

Material Data Tracking – Learnings from LEED v4 Projects

Course Number FR103

6/22/2018 7:00 AM - 8:00 AM

Learning Units 1.0 HSW, GBCI, RIBA

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Questions related to specific products and services may be addressed at the conclusion of this presentation.

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Course / Learning Objectives

- Describe the metrics used in the LEED v4 Materials & Resources “Building Product Disclosure and Optimization” credits and how they differ from LEED v2009.
- Identify the role of the architect in the research and specification of sustainable materials.
- Relate project sustainability goals to product research resources and case study data sets.
- Arrange products and materials by applying the “Materials Action Plans” methodology to their own projects.

When it comes to LEED . . .



Learning from supporting General Contractors on LEED Projects...

Generalizations ...

- GCs are first cost oriented
- GCs are schedule oriented
- Architects are busy people
- Architects may take specs from previous projects



Why has the general contractor been given “assignments” about products specified by the architect?

*Typical language
in 01 81 13
Section,
for a LEED v2009
project.*

*Indicating that the
General Contractor
is to provide HOW
the project would
earn credits for
Recycled Content
and Regional
Materials.*

- C. LEED Action Plans: Provide preliminary submittals within 30 days of date established for the Notice of Award indicating how the following requirements will be met:
 1. Credit MR 2: Waste management plan complying with Division 01 Section "Construction Waste Management and Disposal."
 2. Credit MR 4: List of proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
 3. Credit MR 5: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.
 4. Credit IEQ 3.1: Construction indoor-air-quality management plan.

- D. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:
 1. Credit MR 2: Waste reduction progress reports complying with Division 01 Section "Construction Waste Management and Disposal."
 2. Credit MR 4: Recycled content.
 3. Credit MR 5: Regional materials.

LEED ACTION PLAN – (Materials and Resources Credits)

SUSTAINABLE DESIGN REQUIREMENTS – LEED

Prepared for:

Project:

Pursuing: LEED for Core and Shell, v 2009

Basis Specifications Dated 2/11/15 and Drawings Dated 6/15/15

MR Plan Issuance Date: July 22, 2015

The Materials and Resources Action Plan for LEED Credits MRc4 (Recycled Materials) and MRc6 (Certified Wood) estimates the contribution of costs achievement goals.

Note: The LEED calculation for "Total Material Cost," used to determine p Regional Materials values, only include the hard costs for CSI MasterForm 31.60.00 (Special Foundations and Load-Bearing Elements), 32.10.00 (Basic electrical, and plumbing components, and equipment) only. Excluded are if the project team utilizes a newer numbering format than 2004. The esti be updated for LEED documentation as project costs are finalized in the div CSI divisions.

A. Project Materials Cost Data:

1. Total Construction Cost: **\$103,187**
- a. Div 10 – Specialties: \$ 650,00
- b. Div 11 – Elevators: \$ 6,300,00
- c. Div 21 – Fire Protection: \$ 2,000,00
- d. Div 22 & 23 – Plumbing / HVAC: \$ 11,000,00
- e. Div 26 – Electric: \$ 7,500,00
- f. Div 27 – Communications: \$ incl. Abc
- g. Div 28 – Access, Alarm: \$ incl. Abc

Total (Div 10-11, 21-28) **\$ 27,450,00**

*Note: Additional excluded CSI Divisions to be added

B. LEED Total Material Cost Estimate:

\$ 103,187,000 - \$ 27,450,000 = \$ 75,737,000 then

\$ 75,737,000 * 0.45 = \$ 34,081,650 = LEED Total M

[Dollar amount for Recycled Content and Regional

- C. LEED Project Requirements:
1. Credit MR 4: List of proposed materials with Recycled Content consumer recycled content, and pre-consumer recycled content fo recycled content.
 - a. Project Goal: 10% for 1 Point
 2. Credit MR 5: List of proposed Regional Materials. Identify ea including its source, cost, and the fraction by weight that is consid
 - a. Project Goal: 10% for 1 Point
 3. Credit MR 6: List of proposed Certified Wood. Indicate all wood pr will be specified and purchased as FSC.

D. Estimate of how the LEED Project Requirements for MR4 shall be met (See Table 2)

Table 1: Recycled Content L.L.3

General Information				MR Credits	Recycled Content (%)	Per %	Per %
CSI Div (optional)	Description of Material	Manufacturer / Vendor Name	Material Cost ¹ (\$)				
	Rebar / Reinforcing	Gerda	\$ 2,700,000.00	MR Credits 3	87.0%		
	Concrete	Shyma Ready Mix CMU / Stone Veneer	\$ 5,600,000.00	MR Credits 4	0.0%		
	Masonry	Shyma Ready Mix CMU / Stone Veneer	\$ 120,000.00	MR Credits 3	0.0%		
	Structural Steel (incl H&S Roof Structure)	Freestone	\$ 1,225,000.00	MR Credits 3	10.0%		
	Roofing - TPO	Freestone	\$ 40,000.00	MR Credits 3	10.0%		
	Roofing - Polyspo	Freestone	\$ 40,000.00	MR Credits 3	10.0%		
	Doors - wood		\$ 55,000.00	MR Credits 3	14.0%		
	Doors - Metal		\$ 20,000.00	MR Credits 3	0.0%		
	Rollup Metal Frames	Deco	\$ 75,000.00	MR Credits 3	25.0%		
	Hardware	Deco	\$ 150,000.00	MR Credits 3	25.0%		
	Clings	Veason	\$ 1,700,000.00	MR Credits 3	25.0%		
	Curtainwall - Aluminum Only	Veason	\$ 1,700,000.00	MR Credits 3	0.0%		
	Metal Studs	National Drywall	\$ 250,000.00	MR Credits 3	0.0%		
	Drywall	National Drywall	\$ 120,000.00	MR Credits 3	25.0%		
	1" Shaft Liner	ACT	\$ 50,000.00	MR Credits 3	90.0%		
	ACT	Armstrong - Cimex	\$ 8,000.00	MR Credits 3	5.0%		
	ACT Grid	Armstrong	\$ 8,000.00	MR Credits 3	1.0%		
	Roof Coating	Armstrong	\$ 20,000.00	MR Credits 3	25.0%		
	Exterior Metal Panel		\$ 150,000.00	MR Credits 3	14%		
	Total Recyclable materials cost		\$ 14,823,000.00				
	Total materials cost		\$ 34,081,650.00				
	Sustainable criteria value as percentage of total						
	Percentage of sustainable criteria value with cut sheets provided						

Note 1: Recycled Content and Regional Materials Values are estimated from previous project experience via the data collection provided by the submittal of LEED Submittal Forms with review submittals. Update regular basis per Spec Section 01 01 13.19

Note 2: Materials Cost Values will be confirmed via the submittal of the LEED Submittal Forms.

Note 3: Total Materials Cost will be confirmed as more project costs are finalized.

E. Estimate of how the LEED Project Requirements for MR5 shall be met (See Table 2):

Table 2: Regional Materials L.L.3

General Information			Material Cost ¹ (\$)	MR Credits	Regional Materials			Sustainable C Value (\$)
CSI Div (optional)	Description of Material	Manufacturer / Vendor Name			Calculation Method	Option 1	Option 2	
	Rebar / Reinforcing	Gerda	\$ 2,700,000.00		100.0%	900	500	\$ 2,700,000.00
	Concrete	Shyma Ready Mix CMU / Stone Veneer	\$ 5,600,000.00		100.0%	600	600	\$ 5,600,000.00
	Masonry	Shyma Ready Mix CMU / Stone Veneer	\$ 120,000.00		100.0%	600	600	\$ 120,000.00
	Structural Steel (incl H&S Roof Structure)	Freestone	\$ 1,225,000.00		98.0%	500	500	\$ 1,200,000.00
	Roofing - TPO	Freestone	\$ 40,000.00		0.0%	501	501	\$ 0.00
	Roofing - Polyspo	Freestone	\$ 40,000.00		0.0%	501	501	\$ 0.00
	Doors - wood		\$ 55,000.00		0.0%	501	501	\$ 0.00
	Doors - Metal		\$ 20,000.00		0.0%	501	501	\$ 0.00
	Rollup Metal Frames	Deco	\$ 75,000.00		0.0%	501	501	\$ 0.00
	Hardware	Deco	\$ 150,000.00		0.0%	501	501	\$ 0.00
	Clings	Veason	\$ 1,700,000.00		0.0%	501	501	\$ 0.00
	Curtainwall - Aluminum Only	Veason	\$ 1,700,000.00		0.0%	501	501	\$ 0.00
	Metal Studs	National Drywall	\$ 250,000.00		0.0%	501	501	\$ 0.00
	Drywall	National Drywall	\$ 120,000.00		0.0%	501	501	\$ 0.00
	1" Shaft Liner	ACT	\$ 50,000.00		100.0%	600	500	\$ 120,000.00
	ACT	Armstrong - Cimex	\$ 8,000.00		35.0%	600	500	\$ 17,500.00
	ACT Grid	Armstrong	\$ 8,000.00		71.0%	600	400	\$ 5,600.00
	Roof Coating	Armstrong	\$ 20,000.00		0.0%	501	501	\$ 0.00
	Exterior Metal Panel		\$ 150,000.00		0.0%	501	501	\$ 0.00
	Total Recyclable materials cost		\$ 14,823,000.00					
	Total materials cost		\$ 34,081,650.00					
	Sustainable criteria value as percentage of total							
	Percentage of sustainable criteria value with cut sheets provided							

Note 1: Recycled Content and Regional Materials Values are estimated from previous project experience via the data collection provided by the submittal of LEED Submittal Forms with review submittals. Updates will be confirmed on regular basis per Spec Section 01 01 13.19

Note 2: Materials Cost Values will be confirmed via the submittal of the LEED Submittal Forms.

Note 3: Total Materials Cost will be confirmed as more project costs are finalized.

F. Estimate of how the LEED Project Requirements for MR6 shall be met (See Table 3):

Table 3: Certified Wood¹

200 4th Ave - Bridgestone

FSC Credit: **86.81%** (Based on Quantity Shown on Floor Plans, NEEDS TO BE CONFIRMED BY GC)

