



“The Sustainable Sites Initiative™ (SITES) is an interdisciplinary effort by the American Society of Landscape Architects (ASLA), the Lady Bird Johnson Wildlife Center at the University Of Texas at Austin and the U.S. Botanic Garden to create voluntary national guidelines and performance benchmarks for sustainable land design, construction and maintenance practices.”

Since 2005, the Sustainable Sites Initiative™ has been moving towards the promotion of sustainable landscape land development and management practices that can apply to sites with and without buildings. As a tool to be used in conjunction with LEED® (Leadership in Energy and Environmental Design), SITES™ has the potential to bring a holistic approach to the entire building site. As a company, **greenscreen®** believes that it is important to identify and promote key initiatives that will help to bring about an awareness of the larger issues of sustainable design, green infrastructure and policy development. To this extent, we are in complete support of the *Sustainable Sites Initiative™: Guidelines and Performance Benchmarks November 2009* and will use it as a discussion point to promote the incorporation of these standards into best building, management and policy development practices. The **greenscreen® Sustainable Sites Initiative™ Credit Contributions** is a peer reviewed exploration of product possibilities within the realm of the site and landscape in the built environment.

As a green wall product, **greenscreen®** has applications in architecture, landscape architecture, the building envelope and the landscape. As a company that has a collective breadth of knowledge in these disciplines it is easy to see the connectivity between structure and site, and importantly between the shared concepts of environmental services and sustainable systems. **greenscreen®** advocates for the systematic use of environmental systems, including plants and structure, as a method to promote a wider comprehension of sustainable building and site construction possibilities. The **greenscreen® Sustainable Sites Initiative™ Credit Contributions** will be utilized to help design professionals come to a better understanding of the possibilities and importance of these performance benchmarks. It will also be used as an internal reminder to ensure that **greenscreen®** is aggressively striving to meet and uphold its corporate social responsibility directives and commitments.



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greenscreen® CREDIT CONTRIBUTIONS

for the

SUSTAINABLE SITES INITIATIVE GUIDELINES FOR PERFORMANCE BENCHMARKS

NOVEMBER 2010

SECTION

1. SITE SELECTION (No Applicable credits)

2. PRE-DESIGN ASSESSMENT (No Applicable credits)

3. SITE DESIGN-WATER

Credit 3.2 (2-5 points)

Reduce potable water use for landscape irrigation by 75% or more from established baseline

intent

Limit or eliminate the use of potable water, natural surface water (such as lakes, rivers, and streams), and groundwater withdrawals for landscape irrigation. Encourage alternative irrigation methods and water conservation strategies.

product compatibility

The flexibility and verticality of greenscreen® can allow for the design exploration of drought tolerant vegetation in a relatively confined footprint. Also, greenscreen® can increase planting area square footage and Biomass Density Index (BDI) in small, difficult locations to provide additional opportunities for potable water reduction through alternative irrigation methods. For example, the modular characteristics and design flexibility of greenscreen® make it suitable to be placed in close proximity to or screen rainwater harvesting cisterns which would allow for gravity fed drip irrigation to be incorporated. Additionally, the lightweight advantage of greenscreen® is conducive to rooftop or at grade applications that could easily incorporate low demand vegetation design and the capture/reuse of air conditioner condensate. Additionally, greenscreen® strongly recommends the use of potential technologies and strategies set forth by SITES™ to include the use of low-water-demand vegetation (xeriscaping), native plant material, high efficiency equipment including SMART irrigation technology and proper horticultural maintenance to limit the use of potable water demands for landscapes.

Credit 3.3 (3-8 points)

Protect and restore riparian, wetland and shoreline buffers

intent

Preserve and enhance riparian, wetland, and shoreline buffers to improve flood control and water quality, stabilize soils, control erosion, and provide wildlife corridors and habitats.

product compatibility

Native vines are an integral, and often overlooked part of a native plant community. Climbing or vining plants can have high environmental tolerances, add wildlife value, provide habitat connectivity and can be incorporated successfully in a designed landscape. In the case of riparian, wetland and shoreline ecological systems, vines have been recorded as thriving in bog-swamp conditions with poorly drained soils and a wet to wet/mesic moisture gradient. According to *Native Trees, Shrubs and Vines for Urban and Rural America*, when measuring flood tolerance 8



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indigenous vines are classified as being VERY TOLERANT which indicates generally lowland wet species surviving when flooded or exposed to high water table more than 40 percent of the growing season. 6 native vines are designated as TOLERANT (Hightshoe 1998).

