SW 1: REDUCE EXCESSIVE PAVING OF SITES

New York City Building Code
Proposal developed by the Homes Committee

Summary

Issue:
Due to excess stormwater, 27 billion gallons of sewage are released directly into New York harbor each year. Paving over the ground exacerbates this problem.

Recommendation:
In new construction projects, require that half of the non-built lot be permeable.

Proposed Legislation, Rule or Study

Amendments to the New York City Building Code

1. Add a new Chapter 34 to read as follows:

CHAPTER 34
SITE AND LANDSCAPING

3402.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

AREA, IMPERMEABLE. Any portion of a lot on which the soil is covered with impervious materials such as asphalt or concrete, or bricks or pavers over a concrete or asphalt sub-base

AREA, NON-BUILT SITE. Any area of a lot that is not covered by a building.

3403.1 Impermeable surfaces. Sites shall comply with the following standards on impermeable surfaces:

3403.2 For new buildings, a maximum of fifty percent of the non-built site area of the zoning lot may be impermeable area.

3403.3 For alterations, the impermeable area of the non-built site area of the zoning lot shall not be increased to greater than fifty percent.

3403.3.1 Where over fifty percent of the existing non-built site area of the zoning lot is impermeable area, any impermeable area that is removed shall be replaced only with pervious materials.

Exceptions:

1. Any building classified in occupancy groups F or H and motor fuel-dispensing facilities classified under occupancy group M.

2. Subject to approval of the Commissioner, where compliance would result in flooding within existing buildings.

Effective Date: July 1, 2010

Supporting Information

Issue – Expanded
Impervious pavement is common in urban environments because it is perceived as the lowest cost solution for parking,
plazas, and other hard surfaces. However, impervious surfaces cause hardship for cities by increasing local flooding, combined sewer overflows and other environmental degradation that could avoided by through alternative paving techniques. An increasing number of design options, including pervious pavements of many sorts, can satisfy building functional needs without creating as much runoff and allowing for some re-establishment of natural process and hydrological cycles, such as infiltrations into soils, evaporation, and evapo-transpiration. Alternatives to pavement also often involve planted systems, which create habitat, and cool the city, along with restoring the hydrological cycles.

**Environmental & Health Benefits**

Greater surface permeability in New York City will reduce local flooding, combined sewer overflows, and allow for filtration and groundwater recharge. Permeable areas retain moisture, which evaporates during hot periods, reducing the urban heat island effect.

This proposal was found to have a high, positive environmental impact per building and to impact a large number of buildings. It was thus given an environmental score of 3.

Pollutants in stormwater runoff can have damaging effects on human health and aquatic ecosystems. Since New York City has a combined sewer system in many areas, and intense storms flood the system, which can result in the overflow of untreated stormwater and septic sewage (Combined Sewer Overflow) to be discharged directly into the rivers. Limiting the amount of water flowing directly into the system from intense storms can lessen the occurrences of CSOs.

This proposal was found to have no significant positive health impact.

**Cost & Savings**

As described in the Executive Summary, Bovis Lend Lease prepared cost estimates for each Task Force proposal in the context of well-defined construction projects in specific buildings. Where possible, members of the Technical Committees prepared savings estimates for some of these projects and buildings. These cost and savings estimates are presented in the February 1st draft version of Appendix A. The innate uncertainty in how construction and operation will vary from one building to another, the complexity of the Task Force proposals, and the wide range of applications in which the proposals may be realized mean these figures are truly estimates.

This proposal was estimated to lower capital costs if implemented.

**Precedents**

Several cities require new and redeveloped sites to reduce impervious areas of sites and limit driveway paving.

The City of Philadelphia requires new developments and redevelopments over 10,000 square feet to reduce the impervious area of a site connected to sewers by 20% compared to preexisting conditions. Philadelphia offers the reduction of impervious areas on a lot as an option to meet criteria to reduce peak flow stormwater volumes that are led to sewers. Other structural stormwater management practices may be used that detain water and release it over a longer period of time than unabated runoff.

