JCTOD Outreach, Inc.
d/b/a
Johnson Park Center

LEED for Homes

Owner's Manual

Johnson Park Apartments V

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Overview

JCTOD Outreach Inc. d/b/a Johnson Park Center ("JPC") is the proud owner of affordable housing units located at 1418 West Street and 210-212 Arthur Street in the City of Utica, New York ("JPA V"), that have been certified "green" under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) for Homes Program. In addition, your homes have been certified with an ENERGY STAR® rating through the National ENERGY STAR Program, the US Environmental Protection Agency, and the US Department of Energy. These certifications mean that these apartment buildings have been built, inspected, tested and certified to provide increased comfort, reduced utility and maintenance costs, improved indoor air quality, and a minimized effect on the local and global environments.

As the owner of a green home, it is important to be familiar with the various systems in the home and learn what to do so that owners and tenants can enjoy all of the home's benefits for years to come. A list of all of the measures installed in your LEED-certified home is shown in the Project Checklist in Appendix A of this manual. Further information on these measures can be found in the LEED for Homes Rating System[1].

The purpose of this document is to:

Part 1. Provide a general description of green homes and the certifications obtain for your home, including LEED for Homes and ENERGY STAR.

Part 2. Highlight the operation and maintenance procedures for the LEED for Homes measures that are installed in your home. Note that many of the LEED for Homes measures installed in your home should not require any operations or maintenance. For example, insulation that is more effective than what is required by code is installed behind the drywall. This and other measures installed behind the drywall should provide their intended benefits throughout the life of your home, without the need for maintenance. Features that do not require maintenance are not included in this manual.

Part 3. Describe some of the special LEED features that your builder has installed in your home. Your builder has included these special features to improve substantially the overall performance of your home.

Part 4. Provide green lifestyle tips. Your LEED-certified home includes many measures for *efficiency* (i.e., getting more useful output, such as light, hot water, etc. for the amount of energy supplied). You can further reduce energy and water bills, and your environmental footprint, by following basic measures for *conservation* (i.e., using less energy, water, and other resources). In addition, the day-to-day behavioral choices that you make in other areas of your life, such as transportation, cleaning, and purchasing, can greatly affect your overall environmental footprint. The green lifestyle tips suggest behavioral choices that will help you live more sustainably, and that will often help save you money as well.

[1] The LEED for Homes Rating System can be downloaded at no charge from www.USGBC.org/LEED/homes.

We have prepared this homeowner manual as a tool and reference guide. Please take a moment to read this manual to familiarize yourself with the benefits of a green home and the specific features and systems of your green home, as well as the related operations and maintenance requirements on how to keep your LEED-certified home healthy, comfortable, durable, efficient and environmentally responsible for years to come.

210-212 Arthur Street

1418 West Street

Part 1

Introduction to Your Green Home

- ✓ What are Green Homes?
- ✓ Why Green Homes?
- ✓ What is LEED for Homes?
- ✓ What is ENERGY STAR?

What are Green Homes?

Generally speaking, a green home is designed and built to be:

Healthy,
Comfortable,
Durable,
Energy efficient, and
Environmentally responsible.

A common misconception is that all new homes, built to the minimum building codes, are high quality and high performance homes. However, many new homes do not achieve several of the benefits listed above. Green homes are built to substantially exceed the performance levels offered by conventional, code-compliant new homes.

Also, while many new homes may claim to be green, they differ in how thoroughly they achieve the benefits above. In other words, they achieve different degrees of green, depending on the degree to which they deliver these benefits.

Why Green Homes?

Homes have a very significant environmental impact. According to the U.S. Department of Energy, all homes in the U.S. account for:

22% of the total energy consumed; and
21% of carbon dioxide emissions.

Also, certain indoor air pollutants can often be four to five times higher than outdoor levels. Construction and demolition waste (including both residential and commercial buildings) represents 40% of the solid waste in the U.S. Homes also have a significant impact on the amount of water consumed, on the amount of chemicals (e.g., fertilizer, pest control chemicals) that can damage nearby water bodies, and other consequences.

Shifting towards the design and construction of more sustainable homes can have enormous benefits for the environment, as well as for the occupants.

What is LEED for Homes?

LEED for Homes is a voluntary rating system administered by the U.S. Green Building Council (USGBC). USGBC is a non-profit organization that promotes the design and construction of high performance green buildings. To be certified under the LEED for Homes program, a home must:

- Include several required green measures ("prerequisites") (e.g., achieve energy efficiency at least 15%[2] better than conventional homes), and

[2] Homes must be 15% more efficient in mild & moderate climates and 20% more efficient in cold climates.

- Include many additional green measures. These are chosen by the builder from a variety of optional measures ("credits") to earn points. A project must earn a minimum number of points to achieve certification.

Benefits of a LEED Home include lower energy and water bills, reduced green house gas emissions, and less exposure to mold, mildew and other indoor toxins. A sustainable home is one that utilizes materials and techniques that are friendly to our natural environment, as well as to those who build and occupy the building.

The program includes several additional requirements as well, such as verification by a LEED for Homes Green Rater. The LEED for Homes Green Rater is not associated with the project team (i.e., this person is a "third-party") and he or she has training in verifying green homes. In the verification process, the LEED for Homes Green Rater confirms that:

- All of the required green measures are installed in the home (by visual inspection), and

- The performance level of the home meets the program requirements (by physical testing of the home's air leakage, duct leakage, etc.).

For more information on the LEED for Homes program, go to: www.usgbc.org/LEED/Homes

What is an ENERGY STAR Home?

Your new home is an ENERGY STAR home. Simply put, this label certifies that your home will use at least 15% less energy than an identical home built to the model building code. This means, lower gas and electric bills for you and your tenants for the life of your home. In order to achieve this certification, many features and construction techniques have been utilized in your home that are not found on the average new home construction.

In addition, ENERGY STAR homes are inspected and tested during and after construction by a trained third-party to verify that the required standards have been met.

For more information about ENERGY STAR, go to: www.energystar.gov

Part 2

How to Maintain the Green Features in Your Home

Operations and Maintenance Tips for:

- ✓ Indoor Pollutants
- ✓ The Exterior Structure or Envelope
- ✓ Interior Durability and Finishes
- ✓ Lighting and Appliances
- ✓ Heating, Cooling, and Ventilation Systems
- ✓ Plumbing
- ✓ Your Yard

How to Maintain the Green Features in Your Home

This section includes operation and maintenance tips for LEED for Homes features installed in your home that require some upkeep or user operation. Keep in mind:

- The maintenance requirements for your home are specific to the types of systems that are installed in your home. It is very important for you to be familiar with the product manufacturer's specific recommendations for each system (see Appendix D).

- Many of the features in your LEED-certified home will not require maintenance, so they are not described here. But many still require that you use them properly in order to fully reap their benefits. Review the LEED for Homes checklist (Appendix A) that was customized for your home to familiarize yourself with which green measures are installed in your home.

