Using Compost BMPs for LEED Green Building Credits

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COMPOST based best management practices (BMPs) are a natural fit for green buildings and have been increasingly incorporated in LEED certified projects. From restoring habitat, decreasing storm water, helping to decrease urban heat islands and water use, to using recycled and locally manufactured materials, compost based products are helping design teams and developers achieve more LEED credits.

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Of the major rating systems for building construction under LEED Version 2.2 (New Construction, Existing Buildings, Core and Shell, Commercial Interiors, Homes, Schools, and Neighborhood Development [pilot]), LEED for New Construction (LEED-NC) is the most widely used program in which compost based products and practices have been designed and installed and used to help a project team accrue credits toward LEED Certification. Following are two case studies utilizing compost BMPs on LEED projects.

Case Study: Southface Eco Office

Southface is a green building education, research, advocacy, and technical service providing non-profit organization that has been a leading resource for the green building community for 30 years. Based in midtown Atlanta, Southface has grown rapidly with the thriving green building industry, and as such, has recently completed a new Eco Office for their expanding staff and training capabilities, and to showcase some of the leading trends in green building design and construction. Applying for LEED Platinum Certification, the new Eco Office has incorporated: a green roof system to reduce the urban heat island and storm water volume and peak flow rates; roof top and landscape storm water runoff catchment systems for water reuse inside and outside the building; compost and mulch erosion control blankets for site erosion control and site storm water volume reduction; a bioswale system utilizing a vegetated wall system manufactured from compost socks; a compost based bioretention system used to reduce site storm water volume and peak flow rates, and filter storm water prior to entry into an underground cistern; a vegetated wall system, made from compost sock technology, used to decrease the

Compost socks can be planted with live stakes or plugs at installation.

What is Green Building and LEED Certification?

Buildings in the US account for nearly 25% of all the water consumed in this country, 40% of the municipal solid waste, 50% of all green house gas emissions, 30% of all virgin wood and raw materials use, and 40% of all energy use (75% if you include transportation between buildings) according to the US Green Building Council (USGBC). The Leadership in Energy and Environmental Design (LEED) program created and administered by the USGBC is a point accrual and rating system that promotes and certifies environmentally sustainable building projects to create a national standard, through third party verification, in order to increase the value of green buildings in the marketplace. The LEED green building rating and certification program is targeted to projects that decrease their environmental footprint and increase occupant well being. During the site and building design phase a project team of developers, builders, architects, and consultants determine what level of LEED certification they plan to achieve by predicting how many credits they plan accrue based on their design plan. Ultimately, the USGBC reviews and audits the finished product to determine what the project team was able to accomplish and how many credits the project is awarded. To be LEED Certified a project must attain at least 26 credits out of 69 possible. Levels of Certification include: Certified = 26-32, Silver = 33-38, Gold = 39-51, and Platinum = 52-69. Higher levels of certification have been correlated to higher real estate values, lower operation and maintenance costs, higher worker productivity and attendance, and even greater rent revenues. Increasingly, municipal and federal government agencies are requiring new public buildings be LEED Certified. The square footage registered and certified under the LEED green building program has increased from 80 million in 2002 to 8 billion in 2008. This currently represents approximately 3% of the total US building construction market. This high growth rate, coupled with an even higher ceiling, and strong support from the new administration has made companies of all sizes and market sectors clamor for a foot in this field.

Bioretention system at Southface using compost socks, compost engineered soil, and compost blankets.

bioretention site footprint and restore habitat to this ultra-urban environment; and a compost filter sock used to help stabilize a porous paved sidewalk system and filter storm runoff effluent exiting the porous pavement.

