TABLE OF CONTENTS

Establishment of High Performance Building Construction Standards for State-Funded Buildings

Definitions. 16a-38k- 1

Applicability 16a-38k- 2

Mandatory building project requirements 16a-38k- 3

Building standard strategies for state facilities 16a-38k- 4

Additional mandatory building project requirements for schools . . . 16a-38k- 5

Building standard strategies for schools 16a-38k- 6

Alternative strategies to section 16a-38k-4 of the Regulations of Connecticut State Agencies or section 16a-38k-6 of the Regulations of Connecticut State Agencies 16a-38k- 7

Reporting requirements 16a-38k- 8

Exemptions 16a-38k- 9

Establishment of High Performance Building Construction Standards for State-Funded Buildings

Sec. 16a-38k-1. Definitions

As used in section 16a-38k-1 to section 16a-38k-9, inclusive, of the Regulations of Connecticut State Agencies:

(1) ''ASHRAE'' means the American Society of Heating, Refrigerating, and Air Conditioning Engineers;

(2) ''Building envelope systems'' means the part of the building that represents the barrier between the outdoor and indoor environments, and includes such components as windows, doors, walls, and roofs.

(3) ''Carpet and Rug Institute'' means a trade association that represents manufacturers and suppliers of carpets, rugs, and floor coverings;

(4) ''Chlorofluorocarbons'' or ''CFCs'' means a class of chemical compounds containing chlorine, fluorine, and carbon that were commonly used as refrigerants and that damage the earth's ozone layer;

(5) ''Class I Renewable Energy Source'' means ''Class I Renewable Energy Source'' as defined in section 16-1(a)(26) of the Connecticut General Statutes;

(6) ''Commissioner'' means the commissioner of the Department of Public Works;

(7) ''Commissioning'' means the process of verification that the building's systems perform as designed and according to project requirements and construction documents, including assurances that the specified systems are installed properly and adjusted correctly;

(8) ''Composite wood and agrifiber products'' means particleboard, medium density fiberboard, plywood, wheatboard, strawboard, panel substrates, and door cores;

(9) ''Connecticut State Building Code'' means the state building code as adopted under Section 29-252 of the Connecticut General Statutes;

(10) ''Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings'' means a reference and support manual prepared to assist building teams to comply with sections 16a-38k-1 to 16a-38k-9 inclusive of the Regulations of Connecticut State Agencies, and available electronically on the Connecticut Office of Policy and Management website;

(11) ''Energy Star'' means a program developed jointly by the United States Department of Energy and the United States Environmental Protection Agency that labels products to designate high levels of energy efficiency;

(12) ''Forest Stewardship Council'' means a not-for profit, international membership-based organization that accredits third-party organizations to certify that forest managers and forest product producers support responsible forest management;

(13) ''Green Globes system'' means a green building design and management tool that includes a rating system and guide to encourage the integration of environmentally friendly design into buildings;

(14) ''Green Label Plus'' means an independent testing program developed by the Carpet and Rug Institute to provide assurances that carpet and adhesive products meet stringent criteria for low chemical emissions;

(15) ''Halons'' means a class of organic chemical compounds that contain carbon, fluorine and bromine and may contain chlorine and are destructive to the earth's ozone layer;

(16) ''Heat island effect'' means local air and surface temperatures that are higher than nearby natural areas as a result of heat absorbing surfaces at a site;

(17) ''Hydrochlorofluorocarbons'' or ''HCFCs'' means a class of chemical compounds containing hydrogen, chlorine, fluorine and carbon that are commonly used as substitute refrigerants to Chlorofluorocarbons because they are less damaging to the earth's ozone layer;

(18) ''Institute for Sustainable Energy'' means the Institute for Sustainable Energy at Eastern Connecticut State University;

(19) ''Leadership in Energy and Environmental Design'' or ''LEED'' means a rating system developed by the U. S. Green Building Council to encourage environmental integrity, energy efficiency, healthy work spaces, and sustainable building practices in buildings;

(20) ''Low emitting and fuel efficient vehicles'' means vehicles that are classified as zero emission vehicles by the California Air Resources Board or have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy annual vehicle rating guide;

(21) ''Minimum Efficiency Reporting Value'' or ''MERV'' means a number ranging from one to sixteen that indicates the efficiency at which an air filter can remove particles, where one is the least efficient and sixteen is the most efficient at removing particles;

(22) ''New England Power Pool Generation Information System'' or ''NEPOOL-GIS'' means a system that verifies and manages Renewable Energy Certificates that are the basis for environmental trading and investment incentives in the New England states;

(23) ''On-site renewable energy'' means renewable energy systems located on the building or building site that produce electricity or hot water for use in the building. This includes solar photovoltaic systems, solar hot water systems, wind energy systems, and fuel cell systems;

(24) ''Pre-consumer recycled content'' means that the materials used to make the product were recyclables from within the manufacturing process and never reached consumers;

(25) ''Preferred parking'' means parking spots that are closest to the main entrance of the building, exclusive of handicap designated spaces;

(26) ''Project manager-facilitator'' means whomever the Department of Public Works, Department of Transportation, Office of Legislative Management, the University of Connecticut, or municipality appoints as the lead individual responsible for a particular project;

(27) ''Post-consumer recycled content'' means that the materials used to make a product were already used by a consumer and recycled;

(28) ''Renewable Energy Credit'' or ''REC'' means a certificate representing one megawatt hour of renewable energy that is physically metered and verified from the generator or the renewable energy project;

(29) ''School renovation'' means ''renovation'' as defined in section 10-282 of the Connecticut General Statutes;

(30) ''SDE Commissioner'' means the commissioner of the State Department of Education;

(31) ''Secretary'' means the secretary of the Office of Policy and Management;

(32) ''Solar Heat Gain Coefficient'' or ''SHGC'' means a measure of how well a window blocks heat from sunlight. The SHGC is the fraction of the heat from the sun that enters through a window. It is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits;

(33) ''Solar Reflectance Index'' means a measure of a surface's ability to reflect solar heat, with white being one hundred and black being zero;

(34) ''State facility'' means a building that is owned by the state of Connecticut;

(35) ''State facility renovation'' means an undertaking whereby the designer manipulates the building envelope, electrical systems, mechanical systems, and efficiency of equipment for modification of performance, when costs are two million dollars or more. This includes entire buildings as well as isolated portions of the building;

(36) ''U. S. Green Building Council'' means a membership organization dedicated to shaping the future of sustainable building design through the development of LEED rating system for building performance; and

(37) ''Volatile organic compound'' or ''VOC'' means a class of chemicals that are emitted as gases from certain solids and liquids and that have short- and long-term adverse health effects.

(Adopted effective September 2, 2009)

Sec. 16a-38k-2. Applicability

Sections 16a-35k-1 to 16a-35k-9 apply to:

(a) New construction of a state facility that is projected to cost five million dollars or more, and for which all budgeted project bond funds are allocated by the State Bond Commission on or after January 1, 2008;

(b) State facility renovation that is projected to cost two million dollars or more of which two million dollars or more is state funding, and is approved and funded on or after January 1, 2008;

(c) New construction of public school buildings costing five million dollars or more of which two million dollars or more is state funding, and is authorized by the General Assembly pursuant to chapter 173 on or after January 1, 2009; and

(d) School renovation that is projected to cost two million dollars or more of which two million dollars or more is state funding, and is authorized by the General Assembly pursuant to chapter 173 on or after January 1, 2009.

