

CASE STUDY: Eugene Rainwater Residence



LOCATION: Eugene, Oregon
PROJECT TYPE: Rooftop rainwater reclamation
PROPERTY TYPE: Private home
CONSTRUCTION DATE: 1998
INSTALLER: Water Brothers Construction
DESIGN: Anita Van Asperdt, Eimar Boesjes

Summary

This home was designed to celebrate and showcase rainwater by observing its natural flow. The home both harvests rainwater for later use and allows natural infiltration through constructed stream channels built into the landscape.

Soil Type & Infiltration

Soil in this area of Eugene is poorly drained and does not typically allow for adequate infiltration. However, the home was constructed at a time when certain stormwater building codes relating to infiltration rates were not in place. The catchment design, under today's standards, would be denied approval by the City of Eugene due to the unsuitable soil class. Contradictory to the soil type, the hillside site is characterized by cavernous soil,



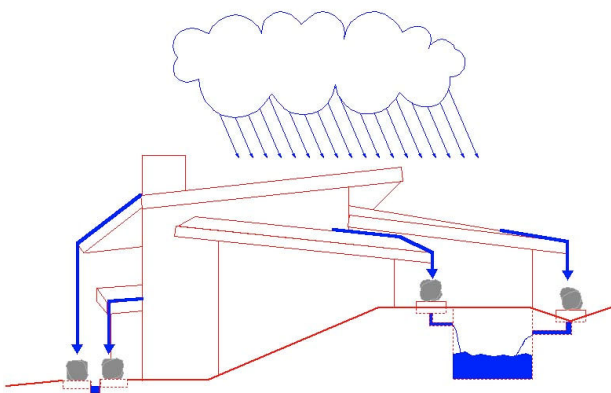
*Rooftop runoff is directed onto boulders and grates where it is then filtered before running into a cistern.
Photo by Eimar Boesjes.*

which has allowed ample drainage of the property. According to the homeowner and system designer, Anita Van Asperdt, the runoff is typically infiltrated within 30 feet of the house, with no negative effects on neighboring properties.

Specifications

The Rainwater Residence occupies a 1/2 acre hillside lot in the south hills of Eugene. Of four total rooftop surfaces, two (1024 ft² total) drain to an 8000 gallon partially buried concrete cistern, and the other two direct rainwater through a series of backyard infiltration channels. The rooftop surfaces are all metal with potable-safe paint and a fabric filter cleanses water before it is stored in the cistern.

The cistern was built into the foundation, with inlet pipes that direct water from the collection sites. The collection sites lie beneath the roofline and consist of concrete footings and metal grates with granite boulders sitting atop for splash effect. The rain



simply falls from the roof edge and onto the granite boulders, trickling through the grates and into the collection pipes that flow to the cistern. Stored water is pumped out for use by a small electric pump. Water is used for outdoor non-potable uses like irrigation and car washing. Overflow from the cistern is directed through the backyard infiltration channels.

Benefits

The aesthetic qualities of rainwater are preserved through this unique system and the environmental benefits have become more prevalent since the home's design ten years ago. The reclamation system reduces the amount of water drawn from the municipal supply and helps to slow runoff and return it to the natural aquifer. Rainwater detention also helps to prevent peak flooding and erosion and minimize pollutant loading. The home is not connected to any storm sewer system and therefore may be exempt from some sewer fees posed by the City of Eugene.

Costs

Because the cistern is a part of the home's foundation, it is difficult to separate the individual costs. The foundation, including the cistern, is estimated to cost \$20,000. Van Asperdt believes this design is not monetarily cost-efficient due to the low prices of water.

Maintenance

The filter fabric for the cistern needs to be replaced every five years for efficiency. So far the

cistern has not needed cleaning. The pump from the cistern has required large amounts of time to reconfigure, and will eventually need to be retrofit with a new pumping system.

Effectiveness & Monitoring

The system is efficient at retaining runoff on site. The 8000 gallon tank typically overflows throughout the winter but is able to supply water for irrigation during dry months, typically through July.



The metal clad, cement cistern can store 8000 gallons.

Successes & Lessons Learned

The project was an overall success but owner & designer Anita Van Asperdt would like to make some changes. The current pump system is not well-suited for its job and results in numerous maintenance visits. The pump is housed inside the residence but should have its own pump house near the cistern. The current design places a lot of unnecessary strain on the pump as it takes water from the bottom of the cistern and pumps it up to

the top. Repositioning the pump outlet lower on the tank would eliminate the extra energy needed to pump water up and over the edge.

The home was designed with separate piping for potable and non-potable uses, allowing for possible grey-water cycling. The nature of Oregon's rain season makes grey-water cycling the most sensible application for rainwater

reclamation. That way, when water is abundant throughout autumn, winter and spring, the grey-water system of the home will effectively use the rain water rather than attempting to store massive volumes for summer irrigation use. Van Asperdt is researching the steps needed to connect the cistern to the grey-water plumbing.

Contact Information

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References

Phone and email conversations with Anita Van Asperdt on 10/14/08 and 10/21/08

“Harvesting Rainwater” Vital Signs Case Study by University of Oregon students Angela Matt & Joshua Cohen, Spring 2001

<http://www.uoregon.edu/~hof/SoIhavesingrain/intro.html>

Pictures and diagram from above website, Eimar Boesjes and Anita Van Asperdt.