GreenSTUDIO Sustainability Consulting

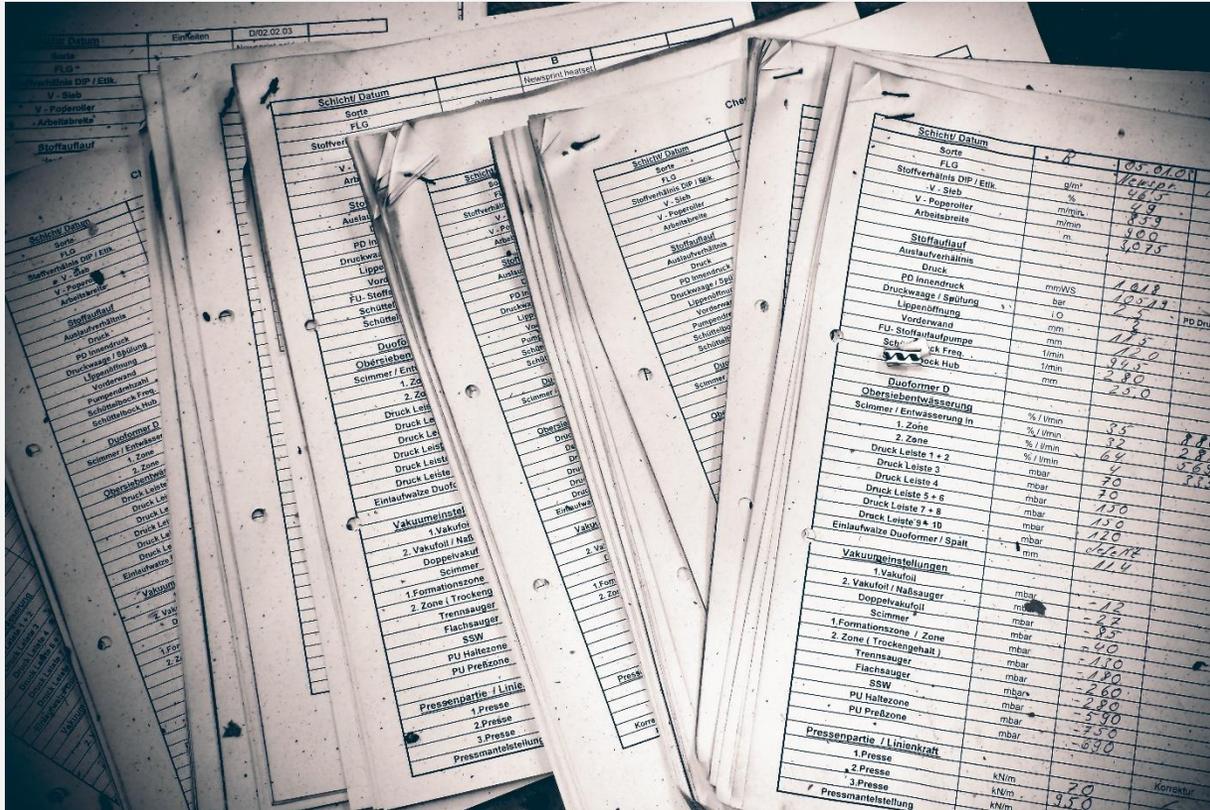
Wood Products	FSC				
	Material cost ² (\$)	% New Wood (as a decimal)	\$ x %	% FSC	FSC Contribution
Concrete Product #0	\$ -	0.00	\$ -	0%	\$ -
Concrete Product #1	\$ -	0.00	\$ -	0%	\$ -
60000 Rough Capacity ³	\$ 90,000.00	1.00	\$ 90,000.00	100%	\$ 90,000.00
60000 Product #0	\$ -	0.00	\$ -	0%	\$ -
60000 Product #1	\$ -	0.00	\$ -	0%	\$ -
60000 Product #2	\$ -	0.00	\$ -	0%	\$ -
60000 Product #3	\$ -	0.00	\$ -	0%	\$ -
60000 Product #4	\$ -	0.00	\$ -	0%	\$ -
60000 Product #5	\$ -	0.00	\$ -	0%	\$ -
60000 Product #6	\$ -	0.00	\$ -	0%	\$ -
60000 Product #7	\$ -	0.00	\$ -	0%	\$ -
60000 Product #8	\$ -	0.00	\$ -	0%	\$ -
60000 Product #9	\$ -	0.00	\$ -	0%	\$ -
60000 Product #10	\$ -	0.00	\$ -	0%	\$ -
60000 Product #11	\$ -	0.00	\$ -	0%	\$ -
60000 Product #12	\$ -	0.00	\$ -	0%	\$ -
60000 Product #13	\$ -	0.00	\$ -	0%	\$ -
60000 Product #14	\$ -	0.00	\$ -	0%	\$ -
60000 Product #15	\$ -	0.00	\$ -	0%	\$ -
60000 Product #16	\$ -	0.00	\$ -	0%	\$ -
60000 Product #17	\$ -	0.00	\$ -	0%	\$ -
60000 Product #18	\$ -	0.00	\$ -	0%	\$ -
60000 Product #19	\$ -	0.00	\$ -	0%	\$ -
60000 Product #20	\$ -	0.00	\$ -	0%	\$ -
60000 Product #21	\$ -	0.00	\$ -	0%	\$ -
60000 Product #22	\$ -	0.00	\$ -	0%	\$ -
60000 Product #23	\$ -	0.00	\$ -	0%	\$ -
60000 Product #24	\$ -	0.00	\$ -	0%	\$ -
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60000 Product #29	\$ -	0.00	\$ -	0%	\$ -
60000 Product #30	\$ -	0.00	\$ -	0%	\$ -
60000 Product #31	\$ -	0.00	\$ -	0%	\$ -
60000 Product #32	\$ -	0.00	\$ -	0%	\$ -
60000 Product #33	\$ -	0.00	\$ -	0%	\$ -
60000 Product #34	\$ -	0.00	\$ -	0%	\$ -
60000 Product #35	\$ -	0.00	\$ -	0%	\$ -
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60000 Product #65	\$ -	0.00	\$ -	0%	\$ -
60000 Product #66	\$ -	0.00	\$ -	0%	\$ -
60000 Product #67	\$ -	0.00	\$ -	0%	\$ -
60000 Product #68	\$ -	0.00	\$ -	0%	\$ -
60000 Product #69	\$ -	0.00	\$ -	0%	\$ -
60000 Product #70	\$ -	0.00	\$ -	0%	\$ -
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60000 Product #72	\$ -	0.00	\$ -	0%	\$ -
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60000 Product #80	\$ -	0.00	\$ -	0%	\$ -
60000 Product #81	\$ -	0.00	\$ -	0%	\$ -
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60000 Product #88	\$ -	0.00	\$ -	0%	\$ -
60000 Product #89	\$ -	0.00	\$ -	0%	\$ -
60000 Product #90	\$ -	0.00	\$ -	0%	\$ -
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60000 Product #95	\$ -	0.00	\$ -	0%	\$ -
60000 Product #96	\$ -	0.00	\$ -	0%	\$ -
60000 Product #97	\$ -	0.00	\$ -	0%	\$ -
60000 Product #98	\$ -	0.00	\$ -	0%	\$ -
60000 Product #99	\$ -	0.00	\$ -	0%	\$ -
60000 Product					

Spec software programs have creative language when it comes to LEED . . .

“We don't know which products might qualify for this credit but want to pursue it anyway, so we will require the submittal of the Regionally-Sourced Products Form for each product used; this will be done by requiring the submittal of the form along with the first application for payment for the product; the form is specified in Section . . .”

- D. Contractor shall familiarize himself with the relevant requirements and provide the necessary information and instruction to all subcontractors and installers.
- E. Since Contractor and subcontractors may not be familiar with sustainable design requirements, this section includes a summary of the products and procedures intended to achieve sustainable design credits.
 1. Some credits are dependent on proper performance by Contractor and subcontractors.
 2. Other credits involve quantifying percentages by weight or volume and cost; these require careful recordkeeping and reporting by the Contractor.
 3. See www.usgbc.org for more information.

These “assignments” are a *reporting* of what the architect / design team have specified ...



**BUT, doesn't
work have to
be done
before you
get to that
reporting?**

Frustration when discrepancies occur. . .

... *it's what you (architect) specified!*

Are all of these within 500 miles????

B. Regional Materials: Flush wood doors shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Algoma Hardwoods, Inc.
 2. Ampco.
 3. Chappell Door Co.
 4. Eggers Industries.
 5. General Veneer Manufacturing Co.
 6. Graham Wood Doors; an Assa Abloy Group company.
 7. Haley Brothers, Inc.
 8. Ipik Door Company.
 9. Lambton Doors.
 10. Marlite.
 11. Marshfield Door Systems, Inc.
 12. Mohawk Doors; a Masonite company.
 13. Oshkosh Door Company.
 14. Poncraft Door Company.
 15. Vancouver Door Company.

DOORS, GENERAL

In addition to requirements specified, comply with AWI "Architectural Standards."

AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.

- B. Regional Materials: Flush wood doors shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- C. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- D. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

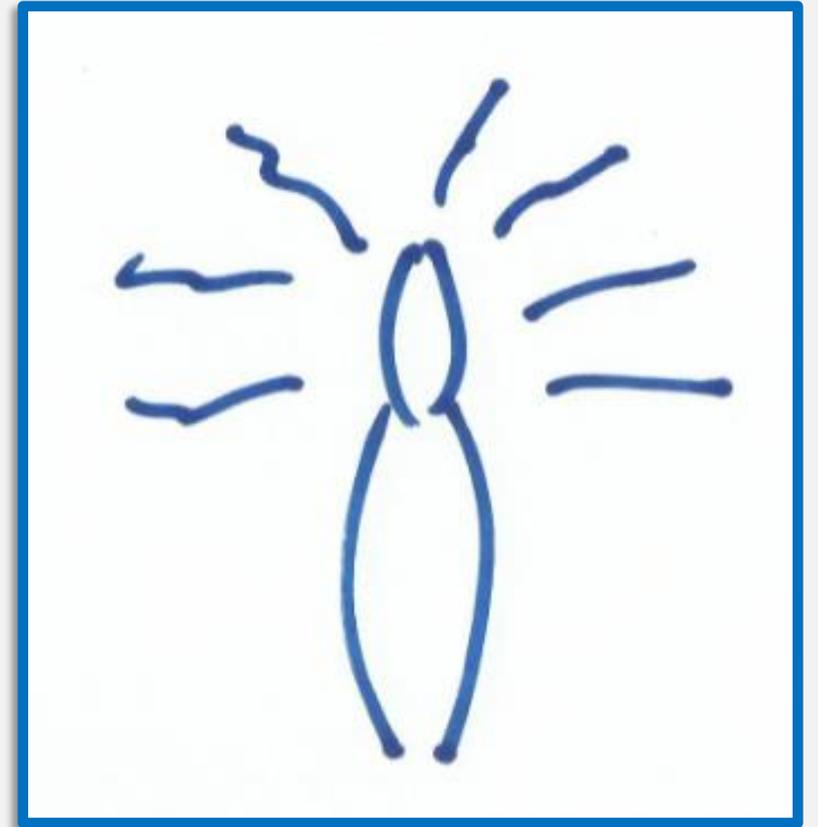
Tracking materials on the projects ...

IMPACTS delivering information to future projects AND allows teams to **OPTIMIZE**



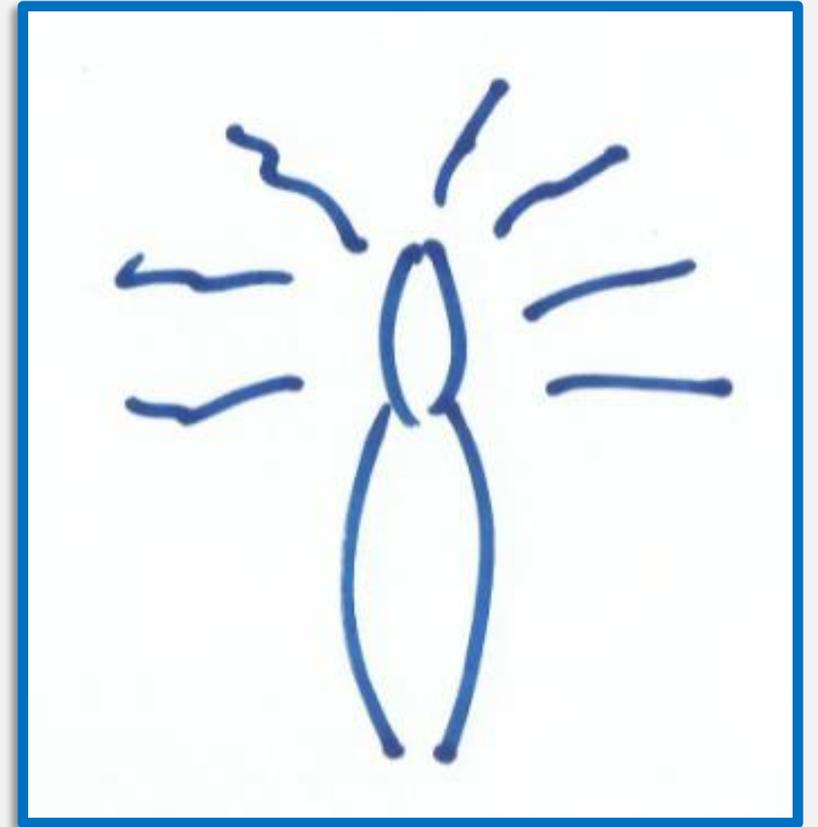
The learnings that I'll describe today were developed, out of *frustration* ...

