HUGH L. CAREY
BATTERY PARK
CITY AUTHORITY

Commercial Institutional Environmental Guidelines

Hugh L. Carey Battery Park City Authority Commercial / Institutional Environmental Guidelines 1.0

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Vision Statement

These Guidelines reinforce the leadership position of the Hugh L. Carey Battery Park City Authority (HLCBPCA) in the field of environmentally responsible design.

With the active encouragement and support of Governor George E. Pataki, HLCBPCA is setting standards for healthy and sustainable environments. The predecessors to these guidelines, HLCBPCA Residential Guidelines, are responsible for the first “Green” residential tower in the United States. With the Commercial/Institutional Guidelines, HLCBPCA seeks to bring the same leadership to the field of Commercial and Institutional projects. All future buildings built under its direction would be at the forefront of ecologically responsible design and would be responsible for educating and influencing the Real Estate market and the Construction industry.

Mission Statement

The purpose of the HLCBPCA Commercial/Institutional Guidelines is to provide both the direction and the metrics for design strategies such that the resultant buildings are outstanding examples of environmental responsibility.

Introduction

Sustainable Design
Sustainable design is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." In most instances this is a "common sense" approach to development that prevents further depletion of natural resources, air pollution, and global warming. This approach decreases dependency on non-renewable resources while improving opportunities for more efficient and more economical alternatives that are sustainable.

Market Strategy
The following guidelines adhere to the most current thinking with respect to sustainable design strategies and are a vehicle for the development of commercial and institutional buildings that are both environmentally and financially rewarding. The guidelines have been designed specifically for the Hugh L. Carey Battery Park City Authority (HLCBPCA), an established leader in urban development. The guidelines respond to increased public awareness of environmental conservation and increased demand for high quality and healthier working environments. Incorporating sustainable principles in the development of the commercial and institutional buildings serves to enhance the current marketing strategies that continue to make Battery Park City a model for urban development.

Total System Approach
A total system approach is the backbone of the guidelines and the best approach to achieving the desired result in a cost effective manner over the life of a building. One of the financial goals of a total system approach is to minimize the impact on first costs (construction costs) by offsetting increases from some requirements with decreases from others. While it is understood that this is a New York City commercial and/or institutional development with customary relationships between owners and occupants, it is anticipated that both developer and tenant will comply with the HCLBPCA green commercial guidelines. The developer will be making significant investments in innovative building systems that will enhance building performance in indoor environmental quality, water conservation, lighting, and energy use. The tenant will share in the benefits of those investments. Careful evaluations must be made of the first costs, operational savings, building performance, potential benefits and how developer and tenants will reasonably participate in those costs and benefits.

Execution
Successful execution of the guidelines depends on owners, developers, tenants, design professionals, and contractors beginning their dialogue at the earliest stages of design to ensure the proper and cost effective realization of sustainable solutions. These guidelines do not represent a complete resource, but rather a framework of concepts that may be interpreted and refined by the individual design teams to achieve the desired result. While some

of the requirements are prescriptive, most are purposely goal oriented to provide for creative solutions in response to rapidly changing technologies and to avoid conflict with evolving policies, regulations, and building codes.

Rebuilding Green

These Guidelines are being issued, after the tragic events of September 11 2001, in a world very different from the one in which they were originally conceived. While its true that events such as the terrorist attack, their causes and their effects are factors much larger than those a set of building guidelines can hope to address, these Guidelines would like to utilize this opportunity to:

a) Ensure that the construction guided by it is, inherently, safer. This would not be achieved by providing more security, but instead by promoting decentralized technologies, such as distributed generation, which make it difficult to immobilize systems by attacking single components.
b) Setting very progressive, yet practical, standards for Indoor Air Quality (IAQ) so that structurally sound buildings can become safe havens instead of becoming places of danger.

Coordination with LEED

The Guidelines are closely coordinated with United States Green Building Council's (USGBC) "Leadership in Energy and Environmental Design Version 2 (LEED V2)" of June 2001. It is the intention of these Guidelines to help create buildings that achieve the LEED "Gold" rating. However, HLCBPCA is guided by a unique set of concerns that, at times, vary from LEED V2. While LEED V2 is a ratings system, these Guidelines are mandatory.

Every section of the Guidelines references the relevant section from LEED V2 - typically, as a footnote at the bottom of every page. The tally of points is subdivided into two columns: "BPCA Score" and "LEED Possible". The first column tallies the number of LEED points scored when implementing any of the Guidelines. The second column tallies the maximum number of achievable points. A running tally is kept through the entire set of Guidelines.

The LEED V2. can be downloaded, free of charge, from:
http://www.usgbc.org

LEED Green Building Certification Levels

LEED Certified	=	26-32	Points
LEED Certified Silver Level	=	33-38	Points
LEED Certified Gold Level	=	39-51	Points
LEED Certified Platinum Level	=	52+	Points

Disclaimer

1) While these guidelines closely relate to LEED V2, they don't provide any guarantees for obtaining any LEED certification.
2) The Guidelines record, in the footnotes, only those LEED V2 points that are pertinent to them.
3) The sequence of the Guidelines' points does not always match the sequence of the LEED V2 equivalents.

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1.0 Site Management

1.1 General Provisions

Intent:

Minimize the impact to the surrounding environment by managing storm water, protecting below grade conditions, and maintaining air quality standards. Maximize the amount of open space and eliminate light pollution.

Assumptions:

Battery Park City is an urban development within New York City that benefits from its density and infrastructure. Site Credit 1(1Pt)

The earliest ideas for Battery Park City were precipitated by the collapsing status of 20 piers in the Hudson River. The solution was to build this "unprecedented new city" on top of the shipping terminals, with an esplanade along the edge. A new bulkhead line was created and these piers were filled in with landfill. Streets and sidewalks are at grade level and form an extension of Manhattan's grid and mass transit systems. Additionally, these Guidelines call for all new paved surfaces to increase existing permeability and to reduce storm water run-off. Site Credit 2(1Pt)

Projects developed on sites within Battery Park City are responding to site concerns by participating in a conscious and managed site plan that encourages high density development and counteracts the effects of urban sprawl and loss of open space, agricultural land, wetlands, and the disturbance of natural habitats. The process creates new public park lands within the city. Battery Park has played a crucial role in revitalizing the residential and commercial aspects of lower Manhattan and in checking the historic deterioration of an existing urban environment.

Requirements:

Design to a site sediment and erosion control plan, as applicable in the unique circumstances of HLBPCA sites, conforming to EPA's storm water management for construction activities; EPA document # EPA 832-R-32-5, Chapter 3. Site Pre-Req.

Take necessary steps to conserve topsoil, if present. Methods could include seeding and mulching.

Eliminate erosion into adjacent receiving waters. Any appropriate method may be used including straw-bales.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Site Pre-Requisite	Control erosion to reduce negative impacts on water and air quality.	-	-
Site Credit: 1	Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.	1	1
Site Credit: 2	Channel development to urban areas with existing infrastructure, protecting green fields and preserving habitat and natural resources.	1	1
	TOTAL	2	2

1.2 Landscape & Roof Design to Reduce "Heat Islands."

Intent:

Minimize contribution to "Heat Islands" (thermal gradient differences between developed and undeveloped areas) and reduce the amount of heat gain/loss through the roof.

Requirements:

.1 Maximize amount of area for planted or "green" roof gardens (i.e., grass or other vegetative material) "Green" roofing is required for 75% of all non-mechanical roof area or 50% of all roof area, whichever is higher. — Site Credit 7(1pt)

.2 All other roof areas to use roof materials with an Albedo reflectance value of at least 0.3(after 3 years of use).

