

LEED v4 Lessons Learned

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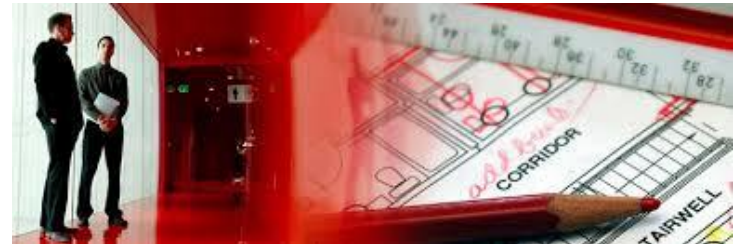
Introductions

- Background
- Perspective
- Relationship



Talking Points

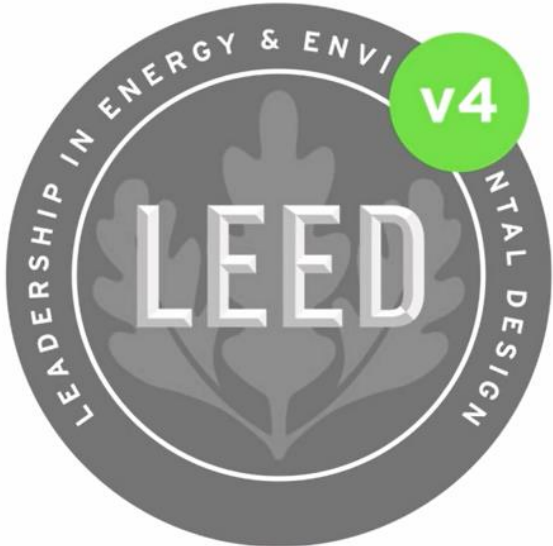
- What is LEED v4?
- OPR to GPR
 - Make it Yours!
 - Beyond LEED
- Owner Lessons Learned
- GC Requirements/Lessons Learned



Early Analysis



VS.



	POSSIBLE: 2
Credit Integrative process	2

LOCATION & TRANSPORTATION POSSIBLE: 18

Credit LEED for neighborhood development location	18
Credit Surrounding density and diverse uses	8
Credit Access to quality transit	7
Credit Bicycle facilities	1
Credit Reduced parking footprint	2

WATER EFFICIENCY POSSIBLE: 12

Prereq Indoor water use reduction	REQUIRED
Credit Indoor water use reduction	12

ENERGY & ATMOSPHERE POSSIBLE: 38

Prereq Fundamental commissioning and verification	REQUIRED
Prereq Minimum energy performance	REQUIRED
Prereq Fundamental refrigerant management	REQUIRED
Credit Enhanced commissioning	5
Credit Optimize energy performance	25
Credit Advanced energy metering	2
Credit Renewable energy production	3
Credit Enhanced refrigerant management	1
Credit Green power and carbon offsets	2

MATERIAL & RESOURCES POSSIBLE: 13

Prereq Storage and collection of recyclables	REQUIRED
Prereq Construction and demolition waste management planning	REQUIRED
Credit Long-term commitment	1
Credit Interiors life-cycle impact reduction	4
Credit Building product disclosure and optimization - environmental product declarations	2
Credit Building product disclosure and optimization - sourcing of raw materials	2
Credit Building product disclosure and optimization - material ingredients	2
Credit Construction and demolition waste management	2

INDOOR ENVIRONMENTAL QUALITY POSSIBLE: 17

Prereq Minimum IAQ performance	REQUIRED
Prereq Environmental tobacco smoke control	REQUIRED
Credit Enhanced IAQ strategies	2
Credit Low-emitting materials	3
Credit Construction IAQ management plan	1
Credit IAQ assessment	2
Credit Thermal comfort	1
Credit Interior lighting	2
Credit Daylight	3
Credit Quality views	1
Credit Acoustic performance	2

INNOVATION POSSIBLE: 6

Credit Innovation	5
Credit LEED Accredited Professional	1

REGIONAL PRIORITY POSSIBLE: 4

Credit Regional priority	4
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TOTAL 110

40-49 Points
CERTIFIED

50-59 Points
SILVER

60-79 Points
GOLD

80+ Points
PLATINUM

Kicking Off

LEED Construction Kick-Off Meeting

- Timing and Purpose of Meeting
- Assembling the Right Team
- Processes/Protocol
- Action Item Identification



Systems Cx

EAp I – Fundamental Commissioning (Cx)

- Bidding/Budgeting the Job
- LEED Cx Kick-Off Meeting
- Submittals
- Cx Field Reporting/Site Visits
- Subcontractor Responsibility



Construction Waste Management

- Waste MGMT plan is now a prerequisite
- Requirements:
 - Same diversion thresholds as v3, however team must ID specific waste streams & ADC does not count
 - New path for reduction of waste (<2.5 lbs/sf)

Calculator

Waste Description	Material Type	Waste Stream	Total Waste (tons)	Diverted Waste (tons)
Cardboard	Cardboard and Papers	Recycled	7.99	7.99
Plastic	Plastic	Recycled	8.59	8.59
Wood	Wood	Recycled	2.97	2.97
Metal	Metals	Recycled	0.58	0.58
Carpet	Carpet and Pad	Recycled	0.15	0.15
Aggregate	Concrete	Recycled	260.97	260.97
Asphalt	Asphalt	Recycled	403.51	403.51
Gypsum	Gypsum Board	Recycled	10.17	10.17
C&D Mixed	Commingled Waste	Recycled	5.67	5.67
Trash	Commingled Waste	Landfill	8.47	0.00
Total construction waste (tons)				709.07
Total diverted construction waste (tons)				700.60
Percentage of construction waste diverted from landfill				98.81%
Total number of material streams				2

