Green Roof Research Program

www.hrt.msu.edu/greenroof/

Osmundson, Theodore H. *Roof Gardens: History, Design, and Construction.* New York: W.W. Norton and Co. 1999

National Renewable Energy Laboratory – Solar Hot Water

www.nrel.gov/learning/re_solar_hot_water.html

Choose eco-friendly pool/hot tub options [EA97]

Resources:

Energy Efficiency Fact Sheet: Hot Tub and Pool Conservation Tips

www.energy.wsu.edu/documents/building/res/spatips.pdf

National Renewable Energy Laboratory, "Conserving Energy and Heating Your Swimming Pool with Solar Energy"

www.nrel.gov/docs/fy00osti/28038.pdf

U.S. Department of Energy: A Consumer's Guide to Swimming Pool Heating

www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13130

Lighting and Electrical

Use efficient lighting/minimize light pollution [EA88-89]

Resources:

USEPA Energy Star® - Light Bulbs and Fixtures

www.EnergyStar.gov/index.cfm?c=lighting.pr_lighting

USEPA, Mercury – Spills, Disposal and Site Cleanup

www.EPA.gov/mercury/spills/index.htm

Greenandsave.com: Solar Path and Garden Lights

www.greenandsave.com/landscaping/lighting/solar_path_and_garden_lights.html

International Dark Sky Association, www.darksky.org

New Jersey Astronomical Association, Light Pollution

www.njaa.org/light.html

NJDEP, Outdoor Lighting Ordinance Guide

www.state.Nj.us/dep/opsc/docs/Sample_Lighting_Ordinance.PDF

Furniture and Fittings

Choose eco-friendly furniture/accessories [MR154]

Resources:

Five Eco-Friendly Outdoor Furniture Brands

www.associatedcontent.com/article/678943/five_ecofriendly_outdoor_furniture.html?cat=6

Greening Your Outdoor Furniture

www.hubpages.com/hub/Greening_Your_Outdoor_Furniture

Case Study

Location of Project: Bernardsville, New Jersey

Landscape Architect: Michael Fleischacker CLA, ASLA, **LEED** AP

General Contractor: Back to Nature

Overview and Scope

This project involved a home converted from stables located on a six-acre property. The homeowners approached Back to Nature in 2002 to help transform the outdoor spaces surrounding the home to be in tune with their organic, nature-loving, and family-oriented lifestyle. The project incorporated several environmentally-conscious strategies, and the outdoor spaces continue to develop as a reflection of the clients' green lifestyle.

Design Approach

The original goal of this project was to create a series of outdoor rooms that would "unfold" in a way similar to the indoor rooms of a home. The project started with a site master plan that evaluated the barriers between indoors and out. Over the next seven years, the landscape architect continued working with the client as the project evolved in the areas of growing organic food, restoring native habitats, integrating alternative energies and stormwater retention practices, promoting a healthy and inviting atmosphere for family and friends, and connecting the homeowners with their land.

Team and Process

An integrated design process has played a value-adding role in realizing the potential of this project. Over the course of this outdoor remodel, stakeholders have included the clients, the landscape architect, architects, contractors from all trades, engineers, arborists, organic consultants, apiary specialists, forest managers, municipal agents, and neighbors.

Finance

Costs are an important consideration for all projects. This venture was no different as costs were woven into the fabric of the project. The project team anticipated and realized both tangible and intangible returns on the investments into this project including a decreased reliance on purchased produce, transportation energy savings and a greatly expanded living space.

Lessons and Trade-offs

The landscape architect points out that there are always surprises in the construction industry; it is a matter of recognizing that fact and anticipating as many of the surprises as you can up front. Having said that, he did not think he would have done anything differently. One thing that this project taught him was that the entire process must be flexible and evolve the same way that the stakeholders and the site do. The world is constantly changing, and so all projects must evolve with it.

"The most rewarding aspect of this project is the relationships I have found myself in with the clients and the other professionals that have had a stake in this regenerative residence."

