

**Follow up**  
**CEHPAC-MSDE Meeting of May 20, 2014**  
**Relocatable Classrooms – Indoor Air Quality Requirements Proposed Regulations (SB 238)**

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CEHPAC was tasked to research and provide feedback to Dr. Lever (MSDE) on three items.

- 1) Are there other **construction codes** which could be considered?
- 2) Are there other items (new things or **processes**) to consider?
- 3) Are there **case studies** (i.e. based on occupant complaints, etc.)

Below please find summary response with information identified to date. This does not include information already shared with CEHPAC or MSDE by other members of CEHPAC.

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**Additional Comments and Considerations:**

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IAQ (Indoor Air Quality) / IEQ (Indoor Environmental Quality) is an ongoing and evolving issue. It is an attempt to ensure that green construction equals not only energy efficiency, but also healthy and environmental sustainable construction. Construction decisions and regulations must take public health and specifically children's environmental health and protection into consideration. The ongoing impact to human health and the environment must be addressed in all construction decisions and should allow for adjustments as new information and standards are made available in this evolving field of concern.

CEHPAC seeks to ensure that steps be taken to assure basic protections for both school children and staff during all construction and renovation activities – considerations during the construction of materials( and/or structures) used in schools. The following are priority issues to be addressed:

- o Maintaining appropriate level of Indoor Environmental Quality (including air, noise, etc.)
- o Protection from exposure to OSHA defined hazardous substances
- o Protection from contact with chemicals used for maintenance, cleaning and pest control<sup>1</sup>
- o Prevention and containment of mold & moisture
- o Testing for radon and protection from areas and materials that emit radon

Green building standards (LEED) do not require or even create an incentive for safe construction practices and protections of people in buildings under construction or renovation or in adjacent facilities. States such as Connecticut<sup>2</sup> and New York have enacted substantive laws requiring that safety standards be met in public schools (refer to the Comprehensive Public School Safety Program of New York State).

Currently there are no provisions in the Maryland Law or Federal Law to ensure basic safeguards to protect school building occupants, especially children, during any construction, renovation, maintenance or custodial activities or even during times when hazardous substances are introduced into a classroom for education or instructional purposes. Modeling and advancing sustainability best practices through building design and redesign is necessary to protect our children in school, their "work place."

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<sup>1</sup> Laws mandating that all Maryland school systems adopt Integrated Pest Management and non-toxic cleaning practices are in place but have not been well implemented and do not address construction and renovation periods.

<sup>2</sup> Connecticut regulations require a project manager to develop an indoor environmental quality management plan, periodic inspections of materials stored on site (mold and moisture), surface grades, drainage systems, replacement of all filters prior to building occupancy, materials that off-gas toxic or potentially toxic fumes be pre-conditioned and in the event that any portion of the building is occupied during construction or renovation activities, the SMACNA *Indoor Air Quality Guidelines for Occupied Buildings Under Construction* be followed - in addition to other basic protections

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## CODES/STANDARDS:

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The MGBC is developing its own modifications to the International Green Construction Code to recommend as the alternative code path to high performance under HB 207 (Chapter 589, 2014); although these modifications haven't been finalized, I believe they'll largely follow the recommendations developed by Anja (attached).

There is a new European VOC emission testing method 'CEN/TS 16516' and the 'CE' marking of construction products. The attached article is a good review of the standard for the CE marking of construction products used indoors as it requires documentation of product emissions of VOC into the indoor air for several different construction product types. Maryland may be able to use some of these European standards as local and federal standards are limited and in some cases not defined or enforceable. This "article summarizes the role of the new testing standard for CE marking, the main characteristics of that standard, major differences to other relevant testing standards (such as EN 717-1 for formaldehyde emissions), and key findings of the validation studies." Link below.

