

## ***Green Parking Principles***

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Sustainability metrics “address the various aspects of land development and management that affect the ability of a site to provide a variety of ecosystem services.”

ASLA Sustainable Site Initiative, 2008



### **Putting Parking Lots to Work**

A previous column has defined green parking, Green Parking, LASN Vol. ?, No. ? December 2010, as “parking lots that do environmental work. A follow up column, Green Parking II, LASN Vol.?, No. ? February 2011 addressed landscape codes that promote sustainable landscape best management practices (LBMP’s) in Chicago, New York City and several other communities that are moving parking toward green. It is clear that the nature of parking lots in urban areas is changing.

If nature is to be preserved, protected or re-built in urban areas, the largest amount of available space to be found is within paved over land used for storing automobiles. In this column, Green Parking Principles, we will examine the root principles of landscape sustainability and how they apply to the greening of parking lots.

### **The Use of Land**

One recent study of parking and green laws found that parking lots occupy about 10 percent of the land in U.S. cities, and can be as much as 20 to 30 percent of the land in downtown CBD areas. The study, by Dr. Kathleen Wolf, University of Washington, 2004 estimated that 80 to 90 percent of all U.S. parking demand is provided by surface parking lots. Due to zoning requirements that often over state the amount of parking required per land use, 2 or 3 times as much space is dedicated to parking as

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compared to floor space in the building being served by the parking. Lots for regional malls can be as large as 60 acres and mostly paved.

In all situations the ecology of a parking lot is non-existent. Paved parking increases the urban heat island effect, pushes polluted runoff quickly into fresh water streams or overloaded sewer systems and provide no habitat for wildlife and even questionable habitat for people. Most parking lots as viewed from the public street are glaring and unattractive and multiple curb cuts are always potential traffic conflict points.

In fact, the environment of parking lots will vary from confusing to ugly to unsafe and not healthy. The only function provided by parking lots is the temporary storage of cars. Often for just a few hours a day while people shop or work. And in many lots, vast swaths of paved parking go unused except during the holiday shopping period. Not a good use of land.

We call these urban land use areas “grey parking” since have no ecology. They provide no environmental services for man-kind, they represent areas of the earth that have been totally destroyed from a natural point of view.

Perhaps it is time for some creative thinking about parking lots and how to create *high performance parking*, or green parking lot.

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Designing parking lots to be green mean they must be designed using sustainable landscaping principles that will bring ecology and life back to these important parts of our cities and towns. But even more important, for parking lots to go green, they must be allowed by the codes. But what are the principles that bring nature back to parking lots and where do these principles come from and how are they to be codified?

Green parking lot design principles must be set forth in local zoning ordinances and landscape codes as we see in **Chicago, New York City, Miami, Seattle, Santa Monica** and **Irvine**.

We can also find the roots of green parking in the **USGBC LEED Program** and the **ASLA SSI Program**. Both of these recently developed programs use rating sheets to tally sustainable metrics. Additional information can be found in the Landscape Architecture Foundation (LAF) **Landscape Performance Series** and through the **Seattle Office of Sustainability and Environment**. Various local sustainable landscaping programs found in **California, Florida, Louisiana** and around the

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**Chesapeake Bay.** The *Chesapeake Conservation Landscaping Council* (CCLC) and the **EPA** add ecological substance to any discussion of green parking lot design.

Common greening principles from these sources are summarized below.

### **Sustainable Landscaping Principles for Green Parking**

**Water:** This principal recognizes storm water as a resource. Therefore water should be harvested, conserved and reused. This principle requires more use of rainwater and less use of potable water for landscape irrigation. Storm water may be taken from parking lot surfaces and cleaned of non-point pollutants and pumped from parking lot detentions. Once filtered and cleaned, it may be recycled through irrigation systems or allowed to infiltrate back into the ground. Water from nearby rooftops or even domestic grey water can be harvested as well.

**Air:** This principle recognizes air as the most important resource on the planet. The goal of this strategy is to reduce air pollution and air born particulate matter. Since oxygen is generated by vegetation and carbon dioxide, a poison, is removed, plants are an integral part of generating cleaner air. Trees and shrubs can be used in and around parking lots to help purify the air and to sequester carbon dioxide one component of green house gas.

**Soil:** This recognizes productive soil as a resource to be protected and rebuilt in regard to fertility. Washed away and wasted soil often enters fresh water bodies as a pollutant. Vegetation, mulching and proper earth grading will minimize top soil loss and polluted runoff. Sediment basins or parking lot detentions should be used to trap sediment, solid waste and heavy metal from runoff. Productive top soil is essential for growing healthy vegetation so blending organic waste back into the ground reduces the waste of biomass. Permeable soil must remain on the site for planting, nurturing and allowing infiltration of rain water.

