

Why Laboratory Embodied Carbon?

#### **EMBODIED CARBON - TECHNICAL BUILDINGS**

LCA tools have experienced a renaissance, enabling an increasing focus on the embodied carbon impacts of structural materials in light commercial, multifamily, and residential applications. But little is known about the embodied carbon intensity of other building types and systems.

Improved design resources will enable us to make better choices at earlier design phases, leading to more beautiful design, better occupant outcomes, and less impact to our fragile climate.

#### WHY LABS?

Labs are designed to support discovery and innovation. Their designs can serve as models for innovation in buildings of all types.

Lab building embodied carbon is significant, due to the intensive structure, finishes, and mechanical systems of these buildings. For example: lab building structural systems are heavier per square foot than office or residential structures, due to their vibration performance. And lab building finishes and built-in casework are significantly more robust than office equivalents.

But hard data is lacking on the embodied carbon intensity of labs and technical buildings that would allow us to quantify these differences.

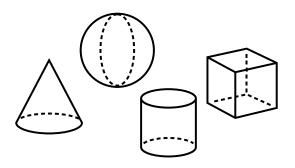
#### LABS RE-IMAGINED

A standard kit of parts for lab planning and lab materials choices has emerged over the past 50+ years. Lab designers have become familiar with a predictable set of choices applying to many projects.

Recent projects show experimentation with a variety of design choices uncommon in laboratory buildings, such as CLT / Timber structural systems, low-carbon concrete, wood cladding, timber curtain wall, and demountable partitions. But no resource brings these experiments into a common framework for evaluating their carbon benefits.

Our goal is to daylight these strategies, quantify their benefits, and advocate for broader adoption. Our hope is this transforms how - and what - we design.

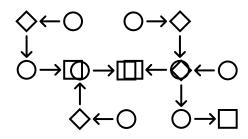
#### Caveats



#### "all models are wrong but some models are useful"

It has been said that "all models are wrong but some models are useful." In other words, any model is at best a useful fiction ... Nevertheless, enormous progress has been made by entertaining such fictions and using them as approximations. - George Box, Statistical Control: By Monitoring and Feedback Adjustment, 1997

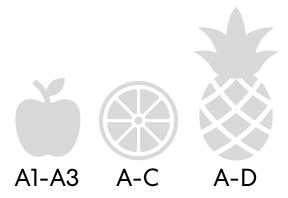
Low Carbon Labs is a simplified model of building systems. It does not include all the systems and products required to make a lab building. But it does demonstrate a method for evaluating individual design choices to improve future projects. We hope that the methods and examples help building owners and designers to contextualize the carbon impact of design choices alongside other conventional project drivers, such as scope, schedule, and cost.



#### Complexity

A key lesson of the study is the surprising difficulty of conducting embodied carbon analysis. There are numerous obstacles, including:

- Lack of EPD data for many products
- Wide variation in EPD scope and format
- Difficulty obtaining quantity takeoffs from design software
- Complexity of conversions between design software units and EPD reporting units
- Complexity of summarizing data across many product categories and creating holistic dashboards
- EC analysis software tools are still developing



#### **Apples, Oranges, and Pineapples**

This study intentionally mixes EPD data from a variety of sources with different Product Category Rules (PCRs), modules (aka. product life cycle stages), and EPD types (ex. product specific vs. industry average).

This is out of necessity. Quality EPD data is sorely lacking for many individual products and, in some cases, for whole product categories.

To maintain "fairness" in comparisons between individual system selections, we have held the calculations within each system to consistent rules (for example, using consistent A1-A3 scope and product specific EPDs).

#### Caveats

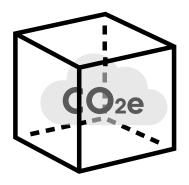


#### **Directionality vs. Magnitude**

This analysis represents a set of design choices, not a complete embodied carbon assessment of a laboratory building.

The complexity and difficulty of assessing just the products and systems included within this study belie the extraordinary difficulty of summarizing the complete Embodied Carbon picture of any building, let alone one as complex as a laboratory.

This leaves us unable to compare the total impact of various systems or design choices relative to the total Embodied Carbon impact of a whole building. For example, we are unable to say "Structure represents X% of a lab building's Embodied Carbon", because we don't know what a lab building's total embodied carbon is. Nobody does.



#### So what can we say about Embodied Carbon?

This study shows that many design choices have significant Embodied Carbon impact that can be easily compared to a building's Operational Carbon profile from an energy model or utility meters.

While the absolute magnitude of carbon reduction is debatable, the results clearly show that Embodied Carbon reduction options exist that are equivalent to years (or even decades) of Operational Carbon pollution.

As we have effective design choices to reduce Operational Carbon due to building energy use and building energy fuel source choices, we also have effective design choices to reduce Embodied Carbon due to building construction materials, systems, and methods.



#### Choose your own adventure

Is "Reimagined" right for my project?

We recognize that not all options will be possible for every laboratory project. Program differences, code / jurisdictional issues, and scope / schedule / budget drivers may place one or several system choices out of reach for a particular project.

So, we have deliberately structured "Low Carbon Labs" as a "choose your own adventure" of systemby-system choices. This has two advantages:

- Teams can pick and choose individual options as the opportunity arises to make small, medium, or large improvements on a particular project.
- 2. Teams can adapt the method to evaluate additional systems, options, or choices specific to their particular interests.

#### Scope and Results

#### **SCOPE AND SYSTEMS**

This study uses a 22' wide x 88' long x 1 story (15' high) "module". The 22' width reflects 2x 11' wide lab aisles. The 88' depth is composed of a 33' structural bay for computing / office work, a 33' bay for wet bench ("open lab") work, and a 22' bay for laboratory support / instrument work. This module provides a cross section of typical laboratory building space types.

The study evaluates (3) choices for each of (14) different building systems: superstructure for office and lab; building envelope (wall backup, insulation, cladding, and glazing); interior partitions; doors; floor finishes for office and labs; ceilings for office and labs; lab equipment (fumehoods); chairs; systems furniture; lab casework cabinets and countertop.

For some systems (ex. flooring), we were able to find many EPDs; thus, the challenge was picking realistic system options from many choices. For other systems (ex. lab countertops), very few EPDs were available, leading to limited system options.

#### **SCENARIOS**

The 3 scenarios (Baseline, Improved, Reimagined) are summaries of individual choices within each system type, aggregated. They don't necessarily represent a specific design case. Rather, they capture the potential for savings along a continuum of design choices. Still, the scenarios are useful to explain the potential of the individual choices when combined at the scale of a building.

The **Baseline** scenario provides a point of reference, with many system choices that can be found in conventional laboratory buildings.

**Improved** represents realistically achievable improvements that may be found in progressive projects.

**Reimagined** represents the better choices that we discovered for each system within the scope of the research study.

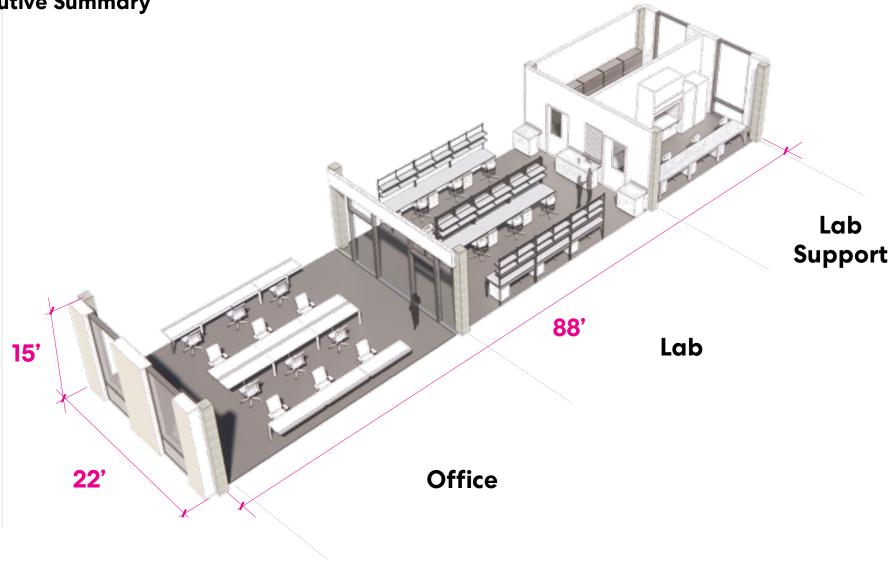
#### **RESULTS**

**Baseline:** The sum of the studied systems within the 22x88 module equates to ~175,000 kg CO2e/sf.

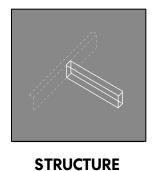
**Improved**: The sum of the studied systems within the 22x88 module equates to ~130,000 kg CO2e/sf, or a reduction of 26% from the baseline. The savings is equivalent to 2-7 years of operational carbon.

**Reimagined:** The sum of the studied systems within the 22x88 module equates to ~50,000 kg CO2e/sf, or a reduction of 73% from the baseline. The savings is equivalent to 7-20 years of operational carbon.

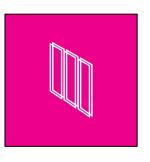
# Scope



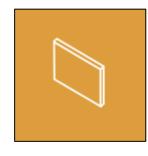
# **Systems**



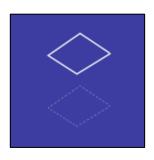
Special thanks to LeMessurier



ENVELOPE OPAQUE



**PARTITIONS** 



**CEILINGS** 



OFFICE SYSTEMS



LAB BENCHTOP



ENVELOPE GLAZING (%)



DOORS



**FLOORS** 



LAB CASEWORK



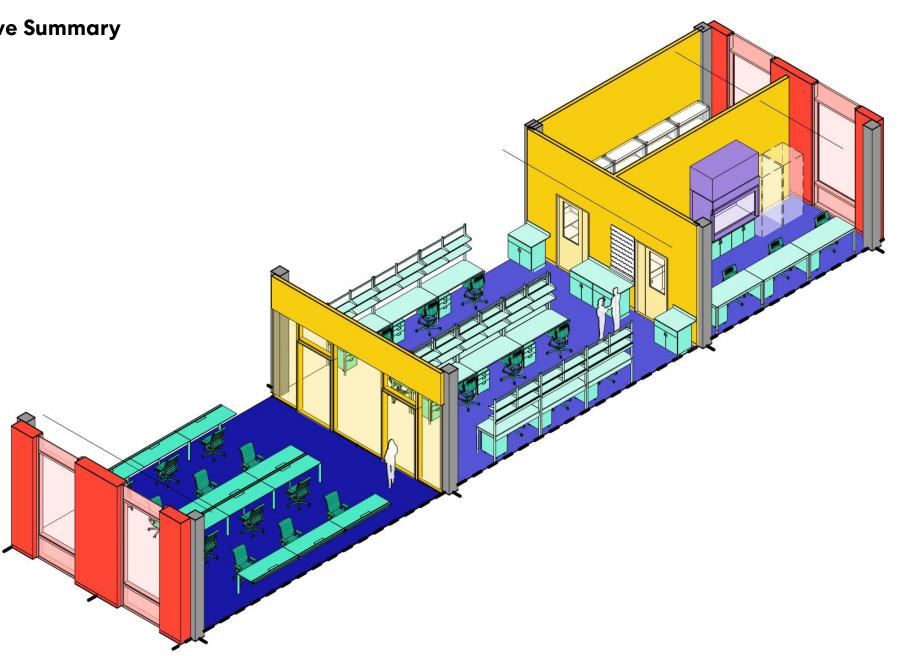
LAB FUMEHOODS Special thanks

to BR+A



**MEP SYSTEMS** 

# **Systems**



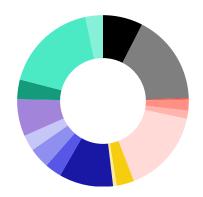
# **Scenarios**



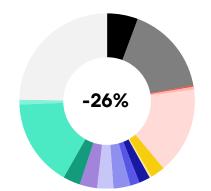




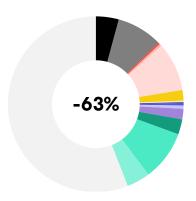
**BASELINE** 



**IMPROVED** 

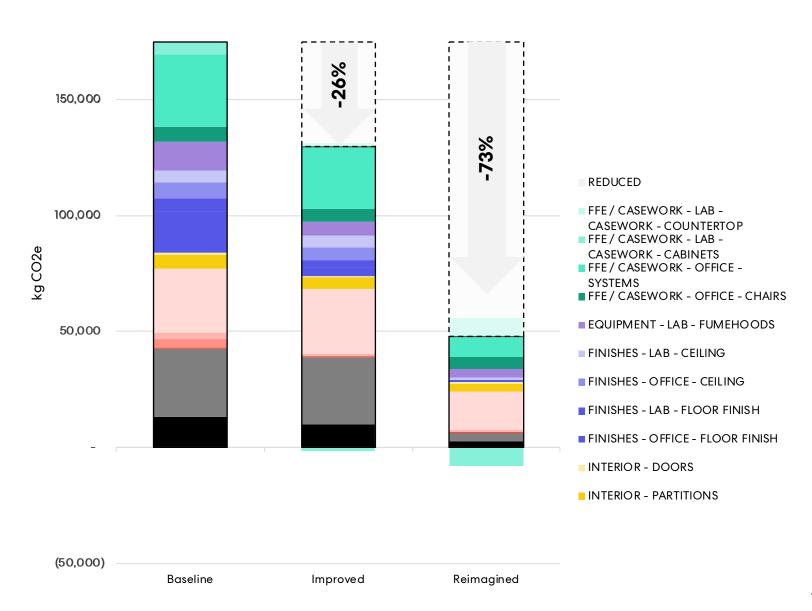


**REIMAGINED** 



200,000

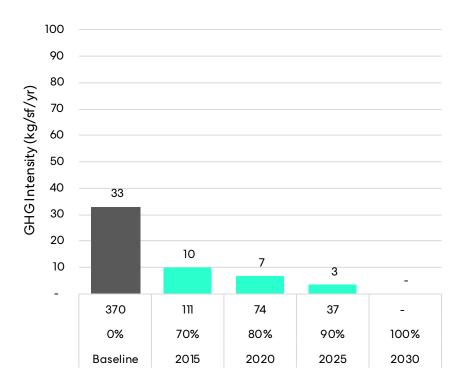
### Results



### **Context**

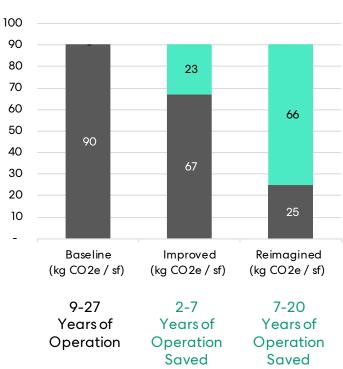
Note: the "module" represents "net" program area of lab space. A real building would contain "gross" areas such as corridors, stairways, mechanical spaces, and storage. These may equate to 35-50% of the total building area included in the operational carbon assessments. So, the comparison of embodied carbon reduction to operational carbon may be diluted by a similar factor in practice.

#### **Operational Carbon Intensity Labs**



Site EUI (kBtu/sf/yr) AIA 2020 % reduction AIA 2030 Target Year

# Embodied Carbon Intensity All Design Choices



Why do we care?

How We

Thought
We'd Do It

How We Did It Looking Ahead

#### Perkins&Will

# Why do we care? (Why We Need the Data)

# Who's Asking?

#### **FOCAS**

Technical University Dublin Ireland, 2020







# FOCAS Architectural Design Competition for a Higher-Education Research Building & Place At Technological University Dublin City Campus Grangegorman

#### Strategic Objectives

It is the GDA's ambition to develop an enduring, adaptable and environmentally responsible building, which is of its place and reflective of the progressive ethos of TU Dublin, its staff, students and its research programmes.

The following objectives support that ambition:

#### Researc

To develop a research Institute that underpins TU Dublin's research strategy and facilitates growth in research numbers at TU Dublin. FOCAS must be at open, collaborative and enriching learning environment that will support the development of interdisciplinary work.

#### Environmental Responsibility

To make a beautiful, useful and environmentally responsible building. The project design solutions must support reduced carbon impacts in terms of the building operation, its life cycle and also embodied carbon.

#### Sustainability & Climate Action

#### Site wide Sustainability Strategy

The GDA is committed to meeting the requirements of the Programme for Government and the Climate Action & Low Carbon Development Act.

#### Collective Ambition

Competition Brief

Developing a culture of awareness of environmental responsibility around the design, delivery and occupancy of FOCAS is an important consideration.

The architect as Team Lead must be able to engender and support a culture that encourages integration and innovation of sustainable and low carbon solutions.

This Competition relates to TU Dublin's FOCAS

Grangegorman is being developed by the GDA.

participate in the Competition.

Competition Brief and include:

cycle and also embodied carbon.

Research Institute (FOCAS), originally the Facility for

Optical Characterisation and Spectroscopy. TU Dublin is Ireland's first Technological University, its City Campus at

FOCAS is an existing TU Dublin research institute which will be relocated to the Grangegorman City Campus. The

Competition Brief and supporting information for FOCAS

The aspirations and guiding principles of the project are

underpinned by project objectives. These are set out in the

To develop a research Institute that underpins TU Dublin's

at TU Dublin, FOCAS must be an open, collaborative

and enriching learning environment that will support the development of interdisciplinary work.