- Michael Fleischacker

Streetside garden

Organic garden

Compost bins

List of Green Strategies

Native Restoration

- Converted lawn to birch grove garden, woodland gardens, and native stone terraces
- Removed invasive species and reintroduced **native species** to woodland ground covers and understory
- Removed stilt grass and lawn from septic field area and reseeded with native prairie mix

Growing organic food and flowers

- Planted peach, pear, and apple trees in orchard
- Created a part-shade herb and vegetable garden with plants selected for their historic medicinal and food value
- Incorporated raised garden beds and a kitchen/cutting garden that expanded significantly the farming capabilities of the property
- Incorporated cold frames to extend the growing seasons and provide a controlled environment for drying fruit, herbs, and vegetables
- Created compost bins from cedar logs, allowing for 100 percent of biodegradable waste to remain on-site and be reintroduced as compost soil in the garden beds
- Built a corn crib-inspired wood shed used to split and store wood harvested from dead or fallen trees, which then are used in wood burning stoves as alternative heating for the residence and ancillary structures
- Created an apiary garden with a beehive that produces fresh honey for a variety of family uses while adding value to the gardens through pollination
- Proposed future projects, including a "green" greenhouse and free range chicken

New pavillion

Other Green Strategies

- Installed low voltage landscape lighting
- Planted edible "living" holiday trees for wildlife habitat and food throughout the winter
- Utilized regional materials and contractors for all aspects of this project.
- Installed an outdoor kitchen
- Proposed **photovoltaic** array, salt water spa, and solar energy for water heating

Kitchen garden

Before

After

Case Study

Location of Project: Bucks County, PA

Homeowners: Richard and Barbara Geller

Architect: Moira McClintock, Jane Wilson, Ford3 Architects

General Contractor: Robert Mitchell

Landscape Architect: Barbara Geller, Landscape Designer, GardensByBarbara

Area Affected: Approximately 600 square feet

Overview and Scope

The project was a new 'garden room' addition to a historical 18th century bank barn that was converted into a home in the 1970's. The owners wanted to have the addition integrate with both the existing living space and the surrounding landscape, using similar materials and repeating design elements. The room was intended to expand the size of the indoor living area yet convey the feeling of being outdoors and close to nature.

Since the owner is a landscape designer and believes in advancing ecological goals, the possibility of incorporating a vegetative **green roof** was seriously considered during design discussions.

Design Approach

The architects are committed to green solutions and implement both active and passive sustainable technologies in their projects. They encouraged exploration and had access to knowledgeable local contacts.

The owner was particularly attracted to the aesthetics and ecological advantages of using a **green roof**. In addition, she was open to using other green technologies, if cost effective.

Team and Process

The homeowners and designers each had a general orientation to green solutions. The architects, in particular, had many successful green project implementations. The building contractor had many years of experience working in the Bucks County area and had previously done work for the owners. He, however, had no experience with green technologies. For the **green roof** installation, he worked closely with the **green roof** suppliers to make sure all components were correctly installed. Over time, he became very committed to the project and felt a genuine pride and enthusiasm in his contribution.

Finance

Since the actual size of the **green roof** was relatively small (approximately 250 square feet), the added cost of a **green roof** was not as much of an issue as it would have been for a larger area. The owner/landscape designer was committed to doing a **green roof**; the additional cost was not an issue.

The owner is a recent graduate of the NY Botanical Garden in Landscape Design and had many contacts at the school for suppliers of **green roof** materials. She acquired estimates for building the **green roof** from several of these established **green roof** supplier/builder teams prior to actually selecting the supplier and builder. When a builder the owner had previously used said he would come out of retirement and travel up from Florida to do the project, the owners decided it was an offer too good to refuse. The actual cost incurred by purchasing the supplies directly from a **green roof** supplier and using the owners' contractor was approximately 10 percent less than working with an established supplier/builder team. The cost of the **green roof** was approximately 15 percent more than a high quality copper standing seam roof which would have been the alternate choice.

The owner anticipates a lower cost for heating and air conditioning as a result of installing a **green roof** and having good cross ventilation compared to a more traditional roof. The savings, however, are difficult to quantify since the room has only existed with a **green roof** and there would be no other comparable experience.