This section is organized by the systems in your home. Each section includes information on:

- Why this system is important;

- Tips for operating and maintaining the system; and

- Websites that provide additional information and maintenance tips for the system.

2.1 Indoor Pollutants

There are many potential sources of pollution in any home. For example, combustion equipment (anything that burns fuel, such as a gas-fired water heater or range) releases carbon monoxide. Cooking can release small airborne particles, which can cause breathing problems, especially for people with asthma.

In general, indoor pollution can be controlled by:

- Reducing the amount of pollutants that are generated (for example, by not having a fireplace); and

- Diluting pollutants once they are created, by bringing in fresh air (ventilation) or removing polluted air with exhaust fans and vents.

Combinations of these pollution control methods are used in LEED-certified homes; but, you can further reduce pollutants in your home through operation and maintenance.

This section includes suggestions to help to control the following indoor pollutants:

- Carbon monoxide;

- Radon; and

- Airborne particles.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is generally released during combustion (e.g., burning of a fuel in equipment like cars, gas-fired appliances, and fireplaces). At high levels, CO can cause health problems, such as headaches and nausea. At very high levels, CO will cause death. LEED-certified homes include CO monitors on each floor of the home, which can help warn if there are dangerous levels in your home.

Never bring an unvented combustion source, like a barbeque grill, into the home. There are no fireplaces or unvented combustion appliances in your homes. Vented combustion sources, such as hot water heaters, have a pipe that carries carbon monoxide and other combustion pollutants out of your home. Equipment, such as barbeque grills, camping stoves, kerosene heaters, etc., will create carbon monoxide and other dangerous pollutants. Because the equipment is unvented, the pollutants cannot escape the home. The carbon monoxide can quickly build up in the home and become dangerous.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

Test/Replace batteries in smoke and carbon monoxide alarms. All combination smoke/CO detectors in your home are hard-wired directly to the electrical system. These detectors do not run on batteries, but should you hear a recorded voice from your detector, it is an indication that the backup battery is weak and needs replacing. The detector will continue to operate without the battery backup; however, we strongly suggest that you take advantage of this extra safety feature provided by the builder and replace the battery promptly. All detectors should be tested periodically by pressing the test button to check the alarm and must be replaced immediately if not functioning properly.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credit:

- Indoor Environmental Quality (EQ) 2: Combustion Venting

Radon

Radon is a naturally occurring gas that is emitted from soil. Different soils emit radon at different rates. Exposure to radon is the #1 cause of lung cancer among non-smokers in the U.S.

Homes can be built with radon resistant construction techniques to reduce the amount of radon that enters your home from the soil below. This includes a radon vent pipe, which runs from below your home to the outside (generally through the roof). LEED-certified homes that are constructed in areas that have been found to have high levels of radon in the soil (in Radon Zone 1) are required to incorporate these radon-resistant construction techniques. LEED-certified

homes in areas that have moderate or low levels of radon in the soil (in Radon Zones 2 and 3) are encouraged to be built with these techniques. In general, this system works without any maintenance on your part. However, periodically check that the radon vent pipe is not blocked (e.g., clear of leaves). In some homes, the pipe will vent out through the exterior wall, instead of through the roof.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Test your home for radon.* The best way to ensure that your home does not have a radon problem is to perform a simple test. Radon test kits are available at your local hardware store. The U.S. Environmental Protection Agency provides guidance on how to conduct the test. If the test shows high levels of radon (above 4 picoCuries per Liter of air [pCi/L]), you should hire a radon professional to install a radon mitigation system. If your home was built with radon resistant construction techniques, then it can be modified with an exhaust fan to make it more effective.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credit:

- Indoor Environmental Quality (EQ) 9: Radon Protection

Airborne Particles

Airborne particles are common pollutants in the home. Airborne particles eventually settle out of the air and become dust on a surface; but, small particles take a long time to settle out, and they can easily be kicked up into the air again (i.e., re-suspended) with activity. Airborne particles can be inhaled, causing health problems such as asthma. Some particles contain allergens, lead, or other components that can cause additional health problems.

LEED-certified homes include several measures to reduce airborne particles:

- During construction, all ducts and vents were sealed to minimize contamination.
- Once all phases of construction were completed and prior to occupancy, your homes were flushed with fresh air for more than 48 hours.
- Cooking – especially frying – generates particles[3]. All LEED-certified homes include kitchen exhaust systems that exhaust particles, humidity, and other pollutants from your home. Use this fan whenever you cook.

[3] Wallace, L.A., et al. Environmental Science & Technology. 2004 Apr 15;38(8):2304-11. "Source strengths of ultrafine and fine particles due to cooking with a gas stove."

- Fireplaces are a common source of particles in the home. Your LEED-certified homes do not have fireplaces.

Your use and maintenance of features installed in your home are important in keeping them working effectively.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

> *Clean or replace walk-off mats at all entries.* Walk-off mats are designed to trap dirt and keep it out of the home, and by helping to remove dirt from shoes. However, if not cleaned and replaced regularly, walk-off mats can become a source of particles.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Indoor Environmental Quality (IEQ) 2: Combustion Venting
- Indoor Environmental Quality (IEQ) 8: Contaminant Control

Additional Information

For more information, resources, and tools related to minimizing your exposure to indoor pollutants, visit:

US EPA's Indoor Environments Division (EPA IED)
www.epa.gov/iaq/combust.html
www.epa.gov/iaq/co.html
www.epa.gov/radon/pubs/citguide.html

2.2 The Exterior Structure or Envelope

Your home is designed to protect you from conditions outside, including heat, cold, wind, and rain. LEED for Homes focuses on improving the performance of 3 aspects of the exterior structure (or exterior envelope) of your home:

- The thermal performance (heat flow resistance);
- The air-tightness (air flow resistance); and
- The water-proofing (moisture flow resistance).

This section includes operations and maintenance suggestions for the exterior structure of your home. Additional sources of information on exterior structures are listed at the end of this section.

Overall Durability of Exterior Structure

The exterior of your home, including the roof and siding, acts like your body's skin. It is the first line of defense in protecting your home from rain, cold air, pests, and other things best kept outside. It is important to keep the exterior in good condition.

If water penetrates into the structure of the building, it can cause damage (e.g., wood rot), which is a major safety concern. It can also reduce the effectiveness of materials such as insulation. In general, water should drain away from your home, and it should do so as quickly as possible. Water that pools on a surface can eventually leak through cracks in the surface, potentially causing damage to the structure.