- With the phrase “... *for LEED*”
- With the *disconnect* between the team members *selecting* materials, *writing* the specs and those *purchasing* materials
- “You’ll need to get that from our spec writer ...”
- Disconnect between credit criteria and written specs
- With “*assignments*” versus integrative thinking



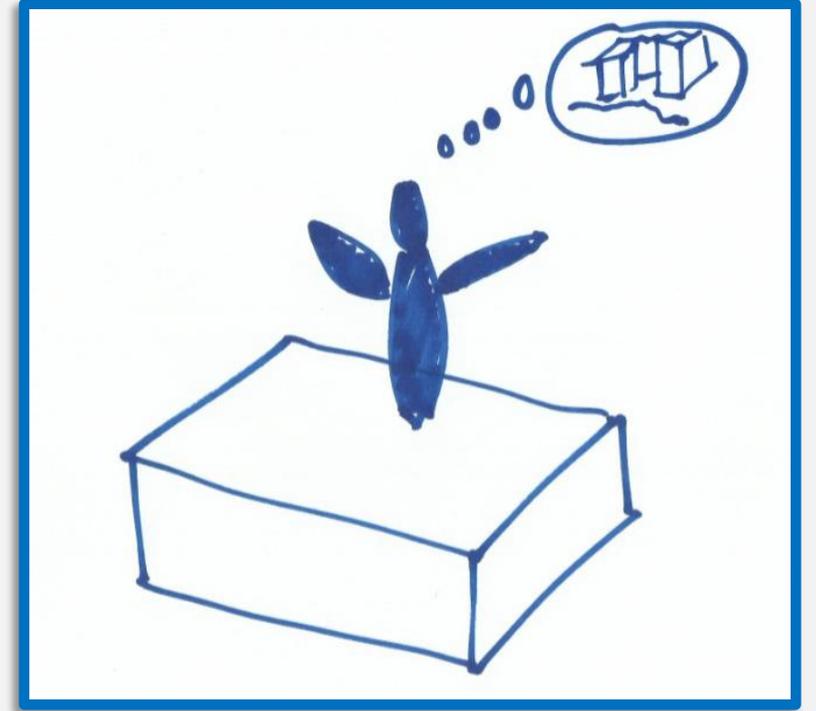
The learnings that I'll describe today were developed,
out of *frustration* ...

- With the complacency of the industry,
“credits are too hard ... so we just won't do them.”
- With the questions
“do we need that point?”
“how many buffer points do we need?”
- With misaligned *motivations* for pursuing rating systems
- With lack of the discussion of the *“value proposition”*
- With the information *available* in the material industry



Rating Systems

- Set the stage for the AEC industry transformation
- 15 years ago ... recycled content? Low VOC paint?
- Evolution of the materials discussion, fostering the industry wide conversations about ...
 - Material transparency/ingredients
 - Raw vs Processed
 - Embodied Carbon
 - Social Equity / Deforestation / Supply Consciousness



LEED v2009 Calculator Sample



Table L-3. Sustainable Materials

Fill in all columns with applicable material data for all attempted credits among MR Credits 3-7. Exclude materials included in MR Credit 1.1 or 1.2: Building Reuse and all mechanical, electrical and plumbing (MEP) components and equipment. If the credit is not attempted, leave the column blank. Include furniture only if actual furniture materials cost was provided in "Tab A. Instructions." To add more materials, click "Add Material." To remove a material, delete the row contents.

Legend

	User-entered
	Read-only

Recycled Content

Regional Materials

General Information				Recycled Content				Regional Materials									
CSI Div (optional)	Description of Material	Manufacturer / Vendor Name	Material Cost ¹ (\$)	MR Credit 3	MR Credit 4	Percent Post-Consumer (%)	Percent Pre-Consumer (%)	Sustainable Criteria Value (\$)	Cutsheet Provided ²	MR Credit 5	Calculation Method	Option 1	Option 1		Sustainable Criteria Value (\$)	Cutsheet Provided ²	MR Credit 6
											Percent Regional (%)	Extraction Distance ³ (mi)	Manufacture Distance ³ (mi)				
	4", 8" 12" CMU	LoJac/BlockWorks	\$ 320,000.00			0.0%	14.0%	\$ 22,320.00	No		100.0%	500	40	\$ 320,000.00	No		
	Sand	LoJac/BlockWorks	\$ 32,000.00			0.0%	0.0%	\$ -	No		100.0%	120	40	\$ 32,000.00	No		
	Mortar	LoJac/BlockWorks	\$ 65,500.00			0.0%	0.0%	\$ -	No		100.0%	500	250	\$ 65,500.00	No		
	CMU Mix 40131	Smyrna Ready Mix	\$ 95,000.00			0.0%	4.0%	\$ 1,900.00	No		100.0%	225	10	\$ 95,000.00	No		
	Ladder-Mesh	Wire Bond	\$ 28,000.00			82.8%	17.0%	\$ 25,564.00	No		100.0%	410	200	\$ 28,000.00	No		
	PVC Control Joint	Wire Bond	\$ 2,800.00			0.0%	100.0%	\$ 1,400.00	No		0.0%	501	501	\$ -	No		
	Cavity Net Flashing	Wire Bond	\$ 2,900.00			0.0%	40.0%	\$ 580.00	No		0.0%	501	501	\$ -	No		
	Copper Fabric Flashing	Wire Bond	\$ 9,000.00			0.0%	90.0%	\$ 4,050.00	No		20.0%	223	200	\$ 1,800.00	No		
	Aqua Flash 500	Wire Bond	\$ 600.00			10.0%	10.0%	\$ 90.00	No		80.0%	500	459	\$ 480.00	No		
	Cell Vent #3601	Wire Bond	\$ 800.00			0.0%	0.0%	\$ -	No		100.0%	500	273	\$ 800.00	No		
003 RC/RM	Brick - Carolina Ceramic Rosewood Sm	Carolina	\$ 157,865.40			0.0%	9.0%	\$ 7,103.94	Yes		100.0%	500	358	\$ 157,865.40	Yes		
003 RC/RM	Brick - Carolina Ceramic Pebble Beach	Carolina	\$ 36,521.10			0.0%	25.0%	\$ 4,565.14	Yes		100.0%	500	358	\$ 36,521.10	Yes		
003 RC/RM	Brick - Ceramic Sable Smooth	Carolina	\$ 16,964.64			0.0%	9.0%	\$ 763.41	Yes		100.0%	500	358	\$ 16,964.64	Yes		
	General Shale GrayStone Sm	General Shale	\$ 3,588.00			0.0%	0.0%	\$ -	No		0.0%	501	501	\$ -	No		
	Structural Steel - W-Shape Beams	Steel Dynamics - Roanoke	\$ 10,200.00			79.0%	15.0%	\$ 8,823.00	No		0.0%	501	438	\$ -	No		
	Angles	Steel Dynamics - Roanoke	\$ 8,500.00			79.0%	15.0%	\$ 7,352.50	No		0.0%	501	438	\$ -	No		
	Tubing	Bull Moose- Trenton GA	\$ 2,000.00			20.6%	11.1%	\$ 523.20	No		0.0%	501	150	\$ -	No		
001 RC/RM	Steel Joist	Nucor - Birmingham	\$ 277,300.00			82.8%	17.0%	\$ 253,174.90	Yes		84.6%	500	325	\$ 234,595.80	Yes		
001 RC/RM	Steel Decking	Nucor - Birmingham	\$ 84,900.00			57.2%	11.7%	\$ 53,529.45	Yes		96.3%	500	125	\$ 81,758.70	Yes		
002 RC/RM	Channel	Gerdau - Charlotte NC	\$ 5,000.00			66.2%	27.5%	\$ 3,997.50	Yes		93.7%	500	409	\$ 4,685.00	Yes		
002 RC/RM	Flat Bar	Gerdau - Charlotte NC	\$ 1,800.00			66.2%	27.5%	\$ 1,439.10	Yes		93.7%	500	409	\$ 1,686.60	Yes		
002 RC/RM	Angle	Gerdau - Charlotte NC	\$ 10,500.00			66.2%	27.5%	\$ 8,394.75	Yes		93.7%	500	409	\$ 9,838.50	Yes		
002 RC/RM	Channel	Gerdau - Jackson TN	\$ 10,500.00			82.2%	15.1%	\$ 9,423.75	Yes		97.3%	500	102	\$ 10,216.50	Yes		
002 RC/RM	Pipe	Gerdau - Jackson TN	\$ 4,500.00			82.2%	15.1%	\$ 4,038.75	Yes		97.3%	500	102	\$ 4,378.50	Yes		
002 RC/RM	Square Bar	Gerdau - Jackson TN	\$ 2,000.00			82.2%	15.1%	\$ 1,795.00	Yes		97.3%	500	102	\$ 1,946.00	Yes		
002 RC/RM	Plate/Sheet	Gerdau - Jackson TN	\$ 3,000.00			82.2%	15.1%	\$ 2,692.50	Yes		97.3%	500	102	\$ 2,919.00	Yes		



LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name:

Date:

Y ? N

Y	?	N	Credit	Integrative Process	1
---	---	---	--------	---------------------	---

0 0 0 Location and Transportation 16

Y	?	N	Credit	LEED for Neighborhood Development Location	16
Y	?	N	Credit	Sensitive Land Protection	2
Y	?	N	Credit	High Priority Site	1
Y	?	N	Credit	Surrounding Density and Diverse Uses	5
Y	?	N	Credit	Access to Quality Transit	5
Y	?	N	Credit	Bicycle Facilities	1
Y	?	N	Credit	Reduced Parking Footprint	1
Y	?	N	Credit	Green Vehicles	1

0 0 0 Sustainable Sites 0

Y	?	N	Prereq	Construction Activity Pollution Prevention	Required
Y	?	N	Credit	Site Assessment	1
Y	?	N	Credit	Site Development - Protect or Restore Habitat	2
Y	?	N	Credit	Open Space	1
Y	?	N	Credit	Rainwater Management	3
Y	?	N	Credit	Heat Island Reduction	2
Y	?	N	Credit	Light Pollution Reduction	2

0 0 0 Water Efficiency 0

Y	?	N	Prereq	Outdoor Water Use Reduction	Required
Y	?	N	Prereq	Indoor Water Use Reduction	Required
Y	?	N	Prereq	Building-Level Water Metering	Required
Y	?	N	Credit	Outdoor Water Use Reduction	5
Y	?	N	Credit	Indoor Water Use Reduction	5
Y	?	N	Credit	Cooling Tower Water Use	5
Y	?	N	Credit	Water Metering	5

0 0 0 Energy and Atmosphere 0

Y	?	N	Prereq	Fundamental Commissioning and Verification	Required
Y	?	N	Prereq	Minimum Energy Performance	Required
Y	?	N	Prereq	Building-Level Energy Metering	Required
Y	?	N	Prereq	Fundamental Refrigerant Management	Required
Y	?	N	Credit	Enhanced Commissioning	5
Y	?	N	Credit	Optimize Energy Performance	5
Y	?	N	Credit	Advanced Energy Metering	5
Y	?	N	Credit	Demand Response	5
Y	?	N	Credit	Renewable Energy Production	5
Y	?	N	Credit	Enhanced Refrigerant Management	5
Y	?	N	Credit	Green Power and Carbon Offsets	5

0 0 0 Materials and Resources 13

Y	?	N	Prereq	Storage and Collection of Recyclables	Required
Y	?	N	Prereq	Construction and Demolition Waste Management Planning	Required
Y	?	N	Credit	Building Life-Cycle Impact Reduction	5
Y	?	N	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
Y	?	N	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
Y	?	N	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
Y	?	N	Credit	Construction and Demolition Waste Management	2

0 0 0 Indoor Environmental Quality 16

Y	?	N	Prereq	Minimum Indoor Air Quality Performance	Required
Y	?	N	Prereq	Environmental Tobacco Smoke Control	Required
Y	?	N	Credit	Enhanced Indoor Air Quality Strategies	2
Y	?	N	Credit	Low-Emitting Materials	3
Y	?	N	Credit	Construction Indoor Air Quality Management Plan	1
Y	?	N	Credit	Indoor Air Quality Assessment	2
Y	?	N	Credit	Thermal Comfort	1

0 0 0 Materials and Resources 13

Y	?	N	Prereq	Storage and Collection of Recyclables	Required
Y	?	N	Prereq	Construction and Demolition Waste Management Planning	Required
Y	?	N	Credit	Building Life-Cycle Impact Reduction	5
Y	?	N	Credit	Building Product Disclosure and Optimization - <u>Environmental Product Declarations</u>	2
Y	?	N	Credit	Building Product Disclosure and Optimization - <u>Sourcing of Raw Materials</u>	2
Y	?	N	Credit	Building Product Disclosure and Optimization - <u>Material Ingredients</u>	2
Y	?	N	Credit	Construction and Demolition Waste Management	2

LEED v4



LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name:

Date:

Y ? N

Y	Credit	Integrative Process	1
0 0 0 Location and Transportation 16			
Y	Credit	LEED for Neighborhood Development Location	16
Y	Credit	Sensitive Land Protection	2
Y	Credit	High Priority Site	1
Y	Credit	Surrounding Density and Diverse Uses	5
Y	Credit	Access to Quality Transit	5
Y	Credit	Bicycle Facilities	1
Y	Credit	Reduced Parking Footprint	1
Y	Credit	Green Vehicles	1

0 0 0 Materials and Resources 13			
Y	Prereq	Storage and Collection of Recyclables	Required
Y	Prereq	Construction and Demolition Waste Management Planning	Required
Y	Credit	Building Life-Cycle Impact Reduction	5
Y	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
Y	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
Y	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
Y	Credit	Construction and Demolition Waste Management	2