Lessons and Trade-offs

There were no serious surprises with this project. The roof was designed and built in an arched form to match the surrounding landscape. The construction work involved in implementing the roof curve was more than anticipated and added to the complexity of installing the **green roof** components.

Serious planning was required to determine the plants for the **green roof**. The site is only sunny for about a third of the day, so sedum plants, which are traditionally used for **green roofs** and thrive in the hot, dry sun, were not an option. Instead, the landscape designer decided to use a palette of low-maintenance, drought-tolerant, ground cover plants with various leaf textures and flowering times. The plants were installed in late August 2008 and have thrived in the special **green roof** growing media. It is anticipated that some supplemental watering will be required for the first year or two until the plants are well established. This plant palette also required a media depth of 4 - 5 inches. The structural engineer needed to take into account this additional roof load when specifying the **glulam** support beams.

In the opinion of the landscape designer and owner, the combination of the aesthetics of a **green roof** and its ecological advantages make it an obvious solution for anyone who is interested in the environment and has an appreciation of nature.

"I felt the project was a great example of collaboration and synergy between the architects, builder and owner. Each provided their own particular expertise and worked collaboratively with the others, presenting ideas and brainstorming solutions. The final result is terrific ."

- Barbara Geller, owner/landscape designer

Green roof over new addition

List of Green Strategies

Energy Conservation

- Installed **green roof** to reduce **heating and cooling load**
- Incorporated cross ventilation into window design to reduce cooling load
- Installed **roof overhang** to reduce summer heat gain and increase winter **passive heat** gain from the sun
- Installed radiant floor heating
- Increased roof insulation **R-Value** by using foam insulation

Water Conservation

- Reduced stormwater **runoff** by installing **green roof**

Resource Conservation

- Reused Bucks County field stone from an abandoned stone wall found up the road from new structure

Outdoor Air Quality

- Increased carbon dioxide absorption and oxygen emission from the **green roof** plant photosynthesis

Before

After

Green Products and Services

Introduction

The purpose of the Green Products and Services is to help homeowners navigate the market with some helpful tips on what to look for when shopping for a particular green home remodeling project. The Guide is organized by building system and lists the general products and services that pertain to remodeling tasks within that system. It includes features and applicable certifications to look for, as well as web links to more information on that product or service. Each item in the Guide also refers to the related REGREEN strategy IDs.

Please note that the New Jersey Green Home Remodeling Guidelines Version 1.0 do not endorse any particular brand or company. It is not the function of the Green Product and Service Guide to direct the consumer to a specific product, but rather to provide a resource to seek out an appropriate manufacturer or service provider to handle remodeling needs.

With the ever-increasing number of green products and services coming into the home remodeling market, finding the appropriate ones can be a challenge. Some manufacturers market products as "green" when in reality they are only marginally better for the environment or whose green features are neutralized by other aspects of their manufacturing or composition. This phenomenon is referred to as "greenwashing" and calls on consumers to seek out references and ensure the true extent of green value.

Product Certification Programs

That being said, there are several leading green product standards and certification programs that can help consumers identify products that meet predefined green criteria. The leading green product standards and programs include:

- Energy Star® - identifies efficient products that reliably deliver energy savings and environmental benefits
- WaterSense – identifies high performing, water efficient products and practices
- Cradle to Cradle - certifies products based on lifecycle of materials used to construct a product and the overall lifecycle of the product
- GreenGuard® Certification Program - certifies products and processes for their low chemical emissions and low toxicity
- Green Seal® - certifies products and practices for their low toxicity and overall environmental impact
- GreenSpec Directory - a published resource on environmentally preferable products
- Forest Stewardship Council (FSC)- certifies wood products coming from forests managed to meet social economic and ecological needs
- Sustainable Forestry Initiative (SFI) - certifies wood products coming from well-managed forests and responsible procurement practices
- National Fenestration Rating Council® (NFRC) - a non-profit organization that administers the only uniform, independent rating and labeling system for the energy performance of windows, doors, skylights, and attachment products