<http://www.eurofins.com/media/9591101/gst-2014-x738-oppl-cen-ts-16516.pdf>

Additionally, California has published guidance and standards on the issue of IAQ in schools. One such document specifically discusses the "**Remedies For Reducing Formaldehyde In Schools**". It states "when new classrooms or furnishings are ordered or constructed, materials can be specified that emit low or no formaldehyde and other volatile chemicals. Schools may also want to request that any furnishings that might emit chemicals be aired out prior to installation. Airing of carpet for several days at an alternate location, such as at a warehouse, can greatly reduce the chemical levels in the classrooms after installation of the carpet. Specification language for low formaldehyde elements was developed by the Collaborative for High Performance Schools (CHPS)"

[http://www.arb.ca.gov/research/indoor/pcs/formald\\_remedies.PDF](http://www.arb.ca.gov/research/indoor/pcs/formald_remedies.PDF)

An IAQ resource document related to this study of relocatable classrooms can be found at

<http://www.arb.ca.gov/research/health/school/pcsfact.pdf>

Finally, **California Standard Section 01350 Specification** ([http://www.cal-iaq.org/vocpublications?download=18%3Avoc\\_standard\\_method](http://www.cal-iaq.org/vocpublications?download=18%3Avoc_standard_method)) (Feb 2010 version 1.1) is the most popular US standard for evaluating and restricting VOC emissions indoor air. Developed in California, more and more rating systems are referring to CA Section 01350. The latest revision occurred in February 2010. Links and comparison information at link below.

[www.eurofins.com/cdph](http://www.eurofins.com/cdph)

Existing knowledge related to is covered in "BUILDING MATERIALS AND INDOOR AIR QUALITY". This document is an excellent resource and a good checklist of the issues related to IAQ in relocatable classrooms as it touches on the health effects of VOCs. Link below.

[http://www.buildingecology.com/articles/building-materials-and-indoor-air-quality/at\\_download/file](http://www.buildingecology.com/articles/building-materials-and-indoor-air-quality/at_download/file)

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## PROCESSES OR NEW INFORMATION:

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There is a details comparison of the US based LEED rating system specifications of VOC emissions into indoor air as compared with the European approaches. This is a recent document and highlights the areas of concerns. This is a great place to start when looking at the best practices in the industry. Link below.

<http://www.eurofins.com/media/803366/leed%20-%20a%20new%20challenge%20for%20low%20voc%20emitting%20materials.pdf>

The National Clearing House for Education Facilities ( <http://www.ncef.org/rl/portable.cfm> ) lists an extensive array of resources specific to relocatable classrooms. I have included some here which are worth reviewing.

[Portable Classrooms. \[IAQ Design Tools for Schools\]](#)

(U.S. Environmental Protection Agency, Indoor Air Quality Design Tools for Schools. , 2012)  
CEHPAC response to MSDE on IAQ Relocatable Classrooms

Information on common problems with portable classrooms, including separate checklists for specifying new portable classrooms, commissioning, and operations and maintenance.

<http://www.epa.gov/iaq/schooldesign/portables.html>

**[Best Practices Manual and Assessment Tool: Relocatable Classrooms for High Performance Schools, 2009 edition.](#)**

(Collaborative for High Performance Schools, San Francisco, CA , 2009) Advises school designers and builders on how to adjust their high-performance strategies to account for the differences found in a typical relocatable classroom. Issues involved with site preparation and locating the relocatable on the site are also addressed. The high-performance characteristics detailed for relocatable classrooms include enhanced daylighting, energy-efficient lighting, energy-efficient, low- noise HVAC systems, an efficient building envelope and interior material with low emissions of volatile organic compounds (VOC). Additional chapters detail the CHPS Relocatable Program, which gives manufacturers the option of building relocatables according to bid specifications included in the manual, or to achieve a minimum number of points based on the CHPS relocatable criteria scorecard, also included in the manual. 154p

[http://www.chps.net/content/041/CHPS\\_Vol\\_VI\\_FINAL.pdf](http://www.chps.net/content/041/CHPS_Vol_VI_FINAL.pdf)

**2012 South Carolina Minimum Specifications Guide for Relocatable Classrooms.**

(South Carolina Dept. of Education, Office of District Facilities Management, Columbia , Dec 07, 2011)

Provides guidance to local school districts to assist them in determining the feasibility of relocatable classroom units for their school needs and to set forth certain minimum mandatory construction, safety, and utility requirements that must be complied with by any manufacturer, vendor and/or contractor supplying a relocatable classroom unit for use in the South Carolina public schools. 12p.

**[Improved Energy Efficiency and Indoor Air Quality for Relocatable Classrooms.](#)**

(Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, University of California, U.S. Department of Energy , 2011) Researchers from Lawrence Berkeley National Laboratory's Environmental Energy Technologies Division teamed with stakeholders including a manufacturer of relocatables, and school districts to find out if relocatable classrooms could be built that are energy-efficient and provide good indoor air quality (IAQ) for their occupants. This describes the results of that effort.