0 0 0 Sustainable Sites 10			
Y	Prereq	Construction Activity Pollution Prevention	Required
Y	Credit	Site Assessment	1
Y	Credit	Site Development - Protect or Restore Habitat	2
Y	Credit	Open Space	1
Y	Credit	Rainwater Management	2
Y	Credit	Heat Island Reduction	2
Y	Credit	Light Pollution Reduction	1

0 0 0 Indoor Environmental Quality 16			
Y	Prereq	Minimum Indoor Air Quality Performance	Required
Y	Prereq	Environmental Tobacco Smoke Control	Required
Y	Credit	Enhanced Indoor Air Quality Strategies	2
Y	Credit	Low-Emitting Materials	3
Y	Credit	Construction Indoor Air Quality Management Plan	1
Y	Credit	Indoor Air Quality Assessment	2
Y	Credit	Thermal Comfort	1

0 0 0 Water Efficiency 6			
Y	Prereq	Outdoor Water Use Reduction	Required
Y	Prereq	Indoor Water Use Reduction	Required
Y	Prereq	Building-Level Water Metering	Required
Y	Credit	Outdoor Water Use Reduction	2
Y	Credit	Indoor Water Use Reduction	6
Y	Credit	Cooling Tower Water Use	2
Y	Credit	Water Metering	1

Y	Credit	Low-Emitting Materials	3
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0 0 0 Energy and Atmosphere 33			
Y	Prereq	Fundamental Commissioning and Verification	Required
Y	Prereq	Minimum Energy Performance	Required
Y	Prereq	Building-Level Energy Metering	Required
Y	Prereq	Fundamental Refrigerant Management	Required
Y	Credit	Enhanced Commissioning	6
Y	Credit	Optimize Energy Performance	18
Y	Credit	Advanced Energy Metering	1
Y	Credit	Demand Response	2
Y	Credit	Renewable Energy Production	3
Y	Credit	Enhanced Refrigerant Management	1
Y	Credit	Green Power and Carbon Offsets	2

0 0 0 Innovation 6			
Y	Credit	Innovation	5
Y	Credit	LEED Accredited Professional	1

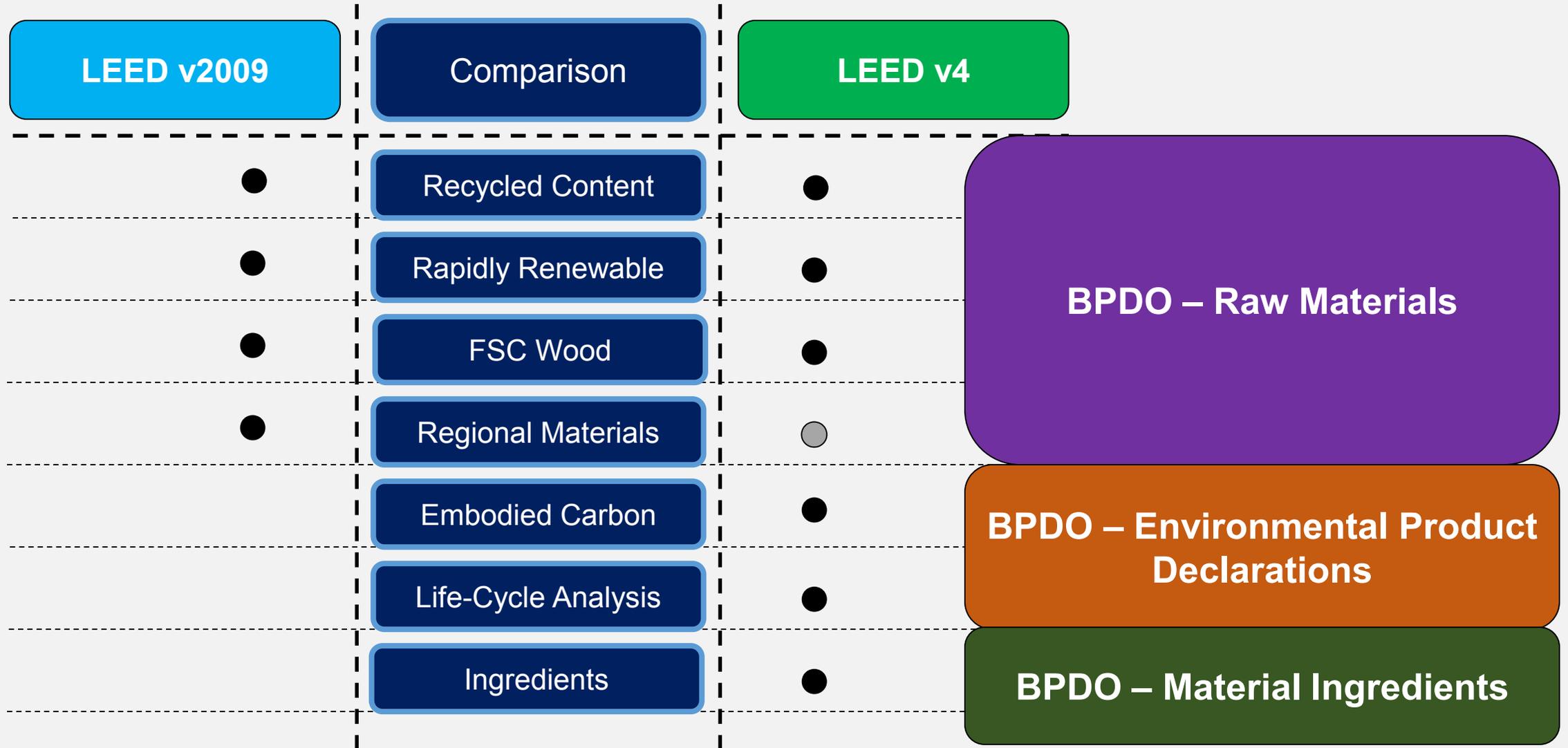
0 0 0 Regional Priority 4			
Y	Credit	Regional Priority: Specific Credit	1
Y	Credit	Regional Priority: Specific Credit	1
Y	Credit	Regional Priority: Specific Credit	1
Y	Credit	Regional Priority: Specific Credit	1

0 0 0 TOTALS		Possible Points: 110
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110		

LEED v4

- Adhesives, Sealants
- Paints, Coatings
- Flooring
- Composite Wood
- Furniture
- ACT, Insulation, Wallboard

General Emissions Evaluations



LEEDv4 BD+C: New Construction & LEEDv4 ID+C: Commercial Interiors

MR: Building Product Disclosure and Optimization

Environmental Product Declarations

Standardized way of communicating environmental effects associated with the life-cycle of a product.

- Raw Material Extraction (Resource Depletion)
- Energy Use
- Chemical Make-up
- Waste Generation
- Emissions to air, soil and water

Option 1 – # of Products, weighted by $\frac{1}{4}$, $\frac{1}{2}$, 1

Option 2 – Optimized = 50% by cost

20
Products

Exemplary
Performance
= 40 Products

LEEDv4 BD+C: New Construction & LEEDv4 ID+C: Commercial Interiors

MR: Building Product Disclosure and Optimization

BPDO – Sourcing of Raw Materials

Communication of raw material environmental extraction practices and supply:

- Option 1: Corporate Sustainability Reporting
- Option 2: Leadership Extraction Practices
 - Extended Producer Responsibility
 - Bio-Based Materials
 - Wood Products
 - Material Reuse
 - Recycled Content

Option 1 – # of Products, weighted by ½, 1

Option 2 – Optimized = 25% by cost

20
Products

25%, by cost

LEEDv4 BD+C: New Construction & LEEDv4 ID+C: Commercial Interiors

MR: Building Product Disclosure and Optimization

Material Ingredients

Selecting products for which the chemical ingredients in the product are inventoried.

Option 1 – There are several available types of inventories, including:

- Health Product Declaration
- Cradle to Cradle
- Declare Label
- Cradle to Cradle Material Health Certificate:

Option 2 – 25% by cost of all installed products optimizing inventories, including:

- Cradle to Cradle Certified v2, v3

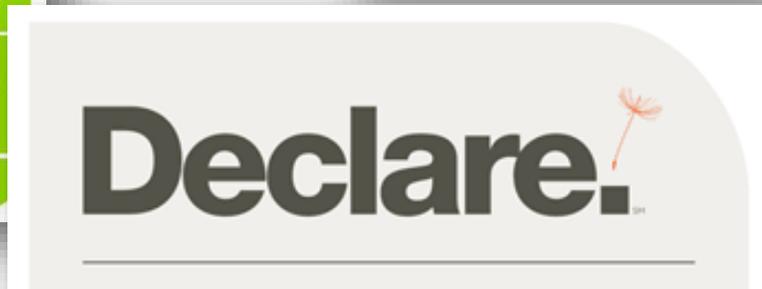
Option 1 – # of Products

Option 2 – Optimized = 25% by cost

20
Products

Exemplary
Performance
= 40 Products

Certifying Entities



Black	Urgent concern due to known persistence, bioaccumulation & toxicity (PBT) or extreme global warming or ozone depletion potential. Avoid immediately.
Red	Very high concern due to known or probable cancer, mutation, endocrine disruption or reproductive or developmental harm, or very high global warming or ozone depletion potential. High priority to eliminate.
Orange	High concern due to possible chronic toxicity, respiratory sensitization, ecotoxicity or high global warming or ozone depletion potential. Next priority for substitution.
Yellow	Moderate concern due to acute health effects or moderate ecotoxicity, global warming or ozone depletion or preliminary data of higher concern health effects. Avoid when possible.
Blue	This substance has been identified for avoidance or careful management on a Restricted Substance List (RSL).

Other Rating Systems

System / Criteria	Living Building Challenge	LEED v4	WELL Building Standard v1
Low-Emitting Materials	●	●	●
Material Transparency	●	●	●
RED LIST	●	●	○
Embodied Carbon	●	●	
FSC Wood	●	●	
Regional Materials	● 310/621/3100 mi	● 100 mi	

For someone who may not use a rating system everyday...
... Research could be a daunting task

- When to start thinking about the correlation of product selection and criteria
- How to engage the value – is this “for points” or something more?
- How to tally the credits while still in design



MOST Recycled Content

Recycled Content



Manufacturer / Model	Recycled Content Ranges*	LEED v4 Contribution (1/2 Pre-Consumer +Post)
Interface Americas GLASBAC RE, Nylon 6	65% Pre +22% Post	(32.5%+22%) = 54.5%
Interface Americas GLASBAC RE, Nylon 6,6	60% Pre + 16% Post	(30%+16%) = 46%
Interface Americas GLASBAC, Nylon 6	63% Pre + 8% Post	(31.5% + 8%) = 39.5%
J&J Invision Kinetex	40% Pre + 16% Post	(20% +16%) = 36%
Interface Americas GLASBAC, Nylon 6,6	58% Pre + 2% Post	(29%+2%)= 31%
Mohawk EcoFlex NXT Gold Modular	56% Pre + 1% Post	(28% +1%)= 29%
J&J Invision Nexus	34% to 56% Pre-Consumer	17% to 28%
Mohawk EcoFlex ICT Gold Modular	49% Pre-Consumer	24.5%
Shaw Contract EcoWorx Carpet Tile with EcoSolution Q	37% to 43% Pre-Consumer	18.5% to 21.5%

LEAST Recycled Content

LEED v2009
LEED v4

*Ranges are based on specific products analyzed, results can vary

LEAST Transparent

Other Attributes

Manufacturer / Model	EPD ¹	HPD ²	Declare ³	Cradle to Cradle ⁴	Cradle to Cradle Material Health Certified ⁵
Interface Americas GLASBAC RE, Nylon 6	Type III	No	No	No	No
Interface Americas GLASBAC RE, Nylon 6,6	Type III	No	No	No	No
J&J Invision Nexus	Type III	No	No	No	No
Interface Americas GLASBAC, Nylon 6	Type III	Yes	No	No	No
Interface Americas GLASBAC, Nylon 6,6	Type III	Yes	No	No	No
Mohawk EcoFlex NXT Gold Modular	Type III	Yes	Red List Free	No	No
J&J Invision Kinetex	Type III	Yes	Red List Free	No	No
Mohawk EcoFlex ICT Gold Modular	Type III	Yes	Declared	No	No
Shaw Contract EcoWorx Carpet Tile with EcoSolution Q	Type III	Yes	LBC Compliant	Silver v3.1	Silver

