

In-Depth: Green Roofs



Cascade Meadow
Wetlands & Environmental Science Center

Function

A green roof was chosen because it met the needs of the design team. For the green roof areas, designers and engineers struck a balance between:

- Storm water management needs
- Costs
- Aesthetics
- Education/Demonstration goals

The two green roofs at Cascade Meadow were designed in conjunction with other storm water practices to:

- Mitigate hydrologic/hydraulic changes on-site so post-construction conditions are equal to or better than pre-construction conditions
- Promote infiltration, control discharge rates, and prevent pollution to protect the adjacent wetland and the South Branch of Cascade Creek, which is impaired because the turbidity levels exceed state water quality standards.

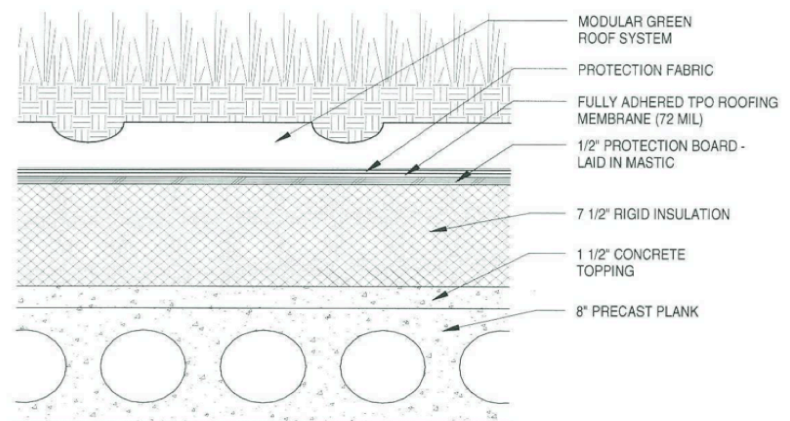
Together with the other storm water design features, the green roofs at Cascade Meadow provide for 100% *infiltration* of a 2-year storm event (approx. 2.8 inches of rainfall over a 24-hour period). This high rate of infiltration results in 80-100% reduction in total suspended solids (soil/dirt) and total phosphorus for 2-year storm events.



Design

Green roofs come in several construction styles; they can be custom-built and grown on site or made with pre-planted and fabricated trays. Cascade Meadow's green roofs were made using the LiveRoof® prefabricated system. Trays are 2 feet by 3 feet and come in a variety of depths. Ours are 6 inches deep and weigh 27 pounds dry or 40 pounds wet. Each tray has an outer plastic shell that is filled with a special soil mixture and suitable plants. Plants, which can be selected by the owner or recommended by the nursery, are grown in the tray and delivered to the building site. The plastic sides are removed from each tray during installation to create uniform plant coverage.

Green roofs reduce runoff by absorbing water from smaller rainstorms (excess water drains from the green roofs, enters the storm sewer and is infiltrated in one of our biocells). They help add extra insulation to the building, which saves energy. They also help protect the roof's underlying waterproof membrane, which can double the lifetime of the roof. The plants will attract birds, butterflies and other beneficial insects adding a new type of habitat to the site.

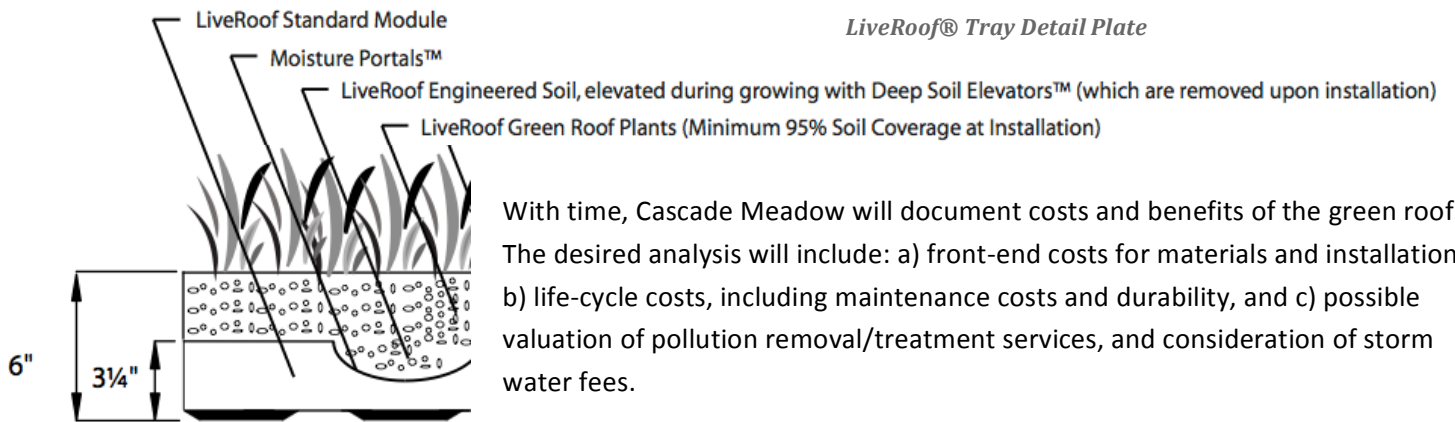


Green Roof Detail Plate



Construction

There are several key steps needed before and during installation of the plant trays. The waterproofing must be verified. Appropriate slip sheets must be selected and installation properly. There can be no walking on the plants. The modules must be properly oriented and overlapped before the soil elevators (plastic sides) are removed. Once installed, the plants must be watered. Due to the critical nature of roof waterproofing, all green roof installation activity must be conducted so as to protect the membrane at all times. This includes cushioning the tray transport “hoppits,” using rubber-cushioned equipment, and frequently sweeping-up of *all* loose growing medium or gravel. Due to the sophistication required, LiveRoof® requires that installers be trained and certified.



With time, Cascade Meadow will document costs and benefits of the green roofs. The desired analysis will include: a) front-end costs for materials and installation, b) life-cycle costs, including maintenance costs and durability, and c) possible valuation of pollution removal/treatment services, and consideration of storm water fees.

Maintenance

Maintenance requirements will vary by manufacturer/designer. LiveRoof® claims that its maintenance costs are \$0.15-\$0.30 per square foot annually, compared with traditionally planted green roofs that cost \$1.00-\$2.00 per square foot. Annual maintenance each spring includes a soil test to verify appropriate pH levels and trimming the plants to a height of 2 inches. LiveRoof® recommends that the following be done twice per month: weeding, soil replacement (loss typically due to birds), drain inspections, and debris/trash removal. Watering is only required under drought-conditions.

Learn More

Cascade Meadow's website provides lots of additional information about various sustainability technologies. Visit www.cascademeadow.org for more details, and watch the website's Events page to learn about upcoming workshops and events that can help answer your sustainability questions.

demonstrate • educate • participate

2900 19th Street NW • PO Box 6532 • Rochester, MN 55903 • Ph: 507.252.8133 • Fax: 507.288.2994

www.cascademeadow.org