<http://eetd.lbl.gov/l2m2/classrooms.html>

**[Relocatable Buildings 2011 Annual Report](#)**

(Modular Building Institute, 2011) Annual report on the relocatable building industry. MBI estimates that public school districts across North America collectively own and operate about 180,000 relocatable classrooms with the industry owning and leasing about 120,000 classrooms. California schools own close to 90,000 units; Texas schools own about 20,000; and Florida owns about 17,000. States like Georgia, North Carolina, Virginia, and Maryland own and operate about 3,000 each. 15p.

[http://www.modular.org/documents/document\\_publication/2011relocatable.pdf](http://www.modular.org/documents/document_publication/2011relocatable.pdf)

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## CASE STUDIES:

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### 1) **BAKE-OUT case study**

CEHPAC discussed recommending pre-occupancy or pre-purchase bake-out and post bake-off change of air filters. There is research to support running the HVAC system at a specific temperature to heat or bake the constructed unit so as to eliminate and remove potentially harmful indoor VOC emissions PRIOR to building occupancy or in the case of the regulations – prior to purchase as a final step in the construction process. There should be a way to incorporate this knowledge and best management practice (BMP) into the Maryland IAQ Regulations for Relocatable Classrooms.

**REFERENCES:** url: [http://aaqr.org/VOL10\\_No3\\_June2010/7\\_AAQR-09-10-OA-0064\\_265-271.pdf](http://aaqr.org/VOL10_No3_June2010/7_AAQR-09-10-OA-0064_265-271.pdf)

"bake-out, a term referring to the act of using heat to accelerate the process of VOC outgassing, has been proved to be effective in reducing building indoor VOC levels (Girman, 1989; Park *et al.*, 2007)."

"Girman, J.R. (1989). The Bake-out of the Office Building - Frequently employed strategies to reduce airborne concentrations of VOCs include several methods: selecting materials with low emissions, treating materials before use in a building, encapsulating or sealing materials in a building, or by dilution through increased ventilation. A major problem is that little is known about the specific health effects of most VOCs at the low concentrations usually found in indoor environments. Therefore, efforts are not focused on the end point-irritation or toxicity-but rather on the exposure. This is an acceptable approach in light of the absence of sufficient information to target efforts on the active or effective toxic or irritating materials" note from the conclusion paragraph of BUILDING MATERIALS AND INDOOR AIR QUALITY at url:

[http://www.buildingecology.com/articles/building-materials-and-indoor-air-quality/at\\_download/file](http://www.buildingecology.com/articles/building-materials-and-indoor-air-quality/at_download/file)

Abstracts and findings of Girman 1989 Study can be found at

[http://www.buildingecology.com/articles/building-materials-and-indoor-air-quality/at\\_download/file](http://www.buildingecology.com/articles/building-materials-and-indoor-air-quality/at_download/file)

and

[http://www.researchgate.net/publication/20466615\\_Volatile\\_organic\\_compounds\\_and\\_building\\_bake-out](http://www.researchgate.net/publication/20466615_Volatile_organic_compounds_and_building_bake-out)

Second bake-out study "**Comparison Of Ventilation Strategies During Bake-Out In Winter At Newly Built Apartment Buildings**" can be found at

[http://www.inive.org/members\\_area/medias/pdf/Inive/IAQVEC2007/Park\\_4.pdf](http://www.inive.org/members_area/medias/pdf/Inive/IAQVEC2007/Park_4.pdf)

### 2) **The California Portable Classrooms Study (PCS)**

This Study was conducted to address concerns raised regarding environmental conditions in California's portable classrooms. The objective of the study was to examine environmental health conditions, especially those related to indoor air quality and health risks, in K-12 portable classrooms in California. These environmental conditions included levels of airborne chemicals; the presence of potential pollutant sources; the performance of heating, ventilating, and air-conditioning systems; factors such as light, noise, temperature, and relative humidity; the presence of mold and other biological contaminants; and pollutant and allergen levels in floor dust. Study Report and Executive Summary can be found at link below.