Research strategy and facilitates growth in research numbers

To make a beautiful, useful and environmentally responsible building. The project design solutions must support reduced carbon impacts in terms of the building operation, its life

provided with a full access following successful registration to

are available from the GDA website. Entrants will be

#### Embodied Carbon

This project targets an outcome of a minimum of 40% reduction in upforton embodied carbon compared to a baseline. The baseline is the current RIBA referenced M4i benchmark of 1,000kg CO2e/m2. This is considered to be a minimum target, the Design Team must work to maximise reductions and review all emerging guidance and benchmarks particularly during preliminary design (CWMF Work Stage (f)).

A range of solutions and opportunities must be considered in the reduction of embodied carbon. It is anticipated that integration of structure, facade, service strategies and fire engineering will be critical in the success of a low embodied carbon solution.

The potential for off-site, modular construction and low carbon materials such as mass timber/ mass timber hybrid both to affect whole life carbon and minimise time-on-site must be interrogated as fundamental design principles.

Life Cycle Assessment & Life Cycle Costs Both of these targets for embodied and operational authoria sit under the concept of 'Whole Life Net Carbon' and circula design as structured in BS EN 15978. The carrying out of Life Cycle Assessments and integrating this into the design process to support and check these targets will form part of the Design Team scope.

#### Developing a Preliminary Design

FOCAS is an innovative and distinctive Institute and it is expected that this way of thinking and working be reflected in an approach to pedagogy.

The Design Team will develop strategies for garbon reduction and environmental responsibility, defining further targets and metrics appropriate to the project. This will be done in collaboration with the GDA and TU Dublin. It will be critical to the ongoing success of the project in meeting all targets that are set that strategies are developed with a full understanding of value and measured against agreed benchmarks. Upfront and life cycle costs must be understood, measured and demonstrated.

#### Design Approach - Response Requirements

Stage II is an opportunity for Entrants to develop their Stage I submission. Entrants must further demonstrate their understanding of the needs and requirements set out in the Project Brief.

Entrants are particularly asked to illustrate an approach to the

Atmosphere – The making of an open, collaborative and enriching learning environment that will support the development of interdisciplinary research;

Adaptability – Spatial adaptability considering evolution of use and research activities as well as enduring 'loose fit' design solutions; and

Construction – Investigate the potential of mass-timber and composite technology, low-auton materials and off site fabricating with reduced on-site assembly. Solutions should address opportunities of modularity and sequencing of the construction works to minimise time-on-site and maximise the potential for disassembly and re-use.

Submissions will be evaluated based on their response to the above with reference to an understanding of the Brief and project requirements.

#### Design Statement - Response Requirements

In the Design Statement, Entrants must address three topics. The response to this section must be aligned to the Entrants' Design Approach.

#### a. Desig

Entrants must describe their design strategy to realise the project brief - in particular Whole Life Carbon objectives.

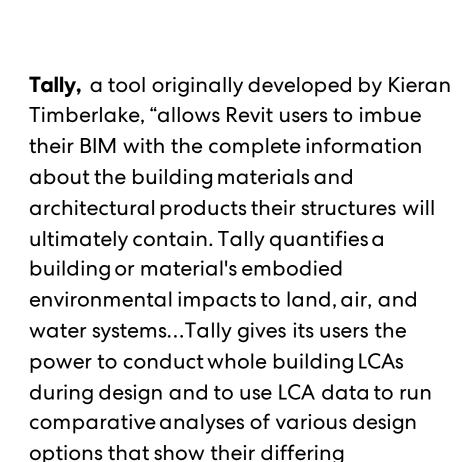
This strategy should be succinct in describing proposed methods for working with and leading design solutions with the Design Team - in particular addressing the collaboration across competencies beyond the Team Lead's expertise.

The strategy must specifically reflect the requirement to work with the GDA and TU Dublin in developing a Definitive Project Brief as part of Work Stage (i).

Competition Regulations

#### Perkins&Will

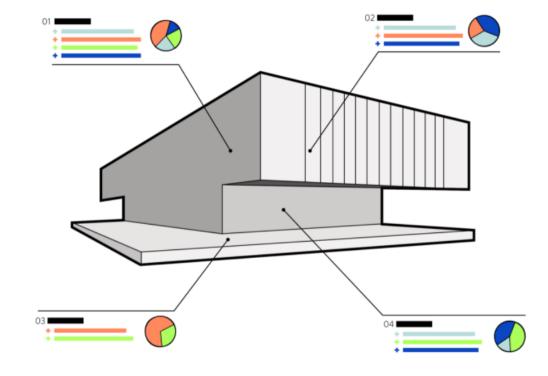
# How We Thought We'd Do It





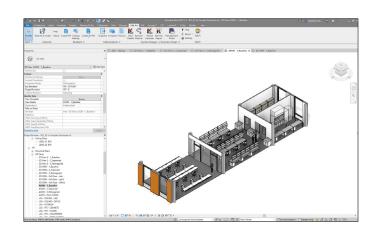
#### **WEBINARS**

To learn more about LCA and Tally watch the recorded webinars below. Topics range from LCA for designers to interpreting data and achieving the LEED v4 Whole Building Life-Cycle Impact Reduction credit.

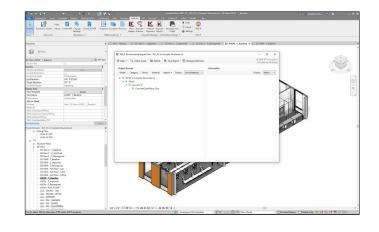


Re-framing Steel: How to Optimize Your Steel Structure to Reduce Embodied Impacts

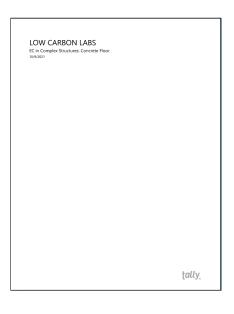
environmental impacts."











#### **Model in Revit**

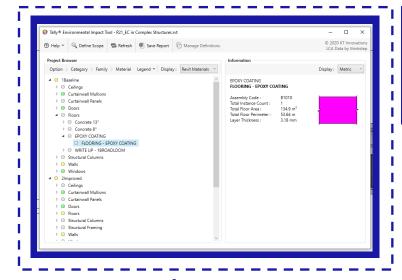
Model lab module in Revit, utilizing design options to include Baseline, Improved and Reimagined scenarios

#### **Use Tally to Assign Materials**

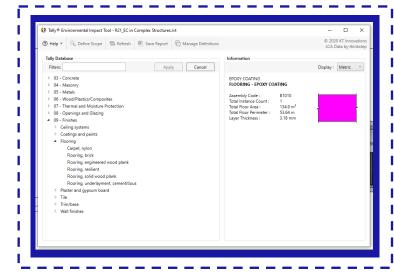
Utilizing Tally Revit Plug-in, assign materials aligned with materials specified in Laboratory projects

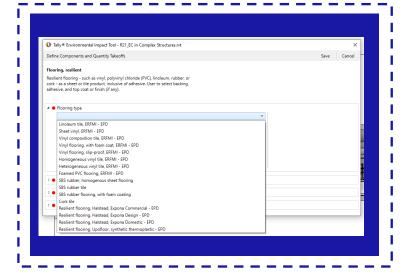
# Report produced by Tally for Material Assessment





Material Categories currently available in Tally cover some, but not all categories relevant to an embodied carbon in laboratories analysis.





For available categories, material options currently available in Tally do not yet include the laboratory finishes typically specified.

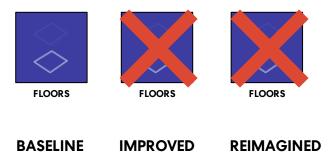




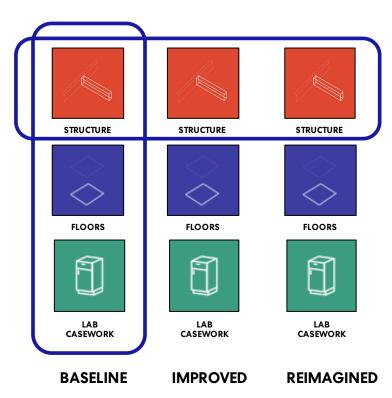
# **Tally**



Whole systems not available in Tally — lab casework, equipment, office/writeup furniture systems.



When the system is available, the products we specify aren't available – flooring is available to analyze, but not the flooring we are looking to analyze.



Tally assessment is geared towards whole-building LCA –

could not review system by system, to understand individual impact of specific material choice.

# EC3

"The Embodied Carbon in Construction Calculator (EC3) tool, is a ...tool that allows benchmarking, assessment and reductions in embodied carbon, ...The EC3 tool ...utilizes building material quantities from construction estimates and/or BIM models and a robust database of digital, third-party verified Environmental Product Declarations (EPDs).

The tool and its subsequent effect on the industry is driving demand for low-carbon solutions and incentivizing construction materials manufacturers and suppliers to invest in disclosure, transparency and material innovations that reduce the carbon emissions of their products."



#### EC3 Tool

Embodied Carbon in Construction Calculator (EC3) Tool

The EC3 Tool Provides ...



Actionable information about embodied carbon in construction



A free, easy-to-use database of construction materials and their environmental impacts



Achievable targets for embodied carbon based on your geography, performance requirements and material selections.



Target specifications for low or zero added material cost

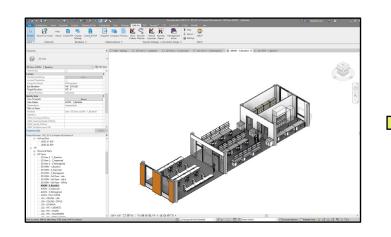


Transparency in methods and material data

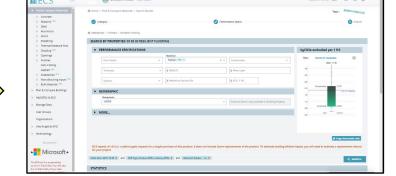


Client-data confidentiality

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**Model in Revit** 

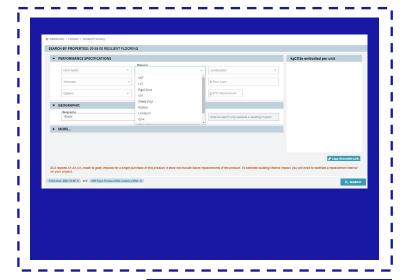
Import to EC3 from BIM360

Assign Materials and Compare Options in EC3



Material Categories currently available in EC3 cover some, but not all categories relevant to an embodied carbon in laboratories analysis. (even with Pilot program access)



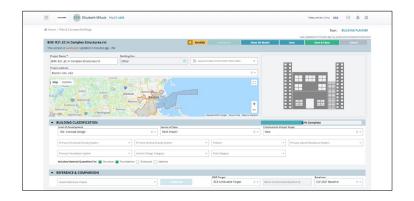


For available categories, material options currently available in EC3 do not yet include the laboratory finishes typically specified.

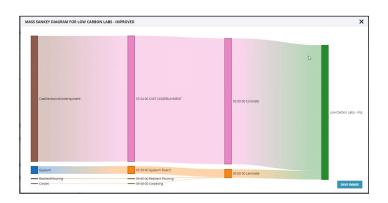
# EC3



Similar to Tally, challenges with lack of systems and lack of options within systems.



EC3 tool is aimed for use during a specific phase of the construction process; the level of information required for input is often not available early in design phases.

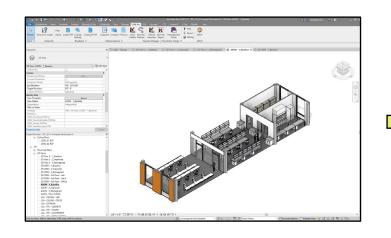


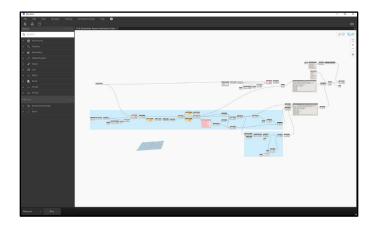
Formatting information for option comparison is difficult.

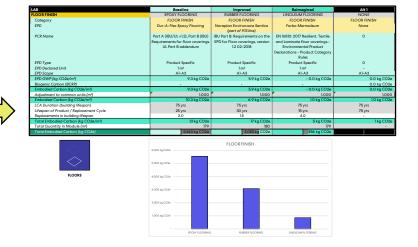
#### **Perkins&Will**

# How We Did It

# Method







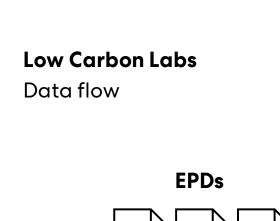
#### **Model in Revit**

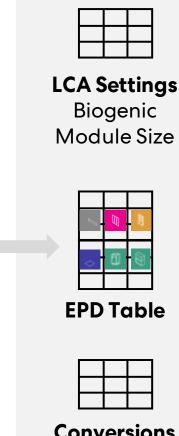
# Use Dynamo to Extract Information

Utilize Dynamo script to extract material quantity data

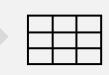
# Pivot Data collected from Revit with Data collected from EPDs

Utilize database created with specific laboratory materials to manually analyze with material quantity data pulled from Revit model









**Quantity Table** 



**LCA Settings** Biogenic



**System** 







System

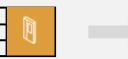


**System** 



**System** 





Summary



**Excel File** 

**Dashboard** 



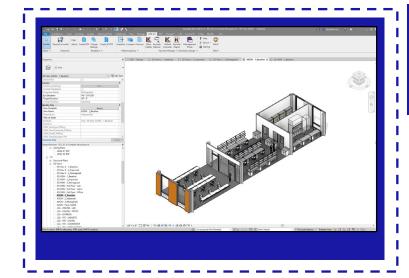
**I2SL LBT** Operational Carbon Data



**AIA 2030** Operational Carbon Targets

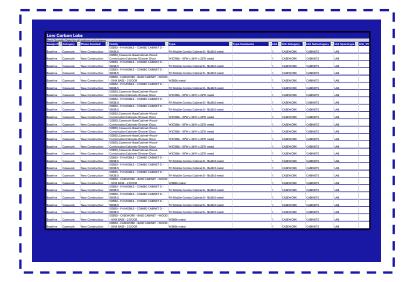


**Revit Model Dynamo** 

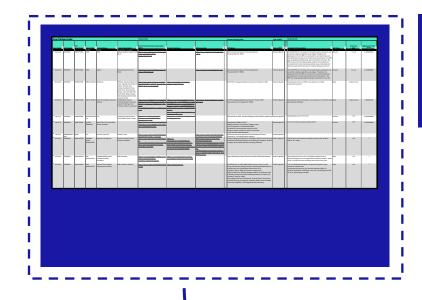


Use module modeled in Revit, to pull relevant material quantity data via Dynamo script.



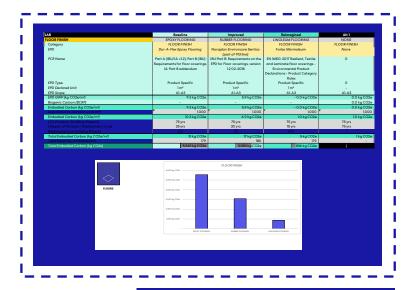


Once pulled from Revit via Dynamo, information is available in Excel for analysis.

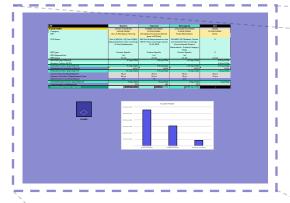


Given the specificity of laboratory material selection, a separate EPD resource was created to reference, listing products typically specified.