(Adopted effective September 2, 2009)

Sec. 16a-38k-3. Mandatory building project requirements

All building projects pursuant to section 16a-38k-2 of the Regulations of Connecticut State Agencies shall meet the minimum building standards outlined in subsections (a) through (*l*) of this section:

(a) Building commissioning shall be an integral part of the building project. Such commissioning shall be performed by an independent third-party, called a commissioning agent, who shall be certified as a commissioning agent by the Building Commissioning Association or the Association of Energy Engineers, and shall either be a Professional Engineer or have an S-1 license. This individual shall be included in the beginning stages of the building process through a post-occupancy evaluation. The commissioning agent shall not be an employee of the architectural, engineering, or construction firm that implements the project, and shall be hired directly by the state, municipality, or regional school district. For state facility projects, the commissioning agent may be an employee of the Department of Public Works provided such person shall act independently of the other staff assigned to oversee the design and construction of the project. The commissioning agent shall report all findings and recommendations to the owner of the state facility or the municipal or regional school district. Coordination and oversight of the training of facility management and maintenance personnel on proper equipment operation as

well as verification of proper development of systems manuals shall be overseen by the commissioning agent in cooperation with the project manager-facilitator and with the building owner, designer, contractor, and subcontractors who installed the systems. The commissioning process, at minimum, shall include the following energy-related systems: (1) heating, ventilating, air conditioning, and refrigeration systems and associated controls, (2) lighting and day-lighting controls, (3) domestic hot water systems, and (4) renewable energy systems. It is required that the commissioning process also include water using systems and the building envelope systems.

(b) All building construction projects shall follow an integrated design process to set environmental and building performance goals. This process, at minimum, shall include at least one collaborative session of the design team consisting of the architect, mechanical engineer, electrical engineer, civil engineer, commissioning agent, the project manager-facilitator representing the building owner, and representative(s) of the building tenant state agency or municipality, as applicable, prior to the preparation of contract documentation. The meeting shall include the owner's project requirements, the basis of design, commissioning plan, performance verification documentation, commissioning report, and post commissioning requirements. Prior to the start of the construction phase, at least one collaborative session among the designers, owner, and contractors, including any selected electrical, mechanical, and controls subcontractors shall be held to insure knowledge of design intent, required approval processes, and commissioning procedures. All records of decisions from the collaborative sessions shall be shared among the design team. The owner of the state facility or the municipal or regional school district shall have final decision making authority.

(c) The base minimum energy performance for all building projects shall be twenty-one percent better than the most current Connecticut State Building Code or ASHRAE Standard 90.1-2004, whichever is more stringent. Base minimum energy performance shall be determined using approved building modeling software that is identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.*

(d) Energy consuming products installed in the building shall be Energy Star compliant if the product category has an Energy Star specification.

(e) The project manager-facilitator shall develop an indoor air quality management plan for the construction phase of the project. As part of the plan, the following shall be addressed:

(1) Periodic inspections of materials stored on-site to ensure that all installed or stored absorptive materials are protected from moisture and mold damage. If resting on the ground, spacers shall be provided to allow air to circulate between the ground and the materials. All water-damaged materials shall be removed from the site and disposed of properly.

(2) Surface grades, drainage systems, and heating, ventilating and air conditioning condensate drainage systems shall be designed so as to prevent accumulation of water under, in, or near the building. Irrigation systems shall be designed so as to prevent spraying of the building.

(3) Ductwork shall be sealed from outside elements during transport and storage, and interior surfaces shall be wiped down immediately prior to installation. During installation, open ends of ductwork shall be temporarily sealed and ductwork shall be protected with surface wrapping. No installed ductwork shall contain internal porous insulation materials or lining.

(4) Heating, ventilation, and air conditioning (HVAC) equipment shall be covered and protected from moisture during transportation and on-site storage. For perma-

nently installed air handlers used during construction, use filtration media in air handlers with a Minimum Efficiency Reporting Value (MERV) of ten, except for unit ventilator systems which shall have a minimum MERV of seven. All filtration media shall be replaced immediately prior to building occupancy with media having a MERV rating of equal or greater value to existing media.

(5) Materials that off-gas toxic or potentially toxic fumes shall be pre-conditioned for at least seventy-two hours prior to installation within the building. Such materials shall also be installed prior to the installation of porous building materials to reduce absorption and adsorption of those toxins by the porous materials. Prior to installation of porous materials and materials vulnerable to mold, the building enclosure shall be watertight.

(6) In the event that any portion of the building is occupied during construction or renovation activities, the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) *Indoor Air Quality Guidelines for Occupied Buildings Under Construction* shall be followed.

(f) Use low-flow fixtures to consume twenty percent less water in aggregate as compared to base levels calculated by meeting the Federal Energy Policy Act of 1992 fixture performance requirements. Calculations shall be based on estimates of occupant usage and shall include the following building fixtures only: showers, urinals, toilets, bathroom sink faucets, and kitchen sink faucets.

(g) The building or building site shall contain convenient areas to serve as collection points for recyclable materials and shall include an area for the sorting and storage of such materials for pick-up by recyclers.

(h) All construction shall include a plan for erosion and sediment control, as required by sections 22a-325 through 22a-329 of the Connecticut General Statutes.

(i) No smoking shall be permitted in any building or portion of a building owned and operated or leased and operated by the state or any political subdivision thereof as mandated by section 19a-342 of the Connecticut General Statutes. All exterior designated smoking areas shall be located at least twenty-five feet away from outdoor air intakes, operable windows, and building entrances.

(j) A plan for integrated pest management as defined in section 22a-47 of the Connecticut General Statues, shall be established as required under section 22a-66*l* for general pest control in state buildings. Schools shall comply with sections 10-231d and 22a-66*l* of the Connecticut General Statutes.

(k) Chlorofluorocarbon (CFC)-based refrigerants shall not be utilized for energy systems in new construction. For renovation projects where existing heating, ventilating and air conditioning equipment is reused, a CFC phase-out conversion shall be undertaken.

(*l*) Buildings shall be designed to meet the minimum ventilation requirements of the current ASHRAE Standard 62.1 using the Ventilation Rate Procedure for mechanical systems. If the current Connecticut State Building Code contains more stringent requirements, it shall be used to meet minimum ventilation requirements.

(Adopted effective September 2, 2009)

Sec. 16a-38k-4. Building standard strategies for state facilities

All building projects as defined in sections 16a-38k-2 (a) and 16a-38k-2 (b) of the Regulations of Connecticut State Agencies shall implement a minimum of twenty-six of the sixty strategies in subsections (a) through (f) of this section.

(a) **Energy efficiency and Renewable Energy- A minimum of one strategy in this subsection is required.**

(1) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by three and one-half percent.

(2) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by seven percent. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (a)(1) of this section.

(3) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by ten and one-half percent. Selection of this strategy shall count as implementing three strategies since it is inclusive of the strategies listed in subsections (a)(1) and (a)(2) of this section.

(4) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by fourteen percent. Selection of this strategy shall count as implementing four strategies since it is inclusive of the strategies listed in subsections (a)(1) through (a)(3) of this section.