[http://www.arb.ca.gov/research/indoor/pcs/pcs-fr/pcs\\_v3\\_es\\_03-23-04.pdf](http://www.arb.ca.gov/research/indoor/pcs/pcs-fr/pcs_v3_es_03-23-04.pdf)

- ### 3) **Improving Ventilation and Saving Energy: Final Report on Indoor Environmental Quality and Energy Monitoring in Sixteen Relocatable Classrooms.** Apte, Michael, et al (Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, CA , Apr 04, 2008) An improved HVAC system for portable classrooms was specified to address key problems in existing units. These included low energy efficiency, poor control of and provision for adequate ventilation, and excessive acoustic noise. Working with industry, a prototype improved heat pump air conditioner was developed to meet the specification. A one-year measurement-intensive field-test of ten of these IHPAC systems was conducted in occupied classrooms in two distinct California climates. These measurements are compared to those made in parallel in side by side portable classrooms equipped with standard 10 SEER heat pump air conditioner equipment. The IHPAC units were found to work as designed, providing predicted annual energy efficiency improvements of about 36 percent to 42 percent across California's climate zones, relative to 10 SEER units. Classroom ventilation was vastly improved as evidenced by far lower indoor minus outdoor CO2 concentrations. **[Authors' abstract]**

<http://www.osti.gov/bridge/purl.cover.jsp?purl=/927880-S1LSE4/>

4) [Hurricane Katrina: Army Corps of Engineers Contract for Mississippi Classrooms.](#)

(U.S. Government Accountability Office, Washington , May 2006)

In the wake of Hurricane Katrina, the Federal Emergency Management Agency (FEMA) tasked the Army Corps of Engineers (the Corps) to purchase temporary classrooms for Mississippi schools. To accomplish its task, the Corps placed a \$39.5 million order for the purchase and delivery of 450 such classrooms. GAO received an allegation on its Fraud Hotline that the Corps paid inflated prices for the classrooms, and in response, this report reviews the facts and circumstances related to the Corps' issuance of the order. The Corps had no prior experience, no advance notice, and the need to buy the classrooms as quickly as possible. Corps contracting officials lacked knowledge of the industry and information about classroom suppliers, inventories, and prices that would have been useful in negotiating a good deal. Faced with these circumstances, they chose to purchase the classrooms by placing an order, noncompetitively, on an existing agreement with a vendor certified under the Small Business Administrations Business Development Program. The Corps accepted the vendor's proposed price of \$39.5 million although it had information that the cost for the classrooms was significantly less than what the vendor was charging. Based on analysis of a quote obtained by the vendor from a local Mississippi business, the price that the vendor actually paid for the classrooms, and prices for similar units from GSA schedule contracts, it was determined that the Corps could have, but failed to, negotiate a lower price. 17p.

**Report NO:** GAO-06-454

<http://www.gao.gov/new.items/d06454.pdf>

5) [Concrete Portables More Durable, Cost Effective. Full Mitigation Best Practice Story.](#)

(U.S. Department of Homeland Security, Federal Emergency Management Agency, Washington, D.C. , 2007)

Discussion of the use of more durable portables in Palm Beach County, Florida. Concrete units are being explored as a safer, cost-effective, and more durable option to easily damaged traditional classroom portables. The portables feature, reinforced roofing, impact-resistant windows, and are rated to withstand winds of 187 mph. Concrete portables can be integrated into a modular design and can be configured to almost any shape or for any purpose. 3p.

<http://www.fema.gov/mitigationbp/bestPracticeDetailPDF.do?mitsslId=3905>

or <https://www.ilis.dhs.gov/content/concrete-portables-more-durable-cost-effective>

6) **Portable Classroom Design Challenge. (url: unknown)**

(Montgomery County Public Schools in Maryland in partnership with the Council for Educational Facility Planners and the Emerging Green Builders of the US Green Building Council. , May 2006)

The results of a design competition for a re-locatable classroom unit are provided in a slide show with 57 photographs of winning entries. The competition was open to K-12 teams, emerging green builders, and architects and manufacturers. The design teams were required to develop a prototype for a prefabricated classroom unit that makes the learning cottage "the cool place to be" for students, staff and after hours community use. The design needed to reflect a commitment to environmental stewardship and high performance standards for durability, safety and health. The teams also considered school siting issues, multiple building schemes and a good connection to the landscape or urban fabric. Information on the competition is provided, as well as list of winners and a powerpoint of the awards.