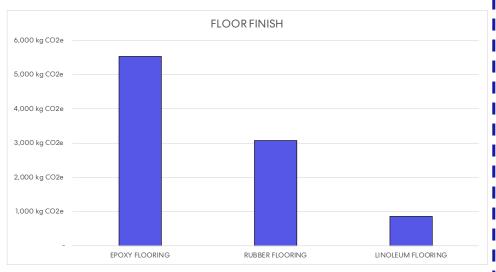
Collecting EPDs, and cataloging their data, enabled manual creation of Baseline, Improved and Reimagined Scenarios,



LAB	Baseline	Improved	Reimagined	Alt 1
FLOOR FINISH	EPOXY FLOORING	RUBBER FLOORING	LINOLEUM FLOORING	NONE
Category	FLOOR FINISH	FLOOR FINISH	FLOOR FINISH	FLOOR FINISH
EPD	Dur-A-Flex Epoxy Flooring	Noraplan Environcare Sentica	Forbo Marmoleum	None
		(part of 913 line)		
PCR Name	Part A (IBU/UL v1.2), Part B (IBU)	IBU Part B: Requirements on the	EN 16810: 2017 Resilient, Textile	0
	Requirements for floor coverings.	EPD for Floor coverings, version	and Laminate floor coverings -	
	UL Part B addendum	1.2 02-2018	Environmental Product	
			Declarations - Product Category	
			Rules	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	l m²	1 m²	1 m³	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e/m²)	9.3 kg CO2e	5.9 kg CO2e	- 0.0 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e/m²)	9.3 kg CO2e	5.9 kg CO2e	- 0.0 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000	1.000	1.000	1.000
Embodied Carbon (kg CO2e/m²)	10.3 kg CO2e	6.9 kg CO2e	1.0 kg CO2e	1.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	25 yrs	30 yrs	15 yrs	75 yrs
Replacements in building lifespan	2.0	1.5	4.0	-
Total Embodied Carbon (kg CO2e/m²)	31 kg CO2e	17 kg CO2e	5 kg CO2e	1 kg CO2e
Total Quantity in Module (m²)	179	180	179	-
Total Embodied Carbon (kg CO2e)	5,543 kg CO2e	3,083 kg CO2e	856 kg CO2e	



**FLOORS** 



#### Materials Analyzed

PDATED:	10/15/2021	Baseline		Improved		Reimagined	
	BUILDING STRUCTURE						
Multiple	Foundations FOUNDATIONS	CONCRETE		CONCRETE WITH	CARRON CURE	??	
Multiple	FOUNDATIONS	CONCRETE	-	CONCRETE WITH	CARBON CORE	**	
-	SUPERSTRUCTURE						
-	SUPERSTRUCTURE - OFFICE (STRENGTH)	CONCRETE (22X33		STEEL (22X33)		TIMBER (22X22)	
	SUPERSTRUCTURE - OFFICE (STRENGTH)		13,068 kg CO2e		9,946 kg CO2e		2,541 kg
-	SUPERSTRUCTURE - LABORATORY (VCA)	CONCRETE (22X33		STEEL (22X33)		TIMBER (22X22)	
Y	SUPERSTRUCTURE - LABORATORY (VCA)		29,403 kg CO2e		28,919 kg CO2e	<del></del>	3,630 kg
	ARCHITECTURE AND INTERIORS						
_	BUILDING ENVELOPE						
	WALL BACKUP	CMU + DRYWALL	FINISH	METAL STUDS +	DRYWALL FINISH	WOOD FRAMIN	G + DRYWALL
v	BUILDING ENVELOPE - WALL RACKLIP	CINO DAI WALL	417 kg CO2e	III AL SIODS T	399 kg CO2e		572 kg
07 00 00	INSULATION	XPS INSULATION	417 kg CO20	SPF INSULATION	•	MINERAL WOOL	
у	BUILDING ENVELOPE - INSULATION		3,708 kg CO2e	1	97 kg CO2e		140 kg
-	CLADDING	TERRACOTTA CLA		METAL PANEL CL		FIBER CEMENT C	
			2,712 kg CO2e		822 kg CO2e		629 kg
08 00 00	GLAZING	ALUMINUM STOR		ALUMINUM STO		ALUMINUM STO	
			27,718 kg CO2e		28,334 kg CO2e		16,528 kg
-	INTERIOR						
-	PARTITIONS	CMU + DRYWALL	FINISH	METAL STUDS +	DRYWALL FINISH	WOOD FRAMIN	
			<b>5</b> ,790 kg CO2e		4,738 kg CO2e		3,570 kg
08 00 00	DOORS	GLASS DOOR		STEEL DOOR		WOOD DOOR	
Υ	INTERIOR - DOORS		1,195 kg CO2e		650 kg CO2e		555 kg
9 00 00	FINISHES					-	
09 00 00	OFFICE - FLOOR FINISH	CARPET BROADLO		CARPET TILE	<b>1</b>	CARPET TILE	1
Y	FINISHES - OFFICE - FLOOR FINISH	, ,	17,905 kg CO2e	1	3,673 kg CO2e		210 kg (
09 00 00	LAB - FLOOR FINISH	EPOXY FLOORING	5,543 kg CO2e	RUBBER FLOORII	3,083 kg CO2e	LINOLEUM FLOO	5
09 00 00	OFFICE - CEILING	DRYWALL CEILING		ACOUSTICAL CE		ACOUSTIC FINIS	856 kg (
09 00 00	CINICE - CEILING	,	6,799 kg CO2e	ACOUSTICAL CE	5,513 kg CO2e	ACOUSTIC FINIS	61 kg
09 00 00	LAB - CEILING	ACOUSTICAL CEIL		AACOUSTICAL CE		ACOUSTICAL C	
070000	FINISHES - LAR - CEILING	ACOUSTICAL CELL	5,321 kg CO2e		5,321 kg CO2e	ACOUSTICAL CI	1,044 kg
11 00 00	EQUIPMENT				,, 0,021 kg 0020		, i,o i i kg
11 53 13	LAB - FUMEHOODS	Conventional 100	fpm	High Performan	e 60 fpm	Filter Fumehood	ls
			12,271 kg CO2e		5,684 kg CO2e		3,560 kg
12 00 00	FFE / CASEWORK						
12 00 00	OFFICE - CHAIRS	TASK CHAIR		TASK CHAIR		TASK CHAIR	
			6,468 kg CO2e		5,652 kg CO2e		5,118 kg
12 00 00	OFFICE - SYSTEMS	SPINE BASED WO		PANEL BASED W		BENCHING	
		1	31,041 kg CO2e	1	28,596 kg CO2e		16,919 kg
12 35 53	LAB - CASEWORK - CABINETS	STEEL SHEET		BAMBOO		PLYWOOD	-
Y	FFE / CASEWORK - LAB - CASEWORK - CABIN	ETS	5,811 kg CO2e	1	(1,565 kg CO2e)	3	(7,846 kg
12 35 53	LAB - CASEWORK - COUNTERTOP	EPOXY COUNTER		STAINLESS STEEL	1	PHENOLIC PANE	
Y		IERI	-	-	33 kg CO2e		23 kg
	CARBON IMPACT OF CHOICES		175,169 kg CO2e		129,893 kg CO2e		48,109 kg
	MODULE SIZE		1,936 sf	•	1,936 sf		1,93
	CARBON INTENSITY OF CHOICES		90.5 kg CO2e/sf		67.1 kg CO2e/sf		24.8 kg CC
	% REDUCTION	'	0%	1	-26%	1	,,
		<del>                                     </del>		1		<del></del>	

#### Materials Analyzed

T UPDATED:	10/15/2021	Baseline		Improved		Reimagined	
	16/16/2021						
	ARCHITECTURE AND INTERIORS						
_	BUILDING ENVELOPE						
-	WALL BACKUP	CMU + DRYWALL F	INISH	METAL STUDS + D	RYWALL FINISH	WOOD FRAMING	+ DRYWALL FIN
			417 kg CO2e		399 kg CO2e		572 kg CO2
07 00 00	INSULATION	XPS INSULATION		SPF INSULATION		MINERAL WOOL I	NSULATION
			3,708 kg CO2e		97 kg CO2e		140 kg CO2
-	CLADDING	TERRACOTTA CLADDING		METAL PANEL CLADDING		FIBER CEMENT CLADDING	
			2,712 kg CO2e		822 kg CO2e		629 kg CO2
08 00 00	GLAZING	ALUMINUM STORE	FRONT	ALUMINUM STOR	EFRONT	ALUMINUM STOR	EFRONT
Y	BUILDING ENVELOPE - GLAZING		27,718 kg CO2e		28,334 kg CO2e		16,528 kg CO2
-	INTERIOR						
-	PARTITIONS	CMU + DRYWALL FINISH		METAL STUDS + DRYWALL FINISH		WOOD FRAMING + DRYWALL I	
			<b>5</b> ,790 kg CO2e		4,738 kg CO2e		3,570 kg CO2
08 00 00	DOORS	GLASS DOOR		STEEL DOOR		WOOD DOOR	
Y	INTERIOR - DOORS		1,195 kg CO2e		650 kg CO2e		555 kg CO2
09 00 00	FINISHES						
09 00 00	OFFICE - FLOOR FINISH	CARPET BROADLO	ОМ	CARPET TILE		CARPET TILE	
			17,905 kg CO2e		3,673 kg CO2e		210 kg CO2
09 00 00	LAB - FLOOR FINISH	EPOXY FLOORING		RUBBER FLOORING	G	LINOLEUM FLOOR	ING
			5,543 kg CO2e		3,083 kg CO2e		856 kg CO2

#### Materials Analyzed

ACOUSTICAL CEILING ACOUSTICAL CEILING SYSTEM 5,321 kg CO2e 11 00 00 EQUIPMENT	11 00 00   LAB - CEILING   ACOUSTICAL CEILING CLEANROOM ACOUSTICAL CEILING SYSTEM   5,321 kg CO2   5,684 kg C	61 kg CO ACOUSTICAL CEILING 1,044 kg CO Filter Fumehoods
ACOUSTICAL CEILING CLEANROOM ACOUSTICAL CEILING SYSTEM  5,321 kg CO2e  11 00 00 EQUIPMENT  11 53 13 LAB - FUMEHOODS  Conventional 100 fpm  High Performance 60 fpm  Filter Fumehoods  12,271 kg CO2e  12 00 00 OFFICE - CHAIRS  TASK CHAIR  TASK CHAIR	09 00 00         LAB - CEILING         ACOUSTICAL CEILING CLEANROOM ACOUSTICAL CEILING SYSTEM           11 00 00         EQUIPMENT         5,321 kg CO2e         5,321 kg CO2e           11 53 13         LAB - FUMEHOODS         Conventional 100 fpm         High Performance 60 fpm           Y         EQUIPMENT - LAB - FUMEHOODS         12,271 kg CO2e         5,684 kg CO2           12 00 00         OFFICE - CHAIRS         TASK CHAIR         TASK CHAIR           12 00 00         OFFICE - SYSTEMS         SPINE BASED WORKSTATION         PANEL BASED WORKSTATION	ACOUSTICAL CEILING  1,044 kg CO  Filter Fumehoods
11 00 00   EQUIPMENT	5,321 kg CO2e   5,321 kg CO2e   5,321 kg CO2e   11 00 00   EQUIPMENT	1,044 kg CO  Filter Fumehoods
11 00 00   EQUIPMENT	11 00 00 EQUIPMENT         .	Filter Fumehoods
11 53 13	11 53 13         LAB - FUMEHOODS         Conventional 100 fpm         High Performance 60 fpm           12 00 00         FFE / CASEWORK         .         .           12 00 00         OFFICE - CHAIRS         TASK CHAIR         TASK CHAIR           12 00 00         OFFICE - SYSTEMS         SPINE BASED WORKSTATION         PANEL BASED WORKSTATION	<u> </u>
12 00 00   FFE / CASEWORK	12 00 00       FFE / CASEWORK       .	<u> </u>
12 00 00   FFE / CASEWORK	12 00 00 FFE / CASEWORK  12 00 00 OFFICE - CHAIRS  TASK CHAIR  TASK CHAIR  6,468 kg CO2e  12 00 00 OFFICE - SYSTEMS  SPINE BASED WORKSTATION  PANEL BASED WORKSTATION	3,560 kg CO
12 00 00       OFFICE - CHAIRS       TASK CHAIR       5,652 kg CO2e       5,118 kg       6,2468 kg CO2e       5,118 kg       6,2468 kg CO2e       5,652 kg CO2e       5,118 kg       5,118 kg       6,2468 kg CO2e       7,118 kg       7,118 kg <t< td=""><td>12 00 00 OFFICE - CHAIRS  Y FFE / CASEWORK - OFFICE - CHAIRS  12 00 00 OFFICE - SYSTEMS  TASK CHAIR  6,468 kg CO2e  5,652 kg CO2  SPINE BASED WORKSTATION PANEL BASED WORKSTATION</td><td></td></t<>	12 00 00 OFFICE - CHAIRS  Y FFE / CASEWORK - OFFICE - CHAIRS  12 00 00 OFFICE - SYSTEMS  TASK CHAIR  6,468 kg CO2e  5,652 kg CO2  SPINE BASED WORKSTATION PANEL BASED WORKSTATION	
12 00 00   OFFICE - SYSTEMS   SPINE BASED WORKSTATION   PANEL BASED	Y FFE / CASEWORK - OFFICE - CHAIRS 6,468 kg CO2e 5,652 kg CO2  12 00 00 OFFICE - SYSTEMS SPINE BASED WORKSTATION PANEL BASED WORKSTATION	
12 00 00   OFFICE - SYSTEMS   SPINE BASED WORKSTATION   PANEL BASED WORKSTATION   BENCHING	12 00 00 OFFICE - SYSTEMS SPINE BASED WORKSTATION PANEL BASED WORKSTATION	TASK CHAIR
31,041 kg CO2e   28,596 kg CO2e   16,919 kg CO2e   12,35 53   LAB - CASEWORK - CABINETS   5,811 kg CO2e   5,811 kg CO2e   5,811 kg CO2e   12,35 53   LAB - CASEWORK - COUNTERTOP   5,811 kg CO2e   5,811 kg CO2e   5,811 kg CO2e   6,846 kg CO2e   7,846 kg		5,118 kg CO
12 35 53         LAB - CASEWORK - CABINETS         STEEL SHEET         BAMBOO         PLYWOOD           Y FFE / CASEWORK - LAB - CASEWORK - CABINETS         5,811 kg CO2e         (1,565 kg CO2e)         (7,846 kg CO2e)           12 35 53         LAB - CASEWORK - COUNTERTOP         EPOXY COUNTER         STAINLESS STEEL SHEET         PHENOLIC PANEL           Y FFE / CASEWORK - LAB - CASEWORK - COUNTERT         -         33 kg CO2e         23 kg           CARBON IMPACT OF CHOICES         175,169 kg CO2e         129,893 kg CO2e         48,109 kg           MODULE SIZE         1,936 sf         1,936 sf         1,936 sf	Y FFE / CASEWORK - OFFICE - SYSTEMS 31.041 kg CO2e 28.596 kg CO2	BENCHING
S,811 kg CO2e   (1,565 kg CO2e)   (7,846 kg CO2e)		16,919 kg CO
12 35 53         LAB - CASEWORK - COUNTERTOP         EPOXY COUNTER         STAINLESS STEEL SHEET         PHENOLIC PANEL           CARBON IMPACT OF CHOICES         175,169 kg CO2e         129,893 kg CO2e         48,109 kg           MODULE SIZE         1,936 sf         1,936 sf         1,936 sf	12 35 53 LAB - CASEWORK - CABINETS STEEL SHEET BAMBOO	PLYWOOD
CARBON IMPACT OF CHOICES         175,169 kg CO2e         129,893 kg CO2e         48,109 kg           MODULE SIZE         1,936 sf	Y FFE / CASEWORK - LAB - CASEWORK - CABINETS 5,811 kg CO2e (1,565 kg CO2	e) (7,846 kg CO
CARBON IMPACT OF CHOICES         175,169 kg CO2e         129,893 kg CO2e         48,109 kg           MODULE SIZE         1,936 sf	12 35 53 LAB - CASEWORK - COUNTERTOP EPOXY COUNTER STAINLESS STEEL SHEET	PHENOLIC PANEL
MODULE SIZE 1,936 sf 1,936 sf 1,	Y FFE / CASEWORK - LAB - CASEWORK - COUNTERT - 33 kg CO2	23 kg CO
MODULE SIZE 1,936 sf 1,936 sf 1,		
CARBON INTENSITY OF CHOICES 90.5 kg CO2e/sf 67.1 kg CO2e/sf 24.8 kg (		
% REDUCTION 0% -26%		f 24.8 kg CO2e

#### **Data Summary**

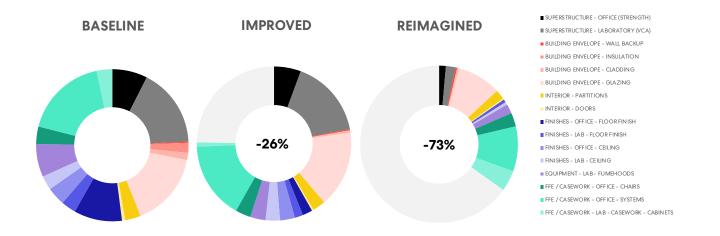
EMBODIED CARBON - SYSTEM SUMMARY	10/15/2021				
CATEGORY	Baseline	Improved	Reimagined		
SUPERSTRUCTURE - OFFICE (STRENGTH)	13,068	9,946	2,541		
SUPERSTRUCTURE - LABORATORY (VCA)	29,403	28,919	3,630		
BUILDING ENVELOPE - WALL BACKUP	417	399	572		
BUILDING ENVELOPE - INSULATION	3,708	97	140		
BUILDING ENVELOPE - CLADDING	2,712	822	629		
BUILDING ENVELOPE - GLAZING	27,718	28,334	16,528		
INTERIOR - PARTITIONS	5,790	4,738	3,570		
INTERIOR - DOORS	1,195	650	555		
FINISHES - OFFICE - FLOOR FINISH	17,905	3,673	210		
FINISHES - LAB - FLOOR FINISH	5,543	3,083	856		
FINISHES - OFFICE - CEILING	6,799	5,513	61		
FINISHES - LAB - CEILING	5,321	5,321	1,044		
EQUIPMENT - LAB - FUMEHOODS	12,271	5,684	3,560		
FFE / CASEWORK - OFFICE - CHAIRS	6,468	5,652	5,118		
FFE / CASEWORK - OFFICE - SYSTEMS	31,041	28,596	16,919		
FFE / CASEWORK - LAB - CASEWORK - CABINETS	5,811	(1,565)	(7,846)		
FFE / CASEWORK - LAB - CASEWORK - COUNTERTOP	-	33	23		
REDUCED	-	43,711	119,214		
CARBON IMPACT OF CHOICES	175,169	129,893	48,109		