(5) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by seventeen and one-half percent. Selection of this strategy shall count as implementing five strategies since it is inclusive of the strategies listed in subsections (a)(1) through (a)(4) of this section.

(6) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by twenty-one percent. Selection of this strategy shall count as implementing six strategies since it is inclusive of the strategies listed in subsections (a)(1) through (a)(5) of this section.

(7) The installation of on-site renewable energy shall provide at least three percent of the building energy needs based upon the most recent version of the U. S. Department of Energy Commercial Buildings Energy Consumption survey for estimated electricity usage or by using modeling software that is identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.* The facility shall retain ownership of associated renewable energy credits (RECs) for a period of two years.

(8) Same as in section 16a-38k-4(a)(7) except at least seven percent of the building energy needs are met through on-site renewable energy. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (a)(7) of this section.

(9) Same as in section 16a-38k-4(a)(7) except at least ten percent of building energy needs are met through on-site renewable energy. Selection of this strategy shall count as implementing three strategies since it is inclusive of the strategies listed in subsections (a)(7) and (a)(8) of this section.

(10) The facility shall have a two-year contract to purchase at least thirty-five percent of the building's annual electricity consumption from a Class I renewable energy source. Alternately, the purchase may be in the form of New England Power Pool Generation Information System (NEPOOL-GIS) renewable energy credits (RECs); or if procuring RECs outside of the NEPOOL-GIS, the RECs shall be equivalent to Class I renewable resources and certified by a nationally recognized certification organization as identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.* Baseline electric usage can be determined using either the most recent version of the U. S. Department of Energy Commercial Buildings Energy Consumption survey for estimated electricity usage or by using building modeling software that is identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings*. RECs purchased to comply with this subsection shall not be purchased from a

facility that has installed renewable energy systems for credit under subsections (a)(7) through (a)(9) of this section.

(11) Develop a measurement and verification plan for energy usage, to cover a period of at least one year after occupancy.

(b) **Indoor Environment -A minimum of two strategies in this subsection are required.**

(1) Install permanent indoor air monitoring systems to provide performance feedback on ventilation systems. Such monitoring systems, at minimum, shall include devices to measure temperature, relative humidity, carbon dioxide, and dew point. Carbon dioxide measurement sensors shall measure both interior and exterior levels of CO2.

(2) Provide increased outdoor ventilation by designing mechanical ventilation systems to exceed the minimum rates required by the current Connecticut State Building Code or the current version of the ASHRAE Standard 62.1, whichever is more stringent, by thirty percent.

(3) After construction ends and with all interior finishes installed but prior to building occupancy, flush the building continuously for at least ten days with outside air while maintaining an internal temperature between 60°F and 78°F and relative humidity no higher than 60%. Do not ''bake out'' the building by increasing the temperature of the space. Alternatively, use the following strategy: Flush out each space separately until 3,500 cubic feet of outside air per square foot of floor space has been delivered to that space. The space shall then be ventilated at the rate of 0.3 cubic feet per minute per square foot of floor space or the design minimum outside air rate, whichever is greater. This shall be performed for a minimum of three hours prior to occupancy and then during occupancy until a total of 14,000 cubic feet of outside air per square foot of floor area has been delivered to that space.

(4) Adhesives and sealants used in the interior of the building shall be certified for low emissions of volatile organic compounds (VOCs) using specifications or certification programs listed in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.*

(5) Paints and coatings used in the interior of the building shall be certified for low emissions of volatile organic compounds (VOCs) using specifications or certification programs listed in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.*

(6) All carpet, carpet adhesive products and carpet cushion installed in the building interior shall meet current testing and product requirements of the Carpet and Rug Institute's Green Label Plus program.

(7) All composite wood and agrifiber products used within the shell of the building shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 Addenda.

(8) To protect building occupants from potentially hazardous particulates and pollutants, building design shall control entry of pollutants and excess moisture into buildings and later cross-contamination of regularly occupied areas at all entries directly connecting to the outdoors through the use of permanent entryway systems to capture, dirt, particulates, and moisture. Such entryway systems shall be a minimum of six feet long and may be permanently installed grates, grills, or slotted systems that allow for cleaning underneath. Outside air intakes shall be located a minimum of twenty-five feet from any hazard or noxious contaminants such as

vents, chimneys, plumbing vents, exhaust fans, cooling towers, street alleys, parking lots, loading docks, dumpster areas, or any area where vehicle idling occurs. If locating an air intake within twenty-five feet of a contaminant source is unavoidable, the intake must be located a minimum of ten feet horizontal distance and two feet lower than the contaminant source.

(9) Allow for individual lighting control for ninety percent or more of the building occupants to allow for adjustments to suit individual tasks and preferences and provide lighting system controllability for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences.

(10) Using conditions for thermal comfort described in the current version of the ASHRAE Standard 55, allow for individual thermal comfort control for fifty percent or more of the building occupants to allow for adjustments to suit individual tasks and preferences and provide thermal system comfort controllability for all shared multi-occupant spaces to enable adjustment that meets group needs and preferences.

(11) Building facility personnel, under direction of the building owner, shall administer an anonymous survey for building occupants within the first twelve months after initial occupancy to assess occupant satisfaction and implement corrective actions for recurrent issues. At minimum, the survey shall cover thermal building comfort, lighting, security issues, indoor air quality, functionality of space, and acoustics. If greater than 20% of the respondents express dissatisfaction with any specific issue, the building owner shall prepare a plan for remedial action.

(12) Demonstrate through computer software simulations or through recording of indoor light measurements that a minimum illumination level of twenty-five foot-candles has been achieved from daylight in at least seventy-five percent of all regularly occupied areas.

(13) There shall be a direct line of sight to the outdoor environment via window glazing between two and one-half to seven and one half feet above the finished floor for seventy percent of all regularly occupied areas.

(14) Where chemical use occurs, including housekeeping areas, chemical storage and mixing areas, and copy/print rooms, use dedicated exhaust to ventilate the space at a minimum of 0.5 cubic feet per minute per square foot with adequate make-up air. No recirculation is permitted and such spaces shall have a negative air pressure of at least five pascal (.02 inches of water gauge) to a minimum of one pascal (0.004 inches of water gauge) when the doors are closed.

(c) **Water efficiency- A minimum of one strategy in this subsection is required.**

(1) Same as in section 16a-38k-3(f), except that the conserving strategies use thirty percent less water in aggregate.

(2) Reduce by fifty percent the amount of water required for landscaping from a modeled, mid-summer baseline usage case. Reductions may be attributed to the use of captured rainwater, recycled waste (grey) water, efficiency of irrigation strategies, and use of drought resistant plant species. This strategy only applies to renovation projects.

(3) Use landscaping that does not require a permanent irrigation system or uses non-potable water for irrigation. Any system installed for irrigation using potable water shall only be utilized for plant establishment and be removed prior to one year of building occupancy.

(4) Reduce potable water use by half through water conserving fixtures and/or use of non-potable water using methodologies stated in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.* This strategy only applies to renovation projects.

(d) **Recycling, Reuse, and Sustainability- A minimum of two strategies in this subsection are required.**

(1) Retain at least seventy-five percent, by surface area, of an existing building structure, including structural floor and roof decking, exterior framing, and envelope surface, but excluding window assemblies and non-structural roofing material. This strategy only applies to renovation projects.