MOST Transparent

LEED

LEED, WELL

LBC
LEED, WELL

LEED, WELL

LEED, WELL

*1, 2, 3, 4, 5: Analysis is based on specific products analyzed, results can vary with backings and nylon

Environmental Product Declaration

EcoFlex™ NXT Gold Modular Carpet Tile

MOHAWK GROUP PREMIUM NON-PVC MODULAR TILE BACKING SYSTEM



Mohawk Group

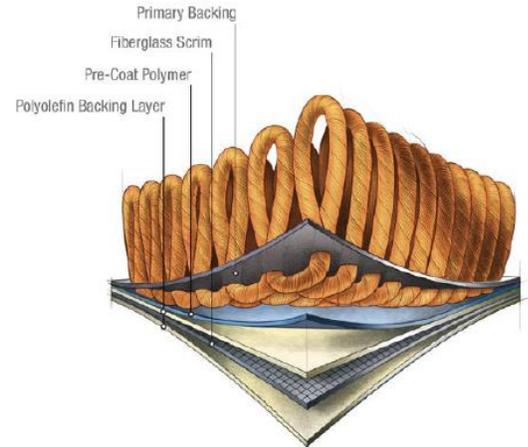
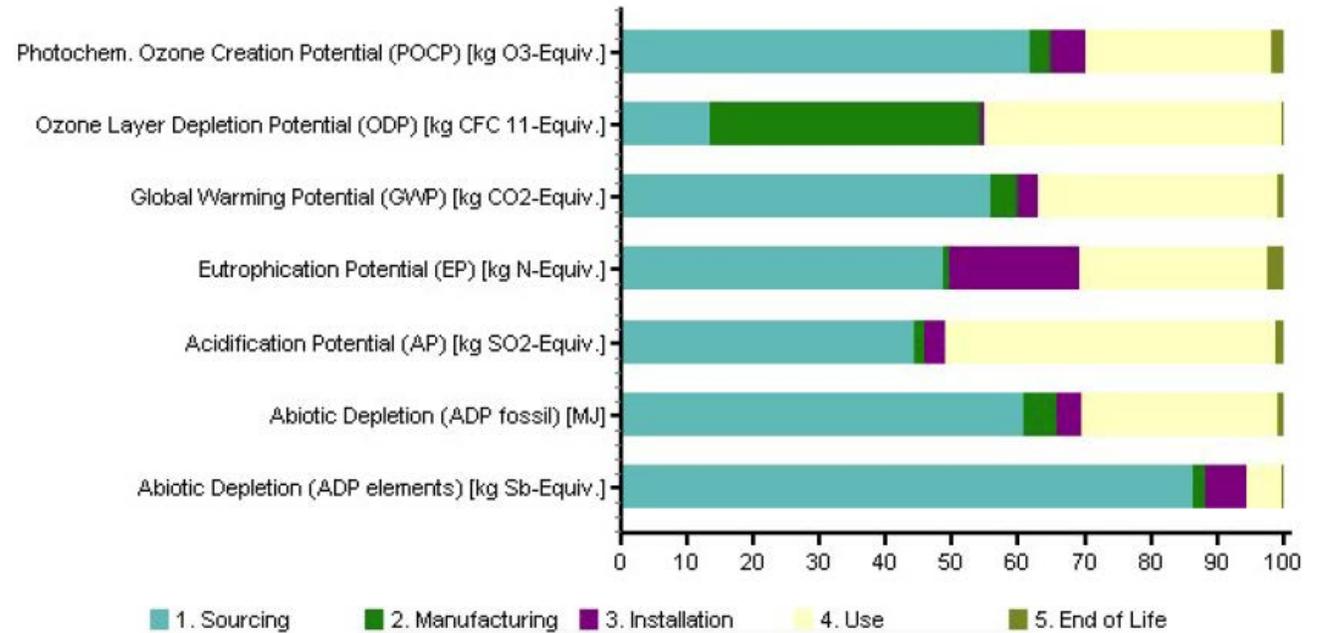
Sustainability is a core value for Mohawk Group. In addition to being the largest flooring company in the world originating in the 1800s, Mohawk is unique among flooring manufacturers in that we own every component of the carpet: yarn, carpet cushion, and carpet tile. Our culture drives us to seek innovation and efficiency throughout the life of our product, thus reducing our consumption of water, energy, and materials. Mohawk also has the most diverse recycling programs in the industry. Through our nation-wide network of partners, we recycle post-consumer carpet and fiber which is subsequently used in the manufacture of other products. Additionally, Mohawk is the nation's largest recycler of plastic containers which are processed into carpet and backing materials in our own facilities. Through third-party verification, Mohawk embraces transparency for the benefit of business and its customers.

For more information visit www.mohawkgroup.com.



GT158 PX II

TRACI impact assessment results for one square meter - 60 year result



A1-A3 Product stage

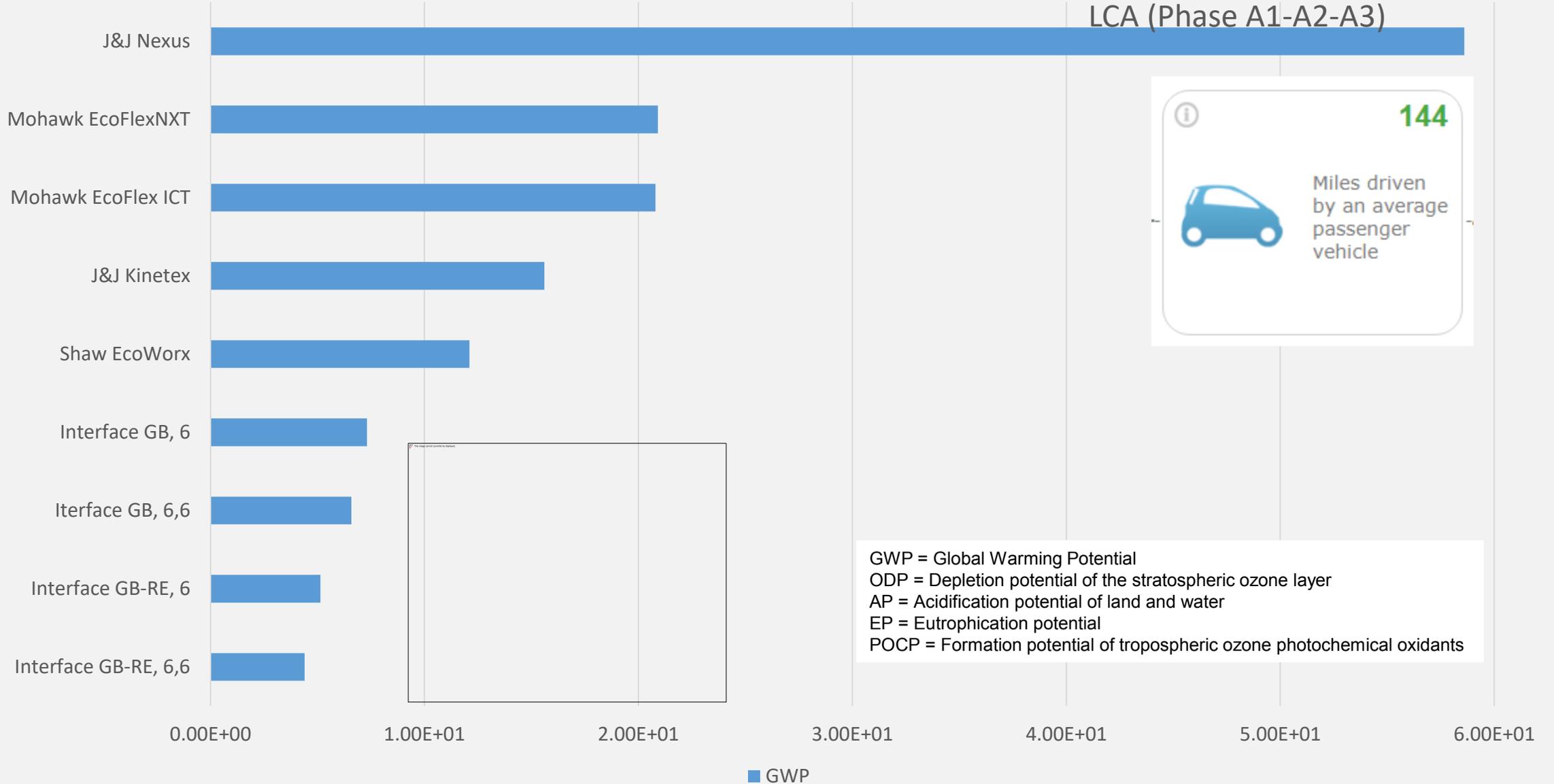
A1 raw material extraction and processing, and processing of recycled materials

A2 transport to the factory and inter-company transport between buildings

A3 manufacturing, including materials, packaging, energy, and waste disposal or recycling

Global Warming Potential (greenhouse gases), in kg CO₂e

LCA (Phase A1-A2-A3)



A1-A3 Product stage

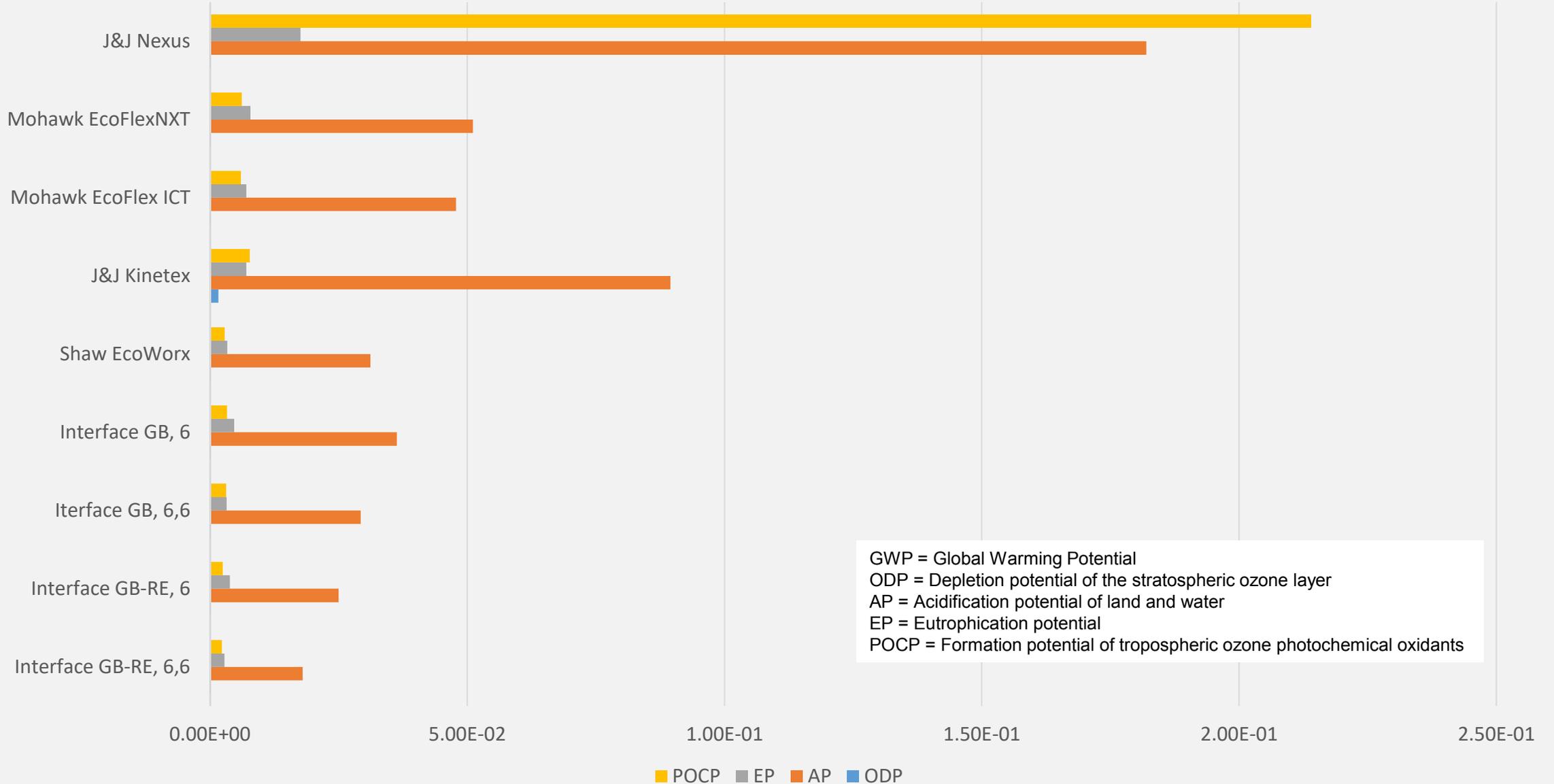
A1 raw material extraction and processing, and processing of recycled materials

