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designed to achieve water savings of 45% better than baseline, earning 4 points for LEED WE Credit 3, Water Use Reduction and 1 point in the Innovation in Design credit category for exemplary performance in WE Credit 3. A water sub-meter was specified to allow the building owner to track water usage. This also contributes to earning points for LEED Credit 5, Measurement and Verification.

The project presented an unusual design challenge for the roof drainage system, due to the numerous roof types with varying heights. The system consists of sloped metal roofing with downspouts that convey storm water to combination primary/overflow drains located on the flat roof areas, where it extends to a below-grade storm water system outside the building. The combination primary/overflow drains resulted in labor savings, since separate overflow drains were not required.

Eastside Fire & Rescue Station 72

Issaquah, Wash.
Ecotope

Fire Station 72 in Issaquah, Wash., is an 11,400-square-foot, full-time facility operated by Eastside Fire and

Photo: Shawn Oram, Ecotope

Rescue. The station houses three rotating shifts of six firefighters at a time. It includes offices, living quarters, three truck bays and support spaces. This project was designed to achieve the aggressive energy efficiency targets of the Architecture 2030 Challenge. The building itself was designed to achieve a 70% reduction in energy use over the regional average for fire stations before solar electric panels were installed. The project received LEED v3.0 Platinum certification.

The project includes an 8,500-gallon, above-grade rainwater cistern for toilet flushing, laundry, irrigation and truck washing and is on track to reduce potable water use by more than 50% over a standard fire station. The project also includes a grid-tied 30 kW solar electric array. Ecotope provided energy efficiency consulting, full mechanical and plumbing design and LEED and sustainability consulting.

Fire trucks are cleaned regularly to reduce transport of potential pollutants and pathogens and to keep the vehicles clean and shiny. Truck washing uses a great deal of potable water in a typical fire station. To reduce this demand, the station harvests rainwater from the roof into a large above-ground cistern. This water is used for all non-potable needs; to wash trucks, flush toilets, to irrigate and for clothes washing.

Ecotope used 10 years of daily rainfall data to develop a cistern sizing calculator. This type of analysis is much more accurate for sizing than using monthly averages or even daily averages. Using actual historical data allows for a better predictor of both large storm events and unusually long dry periods that occur from time to time. Use of rainwater at this station is predicted to save more than 58,000 gallons of potable water each year.

Meier and Frank Warehouse

Portland, Ore.
Glumac

Glumac has designed numerous rainwater harvesting/reuse systems, but none as ambitious as the system currently in place at the recently completed 14th and Everett project in Portland, Oregon. The five-story, full-block Meier and Frank warehouse was renovated to provide Class A office space with many green features. Designed by GBD Architects, the project is on track to achieve LEED Platinum certification. The large footprint and relatively small overall building size make this an ideal project to provide 100% of irrigation and flushwater needs for the building's estimated 700 occupants.

Rainwater is collected off of the eco- and built-up roofs using conventional roof drains and is routed through a storm filter located in the building. From there, it goes into a 147,000-gallon cistern located under the building. 81 percent of all rainfall is collected and reused, leaving 210,400 gallons draining to Portland's overtaxed combined sewer system. More than 530,000 gallons a year are diverted from the municipal systems. A duplex submersible pump controlled by a float switch pumps the recovered rainwater into the day/treatment tank. By utilizing low flow fixtures and drought-resistant plants, we were able to meet capacity with a small 1,600-gallon day tank.

Ultraviolet light and chlorine injection were both explored for treating the water prior to distribution. A chemical system was ultimately selected for its lower cost

Rendering: GBD Architects Incorporated