.3 Provide street trees per Hugh L. Carey Battery Park Conservancy (HLCBPC) requirements. — Site Credit 7(1pt)

.4 Pedestrian and low vehicular traffic areas to be paved with paving systems with minimum 33% permeability.

Technologies/Strategies:

- Provide vegetated surfaces such as green roofs and/or grass paving systems that are water efficient.
- Provide trees to shade exposed surfaces.
- Use high *Albedo* roofing and roof paving materials.

Cost Implications:

- Increased first cost to structure, drainage, and waterproofing.
- Reduced energy consumption due to reduced heat gains/losses.
- Reduced cost of mechanical equipment (and possibly reduced cost of structure due to downsized mech.).
- Potential for longer roof life because of diminished wear from thermal expansion and contraction.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Site Credit 7	Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.		
	Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored / high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces.	1	1
	Install a "green" (vegetated) roof for at least 50% of the roof area.	1	1
	SUBTOTAL	2	2
	TOTAL (Cumulative across Sections)	4	4

1.3 Alternative Transportation

Intent:

Limit contributions to pollution and the use of non-renewable energy sources for transportation by encouraging the use of bicycles and alternative-fuel driven vehicles.

Requirement

.1 Provide enclosed bicycle storage for a minimum of 5% of building occupants. — Site Credit 4(1pt)

.2 Provide showers, lockers and changing facilities for bicycle commuters (health club facilities within the building may satisfy this requirement if these bicyclists are not required to pay a fee for use of the facility).

.3 Install electric-recharging stations(s) for 3% of the total vehicle parking capacity of the site. — Site Credit 4(1pt)

.4 Dedicate 5% of parking spaces to car-pooled ridership.

Technologies/Strategies:

- The availability of appropriate storage will encourage occupants to commute using bicycles.
- When bicycle storage is not adequately provided and bicycles are stored in places with finishes that are not designed for heavy dirt and traffic, there is a consequent increase in maintenance expenses and an effect on the quality of the indoor environment.

Cost Implications:

- Cost of storage space.
- Decrease in maintenance.
- Increased longevity of building finishes.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Site Credit 4	Reduce pollution and land development impacts from automobile use.		
	Locate building within ½ mile of a commuter rail, light rail or subway station or ¼ mile of 2 or more bus lines.	1	1
	Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants.	1	1
	Install alternative-fuel refueling station(s) for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.	1	1
	Size parking capacity not to exceed / to meet only minimum local zoning requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants.	0	1
	SUBTOTAL	3	4
	TOTAL (Cumulative across Sections)	7	8

2.0 Water Conservation

2.1 General Provisions

Intent:

Minimize water consumption by reducing both inflows of processed, city-supplied water and outflow of wastewater. Adopt Best Management Practices (BMP, as published by the Office of Wastewater, Environmental Protection Agency (EPA) and available at www.epa.gov/owm/mtb/runoff.pdf) for harvesting storm water and using reclaimed water generated on-site. Conserve potable water by reducing demands for landscaping, irrigation and other non-potable uses.

Assumptions:

Projects developed on sites within Battery Park City are responding to landscaping and irrigation concerns by participating in a conscious and managed landscape plan that encourages responsible and sustainable landscaping practices, utilizes native and adaptive plantings, high efficiency irrigation and sewage-conveyance technologies, and creates new public park lands within the city.

2.2 Storm Water Management

Intent:

Minimize the impact of storm water on the NYC systems and minimize the use of potable water for maintenance and landscaping purposes by treating and recycling water.

Requirement:

.1 Provide for 100% of all roof and setback rainwater run-off to be collected for maintenance and landscape irrigation by providing on site storage, treatment and infrastructure. Any excess may be considered by HLCBPCA for use in adjacent landscaping.

Site Credit 6(1Pt)

Technologies/Strategies:

- Storm water storage cisterns above/below the ground.
- Permeable paving for reducing storm-water run-off.

Cost Implications:

- Increased first costs to plumbing infrastructure.
- Savings on water and sewage costs.
- Future water cost avoidance.
- Decreased demand on city infrastructure.
- Water available during drought conditions.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Site Credit 6	Limit disruption of natural water flows by eliminating minimizing storm water runoff, increasing on-site infiltration and reducing contaminants.		
	No net increase in the rate or quantity of storm water runoff from existing to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff.	1	1
	Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92- 002 1/93).	0	1
	SUBTOTAL	1	2
	TOTAL (Cumulative across Sections)	8	10

2.0 Water Conservation

2.3 Water Use Reduction

Intent

Minimize the use of potable water by reducing water needs.

Requirements:

.1 Reduce the overall water usage of the project and install fixtures that in aggregate use 20% less water than the water usage requirements in the Energy Policy Act of 1992. Water Credit 3(2Pt)

.2 Specify water-less urinals.

.3 Specify delimiters for cooling towers to reduce evaporation and drift.

.4 Specify automatic shut-off faucets for all lavatories.

Technologies/Strategies:

- Specify low water volume/conserving fixtures, toilets, appliances and dishwashers. Specify waterless urinals.
- Additional water savings, over and above that provided by "low-flow" fixtures, is envisaged from waterless urinals/reclaimed water. Structure water use calculations to substantiate this.
- Consider alternative sources for cooling tower makeup water.
- Install timers on irrigation systems.

Cost Implications:

- Slight increase in first costs.
- Certain kinds of water-less urinals could result in reduced first costs due to reduced plumbing.
- Savings on water and sewage costs.
- Increased energy savings (pumping).

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Water Credit 3	Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.		
	Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.	1	1
	Exceed the potable water use reduction by an additional 10% (30% total efficiency increase).	1	1
	SUBTOTAL	2	2
	TOTAL (Cumulative across Sections)	10	12

2.4 Innovative Water Technologies

Intent

Use reclaimed water, generated on-site, to substitute potable water for non-human consumption. This minimizes both intake of water filtered and processed by municipal authorities as well as reduces the output of wastewater by the building.

Requirements:

.1 Use reclaimed water to flush toilets, for cooling tower make-up, and for irrigation (if applicable and properly treated). Water Credit 2(1Pt)

.2 Provide separate supply infrastructure for the reclaimed water systems.

.3 Locate reclaimed water systems and components on site. Use ecology based natural filtering technology as opposed to chemical treatment. Provide adequate space within the building for storage, treatment and necessary infrastructure.

Technologies/Strategies:

- Capture graywater from lavatories, showers and institutional dishwashing facilities for treatment and reuse by the base building operations.
- Exceed the requirement by treating all wastewater (a.k.a. blackwater) and reduce plumbing costs associated with separate systems.

Cost Implications:

- Increased first costs to plumbing infrastructure.
- Savings on water and sewage costs.
- Decreased demand on infrastructure.
- Water available during drought conditions.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Water Credit 2	Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.		
	Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards.	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	11	13

2.5 Water Efficient & Responsible Landscaping Practices

Intent

Minimize the use of potable water for building and grounds maintenance. Eliminate the use of potable water for irrigation after initial establishment period. Avoid using pesticides, herbicides, or fertilizers that may pollute the environment.

Requirements:

.1 Specify 100% of plantings to be those that (depending on reclaimed water availability) require low amounts of water and that are pest and disease resistant per HLCBPCA Parks Conservancy requirements. — Innov Credit 1(1pt)

.2 Use non-toxic pesticides, herbicides, and fertilizers per HLCBPCA Parks Conservancy requirements.

.3 Provide only clearly labeled storm water / reclaimed water taps, accessible only to building maintenance staff, for building maintenance, sidewalk washing etc.

.4 Specify drip irrigation systems programmed for efficient use. No potable water would be utilized to run these systems. — Water Credit 1(2Pt)

Technologies/Strategies:

- Employ best practices for landscape development by properly establishing plantings, using pesticides as a last resort with an Integrated Pest Management program, and by avoiding highly water-soluble pesticides per HLCBPCPC requirements.