According to the *Landscape Restoration Handbook*, there are 46 woody vines and 43 herbaceous vines listed as part of ecological or native plant communities (Harker, Libby, Harker, Evans and Evans 1999) and when used within a holistic, designed landscape vines can play an intrinsic part in the restoration of these ecosystems. greenscreen® also recommends the design and use of geomorphological and vegetative methods within environmentally sensitive areas and will mutually explore engineering issues such as minimal footer design and other alternative construction techniques.

Credit 3.5 (5-10 points)

Manage stormwater on site

intent

Replicate the hydrologic condition (infiltration, runoff, and evapotranspiration) of the site based on historic, natural, and undeveloped ecosystems in the region.

product compatibility

Successfully managing stormwater is a multiple pronged approach and vegetation can be a very important aspect of that approach. Research studies have shown that plant material can intercept between 7% and 25% of the total amount of rainfall that hits an impervious surface. In addition, leaf surface can be an important factor in an environment's overall evaporation rate (David, Gash, par. 3 2010). Recent studies in Santa Monica and Sacramento, CA (Xiao, McPherson 2002) have shown that plant material can contribute to stormwater management by affecting the aspects of gross precipitation, free throughfall, canopy drip, stemflow and evaporation. greenscreen® realizes that plant material and multilayered plantings can play a significant role in successful stormwater management especially when incorporated into a Best Management Practices (BMP) approach. As a design solution, greenscreen® can help to increase Leaf Area Index (LAI) and can easily provide design solutions for vegetated swales, biofiltration planting areas and other Low Impact Development (LID) design models.

4. SITE DESIGN - SOIL AND VEGETATION

Credit 4.6 (2-5 points)

Preserve or restore appropriate plant biomass on site

intent

Maintain or establish regionally appropriate vegetative biomass to support the ecosystem service benefits provided by vegetation on site.

product compatibility

The benefits of vegetation are well documented and can provide many environmental services. In *The Case for Sustainable Landscapes*, an introduction to the concept of ecosystem services is presented and the importance of vegetation within an environmental system becomes very obvious. Ecosystem services are described as goods and services of direct or indirect benefit to humans that are produced by ecosystem processes involving the interaction of living elements, such as vegetation and organisms, and non-living organisms such as bedrock, water and air (page 27 2009). Vegetation can play an important role in the listed ecosystem services benefits of global climate regulation, local climate regulation, air and water cleansing, erosion and sediment control, pollination, habitat functions, human health and well being benefits, food and renewable



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resources, benefits, and cultural benefits. As suggested in the potential technologies and strategies for these credits, the use of vegetated structures, trellises and green walls are highly encouraged. According to the Planned Site Biomass Density Index (BDI) calculation, greenscreen® provides an excellent opportunity to increase an Existing Site BDI by covering horizontal and vertical surfaces with vegetation. On a typical one acre site, 400 s.f. of vegetated greenscreen® would provide a point benefit of .009 and 1000 s.f. of vegetated greenscreen® would provide a .02 point benefit. Additionally, greenscreen® would advocate that the costs associated with increasing an Existing Site's BDI using green wall and green roof technologies constitutes a much higher Biomass Density Value factor, especially when evaluating cost effective benefits in Desert, Temperate Conifer and Mediterranean Forest, Woodlands & Scrubs terrestrial biomes.

Credit 4.7 (1-4 points)

Use native plants

intent

Plant appropriate vegetation that is native to the ecoregion of the site.