(2) Same as in section 16a-38k-4(d)(1), except that a total of ninety-five percent of the building structure is retained. This strategy only applies to renovation projects. This strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(1) of this section.

(3) Use existing non-structural elements such as interior walls, doors, floor coverings and ceiling systems in at least half (by square footage) of the completed building. This strategy only applies to renovation projects.

(4) Recycle or salvage at least half of non-hazardous construction and demolition debris.

(5) Same as in section 16a-38k-4(d)(4), except that a total of seventy-five percent of non-hazardous construction and demolition debris is recycled or salvaged. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(4) of this section.

(6) Use five percent of refurbished, salvaged, or reused materials, based on cost of the total value of materials on the project. Only permanently installed materials can by used in calculations.

(7) Same as in section 16a-38k-4 (d)(6), except that a total of ten percent of refurbished, salvaged, or reused materials, based on cost of the total value of materials on the project shall be used. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(6) of this section.

(8) Use materials where the weighted average of recycled materials content is ten percent, based on cost, of the total value of the materials in the project. Recycled content value of a material assembly shall be determined by weight. The weighted average shall be determined using the following formula:

Weighted average of recycled materials equals the percentage of post consumer content plus one-half the percentage of pre-consumer content.

(9) Same as section 16a-38k-4(d)(8), except that the weighted average of recycled materials shall constitute at least twenty percent, based on cost, of the total value of the materials in the project. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(8) of this section.

(10) Use a minimum of ten percent of building materials extracted or manufactured within a five-hundred mile radius of the building site.

(11) Same as in section 16a-38k-4(d)(10), except that a minimum of twenty percent of building materials extracted or manufactured within a five-hundred mile radius of the building site shall be used. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(10) of this section.

(12) Use building materials and products that are made from plants harvested in a ten-year or shorter cycle. Two and one-half percent of the total value of building materials and products, based on costs, must be used in the project.

(13) At least half of permanently installed wood and wood-based products shall be certified in accordance with the current Forest Stewardship Council (FSC) principles and criteria.

(e) **Site Selection and Development- A minimum of two strategies in this subsection are required.**

(1) Construct or renovate the building on a previously developed site and within one-half mile of a residential zone/neighborhood with an average density of ten units per acre net and within one half mile of a minimum of ten basic services as described in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings* and with pedestrian access between the building and the services.

(2) Develop on a site that is defined as a brownfield by a local, state, or federal government agency.

(3) Select a site that has access to public transportation. Public transportation is considered accessible if the site is located within one-third of a mile to an existing commuter rail station or located within one quarter mile of a public commuter bus line.

(4) Encourage bicycle transportation by providing secure bicycle racks or storage within five-hundred feet of a building entrance for a minimum of five percent of building users at peak times and shower and changing facilities must be provided in the building or within five-hundred feet of the building. For residential buildings, covered storage facilities shall be provided for securing bicycles for a minimum of fifteen percent of building occupants.

(5) Encourage the use of low-emitting and fuel efficient vehicles by providing preferred parking for low-emitting and fuel efficient vehicles for five percent of the total parking capacity at the site.

(6) Reduce pollution from single occupancy vehicle use by sizing parking capacity to meet, but not exceed minimum local zoning requirements; provide designated preferred parking for carpools or vanpools for five percent of the total provided parking spaces; and provide infrastructure and support programs to facilitate shared vehicle usage such as ride sharing bulletin boards and shuttle services to mass transit.

(7) Protect existing natural areas or restore damaged areas to promote biodiversity. Any site disturbances shall be limited to no more than forty feet beyond the building perimeter; ten feet beyond surface walkways, patios, surface parking and utilities less than twelve inches in diameter; fifteen feet beyond primary roadway curbs and main utility branch trenches; and twenty-five feet beyond constructed areas with permeable surfaces, such as playing fields, that require additional staging areas in order to limit compaction in the constructed area. For previously developed or graded sites, restore or protect to a minimum of fifty percent of the site area, excluding the building footprint, to plant species indigenous to the locality or to cultivars of native plants adapted to the local climate conditions and not considered invasive species or noxious weeds. Except for playing fields and picnic areas, minimize lawn areas to less than ten percent of the building site landscape.

(8) Maximize open space at the site. Provide vegetated open space within the project boundary to exceed the local zoning's open space requirement by twenty-five percent; where there is no local zoning requirement, provide vegetated open space adjacent to the building that, at minimum, is equal to the building footprint.

(9) Design the site to minimize storm water runoff by implementing a storm water management plan that results in a twenty-five percent reduction in peak run-off rates for a two-year, twenty-four hour storm design from pre-construction to developed conditions; and implement a storm water management plan that results in a twenty-five percent decrease in run-off volume of storm water runoff from the one hundred-year, twenty-four hour storm design from existing to developed conditions.

(10) Design the site to minimize pollutants in storm water runoff by implementing a storm water management plan that reduces impervious cover, promotes infiltration, redirects water to pervious areas or storage reservoirs that treats storm water runoff from ninety percent of the average annual rainfall.

(11) Reduce heat island effect at the site by utilizing any combination of the use of native shade species, paving materials with a solar reflectance index of at least twenty-nine, and/or an open grid pavement system for fifty percent or more of the site parking, sidewalk and road areas; or place at least fifty percent of parking spaces under a covering, such as the a deck, a roof, underground or the building itself. Any roof used to cover parking spaces must have a solar reflectance index of at least twenty-nine.

(12) Reduce heat island effect through roofing selection by either installing native vegetation on at least fifty percent of the roof area or by using a roofing material that has a solar reflectance index equal to or greater than the values in the following table on at least seventy-five percent of the roof surface:

Roof Type	Slope	Solar Reflectance Index
Low-Sloped Roof	≤ 2:12	78
Steep-Sloped Roof	> 2:12	29

(13) Reduce light pollution from the site. In addition to requirements mandated in Section 4b-16 of the Connecticut General Statutes, automatic controls to turn off lights during non-business hours shall be installed on all non-emergency interior lighting. Manual override capability may be provided for after hours use. Exterior lighting shall be provided only in areas where lighting is required for safety and comfort. Light fixtures shall not be installed where the main purpose is to light building facades or landscape features. Exterior building-mounted lighting fixtures that are only needed during building operation shall be controlled by a time-clock with an easily accessible manual control. Lighting of flags, signs, and monuments shall be limited to fifty watts per fixture and shall incorporate shielding devices to minimize light pollution. No more than two fixtures may be used for each flag, sign or monument.

(14) Building orientation shall be such that the east/west glazing exposure is minimized. South windows shall have an external overhang to entirely shade adjacent windows during the summer solstice or shall utilize glazing with a solar heat gain coefficient of less than or equal to 0.4. Shading mechanisms or glazing with a solar heat gain coefficient less than or equal to 0.4 shall be installed at eastern and western exposure windows to minimize solar heat gain early and late in the day respectively.

(15) Buildings, roads, parking areas, sidewalks, or other impervious surfaces shall not be built in any area that is inconsistent with the state plan of conservation and development.

(f) **Operations and Procedures/Innovation – No minimum number of strategies are required for this subsection.**

(1) Do not install fire suppression systems that contain chlorofluorocarbons (CFCs), hydro chlorofluorocarbon (HCFCs) or halons. Select refrigerants and heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems that minimize or eliminate compounds contributing to ozone layer depletion and global warming. If refrigerants are used, the mechanical room shall have leak detection equipment installed.