Cost Implications:

- No first cost implications
- Decrease in Maintenance and Operating Costs
- Future Water cost avoidance
- Extended Life of Plantings

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Water Credit 1	Limit or eliminate the use of potable water for landscape irrigation.		
	Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.	1	1
	Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems.	1	1
Innovat -ion Credit 1	To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Buildings System and / or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.	1	1
	SUBTOTAL	3	3
	TOTAL (Cumulative across Sections)	14	16

3.0 Energy Efficiency

3.1 General Provisions

Intent:

Improve whole building energy performance, reduce operating costs, and reduce the environmental impact associated with energy consumption. Maximize energy efficiency and use available technologies to evaluate energy performance throughout the design process. Maximize opportunities for on-site power generation from high efficiency cogeneration plants (plants able to capture waste-heat from electricity generation; utilizing it for production of steam to produce chilled water or additional electricity etc.), renewable energy sources and green power sources.

Energy Pre-Req 2

Assumptions:

Developments will be designed to exceed the requirements of the New York State Energy Code.

An integrated architectural/engineering design approach for base building and tenant systems will be required.

As a development within the urban boundaries of New York City, power will be carried via the existing infrastructure and, therefore, there will be no disturbance of the local environment that would otherwise be necessary to bring power to the site.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Energy Pre-Req 2	Establish the minimum level of energy efficiency for the base building and systems.		
	Design to meet building energy efficiency and performance as required by ASHRAE/IESNA 90.1-1999 or the local energy code, which ever is the more stringent. Analyze expected baseline building performance using the System/ Component Method.	-	-
	SUBTOTAL	-	-
	TOTAL (Cumulative across Sections)	14	16

3.2 Maximize Energy Efficiency

Intent:

Maximize energy performance, reduce operating costs, and reduce the environmental impact associated with energy consumption.

Requirements:

.1 Increase energy efficiency by 30% over ASHRAE 90.1 of 1999 (At an efficiency increase of 35% over New York State Energy Code, a building would achieve energy efficiency standards set in the New York State Green Buildings Tax Credit (NYSGBTC) regulations). Energy Credit 1(4Pt)

.2 In the occupied base building and tenant areas, provide energy efficient fluorescent fixtures with daylight dimming systems, for all perimeter spaces.

.3 Provide motion sensors in 100% of stairs, toilet rooms, storage rooms and 75% of MER spaces.

.4 Use LED “EXIT” signs throughout the building.

.5 Use at a minimum, exterior glazing that incorporates double glazed units with low “e”, spectrally selective high-performance glass (0.25 shading coefficient, and 0.33 U value center of glass). Frames should have thermal breaks and insulated spacers.

.6 Provide underfloor air delivery system for the building.

.7 Major tenants will be required to follow a “Tenant Guide”, prepared by the developer. This will specify the use of efficient lamps and lighting fixtures, daylight dimming controls, occupancy sensors, “Energy Star” personal computers, office equipment and appliances. Additionally, the guide will describe high-performance design features and systems utilized in the building, along with performance benefits in operating cost-savings, indoor environmental quality, occupant health and well-being and reduced environmental impact. The Guide will be made available to all building tenants and to their design professionals enabling better integration of tenant architectural, mechanical, electrical and lighting systems with the base building design.

.8 Provide training to tenants, their designers and their facility managers on the energy efficiency measures incorporated into the design and on practices that tenants could adopt to exploit energy efficiency measures to the fullest. Innov Credit 2 (1pt)

Technologies/Strategies:

- Control infiltration through exterior openings, such as loading docks, lobby entrances, exterior doors, and pedestrian bridges. Reduce air leakage and thermal losses by specifying low-leakage sealing methods and better duct insulation. Consider thermal buffer zones for atriums and exterior corridors.
- Use state-of-the-art technologies for glazing, curtain wall and building envelope design/construction enhancing thermal performance.

3.2 Maximize Energy Efficiency (cont.)

- Account for solar orientation of the building. The orientation of the different elevations should inform their design so as to increase/reduce solar gain, daylighting etc.
- Optimize interior architectural systems for daylighting and glare control, such as light shelves and daylight enhancing ceiling configurations, interior clerestories, light wells and solar shading devices. (blinds and louvers). Use daylight dimming controls for perimeter lighting zones
- Configure high efficiency lighting systems with a lighting control system, integrated with the Building Management System.
- "Right-size" mechanical equipment for each floor taking into account high performance envelope, partial or off-hour loads.
- Utilize premium efficiency motors. Size motors and power correction equipment to reduce power factor losses. Use components that have been designed and optimally sized to respond to part load conditions (peak and off-peak loads), i.e., Variable Air Volume air handling units, variable frequency drives for fans and pumps.
- Consider higher building power utilization voltages to reduce distribution losses.
- Investigate the most energy efficient power, heating and cooling systems.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Energy Credit 1	Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.		
	Exceed the requirements of ASHRAE Standard 90.1-1999, demonstrated by a whole building simulation, by the following: Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1-1999, as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11.	4	10
	New Bldgs. / Existing Bldgs. / Points. 20% / 10% / 2 30% / 20% / 4 40% / 30% / 6 50% / 40% / 8 60% / 50% / 10		
	Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.		
Innovation Credit 2	To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Buildings System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.	1	1
	SUBTOTAL	5	11
	TOTAL (Cumulative across Sections)	19	27

3.2 Maximize Energy Efficiency (cont.)

Technologies/Strategies:

- Cooling system components should be optimized together, including chiller, cooling tower, pumping, and distribution. Consider variable cooling tower temperature control.
- Consider load-matching strategies to optimize system capacities for part load conditions.
- Evaluate night purge/mass-coupled thermal storage control strategies.
- Consider Demand Controlled Ventilation (DCV) HVAC controls with CO_2 sensors.
- Use low face-velocity coils and filters.
- Select air diffusers with high induction ratios, low-pressure drop, and good part-flow performance.
- Optimize duct sizes to reduce pressure losses, which reduces fan energy.
- Evaluate potential heat recovery from spill or exhaust air stream. Consider heat recovery using heat pumps or run-around hydronic loops for supply air reheat.
- Consider radiant heating/cooling systems (closed loop water circulation) for large areas with frequent exposure to ambient conditions, such as loading docks.

Cost Implications:

- By “right-sizing” the mechanical equipment serving the tenants and base building there should be a significant first cost savings in equipment, piping, and wiring. This savings can be used for higher quality exterior envelope components, more efficient lighting, and controls.
- Demand Controlled Ventilation can save energy by reducing unnecessary over-ventilation while maintaining target CFM per person rates.
- Substantial energy savings will be achieved.
- Equipment life cycles will be increased and operating costs will be reduced.

Funding Sources:

- NYS Green Building Tax Credit
- NYSERDA.
- New York Power Authority (NYPA). Funding requests are considered on a case-by-case basis.
- U.S. Department of Energy

3.3 Modeling for Energy Performance

Intent:

Use DOE-2 or similar computer models to forecast energy performance. Evaluate opportunities to reduce operating costs, as well as the environmental impact associated with energy consumption, and help "right size" mechanical/electrical systems.

Requirement:

.1 The HLCBPCA will provide the initial DOE-2 or equivalent energy model. The owner's engineering consultant will take this model and add data as the design progresses in order to evaluate the energy efficiency of the building

Technologies/Strategies:

- Utilize computer modeling to facilitate an interactive process by which the owner, architect, engineer, and contractor team can adequately explore opportunities for energy conservation.

Cost Implications:

- Substantial energy savings.
- Potential increase in professional fees.