product compatibility

According to the Environmental Protection Agency website, the EPA defines native plants as plants that have evolved over thousands of years in a particular region. They have adapted to the geography, hydrology, and climate of that region. Native plants occur in communities, that is, they have evolved together with other plants (EPA 2008). These guidelines further define native as plants that are native to the EPA Level III ecoregion of the site or known to naturally occur within 200 miles of the site. Naturally occurring hybrids, varieties and cultivars of species native to the ecoregion are acceptable (Omernik 1987). Native vines can play a large role in helping to increase coverage of the vegetated area to maximize point totals and make designed landscapes more layered, biologically diverse and sustaining. Native plants are typically more drought tolerant, disease resistant and are more conducive to an Integrated Pest Management (IPM) approach than introduced species and cultivars. Additionally, greenscreen® is dedicated to partnering for research and providing information to designers that pertains to native vines, so that they can be maximized in planting schemes. To date, greenscreen® is involved in multiple scholarly research projects and will provide relevant data when available. Additionally, greenscreen® will continue to foster partnerships that help to provide long term documentation on the beneficial role that plant material plays within the greenscreen® system. For example, to determine which plants would be best for the greenscreen® installations for the Valley Metro Light Rail project in Phoenix, AZ, A Dye Design organized a nine-month study to observe a variety of plants in different areas of the city. *The Vine and Vertical Shade Research Study*, which received the 2006 ASLA Merit Award, provided the team with a substantial list of plant species to use with the greenscreen® systems. Specific species could then be selected based on which plants flourished in which station areas.

greenscreen® would encourage the committee to define the coverage percentages to determine if these point totals include horizontal site surfaces and vertical surfaces as part of the total vegetated area.

Credit 4.9 (1-5 points)

Restore plant communities native to the ecoregion

intent

Restore appropriate plants and plant communities native to the ecoregion of the site to contribute to regional diversity of flora and provide habitat for native wildlife.



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product compatibility

The benefits of incorporating native plant material into a designed landscape, especially previously developed, graded or otherwise disturbed sites, are well documented. The overarching benefit of using native vines within the greenscreen® system increases the surface area of vegetated area calculation to achieve additional points within the credit. The greenscreen® system increases the percentage calculations for all sites when measured by surface area of vegetated area, using estimated vegetated cover within 10 years of installation. Just as importantly, native vines have a high wildlife benefit that includes many species of butterflies, birds and hummingbirds. Many vines species also provide fruits, seeds, leaves, twigs, bark stems and roots for many kinds of wildlife (Hightshoe 1988). Two indigenous grape varieties (*Vitis labrusca* and *Vitis riparia*) are identified as having Very High wildlife value with 50 wildlife users or more. Wildlife value can be extremely important when trying to provide habitat corridors connecting to off-site natural areas or buffers adjacent to off-site natural areas for migrating fauna. This option applies to habitat for species of concern within your region as identified by state Wildlife Action Plans, state wildlife agencies, federal wildlife agencies, or other entities.

Credit 4.10 (2-4 points)

Use vegetation to minimize building heating requirements

intent

Place vegetation in strategic locations around buildings to reduce energy consumption and costs associated with indoor climate control for heating.

product compatibility

Vegetation used as windbreaks can result in significant heat energy and cost savings. According to the requirements for this credit, windbreaks need to be located at least 60' from the building and no more than 200' from the building. Also, the windbreak must be of a particular height and must not cast a shadow on the building. On a smaller site with a limited footprint, a double row windbreak of large evergreen trees with a spacing of up to 20' may not be feasible. Also, in order to get 2 points for this credit the vegetation must extend for the full length of the building wall(s) facing the prevailing winds. The freestanding application of greenscreen® allows for a significant vertical height in tight lot situations. greenscreen® has multiple documented installations which show deciduous or evergreen plant material in an 18" wide planting bed growing as tall as 40'. Design flexibility and adaptation might also allow for a row of densely planted columnar trees and shrubs, in combination with vegetation growing on greenscreen® to extend at least 50' longer than the building walls(s) to achieve the maximum 4 points possible.

Credit 4.11 (2-5 points)

Use vegetation to minimize building cooling requirements

intent

Place vegetation and/or vegetated structures in strategic locations around buildings to reduce energy consumption and costs associated with indoor climate control.

product compatibility

Trees and vegetation lower surface and air temperatures by providing shade and through evapotranspiration. According to the EPA, shaded surfaces, for example, may be 20–45°F (11–25°C) cooler than the peak temperatures of unshaded materials. Evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 2–9°F (1–5°C) (EPA 2008). In addition to trees, some of the suggested strategies to increase shading include the use of shade trellises, green roofs, green facades and green walls. One requirement of Option 2 for



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this credit is the 100 percent shade requirement of all HVAC units within 10 years and the shading requirements of surface areas and walls. Typically, utility mechanicals are placed in areas that are not especially conducive to vegetative shading or an undersized lot can provide difficult space challenges. greenscreen® can provide a vertical vegetative facade or wall that can help achieve the maximum points for this credit.