**Vegetation:** Vegetation as one of the most important elements of nature in the city and they go well beyond merely providing beauty and tranquility to urban life. In most of the principles set forth here, vegetation plays a role as an agent of environmental work so therefore it is an essential resource for urban areas. Vegetation in its many forms such as forbes (herbaceous flowering plants), ferns, grasses graminoides, (grasses, sedges, rushes), ground covers, vines, shrubs, trees and flowering perennials plants are important environmental workers. Importantly, plant materials gather the energy of the sun and return nutrients and biomass to the soil. Plants are involved with many of the principles listed here. Of course every landscape architect understands this.

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**Wildlife:** This principle recognizes wildlife as an important resource of the city. Not only for the way little creatures entertain us, they also measure the quality of the environment we live within too. Certainly many forms of wildlife will not co-habit the city with mankind, but some species do. They need shelter, food, water and land area to allow them to properly reproduce their species. Preserved habitat in various forms within the city serves this purpose for small animals, birds, insects, and reptiles. Parking lots should be designed as habitat for urban wildlife so they can continue to provide the ecological services wildlife is known to provide. A city without song birds is not a pleasant place to be.

**Food Production:** One principle of sustainable landscape development is the production of food. This may be food for wildlife or for hungry mankind. Green parking lots should utilize fruiting plants that will produce edible nuts, berries, drupes, legumes, pomes, tubers, rhizomes, bulbs, corms or stem shoots. Green parking lots can easily feature plants that provide a variety of edible plants. Be aware many plants have toxic parts so care should be taken in specifying which plant to use in public places. Toxic plant rule number one is “always suspect a plant to be toxic, unless known otherwise.”

**Recycling:** This recognizes recycling of used construction materials as an element of sustainable design. Parking lots might be designed to be deconstructed at a future date with all materials being salvaged for re-use. Recycling non-renewable resources can preserve scarce environmental assets while reducing construction costs. Eliminating waste to the landfill is an important idea of sustainable design realized through recycling. For instance, planted areas in and around green parking lots should be used as disposal sites for biomass, natural mulch and yard trimmings. Natural stone once used may be taken up and used again. Reusable precast pavers reduce the huge amount of carbon based energy used in the production of cement. It is interesting how relic pieces of culture can become elements of art in a designed parking lot.

**Regional Design:** Finally, the last but most important element of sustainable design directed toward green parking lots is a *regional based design strategy*. Regional design takes an earth systems approach to the design, construction and maintenance of landscapes. Earth systems of water, sunlight, soils, climate, vegetation, urban forests, natural habitat preservation and natural recycling ought to be incorporated into any landscape design for parking. Since any project in any state is in fact built into a functioning ecosystem, it is important for that project to fit in with the wider regional system of climate, soils, sun, rainfall and vegetation. Earth friendly landscape design will utilize native plants and native landscape character. Invasive plants should not be used and exotics should be minimized. The site designer's first concern should be in preserving regional habitat and regional forms. The second concern should be rebuilding native habitat in regard to water, soil and vegetation. And finally, the third concern should be capturing regional character in the design of housing, industry, commerce and open

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space systems. Sense of place results when all regional factors are respected and included in the design.

Regional character is derived from each state's various landscape features. In Louisiana these would be design concepts based upon the ecology of prairies, deltas, savannahs, beaches, ridges, *chénieres*, terrace faces and upland and wetland forests. These ecologies can all be utilized as regional concepts for the design of green parking lots as well as site open spaces. Regional based landscape design will eliminate the use of invasive species which tend to push native plants out of their way. Regional based design will use plant material that supports the native wildlife population with fruits, drupes and berries.

As can be seen, the above argument based upon sustainable design principles makes a strong case for changing the way we design parking lots. It is time to remove the sea of sterile asphalt and idle concrete that is the city center and replace it with a green open space system that can do environmental work while parking cars. Parking lots designed to be green can do important environmental work while storing cars and providing additional green space that people can use for various activities other than driving and parking cars.

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Word Count 1708      LASN Green Parking III Principles v1



Fig. 1 LEED Platinum Green Parking...Photo: Brandi White Blog Spot.

