

Priority Recommendations to Ensure Connecticut High Performance Building Standards Protect School Children and Personnel Health by Designing, Commissioning, Renovating and Constructing Environmentally Safe Schools.

Prepared by ConnFESS April 2008

The CT Foundation for Environmentally Safe Schools (ConnFESS) reviewed the proposed Connecticut High Performance Building Standards to determine the impact these regulations will have on state and public school construction and renovation. As part of the national Coalition for Healthier Schools, ConnFESS is familiar with many of the national models for building Healthy, High Performance Schools. LEED for Schools, the US EPA's IAQ Design Tools for Schools, the Collaborative for High Performance Schools (CHPS) protocols for New York, the Northeast, Massachusetts and California, New Hampshire Partnership for High Performance Schools and Washington Sustainable Schools are models we compared to the proposed CT guidelines. We believe that CT schools should benefit from the best practices mandated in these model programs in order to develop the most effective High Performance School regulations in the country. Our recommendations reflect language found in the above-mentioned model programs that is not found or is not explicitly outlined in the proposed CT regulations.

Recommendations for improving the CT High Performance Building Standards:

1. a) Include requirements dealing with Site Selection and Development that consider impacts on human health and performance. Among those considerations should be requirements that prohibit building schools on wetlands and marshes or near airports or landfills. Care should be taken to select a site so that the amount of pollutants in the outside air is minimized. Traffic patterns and amounts of pollutants emitted from nearby sites must be evaluated.

b) A Phase I Environmental Site Assessment is currently required by state law before a school is built. If contamination is found, a Phase II Environmental Site Assessment should be mandated and the site should be required to be remediated to protect the health of school occupants. Building a school within 1000 feet of a former landfill should be prohibited. (See LEED for Schools Rating Systems.)

2. Place more emphasis on best design practices that prevent moisture incursion from occurring within the building envelope. CHPS in New York and the Northeast include more explicit requirements that prevent water from entering wall and roof assemblies in order to avoid mold growth or the premature replacement of indoor finishes or structural elements.

3. a) Strengthen language that deals with the design, installation and commissioning of ventilation systems. For example, Connecticut regulation, 16a-28k-4(b)2, which provides increased outdoor ventilation by designing mechanical ventilation to exceed the minimum rates required by current CT State Building Code by 30% should be changed from optional to mandatory.

b) NY and NE CHPS protocols contain many more extensive HVAC requirements such as ensuring that HVAC equipment is properly sized and readily accessible for

ongoing maintenance. These need to be included in mandatory requirements to ensure adequate amounts of clean, fresh air are available for school children and employees to breathe and indoor air pollutants are effectively diluted.

c) Careful location of vents within the building for dilution of pollution sources such as copy rooms, chemical storage and mixing areas (laboratories and janitorial rooms) should be required.

4. a) Expand and mandate a Materials Selection Section. Connecticut regulations should require the use of mold/moisture resistant materials for interior/exterior walls, flooring and roofing (see NY CHPS). They must also demand that products such as solid and composite wood flooring; interior paint; all carpet systems, acoustic ceiling tiles/wall panels, adhesives and sealants, insulation installed interior to build vapor barrier and resilient flooring be certified for low emissions of volatile organic compounds (VOCs). (See NY and NE CHPS). Schools should be directed to use the Green Guard standard specifically established for children and schools as is recommended by LEED for Schools 2007.

b) Current Connecticut Building Standard Options 16a-38-4(b) 4 through 16a-38-4(b)7 that deal with low VOCs for Adhesives and Sealants, Paintings and Coatings, Carpets and Carpet Cushion, Composite Wood and Agrifiber Product all should be mandatory. LEED for Schools adds two new categories for low-emitting materials, Furniture and Furnishings and Ceiling and Wall Systems. These should also be CT mandates. Many products which off-gas VOCs contain a variety of potentially carcinogenic and/or toxic chemicals.

c) The proper sequencing of installation of building materials should be mandated. Indoor air quality (IAQ) is affected not only by the materials that are used, but also by the order in which they are installed. The contaminants off-gassed by products such as adhesives, sealants and paints can be absorbed by porous and woven materials and released long after the school building is occupied. (See EPA's IAQ Design Tools for Schools www.epa.gov/iaq/schooldesign)

5. a) Improve Connecticut Building Standard regulation 16a-38K-4(b) 8 that controls for the entry of pollutants into buildings. Not only should this regulation be mandatory (not optional) but it needs to incorporate more stringent guidelines already found in NY and NE CHPS. These more progressive regulations demand that outside air intake openings be at least 25 feet from any hazard or noxious contaminant such as vents, chimneys or exhaust fans. The Connecticut regulation only asks for air intake openings to be 10 feet from any hazard or noxious contaminant.

b) Walk-off or entry mat systems should be required for all school entrances. These entryway systems are necessary for trapping soil, pollutants, and moisture that otherwise would spread into and throughout the building. They also reduce the cost of properly maintaining the building.

c) Air intakes should not be placed near parking lots or bus idling areas.