The City of Chicago requires redeveloped sites over 7,500 square feet that discharge to combined sewers to reduce impervious cover by 15% from previous conditions. Its stormwater management manual recommends landscaping and permeable pavement as ways to meet stricter regulation. Methods to reduce flooding on-site include vegetated filter strips, which are designed to received stormwater runoff from impervious surfaces and disperse it over permeable areas, and bioinfiltration systems, which are depressed areas containing plants, mulch, and prepared soils. Berkeley limits the amount of paved off-street parking allowed in a yard, and requires permeable surfaces and landscape strips surrounding paved parking. 3

Toronto provides a maximum front yard driveway width and requires 50-60% of front yards to be landscaped. 4

**LEED**

LEED for Homes SS cr.4.1 states lot must be designed such that at least 70% of the built environment, excluding the area under the roof, is permeable or designed to capture water runoff for infiltration on-site.

For existing homes seeking certification under the LEED EB rating system, this proposal will facilitate achieving SS cr. 5.1 & 5.2 Stormwater Management, Rate and Quantity Reduction.

Depending on the permeable surface that is utilized, project teams may also be eligible for LEED for Homes SS cr.3 Local Heat Island Effects or LEED EB-SS cr. 6.1 Heat Island Reduction, non-roof. These sections award points to projects for reducing irrigation, tempering the outdoor environment, and reducing cooling loads.
Implementation & Market Availability

Nearly any surface that is paved with a traditional impervious surface may be converted to a porous pavement system. Porous pavements are especially applicable to sites that are in high-density area where space is too limited for other methods of stormwater management including laws or soil beds for infiltration. A simple option for permeable driveway alternatives is crushed gravel, but where this is undesirable there are an increasing number of options available, and several systems have histories of success.

Porous asphalt was developed in the 1970’s and has been implemented where standard asphalt would otherwise be used. It is installed just as standard asphalt is, but uses larger aggregate so that water can pass through voids in the material. Thomas Cahill, P.E. has used porous asphalt for projects such as walking paths at Swarthmore College and many large-scale parking lots throughout Pennsylvania. Porous asphalt has proven to be at-least as durable as impermeable pavement.

Similar to porous asphalt is porous concrete, which likewise is made of larger sized aggregate so that water can trickle through. The Florida Concrete Association developed porous concrete and it has been used in Florida and other southern states.

Porous asphalt and concrete need regular maintenance; otherwise after time the pores tend to clog up. Vacuuming or power washing annually, or using a leaf blower more frequently all satisfactorily restore permeability. During the winter months sand should never be used to increase friction because the sand will obstruct voids in the pavement. Salts may still be used though they should be used sparingly because chlorides that pass through the pavement may corrode piping and damage plant life. Permeable pavements tend to require less salt anyway because precipitation passes through instead of ponding on top thus mitigating the formation of ice.

Reinforced turf is an especially appealing alternative to paving on sites which experience relatively infrequent traffic. Reinforced turf is comprised of a grid of either plastic or concrete with openings that can be filled with soil. Turf grass can take root in this soil and aid in retaining stormwater. A popular brand of reinforced turf called “Grasscrete”, marketed by a UK based company, is a concrete, heavy-duty interlocking system that has been used for decades.

If the owner or designer deems turf unwanted then permeable pavers can be used. Permeable pavers are paving units, often made of concrete, with openings in between that can be filled with relatively pervious material such as gravel. They can be combined in a variety of patterns and are suited to areas such as patios and plazas.

One need not choose a single variety of permeable pavements over others. On large-scale projects a designer would be smart to apply different permeable pavement systems where they are most appropriate. This has been accomplished very successfully at the New Sunrise Yards in Queens, a light industrial facility for NYC DOT with a need for truck access, extensive parking, and fire code access. Here a varied palette of solutions, which included permeable pavers in the parking area and Grasscrete in the side yard where fire truck access was required, limited the impermeable paving to the truck loading dock areas.

ENDNOTES:
