235 NE Ivy - Hildebrand Ecoroof
2009 - 2012

We started with a one story house with 3 bedrooms and a bathroom. Our two boys were approaching the teenage years, so we knew we would either need to move to a bigger place or add on to our current one. We do alright financially, but looking at some numbers, we knew we wouldn't be able to afford a house the size we needed, so going up was the only option. And when we heard more and read more about the Portland Ecoroof Grant, we decided to go for it - remodeling the house to be a two story with a full ecoroof.

We first decided to start the project probably in spring 2009. I started making notes about things we wanted to have and what we were going to need to do. In spring 2010, we had a pear tree taken down that was too close to the northeast corner of the house and I started using a couple programs to help design the new house layout. I also did some experimenting with normal soil and sedums on a "shelf" off the shed roof - but they didn't do well because they really got no sun back there...

As I worked with possible layouts, I started getting quotes for materials, contractors and engineers. We ultimately decided on just a structural engineer to help with strength calculations instead of hiring a contractor to also hire out all the individual pieces of work. We knew we had to hold back on our finances because we only had a $30,000 home equity line of credit to work with beyond our normal income (and credit cards).

With great help and guidance from our engineer, I pulled together my drawings into a great set of blue prints and with all calculations ready, we submitted it to the city to get the building permit - which would cover plumbing, electrical and any other parts that would need inspections. Our permit was approved in November 2010.

House progress March 2011
Digging the foundation holes wasn't very glamorous and took a very long time.

House progress July to August 2011
Foundation footings ready for concrete - pour date was 8/23/2011

House progress late September 2011
Old roof removed. Glulams and I-joists in place for 2nd floor.

We applied for the Ecoroof Grant in December of 2010, planning that we should be ready to add the green roof within 2 years. We started with digging to add foundation support. We finally had the concrete brought in August of 2011. To do the initial building, we hired a crew: roof was removed and building started in September 2011. The roof was ready for EPDM in October 2011. We got our 45 mil EPDM from Allied Building as 4 strips 13' wide. We had hoped they would be able to put them directly on the roof with their crane, but when they arrived it turned out there were too many obstacles: the walnut tree and the power lines. My father-in-law and I had to take one piece up at a time with a ladder with aid from a pulley & chain. That is heavy stuff - about 150 lbs per piece 13' x ~30'.

Once the stick frame was in place, we were done with the crew and progress slowed down considerably. Through late 2011 and most of 2012 we worked on shearwalls, adde 4x8 columns into first floor walls, installed windows and doors, hooked up electricity for the first floor, assembled plumbing for the second floor, attached rigid insulation to the outside with furring strips and got through about half of the siding.

In September 2012 work really started on the ecoroof. To protect the EPDM surface I decided to invest in some underlayment that is designed to go under pond liners. It's better to spend a little bit more at the start instead of having leaks and much bigger expenses later on.

I designed the ecroof layout to be pretty simple, just a grid placed at 45 degrees. The drainage channels were to be about 6" wide, filled with lava rock, and would double as walking paths. The channels and growing plots would be separated by strips of NewWood. After starting, I realized that I would need to add holes in the NewWood so water could flow - we didn't want to end up with a lake, after all. We acquired various carpet pad pieces to put under the growing medium for the purpose of holding on to

House progress September 29, 2011
Outer structure and support going up.

House progress October 15, 2011
Roof in place, EPDM purchased and put loosely in place to prevent leaks - the tarps were not cutting it.

House progress November 4, 2011
Solatubes sealed in, EPDM sealed and hung over parapet, drains cut and placed.

moisture as long as possible so dry times might not be so dry. And holding back the water during rainy times can also help the ground have time to absorb more moisture as it seeps out of the carpet pad.