45,276

127,060

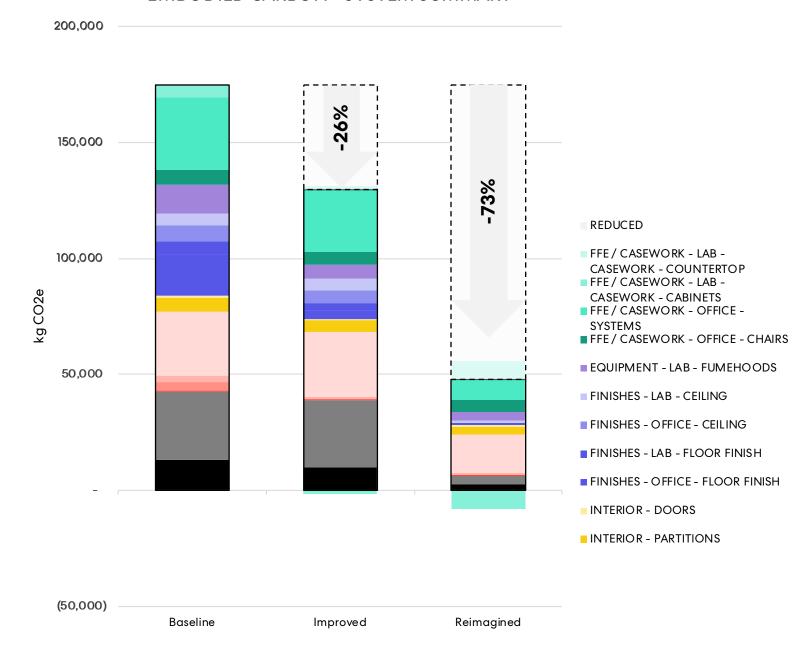
LOW CARBON LABS

REDUCED



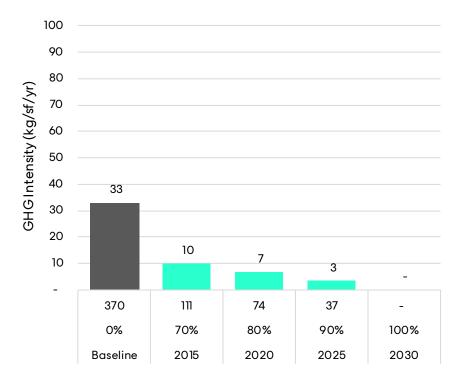
#### **Data Summary**

#### **EMBODIED CARBON - SYSTEM SUMMARY**



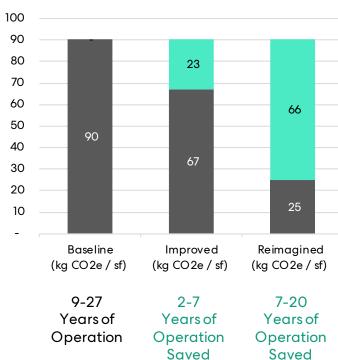
#### **Data Summary**

#### **Operational Carbon Intensity Labs**



Site EUI (kBtu/sf/yr) AIA 2020 % reduction AIA 2030 Target Year

# Embodied Carbon Intensity All Design Choices



and storage. These may equate to 35-50% of the total building area included in the operational carbon assessments. So, the comparison of embodied carbon reduction to operational carbon may be diluted by a

similar factor in practice.

corridors, stairways, mechanical spaces,

Note: the "module" represents "net"

would contain "gross" areas such as

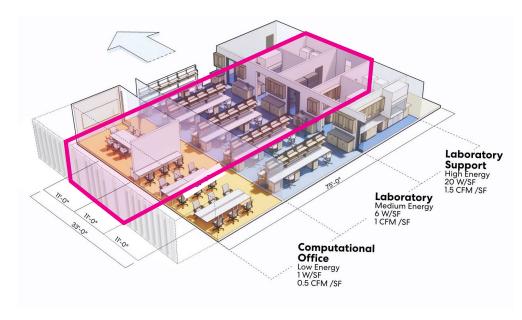
program area of lab space. A real building

# **Scope and Strategy**

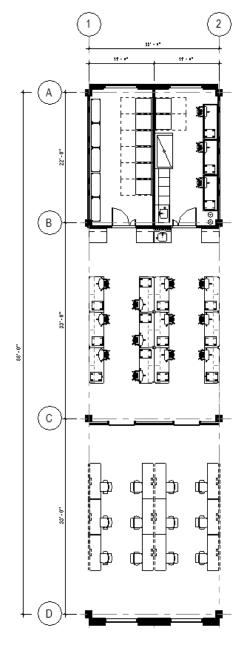
#### **Module for Analysis**

Laboratory design planning follows a "best practice" planning standard - a module based on 11'-0". For the purposes of this study, a 22'-0" wide module was selected. Extending in the opposite direction, modules of 22'-0" (Laboratory Support), 33'-0" (Laboratory) and 33'-0" (Office/Write Up)

Programmatically the module for analysis chosen includes lab, lab support, and office/write up.



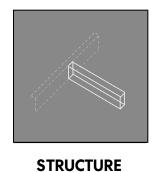
Example Laboratory Building Section



Project Analysis Module

### **Low Carbon Labs - Executive Summary**

# **Systems**



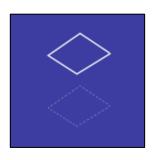
Special thanks to LeMessurier



ENVELOPE OPAQUE



**PARTITIONS** 



**CEILINGS** 



OFFICE SYSTEMS



LAB BENCHTOP



ENVELOPE GLAZING (%)



DOORS



**FLOORS** 



LAB CASEWORK

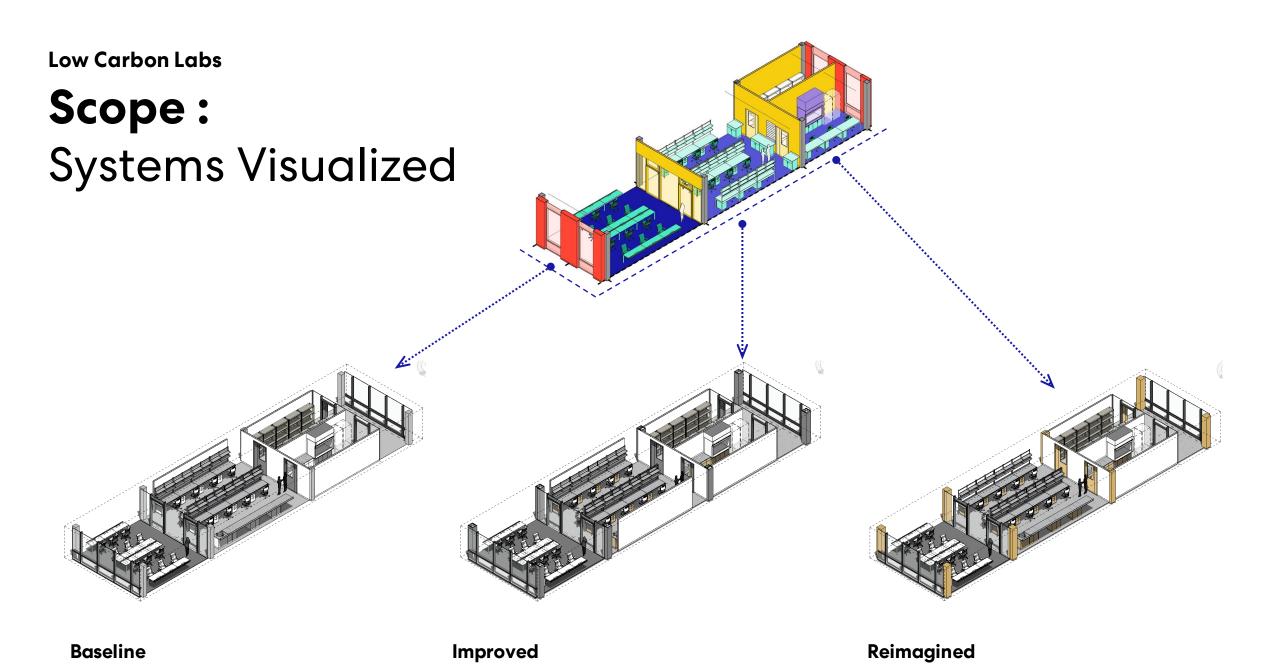


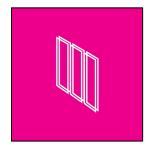
LAB FUMEHOODS Special thanks

to BR+A



**MEP SYSTEMS** 





#### ENVELOPE OPAQUE



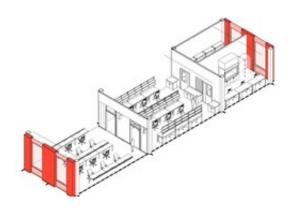
CMU + Drywall + XPS Insulation + Terracotta Cladding

**Baseline** 



Metal Studs + Drywall + SPF Insulation + Metal Panel Cladding

**Improved** 

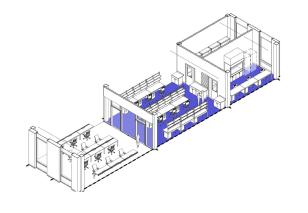




Wood Framing + Drywall + Mineral Wool Insulation + Fiber Cement Cladding

### Reimagined









Dur-A-Flex Epoxy Flooring





Noraplan Environcare Sentica





Forbo Marmoleum

Epoxy

**Baseline** 

Rubber

**Improved** 

Linoleum

Reimagined





**Steel Sheet** 

**Baseline** 



Cold Formed Steel Framing



Bamboo **Improved** 



Flat and Edge Grain Plyboo





North American Softwood Plywood

Plywood

Reimagined

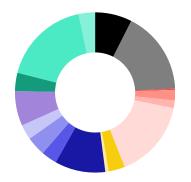
## **Scenarios**



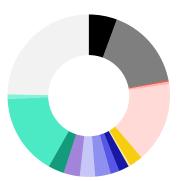




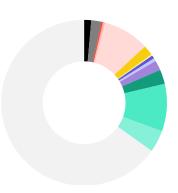
**BASELINE** 



**IMPROVED** 



**REIMAGINED** 



# Scenarios: Choose your own Adventure



### **BASELINE**

Floor Ceiling

### **IMPROVED**

Lab casework Fumehoods

### **REIMAGINED**

Structure

### Perkins&Will

# Looking Ahead

## **Future Research**



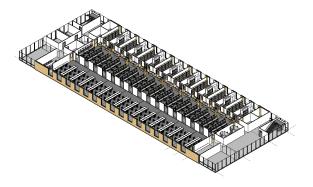






MEP?

Other systems?



**Expanded Physical Scope** 

From Module to Floor From Floor to Building





### **More Products**

Additional glazing systems

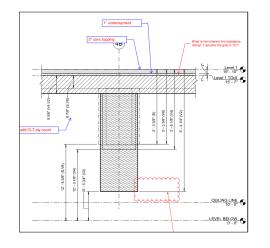
Additional lab casework types

### Parallel Research: Structure - LeMessurier

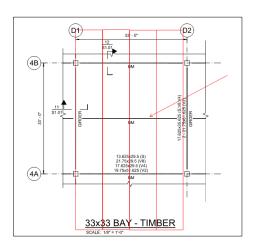


**Structural Options** 

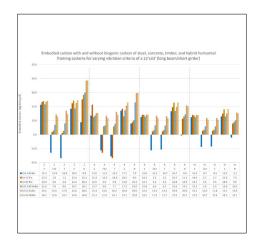
Concrete, Steel, Timber, and Hybrid Scenarios



**Structural Fire Resistance**Options for Lab Buildings



**Low Vibration Design**Options for Lab Buildings



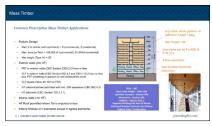
### **Optimization**

Fire Resistance, Low Vibration, with Low Carbon Profiles

<sup>\*</sup> Preliminary Results

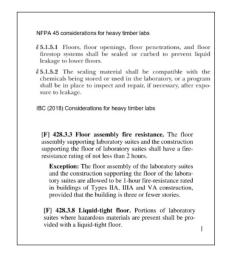
## Parallel Research: Code - Jensen Hughes





# Code Pathways Currently Available:

Prescriptive & Performance Based



# Code Development Process



# Speculate – Which way are we headed?

Both negative and positive trends

### Parallel Research: MEP - BR+A







Quantifying Fumehood Embodied Carbon MEP Systems Embodied Carbon

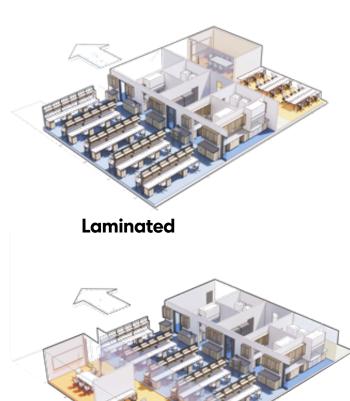
Embodied vs Operational
Carbon - Savings in
Context