For more information on various certification programs currently in use by architects and designers see:

- the ecolibrary™matrix - www.thegreenstandard.org/documents/GGNC09_EcoLibCert.pdf
- Gaia Product Profile developed by The Green Standard™ - www.thegreenstandard.org/gaia.html

Two other reputable sources for green products and services are:

- Green Building Advisor that lists products from the GreenSpec Guide to Residential Building Materials www.greenbuildingadvisor.com/
- National Association of Home Builders (NAHB) Research Center - www.nahbrc.org/manufacturer/greenapproved/index.aspx

Product Standards for GreenSpec[1]

1. Products Made with Salvaged, Recycled, or Agricultural Waste Content
   a. Salvaged products
   b. Products with **post-consumer recycled content**
   c. Products with **pre-consumer recycled content**
   d. Products made with agricultural crop waste material

2. Products That Conserve Natural Resources
   a. Products that reduce material use
   b. Products with exceptional durability or low maintenance requirements
   c. Certified wood products
   d. Rapidly renewable products

3. Products That Avoid Toxic or Other Emissions
   a. Natural or minimally processed products
   b. Alternatives to ozone-depleting substances
   c Alternatives to hazardous products
   d. Products that reduce or eliminate pesticide treatments
   e. Products that reduce stormwater pollution
   f. Products that reduce impacts from construction or demolition activities
   g. Products that reduce pollution or waste from operations

4. Products That Save Energy or Water
   a. Building components that reduce heating and cooling loads
   b. Equipment that conserves energy and manages loads
   c. Renewable energy and fuel cell equipment
   d. Fixtures and equipment that conserve water

5. Products That Contribute to a Safe, Healthy Built Environment
   a. Products that do not release significant pollutants into the building
   b. Products that block the introduction, development, or spread of indoor contaminants
   c. Products that remove indoor pollutants
   d. Products that warn occupants of health hazards in the building
   e. Products that improve light quality
   f. Products that help noise control
   g. Products that enhance community well-being

Sources

[1] The online GreenSpec® Directory lists product descriptions for over 2,000 environmentally preferable products at www.buildinggreen.com

Alex Wilson."Building Materials: What Makes a Product Green?" EBN Volume 9, Issue 1 (revised January, 2006) www.buildinggreen.com/auth/article.cfm?fileName=090101a.xml

Outdoor Living and Landscaping

Site

Product	Features	Certifications	Product Directory/Service Resources	REGREEN ID
New Jersey native plants	Locally grown plants that will thrive in New Jersey's climate and advance local biodiversity. Shop at local nurseries, university agriculture sales, etc.		National Gardening Association www.garden.org/home Native Plant Society of New Jersey, List of New Jersey Native Plants: www.npsnj.org/lists_njplants.htm Conserving Energy with Landscaping www.ext.vt.edu/pubs/envirohort/426-712/426-712.html NJ Department of Agriculture – Jersey Grown www.jerseygrown.nj.gov/	SS34/35/37-38
Block pavers	Use block pavers for driveways, entryways, walkways, or terraces.		ToolBase Services. Permeable Pavement www.toolbase.org/Techinventory/TechDetails.aspx?ContentDetailID=6604&BucketID=6&ategoryID=11	SS32
Pavement	Use porous pavement materials and/or materials that reflect the sun.		Cool Pavements - USEPA www.epa.gov/heatisland/mitigation/pavements.htm Cool Paving -The Encyclopedia of Earth www.eoearth.org/article/Cool_paving	SS32
Porous concrete	Use porous concrete. It requires the same equipment as standard concrete. The mix is composed of gravel and a low water-to-concrete ratio.	American Society for Testing and Materials - ASTM 1319 (standard specifications for Concrete Grid Paving Units) requires a minimum compressive strength of 5000 psi.	PerviousPavement.org, "Pervious Concrete" www.perviouspavement.org	SS32
Rain garden plants	Select appropriate rain garden plants.		Rain Garden Network www.raingardennetwork.com NJAES, Rutgers University njaes.rutgers.edu	WE40