Materials Credits

Lessons Learned:

- Industry is changing for the better!
- Engage all stakeholders early, make reqs clear
- Establish tools & roles for tracking
- Leverage MSDS

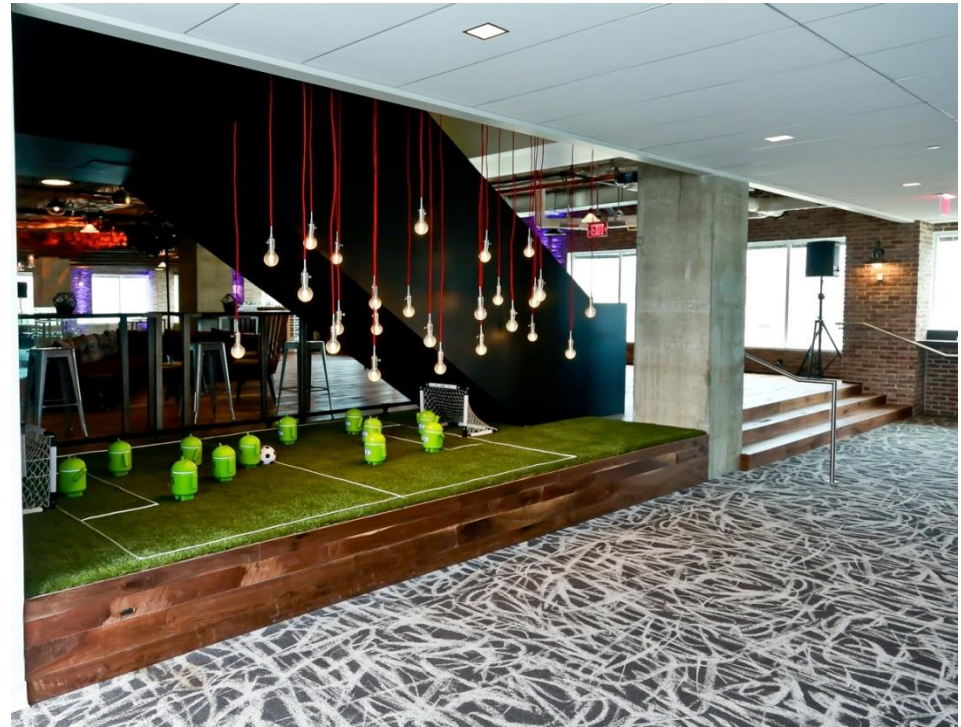


Photo Credit © Tony Powell

Materials Credits Cont.

Materials and Resources Credits

- Life Cycle Assessment
- EDP
- Sourcing of Raw Materials
- Material Ingredients
 - HPD/CASRN



Low Emitting Materials

TABLE 1. Thresholds of compliance with emissions and content standards for 7 categories of materials

Category	Threshold	Emissions and content requirements
Interior paints and coatings applied on site	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> • General Emissions Evaluation for paints and coatings applied to walls, floors, and ceilings • VOC content requirements for wet applied products
Interior adhesives and sealants applied on site (including flooring adhesive)	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> • General Emissions Evaluation • VOC content requirements for wet applied products
Flooring	100%	<ul style="list-style-type: none"> • General Emissions Evaluation
Composite wood	100% not covered by other categories	<ul style="list-style-type: none"> • Composite Wood Evaluation
Ceilings, walls, thermal, and acoustic insulation	100%	<ul style="list-style-type: none"> • General Emissions Evaluation
Furniture	At least 90%, by cost	<ul style="list-style-type: none"> • Furniture Evaluation

TABLE 2. Points for number of compliant categories of products

Compliant categories	Points
3	1
5	2
6	3

IAQ – During Construction

Construction IAQ Management

- Implement Plan
- Measures/Provisions Documentation
- Timing
- Tobacco Use



IEQc4 – Indoor Air Quality Assessment

Lessons Learned:

- Flush-out presents schedule challenge
- Air testing criteria have changed, you have to look closely to notice
- CREL VOCs (CDPH v1.1, Table 4-1) created unrealistic sampling times, calibration curves, & testing methods



Compound	Allowable Concentration ($\mu\text{g}/\text{m}^3$)	Volume Needed (L)	Time to Volume
Phenol	100	100	1,000 minutes (16.67 hours)
Epichlorohydrin	1.5	6,666.67	33,333.33 minutes (23.15 days)
Ethylene glycol monoethyl ether	35	285.71	1428.57 minutes (23.8 hours)
Ethylene glycol monoethyl ether	30	333.33	1666.67 minutes (27.78 hours)
Ethylene glycol monoethyl ether acetate	45	222.22	1111.11 minutes (18.52 hours)

IEQc9 – Acoustic Performance

Lessons Learned:

- ASHRAE 2011 Standards for NC levels are difficult
- Tradeoff with views/daylight: Glass partitions w/ doors make it difficult to achieve $STC > 50$
- Reverberation time requirement is difficult to achieve in open office

Table 2: Maximum HVAC Background Noise Levels

Space	ASHRAE 2011, Chapter 48, Table 1	ANSI/ASA S12.2-2008
Large Conference Room	NC 30	NC 25-30
Small Conference Room	NC 30	NC 30-35
Private Office	NC 30	NC 35-40
Open-plan offices	NC 40	NC 35-40
Public Circulation	NC 40	NC 40-50



Questions?

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