A2 transport to the factory and inter-company transport between buildings

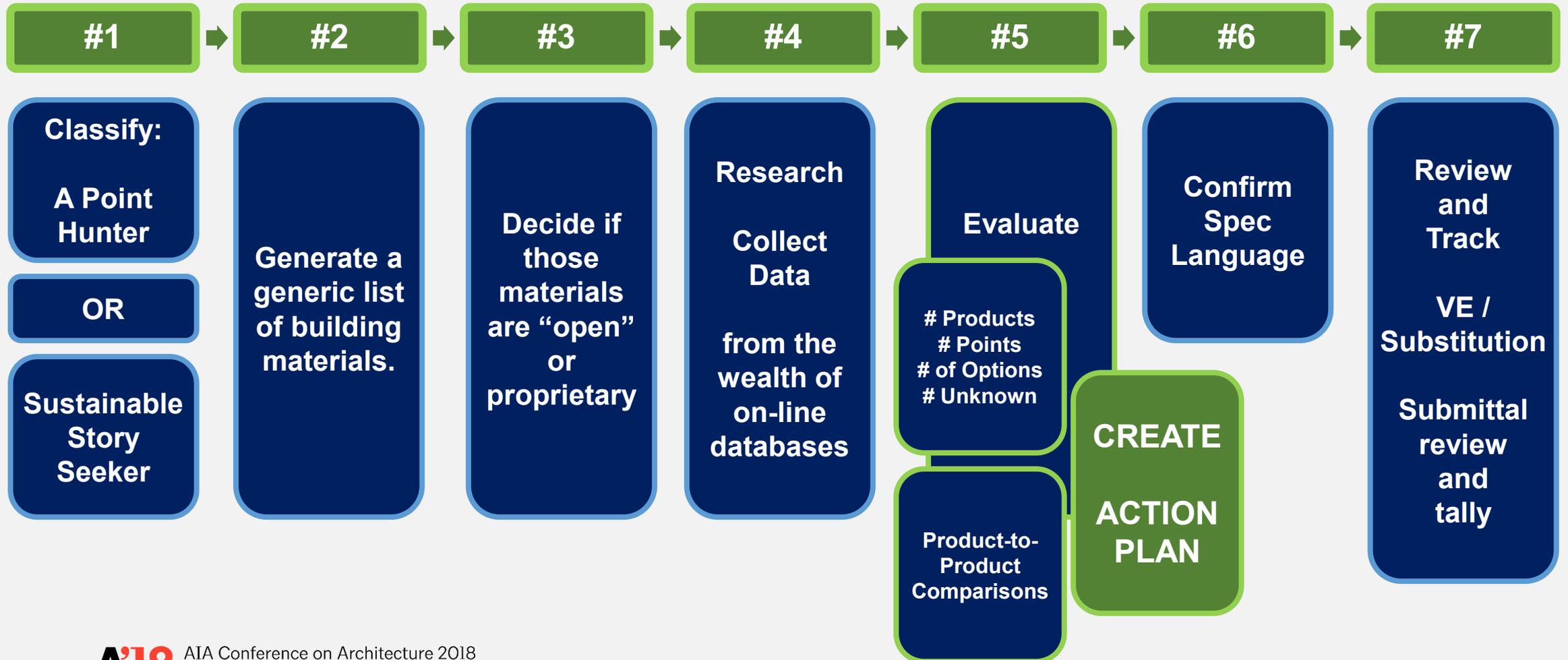
A3 manufacturing, including materials, packaging, energy, and waste disposal or recycling

Other Impact Categories

LCA (Phase A1-A2-A3)



Materials Action Plan Methodology



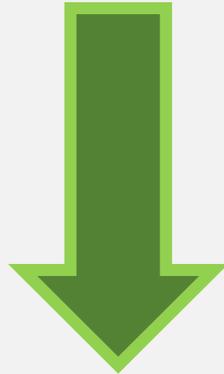
Classify



Point Hunter ?

Quickest, easiest path to earning a point?

For the sake of earning a “point”



Story Seeker ?

Value Proposition of “doing more” with the information?

“Sustainability Story Seeker”

Which Credits Apply?

Environmental Product Declarations

Option 1

Raw Materials

Option 2

Material Ingredients

Option 1

Low Emitting Materials

List Bill of Materials



Open Spec?

Basic Materials List

Many approved equal manufacturers and products.



Proprietary Spec?

Project Specific
Unique Products
No “approved equal”

Common Products for Project:

- Gypsum Board(s)
- Metal Studs
- Acoustic Ceiling Tile(s)
- Door Frames
- Doors
- Carpet
- Floor (Tile), LVT, VCT
- Paint (and Caulk)
- Tile (Grout)
- Etc.

Collect Data



Research Common & Typical

Research Project Specific

Health Product Declaration v2.1
created via: HPDC Online Builder

CLASSIFICATION: 09 91 23.00

PRODUCT DESCRIPTION: PPG SPEEDHIDE ZERO INTERIOR LATEX EGGSHELL IS A PROFESSIONAL GRADE ZERO-VOC* INTERIOR VINYL ACRYLIC FORMULATED TO MEET THE PERFORMANCE REQUIREMENTS OF PROFESSIONAL APPLICATORS. THIS ZERO-VOC*, LOW-ODOR PAINT IS IDEAL FOR PAINTING OCCUPIED SPACES WHILE DELIVERING THE DURABLE PRODUCT PERFORMANCE REQUIRED. SPEEDHIDE ZERO EGGSHELL PROVIDES GOOD HIDE, APPLICATION, AND ANTIMICROBIAL PROPERTIES THAT RESIST MOLD AND MILDEW STAINS ON THE DRY PAINT FILM. THE QUICK DRY ALLOWS FAST RECOAT AND PROVIDES A UNIFORM, SCRUBBABLE EGGSHELL FINISH, RECOMMENDED FOR INTERIOR WALLS, CEILINGS, AND TRIM WHERE A WASHABLE, DURABLE EGGSHELL FINISH IS DESIRABLE. *COLORANTS ADDED TO THIS BASE PAINT MAY INCREASE VOC LEVEL DEPENDING ON COLOR CHOICE.

Section 1: Summary

CONTENT INVENTORY

Threshold per material	Residuals and impurities considered in 1 of 1 materials
<input type="radio"/> 100 ppm	<input type="radio"/> see Section 2: Material Notes
<input checked="" type="radio"/> 1,000 ppm	<input type="radio"/> see Section 5: General Notes
<input type="radio"/> Per GHS SDS	
<input type="radio"/> Per OSHA MSDS	
<input type="radio"/> Other	

Based on the selected Content Inventory Threshold:

Characterized: Yes No

Are the Percent Weight and Role provided for all substances? Yes No

Screened: Yes No

Are all substances screened using Priority Hazard Lists with results disclosed? Yes No

Identified: Yes No

Are all substances disclosed by Name (Specific or Generic) and



Health Product Declaration®

EcoBatt® Foil-Scrim-Kraft (FSK) Faced

Inventory threshold: 100 ppm

Full disclosure known hazards: Yes

Based on the selected content inventory threshold:

Characterized Screened Identified

TOTAL INTENTIONAL INGREDIENTS

GreenScreen® List Translator Scores

- List Translator Likely Benchmark 1 / Benchmark 1 ?
- List Translator Possible Benchmark 1 ?
- List Translator Benchmark Unknown ?
- Benchmark 3 ?
- Benchmark 3 ?
- Benchmark 4 ?
- No GS data available ?

Learn about the GreenScreen® List Translator

Total VOC Content ?

VOC Content data is not applicable for this product category.

Evaluate

PPG: Speedhide Zero Interior Latex Eggshell #6-4310XI					
INTEGRATIVE ANALYSIS	Product Assembly / Manufacturing	Building Product Installation	LIFE CYCLE		
			Product Use	Product Maintenance	End of Life / Reuse
Potential Human Health (Carcinogenicity, Mutagenicity/Genotoxicity, Reproductive & Developmental Toxicity, Acute Toxicity, Eye and Skin Irritation, Aspiration hazard, Chronic toxicity Skin & Respiratory Sensitization, Systemic Toxicity and Organ effects, Air purification/filtration or positive impacts to indoor air quality affecting human health)	Product contains 1 ingredient present at 10%-15% that is listed as a "Cancer" hazard - Titanium Dioxide	Health Impacts during this phase are similar to those in the product manufacturing.	Product meets VOC emission standards for the CDPH/FHLB standard method V1.1 Classroom and Office scenario. Product has negligible health impacts during this phase.	Product requires little to no maintenance during service life and have negligible health impacts during this phase.	Exposure to respirable paint particles should be prevented during demolition and removal.
Potential Environmental Impacts (Air pollution abatement, Bioaccumulation, Persistence, Acute and chronic aquatic toxicity, Water use, Energy use, GHG emissions, Solid waste generation/closed loop process, Biodiversity, habitat and ecosystem)	GWP= ACIDIFICATION= EUTROPHICATION= OZONE Depletion= SMOG= Use of Renewable Energy Sources= Non-renewable Energy Sources= Water Use= Hazardous Waste generation =	Environmental impact during transportation and installation are accounted for in the cradle-to-grave LCA approach and included in the product assembly / manufacturing values.	Product has negligible environmental impacts during this life cycle phase	Product requires little to no maintenance during service life and had negligible environmental impacts during this phase.	Preferred End-of Life Options: Please visit www.paintcare.org for information about disposing unused latex paint. If possible, unused paint should be taken to an appropriate recycling/take-back center or disposed of in accordance with local environmental regulatory agency guidance.
Potential Safety Impacts (Passive survivability during natural disasters, Functionality, including access/egress, during emergencies)	n/a	This product has zero emissions during the application phase.	n/a	n/a	n/a
Functional Unit: 1 m2 of covered and protected substrate for a period of 60 years Lifecycle Scope: Cradle-to-Grave Supplemental Information: Attached HPD, EPD, Greenguard Gold Certificate					

Materials Action Plan

LEEDv4

Materials Action Plan: Building Product Disclosure and Optimization Credits

SAMPLE



CSI Div	Is the material structure or enclosure?	Manufacturer Name	Material Description	Material Cost (\$)	Environmental Product Declaration			Extended Producer Responsibility			Bio-based Materials		Wood Products		Materials Reuse		Recycled Content			Material Ingredient Reporting
					EPD Program Operator	EPD Type	Weighted EPD Value (#)	Extended Producer Responsibility	Percent Extended Producer Responsibility (%)	Sustainable Criteria Value (\$)	Percent Meeting Sustainable Agriculture Network Standard (%)	Sustainable Criteria Value (\$)	Percent FSC Certified (%)	Sustainable Criteria Value (\$)	Percent Salvaged or Reused (%)	Sustainable Criteria Value (\$)	Percent Post-Consumer (%)	Percent Pre-Consumer (%)	Sustainable Criteria Value (\$)	Type of Reporting
ACT-1	No	Armstrong	1752 Georgian	\$30,000.00		0	0.00	Yes	50	\$15,000.00	5	\$1,500.00					2.6	33.3	\$5,775.00	
ACT-2	No	Armstrong	1752 Georgian			0	0.00	Yes	50	\$0.00	5	\$0.00					2.6	33.3	\$0.00	
			ACT Grid	\$30,000.00						\$0.00		\$0.00							\$0.00	
ACT-3	No	Certainiteed	Ecophon Focus DS 48x48	\$10,000.00		Self	0.25	Yes	50	\$5,000.00	0	\$0.00					70	1	\$7,050.00	
ACT-4	No	Certainiteed	Ecophon Focus DS 24x48			Self	0.25	Yes	50	\$0.00	0	\$0.00					70	1	\$0.00	
			ACT Grid							\$0.00		\$0.00							\$0.00	
CB-1	No	Gio Tile	Midtown Base							\$0.00		\$0.00							\$0.00	
Grout	No	Laticrete	Grout 24 Natural Grey							\$0.00		\$0.00							\$0.00	
CPT-1	No	J+J Invision	1819 Kinetex Umbra	\$10,000.00	UL			Yes	50	\$5,000.00		\$0.00					55	0	\$5,500.00	HPD
CPT-2	No	Shaw	5T034 Path / 34761 Portabella	\$20,000.00	UL	Type III	1.00	Yes	50	\$10,000.00	0	\$0.00					0	34.9	\$3,490.00	C2C v2 Silver
CPT-3	No	Shaw	5T034 Path / 34557 Sterling		UL	Type III	1	Yes	50	\$0.00	0	\$0.00					0	34.9	\$0.00	C2C v2 Silver
CPT-4	No	J+J Invision	7992 Marquee Modular	\$10,000.00	NSF	Type III	1.00	Yes	50	\$5,000.00		\$0.00					0	14	\$700.00	
CPT-5	No	J+J Invision	7992 Marquee Modular		NSF	Type III	1.00	Yes	50	\$0.00		\$0.00					0	14	\$0.00	
CPT-6	No	Shaw	5T007 Scupit	\$20,000.00	UL	Type III	1.00	Yes	50	\$10,000.00		\$0.00					0	35.8	\$3,580.00	C2C v2 Silver
CPT-7	No	Shaw	59572 Blockprint		UL	Type III	1.00	Yes	50	\$0.00		\$0.00					0	35.3	\$0.00	C2C v2 Silver
PT-1	No	Sherwin								\$0.00		\$0.00							\$0.00	

Materials Action Plan

Environmental Product Declarations

Complete all columns with applicable material data for the attempted options. If the option is not attempted, leave the column blank.