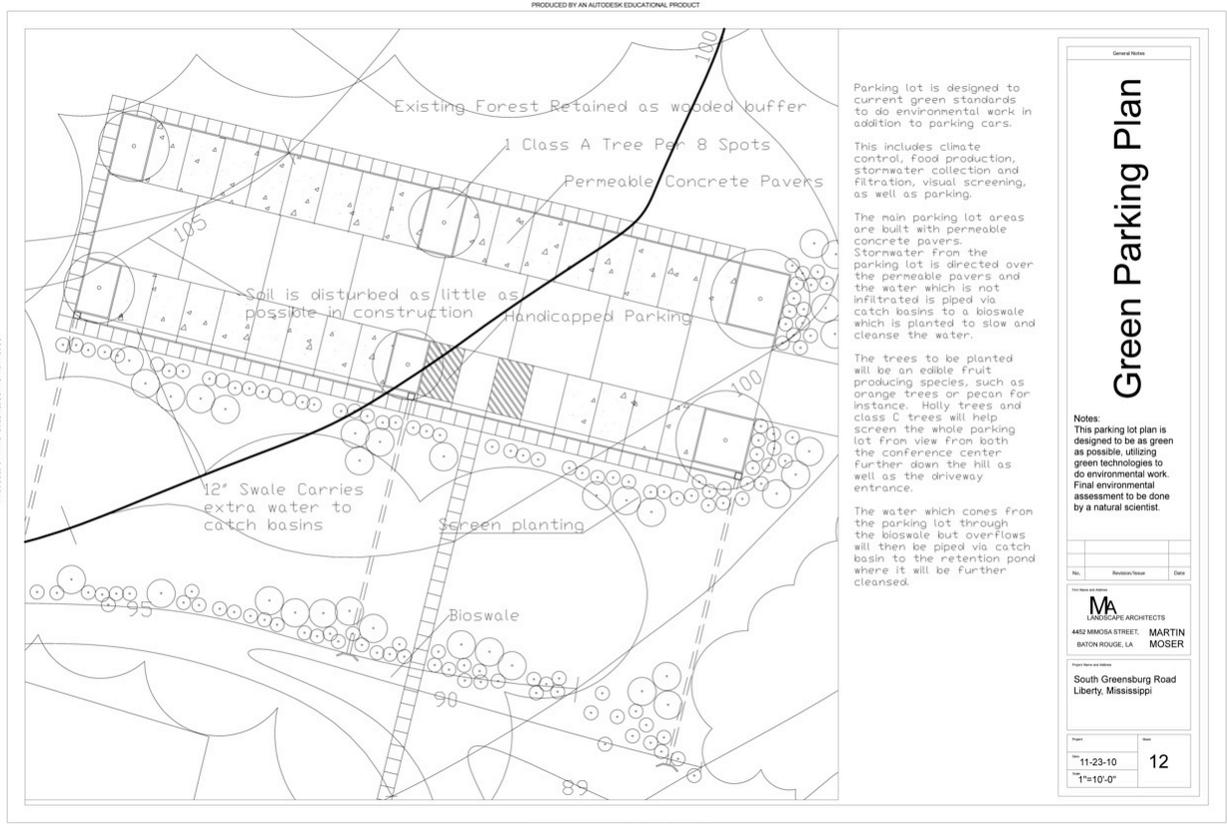


Fig. 2 Green Parking Plan...Martin Moser Louisiana State University.

### LETTERS TO THE EDITOR in regard to Green Parking Stories

Thank you for the initial article on green parking lots. I have had those same thoughts for awhile, but obviously could not convey the message as well as you did. Your article could not have come at a better time. We are working with a small college in northern Indiana and they would like to develop a master plan of one large parking lot on to help with the environmental impact in has on the campus.

As you mentioned in the article it is extremely difficult to find quality information on green parking. I was hoping you could provide me with some information (class handouts and your paper?) on this topic and maybe some case studies or examples of parking lot master plans incorporating these types of practices. This is could be huge savings to the college as the city where it is located actually has a stormwater user fee for properties that utilize the municipal storm sewer system based on the amount of impervious pavement on the property.

Thank you for your time and I look forward to hearing from you and reading your future articles on this topic!

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**Michael J. Bultinck, ASLA  
Lehman & Lehman, Inc.  
Mishawaka, IN**

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**I found your Sustainable Parking article in Landscape Architecture & Specifier News very interesting and would like to receive the class handout material and copy of your paper on Green Parking.**

**Daryl F. Martin, Principal**  
Sierra Design Group, Landscape Architects  
Loomis, CA

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Thanks for the draft paper. I'm circulating it among my engineer colleagues as part of my efforts to promote the view that landscape is infrastructure. Stormwater management provides fertile ground for that discussion. You may feel free to use my comments as is. I'll look forward to your series of articles on green parking.

Scott Milovich

Principal Landscape Architect  
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Public Works Engineering