(2) Utilize innovative high performance features or technologies that exceed any existing mandatory requirement as specified in Section 16a-38k-3 or optional measure within Section 16a-38k-4.

(3) In settings where a central plant provides energy to multiple buildings or in cases where multiple buildings are fed from the same fuel source, new construction or major renovation shall include metering and other such equipment necessary to evaluate energy and water consumption.

(Adopted effective September 2, 2009)

Sec. 16a-38k-5. Additional mandatory building project requirements for schools

In addition to complying with the requirements set forth in Section16a-38k-3 of the Regulations of Connecticut State Agencies, all building projects as defined in sections 16a-38k-2(c) and 16a-38k-2(d) of the Regulations of Connecticut State Agencies shall meet the following mandatory requirements.

(a) All classrooms, including art rooms, music rooms, science rooms, computer rooms, and special needs, remedial and library space shall meet the acoustical standards as required under section 10-285g of the Connecticut General Statutes.

(b) Outside air intakes shall be located a minimum of twenty-five feet from any hazard or noxious contaminants such as vents, chimneys, plumbing vents, exhaust fans, cooling towers, street alleys, parking lots, loading docks, dumpster areas, bus loops, or any area where vehicle idling occurs. If locating an air intake within twenty-five feet of a contaminant source is unavoidable, the intake must be located a minimum of ten feet horizontal distance and two feet lower than the contaminant source.

(c) Only electronic ignitions shall be specified for gas-fired water heaters, boilers, furnaces, air handling units, and stovetops/ovens.

(d) The following materials shall be certified for low emissions of volatile organic compounds (VOCs) using specifications or certification programs listed in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings*:

(1) 50% of adhesives and sealants used in the interior of the building;

(2) Acoustic ceiling tiles and wall panels;

(3) Interior paints;

(4) Wall coverings;

(5) Carpet systems and associated adhesives;

(6) Composite and solid wood flooring;

(7) Resilient flooring and associated adhesives.

(e) The town or regional board of education and the building committee of such town or district, shall provide for a Phase I environmental site assessment in accordance with the American Society for Testing and Materials Standard #1527, Standard Practice for Environmental Site Assessments: Phase I Site Assessment Process, or similar subsequent standards, as required pursuant to Section 10-291 of the Connecticut General Statutes. If a town, regional board of education or the building committee of such town or district suspect contamination, a Phase II Environmental Site Assessment shall be undertaken as described in American Society for Testing and Materials Standard E1903-97 or similar subsequent standards. Any contamination found shall be remedied.

(f) Prior to substantial completion of the building, vacuum all carpeted and soft surfaces with a high-efficiency particulate arrestor (HEPA) vacuum. For phased or occupied renovations, HEPA vacuum the carpet daily in occupied areas.

(Adopted effective September 2, 2009)

Sec. 16a-38k-6. Building standard strategies for schools

All building projects as defined in sections 16a-38k-2(c) and 16a-38k-2(d) of the Regulations of Connecticut State Agencies shall implement a minimum of twenty-eight of the fifty-nine strategies in subsections (a) through (f) of this section:

(a) **Energy efficiency and Renewable Energy- A minimum of one strategy in this subsection is required.**

(1) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by three and one-half percent.

(2) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by seven percent. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (a)(1) of this section.

(3) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by ten and one-half percent. Selection of this strategy shall count as implementing three strategies since it is inclusive of the strategies listed in subsections (a) (1) and (a)(2) of this section.

(4) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by fourteen percent. Selection of this strategy shall count as implementing four strategies since it is inclusive of the strategies listed in subsections (a)(1) through (a)(3) of this section.

(5) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by seventeen and one-half percent. Selection of this strategy shall count as implementing five strategies since it is inclusive of the strategies listed in subsections (a)(1) through (a)(4) of this section.

(6) Same as in section 16a-38k-3(c) except that the percentage improvement over base is increased by twenty-one percent. Selection of this strategy shall count as implementing six strategies since it is inclusive of the strategies listed in subsections (a)(1) through (a)(5) of this section.

(7) The installation of on-site renewable energy shall provide at least three percent of the building energy needs based upon the most recent version of the U. S. Department of Energy Commercial Buildings Energy Consumption survey for estimated electricity usage or by using modeling software that is identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings*.

(8) Same as in section 16a-38k-6(a)(7) except at least seven percent of the building energy needs are met through on-site renewable energy. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (a)(7) of this section.

(9) Same as in section 16a-38k-6(a)(7) except at least ten percent of building energy needs are met through on-site renewable energy. Selection of this strategy shall count as implementing three strategies since it is inclusive of strategies listed in subsections (a)(7) and (a)(8) of this section.

(10) The facility shall have a two-year contract to purchase at least thirty-five percent of the building's annual electricity consumption from a Class I renewable energy source. Alternately, the purchase may be in the form of New England Power Pool Generation Information System (NEPOOL-GIS) renewable energy credits (RECs); or if procuring RECs outside of the NEPOOL-GIS, the RECs shall be equivalent to Class I renewable resources and certified by a nationally recognized certification organization as identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.* Baseline electric usage

can be determined using either the most recent version of the U. S. Department of Energy Commercial Buildings Energy Consumption survey for estimated electricity usage or by using building modeling software that is identified in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.*

(11) Develop a measurement and verification plan for energy usage, to cover a period of at least one year after occupancy.

(b) **Indoor Environment- A minimum of two strategies in this subsection are required.**

(1) Install permanent indoor air monitoring systems to provide performance feedback on ventilation systems. Such monitoring systems, at minimum, shall include devices to measure temperature, relative humidity, carbon dioxide, and dew point. Carbon dioxide measurement sensors shall measure both interior and exterior levels of CO2.

(2) Provide increased outdoor ventilation by designing mechanical ventilation systems to exceed the minimum rates required by the current Connecticut State Building Code or the current version of the ASHRAE Standard 62.1, whichever is more stringent, by thirty percent.

(3) After construction ends and with all interior finishes installed but prior to building occupancy, flush the building continuously for at least ten days with outside air while maintaining an internal temperature between 60°F and 78°F and relative humidity no higher than 60%. Do not ''bake out'' the building by increasing the temperature of the space. Alternatively, use the following strategy: Flush out each space separately until 3,500 cubic feet of outside air per square foot of floor space has been delivered to that space. The space shall then be ventilated at the rate of 0.3 cubic feet per minute per square foot of floor space or the design minimum outside air rate, whichever is greater. This shall be performed for a minimum of three hours prior to occupancy and then during occupancy until a total of 14,000 cubic feet of outside air per square foot of floor area has been delivered to that space.

(4) All composite wood and agrifiber products used within the shell of the building shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 Addenda.

(5) For administrative offices and other regularly occupied spaces, allow for individual lighting control for ninety percent or more of the building occupants in workspaces to allow for adjustments to suit individual tasks and preferences. For classroom and core learning spaces, with the exception of chemistry laboratories, art and music rooms, shops, and gyms, install two modes of illumination: general illumination and audio visual illumination. General illumination mode shall achieve desk level illumination of 30-50 foot-candles; audio visual mode shall achieve a desk level illumination of 10 to 20 foot-candles while limiting vertical illumination at a projection screen of no more than seven foot-candles. All lighting fixtures shall include glare control features.