Funding Sources:

- NYSERDA

3.4 Renewable Energy

Intent:

Employ the use of on-site, non-polluting, source-renewable technologies to reduce pollutants in the atmosphere, reduce operating costs, and reduce the environmental impact associated with energy consumption.

Requirements:

.1 Provide fuel-cell generated power at a minimum rate of 500kW/1,000,000 s.f. of (gross) area or a fraction thereof. — Innov' Credit 3(1Pt)

.2 Provide Building Integrated Photovoltaic (BIPV) panels that contribute a minimum of 5% of the base building (as defined in the NYSGBTC regulations, ref: Glossary) electrical load. — Energy Credit 2(1Pt)

Technologies/Strategies:

- Specify adaptable equipment that can accept multiple fuel sources (i.e. bio fuels versus natural gas).

Cost Implications:

- Increase to first costs with long-term payback.
- It is expected that fuel cells will some day be able to produce electricity below today's costs.

Funding Sources:

- NYS Green Building Tax Credit
- NYSERDA
- U.S. Department of Energy

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Innovation Credit 3	To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Buildings System and / or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.	1	1
Energy Credit 2	Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.		
	% of total energy cost in renewables Points. 5% 1 10% 2	1	2
	SUBTOTAL	2	3
	TOTAL (Cumulative across Sections)	21	30

3.5 Green Power Sources

Intent:

Reduce environmental impact by utilizing alternative and/or renewable power sources. Purchase power from energy providers that utilize water, wind, solar and fuel cell sources to generate power.

Requirement:

.1 Engage in a two-year contract to purchase power with a minimum of 30% generated from renewable sources that meet the Center for Resources Solutions (CRS) Green E-requirements. http://www.green-e.org/what_is/standard/standard.html

Energy Credit 6(1Pt)

Technologies/Strategies:

- Negotiated power agreements with local providers.

Cost Implications:

- Possible increase in central-source rates due to reduced usage

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	Score	Possible
Energy Credit 6	Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.		
	Engage in a two year contract to purchase power with a minimum of 30% generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements.	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	22	31

4.0 Conserving Materials and Resources

4.1 General Provisions

Intent:

Reduce waste, preserve natural resources and reduce the environmental impact from materials manufacturing and transport while protecting the environment from biodiversity loss, increased erosion, air quality impacts, and further depletion by seeking out rapidly renewable resources and eliminating the use of chlorofluorocarbons.

Assumptions:

An integrated architectural approach will be required for the design of the base building and the tenant fit-out. Tenants will be encouraged by owner prepared documentation and instructional sessions to comply with the goals of this section and meet the HLCBPCA mandate to protect the environment and improve the health and well being of building occupants.

4.2 Storage & Collection of Recyclables

Intent:

Facilitate waste reduction. Congruent with the market, recycle materials that would otherwise be dumped into landfills.

Requirements:

.1 On each floor, provide a dedicated and ventilated trash and recycling chute system leading to integrated storage bins at the loading berth level that are clearly labeled for recyclable contents. Material Pre-Req

.2 Separate trash/recycling holding areas will be ventilated and maintained within the building for office use and retail use (if applicable) with direct access to the street, as set forth in the HLCBPC Parks Conservancy Guidelines.

Technologies/Strategies:

- The easier it is to recycle, the more people will participate.

Cost Implications:

- Increased space for Trash/Recycling operations.
- Reduced waste disposal costs.
- Potential for income from recycling.

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Materials Pre-Req.	Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.		
	Provide an accessible area that serves the entire building and is dedicated to the separation, collection, and storage or materials for recycling including (at a minimum) paper, glass, plastics and metals.	-	-
	SUBTOTAL	-	-
	TOTAL (Cumulative across Sections)	22	31

4.3 Construction Waste & Resource Reuse

Intent:

Minimize construction waste and conserve resources through reuse/recycling to reduce the environmental impact from material manufacturing and transport.

Requirements:

.1 During construction, develop and implement a waste management plan and quantify materials diverted by weight so that a minimum of 60% of waste material (by weight) is recycled. — Material Credit 2 (1Pt)

.2 Develop a plan to utilize recycled or salvaged materials during construction.

Technologies/Strategies:

- Identify licensed haulers and processors of recyclables.
- Recycle cardboards, metals, concrete, brick, asphalt, beverage containers, clean dimensional wood, plastic, glass, gypsum board, ceiling tiles and carpet.
- Evaluate the cost-effectiveness of recycling rigid insulation, engineered wood products, and other materials.
- Utilize clean, efficient fuels for construction machinery. — Innov. Credit 4 (1pt)
- Create standardized forms for record keeping and for efficient filing of information.

Cost Implications:

- Potential income generation.
- Increased cost of Construction Management (overseer).

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Materials Credit 2	Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process. Management		
	Develop and implement a waste management plan, quantifying material diversion by weight. Recycle and / or salvage at least 50% (by weight) of construction, demolition, and land clearing waste.	1	1
	Recycle and / or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris.	0	1
Innovat-ion Credit 4	To provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by the LEED Green Buildings System and / or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.	1	1
	SUBTOTAL	2	3
	TOTAL (Cumulative across Sections)	24	34

4.4 Recycled Content

Intent:

Reduce the use of raw materials by replacing them with recycled materials or materials with recycled content.

Requirement:

.1 Use materials such that 50% of the total material cost (as computed by the method outlined in LEED Version 2, Resource Guide to calculate the value of recycled content in the total material cost) comes from recycled material.

Material Credit 4 (2Pt)

Technologies/Strategies:

- Use of recycled materials or materials with recycled content will reduce the burden on already over harvested materials.
- Specify high-recycled content (minimum weighted average of 20% post-consumer and minimum weighted average of 50% post-industrial) carpet and suspended ceiling tiles from manufacturers with established post-consumer re-furbishing programs.
- Use methodology and spreadsheet laid out in *Materials Credit 4, LEED V2 Resource Guide*, to evaluate recycled content of materials.

Cost Implications:

- None at this time.

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Materials Credit 4	Increase demand for building products that have incorporated recycled content material, reducing the impacts resulting from extraction of new material.		
	Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.	1	1
	Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimumweighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.	1	1
	SUBTOTAL	2	2
	TOTAL (Cumulative across Sections)	26	36

4.5 Local/ Regional Materials

Intent:

Reduce the impact of building materials transport and support the local economy.

Requirement:

.1 Use a minimum of 40% of all building materials (based on cost) that are manufactured (final-assembly) within a 500-mile (by air) radius. — Material Credit 5 (1Pt)

Technologies/Strategies:

- Strengthening a local supply chain will reduce costs and build local building technology and infrastructure.

Cost Implications:

- None at this time.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Materials Credit 5	Increase demand for building products that are manufactured locally, reducing the environmental impacts resulting from transportation, and supporting the local economy.		
	Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles.	1	1
	Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles.	0	1
	SUBTOTAL	1	2
	TOTAL (Cumulative across Sections)	27	38

4.6 Renewable & Rapidly Renewable Materials

Intent:

Reduce the use of finite raw materials by replacing them with renewable materials.

Requirements:

.1 The base building is to utilize rapidly renewable materials for 5% (by value) of the total material cost. Material Credit 6 (1Pt)

.2 Encourage tenants, by incorporation of appropriate literature into the "Tenant Guidelines", to utilize rapidly renewable materials for 5%(by value) of the total material cost.

Technologies/Strategies:

- Rather than oak flooring which frequently comes from non-sustainable sources, consider a material like bamboo or a composite made of recycled material for the same purpose.
- Where applicable use products made from natural materials (i.e., wool carpeting, wool wall and furniture fabrics).