Credit 4.12 (3-5 points)

Reduce urban heat island effects

intent

Use vegetation and reflective materials to reduce heat islands and minimize effects on microclimate and on human and wildlife habitat.

product compatibility

On a hot, sunny, summer day, pavement surface temperatures can be 50 to 90 degrees higher than ambient air temperature (Berdahl and Bretz 1997). The incorporation of vegetation, shade structures and green walls to shade surfaces and cool the air in urban spaces has been used for hundreds of years. Green facade wall technology and greenscreen® can play a major role in helping to abate the Urban Heat Island Effect when used in combination with other vegetative technology such as urban forestry and green roofs. Additionally, greenscreen® can incorporate the use of deciduous plant material that allows for a summer cooling, shading benefit and a winter heating, passive solar gain benefit. Qualitative and quantitative data on the contribution that green walls can have towards cooling urban spaces will be very beneficial. To this end, greenscreen® will continue to be proactive in helping to foster, underwrite, present and make publicly available research in this area.

5. SITE DESIGN - MATERIALS SELECTION

Credit 5.2 (1-4 points)

Maintain on-site structures, hardscape and landscape amenities

intent

Maintain existing structures, hardscape, and landscape amenities (e.g. retaining walls and benches) in their existing form to extend the life cycle of existing building stock, conserve resources, and reduce waste.

product compatibility

Through a diverse range of design possibilities and a flexible assortment of mounting applications, greenscreen® is an ideal retrofit or clip-on opportunity to retain existing structures and amenities. *Clip-On Architecture: Reforesting Cities*, an on-line article for the Urban Omnibus blog recommends looking at building retrofit as a way to reforest urban environments. "By integrating more trees and photosynthesizing plants within the fabric of our existing cities, we harness the power of plants to absorb carbon from the atmosphere. The surface area of buildings multiplies the ground footprint of the city many times over, making vertical gardening and the integration of growing walls into our buildings an interesting practical solution. The roofscape of most cities is an area that is often forgotten but that could easily be used for the application of green technologies beneficial to all. Greenscreen is a type of metal structure that can be attached to existing walls or used to create freestanding growing walls" (Keith 2010). Clip-on systems can help to provide aesthetic and environmental benefits while maintaining the existing form of the amenity. Retrofitting allows for extending the lifecycle of an amenity, the conservation of resources and the reduction of waste.



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Credit 5.3 (1-3 points)

Design for deconstruction and disassembly

intent

Design to facilitate reuse and avoid sending useful materials to the landfill.

product capability

With proper care and maintenance, greenscreen® panels are an ideal candidate for deconstruction and reuse within a *Design For Deconstruction* application. The strategies of DfD and the greenscreen® system interconnect seamlessly. The lightweight, rigid panels are modular building components and help to maximize simplicity, minimize the number of components, minimize the number of fasteners, simplify connections and separate building layers. To expedite re-use and minimize labor hours to re-purpose greenscreen® panels in a Design for Deconstruction application, herbaceous plant material choices should be made in lieu of woody plants so that plant material can be removed more easily from the panels without causing significant panel damage.

Credit 5.5 (2-4 points)

Use recycled content materials

intent

Use materials with recycled content to reduce the use of virgin materials and avoid sending useful materials to the landfill.

product compatibility

greenscreen® panels are made with steel wire containing post-consumer and post-industrial recycled scrap metal content between 30% and 70% (2007). The greenscreen® clips and trim are made from steel with a post-consumer and post-industrial recycled steel content between 30% and 75% (2007).

Credit 5.7 (2-6 points)

Use regional materials

intent

Reduce energy use for transportation; increase demand for materials, plants, and soils that are extracted, manufactured, or grown within the region to support the use of local resources; and promote a regional identity.

product compatibility

The greenscreen® modular system is manufactured in Fontana, CA 92337. A 500 mile radius from the manufacturing facility includes the major metropolitan areas of Los Angeles, San Francisco, San Diego, Las Vegas and Phoenix. Also, the lightweight, open grid characteristic of greenscreen® allows for lower shipping costs and the rigidness requires less packaging. An additional benefit of greenscreen® is that the system allows for the significant incorporation of local materials. A successful green wall system incorporates the components of structure, plants, soils and bulk materials (planting mixes, mulch, etc). The greenscreen® system allows for the majority of these components to be sourced locally.