### Perkins&Will

# Graphics

### **Typical Adaptable Lab**

### Frameworks



Laminated
Wet Lab + Support



**Reverse Laminated** 



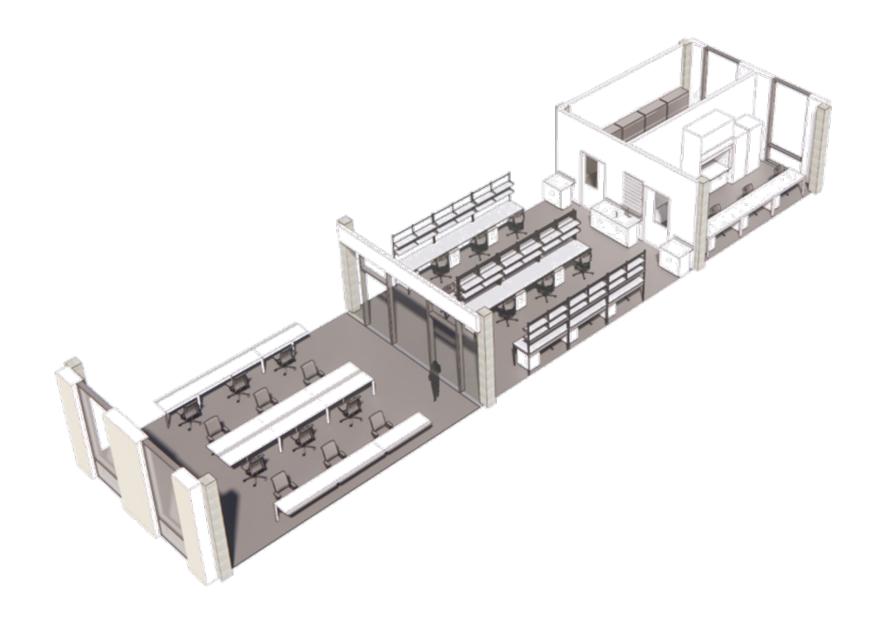
Laminated **Chemistry** 



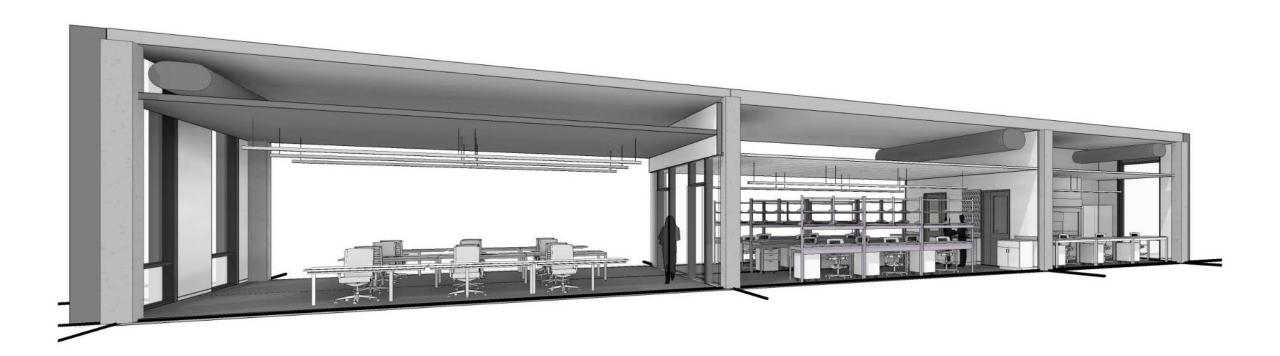
Clustered



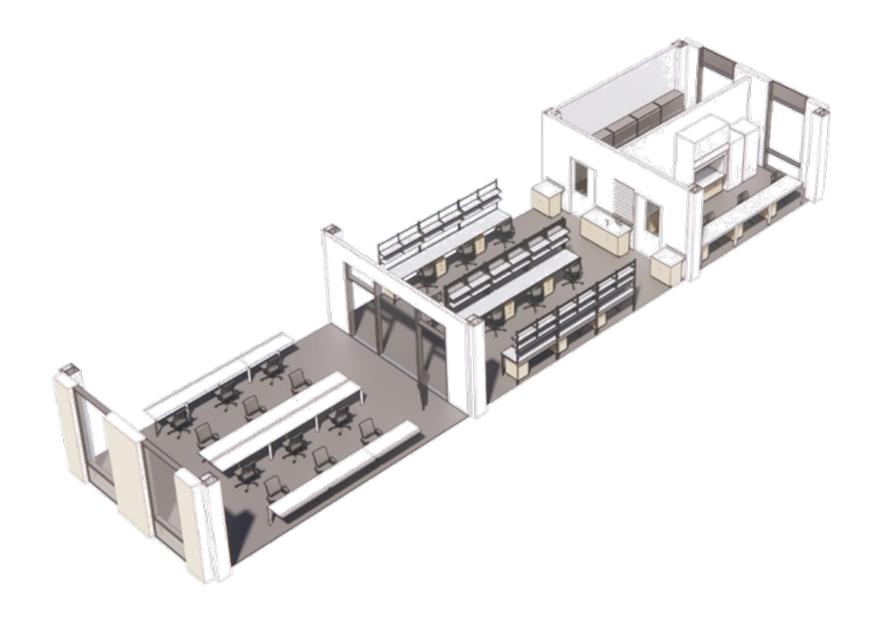
Laminated
Lab + Collaboration



### Baseline



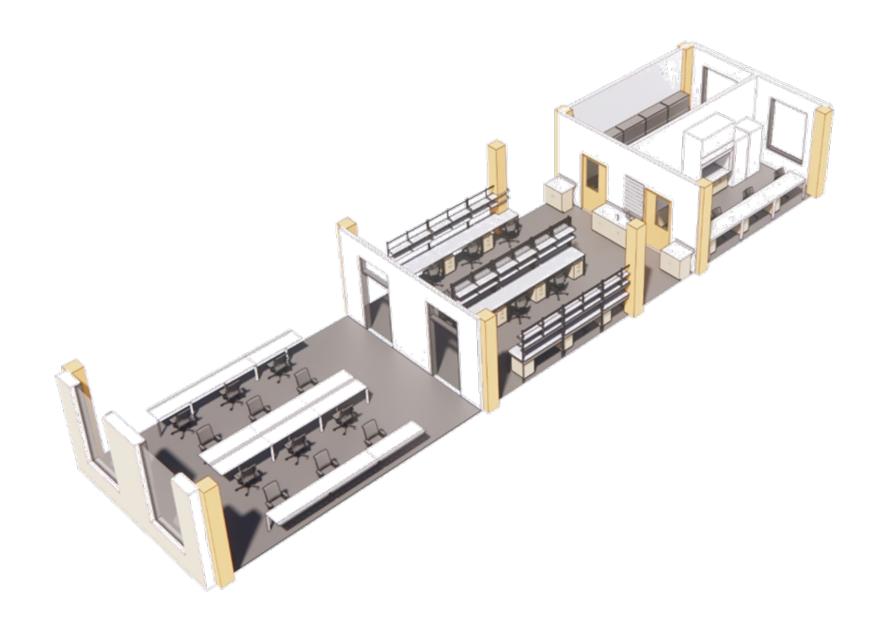
### **Baseline**



Improved



### Improved



**Re-Imagined** 



### **Re-Imagined**



Re-Imagined Laboratory



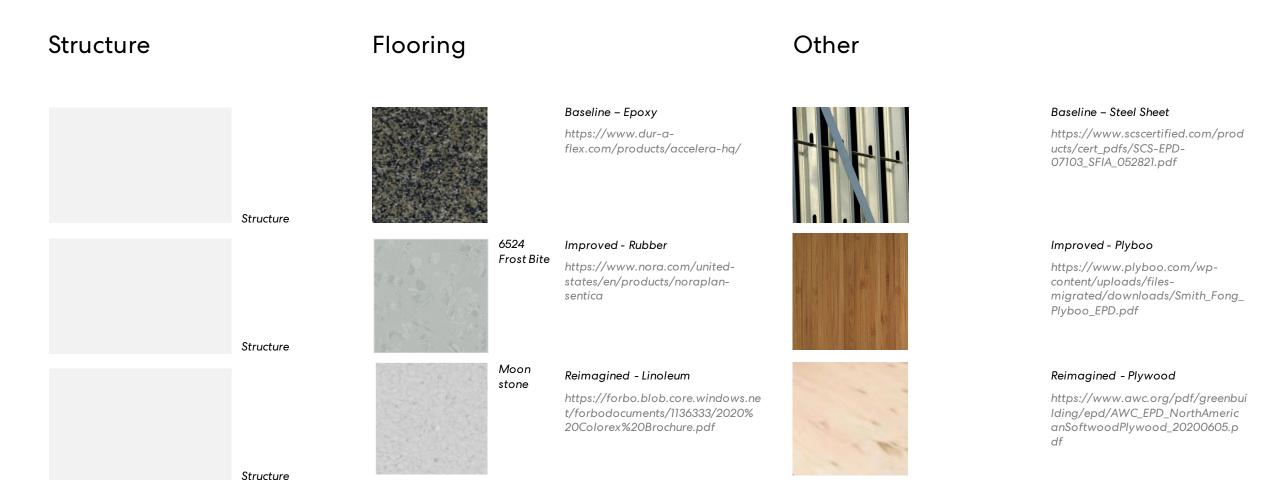
Re-Imagined Laboratory



Re-Imagined Office / Write Up



### Citations for product images



Exploring low embodied carbon design choices for complex building typologies

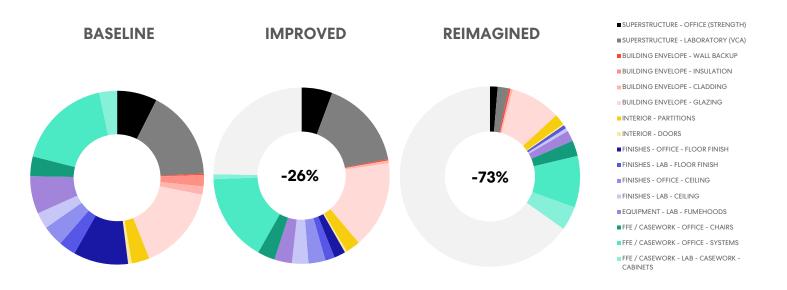
**Volume II: Data Overview** 



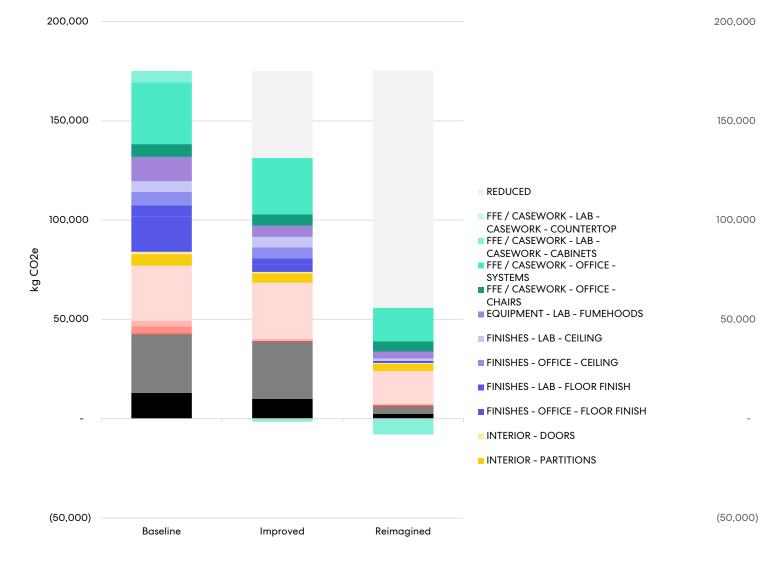
2030 2020

# SUMMARY

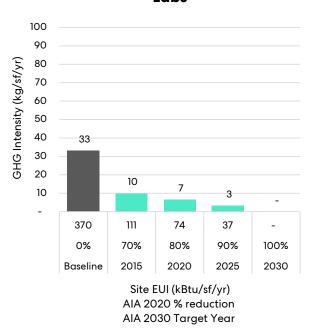
PDATED:	ED CARBON - SYSTEM S	Baseline		Improved		Reimagined		
	BUILDING STRUCTURE							
-	Foundations			•				
Multiple	FOUNDATIONS	CONCRETE	CONCRETE		CONCRETE WITH CARBON CURE		??	
	FOUNDATIONS		-		-			
-	SUPERSTRUCTURE			•		•		
-	SUPERSTRUCTURE - OFFICE (STRENGTH)	CONCRETE (22X3		STEEL (22X33)		TIMBER (22X22)	_	
	SUPERSTRUCTURE - OFFICE (STRENGTH)		13,068 kg CO2e	1	9,946 kg CO2e	1	2,541 kg	
-	SUPERSTRUCTURE - LABORATORY (VCA)	CONCRETE (22X3	1	STEEL (22X33)	00.010.1 000	TIMBER (22X22)	0 (00)	
Υ	SUPERSTRUCTURE - LABORATORY (VCA)		29,403 kg CO2e		28,919 kg CO2e		3,630 kg	
	ARCHITECTURE AND INTERIORS							
_	BUILDING ENVELOPE							
-	WALL BACKUP	CMU + DRYWALI	. FINISH	METAL STUDS +	DRYWALL FINISH	WOOD FRAMING	+ DRYWAI	
			417 kg CO2e		399 kg CO2e		572 kg	
07 00 00	INSULATION	XPS INSULATION	i.	SPF INSULATION		MINERAL WOOL	INSULATIO	
			3,708 kg CO2e		97 kg CO2e		140 kg	
-	CLADDING	TERRACOTTA CL	ADDING	METAL PANEL CL	ADDING	FIBER CEMENT CL	ADDING	
			2,712 kg CO2e		822 kg CO2e		629 kg	
08 00 00	GLAZING	ALUMINUM STO	REFRONT	ALUMINUM STO		ALUMINUM STOR		
Y	BUILDING ENVELOPE - GLAZING		27,718 kg CO2e		28,334 kg CO2e		16,528 kg	
-	INTERIOR	•		•		•		
-	PARTITIONS	CMU + DRYWALI		1	DRYWALL FINISH	1		
00.00.00	INTERIOR - PARTITIONS	01.466.0000	<b>5</b> ,790 kg CO2e		4,738 kg CO2e	1	3,570 kg	
08 00 00	DOORS INTERIOR - DOORS	GLASS DOOR	1,195 kg CO2e	STEEL DOOR	650 kg CO2e	WOOD DOOR	555 kg	
9 00 00	FINISHES		1,195 kg CO2e		650 kg CO2e		555 kg	
09 00 00	OFFICE - FLOOR FINISH	CARPET BROADL	ООМ	CARPET TILE		CARPET TILE		
Y	FINISHES - OFFICE - FLOOR FINISH		17,905 kg CO2e		3,673 kg CO2e	1	210 kg	
09 00 00	LAB - FLOOR FINISH	EPOXY FLOORIN		RUBBER FLOORII		LINOLEUM FLOO	•	
			5,543 kg CO2e		3,083 kg CO2e	B	856 kg	
09 00 00	OFFICE - CEILING	DRYWALL CEILIN	IG SYSTEM	ACOUSTICAL CEI	LING SYSTEM	ACOUSTIC FINISH	1	
			<b>6</b> ,799 kg CO2e		5,513 kg CO2e		61 kg	
09 00 00	LAB - CEILING	ACOUSTICAL CEI	ACOUSTICAL CEILING CLEANROOM		A ACOUSTICAL CEILING SYSTEM		ACOUSTICAL CEILING	
Y	FINISHES - LAB - CEILING		5,321 kg CO2e		5,321 kg CO2e		1,044 kg	
11 00 00	EQUIPMENT	•		•		•		
11 53 13	LAB - FUMEHOODS	Conventional 100		High Performand		Filter Fumehoods	_	
10.00.00	FFF / CARENAODK		12,271 kg CO2e		<b>5</b> ,684 kg CO2e		3,560 kg	
12 00 00	FFE / CASEWORK  OFFICE - CHAIRS	TASK CHAIR		· TASK CHAID		· TASK CHAID		
12 00 00	FFE / CASEWORK - OFFICE - CHAIRS	IASK CHAIK	6,468 kg CO2e	TASK CHAIR	5,652 kg CO2e	TASK CHAIR	5,118 kg	
12 00 00	OFFICE - SYSTEMS	SPINE BASED WO	-	PANEL BASED W		BENCHING	5,116 kg	
7 20 00 Y	FFE / CASEWORK - OFFICE - SYSTEMS	O. H.L DAGLD WC	31,041 kg CO2e		28,596 kg CO2e		16,919 kg	
12 35 53	LAB - CASEWORK - CABINETS	STEEL SHEET	, 5 2 2 2 0	ВАМВОО	,	PLYWOOD	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Υ	FFE / CASEWORK - LAB - CASEWORK - CABII	NETS	5,811 kg CO2e	8	(1,565 kg CO2e)	·	(7,846 kg	
12 35 53	LAB - CASEWORK - COUNTERTOP	EPOXY COUNTER		STAINLESS STEEL		PHENOLIC PANEL		
Y		NTER	-		33 kg CO2e		23 kg	
	CARBON IMPACT OF CHOICES		175,169 kg CO2e	-	129,893 kg CO2e	•	48,109 kg	
	MODULE SIZE		1,936 sf		1,936 sf		1,9	
	CARBON INTENSITY OF CHOICES		90.5 kg CO2e/sf		67.1 kg CO2e/sf		24.8 kg C0	



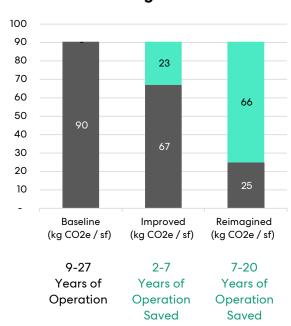
#### **EMBODIED CARBON - SYSTEM SUMMARY**



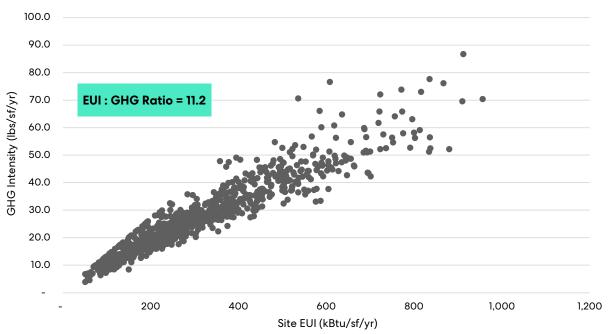
## Operational Carbon Intensity Labs

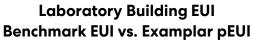


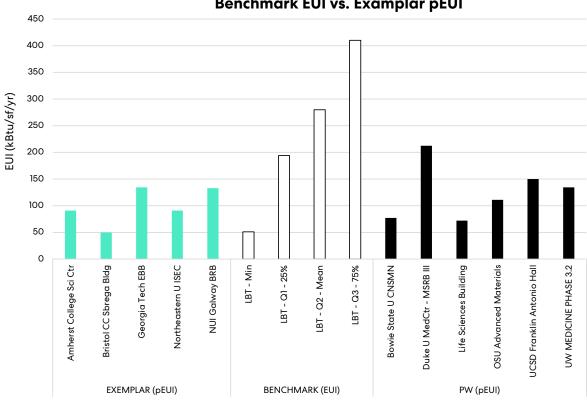
## Embodied Carbon Intensity All Design Choices



#### **12SL LAB BENCHMARKING TOOL**







# **ASSUMPTIONS**

Low Carbon Labs		
Basic Assumptions Last Updated:	9/29/2021	
LCA Settings		
Building Service Life	75	Years
Include Biogenic Carbon?	Yes	Yes / No
Quantity Takeoff Settings		
Revit Model Units	ft²	for LCA units conversion
Reference Module		
Grid X dimension	22	Feet
Grid Y dimension	88	Feet
Module Size	1,936	Square Feet
	179.9	Square Meters
# Floors	1	

# DETAIL

SUPERSTRUCTURE	Baseline	Improved	Reimagined	Alt 1	
OFFICE (STRENGTH)	CONCRETE (22X33)	STEEL (22X33)	TIMBER (22X22)		
LeMessurier Scenario	Strength	Strength	Strength	Strength	
LeMessurier Bay Studies	Concrete (22x33)	Steel (22x33)	Timber (22x22)		
Code	St C	St S	St T22	#N/A	
LeMessurier LCA Scope	[A-D] Bio	[A-D] Bio	[A-D] Bio	[A-D] Bio	
Embodied Carbon of Module (kg CO2e/sf)	18	13.7	3.5	#N/A	
Total Quantity in Module (square feet)	726	726	726		726
Total Embodied Carbon (kg CO2e)	13,068	9,946	2,541	#N/A	
LABORATORY (VCA)	CONCRETE (22X33)	STEEL (22X33)	TIMBER (22X22)		
LeMessurier Scenario	Laboratory (VC-A)	Laboratory (VC-A)	Laboratory (VC-A)	Strength	
LeMessurier Bay Studies	Concrete (22x33)	Steel (22x33)	Timber (22x22)		
Code					
code	2 C	2 \$	2 T22	#N/A	
LeMessurier LCA Scope	[A-D] Bio	2 S [A-D] Bio	2 T22 [A-D] Bio	#N/A [A-D] Bio	
LeMessurier LCA Scope	[A-D] Bio	[A-D] Bio		[A-D] Bio	1,210
LeMessurier LCA Scope Embodied Carbon of Module (kg CO2e/sf)	[A-D] Bio 24.3	[A-D] Bio 23.9	[A-D] Bio 3	[A-D] Bio	1,210
LeMessurier LCA Scope Embodied Carbon of Module (kg CO2e/sf) Total Quantity in Module (square feet)	[A-D] Bio 24.3 1,210	[A-D] Bio 23.9 1,210	[A-D] Bio 3 1,210	[A-D] Bio #N/A	1,210



# **Preliminary Results**

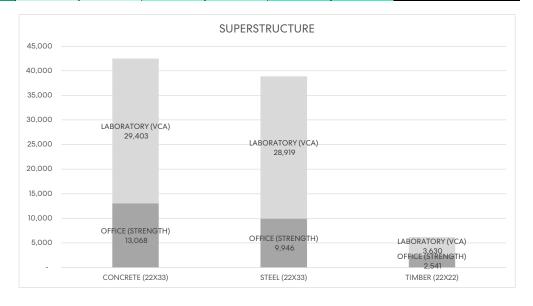
Superstructure embodied carbon results are preliminary. The results as reported here are part of an ongoing research collaboration between the LeMessurier and the authors of this Innovation Incubator proejct.