(6) Using the current version of the ASHRAE Standard 55, allow for individual thermal comfort control in administrative areas for fifty percent or more of the building occupants to allow for adjustments to suit individual tasks and preferences and provide thermal system comfort controllability for all shared multi-occupant spaces such as classrooms, auditoriums, and gyms to enable adjustment that meets group needs and preferences.

(7) Building facility personnel, under direction of the building owner, shall administer an anonymous survey for building occupants within the first twelve months

after initial occupancy to assess occupant satisfaction and implement corrective actions for recurrent issues. At minimum, the survey shall cover thermal building comfort, lighting, security issues, indoor air quality, functionality of space, and acoustics. If greater than 20% of the respondents express dissatisfaction with any specific issue, the building owner shall prepare a plan for remedial action.

(8) Demonstrate through computer software simulations or through recording of indoor light measurements that a minimum illumination level of twenty-five foot-candles has been achieved from daylight in at least seventy-five percent of all regularly occupied areas.

(9) There shall be a direct line of sight to the outdoor environment via window glazing between two and one-half to seven and one half feet above the finished floor for seventy percent of all regularly occupied areas.

(10) To prevent mold, heating, ventilating and air conditioning systems (HVAC) shall be designed to limit space relative humidity to 60% or less during load conditions whether the building is occupied or non-occupied; an ongoing indoor air quality management plan shall be implemented as required under section 10-220 of the Connecticut General Statutes, using the U. S. Environmental Protection Agency's (EPA) Indoor Air Quality *Tools for Schools* Program; and the criteria of sections 16a-38k-6(b)(6) and 16a-38k-6(b)(7) of the Regulations of Connecticut State Agencies shall be met.

(11) Student and teacher classroom chairs, desks, and tables manufactured, refurbished or refinished within one year prior to building occupancy and used within the building interior shall be certified for low chemical emissions by the certifying organization listed in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings*.

(12) Where chemical use occurs, including housekeeping areas, chemical mixing areas, photo labs, science labs, art rooms, and copy/print rooms, use dedicated exhaust to ventilate the space at a minimum of 0.5 cubic feet per minute per square foot with adequate make-up air. No recirculation is permitted and such spaces shall have a negative air pressure of at least five pascal (.02 inches of water gauge) to a minimum of one pascal (0.004 inches of water gauge) when the doors are closed.

(13) Building design shall control entry of pollutants and excess moisture into buildings and later cross-contamination of regularly occupied areas at all high volume entryways and those adjacent to playing fields and locker rooms through the use of three-part walk-off systems and the proper placement of outside air intakes. Walk-off systems shall include a grate or grill outside the entryway for removing dirt and snow, a drop through mat system within the vestibule, and a fifteen foot interior walk-off mat.

(c) **Water efficiency- A minimum of one strategy in this subsection is required.**

(1) Same as in section 16a-38k-3(f), except that the conserving strategies use thirty percent less water in aggregate.

(2) Reduce by fifty percent the amount of water required for landscaping from a modeled, mid-summer baseline usage case. Reductions may be attributed to the use of captured rainwater, recycled waste (grey) water, efficiency of irrigation strategies, and use of drought resistant plant species. This strategy only applies to renovation projects.

(3) Use landscaping that does not require a permanent irrigation system or uses non-potable water for irrigation. Any system installed for irrigation using potable water shall only be utilized for plant establishment and be removed prior to one year of building occupancy.

(4) Reduce potable water use by half through water conserving fixtures and/or use of non-potable water using methodologies stated in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings.* This strategy only applies to renovation projects.

(d) **Recycling, Reuse, and Sustainability-A minimum of two strategies in this subsection are required.**

(1) Retain at least seventy-five percent, by surface area, of an existing building structure, including structural floor and roof decking, exterior framing, and envelope surface, but excluding window assemblies and non-structural roofing material. This strategy only applies to renovation projects.

(2) Same as section 16a-38k-6(d)(1), except that a total of ninety-five percent of the building structure is retained. This strategy only applies to renovation projects. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d) (1) of this section.

(3) Use existing non-structural elements such as interior walls, doors, floor coverings and ceiling systems in at least half (by square footage) of the completed building. This strategy only applies to renovation projects.

(4) Recycle or salvage at least half of non-hazardous construction and demolition debris.

(5) Same as section 16a-38k-6(d)(4), except that a total of seventy-five percent of non-hazardous construction and demolition debris is recycled or salvaged. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(4) of this section.

(6) Use five percent of refurbished, salvaged, or reused materials, based on cost of the total value of materials on the project. Only permanently installed materials can by used in calculations.

(7) Same as section 16a-38k-6(d)(6), except that a total of ten percent of refurbished, salvaged, or reused materials, based on cost of the total value of materials on the project shall be used. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(6) of this section.

(8) Use materials where the weighted average of recycled materials content is ten percent, based on cost, of the total value of the materials in the project. Recycled content value of a material assembly shall be determined by weight. The weighted average shall be determined using the following formula:

Weighted average of recycled materials equals the percentage of post consumer content plus one-half the percentage of pre-consumer content.

(9) Same as section 16a-38k-6(d)(8), except that the weighted average of recycled materials shall constitute at least twenty percent, based on cost, of the total value of the materials in the project. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(8) of this section.

(10) Use a minimum of ten percent of building materials extracted or manufactured within a five-hundred mile radius of the building site.

(11) Same as in section 16a-38k-6(d)(10), except that a minimum of twenty percent of building materials extracted or manufactured within a five-hundred mile radius of the building site shall be used. Selection of this strategy shall count as implementing two strategies since it is inclusive of the strategy listed in subsection (d)(10) of this section.

(12) Use building materials and products that are made from plants harvested in a ten-year or shorter cycle. Two and one-half percent of the total value of building materials and products, based on costs, must be used in the project.

(13) At least half of permanently installed wood and wood-based products shall be certified in accordance with the current Forest Stewardship Council (FSC) principles and criteria.

(e) **Site Selection and Development- A minimum of two strategies in this subsection are required.**

(1) Construct or renovate the building on a previously developed site and within one-half mile of a residential zone/neighborhood with an average density of ten units per acre net and within one half mile of a minimum of ten basic services as described in the *Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings* and with pedestrian access between the building and the services.

(2) Select a site that has access to public transportation. Public transportation is considered accessible if the site is located within one-third of a mile to an existing commuter rail station or located within one quarter mile of a public commuter bus line.

(3) Encourage bicycle transportation by providing secure bicycle racks or storage within five-hundred feet of a building entrance for a minimum of five percent of building users at peak times and shower and changing facilities must be provided in the building or within five-hundred feet of the building.

(4) Encourage the use of low-emitting and fuel efficient vehicles by providing preferred parking for low-emitting and fuel efficient vehicles for five percent of the total parking capacity at the site.

(5) Reduce pollution from single occupancy vehicle use by sizing parking capacity to meet, but not exceed minimum local zoning requirements; provide designated preferred parking for carpools or vanpools for five percent of the total provided parking spaces; and provide infrastructure and support programs to facilitate shared vehicle usage such as ride sharing bulletin boards and shuttle services to mass transit.