Case Study: Verdae Development

Verdae Development is an 1100 acre commercial and residential development project that resides completely within the city limits of Greenville, South Carolina. Hollingsworth Park is the first phase of the residential sector of the Verdae Development, which will ultimately include approximately 5000 new homes. This development is registered, and is seeking certification, through the LEED for Neighborhood Development (ND) program, where its homes will incorporate a variety of green building practices, including ultra high energy and water efficient systems, and green building materials that include compost technologies. This development is exclusively using compost based products for perimeter control, inlet protection, slope stabilization, bioswales, and rain garden/bioretention systems. Green Site Services is the lead site contractor for this development and is designing and installing products by Filtrexx International to accomplish these objectives. Filtrexx International offers over 20 different compost based construction and post-construction storm water management best management practices (BMPs) that are currently being designed and installed on LEED projects. They work directly with the site and building design team to help them maximize their LEED credit potential.

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There are currently six categories under the LEED-NC rating system, however compost based products only contribute to the following three; Sustainable Sites, Water Efficiency, and Materials and Resources.

Sustainable Sites (SS)

This category is divided into 15 sub-categories, although only 5 provide credits where compost BMPs can contribute to a maximum of 5 credits, and 1 prerequisite.

SS Prerequisite 1 (0 credits) Construction Activity Pollution Prevention requires erosion and sediment control practices that comply with minimum requirements for NPDES Phase II and state and local regulations. Although no credits are awarded, this is a prerequisite, and compost BMPs can be applied.

SS Credit 5.1 (1 credit) Site Development: Protect and Restore Habitat awards a credit for the preservation or restoration of site wildlife habitat. If the site is a greenfield (undeveloped)

the plan must preserve 50% of the undisturbed area; if the site has been previously developed the plan must restore native habitat to 50% of the site area. Compost products have been widely used for land and ecosystem restoration projects. Compost uniquely restores above and below ground biodiversity and habitat which is essential to plant community health and ecosystem function and sustainability. Most compost based products are 100% biodegradable and manufactured from organic materials native to the bioregion where they will be applied; making these products uniquely indigenous to the native wildlife and habitat restoration project. Additionally, these products will not disrupt wildlife migration patterns and will not trap wildlife.

SS Credit 6.1 (1 credit) Storm Water Design: Quantity Control awards a credit for reducing site storm water. Sites with less than 50% impervious surface area must maintain post-development site hydrological peak runoff rate and volume to pre-development conditions based on a 2 yr-24 hr storm; or reduce peak flows to receiving stream channels and prevent their erosion and sedimentation utilizing natural systems that include native or adapted vegetation. For sites with greater than 50% impervious surface area a credit is awarded by reducing site storm water volume by 25% based on a 2 yr-24 hr storm event. Compost based Low Impact Development management practices have been widely used to greatly reduce site storm water volume, peak flow rates, and stabilize stream banks and channels using natural materials native to the site bioregion.

SS Credit 6.2 (1 credit) Storm Water Design: Quality Control awards a credit for on-site treatment of post-construction storm water resulting from 90% of the average annual rainfall (from historical records) or reducing 80% of the average annual TSS load. Compost technologies, such as compost storm water blankets and bioretention systems, have been used to target runoff volume reduction, which reduces TSS loads; and can be used to filter and trap TSS from storm water through the compost sock and storm

Bioswale and porous pavement sidewalk design utilizing compost sock living wall (above). Green roof at Southface near downtown Atlanta (below).

water pollutant trap applications. These compost based Low Impact Development management practices are specifically designed for these types of applications.

SS Credit 7.2 (1 credit) Heat Island Effect: Non-Roof awards a credit for minimizing the negative affects of site and building microclimate by reducing hardscape features that increase heat, not pertaining to the roof. The site plan must provide a minimum of 50% shade to site hardscapes 5 years after occupancy. Most compost products can assist in growing rapid, healthy and sustainable site vegetation used to shade area hardscapes which can contribute to this credit.

SS Credit 7.2 (1 credit) Heat Island Effect: Roof awards a credit for minimizing the negative affects of site and building microclimate by reducing roof features that increase heat. Vegetated roof systems have been widely used to insulate buildings and to assist in minimizing contributions to the urban heat island. The building design must have 50% of the roof area utilizing a green roof system or the majority of the roof area must use a combination of a green roof and highly solar reflective materials. Using compost media in green roof systems can improve vegetation establishment, health, and sustainability.