Your LEED-certified home's builder is required to consider the durability risks at your home's site, and to design and build your home to mitigate these risks. (See the LEED for Homes durability forms in Appendix A.) All LEED-certified homes also have water resistant materials in wet areas, such as bathrooms, kitchens, and entryways.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Check / repair all exterior caulking, weather-stripping, and paint.* Check and repair the sealing of the exterior of your home, especially around joints, windows, doors, trim, and plumbing and utility openings. Re-seal with caulk, window putty, weather-stripping, and other air sealing materials. Materials such as caulk and weather-stripping are inexpensive and can save you considerable money in energy bills. By keeping your home well sealed, you will also help prevent pests from entering.

   Check the paint, siding, and other materials on the exterior of your home for damage every few years. Peeling paint should be sanded and repainted. Follow manufacturer's instructions when repainting to avoid more paint peeling in the future. If peeling continues, there may be a moisture problem. If so, contact a professional that specializes in fixing moisture problems.

2. *Check roofing and flashing, and repair any damaged materials.* "Flashing" is sheet metal or other material laid over roof valleys, windows, or other areas where water often drains or collects. Many LEED-certified homes have flashing, because it helps prevent water from seeping into the building structure. Flashing and roof materials (e.g., shingles) become damaged over time. Check these materials at least once a year, particularly before the rainy season, to make sure that they are in good condition (e.g., not missing or damaged). Replace if needed. Materials such as flashing are inexpensive and can save money by reducing the need for costly repairs.

3. *Clean debris from gutters and downspouts.* Downspouts and gutters are important for draining water away from your home. They should be cleaned regularly (generally every spring and fall) to remove leaves, dirt, nests, and other debris.

4. *Remove excess snow from roof to prevent ice dams.* Ice dams form when snow melts on the roof, and then re-freezes further down the roof before it can drain. Ice dams form when areas of your roof are colder than others, because some sections of the underside of the roof are better insulated than other sections. Ice dams cause water to pool on the roof, which can then leak into the home's structure.

   The best solution for handling ice dams is to prevent them from forming. Soon after a snowfall, use a broom to remove snow from the edges of your roof. Doing this prevents snow from becoming ice. Avoid using rakes or sharp tools, because these can damage the roof surface. If your roof is frequently forming ice dams, consult an ice dam specialist to diagnose and fix the problem. For example, your home may need additional insulation in some sections of the attic.

5. *Inspect basement/crawl space for seepage/leakage*. Periodically inspect the lowest part of your home (e.g., the basement or the crawlspace) for pooling water and damp areas. These may indicate that water is not draining properly away from the home. Contact a basement water proofing specialist to identify and fix the problem.

Related LEED for Homes Measures

- Innovation and Design (ID) 2: Durability Management Process
- Energy and Atmosphere (EA) 3: Air Infiltration

Additional Information

For more information, resources, and tools related to the durability of your home, visit:

Home Energy Resource (formerly Home Smart), Basic Care
www.homeenergyresourcemn.org/

University of Massachusetts, Building and Construction Technology, Preventing Ice Dams
bct.nrc.umass.edu/index.php/publications/by-title/preventing-ice-dams/

US EPA's ENERGY STAR Programs, Home Improvement – Peeling Paint
www.energystar.gov/index.cfm?c=home_solutions.hm_improvement_peelingpaint

2.3 Interior Durability and Finishes

The previous section highlighted the importance of maintaining the exterior structure of your home. The interior of your LEED-certified home is carefully designed and constructed as well. This section includes operations and maintenance suggestions related to the interior features of your LEED-certified home, including:

- Interior Durability (control of moisture); and
- Paints and Coatings (control of chemical emissions).

Interior Durability

Just as rain can cause damage if it enters your home's exterior, leaks and moisture originating within the home can also damage the structure. Your LEED-certified home includes measures such as proper drainage and drain pans for appliances that help prevent water from pooling on surfaces in your home. You should check periodically that everything is in working order (e.g., draining freely), and that materials such as bathtub grout are in good condition. This will help keep water from damaging materials below, and help reduce mold and mildew.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Check /repair caulking/grout in and around showers/baths.* For example, check and repair caulk and grout in wet rooms, such as around bathtubs and sinks, between walls and vanities, countertops, or bathtubs.

2. *Check for water leakage around water heaters and dish washers.* A small drip or leak is a sign that the appliance needs repair. Usually small leaks quickly evolve into major leaks that can cause major damage. If there is evidence of a leak, contact the appropriate equipment repairman immediately.

3. *Run bathroom fan for 30 minutes after showering.* Always turn on your bathroom fan while showering or bathing, and allow it to run for 30 minutes after you stop. By using this fan, you help remove moisture that can lead to mold and mildew, and that can damage the structure of the building. You should also run your kitchen fan while cooking, to remove pollutants and odors.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

Innovation and Design (ID) 2: Durability Management Process

Paints and Coatings (e.g., finishes, shellacs, stains)

Interior paints and finishes add to the beauty of homes, and help protect surfaces. However, many paints, coatings, and adhesives contain chemicals that slowly off-gas into the air. These chemicals are called Volatile Organic Compounds, or VOCs. Some of these VOCs (e.g., formaldehyde) can be harmful to your health. Most VOCs are released at the highest rate when they are applied – the "new paint smell". However, significant levels of VOCs will continue to off-gas long after application. Your LEED-certified homes include paint, adhesives, and other materials that are "low VOC" or "no VOC". These have a lower content of these harmful, off-gassing chemicals than conventional products.

Furniture, cabinets, cleaning products, and other materials can also have high levels of VOCs. These are discussed in Part 5.

To reduce occupants' exposure to indoor airborne contaminates, once all phases of construction were completed and prior to occupancy, your homes were flushed with fresh air for more than 48 hours

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

> *If paint is needed for the interior of your home, use paint that is low emitting ("low VOC").* Several programs, such as the Green Seal Standard, will label products that have a low VOC content.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Materials and Resources (MR) 2: Environmentally Preferable Products
- Indoor Environmental Quality (IEQ) 8.3 Preoccupancy Flush

Additional Information

For more information, resources, and tools related to maintaining your home's interior, visit:

GREENGUARD Environmental Institute, Consumers
www.greenguard.org

2.4 Lighting and Appliances

According to the US Department of Energy's Residential Energy Consumption Survey (2001), lighting and appliances use 34% of energy consumed in homes and account for 47% of the energy costs. Your LEED-certified homes include energy efficient lights, occupancy sensors and ENERGY STAR-rated appliances. You can help to control your energy bills by replacing these products with similar energy-efficient products as needed. You can also conserve energy by turning off lights when they are not in use, and by reducing the energy used by home electronics in stand-by mode by unplugging appliances, or by using power strips.

This section includes operations and maintenance suggestions related to your home's:

- Lighting; and
- Appliances.

Additional sources of information on maintaining your lighting fixtures and appliances are listed at the end of this section.