Cost Implications:

- None at this time.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Materials Credit 6	Reduce the use and depletion of finite raw and long cycle renewable materials by replacing them with rapidly renewable materials.		
	Specify rapidly renewable building materials for 5% (By Cost) of total building materials.	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	28	39

4.7 Forest Management

Intent:

Encourage responsible forest management to protect and prolong forest habitats and wood species.

Requirement:

.1 Use 100% Certified wood and wood products (per the Forest Stewardship Guidelines) during construction for temporary bracing, concrete formwork, and site safety barriers such as sidewalk bridges and site enclosures. — Material Credit 7 (1Pt)

.2 Encourage tenants, by incorporation of appropriate literature into the "Tenant Guidelines", to utilize wood and wood products certified by the Forest Stewardship Council (FSC) for 60%(by value) of the total wood/wood material cost.

Technologies/Strategies:

- Incorporate the requirements of the Forest Stewardship Guidelines in the building construction specifications and general conditions.

Cost Implications:

- Potential for slight increase in wood costs.

Funding Sources:

- NYS Green Building Tax Credit.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Materials Credit 7	Encourage environmentally responsible forest management.		
	Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council Guidelines for wood building components including but not limited to structural framing, flooring, finishes, furnishings and non-rented temporary construction applications such as bracing, concrete form-work and pedestrian barriers.	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	29	40

4.8 CFC Elimination

Intent:

Eliminate the use of CFC-based refrigerants in HVAC systems, the use of insulation materials that utilize CFCs during production, and solvents that contain CFCs – all of which contribute to ozone depletion.

Requirement:

.1 Develop a "phase-out plan" for equipment with CFCs and HCFCs (with the exception of HCFC123). — Energy Pre Req 3

.2 Use fire suppression systems with no HCFCs or Halon.

.3 Avoid the use of insulation materials that utilize Chlorine-based gasses in their production process. — Energy Credit 4 (1Pt)

.4 Use HVAC equipment with no CFCs.

Technologies/Strategies:

- No new equipment is installed that uses CFC's.
- Currently there is a ban on CFCs and a ban on HCFCs is scheduled effective 2030.

Cost Implications:

- Possible reduced Energy Efficiency.

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Energy Pre-Req 3	Reduce ozone depletion.		
	Zero use of CFC-based refrigerants in new building HVAC&R base building systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.	-	-
Energy Credit 4	Reduce ozone depletion and support early compliance with the Montreal Protocol.		
	Install base building level HVAC and refrigeration equipment and fire suppres-sion systems that do not contain HCFC's or Halon.	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	30	41

5.0 Enhanced Indoor Environmental Quality (IEQ)

5.1 General Provisions

Intent:

Employ architectural and HVAC design strategies to prevent the development of Indoor Air Quality problems that will impact the overall indoor environment, health, and well being of the occupants.

Assumption:

The ideal building solution will integrate architecture and engineering to create environments that are very healthy and that engender increased productivity. Tenants will be encouraged, by means of Owner prepared documentation and instruction, to participate and strengthen the goal of achieving enhanced indoor environment quality. The required underfloor air delivery system goes a long way toward achieving this goal.

Requirement:

Establish minimum performance standards for indoor air quality performance to prevent problems and maintain the health and well being of occupants. Use ASHRAE 62-1999 as the reference standard.

IEQ Pre Req 1

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
IEQ Pre-Req 1	Establish minimum IAQ performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well-being of the occupants.		
	Meet the minimum requirements of voluntary consensus standard ASHRAE 62-19891999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.	-	-
	SUBTOTAL	-	-
	TOTAL (Cumulative across Sections)	30	41

5.2 Indoor Air Quality (IAQ)

Intent:

Employ architectural and HVAC design strategies that provide improved ventilation effectiveness and minimize introduction of pollutants or of contaminants into occupiable spaces. Design systems for ease of maintenance, for minimal contaminant or pollutant introduction into space, and to avoid dirt, microbial pollutants, moisture, and standing water buildup.

Requirements:

.1 Utilize underfloor air delivery system as specified in section 3.2.6 of this document.

.2 Provide dedicated ventilation systems for maintenance areas associated with chemical use, paint storage, or other potentially harmful pollutants with no air re-circulation and deck-to-deck structural separation from adjoining spaces. — IEQ Credit 5(1pt)

.3 Provide 90% HEPA/other filtration media deemed adequate by HVAC designers to protect occupants against anticipated microbial threats. (90% filtration addresses 90% of sizes of the particulate spectrum).

.4 Provide walk-off grilles at all building entrances to catch potential contaminants and dirt and decrease maintenance requirements. — IEQ Pre Req 2

.5 Provide a dedicated ventilation system, with sufficient capacity, within the core of the building to which tenants could connect smoking room's (maintained at negative pressure) exhausts.

.6 Provide humidity stabilization through out the year to all occupied building spaces. Conform to ASHRAE 55-1992/1995 Addenda.

.7 Mechanical ventilation strategies must be designed for ease of maintenance to prevent dirt collection points, rain entry, coil condensation, and standing water during construction and during operation.

.8 Design ventilation systems to allow for 100% outside air flushing of any floor including the floor immediately above or below to mitigate against indoor air quality problems from construction or renovation during the occupancy of the building.

.9 Locate building fresh air intake away from loading areas, building exhaust fans, cooling towers, and other sources of contamination.

.10 Locate building maintenance areas away from occupied floors and provide ducted exhaust to the exterior roof.

.11 Utilize best practices for interior pest management (i.e., properly sealing cavities, walls, joints; properly detailing and maintaining trash areas; limiting the use of pesticides and insecticides).

5.2 Indoor Air Quality (IAQ) (contd.)

.12 Provide CO_2 monitoring as specified in 6.3.4.

Cost Implications:

- Increase First Costs to HVAC systems.
- Increased employee productivity.
- Decreased sick time.
- Decreased operation cost.
- Decreased emergency spending to resolve unexpected problems.

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent	BPCA Score	LEED Possible
IEQ Credit 5	Design to minimize cross-contamination of regularly occupied occupancy areas by chemical pollutants: Employ permanent entry way systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entry ways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying / print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.	1	1
	Intent:		
IEQ Pre Req 2	Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).		
	Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS fromthe building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.	-	-
	SUBTOTAL	-	-
	TOTAL (Cumulative across Sections)	31	42

5.3 Select Low Emitting Materials

Intent:

Specify materials and finishes (including flooring and furniture) that contain no known carcinogens, have low levels of volatile organic compounds (VOC), and are non-toxic and chemically inert to reduce the amount of indoor air contaminants that are odorous and irritating, and unhealthy to occupants.

Requirements:

IEQ Credit 4(4Pt)

.1 All adhesives, sealants (used as "filler" as opposed to a "coating"), paints, coatings and fabrics in the base building must meet the VOC limits set forth in South Coast Air Quality Management District Rule #1168.
.2 Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.
.3 Carpet systems must meet or exceed the Carpet & Rug Institute Green Label Indoor Air Quality Test Program.
.4 Prohibit urea/phenol formaldehyde based agri-products.
.5 Owner must prepare a "Tenant Guide" recommending the requirements of this section.

Technologies/Strategies:

- Select only products and adhesive compounds with no or low VOC's that comply with the requirements of this section. This provides a health benefit to construction workers and tenants. Reference the *AIA Environmental Resource Guide*.

Cost Implications:

- Slight increase in project cost.

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
IEQ Credit 4	Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.		
	Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:		
	Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51 (1 point)	4	1
	Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. (1 point)		1
	Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. (1 point)		1
	Composite wood and agrifiber products must contain no added urea-formalde-hyde or phenol-formaldehyde resins. (1 point)		1
	SUBTOTAL	4	4
	TOTAL (Cumulative across Sections)	35	46

5.4 Controllability of Systems

Intent:

Increase occupant control of HVAC and natural ventilation systems to support optimum health,comfort and productivity.

