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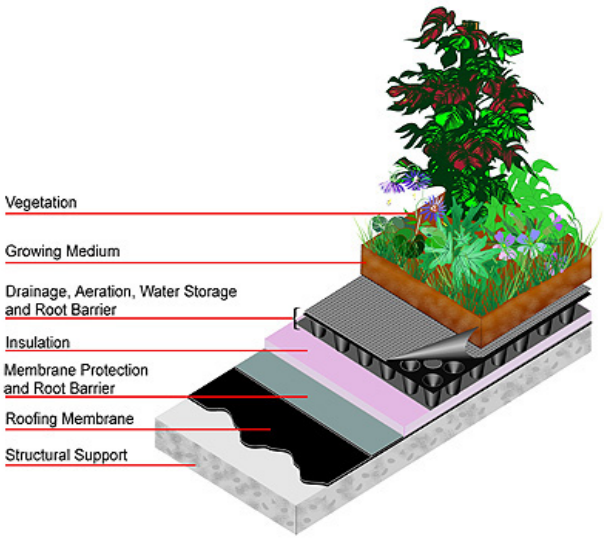
Green Roof Tops at WMU

Intro-

Our project focus is green roofs at Western Michigan University. A green roof is the roof a building having vegetation, among other parts, installed on the roof instead of having a standard roof. For this project we will discuss briefly the structure, the benefits, and the drawbacks of green roofs.

Structure-

There are two primary types of green roofs, extensive and intensive. Extensive green roofs are relatively lightweight, consisting of a shallow growing medium with small plants (e.g., sedums, herbs and grasses). Intensive green roofs, on the other hand, are heavyweight and contains much garden soil. The greater soil depth allows for the growing of larger plants, such as shrubs and trees. Both types offer the potential for reducing urban heat loads, absorbing rainwater, and improving cityscapes. At the same time, they create design and performance challenges for roofing professionals, who must make sure that Garden Roof Systems are specified and installed correctly. Depending on a Garden Roof System's makeup, its weight can range from as low as 16-25 psf to more than 300 psf.



(American Wick Drain Corp)

Green roofs require additional roofing components to support vegetation. These components consist of a specialized waterproofing membrane, root barrier, drainage layer, filter or water retention layer, growing medium and vegetation.

Benefits-

Benefits offered by green roofs include, energy efficiency, storm water management, aesthetics, and roof longevity.

There are many factors that contribute to the thermal energy efficiency of buildings; this includes insulation, direct sunlight, widows, and surface area among others. Studies that have been done in other countries have shown many positive effects toward energy consumption. One of the more difficult aspects in finding this type of information was the fact that it is more cost effective to build a green roof into the designs of a new building, rather than retrofit an existing building. There are different aspects of a green roof itself that affects its thermal effectiveness; soil type, soil layer thickness, plant types and extent of the green roof all impact its effectiveness.

Green roofs help to stabilize temperatures, by absorbing the sun rays that would otherwise be absorbed by the building itself. This reduction of fluctuation helps maintain temperatures within buildings and reduce air conditioning costs during summer months, and heating costs during warmer months. It is important to note however, that these are not a substitute for insulation, but rather an enhancement. Another benefit of this energy absorption is fluctuation in temperature, and thus less expansion and shrinking, increasing the longevity of the building.

Due to an increasing amount of impervious surfaces, such as concrete and roof tops, replacing green surfaces, such as grasses, hydrology in some places is becoming a real concern. Water running in concentrated flows, moving at much faster rates can overwhelm storm water systems, and can cause high rates of erosion. With green surfaces, water is absorbed, and slowly released back into the environment, and pollutants are filtered out. Green roofs are not an exception. Green roofs absorb water, the amount depending on the extent of the roof, its plants and its soil layer, and slowly release the water over a much longer period compared to a regular rooftop. Depending on the scope and extent of the green roof, this can have a major impact on the storm water runoff in the area. A thoughtfully designed green roof can help ease the burden to hydrological systems that are unequipped to deal with high volumes of water moving at a rapid pace. This benefit, however, is highly limited, if rainfall happens in too large volumes, or in too close succession, then the system will become saturated and stop absorbing water.

Drawbacks-

Some of the negative aspects of this project included the costs of green roofs and some of the uncertainty of the amount of energy and water held in the actual roof. Green roofs are not the only option in regards to controlling the energy costs as well as the heating and cooling processes for a building. Other technologies include living walls, white roofs, and insulation. To retain storm water other options such as rainwater cisterns and reclamation could be installed instead of a green roof. Yet, the major deterrent from installing a green roof on a building is the cost. LiveRoof models are around 20 dollars per square foot and having to retrofit an already existing building can create more expenses. The initial cost of a green roof can be very expensive, but the amount of money you can save in the long run can be very beneficial.

Goldsworth Dining Hall-

Currently plans are being set to work on a dining hall near Goldsworth Valley Pond. This brand new dining hall will serve hundreds of students every day and will also be visible from a few of the nearby dorms. To help combat issues of storm water and energy conservation in the building, a green roof could possibly have a positive impact on the surrounding environment, the building, and the students and staff who are there every day.