

Long Term Flexibility

The house is designed to allow the homeowners to age in place and for flexibility of future owners. Primary rooms are located on the main floor and on the same level as the auto court to allow wheelchair access. Bathrooms have curb-less showers and comfort-height toilets; the MIL includes shower grab bars. The MIL can also be re-connected by reopening a framed archway in a wall between the great rooms, so the house can accommodate either a large, extended family or two smaller families.



King County

Department of
Natural Resources and Parks
Solid Waste Division

Photos courtesy of: Cindy Apple

Eastside Harvest House – a bounty of sun, rain & food

One of the most sustainable homes in the NW region, Eastside Harvest House (EHH) takes advantage of abundant resources – sun, rain, good farming soils and climate. With a comprehensive, deep green design approach, this single family residence treads lightly on its semi-urban lot with a large permaculture garden, solar power and solar hot water, and rainwater collected for interior and exterior uses.

About the Project

Project Description

Eastside Harvest House sits on a 1-acre, pedestrian-friendly lot in Kirkland, Washington, near a neighborhood center with shops, bus lines and other services. The overall design emphasizes simplicity and flexibility, with a clean, modern form and single-gutter metal shed roof. The 3,570 square foot home, including a mother-in-law (MIL) suite, is built on only a quarter of the lot. This preserved space for an extensive 2,600 SF permaculture garden and 1,500 SF of terraced rain gardens. The project's basement root cellar provides space to store produce, while ample kitchen counters provide area for preserving and canning the yield.

High Performance

Green strategies encompassing energy efficiency, power generation, water efficiency and re-use, healthy materials, low-impact development, and sustainable building materials resulted in a comprehensive green project.

There were some challenges – the views are to the west, and yet the sun is, as always, on the south. With a twist on solar design rules of thumb, 40 evacuated solar hot water tubes cover a large portion of the south wall, with windows facing the Lake Washington view.

Overall the team was spurred on by a shared vision and kept an upward performance trend throughout the project. For example, they doubled the size of the PV array during construction, which will generate all of the home's power. The team also increased the percentage of FSC wood from an initial specification of 80% to a final constructed total of 100%! Every piece of wood in this house was sustainably harvested. This attention to detail earned the project top green building honors:

- Built Green 5-Star: 886 points – 2ND highest score ever awarded
- LEED Homes Platinum: 121 points - tied for 2nd highest score in nation

Single family residence treads lightly on its semi-urban lot with a large permaculture garden, solar power and solar hot water, and rainwater collected for interior and exterior uses.



Eastside Harvest House

Kirkland, Washington

High Performance

"There is nothing we did in the Eastside Harvest House that our firm had not done before on other projects. But in this single project we did almost everything that can be done. EHH is an encyclopedia of green building."

— George Ostrow,

VELOCIPEDE architects inc

Site & Water

EHH hits some impressive performance metrics, starting from the ground up. A series of terraced rain gardens are designed to infiltrate 100% of storm water on-site. A dispersion field handles potential overflow and backup measure. In addition, four cisterns, with a total of 12,000 gallons capacity, capture rainwater from the metal shed roof. In its first summer, most of the collected rain water is being used to irrigate the landscaping during its initial establishment period. However, the filtration and UV sterilization system allow for subsequent use for interior potable uses, as well as toilet flushing and irrigation.

- Permitted potable rain water system – the first in King County
- Harvested rain water diverted for landscape irrigation and domestic house needs
- Large permaculture garden with extensive edible and functional landscaping, including fruit and nut orchard, berry bushes, a water fountain to attract bees, and terraced vegetable beds
- Exterior, impervious surfaces drain to large rain gardens
- 100% storm water infiltration via 1,500 sf of rain gardens
- Planted drought-tolerant landscaping
- Green factor score of 0.87

- Protected and redistributed excavated soil for final grading
- Installed dual-flush toilets

Energy

A 17 kw PV array, solar hot water, efficient, advanced framed envelope and energy-smart appliances and lighting combine to create a building that will produce most of its own power.