(6) Protect existing natural areas or restore damaged areas to promote biodiversity. Any site disturbances shall be limited to no more than forty feet beyond the building perimeter; ten feet beyond surface walkways, patios, surface parking and utilities less than twelve inches in diameter; fifteen feet beyond primary roadway curbs and main utility branch trenches; and twenty-five feet beyond constructed areas with permeable surfaces, such as playing fields, that require additional staging areas in order to limit compaction in the constructed area. For previously developed or graded sites, restore or protect to a minimum of fifty percent of the site area, excluding the building footprint, to plant species indigenous to the locality or to cultivars of native plants adapted to the local climate conditions and not considered invasive species or noxious weeds. Except for playing fields and picnic areas, minimize lawn areas to less than ten percent of the building site landscape.

(7) Maximize open space at the site. Provide vegetated open space within the project boundary to exceed the local zoning's open space requirement by twenty-five percent; where there is no local zoning requirement, provide vegetated open space adjacent to the building that, at minimum, is equal to the building footprint.

(8) Design the site to minimize storm water runoff by implementing a storm water management plan that results in a twenty-five percent reduction in peak run-off rates for a two-year, twenty-four hour storm design from pre-construction to developed conditions; and implement a storm water management plan that results

in a twenty-five percent decrease in run-off volume of storm water runoff from the one hundred-year, twenty-four hour storm design from existing to developed conditions.

(9) Design the site to minimize pollutants in storm water runoff by implementing a storm water management plan that reduces impervious cover, promotes infiltration, and redirects water to pervious areas or storage reservoirs that treats storm water runoff from ninety percent of the average annual rainfall.

(10) Reduce heat island effect at the site by utilizing any combination of the use of native shade species, paving materials with a solar reflectance index of at least twenty-nine, and/or an open grid pavement system for fifty percent or more of the site parking, sidewalk and road areas; or place at least fifty percent of parking spaces under a covering, such as the a deck, a roof, underground or the building itself. Any roof used to cover parking spaces must have a solar reflectance index of at least twenty-nine.

(11) Reduce heat island effect through roofing selection by either installing native vegetation on at least fifty percent of the roof area or by using a roofing material that has a solar reflectance index equal to or greater than the values in the following table on at least seventy-five percent of the roof surface:

Roof Type	Slope	Solar Reflectance Index
Low-Sloped Roof	≤ 2:12	78
Steep-Sloped Roof	> 2:12	29

(12) Reduce light pollution from the site. In addition to requirements mandated in Section 4b-16 of the Connecticut General Statutes, automatic controls to turn off lights during non-business hours shall be installed on all non-emergency interior lighting. Manual override capability may be provided for after hours use. Exterior lighting shall be provided only in areas where lighting is required for safety and comfort. Light fixtures shall not be installed where the main purpose is to light building facades or landscape features. Exterior building-mounted lighting fixtures that are only needed during building operation shall be controlled by a time-clock with an easily accessible manual control. Lighting of flags, signs, and monuments shall be limited to fifty watts per fixture and shall incorporate shielding devices to minimize light pollution. No more than two fixtures may be used for each flag, sign or monument. Sports field lighting shall be controlled automatically for shut-off no later than eleven PM, with manual override to prevent disruption of school-sponsored events.

(13) Building orientation shall be such that the east/west glazing exposure is minimized. South windows shall have an external overhang to entirely shade adjacent windows during the summer solstice or shall utilize glazing with a solar heat gain coefficient of less than or equal to 0.4. Shading mechanisms or glazing with a solar heat gain coefficient less than or equal to 0.4 shall be installed at eastern and western exposure windows to minimize solar heat gain early and late in the day respectively.

(14) Buildings shall not be constructed on land that is lower than five feet above the elevation of the 100 year flood as defined by the Federal Emergency Management Agency or its successor agency; and buildings, roads, parking areas, sidewalks, or other impervious surfaces shall not be built in any area that is inconsistent with the applicable municipal plan of conservation and development prepared in accordance with section 8-23 of the Connecticut General Statutes.

(15) The school building shall be sited on land away from sources of unreasonable excess noise, such as highways, airport flight paths, and areas that are subject to unreasonable noise from agricultural or industrial equipment use.

(f) **Operations and Procedures/Innovation – No minimum number of strategies are required for this subsection.**

(1) Do not install fire suppression systems that contain chlorofluorocarbons (CFCs), hydro chlorofluorocarbon (HCFCs) or halons. Select refrigerants and heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems that minimize or eliminate compounds contributing to ozone layer depletion and global warming. If refrigerants are used, the mechanical room shall have leak detection equipment installed.

(2) Utilize innovative high performance features or technologies that exceed any existing mandatory requirements as specified in sections 16a-38k-3 and 16a-38k-5 or optional measures within Section 16a-38k-6.

(3) Integrate the sustainable features of the school building into the educational curriculum within the first full year of school operation.

(Adopted effective September 2, 2009)

Sec. 16a-38k-7. Alternative strategies to section 16a-38k-4 of the Regulations of Connecticut State Agencies or section 16a-38k-6 of the Regulations of Connecticut State Agencies

(a) As an alternate to meeting the criteria in section 16a-38k-4 of the Regulations of Connecticut State Agencies, a project as defined by sections 16a-38k-2(a) and 16a-38k-2(b) of the Regulations of Connecticut State Agencies may meet the requirements under section 16a-38k-4 of the Regulations of Connecticut State Agencies by receiving a Leadership in Energy and Environmental Design (LEED) Silver level certification from the United States Green Building Council, or by receiving a Two-Globe rating from the Green Globe system self certification program, providing that the project includes all mandatory requirements within sections 16a-38k-3 and 16a-38k-8 of the Regulations of Connecticut State Agencies.

(b) As an alternate to meeting the criteria in section 16a-38k-6 of the Regulations of Connecticut State Agencies, a project as defined by sections 16a-38k-2(c) and 16a-38k-2(d) of the Regulations of Connecticut State Agencies may meet the requirements under section 16a-38k-6 of the Regulations of Conneticut State Agencies by receiving a Leadership in Energy and Environmental Design (LEED) Silver level certification from the United States Green Building Council, or by meeting the criteria set forth in the Northeast Collaborative for High Performance School Protocol, also known as NE-CHPS, providing that the project includes all mandatory requirements within sections 16a-38k-3, 16a-38k-5, and 16a-38k-8 of the Regulations of Connecticut State Agencies.

(Adopted effective September 2, 2009)

Sec. 16a-38k-8. Reporting requirements

(a) For projects as defined in sections 16a-38k-2(a) and 16a-38k-2(b) of the Regulations of Connecticut State Agencies:

(1) Upon successful awarding of the design contract, the design team shall provide a letter to both the commissioner and the secretary listing the project timeline and members of the design team and indicating understanding of the requirements of sections 16a-38k-1 through 16a-38k-9 of the Regulations of Connecticut State Agencies.

(2) Upon design development completion, a report shall be submitted to the Secretary and the Commissioner by the project manager facilitator on behalf of and signed off by the agency/municipality that will be responsible for the ongoing care, operation, and maintenance of the building. This submittal shall include details of how the agency is complying with the mandatory measures under section 16a-38k-3 of the Regulations of Connecticut State Agencies. Documentation shall also include which of the twenty-six measures of the sixty measure strategies are planned for implementation; or if the project is utilizing the alternative strategy outlined in section 16a-38k-7(a) of the Regulations of Connecticut State Agencies, the project manager-facilitator shall document how the design team intends to meet the alternative paths to compliance.

