

Materials and Waste Management

MW.P1: Storage and Collection of Recyclables

Prerequisite

Applicability	Verification Required		
All projects.	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Facilitate the separation and collection of materials for recycling

Providing easily accessible recycling to the students, teachers and staff ensures a significant portion of solid waste can be diverted from landfills and transformation facilities. Recycling of paper, cardboard, metals, plastics and organics diminishes the need to extract virgin materials.

Prerequisite	<p>MW.P1.1 The school building shall meet any local ordinances for recycling space, and</p> <p>Provide easily accessible areas serving the entire school that are dedicated to the collection and storage of materials for recycling including (at a minimum) paper, cardboard, glass, plastics, and metals. There shall be at least one centralized collection point (loading dock), and ability for separation of recyclables where waste is disposed of for classrooms and common areas such as cafeteria's, gyms or multi-purpose rooms. Educational signage must be provided over the recycling stations identifying for users what materials may be recycled and how to separate them if necessary.</p> <p>If there is no recycling infrastructure on the island, then the project is exempt from this prerequisite. If there is no recycling infrastructure and the project establishes a recycling program, the project should consider applying for an innovation credit.</p>
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Implementation

Early in the design phase, be sure to reserve space for recycling functions and show areas dedicated to the collection of recycled materials on floor plans. Consider the question of how recyclable materials will be collected and removed from classrooms, teachers' prep rooms, and offices. When recycling bins are used, they should be able to accommodate a 75% diversion rate (from normal waste basket contents) and be easily accessible to students and staff as well as custodial staff. Consider bin designs that allow for easy cleaning to avoid health issues.

Consider claiming innovation credit for establishing a composting program for landscape waste and food.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at design review and construction review.

Design Review Requirements	
MW.P1	Construction drawings, site and classroom plans, must include the centralized collection point and recycling bins/dumpsters/areas in classrooms and common areas such as cafeterias or multi-purpose rooms.
Construction Review Requirements	



MW.P1	Provide pictures of the centralized recycling collection point and typical classroom/common area recycling bins/dumpsters. The pictures should show the required educational signage.
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Resources

Kokua Hawaii Foundation: <http://kokuahawaiifoundation.org/schoolprograms/3rsschoolrecycling/>

Recycle Hawaii – Where to Recycle:

http://www.recyclehawaii.org/index.php?option=com_content&task=view&id=26&Itemid=18

California Integrated Waste Management Board Recycling Space Allocation Guide at:

<http://www.ciwmb.ca.gov/publications/localasst/31000012.doc>



Materials and Waste Management

MW.P2: Minimum Construction Site Waste Management

Prerequisite

Applicability	Verification Required		
All projects.	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Divert construction and demolition waste from landfills.

This prerequisite, and its corresponding points under MW.C1, are feasible in all parts of Hawaii. Even if there are limited recycling facilities or waste management recycling companies in the project area, construction waste management can still take place through sub-contractors sorting the waste into multiple dumpsters. Construction and demolition waste account for approximately 22% of the waste disposed. Recycling construction and demolition (C&D) materials reduces demand for virgin resources and diminishes the need for landfill space.

Requirement

Prerequisite	<p>MW.P2.1 Recycle, reuse, and/or salvage at least 50% (by weight) of non-hazardous construction and demolition waste, not including land clearing and associated debris.</p> <p>If there is no recycling infrastructure on the island, then the project is exempt from this prerequisite.</p>
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Implementation

Successful salvage, recycling, and diversion of construction and demolition materials are usually the result of a well thought out waste management plan and on-site training for contractors and subcontractors.

Compliance calculations for this credit must be based on weight. Many recycling and landfill facilities weigh incoming materials. Shipments that cannot be weighed can be estimated based on their volume and density. ADC (Alternative Daily Cover) does not qualify as material diverted from disposal.

$$\text{Recycle Rate (\%)} = [\text{Recycled Waste [Tons]} / (\text{Recycled Waste [Tons]} + \text{Garbage [Tons]})] \times 100$$

Note: DO NOT include materials classified as hazardous waste in these calculations.

The Construction Waste Management Plan should detail the following components:

- The diversion percentage goals for C&D wastes, e.g., 75% or 90%. A 95% recycling rate will receive an Innovation credit.
- Recycling/reuse strategies and processes for onsite recycling, deconstruction and salvage, e.g., scheduling of different stages of deconstruction to best remove recyclable or salvageable materials intact.
- On-site communication: the general contractor will detail communication strategies for construction workers and subcontractors about the recycling program and goals.



- Waste management documentation: The construction waste management plan will specify documents needed to show waste diversion—e.g., weight tickets for all wastes removed from the site including recycled and salvaged materials.
- Diversion summary: Recycling and waste data will be collected into a summary document for construction documentation.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at design review and construction review.

Design Review Requirements	
MW.P2	Construction drawings must include general notes to the Contractor to implement a Construction Waste Management Plan. The notes should specify the required diversion rate through recycling, composting or salvage, compliant and preferred facilities to receive the debris, and that they are responsible to maintain documentation (weight tickets / receipts) for all debris leaving the site to be summarized and submitted after construction as a diversion summary.
Construction Review Requirements	
MW.P2	Provide a diversion summary and back up documentation for where debris was taken.

Resources

A Contractor's Waste Management Guide, Best Practices and Tools for Job Site Recycling and Waste Reduction in Hawaii. Prepared by O'Brien & Company for DBEDT.

<http://hawaii.gov/dbedt/info/energy/publications/cwmq.pdf>

Minimizing Construction and Demolition Waste in Hawaii. Clean Hawaii Center.

http://hawaii.gov/health/environmental/compliance/sb_library/c_and_d_waste_min.pdf

CHPS Best Practices Manual, Volume II: Guideline GC2: Construction and Demolition Waste Management.

CHPS High Performance Schools Best Practices Manual Electronic Appendix A: Job Site Specification:

www.chps.net

Recycling Construction and Demolition Wastes: A Guide for Architects and Contractors

www.architects.org/emplibrary/CD_Recycling_Guide.pdf

Recycling Construction and Demolition Wastes: A Guide for Architects and Contractors

http://www.architects.org/emplibrary/Recycling_Guide_11-19-04.pdf

U.S. EPA C&D: <http://www.epa.gov/epaoswer/non-hw/debris-new/index.htm>

CIWMB Construction/Demolition and Inert Debris Tools and Resources:

www.ciwmb.ca.gov/leatraining/resources/cdi/tools/calculations.htm



Materials and Waste Management

MW.C1: Construction Site Waste Management

3 Points

Applicability	Verification Required		
All projects.	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Divert construction and demolition waste from landfills.

This credit builds on the prerequisite MW.P2 for increased construction debris diversion.

Requirement

1 point	MW.C1.1 Recycle, reuse, and/or salvage at least 75% (by weight) of non-hazardous construction and demolition waste, not including land clearing and associated debris.
Or 2 points	MW.C1.2 Recycle, reuse, and/or salvage at least 90% (by weight) of non-hazardous construction and demolition waste, not including land clearing and associated debris.

Implementation

Follow the implementation guidelines under prerequisite MW.P2.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at design review and construction review.

Design Review Requirements	
MW.C1	Construction drawings must include general notes to the Contractor to implement a Construction Waste Management Plan. The notes should specify the required diversion rate through recycling, composting or salvage, compliant and preferred facilities to receive the debris, and that they are responsible to maintain documentation (weight tickets / receipts) for all debris leaving the site to be summarized and submitted after construction as a diversion summary.
Construction Review Requirements	
MW.C1	Provide a diversion summary and back up documentation for where debris was taken.

Resources

See resources under prerequisite MW.P2.



Materials and Waste Management

MW.C2: Single Attribute - Recycled Content

2 Points

Applicability	Verification Required		
All projects.	<input type="radio"/> at Design Review	<input checked="" type="radio"/> at Construction Review	<input type="radio"/> at Performance Review

Intent: Specify and install recycled content products in order to reduce the environmental impacts associated with extraction and processing of virgin materials.

The number and variety of products using recycled-content materials expands every year. Using these materials closes the recycling loop by creating markets for materials collected through recycling programs across the country. It also reduces the use of virgin materials and landfill waste. Recycled-content alternatives exist for all major building materials and surfaces. Recycled content is either a postconsumer (collected from end users) or secondary material. Secondary material (also known as post-industrial or pre-consumer) is collected from manufacturers and industry. Both of these materials combined make up the total recycled-content of a product.

Requirement

1-2 points	<p>MW.C2.1 Recycle content claims must be in accordance with the International Organization of Standards document ISO 14021-1999 – Environmental labels and declarations.</p> <p><i>Prescriptive Approach:</i> Specify and install at least four major materials from Table 16 for 1 point, or eight major materials from Table 15 for 2 points.</p> <p style="text-align: center;">OR</p> <p><i>Performance Approach:</i> The weighted average recycled-content value is at least 10% (postconsumer + ½ secondary) for 1 point, or at least 20% for 2 points.</p>
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Fly ash generated from municipal solid waste incinerators is not an acceptable recycled content material under this credit, nor is fly ash generated as a coal combustion by-product where the coal plant is fired with hazardous waste, medical waste or tire-derived fuel.

Mercury concentration should not be more than 5.5 ppb (0.0055 mg/L) as determined by a Toxic Characteristic Leaching Procedure (TCLP) following EPA 7470A. Most U.S. fly ash has mercury content of 2 ppb or less. This is a level that is deemed acceptable for drinking water in the U.S. and is safe for use in construction. Furthermore, when this mercury is bound in the matrix of construction materials, the scientific literature indicates that it does not leach out, even when subjected to more aggressive conditions than anticipated in real life. Certain combinations of coal types and power plant combustion may produce fly ash with higher mercury content, though this appears to be rare.

Implementation

Recycled content is either a post-consumer (collected from end users) or secondary material. Secondary material (also known as post-industrial or pre-consumer) is collected from manufacturers and industry. The objective of this credit is to maximize post-consumer recycled content; therefore industrial secondary recycled content is discounted 50% for the calculations.

Prescriptive Approach:

At least four major materials (eight for 2 points) shall be specified and installed in the project that meet the minimum total recycled content levels as listed in Table 15, Minimum Recycled Content Levels. A "major"



material is defined as those materials covering more than 50% of a major building surface (such as parking areas, floor, roof, partitions, walls), or serving a structural function throughout the majority of the building. For example, credit would not be issued if tackable wall panels were used in only one classroom. Recycled content products with minimum recycled content levels must be used throughout the project.



Table 15 – Minimum Recycled Content Levels¹

Total Recycled Content = Post-consumer Recycled Content + ½ Secondary Recycled Content

Note: If tire derived products are used indoors, they must also meet EQ.C4 standards for low-emitting materials.

Category	Product	Total Recycled Content	Post Consumer Recycled Content
Building Insulation	Fiberglass Insulation	30%*	30 %
	Cellulose Insulation (Including Cotton and Denom)	75%*	75 %
Flooring	Nylon Carpet (Total) Weight	10%*	10 %
	Polyester Carpet Fiber Face	25%*	25 %
	Plastic	40%	0 %
	Tire-derived Rubber	50%*	50 %
	Glass	50%*	50 %
	Ceramic	45%	0 %
Acoustical Ceiling Tiles and Wall Panels	Glass	30%	0 %
	Recycled Newspaper, Slag Wool, Aluminum	30%	0 %
Countertops	Paper	30%*	30 %
	Glass	50%*	50 %
	Ceramic Tile	45%	0 %
Wall Coverings	Tackable Wall Panels	100%*	100 %
	Paint	50%*	50 %
Aggregate Base and Subbase	Recycled Aggregate	50%	0 %
Structural Concrete	Fly Ash, Rice Hull Ash, or other Pozzolanic Materials (See credit restrictions on claiming credit for fly ash.)	25% ²	0 %
Structural Steel	Basic Oxygen Furnace (BOF) Produced Steel	16%*	16 %
	Electric Arc Furnace (EAF) Produced Steel	67%*	67 %
Shower/Restroom Partitions	Plastic	20%	0 %
	Steel	25%	0 %
Windows	Fiberglass Frame	15%	0 %
Roofing Materials	Steel	25%	0 %
	Aluminum	20%	0 %
	Fiber (Felt) or Fiber Composite	50%*	0 %
	Tire-derived Products	50%*	50 %
	Plastic or Plastic/ Rubber Composite	100%*	100 %
Playground Equipment	Plastic	90%	90 %
	BOF Steel, EAF Steel	16%, 67%	16 %, 67 %
	Aluminum	25%*	25 %
Playground Surfaces	Plastic	10%*	10 %
	Tire-derived	100%*	100%

¹ Table 15 is adapted from the US EPA Comprehensive Procurement Guidelines. www.epa.gov/cpg/

* Note: Asterisked products must meet their minimum total recycled content level entirely with post-consumer (collected from end-users) content. For all other products, secondary recycled content (also known as post-industrial or pre-consumer) may count as half credit toward the minimum total recycled content required. For example, the 30% total recycled content requirement for acoustical ceiling tiles could be met by a product with 60% secondary content or one with 10% post-consumer content and 40% secondary recycled content.

Landscaping Products	Compost, Co-compost, and Mulch	80%*	80 %
Plastic Lumber and Timbers	Plastic	10%*	10 %
Parking Stops	Plastic	10%*	10 %
	Tire-derived Products	100%*	100 %
New product categories may be considered provided the value exceeds 5% of the total project material cost. See ME 4.1.2 which states that a default value of 35 % of the Total Construction Cost can be used for Total Project Material Cost. i.e. for a \$5,000,000 major modernization project take 35 % of that cost then 5 % of that cost and a new product category would need to be worth at least \$87,500 to be considered		20%	10%
All Other Product Categories (Maximum of 2 points from this category are eligible for credit under ME4.1. To receive credit, products must also complete a Life Cycle Effects Screening (LCES) to ensure there are no environmental or health tradeoffs).		25%	0 %

Performance Approach:

Another method to verify compliance with this credit is to use the performance approach. The weighted average of recycled-content value is calculated using the following equations:

- Recycled Content Value (RCV): Calculate the Recycled Content Value of each product by multiplying the cost of the product by the percent of postconsumer recycled content and then adding ½ of the cost of the product multiplied by the percent of secondary recycled content. Material Cost is the construction cost of each individual material excluding all labor costs, project overhead, and fees.

$$RCV = (\% \text{ postconsumer recycled content} \times \text{material cost}) + 0.5 \times (\% \text{ secondary recycled content} \times \text{material cost})$$

- Total Recycled Content Value: Total Recycled-content Value is the sum of the postconsumer and secondary recycled-content value of all recycled-content products.

$$\sum RCV = RCV \text{ Product A} + RCV \text{ Product B} + RCV \text{ Product C, etc.}$$
- Verify RCV of Each Recycled Product DOES NOT Exceed 25% of $\sum RCV$: If RCV of Product A is greater than 25% of $\sum RCV$, then 25% ($\sum RCV$) must be substituted for the value of Product A in the Total Recycled Content Value equation. This step must be repeated for each product to verify that no one material accounts for more than 25% of the $\sum RCV$.

$$RCV \text{ Product A} \leq (25\%) (\sum RCV)$$

(If RCV of Product A is greater than 25% of $\sum RCV$, then 25% ($\sum RCV$) must be substituted for the value of Product A in the Total Recycled Content Value equation. Repeat equation for each product.)

Weighted Average Recycled Content Value (%): The Weighted Average Recycled Content Value is calculated by dividing the Total Recycled-Content Value ($\sum RCV$) by the Total Project Material Cost. The Total Project Material Cost is the construction cost of all materials excluding all labor costs, project overhead, and fees. A default value of 35% of the total construction costs can be used for the Total Project Material Cost.

$$\text{Weighted Average Recycled Content Value } [\%] = \frac{\text{Total Material Cost } [\$]}{\text{Total Recycled Content Value } [\$]} \times 100$$

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at construction review. It is recommended, but not required that construction drawings include notes for the required recycled content levels on finish sheets. Please note that while the HI-CHPS Materials



Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Construction Review Requirements	
MW.C2	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C2	Provide cut sheets for materials claimed to have the required recycled content.
MW.C2	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.

Resources

CHPS Best Practices Manual, Volume II: Interior Surfaces and Finishes Chapter.

CHPS Product Database: <http://www.chps.net/dev/Drupal/node/445>

LEED™-NC 2.2 Reference Guide: Materials Credit 4: Recycled Content.

State Agency Buy Recycled Campaign (SABRC) at <http://www.ciwmb.ca.gov/BuyRecycled/StateAgency/>

California Integrated Waste Management Board (CIWMB) Recycled-content Products Database:
www.ciwmb.ca.gov/rcp

US EPA's Comprehensive Procurement Guideline (CPG) Program: www.epa.gov/cpg

CA Department of Toxic Substance Control TCLP and WET:

http://ccelearn.csus.edu/wasteclass/mod6/mod6_05.html

CA Department of Toxic Substance Control WET Procedures:

http://www.dtsc.ca.gov/LawsRegsPolicies/Title22/upload/OEARA_REG_Title22_Ch11_AppII.pdf



Materials and Waste Management

MW.C3: Single Attribute - Rapidly Renewable Materials

2 Points

Applicability	Verification Required		
All projects.	<input type="radio"/> at Design Review	<input checked="" type="radio"/> at Construction Review	<input type="radio"/> at Performance Review

Intent: Specify and install materials that replenish themselves faster than traditional extraction demand and are organically grown.

Rapidly renewable raw materials are those materials that substantially replenish themselves faster than traditional extraction demand (e.g. planted and harvested in less than a 10 year cycle); and that are sustainably managed. Products in this category include, but are not limited to, bamboo products, wheat grass cabinetry, linoleum and bioplastics. The products indoor air quality and durability properties should also be considered.

Requirement

1 point	<p>MW.C3.1 Use rapidly renewable materials, excluding wood fiber, for 2.5% of the total value of all products used in the project.</p> <p style="text-align: center;">OR</p> <p>Prescriptive Approach: Specify rapidly renewable materials, for 50% of one of the following major interior finish or structural materials:</p> <ul style="list-style-type: none"> • Flooring (ft²) • Casework (ft³) • Acoustical Ceiling Tile (ft²) • Wall Covering (ft²) • Tile (ft²) • Exterior Walls (ft²) • Roof (ft²) <p>A product must contain 25% rapidly renewable raw materials based on weight.</p>
1 point	<p>MW.C3.2 For at least 50% of the rapidly renewable materials used on the project, use certified USDA organic materials or materials utilizing environmentally sustainable agriculture harvest methods certified under the "Draft National Standard for Trial Use, Sustainable Agriculture (SCS-101) certified under a program that meets the criteria for Alliance full membership such as IFOAM organically grown materials. This credit can only be attempted for projects achieving MW.C3.1 above.</p>

Implementation

To confirm compliance with this credit determine the total costs of all qualifying materials and the total cost of all renewable materials. Materials considered as qualifying are listed on Table 16 - Materials to be Included and Excluded from Calculations.



Table 16 – Materials to be Included and Excluded from Calculations

<i>Name</i>	<i>Included in the cost calculation</i>	<i>Not included in the cost calculation</i>	<i>Notes on DHS Materials Testing</i>
General Conditions	Not Applicable	Not Applicable	Not applicable
Site Work	Site furnishings, bike racks, site paving systems (including asphalt, concrete for sidewalks and driveways as well as other paving systems), gravel, fences and gates, parking lot accessories, play ground surfaces, and play ground equipment.	Plant materials, earth, sand and outdoor lighting fixtures (see Division 16).	No testing required.
Concrete	All products. Include all concrete used in the construction of the building: slabs, structural concrete, basement walls and concrete toppings on steel or wood decks. Concrete used in site work is also included, but in Division 2.	Formwork and temporary scaffolding.	No testing required.
Masonry	All products. Include all masonry used in the construction of the building, both structural and otherwise. Masonry used in site work is also included, but in Division 2.	Nothing	No testing required.
Metals	Light gauge metal framing for walls, roofs or floors, wood structural connectors, metal roofing, decorative metal, guard rails and hand rails. Aluminum or steel used in the manufacturing of windows and doors is included in Division 8.	Structural steel including steel reinforcing bars or meshes used in concrete.	No testing required.
Wood and Plastic	All products used in the permanent construction of the building.	Formwork, temporary fences, construction barriers, scaffolding, bracing, and other elements that are not part of the finished building.	Only applies for materials that are exposed to the interior space. If people can see from inside it you have to test it. Most structural wood products would not need to be tested: framing lumber, OSB, and plywood.
Thermal and Moisture Protection	All products. All insulation used in walls, roofs, floors and slabs as well as insulation used for pipes and ducts. All air barriers and vapor barriers.	Nothing	Testing required.
Doors and Windows	All products	Nothing	No testing required.
Finishes	All products	Nothing	Everything has to be tested.
Specialties	All products	Nothing	Testing only required for surface mounted whiteboards and tack boards.
Equipment	Excluded	All products	No testing required.
Furnishings	Fixed casework and other built-items	Moveable desks, tables, chairs, cabinets and bookcases that are not in the construction contract. Generally everything that is not bolted down is excluded.	Testing required.
Special Construction	Excluded	All Products	No testing required.
Conveying Systems	Excluded	All products	No testing required.
Mechanical	Excluded	All products	No testing required.
Electrical	Excluded	All products	No testing required.

Material cost is the construction cost of a material excluding all labor costs, project overhead, and fees. Divide the cost of all renewable materials by the total qualifying material cost and multiply by 100 to determine the percentage of renewable materials in the construction.

Renewable Raw Materials [%] = Renewable material cost[\$]/Total material cost[\$] x100 Be sure to use the total qualifying materials cost for the project in the denominator of the calculation equation.

The prescriptive approach requires that 50% of all material from one of the listed groups meet the criteria. For example, a minimum of 50% of all floor coverings used in the school must contain 25% rapidly renewable raw materials based on weight. This calculation may use the formula above for the dollar value of the materials or may be calculated on the base unit:

$$\text{Renewable Raw Materials [\%]} = \text{Renewable Material Unit} / \text{Total Material Unit} \times 100$$

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at construction review. It is recommended, but not required that construction drawings include notes for the required features on the finishes sheets. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Construction Review Requirements	
MW.C3	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C3	Provide cut sheets for materials claimed to have the required rapidly renewable or organically grown features.
MW.C3	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.

Resources

CHPS Best Practices Manual: Volume II: Interior Surfaces and Finishes Chapter.

CHPS Product Database: <http://www.chps.net/dev/Drupal/node/445>

LEED™ Reference Guide: Materials Credit 6: Renewable Materials.

CHPS Best Practices Manual: Volume II: Interior Surfaces and Finishes Chapter.

ISEAL Member certifying organizations: www.isealalliance.org/membership



Materials and Waste Management

MW.C4: Single Attribute – Certified Wood

1 Point

Applicability	Verification Required		
All projects. For major renovation projects, it applies to only the purchase of new wood.	<input type="radio"/> at Design Review	<input checked="" type="radio"/> at Construction Review	<input type="radio"/> at Performance Review

Intent: Specify and install sustainably harvested wood.

Wood grown and harvested in an ecological manner is a truly sustainable material that is renewable, biodegradable, energy efficient and recyclable. Certification programs help to ensure wood is grown and harvested with responsible forest management practices.

Requirement

1 point	<p>MW.C4.1 Use a minimum of 50% of wood-based materials certified in accordance with one of the following programs. This includes, but is not limited to, framing, flooring, finishes and built in cabinetry.</p> <ul style="list-style-type: none"> • Forest Stewardship Council (FSC) • Canadian Standards Association Z809 Standards • Sustainable Forestry Initiative Standard 2005-2009 • American Tree Farm System 2004-2008 AFF Standard • Programme for Endorsement of Forest Certification Schemes (PEFC)
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Implementation

Refer to one of the wood certification programs listed above for wood building components that comply with the requirements, and incorporate them into the material selection for the project.

To perform the calculation for this credit, determine the cost of total new wood based products and the cost of certified wood based products. Exclude all labor costs, project overhead and fees. Divide the total cost of certified wood products by the total cost of all new wood products that are incorporated into the permanent construction. Multiply this result by 100 to determine the percentage of wood products that are certified. Be sure to use the total wood products cost for the project in the denominator of the calculation equation.

$$\text{Wood Material Portion [\%]} = \frac{\text{Wood Products Cost [\$]}}{\text{Total New Wood Based Products Cost [\$]}} \times 100$$

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at construction review. It is recommended, but not required that construction drawings include notes for the required features on finish sheets. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.



Construction Review Requirements	
MW.C4	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C4	Provide cut sheets for materials, and Certificates of Chain-of-Custody signed by manufactures certifying that the product meets the required standard.
MW.C4	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.

Resources

CHPS Best Practices Manual: Volume II: Interior Surfaces and Finishes Chapter.

CHPS Product Database: <http://www.chps.net/dev/Drupal/node/445>

Old to New: Design Guide, Salvaged Building Materials in New Construction, 3rd Edition (2002)
<http://www.lifecyclebuilding.org/files/Old%20to%20New%20Design%20Guide.pdf>

Forest Stewardship Council Web site at: www.fscus.org

LEED™ *Reference Guide*: Materials Credit 7: Certified Wood.



Materials and Waste Management

MW.C5: Single Attribute – Regional Materials

2 Points

Applicability	Verification Required		
All projects.	<input type="radio"/> at Design Review	<input checked="" type="radio"/> at Construction Review	<input type="radio"/> at Performance Review

Intent: Increase demand for building materials and products that are extracted and manufactured within the State, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Establish a project goal for locally sourced materials, and identify materials and material suppliers that can achieve this goal. During construction, ensure that the specified local materials are installed and quantify the total percentage of local materials installed.

Requirement

1-2 points	MW.C5.1 Specify a minimum of 10% of building materials (based on cost) that are extracted, and manufactured within the State of Hawaii for 1 point and 20% of building materials for 2 points.
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Implementation

If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value. Mechanical, electrical and plumbing components and specialty items such as elevators and equipment shall not be included in this calculation. Only include materials permanently installed in the project. Furniture may be included.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at construction review. It is recommended, but not required that construction drawings include notes for the required features on finish sheets. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Construction Review Requirements	
MW.C5	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C5	Provide a statement on manufacturer's letterhead that supports the extraction and manufacturing of the product within the State.
MW.C5	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.



Resources

LEED™ Reference Guide Credit MR5.1 and MR5.2

CHPS Product Database: <http://www.chps.net/dev/Drupal/node/445>



Materials and Waste Management

MW.C6 Materials Reuse

2 Points

Applicability	Verification Required		
All projects can obtain salvaged material from off-site. For a new building, the calculation should be performed using the total salvaged material costs and the material costs for the new building. The costs of new materials purchased for renovations should be used in the denominator of the equation for calculations in this instance.	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Specify and install re-used (salvaged) materials to limit waste and the use of raw materials.

Salvaged materials or products are reused from a previous use or application and then used in a new use or application with only superficial modification, finishing, or repair. Commonly salvaged building materials include wood flooring/paneling/cabinets, doors and frames, ironwork and decorative lighting fixtures, brick, masonry and heavy timbers.

Requirement

1-2 points	<p>MW.C6.1 To receive credit for salvaged materials, the materials may not be considered hazardous, those containing lead based paint, asbestos, mercury, arsenic, or other harmful PCB's.</p> <p><i>Performance Approach:</i> Specify re-used, salvaged or refurbished materials obtained off-site for 5% of building materials.</p> <p style="text-align: center;">OR</p> <p><i>Prescriptive Approach:</i> Specify re-used, salvaged or refurbished materials for 25% of one (for one point) and two (for two points) of the following major finish materials:</p> <ul style="list-style-type: none"> • Flooring (ft²) • Casework (ft³) • Acoustical Ceiling Tile (ft²) • Wall Finishes (ft²) • Tile (ft²) • Roofing Materials (ft²)
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Implementation

Re-used materials are defined as material taken from another site and used for the same purpose at the new site, e.g. removing wood flooring from another site to use as flooring in the new school. Salvaged material may also come from the same building site but must be used for a different purpose, otherwise it is considered recycled material. For example, many schools build on the same site and demolish the old school building when the new one is completed. If the project demolished concrete structures from the old school and ground the concrete as fill for the new school, the concrete fill would be considered salvaged material. Commonly salvaged building materials include wood flooring/paneling/cabinets, doors and frames, mantels, ironwork and decorative lighting fixtures, brick, masonry, and heavy timbers.



To verify compliance with this credit first determine the total cost of all salvaged materials if purchased new, and the total cost of all qualifying materials. Materials considered as qualifying are listed on Table 16 – Materials to be Included and Excluded from Calculations under MW.C4.

Material cost is the construction cost of a material excluding all labor costs, project overhead, and fees. If the cost of the salvaged or refurbished material is below market value, use the replacement cost to estimate the material value; otherwise use the actual cost to the project. The next step is to divide the total cost of salvaged materials by the total cost of all qualifying materials and then multiply by 100 to determine the salvage rate as a percentage of all qualifying materials.

$$\text{Re-Used Rate [\%]} = \frac{\text{Salvaged Material Cost [\$/Qualifying Material Cost [\$/]} \times 100$$

Hazardous re-used or salvaged materials should be avoided that contain lead based paint, asbestos, mercury, arsenic or other harmful PCB's.

The prescriptive approach requires that 25% of all material from one of the listed groups be salvaged or refurbished for 1 point or 25% of all material from two of the listed groups be salvaged or refurbished for two points. 50% of the material from one group will also earn two points. For example, using salvaged ceiling tile for 55% of all ceilings in the school will earn one points. This calculation may use the formula above for the dollar value of the materials or may be calculated on the base unit:

$$\text{Re-Used / Salvage Rate [\%]} = \frac{\text{Salvaged Material [Unit]/ Qualifying Material [Unit]} \times 100$$

Exclude all labor costs, all mechanical and electrical material costs, and project overhead and fees. If the cost of the salvaged or refurbished material is below market value, use replacement cost to estimate the material value; otherwise use actual cost to the project. Provide the specifications for the salvaged material. Designate the CSI number, section, and page number that highlight compliance with this requirement.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at design review and construction review. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Design Review Requirements	
MW.C6	Construction drawings must include notes regarding how salvaged materials will be used in various locations.
Construction Review Requirements	
MW.C6	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C6	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.

Resources

CHPS Best Practices Manual, Volume II: Materials Selection and Research Section; Interior Surfaces and Furnishings Chapter.

CHPS Product Database: <http://www.chps.net/dev/Drupal/node/445>

Re-Use Hawaii: <http://www.reusehawaii.org/site/welcome.html>



Materials and Waste Management

MW.C7 Durable and Low Maintenance Flooring

1 Point

Applicability	Verification Required		
All projects.	<input type="radio"/> at Design Review	<input checked="" type="radio"/> at Construction Review	<input type="radio"/> at Performance Review

Intent: Choose flooring finishes that reduce maintenance needs and perform well in the long run.

Interior school traffic can cause certain flooring surfaces to wear faster than other building uses. Flooring materials should be chosen wisely to ensure ease of maintenance and a long life span.

Requirement

1 point	<p>MW.C7.1 Chose flooring products for 50% of the interior surface floor that have the following low maintenance and durability features:</p> <ul style="list-style-type: none"> • Impermeable to moisture and air. • 15 year non-prorated life-time warranty (excludes concrete and terrazzo). • Provide documentation showing that the life cycle (15 year) initial costs and maintenance needs of all flooring in the project have been assessed.
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Implementation

Identify flooring finishes that meet the above requirements as being durable and having low maintenance needs.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at construction review. It is recommended, but not required that construction drawings that include sheets for finishes provide notes for the required features.

Construction Review Requirements	
MW.C7	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C7	Provide cut sheets for materials claimed to have the required features.
MW.C7	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.

Resources

CHPS Best Practices Manual: Volume II: Interior Surfaces and Furnishings Chapter.



Materials and Waste Management

MW.C8: Building Reuse - Exterior

2 Points

Applicability	Verification Required		
<p>All projects. For major modernizations this credit would apply in reuse of the existing structure and shell of the building(s) being modernized.</p> <p>For new schools to obtain this credit, the new school must be in an existing (previously non-school) facility.</p> <p>For new buildings on an existing campus, this credit would apply in the instance of an existing building, for instance a maintenance shed, being converted into conditioned space for classrooms, administration, or other school functions. In addition, this credit pertains to a case where a building next to an existing school is purchased by the school district and converted into classroom or other school space.</p>	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Increase the reuse of existing building structure and shell.

Reusing parts of the building can save significant money and resources, while greatly reducing the amount of construction waste. When materials are re-used, the environmental benefits start with resource savings and extend down through the entire life-cycle of the material: less energy is spent extracting, processing, and shipping the materials to the site. Depending on the amount of building re-used, the district can significantly reduce their construction and material costs. However, the building envelope will significantly affect many important high performance areas, such as space programming, energy performance, opportunities for daylighting, and indoor air quality. In addition, care must be taken to ensure that any environmental hazards such as toxins, lead, and asbestos have been identified and addressed. Develop a list of benefits and tradeoffs, and make the decision based upon the overall, integrated design tradeoffs.

Requirement

1-2 points	<p>MW.C8.1 Reuse large portions of existing structures during renovation or redevelopment projects. Maintain at least 50% of existing building structure and shell (exterior skin and framing, excluding window assemblies). Hazardous materials that are remediated as part of the project scope AND elements requiring replacement due to unsound material condition shall be excluded from the calculation of the percent maintained. Points are allocated as follows:</p> <ul style="list-style-type: none"> • Maintain 50% of existing structure and shell – 1 point • Maintain 75% of existing structure and shell – 2 points
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Implementation

Percentage of reused structural materials (foundation, slab on grade, beams, floor and roof decks, etc.) and shell materials (roof and exterior walls) should be estimated in square feet. Average together the structural and shell reuse percentages. The average will be used to determine the overall reuse percentage for the building.



Building Reuse (%) = $100 \times \frac{[\text{Reused (floor+ roof area + ground floor/slab)} + \text{Reused (exterior wall area excluding window assemblies)}]}{[[\text{Total (floor+ roof area + ground floor/slab)} + \text{Total (exterior wall area excluding window assemblies)}]]}$.

Note: This credit will be subject to review if design changes are made during construction affecting the amount of existing structure and shell that are retained.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at design review and construction review. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Design Review Requirements	
MW.C8	Construction drawings must include demolition plans and existing site plans that verify features to remain.
Construction Review Requirements	
MW.C8	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C8	Maintain pictures taken before and after of major or large reuse of structural or shell elements to be provided if audited only.

Resources

CHPS Best Practices Manual, Volume II: Material Selection and Research Section; Interior Surfaces and Furnishings Chapter.

LEED™-Reference Guide: Materials Credit 1: Building Reuse.



Materials and Waste Management

MW.C9: Building Reuse – Interior

1 Point

Applicability	Verification Required		
All projects. For major modernizations this credit would apply in reuse of the interior elements of the building(s) being modernized. For new schools to obtain this credit, the new school must be in an existing (previously non-school) facility and reuse interior elements.	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Increase the reuse of interior non-shell elements.

There are many materials that may be reused from within a building beyond the existing shell and structural system. Interior partitions, finishes, doors and ceilings systems are among the items that can be salvaged and reused in the refurbished building. Reuses of these materials not only reduces the amount of waste sent to landfills, but can also significantly reduce material and construction costs.

Requirement

1 point	MW.C9.1 Maintain 50% non-structural elements (interior walls, doors, floor coverings, and ceiling systems) in at least 50% of completed building (including additions).
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Implementation

Percentage of reused, non-shell building portions will be calculated as the total area (ft²) of reused walls, floor covering, and ceiling systems, divided by the existing total area (ft²) of walls, floor covering, and ceiling systems.

Internal Building Reuse (%) = Reused Non -structural Elements [ft²]/ Total Non-structural Elements [ft²] x 100

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at design review and construction review. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Design Review Requirements	
MW.C9	Construction drawings must include demolition plans and existing site plans that verify features to remain.
Construction Review Requirements	
MW.C9	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C9	Maintain pictures taken before and after of major non-structural elements to be provided if audited only.



Resources

CHPS Best Practices Manual, Volume II: Material Selection and Research Section; Interior Surfaces and Furnishings Chapter.



Materials and Waste Management

MW.C10: Environmental Performance Reporting

4 Points

Applicability	Verification Required		
All projects.	<input checked="" type="checkbox"/> at Design Review	<input checked="" type="checkbox"/> at Construction Review	<input type="checkbox"/> at Performance Review

Intent: Reward the use of materials that have undergone life cycle analysis (LCA) and/or life cycle impact analysis (LCIA) on the environment and human health.

As the building marketplace embraces the environmental movement, there are more and more environmental claims that consumers must understand and decipher. Third-party certification of environmental performance is a way to provide independent confirmation that these claims are accurate and documented. This credit is intended to provide a level playing field by which industrial practices can be assessed and consumers (schools and school districts) can be assured of accurate information regarding the environmental performance of product choices. This credit also intends to provide the consumer with a better assessment of a given products impact on the environment and on human health through a life-cycle impact assessment. Life-cycle impact assessment is a "cradle to grave" approach. As opposed to the focus on single or multi-attributes of products without considering the environmental trade-offs of these attributes or in the life-cycle production and use of the product.

CHPS released a product database for school districts and designers specifying products that meet CHPS' high performance requirements. The database lists products that have been pre-approved by CHPS to meet CHPS requirements. This is meant to ease product identification and selection. A school district or design team will receive credit by merely choosing products from the database, and will not be responsible for product compliance.

Requirement

	To claim points under MW.C10.1, the product must meet the low-emitting material requirements listed under credits EQ.P8 and EQ.C4.
1 or 2 points	MW.C10.1 1 point will be awarded (up to 2) for each product or material that is at least 2% of the total value of all building materials and products (based on cost) if they have completed a Manufactured Declared Life Cycle Analysis or Life Cycle Impact Assessment. Manufacturers must make the Life Cycle Analysis publically available and meet the ISO 14044 standard. It is the intent for school districts and design professionals to use the CHPS produce database to identify qualifying products.
Or 2 or 4 points	<p>MW.C10.2 An additional 2 points will be awarded (up to 4) for each product or material that is at least 4% of the total value of all building materials and products (based on cost) if:</p> <ul style="list-style-type: none"> • They have an Third-Party Certified Type III Environmental Product Declaration (EPD) and meets or exceed one of the following performance levels: • Comparison to Historical Corporate Baseline: Demonstrate a 10% or higher reduction of impact in one half of the impact categories (global warming and abiotic resource depletion are required), with no tradeoffs). Corporate baseline must be within the past 10 years. • Comparison to Industry Baseline. Demonstrate a 10% or higher reduction of



	<p>impact in one half of the impact categories (global warming and abiotic resource depletion are required), with no tradeoffs). Industry baseline must be within the past 10 years.</p> <ul style="list-style-type: none"> • Comparison of Industry Baseline. Demonstrate a 20% or higher reduction of impact in one half of the impact categories (global warming and abiotic resource depletion are required), with no tradeoffs). Industry baseline must be within the past 10 years <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • They have a Life-Cycle Impact Profile Declaration (LCID) and meet or exceed one of the following performance levels: <ul style="list-style-type: none"> • Comparison to Industry Baseline. Demonstrate a 10% or higher reduction of impact in one half of the impact categories (global warming and abiotic resource depletion are required), with no tradeoffs). Industry baseline must be within the past 10 years. • Comparison of Industry Baseline. Demonstrate a 20% or higher reduction of impact in one half of the impact categories (global warming and abiotic resource depletion are required), with no tradeoffs). Industry baseline must be within the past 10 years.
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This credit may only be claimed for projects that are earning points under MW.C2, MW.C3, MW.C4, MW.C5, and EQ.C4.

Implementation

CHPS wishes to recognize those manufactures and specifiers that are committed to understanding their products impact on the environment and on human health. The intent of CHPS is to move manufactures and specifiers to products and materials that throughout their life cycle provide minimal impact on the environment and human health.

ISO 14025 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures

ISO 14025 establishes the principles and procedures for developing Type III environmental declarations (EPD). It specifically establishes the use of the ISO 14040 series of standards on life-cycle assessment in the development of these declarations. Type III environmental declarations prepared in accordance with this standard are intended to present quantified environmental life cycle product information to enable comparisons between products fulfilling the same function.

ISO 21930 Sustainability in building construction -- Environmental declaration of building products

Building on the framework and requirements described in ISO 14025, ISO 21930 contains specifications and requirements for type III environmental declarations (EPD) of building products. The standard recommends that Type III declarations for building products account for all life cycle stages of the product. Omissions of life cycle stages must be justified.

ISO 21930 requires that environmental information covering all life cycle stages ("cradle to grave") be subdivided into at least three life cycle stages for reporting purposes:

- product stage (raw material supply, transport to production, manufacturing: "cradle to gate")
- building stage (transport to building site, building installation, use, maintenance and repair, replacement)
- end of life stage (demolition, transport, disposal / recycling)

ISO 21930 also specifies the minimum requirements for the verifiers in terms of competence (ISO 19011:2002, clause 3.14) including:



- Knowledge of relevant industry, product and product-related environmental matters
- Process and product knowledge of the product category
- Expert on LCA and methodology for LCA work
- Knowledge of the relevant standards in the field of environmental labelling and declarations, and life cycle assessment
- Knowledge of the regulatory framework in which requirements for environmental declarations have been prepared
- Knowledge of the program for Type III environmental declarations

SCS-002-200x, Type III Life-Cycle Impact Profile Declaration (LCID)

LCIDs provide a life cycle assessment result based on life cycle impact assessment in accordance with draft standard for trial use SCS-002-200x, Type III Life-Cycle Impact Profile Declarations for Products and Services and ISO 14044. LCID's use Life-Cycle Assessment (LCA) or "cradle to grave" techniques to consider environmental impacts at each stage of a product's life-cycle, from the time natural resources are extracted from the ground and processed through each subsequent stage of manufacturing, transportation, product use, and ultimately disposal. The product's environmental information is summarized on an "impact profile" listing each impact indicator result which then compares these results to a baseline, such as the average product performance. The impact-profile is very similar to a nutritional food label. In addition to the impact-profile, the LCID includes a report that contains method (life cycle software used, data quality), scope (unit processes, location, process description, functional unit), and assumptions.

CHPS reserves the right to review and approve/disapprove the proposed Corporate Historical Baseline or Industry Baseline utilized to determine a product's performance levels. A listing of approved baselines will be provided on the CHPS website and/or via the CHPS Product Database.

Verification

For projects seeking verification through the CHPS Verified Program (Pg 12), compliance documentation is required at construction review. It is recommended, but not required that construction drawings include notes for the required features on finish sheets. Please note that while the HI-CHPS Materials Worksheet is not required until after construction, it is highly recommended that design teams begin using it as early as possible, particularly if recognition is contingent on compliance.

Construction Review Requirements	
MW.C4	Provide the HI-CHPS Materials Worksheet provided to HI-CHPS Verified projects at the point of registration.
MW.C4	Provide cut sheets for materials selected.
MW.C4	Proof of purchase and/or installation is only required if audited during construction review. CHPS recommends records are kept in the event an audit is requested.

Resources

CHPS Schools Product Database <http://www.chps.net/dev/Drupal/node/445>

Pharos: http://www.pharosproject.net/about_pharos/

ISO 14025: http://www.iso.org/iso/catalogue_detail?csnumber=38131

ISO 21930: http://www.iso.org/iso/catalogue_detail?csnumber