Lighting

Collectively, interior and exterior lighting typically accounts for 5% to 15% of a new home's total energy use. Energy efficient bulbs and fixtures can use 50-75% less energy, and can emit the same amount of light. These also require less frequent replacement.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *If replacing lights, use only ENERGY STAR-labeled lighting.* Choose bulbs and fixtures with the ENERGY STAR label, such as ENERGY STAR-labeled compact fluorescent lights. These bulbs may have a first cost that is more expensive than traditional, incandescent bulbs, but you will recover any cost difference quickly because of the bulbs' longer life and lower energy use. ENERGY STAR-labeled bulbs also achieve high standards for comfort issues (e.g., less flicker than other bulbs).

2. *Periodically check if exterior automated lighting controls are working.* Many LEED-certified homes include exterior lighting that is motion controlled. If the motion control detector stops working, have the detector fixed or replaced so that you can continue to save energy when lighting is not needed. If you feel that some continuous lighting is needed for safety reasons, consider installing a low level of light, with a sensor to trigger a high level of light when motion is detected.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Energy and Atmosphere (EA) 1: Optimize Energy Performance
- Energy and Atmosphere (EA 8): Lighting

Appliances

Household appliances typically use 20-30% of a home's total energy use and about 25% of a home's indoor water use. Your LEED-certified homes have ENERGY STAR-labeled appliances, which can use 10-50% less energy and water than standard models.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Clean/adjust direction of ceiling fans seasonally.* In the summer, ceiling fans can be used to make people feel cool by blowing air on them. Remember to turn off the fan when used for cooling if no one is in a room. Fans do not cool rooms – they only cool people.

   A ceiling fan can also be used to help warm a room when it is operated in reverse, by gently pushing warm air back to the floor. (Hot air rises.) Most ceiling fans have a switch that allows you to reverse its direction. Reverse the direction of fans each summer and winter. Use a very low speed for winter, and turn down your thermostat to capture the heating bill savings from using fans.

   Clean the fan blades at least annually, to reduce particles in your home and to keep the fan in good condition.

2. *Connect appliances (e.g., televisions, chargers) to a power strip and switch it off when not in use.* "Phantom loads" refer to energy that appliances (e.g., televisions, cell phone, laptop chargers) continue to draw when they are turned off. The U.S. Environmental Protection Agency estimates that households spend $100 per year to power devices in this standby mode[1]. Unplug appliances when they are not in use, or connect them to a power strip and turn off multiple appliances when they are not in use. Some power strips also serve as surge protection for appliances.

   The U.S. EPA has also begun to identify some products, such as power adaptors, with the ENERGY STAR label. Look for this label to identify products that are more efficient than conventional models.

3. *Choose ENERGY STAR-labeled appliances.* ENERGY STAR-labeled appliances use less energy and/or water than conventional models. While these often have a slightly higher cost, they will save money in the long-run because of lower energy or water bills. Also make sure that you buy the right sized appliance for your household's needs. For example, refrigerators that are too full, or that are almost empty, will not perform at the rated efficiency.[1]

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credit:

- Energy and Atmosphere (EA) 1: Optimize Energy Performance
- Energy and Atmosphere (EA) 9: Appliances

Additional Information

For more information, resources, and tools related to maintaining your home's lighting and appliances, visit:

U.S. Environmental Protection Agency (USEPA) Energy Star program, resources for lighting and appliances:
www.energystar.gov/index.cfm?c=lighting.pr_lighting
www.energystar.gov/index.cfm?c=appliances.pr_appliances

Alliance to Save Energy
www.ase.org/section/topic/lights

Federal Trade Commission's How to Buy an Energy-Efficient Home Appliance
www.ftc.gov/bcp/edu/pubs/consumer/homes/rea07.shtm

Department of Energy, Energy Efficient Appliances
www1.eere.energy.gov/buildings/appliance_standards/pdfs/26468.pdf

California Energy Commission's Consumer Energy Center
www.consumerenergycenter.org/home/appliances/

2.5 Heating, Cooling, and Ventilation Systems

Well designed heating cooling and ventilation systems are essential elements of a comfortable and healthy LEED-certified home. More importantly, they also provide for significant energy savings (at least 30% in most LEED-certified homes).

This section includes 2 related topics:

- Heating and Cooling Systems; and
- Ventilation Systems.

Additional sources of information on these systems are listed at the end of this section.

Heating and Cooling Systems

Heating and cooling systems are required to maintain comfortable temperatures within a home. They are also one of the major causes of excessive energy use in homes.

LEED-certified homes have heating and cooling equipment that is often 20 to 30% more efficient than equipment that meets the minimum efficiency standards. Your LEED-certified homes have been equipped with a geothermal heat pump system, which couples your homes' HVAC systems to the earth. Geothermal heat pump systems tap the constant temperature of the earth to provide efficient heating and cooling. Each system is also correctly sized, based on the size of your home, how well your home is insulated, and other factors. This translates into lower energy bills.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

Clean or replace filters in heating/cooling equipment. Dirty filters are a common cause of equipment malfunction or damage. Clean filters will allow your equipment to run more efficiently. Filters are relatively inexpensive and easy to replace. How often you will need to replace your filter will vary depending on the product. Please refer to the applicable Product Manual in Appendix D.

2. *Adjust thermostat for season change*. Set your programmable thermostat to "reasonable" set-points to conserve energy. LEED-certified homes generally have programmable thermostats that allow you to set different set-point temperatures at different times of the day. Example settings are provided below.

Example Temperature Settings for Programmable Thermostat

Season	Time of Day		
	Night	Day	
		Occupied	Un-Occupied
Winter	60	70	60
Summer	75	75	85

3. *Clean in and around grills and registers; vacuum inside of ducts.* For forced air systems (i.e., systems that blow hot or cold air through ducts), annually remove the heating registers and vacuum inside the ducts that are within reach.

4. *Check / adjust humidity levels.* As described in the section on Durability, wet building materials can lead to rot or other damage to the building's structure, and lead to mold or mildew growth. Monitor the relative humidity in your home. Relative humidity monitors are inexpensive and available at hardware stores. In general, the recommended relative humidity in the home should be between 30 to 60%. Use your home's systems (e.g., fans in wet rooms, and dehumidifiers, if present) to keep the relative humidity in this range. If the relative humidity is often well above 60%, or if your home shows other signs of high humidity (such as windows with condensation on the inside or a damp basement):

   - First check that everyone in the household is using local exhaust fans properly (e.g., turning on bathroom fans during bathing and kitchen fans when cooking); and
   - If your home still has high humidity, consider installing a dehumidifier (if your home does not already have one).

   If your home has low humidity levels, you may choose to install a humidifier. Continue to monitor the relative humidity closely. Do not operate a humidifier while the air conditioner is running.

5. *Check roof / soffit vents for flow and obstructions*. Many homes include vented attics. These vents allow hot air to escape during the hot summer months. In the winter, vented attics help to keep the attic cool, reducing the chance for ice dams to form.[1] If your home has vents in the attic, do not cover these with insulation or any other material. Periodically check that vents have not become covered or obstructed by items in the attic.