Product	Features	Certifications	Product Directory/Service Resources	REGREEN ID
Pesticide	For gardening, look for an insecticidal soap and a broad-spectrum natural pesticide containing neem oil, spinosad, or pyrethrum.		Natural Pesticides www.livingwithbugs.com/natural_pesticides.html Earth Easy - Natural Lawn Care www.eartheasy.com/grow_lawn_care.htm	SS38
Erosion control products	Silt fencing and mulching help control erosion, especially during construction. Use socks filled with chipped or ground wood to reduce soil erosion and manage runoff.		Controlling Soil Erosion and Sediment During Construction www.sanjuanislandscd.org/Information/Articles/assets/04-06percent20ErosionpercentControlpercentDuringpercentConstruction.pdf	SS29
Fertilizer	For lawn care, use a fertilizer with time-released, water-insoluble nitrogen, or use composting for natural fertilizer. Control weeds with corn gluten (which kills weed seedlings) and spot-spray weeds with a solution of 5 parts white vinegar, 2 parts water, 1 part dish soap.		Earth Easy - Natural Lawn Care www.eartheasy.com/grow_lawn_care.htm	SS34
Outdoor Structures				
Sustainably harvested wood	Wood labeled FSC is certified by the Forest Stewardship Council (FSC) and meets high social and environmental harvesting criteria.	FSC	How To Find Sustainable Wood www.thedailygreen.com/environmental-news/community-news/sustainably-harvested-wood-66120201 Plastic Lumber Guide: Healthy Building Network healthybuilding.live.radicaldesigns.org/downloads/gtpl_condensed.pdf	MR111-113
Plastic lumber	HDPE wood plastic composites	FSC	Plastic Lumber Guide Healthy Building Network: healthybuilding.live.radicaldesigns.org/downloads/gtpl_condensed.pdf California Integrated Waste Management Board's Recycled Content Product Directory www.ciwmb.ca.gov/RCP/	MR111-113
Rain barrel	Rain barrels either can be purchased or homemade. Several online retailers and some hardware or garden stores sell rain barrels of varying size and complexity.		Chesapeake Bay Foundation: Build Your Own Rain Barrel www.cbf.org/site/DocServer/rain_barrel_guide-web.pdf?docID=2868 Mid-America Regional Council: Build Your Own Rain Barrel www.marc.org/Environment/Water/buildrainbarrel.htm Home & Garden Television: Rain Barrels www.hgtv.com/landscaping/rain-barrels/index.html	WE40

Outdoor Living and Landscaping

Site

Product	Features	Certifications	Product Directory/Service Resources	REGREEN ID
Pool chemicals	Copper/silver ionization and UV technologies are effective non-chemical strategies to keep pools clean and free from harmful pathogens.		Green Style Mag: Eco-friendly Pool Treatment www.greenstylemag.com/blog/?p=845 Associated Content "Eco Friendly Swimming Pool Supplies" www.associatedcontent.com/article/1837785/eco_friendly_swimming_pool_supplies.html?cat=6 Coolest Gadgets - Solar Powered Pool Purifier www.coolest-gadgets.com/20070629/solar-powered-pool-purifier-makes-swimming-nearly-chemical-free/	EA97
Compost bin	Protected area to collect yard and vegetable waste to make organic soil.		University of Missouri Extention: How to Build a Compost Bin www.extension.missouri.edu/publications/DisplayPub.aspx?P=G6957 Backyard Gardener: Garden Compost Site www.backyardgardener.com/compost/index.html	
Lighting and Electrical				
Energy efficient lighting	CFLs or LEDs; solar lighting fixtures	ENERGY STAR	USEPA Energy Star®, Light Bulbs and Fixtures www.energystar.gov/index.cfm?c=lighting.pr_lighting Lighting Research Center Outdoor Lighting Handbook www.lrc.rpi.edu/researchAreas/outdoor.asp International Dark Sky Association www.darksky.org	EA88-89
Furniture and Fittings				
Outdoor furniture	Look for products made with sustainably harvested wood or recycled content.	FSC	Eco-Friendly Outdoor Furnishings: The Home Know-It-All www.thehomeknowitall.com/the_home_knowitall/2008/05/eco-freindly-ou.html	MR154

aquifer An aquifer is an underground formation of permeable material that contains a substantial quantity of water.