## Analysis By:

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Mike Gryniuk mgryniuk@lemessurier.com





1

EXTERIOR	Baseline	Improved	Reimagined	Alt 1
WALL BACKUP	CMU + DRYWALL FINISH	METAL STUDS + DRYWALL	WOOD FRAMING + DRYWALL	NONE + NONE
WALL FRAMING	CMU	METAL STUDS	WOOD FRAMING	NONE
Category	PARTITIONS	PARTITIONS	PARTITIONS	PARTITIONS
EPD	СМИ	Cold Formed Steel Framing	Stora Enso LVL (Laminated	None
		Systems	Veneer Lumber)	_
PCR Name	Manuctured Concrete and	UL Part B: Designated Steel Construction Product EPD	Standards EN 15804 and EN	0
	Concrete Masonry Products (UN CPC 3755)	Requirements, v2.0 (August 26,	16485 provide the core product category rules	
	11000000 (014 01 0 0700)	2020)	for the assessment. Standard	
		,	EN 15942	
			provides the communication	
			format for EPD.	
			Biogenic carbon content of wood is calculated	
			in line with EN 16449 standard.	
EPD Declared Unit	1 cu yd	1 metric tonne	l m³	-
EPD Scope EPD GWP (kg CO2e)	A1-A3 294.0 kg CO2e	A1-A3 1,710.0 kg CO2e	A1-A3 155.3 kg CO2e	A1-A3 0.0 kg CO2e
Biogenic Carbon (BCRP)		-	- 804.0 kg CO2e	0.0 kg CO2e
Embodied Carbon (kg CO2e)	294.0 kg CO2e	1,710.0 kg CO2e	- 648.7 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	0.001204	0.000014	0.000204	1.000000
Total Embodied Carbon (kg CO2e/m²)  LCA Duration (building lifespan)	0.35 kg CO2e 75 yrs	0.02 kg CO2e 75 yrs	- 0.13 kg CO2e 75 yrs	0.0 kg CO2e 75 yrs
Lifespan of Product / Replacement Cycle	75 yrs	75 yrs 30 yrs	75 yrs 75 yrs	75 yrs 75 yrs
Replacements in building lifespan	-	1.5	-	-
Total Embodied Carbon (kg CO2e/m²)	0.35 kg CO2e	<b>0</b> .06 kg CO2e	- 0.13 kg CO2e	0.00 kg CO2e
INTERIOR FINISH	DRYWALL FINISH	DRYWALL FINISH	DRYWALL FINISH	NONE
Category	PARTITIONS	PARTITIONS	PARTITIONS	PARTITIONS
EPD PCR Name	5/8" Gypsum Board or Environmental Product Declar	5/8" Gypsum Board	5/8" Gypsum Board	None 0
EPD Declared Unit	92.9 m <sup>2</sup>	92.9 m <sup>2</sup>	92.9 m <sup>2</sup>	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e)	503.9 kg CO2e	503.9 kg CO2e	503.9 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	- 503.9 kg CO2e	- 503.9 kg CO2e	- 503.9 kg CO2e	0.0 kg CO2e
Embodied Carbon (kg CO2e)  Adjustment to common units (m²)	0.010764	0.010764	0.010764	0.0 kg CO2e 1.000000
Total Embodied Carbon (kg CO2e/m²)	5.4 kg CO2e	5.4 kg CO2e	5.4 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs 1.5	30 yrs 1.5	30 yrs 1.5	75 yrs
Replacements in building lifespan  Total Embodied Carbon (kg CO2e/m²)	13.56 kg CO2e	13.56 kg CO2e	13.56 kg CO2e	0.00 kg CO2e
WALL FRAMING + INTERIOR FINISH	14 kg CO2e	14 kg CO2e	13 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)  Total Embodied Carbon (kg CO2e)	30 SM 417 kg CO2e	29 SM 399 kg CO2e	43 SM 572 kg CO2e	-
Total Embodied Carbon (kg CO2e)	417 kg CO2e	077 kg CO2e	0/2 kg CO26	-
INSULATION	XPS INSULATION	SPF INSULATION	MINERAL WOOL INSULATION	NONE
Category	INSULATION	INSULATION	INSULATION	INSULATION
EPD	FOAMULAR Extruded Polystyrene (XPS)	Spray Polyurethane Foam Insulation (HFC)	Rockwool Cavityrock	None
	Insulation	modication (rin c)		
PCR Name			nt and Requirements on the Back	0
EPD Serve	1 m <sup>2</sup>	l m²	l m²	-
EPD Scope EPD GWP (kg CO2e)	A1-A3 21.9 kg CO2e	A1-A3 3.3 kg CO2e	A1-A3 1.3 kg CO2e	A1-A3 0.0 kg CO2e
Biogenic Carbon (BCRP)	- 21.7 kg CO2e	- 0.5 kg CO2e	- 1.5 kg CO2e	0.0 kg CO2e
Embodied Carbon (kg CO2e)	21.9 kg CO2e	3.3 kg CO2e	1.3 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000000	1.000000	1.000000	1.000000
Total Embodied Carbon (kg CO2e/m²)  LCA Duration (building lifespan)	21.9 kg CO2e 75 yrs	3.3 kg CO2e 75 yrs	1.3 kg CO2e 75 yrs	0.0 kg CO2e 75 yrs
Lifespan of Product / Replacement Cycle	60 yrs	75 yrs	30 yrs	75 yrs
Replacements in building lifespan	0.3	-	1.5	-
Total Embodied Carbon (kg CO2e/m²)	27 kg CO2e	3 kg CO2e	3 kg CO2e	0 kg CO2e
Adjustment from EPD units (R5.68 to R20)  Total Embodied Carbon (kg CO2e/m²)	3.52 124 kg CO2e	3.52 15 kg CO2e	3.52 15 kg CO2e	3.52 0 kg CO2e
Total Quantity in Module (m²)	30 SM	29 SM	43 SM	
Total Embodied Carbon (kg CO2e)	<b>3.</b> 708 kg CO2e	97 kg CO2e	140 kg CO2e	-
CLADDING CUREDANING		A1118 40: ****	A1118 40:	
CLADDING SUBFRAMING Category	NONE CLADDING	ALUMINUM FRAMING  CLADDING	ALUMINUM FRAMING  CLADDING	NONE CLADDING
EPD	None	ALUMINUM SPECIALTY	ALUMINUM SPECIALTY	None
		PRODUCTS	PRODUCTS	
		AN INDUSTRY-AVERAGE	AN INDUSTRY-AVERAGE	
		ENVIRONMENTAL PROFILE	ENVIRONMENTAL PROFILE	

PCR Name	0	Institute Construction and	Institute Construction and	0
		Environment e.V. (IBU), 2014.	Environment e.V. (IBU), 2014.	
		PCR Guidance-Texts for	PCR Guidance-Texts for	
		Building-Related Products and	Building-Related Products and	
		Services. Part B: Requirements	Services. Part B: Requirements	
		on the EPD for Metal Ceilings,	on the EPD for Metal Ceilings,	
		Version 1.6, 2014.	Version 1.6, 2014.	
		UL Environment Addendum-	UL Environment Addendum-	
		Product Category Rules for	Product Category Rules for	
		preparing an environmental	preparing an environmental	
		product declaration (EPD) for	product declaration (EPD) for	
		PCR: IBU Product Category	PCR: IBU Product Category	
		Rules, Part B: Requirements on	Rules, Part B: Requirements on	
		the EPD for Metal Ceilings,	the EPD for Metal Ceilings,	
		October 2013 Version 1 2014	October 2013 Version 1 2014	
EPD Declared Unit	-	1 kg	1 kg	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e)	0.0 kg CO2e	9.5 kg CO2e	9.5 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	0.0 kg CO2e	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e)	0.0 kg CO2e	9.5 kg CO2e	9.5 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000000	0.009171	0.009171	1.000000
Total Embodied Carbon (kg CO2e/m²)	0.0 kg CO2e	0.1 kg CO2e	0.1 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	75 yrs	75 yrs	75 yrs	75 yrs
Replacements in building lifespan	-	-	-	-
Total Embodied Carbon (kg CO2e/m²)	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e

CLARRING	1			
CLADDING	TERRACOTTA CLADDING	METAL PANEL CLADDING	FIBER CEMENT CLADDING	NONE
Category	CLADDING	CLADDING	CLADDING	CLADDING
EPD	Terrart	Metal Composite Panel System	EQUITONE (Linea / Lunara)	None
			fibre cement sheets	
PCR Name	PCR part B: Requirements	UL Part B: Insulated Metal	Fibre cement / Fibre concrete,	0
	relating to the EPD for	Panels, Metal Composite	07.2014 (PCR checked and	
	ceramic panellings, 1.6,	Panels, and Metal Cladding:	approved by the SVR)	
	07.2014, Institut Bauen und	Roof and Wall Panels, v2.0		
	Umwelt e.V., 2014	October 23 2018		
EPD Declared Unit	1 m²	100 m²	1 m²	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e)	90.5 kg CO2e	2,800.0 kg CO2e	9.8 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e)	90.5 kg CO2e	2,800.0 kg CO2e	9.8 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000000	0.010000	1.000000	1.000000
Total Embodied Carbon (kg CO2e/1M2)	90.5 kg CO2e	28.0 kg CO2e	9.8 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	75 yrs	75 yrs	50 yrs	75 yrs
Replacements in building lifespan	-	-	0.5	-
Total Embodied Carbon (kg CO2e/1M2)	91 kg CO2e	<b>2</b> 8 kg CO2e	15 kg CO2e	0 kg CO2e
		-		·-
CLADDING SUBFRAMING + CLADDING	91 kg CO2e	28 kg CO2e	15 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)	30 SM	29 SM	43 SM	-
Total Embodied Carbon (kg CO2e)	2,712 kg CO2e	822 kg CO2e	629 kg CO2e	-

GLAZING	ALUMINUM STOREFRONT	ALUMINUM STOREFRONT	ALUMINUM STOREFRONT	NONE
Category	GLAZING	GLAZING	GLAZING	GLAZING
EPD	Traditional Curtain Wall	Traditional Curtain Wall	Traditional Curtain Wall	None
PCR Name	Gate Window Product Category I	Gate Window Product Category I	Gate Window Product Category I	0
EPD Declared Unit	1 m²	1 m²	1 m²	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e)	353.6 kg CO2e	353.6 kg CO2e	353.6 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e)	353.6 kg CO2e	353.6 kg CO2e	353.6 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000000	1.000000	1.000000	1.000000
Total Embodied Carbon (kg CO2e/1M2)	353.6 kg CO2e	353.6 kg CO2e	353.6 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5	-
Total Embodied Carbon (kg CO2e/1M2)	884 kg CO2e	884 kg CO2e	884 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)	31 SM	32 SM	19 SM	-
Total Embodied Carbon (kg CO2e)	27,718 kg CO2e	28,334 kg CO2e	16,528 kg CO2e	

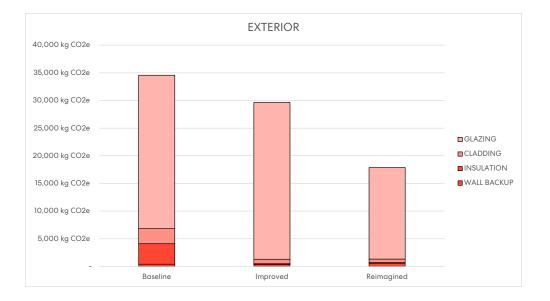
P Innovation Incubator - Low Carbon Labs



ENVELOPE OPAQUE



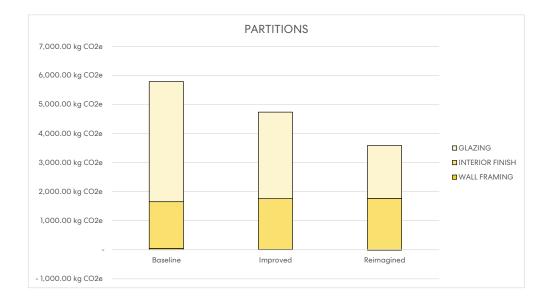
ENVELOPE GLAZING (%)



	Baseline	Improved	Reimagined	Alt 1
PARTITIONS	CMU + DRYWALL FINISH	METAL STUDS + DRYWALL	WOOD FRAMING + DRYWALL	NONE + NONE
WALL FRAMING	CMU	METAL STUDS	WOOD FRAMING	NONE
Category	PARTITIONS	PARTITIONS	PARTITIONS	PARTITIONS
EPD	CMU	Cold Formed Steel Framing	Stora Enso LVL (Laminated	None
		Systems	Veneer Lumber)	
PCR Name	Manuctured Concrete and	UL Part B: Designated Steel	Standards EN 15804 and EN	0
	Concrete Masonry	Construction Product EPD	16485 provide the core product	
	Products (UN CPC 3755)	Requirements, v2.0 (August 26,	category rules	
		2020)	for the assessment. Standard	
			EN 15942	
			provides the communication	
			format for EPD.	
			Biogenic carbon content of	
			wood is calculated	
EDD Designed Heat	2	1	in line with EN 16449 standard.	
EPD Declared Unit EPD Scope	l cu yd Al-A3	1 metric tonne A1-A3	1 m³ A1-A3	- A1-A3
EPD GWP (kg CO2e)	294.0 kg CO2e	1,710.0 kg CO2e	155.3 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	274.0 kg CO2e	- 1,710.0 kg CO2e	- 804.0 kg CO2e	0.0 kg CO26
Embodied Carbon (kg CO2e)	294.0 kg CO2e	1,710.0 kg CO2e	- 648.7 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	0.001204	0.000014	0.000204	1.000000
Total Embodied Carbon (kg CO2e/m²)	0.354 kg CO2e	0.0 kg CO2e	- 0.1 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	75 yrs	30 yrs	75 yrs	75 yrs
Replacements in building lifespan	-	1.5	-	-
Total Embodied Carbon (kg CO2e)	0.354 kg CO2e	0 kg CO2e	- 0 kg CO2e	2E-50
Total Quantity in Module (m²)	119 SM	129 SM	130 SM	-
Total Embodied Carbon (kg CO2e)	42.01 kg CO2e	7.55 kg CO2e	- 17.29 kg CO2e	-
NTERIOR FINISH	DRYWALL FINISH	DRYWALL FINISH	DRYWALL FINISH	NONE
Category	PARTITIONS	PARTITIONS	PARTITIONS	PARTITIONS
EPD EPD	5/8" Gypsum Board	5/8" Gypsum Board	5/8" Gypsum Board	None
EPD Declared Unit	92.9 m <sup>2</sup>	92.9 m²	92.9 m <sup>2</sup>	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e)	503.9 kg CO2e	503.9 kg CO2e	503.9 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e)	503.9 kg CO2e	503.9 kg CO2e	503.9 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	0.011	0.011	0.011	1.000
Total Embodied Carbon (kg CO2e/m²)	5.4 kg CO2e	5.4 kg CO2e	5.4 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5 14 kg CO2e	- 0 lum COOn
Total Embodied Carbon (kg CO2e/m²) Total Quantity in Module (m²)	14 kg CO2e 119 SM	14 kg CO2e 129 SM	14 kg CO2e	0 kg CO2e
Total Embodied Carbon (kg CO2e)	1,610 kg CO2e	1,752 kg CO2e	1,768 kg CO2e	<u>-</u>
Total Embodied edition (kg eoze)	1,010 kg CO22	1,7 02 kg CO2C	1,700 kg CO20	
GLAZING	INTERIOR GLAZING	INTERIOR GLAZING	INTERIOR GLAZING	NONE
Category	GLAZING	GLAZING	GLAZING	GLAZING
EPD	DIRTT Solid Glass Interior Wall	DIRTT Solid Glass Interior Wall	DIRTT Solid Glass Interior Wall	None
	(Savannah)	(Savannah)	(Savannah)	
PCR Name	Earthsure Product Category	Earthsure Product Category	Earthsure Product Category	0
	Rule 30162403:2014 for Interior	Rule 30162403:2014 for Interior	Rule 30162403:2014 for Interior	
	Wall Systems	Wall Systems	Wall Systems	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 m²	l m²	l m²	<del>-</del>
EPD Scope	Al-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e) Biogenic Carbon (BCRP)	81.0 kg CO2e	81.0 kg CO2e	81.0 kg CO2e	0.0 kg CO2e 0.0 kg CO2e
Embodied Carbon (kg CO2e)	- 81.0 kg CO2e	- 81.0 kg CO2e	81.0 kg CO2e	0.0 kg CO26
Adjustment to common units (m²)	1.000	1.000	1.000	1.000
Total Embodied Carbon (kg CO2e/m²)	81.0 kg CO2e	81.0 kg CO2e	81.0 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Encopan of Froduct, Replacement Cycle	1.5	1.5	1.5	<u> </u>
Replacements in building lifespan				
Replacements in building lifespan Total Embodied Carbon (kg CO2e/m²)	203 kg CO2e	203 kg CO2e	203 kg CO2e	0 kg CO2€
Replacements in building lifespan  Total Embodied Carbon (kg CO2e/m²)  Total Quantity in Module (m²)	203 kg CO2e 20 SM	15 SM	9 SM	0 kg CO2e 
Replacements in building lifespan Total Embodied Carbon (kg CO2e/m²)	203 kg CO2e			0 kg CO2e - -