Requirements:

IEQ Credit 6(1Pt)

.1 Achieve maximum individual control of HVAC by adopting an Underfloor Air Delivery System, Ref:3.2.6.
.2 Provide computerized Building Management Systems (BMS) for base building operation.
.3 Provide individual controls for lighting and HVAC.

Technologies/Strategies:

- Specify an under-floor air delivery system with manual control over the volume of air delivered.
- Provide floor-by-floor HVAC systems and programmable thermostats to allow occupants to set air conditioning/heating times of operation and temperature settings. Connect all tenant mechanical equipment to the BMS.

Cost Implications:

- Slightly increased First Costs.
- Increased energy savings.
- Greatly reduced cost for "churn" (the act of relocating employees/groups within the office).

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
IEQ Credit 6	Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.		
	Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall.	0	1
	Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas.	1	1
	SUBTOTAL	1	2
	TOTAL (Cumulative across Sections)	36	48

5.5 Lighting & Daylighting

Intent:

Implement design strategies to maximize access to daylight and views to the outdoors in a glare-free way and whenever possible integrate indoor space with the outside environment to improve IEQ for building occupants.

Requirements:

.1 Minimum floor to ceiling height to be 9'-6".
.2 Maximize daylighting and access to views from all spaces that are occupied for a majority of the day.

IEQ Credit 8(2Pt)

Technologies/Strategies:

- Request that tenants design their interiors with glass partitions, clerestory glass, and open planning at the perimeter to allow all occupants to have access to daylight.
- Increase floor to ceiling heights.

Cost Implications:

- Increased first costs.
- Decreased operating costs.
- Increased productivity.

Funding Sources:

- None at this time.

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
IEQ Credit 8	Provide a connection between indoor spaces with and the outdoor environment through the introduction of sunlight and views into the occupied areas of the building.		
	Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accom plishing the specific tasks within a space would be enhanced by the direct penetration of sunlight.	1	1
	Direct line of sight to vision glazing while seated from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas.	1	1
	SUBTOTAL	2	2
	TOTAL (Cumulative across Sections)	38	50

5.6 Indoor Pest and Microbial Contaminant Control

Intent:

Design HVAC delivery systems to better protect occupants from intended or unintended microbial attacks. Traditional pests (such as cockroaches, mice, and rats) and their excrement may be a source for asthma, allergies, and other health concerns for building occupants; the use of toxic chemicals to rid the building of pests, in turn, can cause the degradation of IAQ.

Requirements:

.1 Ref. 5.2.3 of these Guidelines.
.2 Develop a "Pest Management Plan" as part of the required "Maintenance Manual" (see §6.4) that strongly recommends the requirements of this section.
.3 Use best efforts to seal, caulk, and repair points of entry, habitation, and breeding areas to mitigate against pest occurrences within the building.
.4 In the base building, use boric acid powder for insect control as opposed to the practice of extermination with toxic chemicals and strongly recommend it to tenants.

Technologies/Strategies:

- Properly seal all penetrations (i.e. around water pipes, steam risers, electrical conduits, etc…) with copper mesh and caulking or plaster.
- Properly seal cracks and joints at tile floor/wall joints, baseboard/wall interfaces, and window frame/wall interfaces.
- Cover all ventilation portals with insect mesh (metal window screen) and ¼ inch wire mesh (hardware cloth).
- Encourage prompt repair of leaky faucets, condensation on pipes, or other sources of water in the "Maintenance Manual."
- Eliminate moisture traps.

Cost Implications:

- None at this time.

Funding Sources:

- None at this time.

6.0 Operations & Maintenance

6.1 General Provisions

Intent:

Provide proper construction, maintenance, and controls so that building systems operate as designed in order to achieve and maintain energy performance and IEQ requirements.

Assumptions:

- Tenants will be encouraged by owner prepared documentation and instructional sessions to comply with the goals of this section and meet the HLCBPCA mandate to protect the environment, save energy, and improve the health and well being of building occupants.

- An as-built manual will be prepared that will incorporate material substitutions and method variations; changes during construction, field data, contractor's affidavits and construction log information. The as-built manual will be used as research data for future building standards and will become a resource for building design teams on future development projects.

6.2 Full Commissioning

Intent:

Test and calibrate building systems to be certain they can be operated as designed in order to achieve and maintain energy performance and IEQ requirements.

Requirements:

Energy Pre Req1

.1 Submit "Building Commissioning Plan" to HLCBPCA.

.2 A "Commissioning Team", put together by the owner, and comprising at a minimum, representatives of the building staff, construction team and the Mechanical, Electrical & Plumbing (MEP) engineers, must be integrally involved with the project from design development to 8 months after occupation.

.3 Commissioning plan must be satisfactorily completed and approved by HLCBPCA.

Technologies/Strategies:

- Introduce mandatory Testing, Adjusting and Balancing (TAB) procedures for all mechanical equipment.
- Introduce standards and strategies early into the design process.
- Incorporate and clearly state design intentions and requirements in the project construction documents.
- Tie final contractor payments to performance.
- Institute continuous commissioning practices.

Cost Implications:

- Increase in professional fees.
- Substantial energy savings.
- Decrease in life cycle and operating costs.
- Reduced change orders, recall and project delay.

Funding Sources:

- NYS Green Building Tax Credit
- NYSERDA

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Energy Pre-Req 1	Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.		
	Engage a commissioning authority. Document Develop design intent and the basis of design for the building and systems. documentation. Include commissioning requirements in the construction documents. Develop and utilize a commissioning plan. Verify installation, functional performance, training and documentation. Complete a commissioning report.	-	-
	SUBTOTAL	-	-
	TOTAL (Cumulative across Sections)	38	50

6.3 Building Systems Monitoring

Intent:

Design and specify equipment to be installed in the base building systems to provide feedback for comparison, management, and optimization of actual vs. estimated energy performance over time and IEQ.

Requirements:

.1 Install and maintain a permanent monitoring system that tracks the IEQ and energy performance of the base building systems and allow operators to make adjustments to maintain targets semi-annually.

.2 Divide floor plates above 10,000sf into quadrants for sample gathering. “Shared-sensor” or distributed sensors maybe used.

.3 Provide air quality profile, prepared by a licensed engineer or certified industrial hygienist, for each tenant space at time of initial occupancy that meets the following criteria:

a. < 50 ppb of Formaldehyde
b. < 200 um^3 total volatile organics

.4 Provide permanent carbon dioxide (CO_2) monitoring with a real-time Demand Controlled Ventilation (DCV) system that matches the amount of ventilation air to the level of occupancy; as mentioned in Section 3.2 (Strategies/Technologies). IEQ Credit 1 (1Pt)

Technologies/Strategies:

- Use Internet communication technologies to monitor systems

Cost Implications:

- Increased First Costs to HVAC system.
- Minimal cost to perform quality profile; IAQ testing costlier.
- Decreased cost of operations.

Funding Sources:

- NYS Green Building Tax Credit

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
IEQ Credit 1	Provide capacity for indoor air quality (IAQ) monitoring to sustain long term occupant health and comfort.		
	Install a permanent carbon dioxide (CO2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time.	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	39	51

6.4 Maintenance Accountability

Intent:

Provide for maintenance and operational continuity for the entire building by establishing an ongoing system that guarantees accountability for maintaining performance standards.

Requirement:

.1 A "Maintenance Manual" will be prepared by the owner and submitted to the HLCBPCA for review and will subsequently be made available to all maintenance staff. The manual will include best practices for maintenance and housekeeping, building systems descriptions (include model numbers if applicable), manufacturer's literature, and best practices for pest management.