arbor(s) Arbors or pergolas, as they are commonly known, typically consist of a combination of pillars, cross beams, and lattice work upon which vegetation such as vines can be trained and provide shade. Some varieties are attached to existing structures including houses or decks.

asbestos Asbestos is the name given to a number of naturally occurring, fibrous silicate minerals mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. Asbestos is commonly used as an acoustic insulator, and in thermal insulation, fire proofing and other building materials. Many products in use today contain asbestos.

biophilia The term biophilia literally means the "love of living things." It was coined by Edward O. Wilson, an entomologist at Harvard University, to describe his hypothesis that humans have an inherent connection to nature associated with our evolution.

borate(s) Borates are boron-containing, naturally-occurring minerals. Common commercial applications of borates include wood treatment, detergent additive, and plant fertilizer.

combustion appliances Combustion equipment refers to appliances that burn fuels including stoves, water heaters, and clothes dryers. It is important to make sure that these appliances work correctly and are properly ventilated to prevent carbon monoxide, a byproduct of combustion, from entering the home.

Compact Fluorescent Lights (CFLs) Compact fluorescent lights are the miniature fluorescent lights that can screw into standard light fixtures that conventionally use incandescent bulbs. CFLs are more energy-efficient and durable than incandescent bulbs.

companion planting Companion planting can be described as the establishment of two or more plant species in close proximity so that some natural benefit (pest control, higher yield, etc.) is derived.

compost pile A compost pile consists of organic matter including lawn clippings, leaves, and branches that is typically collected in a bin where it can decompose and be added to plant beds improving the soil quality with nutrients.

container garden Containers including planter boxes, wooden barrels, and large flower pots can be filled with soil, be planted, and arranged as an addition to an existing garden or to create a new one where plants wouldn't otherwise be able to grow in places such as rooftops or patios.

cooling load Cooling load refers to the amount of heat that gets removed by an HVAC system.

copper/silver electrolysis Electrolysis is the process by which an electric current is passed through a substance that causes it to gain or lose electrons.

deciduous tree(s) Deciduous trees are species that shed their leaves for part of the year.

dethatch Dethatching is the removal of dead grass from a lawn.

disposable respirators Disposable respirators or filtering facepieces can be made of cloth or paper and are designed to clean the air as you breathe it to prevent you from inhaling irritating substances.

drip-irrigation Drip, or micro-irrigation, technology uses a network of plastic pipes or soaker hoses to carry a low flow of water under low pressure to plants. Drip irrigation exceeds 90 percent efficiency whereas sprinkler systems are 50 to 70 percent efficient.

dripline The dripline of a tree refers to the area of ground located directly under the circumference of its outermost branches. This area indicates where the tree should be watered as opposed to the base of its trunk where it can develop root rot.

erosion Erosion is the process by which soil and rock are worn away through water, wind, ice and wave transport.

evergreen trees Evergreen trees retain their needles or leaves through the winter and into the next growing season.

fine fescue Fine fescues are grasses chosen for their advantageous IPM qualities such as drought tolerance, low maintenance, texture and color differences, and their performance as natural or unmowed areas.

Forest Stewardship Council (FSC) – Certified Wood The Forest Stewardship Council certifies wood that complies with its standards-disapproving of illegally harvested wood, wood harvested in violation of traditional and civil rights, in forests in which high conservation values (areas particularly worthy of protection) are threatened through management activities, from conversion of natural forests, and from areas where genetically modified trees are planted.

full cut-off fixture Full cut-off light fixtures direct light from outdoor light sources to where it is needed and block excess light that is emitted upwards or sideways reducing light pollution.

garden bed Garden beds are designated areas in a landscape for plants and other natural materials.

genetic diversity Genetic diversity refers to the variety in a gene pool of a species or population.

glazing Window glazings are compounds applied to glass to reduce the amount of heat transfer between the interior and the exterior of a building and/or the ultra-violet (UV) light passing that passes through it.

glulam Glulam is a structural timber product composed of laminated layers of wood. It is generally composed of woods that could otherwise be waste. The laminate strengthens the beams making them good elements for green roofs.

green roof Green roofs are contained vegetative roof coverings that provide a variety of economic, ecological, and aesthetic benefits including reducing the heating/cooling loads of the building, reducing runoff, and producing oxygen among others.