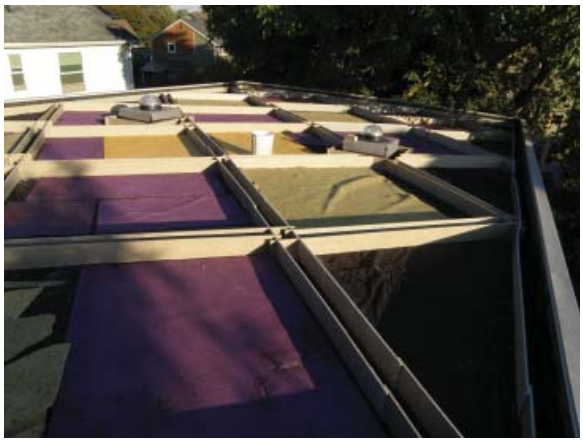
After the NewWood was in place, we had Swanson Bark from Longview come down with 22 yards of Rooflite Extensive mc. We ended up going with them because we liked the idea of paying one company to provide the product and the means of getting on the roof (blower truck). There were a couple other closer companies that had promising roof-friendly mediums, but we would have had to hire another company with the blower truck.

The worker with experience with the blower was a bit apprehensive when he was told about our project. He had a job in the past that took forever because the medium must have been too wet, it wouldn't blow very well. But, fortunately, the Rooflite mix flowed through the 5" blow tube easily. They arrived with their truck around 11 am and they were all done and gone by 5 pm.

Some of my channel spaces collapsed under the weight of the medium, and we had to also extract medium from the channels to prepare for the lava rock. I calculated I would need 4 yards of lava rock, and had it brought in by Mt. Scott Fuel and dumped on the driveway. With a couple family members, we got it all on the roof in less than 3 days. Five-gallon bucket by five-gallon bucket, pulling it up to the roof by rope, we carried and poured. That was a chore. We were short, though, so we had to go get another yard of lava rock with a pickup truck. We were able to get that up to the roof with 3 of us in a few hours. Lava rock was all in place on October 23rd.

We had a good rain before we were done with the lava rock and we discovered a couple leaks. Turns out that I was not thorough enough when I sealed the seams of the EPDM. We didn't have leaks during the first winter because water was free to flow, but

House progress September 20, 2012
NewWood in place - ready for carpet pad.



Ready for growing medium.

Rooflite Extensive mc from Swanson Bark of Longview on October 8, 2012.

the NewWood walls and growing medium caused water to pool if it rained hard enough. So wherever I wasn't able to get the membrane flat, wherever there was a little ripple, we started to have some leaks. For a few weeks I had to dig for the seams and seal them with lap sealant. It worked in general, but one leak was persistent and it was hard to locate where it was coming from - since water getting under the membrane would have to flow down to the next plywood seam and down again to the next plywood layer... The moral of the story is to make sure to seal your membrane expecting that water will try to flow both directions - before you cover it up!

We purchased our collection of plants from Koenig & asssociates. We considered getting some unrooted cuttings because they were so cheap, but decided we should go with plugs with roots until we get them established. And over time we expect we'll be able to cut our own unrooted cuttings from our successful plants. The 50-cell trays were the best deal, but they are pretty small plants; we'll see how well they do up there. We started planting on October 21st and with one person planting, it was mostly done in 2 full (nonconsecutive) days. Some plants had to wait in their trays because of the leaks we found, but the 50-cell plugs are pretty small and easy to move around. And as long as you still have the trays they came in, you can even put plugs back in if necessary. October was my targeted planting month because I didn't want to have to provide much water to get the plants established. We'll see how they do over the winter.

Planting started October 21, 2012
Still some lava rock being brought up.

House progress September 2012
Exterior almost done except for siding - House from the street looks pretty much the same in December with work being done on sides and inside.

The project is still ongoing, it will be awhile before I'm all done on the inside. But the green roof installation is pretty much complete.

Additional documents attached to this story:

- Tech details (itemized list of costs, products and labor along with a chart of planted species)
- Operations and Maintenance (notes about maintenance and irrigation on the green roof)
- Cross Section (diagram of ecoroof, notes on house structure for supportting the green roof)
- Planting plan (diagram of ecoroof layout with plots, drainage channels, plant locations)
- Rooflite Extensive MC Specifics (organic makeup, weight, etc)
- Copy of Building Permit from the City of Portland