Water Efficiency (WE)

This category is divided into 5 subcategories, where 3 provide credits which compost products/practices may contribute toward a maximum of 3 credits.

WE Credit 1.1 (1 credit) Water Efficient Landscape: Reduce 50% awards a credit for reducing landscape irrigation from potable water sources by 50% based on a mid-summer usage baseline. Compost has a high water holding capacity and can hold up to five times its weight in water. Increasing soil organic matter content using compost engineered soils or surface applied compost blankets may contribute to this credit. For every 1% increase in soil organic matter, plant available water is increased by 16,500 gal per acre foot of soil (compost is generally 50% organic matter, dry weight basis). If applied as a compost blanket it can hold approximately 1450 cubic feet of water and decrease water loss by reducing surface evaporation. By reducing evaporation and increasing water holding capacity through the use of these compost based products, irrigation requirements can be greatly reduced. Agricultural research has shown minimal applications of compost can decrease irrigation requirements by 30%.

For every 1% increase in soil organic matter, plant available water is increased by 16,500 gal per acre foot of soil (compost is generally 50% organic matter, dry weight basis).

WE Credit 1.2 (1 credit) Water Efficient Landscape: Reduce 100% awards an additional credit to WE Credit 1.1 for eliminating permanent irrigation equipment (temporary irrigation can be used for 1 year post-construction for vegetation establishment). Increasing the application rate of compost blankets or

the compost inclusion rate of an engineered soil system can further increase water holding capacity and reduce evaporation.

WE Credit 2 (1 credit) Innovative Wastewater Technologies awards a credit for reducing potable water use in building toilet systems or by reduction of wastewater discharge through on-site treatment. Compost has been widely used as a substrate with plant materials in water biofiltration systems and constructed wetlands used to treat wastewater, increase infiltration, adsorb/bind pollutants, and recharge aquifers and ground water systems. Composting toilet systems have been utilized to reduce potable water use to attain this credit.

Materials and Resources (MR)

This category is divided into 14 sub-categories, where 5 provide credits that compost products/practices may contribute to a maximum of 5 credits.

MR Credit 4.1 (1 credit) Recycled Content: 10% awards a credit for using pre-consumer and post-consumer recycled materials in the building project. Ten percent of the materials (determined on cost basis) in the building project must be of recycled content. Higher value is given to materials made of post-consumer recycled content. Compost is 100% recycled and can be made from pre-consumer and/or post-consumer materials.

MR Credit 4.2 (1 credit) Recycled Content: 20% awards an additional credit to MR Credit 4.1 for increasing recycled materials in the building project to 20%.

MR Credit 5.1 (1 credit) Regional Materials: 10% awards a credit for using materials that are extracted, recovered, or harvested, and manufactured within 500 miles of the building project in order to reduce the negative impacts from transportation and support use of indigenous resources and local economies. Products that meet these criteria must account for ten percent (cost basis) of building materials. Due to the bulk and weight of compost feedstock materials and end products, these materials are rarely collected or distributed over 200 miles.

MR Credit 5.2 (1 credit) Regional Materials: 20% awards an additional credit to MR Credit 5.1 for increasing defined regional materials to 20% (cost basis) of building materials used in the project.

MR Credit 6.0 (1 credit) Rapidly Renewable Materials awards a credit for using building materials made from sources that are renewable in 10 yrs. These materials must account for 2.5% (cost basis) of the materials used in the project. Compost is a rapidly renewable resource that is continually manufactured from organic materials often harvested or collected in much less than 10 yrs. **L&W**

For more information on LEED or designing with compost based best management practices contact Britt Faucette at Filtrexx International, e-mail: brittf@filtrexx.com or call (678)592-7094.