   Other homes are designed with unvented attics (i.e., the attic is conditioned). Your builder will have considered whether roof / soffit vents were beneficial for your particular home, as part of the program's durability requirements.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Indoor Environmental Quality (IEQ) 3: Moisture Control
- Energy and Atmosphere (EA) 6: Space Heating and Cooling
- Energy and Atmosphere (EA) 11: Appropriate HVAC Refrigerants
- Indoor Environmental Quality (IEQ) 7: Air Filtering

Ventilation Systems

Ventilation systems exhaust airborne pollutants from your home and also replenish your home with fresh air. Generally there are 2 types of ventilation systems that are used in your home:

1. Local Exhaust Systems (i.e., bath and kitchen fans); and
2. Whole-house ventilation systems.

All LEED-certified homes are required to have whole-house air ventilation systems, which provide the right amount of fresh air into your home. (The rate is based on the size of your home and number of bedrooms.) Also, all LEED-certified homes must have exhaust fans in kitchens and bathrooms, which must be vented directly to the outdoors. These measures help provide better indoor air quality, and they protect the structure from moisture damage. Even moist air can become a problem if it is not exhausted from your home, because it can cause damage structures and lead to mold growth. (In contrast, many code homes do not have ventilation systems and/or do not exhaust moist air directly to the outdoors.)

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Check operation of mechanical ventilation systems (for example, an HRV/ERV) and regularly replace filters.* Ventilation is often provided in the same system as heating or cooling. Such systems require regular filter changes and bi-annual service check-ups.

   Your LEED-certified homes also include a Heat Recovery Ventilator (HRV) or an Energy Recovery Ventilator (ERV). An HRV brings in fresh air for ventilation, but transfers the heat from the outgoing stale air to incoming air. An ERV performs similarly, but it removes heat from the incoming air, using the cold stale air that it exhausts. These systems reduce energy for heating and cooling, and provide fresh air.

   If your home has a separate ventilation system, clean or replace the filter regularly. Check your manufacturer's information for your product's specific requirements, but a general rule of thumb is every one to three months.[1] Periodically check the intake and exhaust vents to ensure that they are clear from leaves, debris, etc.

2. *Check operation of local exhaust fans.* At least once a year, check all of the exterior vents (e.g., kitchen, bathroom) where air exits from your home. These are located on the roof, or may be located on exterior walls. Make sure that they are clear of leaves, debris, etc., and that the damper (the flap covering the opening) can move freely.

   Also, periodically check that your exhaust fans are operating: Hold a piece of toilet paper up to the exhaust fan in the bathroom while the fan is running. The paper should be held firmly against that fan grille, after you let it go. If you find a problem, contact a ventilation specialist.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Indoor Environmental Quality (IEQ) 4: Outdoor Air Ventilation
- Indoor Environmental Quality (IEQ) 5: Local Exhaust

Additional Information

For more information, resources, and tools related to maintaining your home's heating, cooling, and ventilation systems, visit:

Green Home Guide by the U.S. Green Building Council (USGBC)
www.GreenHomeGuide.com

U.S. Department of Energy (DOE), Energy Saver's
www.energysavers.gov

U.S. Government, Home Owner Resources
http://www.usa.gov//Citizen//Topics//Family//Homeowners.shtml

U.S. Environmental Protection Agency (USEPA), Energy Star program
www.energystar.gov/homes
www.energystar.gov/index.cfm?c=dehumid.pr_basics_dehumidifiers

California Energy Commission, Consumer Energy Center
www.consumerenergycenter.org/home/heating_cooling/index.html

Natural Resources Canada, Routine maintenance for HRV's
http://oee.nrcan.gc.ca/Publications/infosource/Pub/hrv/maintenance.cfm?attr=4#schedule

2.6 Plumbing

Water is an important resource, and it takes considerable energy to move, treat, and heat water. The average family of four can use 400 gallons of water every day, and, on average, approximately 70% of that water is used indoors[4].

Leaky pipes and fixtures can result in large amounts of wasted water, and cause damage to structures below. Plumbing can also serious damage it not maintained during the winter.

This section includes operations and maintenance suggestions related to your plumbing equipment. Note that tips on maintaining the efficient use of water outdoors are included in the "Your Yard" section below. Tips on conserving water both indoors are outdoors are provided in Part 5.

[4] http://www.epa.gov/watersense/pubs/indoor.html

Indoor Plumbing Fixtures and Fittings

All LEED-certified homes include measures that should reduce water use, relative to conventional homes that are built to the minimum building code. Measures that reduce hot water use will save both energy and water. Many of these measures will not require any special maintenance. Your LEED-certified homes include low flow fixtures (e.g., low-flow faucets, showers, and toilets), and the plumbing has been designed so that the hot water tank is close to the fixtures that require hot water.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Check / fix leaks immediately in pipes, fixtures, and appliances.* Immediately fix any leaks in pipes, equipment (e.g., water heaters, clothes washers), and plumbing fixtures (e.g., toilets, sinks). According to the U.S. EPA's WaterSense program, leaky faucets that drip at the rate of one drip per second waste more than 3,000 gallons of water each year.[1] Over time, water leaks may lead to structural problems.

   If your hot water tank is leaking, shut off the water supply to the tank, and shut off the fuel input (or electricity) until a plumber can repair or replace the system. The pressure relief valve may be clogged or not working, or there may be some other problem that should be addressed.

2. *Prevent pipes from freezing: turn on/off outdoor faucets.* When water pipes run through the exterior walls of your home (e.g., to your irrigation system, outdoor faucets, or garden hoses), they are susceptible to freezing in the winter. As the water in the pipes freezes, it expands and can potentially cause the pipe to burst. To prevent this, in late fall, turn off the water supply to the outdoors. Then drain these fixtures to the outdoors to remove any water that remains in the pipes or hoses. Most homes have a separate shut-off valve for each outdoor faucet.

   If you go on vacation in the winter, turn the heat down, but not off, in your home. The home must be warm enough to keep the pipes inside from freezing.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Water Efficiency (WE) 3: Indoor Water Use
- Energy and Atmosphere (EA) 7: Water Heating
- Energy and Atmosphere (EA) 9: Appliances

Additional Information

For more information, resources, and tools related to maintaining your home's plumbing fixtures and fittings, visit:

H_2O Use, Household Water Efficiency Resources
http://www.h2ouse.org/resources/links/index.cfm

Urban Water Resources Management, Water Conservation Tips
http://www.gdrc.org/uem/water/conservation.html

National Association of Home Builders, TOOLBASE, Low flow fixtures
http://www.toolbase.org/Techinventory/TechDetails.aspx?ContentDetailID=868&BucketID=6&CategoryID=9

Flex Your Power, Low Flow Showerheads
http://www.fypower.org/res/tools/products_results.html?id=100160

Montana Weatherization Training Center, Water Heater Maintenance Tips
http://www.weatherization.org/waterheatermaintenance.htm

2.7 Your Yard

Your yard can provide useful environmental benefits, such as providing shade, erosion control, and managing storm water run-off. However, a poorly managed yard (e.g., one that is over-watered and treated with harmful chemicals) can be a drain on resources like water supplies, and cause damage to the local environment and to your home.