6. Modify language for Connecticut Building Standard option 16a-38K-4(b) 3 that deals with building flush out. There should be no alternative to flushing out the building continuously with outside air and such a flush out should be mandatory. Language that allows indoor air testing to replace a building flush out process must be removed. Use specifications for Building Flush Out in the NY CHPS protocols. See pages 94-95 which describe how outside air is used to remove odors and VOC's that accumulate during the construction process. Use of 100% outside air prevents particles from continuing to re-circulate throughout the building.

7. Modify language for Connecticut Building Standard requirement 16a-38k-3 (a) dealing with the training of facility management and maintenance personnel on proper equipment operation and on the development of systems manuals. Require training for school maintenance staff, administrators, teachers and other staff to protect IAQ and provide for energy efficiency. In addition to systems manuals for maintenance staff, also require the development of guides for teachers and administrators on how to correctly use their room lighting and HVAC systems.

8. The optional language for Connecticut regulation 16a-38K-4(b)11 that only surveys staff for thermal comfort should be replaced by more effective guidelines. Require the Commissioning Agent to conduct and report on a post occupancy evaluation administered to building staff within twelve months after initial occupancy. Such an evaluation would include staff satisfaction with thermal comfort, indoor air quality, acoustics, lighting, safety/security issues and general functionality of space. The report on post occupancy feedback would be made available to the public and include a plan for resolution for issues raised. All problems and proposed solutions would be reviewed by design, construction, commissioning and operations and maintenance staff.

9. Many important health and safety measures included in other high performance school standards (See NY CHPS pages 89-94) that guide the implementation of an IAQ management plan during construction are absent from CT guidelines. All necessary steps must be taken to minimize the amount of pollutants distributed and retained by surface materials and ventilation systems. This is especially critical if school renovation occurs when students and staff are present.

10. The draft regulations contain no mechanism for assuring that the regulations are actually implemented by the project owner, design team, and construction teams. It is critically important that third party certification be included. Commissioning ensures that the building performs as intended and as designed, but is not an adequate substitute for certification. As the state has no staff able to perform such certification, the regulations should require that the project owner provide certification post-occupancy that the building conforms to the regulations, such certification to be performed by professionals qualified by the state to perform such services. The underlying legislation does not provide for penalties or other consequences upon failure to adhere to the regulations, but that does not lessen the need for the public to know whether the regulations have been followed.

11. Clarify IPM requirements for school buildings because state laws involving pest management are not the same for schools and office buildings. We recommend the use of requirements in NY CHPS (See page 108)

Follow up Recommendations:

1. Convene an adhoc multiagency and stakeholders committee (to include a ConnFESS representative) to more thoroughly review and adjust regulations and guidelines so that they address the significant differences between school and office buildings during integrated design, construction and commissioning phases. It is also essential that existing federal and state statutes pertaining to school environmental health laws be explicitly incorporated into the regulations and compliance manual. (Public school regulations need to be in place prior to January 1, 2009).
2. Address short and long term barriers to the effective implementation of these High Performance Building Standards. Many of these barriers are the same as those identified in ConnFESS reports that track the implementation of PA03-220: An Act Concerning Indoor Air Quality in Schools (www.pollutionfreeschools.org). A major roadblock will continue to be that no state agency or combination of agencies currently has the expertise, resources, responsibility, or authority to protect school occupants from environmental health hazards. Adding on additional requirements for energy efficiency, water efficiency, recycling, reuse and sustainability, site selection and development and operations to pre-existing indoor air provisions in PA03-220 only further complicates current enforcement and compliance deficiencies. The lack of third-party certification beyond the commissioning process also compounds these concerns.
3. Effective operation and maintenance procedures are essential to protect the investment in and the performance of a High Performance School Building. Student and staff health and productivity can suffer when building systems fail to operate as designed. Deferred maintenance, lack of regularly scheduled training of school staff on the operation and maintenance of systems, staff turnover and lack of communication can all eventually lead to sub-standard maintenance and incorrect operation of building systems. (See the EPA's IAQ Design Tools for Schools.) Schools should be required to:
 - a) Adopt and implement a written Preventive Maintenance Plan
 - b) Adopt and implement the EPA's *Indoor Air Quality Tools for Schools* Program or its equivalent
 - c) Provide annual training to school staff (appropriate to their roles) on operation and maintenance of building systems

Promulgating regulations that are restricted to design, renovation, commissioning and construction without addressing long-term preventive maintenance is problematic. All other high performance school models we are familiar with include specific guidance for long-term maintenance. At some point, CT must establish effective long-term preventive maintenance protocols for schools. Two of the five attributes research shows leads to positive health and learning outcomes deal with cleanliness and routine, long-term maintenance.