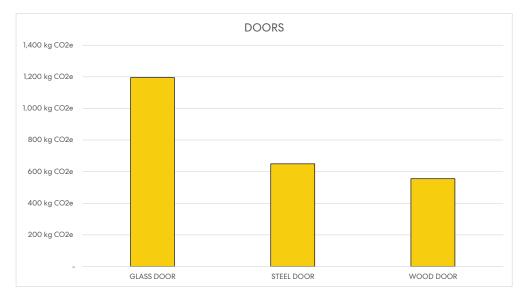
**PARTITIONS** 



INTERIOR	Baseline	Improved	Reimagined	Alt 1
DOORS	GLASS DOOR	STEEL DOOR	WOOD DOOR	NONE
Category	DOORS	DOORS	DOORS	DOORS
EPD	Optima Aluminum Framed	Assa Abloy Regent and Omega	Eggers Industries -	None
	Doors	Doors	Architectural Wood Door Leaf	
PCR Name	The CEN standard EN 15804	Commercial Steel Doors and/or	PCR for preparing an EPD for	0
	serves as the core PCR	Frames 9005	interior architectural wood	
			door leaves ASTM, 2015	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 Door	1 Door	1 Door	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
Total Embodied Carbon (kg CO2e/unit)	239.0 kg CO2e	130.0 kg CO2e	111.0 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Total Embodied Carbon (kg CO2e/unit)	239.0 kg CO2e	130.0 kg CO2e	111.0 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5	i
Total Embodied Carbon (kg CO2e/unit)	598 kg CO2e	325 kg CO2e	278 kg CO2e	0 kg CO2e
Total Quantity in Module (units)	2	2	2	-
Total Embodied Carbon (kg CO2e)	1,195 kg CO2e	650 kg CO2e	555 kg CO2e	-



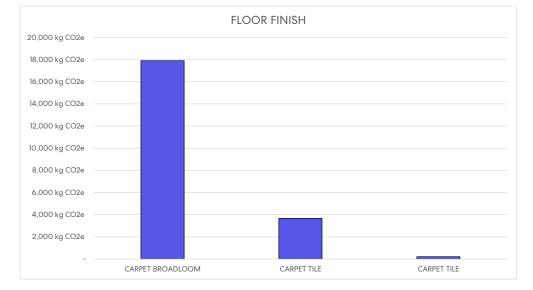
**DOORS** 



OFFICE	Baseline	Improved	Reimagined	Alt 1
FLOOR FINISH	CARPET BROADLOOM	CARPET TILE	CARPET TILE	NONE
Category	FLOOR FINISH	FLOOR FINISH	FLOOR FINISH	FLOOR FINISH
EPD	Mohawk Tufted Nylon Carpet	Mohawk Ecoflex Matrix	INTERFACE CQUEST BIOX	None
	on Weldlok Onguard Backing	Modular Carpet Tiles		
PCR Name	UL Product Category Rule (PCR)	UL Product Category Rule (PCR)	Part A: Life Cycle Assessment	0
	Guidence for Building-Related	Guidence for Building-Related	Calculation Rules and Report	
	Products and Serivces Part B:	Products and Serivces Part B:	Requirements, Version 3.2, 2018	
	Flooring EPD Requirements	Flooring EPD Requirements	Part B: Flooring EPD	
	v.2.0 September 2018	v.2.0 September 2018	Requirements, Version 2.0, 2018	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 m²	1 m²	1 m²	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e/m²)	52.9 kg CO2e	10.0 kg CO2e	- 0.4 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e/m²)	52.9 kg CO2e	10.0 kg CO2e	- 0.4 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000	1.000	1.000	1.000
Embodied Carbon (kg CO2e/m²)	53.9 kg CO2e	11.0 kg CO2e	0.6 kg CO2e	1.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	15 yrs	15 yrs	15 yrs	75 yrs
Replacements in building lifespan	4.0	4.0	4.0	-
Total Embodied Carbon (kg CO2e/m²)	270 kg CO2e	55 kg CO2e	3 kg CO2e	1 kg CO2e
Total Quantity in Module (m²)	66	67	66	-
Total Embodied Carbon (kg CO2e)	17,905 kg CO2e	3,673 kg CO2e	210 kg CO2e	-



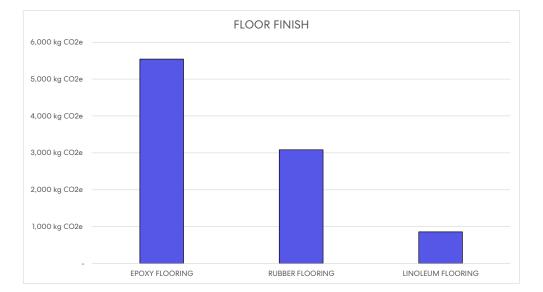
**FLOORS** 



LAB	Baseline	Improved	Reimagined	Alt 1
FLOOR FINISH	EPOXY FLOORING	RUBBER FLOORING	LINOLEUM FLOORING	NONE
Category	FLOOR FINISH	FLOOR FINISH	FLOOR FINISH	FLOOR FINISH
EPD	Dur-A-Flex Epoxy Flooring	Noraplan Environcare Sentica (part of 913 line)	Forbo Marmoleum	None
PCR Name	Part A (IBU/UL v1.2), Part B (IBU)	IBU Part B: Requirements on the	EN 16810: 2017 Resilient, Textile	0
	Requirements for floor	EPD for Floor coverings, version	and Laminate floor coverings -	
	coverings. UL Part B addendum	1.2 02-2018	Environmental Product	
			Declarations - Product	
			Category Rules	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 m²	l m²	1 m³	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e/m²)	9.3 kg CO2e	5.9 kg CO2e	- 0.0 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e/m²)	9.3 kg CO2e	5.9 kg CO2e	- 0.0 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.000	1.000	1.000	1.000
Embodied Carbon (kg CO2e/m²)	10.3 kg CO2e	6.9 kg CO2e	1.0 kg CO2e	1.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	25 yrs	30 yrs	15 yrs	75 yrs
Replacements in building lifespan	2.0	1.5	4.0	-
Total Embodied Carbon (kg CO2e/m²)	31 kg CO2e	17 kg CO2e	5 kg CO2e	1 kg CO2e
Total Quantity in Module (m²)	179	180	179	-
Total Embodied Carbon (kg CO2e)	5,543 kg CO2e	3,083 kg CO2e	856 kg CO2e	-



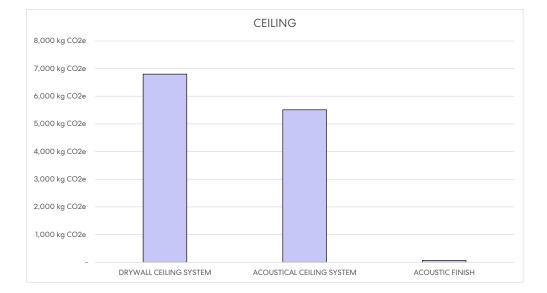
**FLOORS** 



OFFICE	Baseline	Improved	Reimagined	Alt 1
CEILING	DRYWALL CEILING SYSTEM	ACOUSTICAL CEILING SYSTEM	ACOUSTIC FINISH	NONE
Category	CEILING	CEILING	CEILING	CEILING
EPD	USG Ensemble	Armstrong Ultima Ceiling	International Cellulose K-13	None
PCR Name	NSF International PCR for	PCR Guidance for Building	Product Category Rules (PCR)	0
	Gypsum Panel Products, v1.1	Related Products and Services,	Guidance for Building-Related	
	April 23 2020	From	Products and Services Part B:	
		the range of Environmental	Building Envelope Thermal	
		Product Declarations of UL	Insulation EPD Requirements	
		Environment: "Part B: Non-		
		Metal Ceiling Panel EPD		
		Reauirements". October 2015v1.		
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1,000 sf	1 m²	1 m²	-
EPD Scope	A1-A3	A1-D	A1-A3	A1-D
Total Embodied Carbon (kg CO2e)	1,420.0 kg CO2e	12.4 kg CO2e	1.4 kg CO2e	<del>-</del>
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Total Embodied Carbon (kg CO2e)	1,420.0 kg CO2e	12.4 kg CO2e	1.4 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	0.0107639	1.000	1.000	1.000
Total Embodied Carbon (kg CO2e/m²)	15.3 kg CO2e	12.4 kg CO2e	1.4 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	75 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	-	-
Total Embodied Carbon (kg CO2e/m²)	38 kg CO2e	31 kg CO2e	1 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)	178	178	45	-
Total Embodied Carbon (kg CO2e)	6,799 kg CO2e	5,513 kg CO2e	61 kg CO2e	-



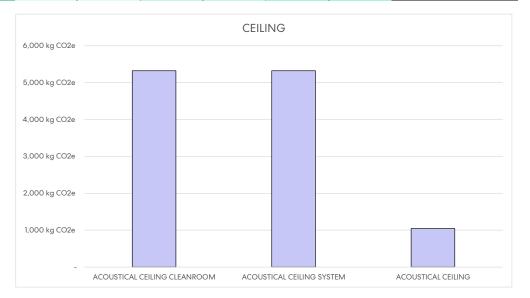
**CEILINGS** 



LAB	Baseline	Improved	Reimagined	Alt 1
CEILING	COUSTICAL CEILING CLEANROOF	ACOUSTICAL CEILING SYSTEM	ACOUSTICAL CEILING	NONE
Category	CEILING	CEILING	CEILING	CEILING
EPD	Armstrong Clean Room FL	Armstrong Calla Ceiling Panels	Armstrong Optima Ceiling	None
	Ceiling Panels		Panels	
PCR Name	PCR Guidance for Building	PCR Guidance for Building	PCR Guidance for Building	0
	Related Products and Services,	Related Products and Services,	Related Products and Services,	
	From	From	From	
	the range of Environmental	the range of Environmental	the range of Environmental	
	Product Declarations of UL	Product Declarations of UL	Product Declarations of UL	
	Environment: "Part B: Non-	Environment: "Part B: Non-	Environment: "Part B: Non-	
	Metal Ceiling Panel EPD	Metal Ceiling Panel EPD	Metal Ceiling Panel EPD	
	Requirements". October 2015v1.	Reauirements". October 2015v1.	Reauirements". October 2015v1.	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 m²	1 m²	1 m²	-
EPD Scope	A1-D	A1-D	A1-D	A1-D
Total Embodied Carbon (kg CO2e/m²)	11.0 kg CO2e	11.0 kg CO2e	8.4 kg CO2e	-
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Total Embodied Carbon (kg CO2e/m²)	10.9607	11.0 kg CO2e	8.4 kg CO2e	0.0 kg CO2e
Adjustment to common units (m²)	1.00000	1.000	1.000	1.000
Total Embodied Carbon (kg CO2e/m²)	12.0 kg CO2e	12.0 kg CO2e	9.4 kg CO2e	1.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5	-
Total Embodied Carbon (kg CO2e/m²)	30 kg CO2e	30 kg CO2e	23 kg CO2e	1 kg CO2e
Total Quantity in Module (m²)	178	178	45	-
Total Embodied Carbon (kg CO2e)	5,321 kg CO2e	5,321 kg CO2e	1,044 kg CO2e	-



**CEILINGS** 

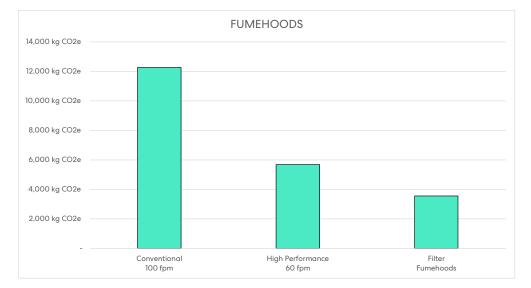


LAB	Baseline	Improved	Reimagined	Alt 1
	Conventional	High Performance	Filter	
FUMEHOODS	100 fpm	60 fpm	Fumehoods	
6' Hood Cabinet	166	166	166	
Supply + Exhaust AHUs - Alum	3,695	1,642	-	
Supply + Exhaust AHUs - Steel	298	132	-	
S.S. Exhaust Ductwork	203	90	-	
Supply Ductwork	547	243	-	
Embodied Carbon (kg CO2e/cabinet)	4,909 kg CO2e	2,274 kg CO2e	166 kg CO2e	
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	
Replacements in building lifespan	1.5	1.5	1.5	-
Cabinet Embodied Carbon (kg CO2e/cabinet)	12,271 kg CO2e	5,684 kg CO2e	414 kg CO2e	-
Filters	-	-	210	
Embodied Carbon (kg CO2e/FILTER)	-	-	210 kg CO2e	
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	
Lifespan of Product / Replacement Cycle	-	-	5 yrs	
Replacements in building lifespan	-	-	14.0	-
Filter Embodied Carbon (kg CO2e/FILTER)	-	-	3,146 kg CO2e	-
Total Embodied Carbon (kg CO2e/hood)	12,271 kg CO2e	5,684 kg CO2e	3,560 kg CO2e	
Total Quantity in Module	1	1	1	
Total Embodied Carbon (kg CO2e)	12,271 kg CO2e	5,684 kg CO2e	3,56 <mark>0 kg CO2e</mark>	



Analysis By: BR+A Consulting Engineers BOSTON 10 Guest Street 4th Floor Boston, MA 02135 617.254.0016



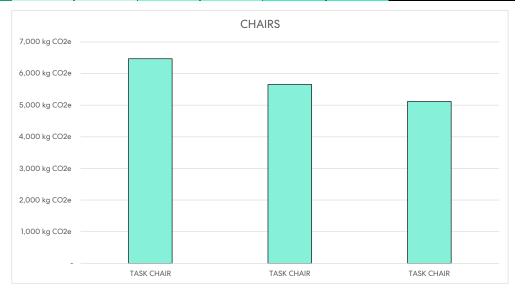


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OFFICE	Baseline	Improved	Reimagined	Alt 1
CHAIRS	TASK CHAIR	TASK CHAIR	TASK CHAIR	NONE
Category	CHAIRS	CHAIRS	CHAIRS	CHAIRS
EPD	Knoll Ollo Light Task Chair	Steelcase Think Chair	New Aeron Chair	None
PCR Name	PCR 2012:01 Construction	[Not specified]	Reference PCR: Product	0
	Products And Construction		Category Rule for	
	Services,		<b>Environmental Product</b>	
	Version 2.3, UN CPC 314		Declaration BIFMA PCR for	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 Chair	1 Chair	1 Chair	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
Total Embodied Carbon (kg CO2e/unit)	107.8 kg CO2e	94.2 kg CO2e	85.3 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Total Embodied Carbon (kg CO2e/unit)	107.8 kg CO2e	94.2 kg CO2e	85.3 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	15 yrs	15 yrs	15 yrs	75 yrs
Replacements in building lifespan	4.0	4.0	4.0	-
Total Embodied Carbon (kg CO2e/unit)	539 kg CO2e	471 kg CO2e	427 kg CO2e	0 kg CO2e
Total Quantity in Module (unit)	12	12	12	-
Total Embodied Carbon (kg CO2e)	6,468 kg CO2e	5,652 kg CO2e	5,118 kg CO2e	-



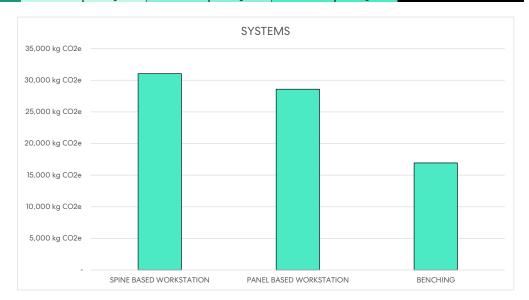
OFFICE SYSTEMS



OFFICE	Baseline	Improved	Reimagined	Alt 1
SYSTEMS	SPINE BASED WORKSTATION	PANEL BASED WORKSTATION	BENCHING	NONE
Category	SYSTEMS	SYSTEMS	SYSTEMS	SYSTEMS
EPD	Knoll Currents	Knoll Dividends Horizon	Knoll Antenna Workspaces	None
PCR Name	NSF International-BIFMA PCR	NSF International-BIFMA PCR	NSF International-BIFMA PCR	0
	for Office Furniture Workspace	for Office Furniture Workspace	for Office Furniture Workspace	
	Products: UNCPC 3814	Products: UNCPC 3814	Products: UNCPC 3814	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 m²	1 m²	1 m²	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
Total Embodied Carbon (kg CO2e/unit)	495.0 kg CO2e	456.0 kg CO2e	269.8 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Total Embodied Carbon (kg CO2e/unit)	495.0 kg CO2e	456.0 kg CO2e	269.8 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	15 yrs	15 yrs	15 yrs	75 yrs
Replacements in building lifespan	4.0	4.0	4.0	-
Total Embodied Carbon (kg CO2e/unit)	2,475 kg CO2e	2,280 kg CO2e	1,349 kg CO2e	0 kg CO2e
Total Quantity in Module (unit)	9	9	9	-
Total Surface Area of Workstations (m²)	13	13	13	-
Total Embodied Carbon (kg CO2e)	31,041 kg CO2e	28,596 kg CO2e	16,919 kg CO2e	



OFFICE SYSTEMS



LAB	Baseline	Improved	Reimagined	Alt 1
CASEWORK	STEEL SHEET	BAMBOO	PLYWOOD	NONE
CABINETS	CABINETS	CABINETS	CABINETS	CABINETS
EPD	Cold Formed Steel Framing	Flat and Edge Grain Plyboo	North American Softwood	None
			Plywood	
PCR Name	ISO 14044 and Product	ISO 14044 and Product	UL Environment: Product	0
	Category Rules (PCR) for	Category Rules (PCR) for	Category Rules for Building-	
	Construction Products and	Construction Products and	Related Products and Services.	
	Services.	Services.	Part A: Calculation Rules for the	
			Life Cycle Assessment and	
			requirements on the Project	
			Report, v3.2	
			Part B: Structural and	
			Architectural Wood Products	
			EPD Requirements . v1.0	
EPD Type	Product Specific	Product Specific	Industry Wide	0
EPD Declared Unit	1 metric tonne	1 kg	1 m³	-
EPD Scope	A1-A3 / kg	A1-A3 / kg	A1-A3 / kg	A1-A3 / kg
EPD GWP (kg CO2e/kg of product)	2.4 kg CO2e	3.6 kg CO2e	0.5 kg CO2e	-
Biogenic Carbon (BCRP/kg of product)	-	- 4.3 kg CO2e	- 4.4 kg CO2e	-
Embodied Carbon (kg CO2e/kg of product)	2.4 kg CO2e	- 0.7 kg CO2e	- 3.9 kg CO2e	-
Weight of Cabinet in Ibs	75	73	65	130
Weight of Cabinet in kg	34.02	33.11	29.48	58.97
Embodied Carbon (kg CO2e/cabinet)	83 kg CO2e	- 23 kg CO2e	- 116 kg CO2e	-
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5	-
Total Embodied Carbon (kg CO2e/cabinet)	208 kg CO2e	- 58 kg CO2e	- 291 kg CO2e	-
Total Quantity in Module (project units)	28	27	27	-
Total Embodied Carbon (kg CO2e)	5,811 kg CO2e	1,565 kg CO2e	- 7,846 kg CO2e	