General Information (from Materials tab)			Option 1 Environmental Product Declaration		
Material Description	Is the material structure or enclosure?	Material Cost	EPD Program Operator	EPD Type	Weighted EPD Value (#)
Eggers Industries - PLAM Door PC	No	\$ 20,296.00	UL (008)	Product-specific Type III	1.00
Eggers Industries - PLAM Door MC	No	\$ 1,204.00	UL (008)	Product-specific Type III	1.00
Surface Overhead Stops, Brass - Glynn-Johnson	No	\$ 333.00			
Hager Flush Bolts	No	\$ 21.00			
Hager Protection Plates, Stainless Steel	No	\$ 1,298.00			
Hager Push/Pull Plates, Stainless Steel	No	\$ 174.00			
Roton Aluminum Hinges	No	\$ 156.00			
Hager - Aluminum Screw On Weatherstripping	Yes	\$ 313.00			
Hager - Stainless Steel Butt Hinges	No	\$ 1,474.00	UL (009)	Product-specific Type III	1.00
Hager - Floor/Wall Stops	No	\$ 105.00			
Hager Aluminum Thresholds	Yes	\$ 110.00	UL (010)	Product-specific Type III	1.00
Hager - Steel Butt Hinges	No	\$ 1,678.00			
LCN - 1460 Series	No	\$ 4,479.00	UL (011)	Product-specific Type III	1.00
LCN - 4110 Series	No	\$ 645.00	UL (012)	Product-specific Type III	1.00
Schlage - B600 Series Deadbolt	No	\$ 110.00			
Schlage - Cylinders	No	\$ 3,193.00			
Schlage - ND Series Cylinder Lock	No	\$ 10,137.00	UL (013)	Product-specific Type III	1.00
Schlage - AD 400	No	\$ 1,467.00			
Schlage - M490	No	\$ 4,491.00			
Schlage PS902	No	\$ 1,389.00			
Steelcraft - F-Series frame (cold rolled)	No	\$ 6,867.00		Product-specific Type III	1.00
Steelcraft - F-Series frame (galvannealed)	Yes	\$ 697.00		Product-specific Type III	1.00
Steelcraft - L-Series Doors (galvannealed)	Yes	\$ 2,098.00		Product-specific Type III	1.00
Von Duprin 98/99 Exit Devices	No	\$ 5,756.00	UL (014)	Product-specific Type III	1.00

06 1053 - MISC ROUGH CARPENTRY

(page 87)

- ADD LEED Submittal Form Text
ADD Composite Wood Documentation

LEED Submittal Form: Complete and include total material cost (cost of product to project, excluding installation labor and equipment). Provide documentation supporting claims on the LEED Submittal Form. Documentation can include written statements on manufacturer's letterhead, certificates, or product data sheets.

Composite Wood Evaluation Documentation

- Evidence of Compliance: Acceptable types of evidence are:
 - Current "No Added Formaldehyde (NAF)" certification
 - Current "Ultra-Low Emitting Formaldehyde (ULEF)" certification
 - Report of laboratory testing performed in accordance with the NAF or ULEF requirements.

(page 90) ADD Product Criteria under 2.5:

Composite wood products installed on the interior side of the weatherproofing envelope shall be labeled ULEF (ultra-low-emitting formaldehyde) OR NAF (no added formaldehyde) per the California Air Resources Board ATCM for formaldehyde.

07 2100 Thermal Insulation

(page 140) ADD LEED Submittal Form

LEED Submittal Form: Complete and include total material cost (cost of product to project, excluding installation labor and equipment). Provide documentation supporting claims on the LEED Submittal Form. Documentation can include written statements on manufacturer's letterhead, certificates, or product data sheets.

ADD

General Emissions Evaluation Documentation

- Evidence of Compliance: Acceptable types of evidence are the following;
- Current UL (GGG) certification.
- Current SCS (CPD) Indoor Advantage Gold certification.
- Current listing in CHPS (HPPD) as a low-emitting product.
- Test report showing compliance and stating exposure scenario used.

(page 141) ADD requirement for "General Emissions Evaluation"
(page 141) See adhesive note

Confirm Spec Language

Use the Action Plan

Material Ingredients

Fill in all columns with applicable material data for all attempted options. If the option is not attempted, leave the column blank.

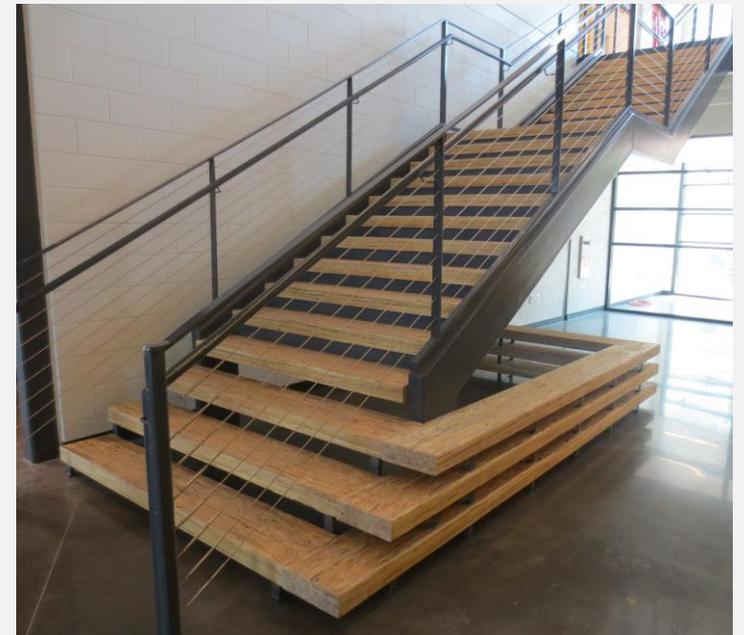
General Information (from Materials tab)			Option 1 Material Ingredient Reporting	Option 2 Material Ingredient Optimization			
Material Description	Is the material structure or enclosure?	Material Cost (\$)	Type of Reporting	Certification Program	Does the entire product meet local criteria?	Sustainable Criteria Value Subtotal (\$)	Total Sustainable Criteria Value with Location Valuation Factor (\$)
Armstrong Rubber Base	No	\$ 3,016.61				\$ -	\$ -
Armstrong Rubber Stair Treads	No	\$ 1,589.59				\$ -	\$ -
Armstrong Risers	No	\$ 514.57				\$ -	\$ -
Taylor Wall Base Adhesive 2440 [U]	No	\$ 460.98				\$ -	\$ -
Shaw Ecohour II Carpet Tile (Ecohour Backing)	No	\$ 2,173.64	Cradle to Cradle	Cradle to Cradle v3 Silver		\$ 2,173.64	\$ 2,173.64
Egrip III [Ecore] 0 VOC	No					\$ -	\$ -
Lok Dots Adhesive	No	\$ 546.25				\$ -	\$ -
Ecore Terrain Rx Sheet Vinyl	No	\$ 15,142.05	Health Product Declaration			\$ -	\$ -
EcoreFit	No	\$ 11,744.38	Health Product Declaration			\$ -	\$ -
EcoSurfaces	No	\$ 20,194.87	Health Product Declaration			\$ -	\$ -
Weld Rod	No	\$ 70.01				\$ -	\$ -
Taylor Tough-Grip Tape	No	\$ 218.28				\$ -	\$ -
Arloco - natural elements LVT - gray	No	\$ 1,768.28				\$ -	\$ -
Arloco - natural elements LVT - gray	No					\$ -	\$ -
Arloco - natural elements LVT - gray	No					\$ -	\$ -
Nature's Path LVT - Manhattan	No					\$ -	\$ -
Nature's Path LVT - Manhattan	No					\$ -	\$ -
Waldock Adhesive? V-82 or V-95?	No	\$ 8,105.91				\$ -	\$ -
Mondao Pie 105 Adhesive (48 g/L)	No	\$ 3,659.88				\$ -	\$ -
Mondo Sport Impact Flooring	No	\$ 42,328.42				\$ -	\$ -
Blend Tile - Shaw Carpet [EcoWork] Mix Tile - Shaw Carpet [EcoWork]	No		Cradle to Cradle	Cradle to Cradle v3 Silver	No	\$ -	\$ -
Blend Tile - Shaw Carpet [EcoWork] Mix Tile - Shaw Carpet [EcoWork]	No					\$ -	\$ -
Shaw Technique Tile / 5T022	No	\$ 14,279.87	Cradle to Cradle	Cradle to Cradle v3 Silver	No	\$ 14,279.87	\$ 14,279.87
Shaw Vanish Tile / 5T023	No	\$ 4,321.38	Cradle to Cradle	Cradle to Cradle v3 Silver	No	\$ 4,321.38	\$ 4,321.38
Shaw Blend Tile / 5T025	No	\$ 2,545.92	Cradle to Cradle	Cradle to Cradle v3 Silver	No	\$ 2,545.92	\$ 2,545.92
Shaw Hint Tile / 5T024	No	\$ 4,763.03	Cradle to Cradle	Cradle to Cradle v3 Silver	No	\$ 4,763.03	\$ 4,763.03

Based on Issued Specs:

Ready for Tally

Ready for VE

Ready for Substitution Requests



Repeat the Process, Optimize

Analyze and consider:

- Intended and reasonably anticipated uses of the product,
- Potential hazardous exposures,
- Product service life,
- Waste generation and/or materials reuse,
- Contributions to health, safety and the environment, including improvements to occupant safety, air quality, water quality, materials reuse, energy efficiency, and carbon mitigation.

Integrative Analysis of Building Materials
www.usgbc.org
Pilot Credit

Schedule of Spec Sections that require completed LEED Submittal Forms to be submitted concurrently with product data and other submittals distributed for review. Manufacturer supporting data of claims made on form is also required (i.e. VOC in g/L, Certificates)

Note: This table is for reference only, specific information is listed spec section by spec section

Definition of Sustainable Design Submittals:

1. LEED Submittal Form: Complete and include total material cost (cost of product to project, excluding installation labor and equipment). Provide documentation supporting claims on LEED Submittal Form. Documentation can include written statements on manufacturer's letterhead, certificates, or product data sheets.
2. "VOC" indicated both "VOC Content" in g/L and "VOC Emissions" per the product's "General Emissions Evaluation" Certificate. Note the VOLUME of all wet-applied products is required.