This section includes information on ways that you can minimize the environmental impact of your yard. Three general aspects of your yard are addressed:

- Landscaping;
- Irrigation; and
- Pest Control.

Additional sources of information on maintaining your yard are listed at the end of this section.

Landscaping

Landscaping can be a major use of water for your home, and it can have significant impacts on the local ecology. Every LEED-certified home is required to incorporate good landscaping practices during construction, such as conserving topsoil, controlling erosion, and not planting invasive species. Your LEED-certified homes have rain barrels, permeable pavers, no-mow grass and more drought-tolerant plant species than conventional homes. These practices reduce the amount of silt that enters local bodies of water and reduce the amount of water that is needed to keep a yard looking attractive.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Replace and repair landscaping - mulch, permeability features.* Many LEED-certified homes include mulched areas. Mulch provides nutrients to plants, helps to retain moisture in the soil, and helps prevent weeds from growing. Replace or add mulch to planted areas when needed. A few inches of mulch to cover the ground is generally sufficient.

   Many LEED-certified homes include permeable features that capture water and allow it to infiltrate the ground below. These may include rain gardens, dry wells, swales, cisterns, permeable paving, and other features. Check these features periodically after a rainstorm to ensure that water is properly draining. For example, the porous layer below permeable hardscapes may clog with debris, and could need to be vacuumed. Rain gardens need to be regularly weeded.

   If plants die or need to be replaced for other reasons, consider replacing them with native or drought tolerant species. Check with your local university agricultural extension office, botanical garden, or other resource for guidance.

2. *Check for pooling of rain water on property*. Many LEED-certified homes have sloped areas on the property that are graded away from the home or include erosion control measures (e.g., swales, terracing or retaining walls). These features will help prevent water from flowing towards the foundation of the home, helping to keep it dry.

   If you notice pooling of rainwater, you may need to hire a landscape professional to re-grade the area to guide rain water away from your home. If your landscaping includes erosion control such as swales, terracing or retaining walls, inspect these features annually to make sure they are in good condition.

3. *Avoid damaging de-icers on hardscapes.* In winter months, shovel or plow sidewalks, driveways, and other hardscapes soon after a snow-fall. This will prevent ice build-up. If you must add chemical de-icers, use magnesium chloride or calcium chloride products instead of sodium chloride or potassium chloride products. All chloride products damage vegetation, but magnesium chloride and calcium chloride are less damaging to concrete and other man-made surfaces. Sand can also be used. Sand does not help melt ice, but it will provide traction.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credits:

- Sustainable Sites (SS) 2: Landscaping
- Sustainable Sites (SS) 3: Local Heat Island Effects
- Sustainable Sites (SS) 4: Surface Water Management

Irrigation

Water used to irrigate plants can have a major impact on total water use. For example, in California, 50% to 70% of household water is used outdoors[5]. By delivering water only when it is needed, and only to the plants that need it, you can help conserve water and reduce your water bills.

Collecting rainwater and using it to water plants provides several environmental benefits, such as reducing the demand for public water supply (and related electricity used for pumping).

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Winterize your irrigation system: turn off water, drain*. If your irrigation system freezes, the underground pipes may burst. Locating and repairing such leaks can be very difficult and expensive. Turn your irrigation system off, usually with a central shut-off valve that is located in your home, and drain the system of any water.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credit:

- Water Efficiency (WE) 1: Water Reuse
- Water Efficiency (WE) 2: Irrigation System

[5] http://www.cpuc.ca.gov/PUC/Water/waterconservationInfo.htm

Pest Control

Pests such as termites, ants, and rodents can damage the structure and cause health problems. These can be controlled through strategies other than the use of toxic chemicals. Long term exposure to such chemicals can be harmful to your family and pets. Preventing pests from entering, or nesting in, your home is the best strategy. Your LEED-certified homes were designed with physical barriers that block some of the common entry points for pests.

You can also follow pest prevention measures. In general, pests are drawn to shelter, water, and food. Keeping your home and yard dry and tidy will discourage pests.

Operations and Maintenance Tips

The following general maintenance strategies are highly recommended.

1. *Keep plantings at least 24" away from home.* Don't plant any vegetation within this area, and trim landscaping so that all branches are further than this from the home. Also maintain at least 12" of exposed concrete on all exterior walls between the ground and the beginning of the wood siding. This enables the visual checking for termite pathways from the soil to the wood siding.

2. *Avoid use of toxic chemicals for pest control and chemical fertilizer.* Insecticides and chemical fertilizers kill pests and weeds, but they can also harm people and pets. If you live in an area with a high risk for termites, consider getting a termite inspection annually. If your home does develop a pest infestation, select low toxicity insect and pest control systems.

Related LEED for Homes Measures

For more information on this LEED measure, please look-up the following credit:

- Sustainable Sites (SS) 5: Non-Toxic Pest Control

Additional Information

For more information, resources, and tools related to maintaining the sustainability of your yard, visit:

U.S. Environmental Protection Agency (US EPA), "*Sustainable Landscaping: The Hidden Impact of Gardens"* presentation
www.epa.gov/greenacres/smithsonian.pdf

U.S. EPA's "GreenScapes"
www.epa.gov/greenscapes/index.htm
http://www.epa.gov/WaterSense/docs/water-efficient_landscaping_508.pdf

The H_2ouse Garden Guide
www.h2ouse.org/gardensoft/index.aspx

The USDA's National Resource Conservation Service
http://www.nrcs.usda.gov/feature/backyard/

The Irrigation Association
www.irrigation.org/

Statewide Integrated Pest Management Program, University of California
www.ipm.ucdavis.edu/WATER/U/alternative.html

Part 3
Special Features

See the following pages for a brief overview and operations and maintenance tips for the special features installed in your home.

Geothermal System

Description

Your homes have been equipped with a geothermal heat pump system. A geothermal heat pump system taps the constant temperature of the earth to provide efficient heating and cooling. Heat energy can be extracted from the earth in the winter, and added to your homes. In the summer, the process can be reversed: unwanted heat is extracted from the building and added to the earth.

Benefit

A geothermal heat pump system is a renewable energy system, which couples your home's HVAC system to the earth. The ground provides a nearly constant temperature source of BTUs for efficient heating and serves as a sink for BTUs for efficient cooling. Geothermal heat pumps have low operating costs, no on-site combustion, low maintenance and low environmental impact.

Operation and Maintenance Tips

Tip 1.	Regular maintenance (such as filter changes) should be provided as necessary by your HVAC contractor.