.2 Persons responsible for maintaining building systems are to be involved in the design, selection, and commissioning of all equipment.

.3 The "Maintenance Manual" shall have specific directions for the storage and conveyance of trash from the site including the number and size of trash compactors and a refrigerated trash room if found necessary. The "Maintenance Manual" shall specify that trash will be maintained in the building until pickup.

.4 Incorporate into the "Maintenance Manual" specific requirements as per DOE's International Performance Measurement and Verification Protocol for the following items: items: lighting systems and controls, constant and variable motor loads, variable frequency drive operation, chiller efficiency and variable loads (kW/ton), cooling load, air and water economizer and heat recovery cycles, air distribution static pressures and ventilation air volumes, boiler efficiencies, building specific process energy efficiency systems and equipment, and indoor water risers and outdoor irrigation systems.

Energy Credit 5 (1Pt)

Relevant Section from LEED V2

	Intent:	BPCA Score	LEED Possible
Energy Credit 5	Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.		
	Comply with long term continuous measurement of performance as stated in Option B: Methods by Technology of US DOE's International Performance Measurement and Verification Protocol	1	1
	SUBTOTAL	1	1
	TOTAL (Cumulative across Sections)	40	52

6.4 Maintenance Accountability (cont.)

Technologies/Strategies:

.1 Regularly replace filters and calibrate equipment to maintain energy performance targets.

.2 Use only environmentally responsible cleaning materials that minimize the impact to indoor air quality.

Cost Implications:

- Decreased maintenance labor costs.
- Increased product life.
- Decreased exposure to pollutants, translating to decreased health care cost/lost time.

Funding Sources:

None at this time.

List of Resources

Publications:

American Institute of Architects. *AIA Environmental Resource Guide*. New York: McGraw-Hill, 1995.

Barnett, Dianna Lopez and William Browning. *Primer on Sustainable Building*. Rocky Mountain Institute, 1995

Battery Park City Authority and Ralph Lerner. *Battery Park City: Design Guidelines for The North Residential Neighborhood*. 1994.

City of New York Department of Design And Construction (DDC). *High Performance Building Guidelines*. 1999.

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Johnson, Tim. *Low E Glazing Design Guide*. Boston: Butterworth, 1991.

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Tuluca, Adrian (Steve Winter and Associates, Inc.). *Energy Efficient Design and Construction for Commercial Buildings*. New York: McGraw-Hill, 1997.

Watson, Donald and Kenneth Labs. *Climatic Building Design*. New York: McGraw-Hill, 1983.

US Green Building Council. *Leadership in Energy and Environmental Design Green Building Rating System Criteria (LEED™)*. 1999.

State of New York. *Green Buildings Tax Credit Regulations*, 2001.
NB: Although cited in several places in these Guidelines as a source of funding, it should be understood that the NYSGBTC funds come available to the development team only upon the complete fulfillment of all the statutes of that regulation and not upon meeting isolated requirements.

List of Resources (cont.)

Web Sites:

American Council for an Energy-Efficient Economy
http://www.aceee.org/

Energy Efficiency and Renewable Energy Network (EREN)
http://www.eren.doe.gov/

Energy Star Program (U.S. EPA)
http://www.energystar.gov/

Environmental Building News
http://www.ebuild.com/

Environmental Defense Fund
http://www.edf.org/

Iris Communications – Resource for Environmental Design Index
http://www.oikos.com/

National Resources Defense Council
http://www.nrdc.org/

New Jersey Department of Environmental Protection
http://www.state.nj.us

New York State Energy and Research Development Authority
http://www.nyserda.org/

Rocky Mountain Institute
http://www.rmi.org/

Scientific Certification Systems
http://www.scs1.com/

Southface Energy Institute
http://www.southface.org/

US Department of Energy
http://www.doe.gov/

US Environmental Protection Agency
http://www.epa.gov/

US Green Building Council
http://www.usgbc.org/

List of Resources (cont.)

Technical Documents Cited:

EPA 832-R-32-5 Chapter 5: Erosion control and topsoil conservation.

South Coast Coast Air Quality Management District Rule 1168: Adhesive and sealants' off gassing limits.

"Green Seal" (www.greenseal.org) : Paints and coatings.

Carpet and Rug Institute's Green Label IAQ Test Program: Permissible limits of off-gassing by carpets and rugs.

Center for Resources Solutions' "green-e" requirements: Sources of "Green" power.

American Society of Heating, Refrigeration and Air-conditioning Engineers' Standard 62-1999:
Minimum permissible Indoor Air Quality standards.

Leadership in Energy and Environmental Design, Version 2 (LEED V2) Resource Guide: General reference.

New York State Energy Code: Energy performance base-line.

Appendix

Summary of Innovation Credit Points:

Section:	*BPCA Commercial Environmental Guidelines Requirement:*	*Points*
2.5.1	Specify 100% of plantings to be those that (depending on reclaimed water availability) require low amounts of water and that are pest and disease resistant per HLCBPCA Parks Conservancy requirements.	1
3.2.8	Provide training to tenants, their designers and their facility managers on the energy efficiency measures incorporated into the design and on practices that tenants could adopt to exploit energy efficiency measures to the fullest.	1
3.4.1	Provide fuel-cell generated power at a minimum rate of 500kW/1,000,000 s.f. of (gross) area or a fraction thereof.	1
4.3	Utilize clean, efficient fuels for construction machinery.	1
	TOTAL	**4**

Appendix (cont.)

Funding Sources

New York State Green Building Tax Credit

New York State Department of Taxation and Finance
(tax related questions)
Business Tax Hotline:
1 - 800 - 972 - 1233
General Tax Information Hotline:
1 - 800 - 225 – 5829

New York State Energy Research and Development Authority
(building- related questions)
Craig Kneeland, Project Manager
(518) 862 - 1090, ext. 3311
e-mail: cek@nyserda.org

New York State Department of Environmental Conservation
(all other questions)
James Austin, Assistant Commissioner
(518) 485 - 8437
e-mail :jdaustin@gw.dec.state.ny.us

http://www.dec.state.ny.us/

New York State Energy and Research Development Authority
For more information about NYSERDA's building programs, contact:

Technical Communications Unit
NYSERDA
Corporate Plaza West
286 Washington Avenue Extension
Albany, New York 12203-6399
Phone: 518.862.1090, ext. 3250

http://www.nyserda.org/

United States Department of Energy
For more information about USDOE building programs, contact:

Dru Crawley
United States Department of Energy
1000 Independence Ave. SW
Washington, DC. 20585
Phone: 202.586.2344
Fax: 202.586.1628

drury.crawley@ee.doe.gov
http://www.doe.gov/

Appendix (cont.)

Schedule of Limits on VOC Emissions

Requirements for Adhesives

Limits on VOCs in grams per liter, less water and exempt compounds, used for welding and installation.

Non-vinyl backed indoor carpet installation	150
Carpet pad installation	150
Wood flooring installation	150
Ceramic tile installation	130
Dry wall and panel installation	200
Subfloor installation	200
Rubber floor installation	150
VCT and asphalt tile installation	150
PVC welding	510
CPVC welding	490
ABS welding	400
Plastic cement welding	350
Cove base installation	150
Adhesive primer for plastic	650
All other	250

Limits on VOCs in grams per liter, less water and exempt compounds, applied to the following substrates.

Metal to metal	30
Plastic foams	120
Porous material except wood	120
Wood	30
Fiberglass	200

Requirements for Sealants

Limits on VOCs in grams per liter, less water as applied, or in grams per liter of low-solids products.