- **extensive** Extensive green roofs are 6 inches or shallower and are frequently designed to satisfy specific engineering and performance goals.
- **intensive** Intensive green roofs may become quite deep and merge into more familiar on-structure plaza landscapes with promenades, lawn, large perennial plants, and trees.

hardy turf grass Hardy turf grasses are able to grow in a variety of conditions and are low maintenance reducing the need for fertilizers and pesticides.

heat island effect The heat island effect occurs in densely urbanized areas where impermeable roof and pavement temperatures increase during the summer, elevating the air temperature. This in turn generates a greater demand in energy consumption for cooling systems which concentrates air pollutants and creates smog. Runoff from these heated surfaces reaches waterways where it can increase the water temperature and negatively affect ecosystems.

HEPA filtered air scrubbers High efficiency particulate air or HEPA air filters are a type of high-efficiency air filter that remove at least 99.97% of airborne particles down to a size of 0.3 micrometers (µm) in diameter.

HEPA vacuum High efficiency particulate air or HEPA filters are a type of high-efficiency air filter that remove at least 99.97% of airborne particles 0.3 micrometers (µm) in diameter. HEPA filter used in vacuum cleaners trap the fine particles (such as pollen and dust mite feces) which trigger allergy and asthma symptoms.

High-Density Polyethylene (HDPE) High-density polyethylene (HDPE) is a thermoplastic used to make milk bottles, packaging containers, toys and other products. It is known for its resistance to most chemicals, high impact tensile strength, and insolubility in organic solvents.

Home Performance Audit Home Performance Audits are conducted to assess the energy efficiency of a home and evaluate possible energy saving measures.

IICRC S500 Guidelines The Institute of Inspection, Cleaning and Restoration is an independent, non-profit certification body that sets and promotes standards for the inspection, cleaning and restoration service industry. These guidelines provide specific practical standards for water damage restoration.

impervious surface Impervious surfaces such as concrete and conventional asphalt that do not allow water penetration.

indoor sunspace Indoor sunspaces provide a buffer between a home's interior and exterior reducing the exposure of temperature fluctuation and direct sunlight. Made of glass, they may serve as an additional living space where the user can enjoy the natural warmth and light produced by the sun.

infiltration Infiltration is the process by which water seeps through the ground before reaching a nearby water body or an aquifer.

Integrated Pest Management (IPM) Integrated Pest Management is an effective and environmentally sensitive form of pest management that utilizes monitoring, prevention, and control techniques.

ionization Ionization is a treatment where water passes through a metal chamber (usually copper or silver) exposed to a low voltage causing the ions to penetrate the outer membrane of any pathogens in the water and thus kill or render them harmless.

ledger plate A ledger plate is a strip of wood laid flat across the tops of studding as a support for joists.

Light-Emitting Diode (LED) Light Emitting Diodes are electronic light sources that use less energy than incandescent bulbs or compact fluorescent lamps.

Light Organic Solvent Preservatives (LOSPs) Light organic solvent preservatives contain insecticides and sometimes water repellents to protect wood from pests and weather conditions.

light pollution Light pollution is excessive, unwanted light typically projected upward and/or outward from an artificial light source.

mold amplification sites Mold amplification sites are locations where mold has built up over time. Typical sites of indoor mold buildup are damp cellulosic materials (e.g., wallboard paper, wallpaper, carpet backing, damp papers); debris in ventilation ducts, in carpets, or in mattresses or upholstered furniture; poorly maintained humidifiers; insulation on which organic film has accumulated; constantly humid painted, caulked or plastic surfaces (e.g., windowsills, shower stalls, cold air return vents); and potted plant soils.

National Fenestration Rating Council (NFRC) The National Fenestration Rating Council (NFRC) is a non-profit organization that administers the only uniform, independent rating and labeling system for the energy performance of windows, doors, skylights, and attachment products.

native plants/species Native plants, species or trees that occur in the region in which they evolved.

natural pest management Natural pest management employs pest control techniques that are environmentally sensitive and effective based on prevention, monitoring, and using the least toxic chemicals possible.

non-porous Non-porous materials lack any spaces where gasses or liquids can pass through.

organic amendments An organic soil amendment improves soil's water retention, permeability, water infiltration, drainage, aeration and structure by adding materials such as wood chips, grass clippings, straw, compost, manure, sawdust and wood ash. Organic is a greener substitute for inorganic amendments that use non-living or synthetic materials.

pH pH is a measure of the acidity or basicity of a solution. Solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are said to be basic or alkaline.

planting bed Planting beds are areas designated in a landscape for planting.

porous Porous materials have spaces through which gases and/or liquids can pass.

pressure-treated lumber Pressure-treated lumber undergoes a process where chemical preservatives are infused deeply within. These products are insect and rot resistant and can be found in a variety of forms including boards, posts, and plywood primarily for exterior use.

PVC (vinyl) Polyvinyl chloride is a plastic commonly used as piping that is capable of off-gassing harmful chemicals.

rainwater collection system Rainwater collection systems, also known as rainwater catchment systems or rainwater harvesting, employ a system of gutters, pipes, and containers to collect and store rainwater from roofs. Depending on the amount of water collected, it can serve as a primary or supplementary water source for such uses as watering plants. Collecting rainwater reduces runoff and saves resources.

rainwater garden Rainwater gardens are constructed landscape systems that utilize native plants to collect runoff.

rim joist Rim joists are the boards that cap the ends of the floor system.

roof garden Roof gardens are landscape systems constructed on a building's roof to reduce runoff, decrease heat island effect as well as cooling load in the summer and heating load in the winter, remove air pollutants, and add aesthetic value among other purposes.

runoff Runoff is water that doesn't infiltrate the ground but instead flows above ground to a water body.

single-pane window Single-paned windows have only one piece of glass separating the interior and exterior of a home. Double-pane windows are considered to be much more energy-efficient.

solar cover Solar covers are used to retain the water temperature in pools and may also serve as a form of protection.

solar pool heating system In solar pool heating systems water circulates through a large heat exchange surface, usually located on your roof, and absorbs the sun's energy. Most solar 'collectors' are flat black panels manufactured from high technology plastics which have been designed to resist weather and ultraviolet radiation. These heating systems can also be used for hot tubs.

stormwater recharge Stormwater recharge is the active restoration of groundwater resources by way of stormwater drainage systems.

tall fescue Tall fescues are grasses that can grow in cool conditions as a lawn, for erosion control, athletic fields, and other uses.

thatch Thatch is a layer of grass stems, roots, clippings, and debris that settle on the ground and either slowly decompose and/or accumulate over time. Some thatch is healthy for a lawn, but excessive thatch (over 1/2 inch thick) creates a favorable environment for pests and disease, an unfavorable growing environment for grass roots, and can interfere with some lawn care practices.

topsoil Topsoil is the outermost layer of soil primarily composed of organic matter.

trellis Trellises are structures that usually consist of latticework to support vegetation including vines and other creeping plants.

Ultraviolet (UV) technologies Ultraviolet technologies include systems that utilize ultraviolet radiation for purposes such as water treatment.

vegetative infiltration swale Vegetative infiltration swales are planted areas intended to catch runoff where it can be filtered and enter the ground.

virgin material Virgin material is made exclusively with raw materials and contains no recycled content.

watershed Watersheds physically describe the drainage basins of a region including all lands and water bodies that flow into it main waterway.

windbreak Windbreaks are barriers typically consisting of trees, shrubs, crops, fences, and other materials to direct wind flow.