Tip 2.	Check condensate drain pan should be checked annually and cleaned and flushed as required by your HVAC contractor.

Geothermal Heat Pump System

Related LEED for Homes Measures

Energy & Atmosphere (EA) 1: Optimize Energy Performance

Additional Information

For more information, resources, and tools, visit:

National Renewable Energy Laboratory
www.nrel.gov

Office of Energy Efficiency and Renewable Energy
www.eere.energy.gov

Photovoltaic System

Description

Your homes have been equipped with a photovoltaic system. A photovoltaic system collects the energy in sunlight and converts it into electricity. A photovoltaic system is often called PV for short, or referred to as solar panels. The main components of a PV system are the collection panels (sometimes called "the array"), and an inverter. The panels collect the sunlight and convert it into direct current electricity. The inverter converts the direct current electricity into alternating current, so that it can be used by household products.

Benefit

Most homes get their electricity by buying it from their utility company. Because your PV system generates electricity, it reduces the amount of electricity that you need to buy. This will lower your electricity bills. In addition, the sun is a clean, renewable source of energy. The electricity generated by a PV system is more sustainable than electricity generated by fossil fuels (e.g., coal, natural gas).

Operation and Maintenance Tips

Tip 1. Periodically rinse off the panels in your PV system. Dust reduces the effectiveness of the system, by blocking sunlight. Review the product information for your equipment to find instructions to properly rinse the panels without damaging them. The frequency for this task varies depending on the type of panels and the conditions of your yard, but a good rule of thumb is to rinse them off once per year.

Tip 2. Have your PV system serviced by a professional every few years. The technician can check the inverter and perform other tasks that require special training, to keep your system running as effectively as possible.

Tip 3. Keep vegetation trimmed to maximize direct sunlight for panels. While it is common for trees, surrounding homes, and other obstacles to block some direct sunlight, trim branches back every few years so that as much direct sunlight as possible falls on the panels.

1418 West Street – PV Solar Panels

Related LEED for Homes Measures

- Energy and Atmosphere (EA) 1: Overall Energy Performance
- Energy and Atmosphere (EA) 10: Renewable Energy

Additional Information

For more information, resources, and tools, visit:

American Solar Energy Society
www.ases.org

Water Efficiency

Description

A rainwater harvesting system has been installed at each home, using 50 percent of the roof area for harvesting rainwater, which can hold up to 840 gallons of water per building.

High-efficiency fixtures and fittings, including shower heads and toilets, as well as very high-efficiency lavatory faucets, have been installed to minimize indoor demand for water.

Benefit

Rainwater harvesting system captures rainwater from a home site and stores it for future use in a large tank or cistern. Such a system can significantly reduce or completely eliminate the amount of potable water used for irrigation. Rainwater harvesting also helps manage runoff from the house, which reduces the risk of on-site flooding and erosion and eases the strain on storm-water management systems.

Faucets, showers, baths and toilets typically account for two-thirds of a home's indoor water use and one-third of its total water use. Installing high-efficiency fixtures and fittings is an easy strategy for reducing indoor water use. High-efficiency fixtures and fittings will save the owners and occupants money on utility costs for water and water heating over the life of the home.

Operation and Maintenance Tips

Tip 1. Keep gutters free of leaves and debris that could cause blockages and prevent rainwater from collecting in the rainwater harvesting system.

Tip 2. Check and immediately fix any leaks in fixtures and fittings.

210-212 Arthur Street – Rain Harvester

1418 West Street – Rain Harvester

Gerber Viper 1.28 gpf High-Efficiency Toilet

Related LEED for Homes Measures

Water Efficiency (WE) 1: Water Reuse
Water Efficiency (WE) 3: Indoor Water Use

Additional Information

For more information, resources, and tools, visit:

American Rainwater Catchment Systems Association
www.arcsa.org

Water Use it Wisely
www.wateruseitwisely.com/toolsLinks/index.shtml

U.S. EPA's WaterSense℠ Program
www.epa.gov/owm/water-efficiency

Lighting and Appliances

Description

Your homes have been equipped with high-efficiency indoor lighting fixtures, such as those with the ENERGY STAR label, and occupant sensor controls. In addition, your homes have been equipped with certain ENERGY STAR appliances.

Benefit

Interior and exterior lighting accounts for about 5% - 15% of a home's total energy use. High-efficiency indoor lighting fixtures use approximately 50% - 75% less energy than conventional incandescent fixtures. High-efficiency lamps also require less frequent replacement and generate less heat, both which result in cost savings to you.

Household appliances are responsible for 20% - 30% of a home's total energy use. ENERGY STAR refrigerators require about half as much energy as models manufactured before 1993. Combination ceiling fan-light units that earned the ENERGY STAR label are about 50% more efficient than conventional units.

Operation and Maintenance Tips

Tip 1. Replace bulbs in lighting fixtures using only the specified type and watt.

Tip 2. The induction cooktop is equipped with induction cooking zones of different sizes. The magnetic cooking zone sensors located below the cooktop require the use of cookware made with magnetic base material in order to start the heating process. Select cookware specifically manufactured and approved for induction cooking that have flat bottoms that match the induction cooking zone size. Proper relationship of cookware to cooking zone will also improve efficiency. If you are not sure the cookware is manufactured for induction cooking, use a magnet to test whether the cookware with work. If a magnet sticks to the bottom of the cookware, the cookware is correct for induction cooking. Do not slide anything metal or glass across the cooktop. Do not use cookware with dirt or dirt build-up on the bottom. Do not use your cooktop as a cutting board or work surface. Do not use abrasive cleaners or scrubbers to clean your cooktop.

Induction Stoves

ENERGY STAR Range Hoods

ENERGY STAR Lighting Fixtures

Occupancy Sensors

Related LEED for Homes Measures

Energy & Atmosphere (EA) 1: Optimize Energy Performance

Additional Information

For more information, resources, and tools, visit:

Alliance to Save Energy
www.ase.org/section/topic/lights

ENERGY STAR Advanced Lighting Program
www.energystar.gov/index.cfm?-bldrs_lenders_raters.ALP_Builder

ENERGY STAR Qualified Appliances
www.energystar.gov/index.cfm?c_appliances.pr_appliances

Landscaping

Description

Your landscape features were designed to avoid invasive species and to minimize demand for water and synthetic chemicals. Features include rainwater harvesting, permeable pavers, native/ drought-tolerant plants and no-mow grass.

Benefit

Invasive species tend to reproduce at very high rates and out-compete native species for space, water and nutrients, leading to infestations that can disrupt local ecosystems and cause a significant loss of biodiversity. By contrast, native plants promote biodiversity and habitat sustainability by providing food and shelter for indigenous wildlife.