Credit 5.8 (2 points)

Use adhesives, sealants, paints and coatings with reduced VOC emissions



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intent

Select paints, sealants, adhesives, coatings, and other products used in site development that contain reduced amounts of volatile organic compounds to reduce harmful health effects associated with air pollution.

product compatibility

greenscreen® panels are treated for durability and appearance with a thermally applied polyester powder coating in two processes and the higher solids content of powder coatings results in a lower volume of material needed for a given surface area. The combined VOC emissions from these are less than 1% of the powder material, according to the Paint and Coatings Resource Center (PCRC) maintained by the National Center for Manufacturing Sciences (NCMS). All mounting clips, posts, post caps and planter straps that require finishing also receive the same process. The greenscreen® manufacturing facility also adheres to and follows all regulatory requirements pertaining to water and solid or hazardous waste.

Credit 5.10 (3-6 points)

Support sustainable practices in materials manufacturing

intent

Support sustainable practices in materials manufacturing by purchasing materials from manufacturers whose practices increase energy efficiency, reduce resource consumption and waste, and minimize negative effects on human health and the environment.

product compatibility

Supporting sustainable practices during greenscreen® product manufacturing is a constant and ongoing consideration. Panels are constructed with recycled content steel in a manufacturing facility that adheres to a zero steel waste policy. The manufacturing facility also utilizes a closed loop collection and recycling system for the alkaline wash application and has recently invested in a system that will capture and re-use up to 38% more of the powdercoating. greenscreen® is continually looking to maximize efficiencies and is exploring the viability of a mid frequency welding process that will potentially reduce energy consumption in addition to providing greater, consistent energy efficiency. An additional option under consideration is an organic phosphating technology that cleans and prepares the metal using the platorization process. The platorization process uses no water, creates no solid waste, has virtually no VOC's and operates at room temperature.

6. SITE DESIGN - HUMAN HEALTH AND WELL BEING

Credit 6.5 (3 points)

Provide for optimum site accessibility, safety and wayfinding

intent

Promote site use by increasing user's ability to understand and safely access outdoor spaces.

product compatibility

The Planning for Optimum Site Use Worksheet provides examples and additional descriptions for the required components.



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- The definition of space/access control requirement in the Safety category calls for walkways and landscape elements to direct visitors to the proper entrance and away from private areas by utilizing planting, pavement treatments, short walls and/or fences. The freestanding application of greenscreen® allows for spatial definition in a private, semi-private or completely visually accessible application. In addition, freestanding greenscreen® applications are non-climbable and can be incorporated very easily into overall site security programming.
- The entrance and gateways requirement in the Wayfinding category states that gateways are often highlighted by separation between areas, such as fences, hedges, low walls, etc. The design flexibility of greenscreen® panels, column trellises, gates and customizable shapes helps to execute most of the stated traditional design techniques.
- The landmarks requirement in the Wayfinding category states that on-site landmarks may include vertical features such as towers, should be visible from main paths and should be unique and distinct from their surroundings. As a customizable and lightweight rigid panel, greenscreen® has been utilized as a unique on-site landmark or can easily be incorporated into a memorable object.
- The distinct areas and regions requirement in the Wayfinding category states that an area can be distinct when it has unique materials and vegetation within a recognizable space. Spatial definition, vegetation incorporation and a unique material are inherent characteristics of the greenscreen® system.

Credit 6.6 (4-5 points)

Provide opportunities for outdoor physical activity

intent

Provide on-site opportunities that encourage outdoor physical activity to improve human health.

product compatibility

The Planning for Physical Activity Worksheet provides examples and additional descriptions for the required components.

- The microclimate and other site-specific considerations category, which is a requirement, states that physical activity features should be designed with protective windbreaks, awnings and other sources of shade. Vegetation and green walls are encouraged and greenscreen® panels are a simple way to provide a barrier to minimize excessive wind, sunlight, traffic or unsightly features.
- The access to vegetation consideration requires that visual and physical access be provided to vegetation. Although the examples and descriptions of components are limited, greenscreen® believes that access to vegetation is critical, especially when designing for an increase in outdoor physical activity. Gardening can be a successful low impact, outdoor physical activity for specific user groups. The advantages of vertical gardening, for either aesthetic purposes or urban farming purposes, and the incorporation of greenscreen®



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panels into vertical gardening are seamless. The use of greenscreen® panels can help to eliminate the obstacles of garden maintenance like bending and stooping to pull weeds or kneeling to harvest produce. Additionally, greenscreen® panels can be used in flexible applications to provide access opportunities for ADA compliance and universal design.

