



# Re-Naturing the City: A Role for Sustainable Infrastructure and Buildings

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Design professionals and planners are learning new ways to weave nature into the urban experience through the vehicle of high performance or green building. With energy- and resource-efficient building practices joined to metrics such as air quality, indoor lighting, and thermal comfort, environmental quality is being expressly redefined by better human outcomes. Put back in touch with daylight's full spectrum, embracing the lost logic of passive solar heating and natural ventilation, reconnecting with the world outside, enjoying designs that promote views for everyone to experience weather, seasons, and views, we may once again benefit from proximity to the natural world.

Sustainability, many are coming to understand, is not about austerity, but to the contrary, may proffer a richer, more sensuous experiential dimension. Practiced well, it's about keeping abundant the **visual, tactile, acoustic, and thermal cues** that are our link to natural processes. Locked in conventionally lit, hard-surfaced, climate-controlled interiors, with ever more social and business transactions being mediated electronically, human senses can wither. They become anaesthetized. Green design privileges access by all of our faculties to daylight, views, and fresh air, enabling us to feel or hear sound of wind or water, providing the "thermal delight" experienced indoors in a sunny spot or outdoors on a green roof. Vegetated roofscapes and rain gardens bring nature close to hand while beneficially catching, cleaning, or even infiltrating stormwater right on site. In sum, buildings that celebrate local microclimate, topology, vegetation, hydrology, and material

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Street tree and skyline,  
Brooklyn, NY.

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Left:  
The West Side Highway  
looking north from the  
pedestrian bridge at Rector  
Street. Planted medians  
buffer adjacent pedestrian  
and bicycle pathways from  
highway car traffic and  
provide welcome views.

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**Green roof on Chicago's City Hall.**

PHOTO BY LINDSAY CAMPBELL,  
U.S. FOREST SERVICE



**Green infrastructure and redesigned streetscape improve bicycle and pedestrian transportation.**

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OF TRANSPORTATION





Front yard urban tree canopy in Carroll Gardens, Brooklyn.

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resources, may realize both greater efficiency and effectiveness, being more comfortable and conducive to productivity, than conventional buildings that ignore their surroundings.

The techniques and resultant benefits of closely coupling built and natural systems described above can today be applied to the design and construction of the public right-of-way — that familiar urban cross-section of sidewalk, street trees, parking and travel lanes, and associated subsurface utility and stormwater infrastructures. Indeed, the right-of-way remains today a typology of the “commons” and is, in fact, an undervalued public space that can offer significant ecological and human health benefits. Our city streets can move toward high performance by application of the core principles of sustainable design — using materials, energy, and resources more effectively, limiting hazardous substances and waste, and reducing other detrimental impacts to the air, water, and soil.

Best practices for the right-of-way marry nature’s economy of means to her beneficial processes. A few examples may illuminate this point. **Treating stormwater runoff** as close to its source as possible by using landscaped or “bioengineered” structures in roadway medians or in sidewalk areas can return cleaner water to its natural hydrologic pathways. In lieu of the conventional, miserly 5 ft x 5 ft tree pit, trees may be connected continuously under the sidewalk pavement with continuous trenches filled with structural soil (organic matter mixed in a matrix of large stones). This allows trees’ roots air and room for growth, while providing a useful stormwater reservoir. Through shading and evaporation, trees combat the local “heat island effect” of higher summertime city temperatures while reducing heat stress on asphalt pavement. So can light-colored asphalt and concrete on streets and sidewalks that deflect some incoming solar gain. At night the city also benefits from pavement’s greater reflectivity as it boosts the effectiveness of streetlight illumination. Diversified native (water efficient) plant and tree species, brought in greater density to our streetscapes, enhance the walkability of the right-of-way — improving public health, safety, and quality of life.

Envision, if you will, such a transformation of New York City’s largest real estate holding, namely its 20,000 lane- miles of right-of-way — an aggregate area greater than the island of Manhattan. By combining

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these progressive “best practices” across landscape architecture, civil engineering, and utility conveyance systems, the rights-of-way become a whole system, an integration of many parts combined for their higher performance in a densely urbanized environment. By incorporating into engineered systems the intelligence of natural ones, whose passive processes clean and cool air and water (using infiltration, bio-retention, bio-remediation and evapo-transpiration), and by helping to replenish and augment plant species health and diversity, utilitarian public works can begin to transcend their single purpose functions. This gentle ‘greening of gray infrastructure’ can also, over long time horizons, achieve a subtle but profound re-naturing of the city. Locally and nationally, as we proceed with a new era of infrastructure upgrade, our goal should be to make this relatively taken-for-granted real estate more resilient, functional, and beautiful, fostering a healthier urban environment.

Overcoming our increasingly devastating disconnect from the natural world has permitted us to accept as norms the terms of pollution, sprawl, social isolation and a generalized diminishment in human experience and potential. Re-energizing our symbiotic relationship with nature in an urbanizing landscape is perhaps one of the most pressing needs and potent opportunities of our time.