Spec. Section #	Title	Submit Complete LEED SUBMITTAL FORM	Product Contributions:										OTHER CREDIT		
			Recycled Content	Regional Materials	EPD (Industry Standard or Product Specific)	Raw Ingredients	VOC Adhesive / Sealants	VOC Paints / Coatings	VOC Flooring	ULEF / NAF Composite Wood	ACT Ceilings, Insulation and Wall Covering				
03-20-00	Concrete Reinforcing	Yes	Yes	Yes	Yes	Yes	Yes								
03-30-00	Concrete Cast-in-Place	Yes	Yes	Yes	Yes	Yes		YES, Curing Compound							
04-22-00	CMU	Yes	Yes	Yes						Yes					
04-42-00	Exterior Stone Cladding	Yes	Yes	Yes											
04-72-00	Cast Stone	Yes	Yes	Yes											
05-12-00	Structural Steel	Yes	Yes	Yes	Yes	Yes	Yes								
05-31-00	Steel Decking	Yes	Yes	Yes	Yes	Yes	Yes								
05-41-00	Cold Form Metal Framing	Yes	Yes	Yes	Yes	Yes	Yes								
05-50-00	Metal Fabrication	Yes	Yes	Yes											
05-52-13	Pipe & Tube	Yes	Yes	Yes											

Continued on Next Page

Increases the ability for the design team to ensure they are specifying to meet credit criteria on their next project.

Case Studies

LEED v4 Projects

BD+C

ID+C

- Environmental Product Declarations
- Sourcing of Raw Materials
- Material Ingredient Reporting



Case Studies

Pilot Credit 52

Material Multi-Attribute Assessment

Environmental Product Declarations



LEED BD+C: New Construction | v3 - LEED 2009

Material multi-attribute assessment

MRpc52 | Possible 1 point

Language

Resources

Addenda

Forum

Intent

Pilot Credit Closed

This pilot credit was closed on 3/15/2017. Projects registered for this pilot prior to 3/15/2017 may continue to use the pilot credit as part of their certification.

To increase the use of products and materials with life cycles, ingredients, and attributes that improve overall environmental, economic and social performance.

Requirements

Option 1. environmental product declaration (EPD) (1 point)

Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below.

- Product-specific declaration.
 - Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one quarter (1/4) of a product for the purposes of credit achievement calculation.
- Environmental Product Declarations which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - Industry-wide (generic) EPD – Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator are valued as one half (1/2) of a product for purposes of credit achievement calculation.
 - Product-specific Type III EPD – Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator are valued as one whole product for purposes of credit achievement calculation.
- USGBC approved program – Products that comply with other USGBC approved environmental product declaration frameworks.

Case Studies

Pilot Credit 76

Material Ingredient Reporting

- Health Product Declaration
- Cradle to Cradle
- Declare Label

LEED BD+C: New Construction | v3 - LEED 2009
Material ingredient reporting
MRpc76 | Possible 1 point

Language Resource Addenda Forum All

Intent

Pilot Credit Closed
This pilot credit was closed on 3/15/2017. Projects registered for this pilot prior to 3/15/2017 may continue to use the pilot credit as part of their certification.

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Requirements

Option 1. material ingredient reporting (1 point)
Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).

- **Manufacturer inventory.** The manufacturer has published complete content inventory for the product following these guidelines:
 - A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN) and/or European Community Number (EC Number)
 - Materials defined as trade secret or intellectual property may withhold the name and/or CASRN/EC Number but must disclose role, amount and hazard screen using either:
 - GreenScreen benchmark, as defined in GreenScreen v1.2.
 - The Globally Harmonized System of Classification and Labeling of Chemicals rev6 (2015) (GHS)
 - The hazard screen must be applied to each trade secret ingredient and the inventory lists the hazard category for each of the health hazards included in Part 3 of GHS (e.g. "GHS Category 2 Carcinogen").
 - Identify in the inventory all hazard classes for which a classification cannot be made because there are insufficient data for a particular endpoint(s).
- **Health Product Declaration.** The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
- **Cradle to Cradle.** The end use product has been certified at the Cradle to Cradle v2 Basic level or Cradle to Cradle v3 Bronze level.
- **Declare.** The Declare product label must indicate that all ingredients have been evaluated and disclosed down to 1000 ppm.
- **ANSI/BIFMA e3 Furniture Sustainability Standard.** The documentation from the assessor or scorecard from BIFMA must demonstrate the product earned at least 3 points under 7.5.1.3 Advanced Level in e3-2014 or 3 points under 7.4.1.3 Advanced Level in e3-2012.
- **Cradle to Cradle Material Health Certificate.** The product has been certified at the Bronze level or higher and at least 90% of materials are assessed by weight.
- **Product Lens Certification**
- **Facts - NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric** at any certification level
- **USGBC approved program.** Other USGBC approved programs meeting the material ingredient reporting criteria.

1201 Demonbreun – LEED v2009 Core & Shell

Construction Completed in 2017
Certification Completed in 2017

Pilot Credit #76 (MI)
Pilot Credit #52 (EPD)

What was planned?

How was the action plan used?

Results



Tusculum Elementary School – LEED v2009 for Schools

Construction Completed in 2017
Certification Completed in 2017

Pilot Credit # 76 (MI)
Pilot Credit # 52 (EPD)

Use this as a starting point
conversation of RED LIST
materials



Binkley Garcia Architecture

Corporate HQ – LEED v2009 for New Construction

Construction Completed in 2017
Certification Completed in 2017

Pilot Credit # 52 (EPD)
Pilot Credit # 76 (MI)

What was planned?

How was the action plan used?

Results



VU BioChem – LEED v2009 for Commercial Interiors

Construction Completed in 2017
 Certification Completed in 2018

Pilot Credit #52

What was planned?

How was the action plan used?

Results



Blair + Mui Dowd

Environmental Product Declarations

Complete all columns with applicable material data for the attempted options. If the option is not attempted, leave the column blank.

General Information (from Materials tab)			Option 1 Environmental Product Declaration		
Material Description	Is the material structure or enclosure?	Material Cost	EPD Program Operator		
J&J/Invision Floored II 9708			NSF (001)	Product-specific Type III	1.00
Armstrong Meditone			ASTM (002)	Product-specific Type III	1.00
Armstrong Migrations BBT			ASTM (003)	Product-specific Type III	1.00
Continental Building Products - Firecheck X			FP Innovations (004)	Industry-wide (generic)	0.50
Continental Building Products - Mold Defense Type X			FP Innovations (004)	Industry-wide (generic)	0.50
Continental Building Products - Shaftliner Type X			FP Innovations (004)	Industry-wide (generic)	0.50
Marinoware - ViperStud 20			UL (005)	Product-specific Type III	1.00
Marinoware - CT Shaftwall Studs			UL (005)	Product-specific Type III	1.00
Marinoware - FrameRite Connectors			UL (005)	Product-specific Type III	1.00
Armstrong ACT - DUNE 1772			UL (006)	Product-specific Type III	1.00
Armstrong GRID - Prelude XL			UL (007)	Product-specific Type III	1.00
Armstrong GRID - Axiom Trim			UL (008)	Product-specific Type III	1.00
Knauf - EcoBatt			UL (009)	Product-specific Type III	1.00
McKinney Hinges			UL (010)	Product-specific Type III	1.00
Yale-Mortised Locks			UL (011)	Product-specific Type III	1.00
Yale Closers					
Yale Exit Devices					
Rockwood - Overhead Stops					
Rockwood - KickPlates			UL (012)	Product-specific Type III	1.00
Rockwood - Stops					
Rockwood - Astragal					
Sherwin Williams - B28W02600			NSF (013)	Product-specific Type III	1.00
Sherwin Williams - B30W2651			NSF (014)	Product-specific Type III	1.00
Toto 105 Series Faucet			SM / NSF (015)	Product-specific Type III	1.00
Toto UT445U(V) Urinal			SM / NSF (016)	Product-specific Type III	1.00
Toto TET1LA 1.28 gpf FV			SM / NSF (017)	Product-specific Type III	1.00
Toto CT708E(G) Bowl			SM / NSF (018)	Product-specific Type III	1.00
Toto TEU1UA			SM / NSF (019)	Product-specific Type III	1.00
Haworth - Zody Chair			SCS (020)	Product-specific Type III	1.00

Lendlease Nashville – LEED v2009 for Commercial Interiors – WELL v1 for New Interiors

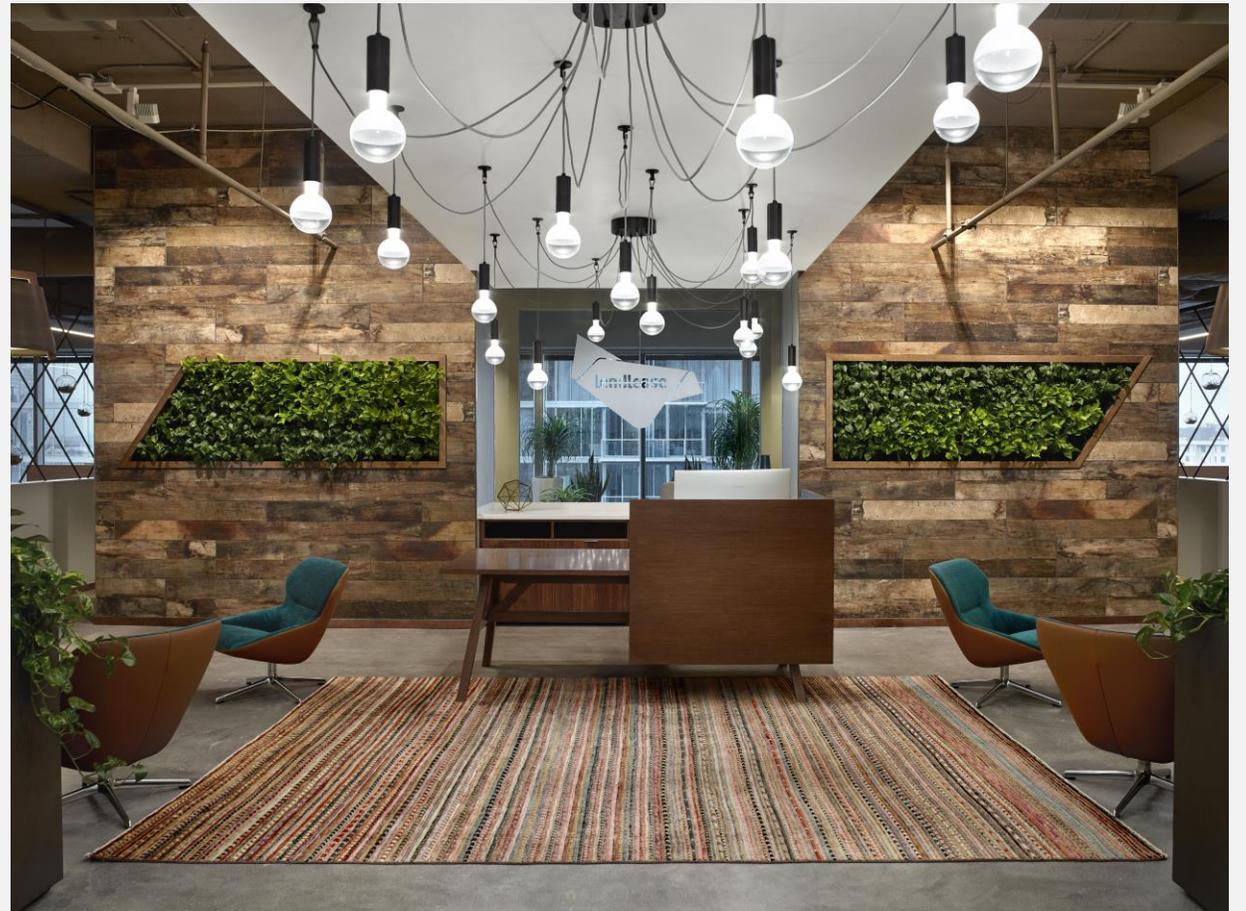
Construction Completed in 2017
Certification Completed in 2017

Pilot Credit # 52 (EPD)

What was planned?

How was the action plan used?

Results



Hastings Architecture Associates, LLC

Healthcare Center – LEED v4 for New Construction

Construction Completed in 2017
Certification Completed in 2018

EPD – Option 1
Raw Materials – Option 2
Materials Ingredients – Option 1

What was planned?

How was the action plan used?

Results



Madison Community Center – LEED v4 for New Construction

Construction Completes in 2018
Certification Pending

EPD – Option 1
Raw Materials – Option 2
Materials Ingredients – Option 1

What was planned?

How was the action plan used?

Results



Hastings Architecture Associates, LLC

VU Eskind Library – LEED v4 for Commercial Interiors

Construction Completes in 2018
Certification Pending

EPD – Option 1
Raw Materials – Option 2
Materials Ingredients – Option 1

What was planned?

How was the action plan used?

Results



Summary

- Classify as “Point Hunter” versus “Sustainable Story Seeker”
- Reinvest in the *credit intents* to guide market transformation
- Reiterate criteria to inform the project team
- Value the research time and repeat the process

Contact Information

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Thank you!