(3) At the end of the construction document phase, a report shall be prepared by the design team to include energy modeling for the current Connecticut State Building Code requirements versus the proposed building project and cost differentials and operational savings for the project. The report is to be provided to the project manager-facilitator for submittal to the secretary and the commissioner.

(4) If, at any time during the construction process, substitutions for the any of the twenty-six stated measure strategies are made, the commissioner and the secretary shall be notified by the project manager-facilitator in writing of the changes. These substitutions must be in conformance with the general requirements of the project manual. Such changes shall be agreed to by the secretary and the commissioner. A pre-occupancy commissioning report shall be prepared by the commissioning agent that demonstrates that the project has met all of the requirements spelled out in sections 16a-38k-3 and 16a-38k-4 of the Regulations of Connecticut State Agencies; or alternatively, in sections 16a-38k-3 and 16a-38k-7 of the Regulations of Connecticut State Agencies. The report is to include all design elements of the project that address each completed strategy in sections 16a-38k-3 and 16a-38k-4 of the Regulations of Connecticut State Agencies; or alternatively, in sections 16a-38k-3 and 16a-38k-7 of the Regulations of Connecticut State Agencies. The report shall be submitted to the commissioner and to the secretary with the seal of the professional engineer and signed off by the project manager-facilitator indicating that ''this report certifies that the material contained herein is true and correct.''

(5) A post-occupancy commissioning report shall be prepared by the commissioning agent and submitted by the agency that is responsible for the ongoing care, operation, and maintenance of the building to the secretary and the commissioner within one hundred eighty days after one year of occupancy. The report shall include results of any post-occupancy survey of building occupants, a description of any adjustments made to equipment or building operation and the reasons for which the changes were made, and one year of all energy usage by source and water usage.

(b) For projects as defined in sections 16a-38k-2(c) and 16a-38k-2(d) of the Regulations of Connecticut State Agencies:

(1) Upon successful awarding of the design contract, the design team shall provide a letter to the SDE commissioner listing the project timeline and members of the design team and indicating understanding of the requirements of sections 16a-38k-1 through 16a-38k-9 of the Regulations of Connecticut State Agencies.

(2) Upon design development completion, a report shall be submitted to the SDE commissioner by the project manager facilitator on behalf of and signed off by the agency/municipality that will be responsible for the ongoing care, operation, and maintenance of the building. This submittal shall include details of how the project is complying with the mandatory measures under sections 16a-38k-3 and 16a-38k-

5 of the Regulations of Connecticut State Agencies. Documentation shall also include which of the twenty-eight measures of the fifty-nine measure strategies are planned for implementation; or if the project is utilizing the alternative strategy outlined in section 16a-38k-7(b) of the Regulations of Connecticut State Agencies, the project manager-facilitator shall document how the design team intends to meet the alternative paths to compliance.

(3) At the end of the construction document phase, a report shall be prepared by the design team to include energy modeling for the current Connecticut State Building Code requirements versus the proposed building project and cost differentials and operational savings for the project. The report is to be provided to the project manager-facilitator for submittal to the SDE commissioner.

(4) If, at any time during the construction process, substitutions for the any of the twenty-eight measure strategies are made, the SDE commissioner shall be notified by the project manager-facilitator in writing of the changes. These substitutions must be in conformance with the general requirements of the project manual. Such changes shall be agreed to by the SDE commissioner. A pre-occupancy commissioning report shall be prepared by the commissioning agent that demonstrates that the project has met all of the requirements spelled out in sections 16a-38k-3, 16a-38k-5, and 16a-38k-6 of the Regulations of Connecticut State Agencies; or alternatively, in sections 16a-38k-3, 16a-38k-5, and 16a-38k-7 of the Regulations of Connecticut State Agencies. The report is to include all design elements of the project that address each completed strategy in sections 16a-38k-3, 16a-38k-5, and 16a-38k-6 of the Regulations of Connecticut State Agencies; or alternatively, in sections 16a-38k-3, 16a-38k-5, and 16a-38k-7 of the Regulations of Connecticut State Agencies. The report shall be submitted to the SDE commissioner with the seal of the professional engineer and signed off by the project manager-facilitator indicating that ''this report certifies that the material contained herein is true and correct.''

(5) A post-occupancy commissioning report shall be prepared by the commissioning agent and submitted by the agency that is responsible for the ongoing care, operation, and maintenance of the building to the SDE commissioner within one hundred eighty days after one year of occupancy. The report shall include results of any post-occupancy survey of building occupants, a description of any adjustments made to equipment or building operation and the reasons for which the changes were made, and one year of all energy usage by source and water usage.

(Adopted effective September 2, 2009)

Sec. 16a-38k-9. Exemptions

Any exemption request shall be submitted to the secretary with the signature of the agency commissioner, deputy commissioner, president or vice president of the agency, or the chief operating officer of the municipality or school district that is responsible for the ongoing care, operation, and maintenance of the building. Within no more than forty-five days of submittal of an exemption request, the secretary, in consultation with the commissioner and the Institute of Sustainable Energy, may exempt a facility from complying with these regulations if the secretary finds, in a written analysis, that the cost of such compliance significantly outweighs its benefits. Requests for exemptions shall be submitted to the secretary with cost/benefit calculations and life-cycle analysis and shall include:

(a) for projects as defined in sections 16a-38k-2(a) and 16a-38k-2(b) of the Regulations of Connecticut State Agencies:

(1) a description of the building project,

(2) documentation for such costs required to minimally meet the provisions of sections 16a-38k-3 and 16a-38k-4 of the Regulations of Connecticut State Agencies or, alternatively, sections 16a-38k-3 and 16a-38k-7 of the Regulations of Connecticut State Agencies,

(3) what efforts have been made to comply with the provisions of sections 16a-38k-3 and 16a-38k-4 of the Regulations of Connecticut State Agencies or, alternatively, sections 16a-38k-3 and 16a-38k-7 of the Regulations of Connecticut State Agencies,

(4) health and safety impacts of the building occupants and building management personnel, and

(5) the reason(s) for which such an exemption is necessary. In the case of an historic building, documentation of the building being on the State Register of Historic Places or the National Register of Historic Places shall be submitted.

(b) for projects as defined in sections 16a-38k-2(c) and 16a-38k-2(d) of the Regulations of Connecticut State Agencies:

(1) a description of the building project,

(2) documentation for such costs required to minimally meet the provisions of sections 16a-38k-3, 16a-38k-5 and 16a-38k-6 of the Regulations of Connecticut State Agencies or, alternatively, sections 16a-38k-3, 16a-38k-5 and 16a-38k-7of the Regulations of Connecticut State Agencies,

(3) what efforts have been made to comply with the provisions of sections 16a-38k-3, 16a-38k-5 and 16a-38k-6 of the Regulations of Connecticut State Agencies or, alternatively, sections 16a-38k-3, 16a-38k-5 and 16a-38k-7 of the Regulations of Connecticut State Agencies,

(4) health and safety impacts of the building occupants and building management personnel, and

(5) the reason(s) for which such an exemption is necessary. In the case of an historic building, documentation of the building being on the State Register of Historic Places or the National Register of Historic Places shall be submitted. If the secretary approves of any such exemption, the secretary shall notify the SDE commissioner in writing of such exemption.

(Adopted effective September 2, 2009)