Credit 6.7 (3-4 points)

Provide views of vegetation and quiet outdoor spaces for mental restoration

intent

Provide visual and physical connections to the outdoors to optimize the mental health benefits of site users.

product compatibility

Option 1 of this credit presents significant opportunities for the design and utilization of green facade technology. Lightweight, rigid greenscreen® panels provide delineation of outdoor spaces with the added benefits of microclimate alteration, aesthetic experience and access to vegetation. The design flexibility and adaptable application allows for an increase in vegetation utilization that helps to encourage biophilic design principles. Additionally, greenscreen® has the experience and engineering documentation that makes it possible for the panels to be incorporated into roof garden or roof top structures to maximize accessibility for site users.

Option 2 of this credit also presents significant possibilities and an additional point for sites which are regularly occupied. The additional point can be achieved by providing views of appropriate plant species for 75 percent of all building windows. Appropriate plant species as identified in Credit 4.6 can be utilized in conjunction with the greenscreen® system to increase the Planned Site Biomass Density Index (BDI). The verticality and flexibility of greenscreen® allows the designer to maximize the benefits of vegetation with a very nominal ground plane footprint on demanding sites.

Credit 6.8 (3 points)

Provide outdoor spaces for social interaction

intent

Provide outdoor gathering spaces of various sizes and orientations to accommodate groups, for the purpose of building community and improving social ties.

product compatibility

The Designing for Social Interaction Worksheet provides examples and additional descriptions for the required components.

- The microclimate and other site-specific considerations category, which is a requirement, states that social activity features should be designed with protective windbreaks, awnings and other sources of shade. Vegetation and green walls are encouraged and greenscreen® panels are a simple way to provide a barrier to minimize excessive wind, sunlight, traffic or unsightly features.

The access to vegetation consideration requires that visual and physical access be provided to vegetation. Although the examples and descriptions of components are limited, greenscreen® believes that access to vegetation is critical, especially when designing to provide outdoor spaces



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for social interaction. The design and integration of the greenscreen® system in Options 1 or 2 will help to develop a plan for encouraging social interaction on site by providing vegetative benefits, noise abatement, microclimate alteration, spatial definition and aesthetic experience.

7. CONSTRUCTION (no applicable credits)

8. OPERATIONS AND MAINTENANCE (No applicable credits)

9. MONITORING AND INNOVATION

Credit 9.2 (8 points)

Innovation in site design

intent

To encourage and reward innovative sustainable practices for exceptional performance above requirements and/or innovative performance in sustainable sites categories not specifically addressed by the *Sustainable Sites Initiative™: Guidelines and Performance Benchmarks November 2009*.

product compatibility

In 2010, greenscreen® is undertaking two major initiatives to challenge the design community and allied product manufacturers to strive for and attain exceptional sustainable practices. greenscreen® has partnered with MindClickSGM to undergo a corporate sustainability audit that will incorporate the following:

- employee sustainability engagement
- target market sustainability performance
- Scope 1 and 2 carbon footprint measurement
- completion of EPA Waste Reduction Model (WARM) and voluntary reporting of GHC emissions
- measure, track and report energy and water consumption using the Energy Star Portfolio Management tool

Additionally, greenscreen® in partnership with MindClickSGM, is conducting a third party verified LifeCycle Assessment that will outline the life cycle environmental impacts of the product. This analysis will be based on ISO 14040 standards and the evaluation of performance will be relative to leading global standards and protocols (GRI, ISO, Carbon Disclosure Project, etc.). These two initiatives will help to identify sustainability performance gaps and recommendations for use in developing a long range corporate sustainability plan and Corporate Social Responsibility agenda. greenscreen® would advocate for examples of this type of innovation that is not specifically addressed by the *Sustainable Sites Initiative™: Guidelines and Performance Benchmarks November 2009* to be included within this credit.



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