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**INDUSTRY STANDARDS:**

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There are industry specific (rather than environmental or public health) standards for testing VOC emissions in specific products: These are industry standards for hazardous materials – and do not necessarily reflect products that should be used in schools – and specifically in relocatable classrooms. However, this is a known standard that should be reviewed.

<http://www.astm.org/Standards/building-standards.html>

"ASTM's building standards are instrumental in specifying, evaluating, and testing the dimensional, mechanical, rheological, and other performance requirements of the materials used in the manufacture of main and auxiliary building parts and components. These materials include construction sealants, structural members, insulation systems, and other facilities used in conjunction with the erection of the foundation, walls, roofs, ceilings, doors, and windows of both commercial and domestic building structures. These building standards are helpful in guiding manufacturers, construction companies, architectural firms, and other users of such parts and components in their proper fabrication and installation procedures, as well as the possible hazards involved during these processes."

**NOTE:** Additional info at **National Clearing House for Educational Facilities** at url: <http://www.ncef.org/rl/portable.cfm>  
This link contains information on the design, manufacture, and use of portable structures on school campuses, compiled by the National Clearinghouse for Educational Facilities.

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Suggested modifications to the International Green Construction Code – for use HB 207 (Chapter 589, 2014 (attached)).

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| Maryland International Green Construction Code Review |  |                |  |                              |           |
|---|--|----------------|--|------------------------------|-----------|
|   | Comments   | Name Commenter | Contact Email  | Priority (1 minor - 5 major) | Date      |
| <b>Chapter 8</b>                                      | <b>Indoor Environmental Quality</b>  |                |  |                              |           |
|   | Any 'baseline' IAQ and comfort testing should be qualified as these tests are often impacted by the construction process and are not necessarily the optimal in terms of ongoing air quality and comfort levels.   |                |  |                              |           |
| Section 801   | Connecticut's regulations implementing its green building law require a project manager to develop an indoor environmental quality management plan, periodic inspections of materials stored on site (mold and moisture), surface grades, drainage systems, all filtration shall be replaced prior to building occupancy, materials that off-gas toxic or potentially toxic fumes be pre-conditioned and in the event that any portion of the building is occupied during construction or renovation activities, and that the SMACNA Indoor Air Quality Guidelines for Occupied Buildings Under Construction be followed - in addition to other basic protections. | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> | <b>priority 5</b>            | 5/15/2013 |
| Section 802   | Consideration should be given to the physical location of the HVAC unit so as to minimize impact on building occupants (noise, views, air-intakes, etc.) see page 30 of <a href="http://mdehdn.org.files.wordpress.com/2013/05/md-ehn-healthy-schools-carella-presentation-130516-final-with-ghs-and-ijpm-const-bmp.pdf">http://mdehdn.org.files.wordpress.com/2013/05/md-ehn-healthy-schools-carella-presentation-130516-final-with-ghs-and-ijpm-const-bmp.pdf</a>  | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                              | 5/15/2013 |
| Section 803   | <b>803.3</b> increase minimum distance from 25 ft to 100 ft<br><b>803.4</b> add storage, maintenance, workshop rooms (due to hazmats - paints,pesticides, gasoline, etc.)<br><b>803.4.1</b> exclude use of plenum space - must utilize return air ducts venting to exterior<br><b>803.5</b> should be some mention of regular and routine replacement of filters - including the replacement of filters just prior to building occupancy so as to avoid any migration of construction related materials embedded in the filters  | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                              | 5/15/2013 |
| Section 804   | <b>804</b> consider adding kilns (and other art/shop equipment) also consider requiring return air ducts where plenum space could be compromised by the use of such equipment in rooms below<br><b>804.2</b> mandatory review & adjustment/update of maximum concentrations prior to testing. Also include a mandatory initial 'flush' of the system   | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                              | 5/15/2013 |
| Section 805   | Please consider requiring a mandatory review of products used to construct and maintain structures to ensure that most current info is available at time of construction. Efforts should be made to eliminate products that contain petro chemicals (or petroleum based products) and replace them with non-petro based alternatives. This is especially important when selecting products that out-gass such as adhesives, cleaning products, solvents, paints, carpets, etc.   | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> | <b>priority 5</b>            | 5/15/2013 |
| Section 806   | <b>806.1</b> petro chemicals s/a adhesives, etc. - see comment for <b>805</b><br><b>806.2</b> why are exceptions allowed? Consider requiring forced 'out-gassing' by heating building/room to force out VOC's prior to occupation (followed by a replacement of air filters if applicable).<br><b>806.4</b> cummulative VOC?<br><b>806.n</b> consider adding contingency plan if sealants/finishes are applied   | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                              | 5/15/2013 |
| Section 807   | Clarify exceptions and ensure that any testing simulate actual use of building. This is especially important for schools when testing for background noises from equipment.  | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                              | 5/15/2013 |
| Section 808   | As in New York State - mandate that all classrooms have windows. Currently Maryland schools can be built without windows - illegal in NYS. Also classroom windows should have the ability to be opened, so that at times when energy efficiency impacts HVAC to the point of discomfort - the option of opening a window is available.   | VB Carella     | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                              | 5/15/2013 |

|                   |   |            |  |                   |           |
|-------------------|---|------------|--|-------------------|-----------|
| <b>Chapter 9</b>  | <b>Commissioning (as it relates to IEQ)</b>   |            |  |                   |           |
| Section 901       |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 902       |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 903       | Training or education materials should be provided to building occupants, so that they do not introduce products into the building that could compromise the IAQ. This would include products for cleaning, pest control, air freshening, etc...  | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 904       | Building O&M should include guidance for ' <b>green and healthy</b> ' cleaning, maintenance and custodial activities as well as instructions an <b>BMP for Integrated Pest Management (IPM)</b> . Both Structural and Grounds IPM should be covered with particular attention paid to using chemical means of pest control as a last resort (only after all other means have been exhausted) and ensuring that any chemical means be review for petro-chemical content (i.e. Petroleum distillates are a primary ingredient in turf and tree chemical pest control products - alternatives should be mandated that do not contain petro-chemicals, with particular concern for Petroleum distillates due to their impact to human health and the environment. | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> | <b>priority 5</b> | 5/15/2013 |
| 904.3             | Mandating a Green Cleaning Policy and an IPM Policy could be considered here. Additionally, when providing O&M documents - consideration must be given to the actual use of school buildings. Often HVAC and other systems are shut down to save energy, yet the building is still in use (i.e. afterschool activities, summer or school break activities, etc.). Such shut downs, especially during the 'unoccupied' summer months can lead to POOR IAQ including the introduction of mold during the summer months if the air movement systems are disabled to save energy.   |            |  |                   |           |
| other             | Ensure that supplemental supplies such as screens for window, walk-off mats, etc. are included and present prior to building occupation.  | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| <b>Chapter 10</b> | <b>Existing Buildings (as it relates to IEQ)</b>  |            |  |                   |           |
|                   | Consideration should be given to providing basic protections to building occupants during renovation, construction, maintenance and custodial activities.   |            |  |                   |           |
| Section 1001      | Currently there are no provisions in the Maryland Law or Federal Law to ensure basic safeguards to protect school building occupants, especially children, during any construction, renovation, maintenance or custodial activities or even during times when hazardous substances are introduced into a classroom for education or instructional purposes. NYS has had such regs since 1999. Summary of NYS regs can be found on page 15 of <a href="http://mdehdndotorg.files.wordpress.com/2013/05/md-ehh-healthy-schools-carella-presentation-130516-final-with-ghs-and-ipm-const-bmp.pdf">http://mdehdndotorg.files.wordpress.com/2013/05/md-ehh-healthy-schools-carella-presentation-130516-final-with-ghs-and-ipm-const-bmp.pdf</a>                    | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> | <b>priority 5</b> | 5/15/2013 |
| Section 1002      |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 1003      | Consideration should be given to utilizing 'greener and healthier' means of water sanitation and eliminating the use of chlorine, algecides, etc. Refer to systems used in European Union that eliminate toxins from the pool water and by default the ambient air.   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 1004      |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 1005      |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 1006      |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| Section 1007      |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| <b>Appendix A</b> | <b>Project Electives</b>  |            |  |                   |           |
| A 101             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 102             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 103             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 104             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 105             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 106             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 107             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
| A 108             |   | VB Carella | <a href="mailto:jicarella@msn.com">jicarella@msn.com</a> |                   | 5/15/2013 |
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