Conventional turf, which requires regular mowing, watering and/or chemicals, is a monoculture with a shallow but tight root system that prevent it from storing water well and allow heavy rainfall to run off rather than absorb into the surface. Conventional turf also can facilitate the overpopulation of certain insect species, leading to greater risk of infestation. No Mow Grass is low maintenance, reduces pest infestation, and requires less watering, mowing, fertilizing and weeding that conventional turf. No Mow Grass is real grass that only grows 1 to 6 inches high so mowing is needed one a month or less.

The provision and distribution of potable water is costly and energy intensive, particularly during dry periods, The use of drought-tolerant plants can reduce demand for water, chemicals and maintenance and helps protect soli quality and regional water quality by reducing runoff of topsoil, pesticides and fertilizers.

Erosion problems are worsened by storm-water runoff from impervious surfaces, such as rooftops, decks, driveways and paved walkways. Rainwater harvesting can help manage runoff from the roof while also providing a source of water for irrigation. Rainwater is good for landscaping because it has lower salt content and higher nitrogen content than treated potable water. Permeable pavers also let storm-water drain away and help manage excess runoff.

Operation and Maintenance Tips

Tip 1.	Spring Clean-up. Clean-up old leaves and debris and mow to reduce your grass's tendency to go to seed.

Tip 2.	Mulch mow no more frequently than monthly. Stop mowing when temperatures are over 80 degrees. Set your mower to "low mowing" in the spring and "high mowing" thereafter.

Tip 3. Water plants when needed using rainwater rather than treated potable water.


1418 West Street – Rain Harvester, Drought-Tolerant Landscaping



210-212 Arthur Street – Rain Harvester, Permeable Pavers, Drought-Tolerant Landscaping, No Mow Grass

Related LEED for Homes Measures

- Sustainable Sites (SS) 2: Landscaping
- Sustainable Sites (SS) 4: Surface Water Management

Additional Information

For more information, resources, and tools, visit:

Cornell Cooperative Extension
www.cce.cornell.edu

NAHB Research Center ToolBase Services: Permeable Pavement
www.toolbase.org/Technology-Inventory/Sitework/permeable-pavement

No Mow Grass
www.nomowgrass.com

North American Native Plant Society
www.nanps.org

Soil and Water Conservation Society
www.swcs.org

Part 4
Suggestions on How to Live More Sustainably

This section includes a summary of suggestions for living more sustainably, such as conserving water and energy, reducing waste, and protecting local bodies of water. Many of these suggestions will also save you money. These lifestyle suggestions can be adopted by residents of any home, whether LEED-certified or not. However, several of the lifestyle suggestions overlap the information provided in other sections of this manual.

While the list provided here is a good start, there are countless other opportunities. There are additional resources listed after the table with websites that can provide further discussion of some of the tips in the table, and offer new tips.

Green Lifestyle Tips

Suggestions
Energy Efficiency
Keep unoccupied rooms closed (doors and heating / cooling vents)
Keep HVAC vents clear of furniture, rugs, etc.
Use insulated draperies
Use energy-saving mode for electronics when not in use, or powerstrips
Turn off lights in rooms when not in use
Use cold/warm settings for laundry
Water Efficiency
Take shorter showers
Use dish- and clothes-washers only when full
Turn water off while teeth brushing
Install an automatic shut-off nozzle on garden hose
Waste Management
Properly recycle gas, kerosene, paint, and other hazardous waste
Donate items instead of throwing them away
Buy second-hand products, or products with recycled content
Use re-usable shopping bags
Reduce paper waste (e.g., use cloth napkins)
Use unbleached coffee filters, paper towels, etc.
Opt-out of junk mailings if possible
Find out what can be recycled in your area and recycle these products
Indoors and Cleaning
Use nontoxic, biodegradable detergents and cleaners
Buy furniture and furnishings with low VOC content.
Food Purchases
Grow your own food or participate in community garden
Purchase locally grown, and organic food
Participate in a Community Supported Agriculture (CSA) program
Eat less meat
Purchase seafood from sustainable seafood programs

Green Lifestyle Tips (cont'd)

Suggestions
Transportation
Bike or walk for short trips
Use public transportation
Carpool and/or run errands in fewer trips
Avoid idling cars unnecessarily
Regularly maintain cars, other vehicles
Your Yard
Refrain from use of toxic chemicals, insecticides, fertilizers, etc.
Plant natives trees and plants
Place hardwood mulch around trees and gardens
Use composting from kitchen on gardens and landscapes
Leave grass clippings on yard to provide nutrients back to soil
Home Office and Study
Use electronic format instead of paper as much as possible
Recycle paper, used print cartridges, and old electronics
Use recycled paper, and recycled print cartridges

Additional Resources

The following resources can provide further information on some of the green lifestyle tips listed in the table.

Energy Efficiency

The ENERGY STAR program from the U.S. EPA and U.S. Department of Energy: www.energystar.gov

The Consumer Energy Center from the California Energy Commission: www.consumerenergycenter.org

Water Efficiency

The WaterSense program from the U.S. EPA
www.epa.gov/watersense/

Waste Management

The National Resources Defense Council
www.nrdc.org/cities/recycling/gelectronicsrecycling.asp

Indoors & Cleaning

The GREENGUARD Environmental Institute
www.greenguard.org/

Food Purchases

The National Resources Defense Council
www.nrdc.org/health/food/default.asp

The Monterey Bay Aquarium
www.montereybayaquarium.org/

The City of Annapolis
www.ci.annapolis.md.us/sustainability.asp?page=13694

Transportation

The Best Workplaces for Commuters program from the U.S. EPA
http://www.epa.gov/omswww/bwc.htm

The Pennsylvania American Automobile Association's Gas Watcher's Guide
www.aaapa.org/pdfs/Gas_Watchers_Guide.pdf

Your Yard

The Lady Bird Johnson Wildflower Center
www.wildflower.org

The Plant Native Organization
www.plantnative.org

Home Office & Study

The National Resources Defense Council
www.nrdc.org/land/forests/gtissue.asp

The Forest Stewardship Council
http://fscus.org/

The following resources provide additional green living tips:
http://www.nrdc.org/greenliving/
http://www.ci.annapolis.md.us/sustainability.asp?page=13694

Many local or state government offices, water districts, and utilities provide local or regionally specific recommendations. Contact these organizations or find their websites to discover information specific to your area.

Appendix A
LEED for Homes Documentation

The green measures installed in every LEED-certified home must be verified by a third-party verification organization (other than the project team that designed and built your home). This organization is called a LEED for Homes Provider, which includes or oversees the LEED for Homes Green Rater. At the completion of the verification process, these verifiers prepare the following three documents:

- ✓ Project Checklist;
- ✓ Durability Forms; and
- ✓ Accountability Forms.

Copies of these verification documents are included in this appendix.

Appendix B
ENERGY STAR Certification

Appendix C
Building Plans & Specifications

Appendix D
Detailed Manufacturer's Info about Products in Your Homes

Appendix E
Deeds