- Installed photovoltaic system will produce much of the home's power
- Motorized sunshades installed that deflect unwanted summer heat
- Triple-glazed, argon-filled windows installed for highest efficiency
- Electric water-heating tank installed with solar pre-heating system
- Insulation used to achieve R-20 to R-50 levels
- Energy Star® appliances installed
- Window U-values of 0.19 fixed, 0.21 operable
- Installed LED and CFL light fixtures, except for 5 halogen lamps
- HERS index of minus 7

The Made in Washington PV panels also qualify the owner for the in-state price of 36 cents/kwh (compared to 15 -18 cents/kwh) for producing solar power. The local panels are more expensive than those made in California, but the overall payback is still better for the owner. Additionally, local sourcing supports a local green economy.

Photos Left to Right: Permitted potable rain water system – the first in King County, Installed photovoltaic system will produce much of the home's power, Solar pre-heating water system.



Eastside Harvest House

Kirkland, Washington

Materials

"Almost every single item has a green conscience behind it - the concrete, finishes, every piece of lumber, even the door jamb shims - it was amazing and complex. It's remarkable what you can do when you think outside the box but hopefully this level of green will be inside the box soon."

— **Ricky Bribiesca,**
Model Remodel

Health & IAQ

With attention to a healthy landscape, it's no surprise that the wellness mindset continued indoors. Finishes and systems were selected that keep pollutants out and fresh air in.

- No carpet installed to improve indoor air quality
- Used zero-VOC paints and low-toxic water-based sealants and adhesives
- Heat recovery ventilator acts as whole house fan with MERV 12 filter
- Formaldehyde-free cabinetry, trim and cellulose insulation installed
- ABS, rather than PVC, used for plumbing
- Drain plane installed for walls between siding, trim and building wrap for moisture control
- Constructed roof overhangs of at least 24"
- Inverter driven, mini split heat pump installed (ductless and ducted)
- Completed window leak testing to ensure no water infiltration to inside of house

Materials

Exterior and interior materials were carefully chosen to combine healthy, sustainable attributes and to require minimal to no maintenance.

- Materials chosen for durability, ease of upkeep and high-recycled-content
- Materials and finishes include using 100% FSC wood
- Used low or no toxicity materials and finishes
- Minimum PVC used
- Products with high recycled content used
- Waste management deconstruction plan recycle rate of 98% of previous onsite structure (62% diversion after biofuel and alternative daily cover excluded)
- Utilized advanced framing techniques to reduce waste
- Post-consumer 100% recycled glass cullet was used under slab as a capillary break
- Used blown-in cellulose for insulation containing 85% post-consumer waste
- Durable metal roofing with 55% recycled content installed that has a 40-year warranty

Photos Left to Right: Products with high recycled content used, No carpet and zero-VOC paints and low-toxic water-based sealants to improve indoor air quality, Formaldehyde-free cabinetry.



Custom Home Case Study

5-Star Built Green Home in Kirkland

Breaking Down the Barriers!

“Our work is helping break down the relationship barriers between the development community and cities. Overall, we want to work with developers and others that want to do these types of projects. We can’t anticipate every condition but we are willing to work out how to make things happen.”

— **Dave Barnes, City of Kirkland Building Department**

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Breaking Down the Barriers!

Going deep green doesn’t need to include a lot of hassle. EHH was designed to sail through code review by using tried and true technologies. A couple questions did arise, but the City of Kirkland’s Green Team was able to shepherd the project through:

- **Potable Rainwater System:** Prior to EHH, the City of Kirkland didn’t have regulations regarding potable uses of rainwater, but quickly adopted King County Department of Health requirements. Now rainwater collection with filtration, UV sterilization and back flow preventer valves qualify as an “allowable system” for potable uses, enabling EHH to be the first permitted potable rainwater harvesting system in King County!
- **Comprehensive Reviews:** Kirkland offers pre-submittal reviews and concept design reviews to applicants. The EHH design team capitalized on this process, and was able to meet with all the review disciplines at

one appointment, saving time and money while ensuring the project was on the right track. The comprehensive review process complemented the project’s all-inclusive sustainable approach, incorporating 100% storm water retention, potable rainwater systems, extensive solar, and other green features that might trigger permit review delays if not properly vetted.

- **Digital Permit Submittals:** The project went paperless, submitting for permit review online. Digital reviews are faster for the Building Department, streamlining their overall turnaround and reducing paper waste.
- **Green Project Expedited Reviews:** EHH easily met the requirements for expedited reviews, available to any project pursuing Built Green 4 or 5 Star and LEED Silver or beyond.

A series of terraced rain gardens are designed to infiltrate 100% of storm water on-site.