Sealants:	
Architectural	250
Roadways	250
Roofing material insulation	450
PVC welding	480
Other	420
Sealant Primer:	
Architectural – nonporous	250
Architectural – porous	775
Other	775

Appendix (cont.)

Requirements for Architectural Coatings

Limits on VOCs in grams per liter, less water.

Group I	
Bituminous pavement sealer	100
Bond Breaker	600
Concrete curing compound	350
Dry fog coating	400
Industrial maintenance primer or topcoat	450
Mastic texture coating	200
Metallic pigmented coating	500
Non-flat architectural coating	380
Primer, sealer, and undercoater	350
Roof coating	300
Swimming pool coating	600
Traffic coating	250
Waterproof mastic coating	300
Wood preservative coating	550
Group II	
Fire retardant coating (opaque)	500
Fire retardant coating (all others)	850
High heat resistant coating	650
Lacquer	680
Multicolored coating	600
Quick-dry primer, sealer, undercoater	500
Shellac (clear)	730
Shellac (pigmented)	550
Sign Paint	450
Stain (semi-transparent)	550
Stain (opaque)	350
Tile-like glaze coating	550
Varnish	450
Waterproof sealer	600
All other architectural coatings	250

Appendix (cont.)

Schedule of Low Flow Rates
(Rates are 20% less flow than the Energy Policy Act of 1992)

Showerheads	2.00 gal./min.
Lavatory Faucets	2.00 gal./min.
Lavatory Replacement Aerators	2.00 gal./min.
Kitchen Faucets	2.00 gal./min.
Kitchen Replacement Aerators	2.00 gal./min.
Metering Faucets	2.00 gal./min.
Gravity Toilets	1.28 gal./flush
Urinals	0.80 gal./flush

Appendix (cont.)

Schedule of Submission Requirements

The owner is required to assemble this information into a single resource and submit two (2) copies with the required Schematic Design, Design Development, Construction Document, and As-built submissions to the Battery Park City Authority as follows:

- Bound 8½ x 11 formats (11x17 fan fold inserts acceptable)
- Include a table of contents and a list of all applicable team participants and consultants.
- Each of the six environmental categories from the guidelines will be a separate section (i.e., 1.0 Site Management).
- Within each of these sections, the requirements are to be referenced by section number (i.e., §1.3.2)
- For each requirement, include a narrative that describes the owner's actions and strategies for compliance with the guidelines followed by the requested information from the "Compliance Requirements". The Schematic Design submission must included the DOE-2 analysis, but may only include the written narratives for all other requirements.
- Required a comprehensive "Tenant Guide" to be separately bound as an appendix item. "Tenant Guide" will only be required for the As-built or final submission.
- The HLCBPCA may request the final version of the manual to be submitted in an electronic format (i.e., CD-ROM, CAD and text file formats to be determined).

The intent is to demonstrate compliance with the guidelines. Therefore, for each and every submission the written narrative must be included for each requirement. The manual must be 100% complete at the end of construction documents. The As-built manual will incorporate material substitutions; changes during construction, field data, contractor's affidavits and construction log information. The As-built manual will be used as research data for future building standards and will become a resource for building design teams on future development projects.

The HLCBPCA will review all submissions in a prompt and timely manner. Further, the HLCBPCA will maintain field personnel to observe construction methods and technologies and to verify that construction is proceeding in accordance with the official documents.

Glossary (cont.)

The following is a partial glossary of terms from the City of New York Department of Design And Construction's (DDC) *High Performance Building Guidelines*.

Albedo: The ratio of reflected light to the total amount falling on a surface. A high Albedo indicates high reflectance properties.

Building Commissioning: A systematic process beginning in the design phase, lasting at least one year after construction, and including the preparation of operating staff of ensuring, through documented verification, that all building systems perform interactively according to the documented design intent and the owner's operational needs.

Chlorofluorocarbons: CFCs are a family of chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere where their chlorine components destroy the earth's protective ozone layer.

Energy Modeling: A computer model that analyzes the buildings energy related features in order to project energy consumption.

Fuel Cell: A technology that uses an electromagnetic process to convert energy into electrical power. Often powered by natural gas, fuel cell power is cleaner than grid-connected power sources. In addition, hot water is produced as a by-product that can be utilized as a thermal resource for the building.

Graywater: Wastewater that does not contain sewage or fecal contamination and can be reused for irrigation after simple filtration.

Hydrochlorofluorocarbon: HCFCs are generally less detrimental to depletion of stratospheric ozone than related chlorofluorocarbons (CFCs). HCFCs are generally used to replace CFCs where mandates require CFCs to be eliminated. A total ban on CFCs and HCFCs is scheduled effective 2030.

Integrated Pest Management: A coordinated approach to pest control that is intended to prevent unacceptable levels of pests by the most cost-effective means with the least possible hazard to building occupants, workers, and the environment.

Life Cycle Cost: The amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs, and disposal costs discounted over the lifetime of the product.

Low-E windows: "Low-E" (low-emissivity) windows reflect heat, not light, and therefore keep spaces warmer in the winter and cooler in the summer.

Glossary (cont.)

Operations & Maintenance: Operations refers to how equipment or systems are run, e.g., when a system should be turned on, temperature ranges, set points for boiler pressures and temperatures, thermostat set points, etc. Maintenance refers to servicing or repair of equipment and systems. "Preventive maintenance" performed on a periodic basis to ensure optimum life and performance is designed to prevent breakdown and unanticipated loss of production or performance. "Corrective" or "unscheduled" maintenance refers to repairs on a system to bring it back "on-line." "Predictive" maintenance is performed on equipment monitored for signs of wear or degradation, e.g., through thermography, oil analysis, vibration analysis, maintenance history evaluation.

Photovoltaic Panels: Photovoltaic devices use semiconductor material to directly convert sunlight into electricity. Power is produced when sunlight strikes the semiconductor material and creates an electric current.

Post-consumer Recycled Content: Post-consumer material is material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item.

Pre-consumer Recycled Content: Pre-consumer material is material diverted from the waste stream following an industrial process, excluding reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process. Synonyms include post-industrial and secondary material.

R-value: A measure of the thermal resistance of material.

Recycling: The series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Renewable Energy: Energy resources such as wind power or solar energy that can keep producing indefinitely without being depleted.

Glossary (cont.)

Urban Heat Island Effect: The additional heating of air over city as the result of the replacement of vegetated surfaces with those composed of asphalt, concrete, rooftops and other man-made materials. These materials store much of the sun's energy, producing a dome of elevated air temperatures up to 10°F greater over city compared to air temperatures over adjacent rural areas. Light colored rooftops and lighter colored pavement can help to dissipate heat by reflecting sunlight, and tree planting can further help modify the city's temperature through shading and evapotranspiration.

Volatile Organic Compounds: VOCs are chemicals that contain carbon molecules and are volatile enough to evaporate from materials surfaces into indoor air at normal room temperatures (referred to as off-gassing). Examples of building materials that may contain VOCs include, but are not limited to: solvents, paints, adhesives, carpeting, and particleboard. Signs and symptoms of VOC exposure may include eye and upper respiratory irritation, nasal congestion, headache and dizziness.

The following definition has been taken from the State of New York's *Green Building Tax Credit Regulations*:

Base Building: All areas of the building not intended for occupancy by a tenant or owner, including but not limited to the structural components of the building, exterior walls, floors, windows, roofs, foundations, chimneys and stacks, parking areas, mechanical rooms and mechanical systems, and owner controlled and/or operated service spaces, sidewalks, main lobby, shafts and vertical transportation mechanisms, stairways and corridors.

The following items are independently defined for the purposes of these Guidelines:

Blackwater: Waste water from the toilet.

Reclaimed Water: Water gathered from any combination of Graywater, Blackwater and from harvested Storm water.