LAB CASEWORK

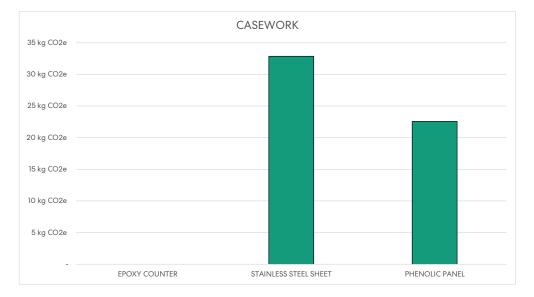


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LAB	Baseline	Improved	Reimagined	Alt 1
CASEWORK	EPOXY COUNTER	STAINLESS STEEL SHEET	PHENOLIC PANEL	NONE
COUNTERTOP	COUNTERTOP	COUNTERTOP	COUNTERTOP	COUNTERTOP
EPD	Durcon Greenstone	Cold Rolled Stainless Steel	Fundermax Max Panels	None
		Outokumpu Oyj		
PCR Name	[No EPD Available]	Structural steels, 07.2014 (PCR	Laminates, 10.2018 (PCR	0
		checked and approved by the	checked and approved by the	
		SVR)	SVR)	
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	NA	1 metric tonne	l m²	-
EPD Scope	A1-A3 / kg	A1-A3 / kg	A1-A3 / kg	A1-A3
EPD GWP (kg CO2e/kg of product)	-	3 kg CO2e	2 kg CO2e	0 kg CO2e
Biogenic Carbon (BCRP/kg of product)	-	-	-	-
Embodied Carbon (kg CO2e/kg of product)	-	3 kg CO2e	2 kg CO2e	0 kg CO2e
Weight in Lbs/ft <sup>2</sup>	11.0	4.0	5.3	
Weight in kg/m²	0.46	0.17	0.22	1.00
Embodied Carbon (kg CO2e/m²)	-	0.57 kg CO2e	0.39 kg CO2e	0.00 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	75 yrs
Lifespan of Product / Replacement Cycle	30 yrs	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5	-
Total Embodied Carbon (kg CO2e/m²)	-	1.43 kg CO2e	0.98 kg CO2e	0.00 kg CO2e
Total Quantity in Module (m²)	23.81	23.02	23.02	23.02
Total Embodied Carbon (kg CO2e)		33 kg CO2e	23 kg CO2e	0 kg CO2e

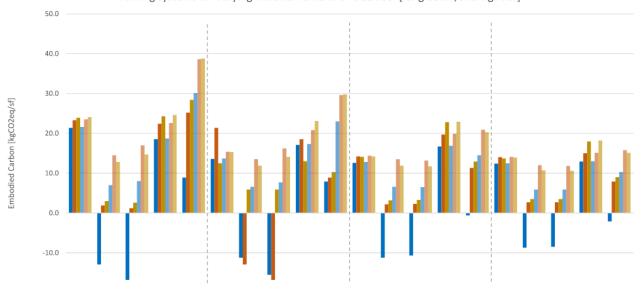


LAB BENCHTOP



# APPENDIX

# Embodied carbon with and without biogenic carbon of steel, concrete, timber, and hybrid horizontal framing systems for varying vibration criteria of a 22'x33' [long beam/short girder]



LCA Category	2 S	2 T22	2 T	2 C	2 H	4 S	4 T22	4 T	4 C	4 H	8 S	8 T22	8 T	8 C	8 H	St S	St T22	St T	St C	St H
[A1-A3] Bio	21.40	-12.90	-16.80	18.50	8.90	13.60	-11.20	-15.50	17.10	7.90	12.60	-11.20	-10.70	16.70	-0.60	12.40	-8.70	-8.50	12.90	-2.10
[A-C] Bio	23.30	1.90	1.20	22.40	25.20	21.40	-12.90	-16.80	18.50	8.90	14.20	2.20	2.30	19.70	11.30	14.00	2.70	2.70	15.00	7.90
[A-D] Bio	23.90	3.00	2.60	24.30	28.40	12.50	5.90	5.90	13.00	10.30	14.10	3.20	3.30	22.80	12.90	13.70	3.50	3.50	18.00	9.00
[A1-A3] NoBio	21.60	7.00	8.00	18.70	30.10	13.70	6.60	7.70	17.30	23.00	12.80	6.60	6.50	16.90	14.50	12.50	5.90	5.90	13.00	10.30
[A-C] NoBio	23.50	14.50	17.00	22.60	38.60	15.40	13.50	16.20	20.80	29.60	14.40	13.50	13.20	19.90	20.90	14.10	12.00	11.80	15.10	15.80
[A-D] NoBio	24.10	12.80	14.70	24.60	38.80	15.30	11.90	14.10	23.10	29.80	14.20	11.90	11.70	22.90	20.30	13.90	10.70	10.60	18.20	15.10

Analysis By:

LeMessurier 1380 SOLDIERS FIELD ROAD, BOSTON, MA 02135 617-868-1200

Mike Gryniuk mgryniuk@lemessurier.com



## **Preliminary Results**

Superstructure embodied carbon results are preliminary. The results as reported here are part of an ongoing research collaboration between the LeMessurier and the authors of this Innovation Incubator proejct.

# **Low Carbon Labs**

# CMU CONVERSION CALCULATION

Omni Calculator

https://www.omnicalculator.com/construction/concrete-block-fill

Volume of concrete in CMU at specified size	0.011518 cu yd
CMU Size	16 " wide x 8" tall x 8" thicknes
CMU units wide	0.7500 per 1 LF horizontal
CMU units tall	1.5000 per 1 LF vertical
Equivalent # CMU units	1.1250 per 1 ft² of wall
Equivalent # CMU units	0.1045 per 1 m² of wall
Approx CMU cu yd per unit m² of wall area	0.00120381 cu yd / m²

# **Low Carbon Labs**

# METAL STUD CONVERSION CALCULATION

## **EPD Link**

https://www.clarkdietrich.com/sites/default/files/imce/pdf/SupportTools/EPD\_HPD/101.1\_Clarkwestern%20Dietrich\_EPD\_Cold-Formed%20Steel%20Framing%20Systems.pdf

**EPD Units** 

1 metric ton (mT)

## ClarkDietrich iProstud

https://www.itools.clarkdietrich.com/iprostud.php

# **Interior Metal Stud Framing**

**Example Product** 

https://www.itools.clarkdietrich.com/submittalpro/dyn\_pdf/%7B%22pdf\_type%22%3A%22individual\_product%22%2C%22project\_product\_code%22%3A%22product%7Cprostud~product\_code%7C362PDS125-15-50ksi~coating%7CG40EQ%22%7D/CD\_362PDS125-15-50ksi.pdf

 Unit Weight
 0.348
 lbs
 /
 1 LF

 Conversion Factor (Pound to Metric Ton)
 0.000454
 0.000158 mT / 1 LF

# **Exterior Metal Stud Framing**

**Example Product** 

https://www.itools.clarkdietrich.com/submittalpro/dyn\_pdf/%7B%22pdf\_type%22%3A%22individual\_product%22%2C%22project\_product\_code%22%3A%22product%7Cstructural\_stud~product\_code%7C550S162-33~coating%7CCP60~punched%7Ctrue%22%7D/CD\_550S162-33.pdf

Unit Weight

Conversion Factor (Pound to Metric Ton)

Exterior Metal Stud Mass / LF

0.000503 mT / 1 LF

Approx stud length per unit SF of wall area

Wall Height	14	'	-	6 "	High	
Stud Spacing	0	1	- [	16 "	O.C.	
Vertical Studs Length / SF	0.75		_			
Horizontal Studs Length / SF	0.14					
Subtotal	0.89					
Allowance for opening framing	0.04			5%		
Stud Framing / SF of wall area	0.93	LF	/	SF		
Conversion Factor (SF to m²)	0.09290					
Stud Framing / m² of wall area	0.08662	LF	/	m²		

Approx stud mT per unit m<sup>2</sup> of wall area

Interior Walls	1.37E-05 mT /	m²
Exterior Walls	4.36E-05 mT /	m²

#### **Low Carbon Labs** LVL STUD CONVERSION CALCULATION **EPD Link** https://portal.environdec.com/api/api/v1/EPDL ibrary/Files/e5b39f2f-7029-49f0-b427-4f3108dd95c6/Data 1 m³ **EPD Units** Approx stud volume per unit SF of wall area " High Wall Height " O.C. **Stud Spacing** 0.75 SF Vertical Studs Length / SF LF Horizontal Studs Length / SF 0.14 LF SF LF SF Subtotal 0.89 Allowance for opening framing 0.04 5% Stud Framing Linear Feet / ft² of wall area 0.93 LF SF Stud Framing Linear Feet / m² of wall area 0.08662 LF m² **Exterior Stud Cross Section** Stud Thickness 2.0 Stud Depth 6.0 **Stud Cross Section** 0.083 ft<sup>2</sup> Volume ft<sup>3</sup> / m<sup>2</sup> of wall area 0.00721801 ft3 m² erior stud framing volume m<sup>3</sup> / m<sup>2</sup> of wall area 0.0002044 m<sup>3</sup>

Low Carbon Labs ALUMINUM ZEE GIRT CONVERSIO	N CALCULATIO	N			NOTES	
Depth of Zee	Dim A	4.5	"		Wall Cavity Depth	
Face of Zee	Dim B	1.0	II		Attachment Surfaces	
Gauge	(16 Ga.)	0.0630	II		Thickness	
Cross Section	Area	0.4095	sq.in.	/	LF	
Conversion Factor (sq.in. to m²)	'	0.00065				
	Cross Section	0.00026	m²	/	LF	
Wall Height		14	1	-	6 " High	
Zee Spacing		-	-	-	16 " O.C.	
Vertical Zee Length / SF		0.75	LF	/	sf	
Conversion Factor (SF to m²)		0.09290				
Framing /	m² of wall area	8.07293	LF	/	m²	
Weight / Mass		4.3	kg	/	m²	
		0.00917	kg	/	m²	

https://www.certainteed.com/resources/101.1\_CISCA\_EPD\_Aluminum\_Specialty\_Products\_20141217.pdf

# **Low Carbon Labs**

# FUMEHOOD CALCULATIONS

Fumehood (100 fpm face	velocity)						
Component	Count	Unit	Material	lbs	kg	kgCO2e/kg	kgCO2e
Hood Cabinet (6')	1	6' Hood	Carbon-Steel	500	226.80	0.73	166
Supply + Exhaust AHUs - Alum	900	cfm	Aluminum	900	408.23	9.05	3,695
Supply + Exhaust AHUs - Steel	900	cfm	Carbon-Steel	900	408.23	0.73	298
S.S. Exhaust Ductwork			Stainless Stee	225	102.06	2	203
Supply Ductwork			Carbon-Steel	1653	749.82	1	547
					Hoo	d + Ductwork	4,909

# Fumehood (60 fpm high performance)

Component	Count	Unit	Material	lbs	kg	kgCO2e/kg	kgCO2e
Hood Cabinet (6')	1	6' Hood	Carbon-Steel	500	226.80	0.73	166
Supply + Exhaust AHUs - Alum	400	cfm	Aluminum	400	181.44	9.05	1,642
Supply + Exhaust AHUs - Steel	400	cfm	Carbon-Steel	400	181.44	0.73	132
S.S. Exhaust Ductwork			Stainless Stee	100	45.36	1.99	90
Supply Ductwork			Carbon-Steel	735	333.25	1	243
					Hoo	d + Ductwork	2,274

#### Filter Hood (carbon adsorption filter technology)

(							
Component	Count	Unit	Material	lbs	kg	kgCO2e/kg	kgCO2e
Hood Cabinet (6')		1 6' Hood	Carbon-Steel	500	226.80	0.73	166
					Hoo	d + Ductwork	166

Filter Embodied Carbon per 5	year life	units	US Tons CO2	kg Co2	Notes	
Coconut Havesting	zero (product of coconut food industry)		0.000	-		
Removing Husk	zero (waste product of coconut food industry)		0.000	-		
Transportation - local	Pounds of carbon (via truck), 160km	52.92	0.0004	0	105g/metricTon/km	https://timeforchange.org/co2-emissions-shipping-goods
Activation Process	4 tons CO2/Ton Activated Carbon	52.92	0.106	96		
Transportation - ship	Asia to America (cargo ship), 22,500km	52.92	0.012	11	20g/metricTon/km	https://sea-distances.org/
Transportation - Semi	From NY Port to Erlab (Semi truck), 400km	52.92	0.001	1	105g/metricTon/km	https://timeforchange.org/co2-emissions-shipping-goods
Filter Manufacturing	1-1/5HP motor for conveyor/filler, 5 mins/filter	n/a	0.373	338	1.5Hp motor for 5 mins/	filter
Transportation - local	to job site, Semi truck, 1,600km	104	0.009	8	105g/metricTon/km	
Transportation - local	from job site to incinerator, 400km	104	0.002	2	105g/metricTon/km	
Incineration	83kW (300kJ) produced per filter	n/a	-0.272	(247)	Ash, Water, Nitrogen, C	O2 https://www.epa.gov/energy/greenhouse-gas-equivalencies-calcu
·	_		Filters	210		

Hood + Ductwork + Filters 375

	Global War	ming Poten	tial
LCA Data (OneClickLCA)	kgCO2e/ kg	kgCO2e/II	kgCO2e/m3
Galvanized steel	2.52	5.54	19683
Stainless steel	1.99	4.39	34504
Aluminum	9.05	19.92	31639
Structural steel	2.34	5.14	18352
Carbon-Steel	0.73	1.61	5708
Cast iron		1.5	
Copper		7.3	

\*\*GWP values are collected from oneclicklca.com

\*\*\*GWP values (galvaized steel, stainless steel, aliminium,structural steel) are averaged based on 3 ratings; high recyled medium, and low reclyed percentages.

\*\*Transportation is not added

\*Transportation method (Transportation distance approximate 370 mile)

\*Trailer combination, 40 ton capacity, 100% fill rate: 0.0559 kg CO2e / tonmile

US Tons to Kg

907.185

Analysis By: BR+A Consulting Engineers BOSTON 10 Guest Street 4th Floor Boston, MA 02135 617.254.0016



# **Low Carbon Labs**

RESOURCES		
Туре	Name	Link
EPD Database	The International EPD	https://www.environdec.com/library
	System / Envirodec	
EPD Database	UL Spot	https://spot.ul.com/
EPD Database	The EPD Registry	https://www.theepdregistry.com/
EPD Database	SCS Global Services	https://www.scsglobalservices.com/certified-green-
		products-guide?program=192
Product DB	Sustainable Minds	https://www.transparencycatalog.com/
Reference	Principles for the	https://www.bio.org/sites/default/files/legacy/bioorg/do
	<b>Accounting of Biogenic</b>	cs/Position_Carbon_Footprint_PCF.pdf
	Carbon in	
	<b>Product Carbon Footprint</b>	
	(PCF) Standards	
EPD Database	HPN Ecoguide	https://ecoguide.housingpartnership.net/ecoguide/certifi
		cation/epd-certificate/
Reference	NIST - BEES	https://ws680.nist.gov/Bees2
EPD Database	ASTM PCR and EPD DB	https://www.astm.org/CERTIFICATION/EpdAndPCRs.html
EPD Database	NSF.org	http://info.nsf.org/Certified/Sustain/epd_search.asp
Calculation reference	Concrete Block Fill	https://www.omnicalculator.com/construction/concrete-
	Calculator	block-
		fill#:~:text=The%20core%20volume%20of%20a,3%20or%
		200.006424%20m3.&text=From%20our%20calculations
		%20above%2C%20we,use%20to%20construct%20our%2
		Owall.

P Innovation Incubator - Low Carbon Labs

Low Carbon L	abo								
	aps								
COMMUNICATIONS				Info Provided	Discussion	Contact	Contact Email	Contact 2	Contact 2 Email
roduct / Research Are		Latest Communication	Туре		Discussion			Contact 2	Contact 2 Email
aboratory Structural	LeMessurier	10/7/2021	Calls. Joint research			Michael C. Gryniuk, P.E.	mgryniuk@lemessurier.com		
Systems						Associate			
						LeMessurier			
						1380 Soldiers Field Road			
						Boston, MA 02135			
						T 617-868-1200 x413			
Building / Fire Code	Jensen Hughes		Calls. Joint research			JEREMY LEBOWITZ, PE   Practice Leader -	ilebowitz@jensenhughes.com		
ssues in Lab Buildings						Industrial			
						Jensen Hughes			
						+1508-273-8482			
aboratory Mechanica	I BR+A		Calls. Joint research	L		JACOB KNOWLES	jknowles@brplusa.com	TURAN KARAKUS	TKarakus@brplusa.com
Systems						Associate Principal		Sustainable Design	
						Director of Sustainable Design		617.925.8305 direct	
						BR+A CONSULTING ENGINEERS		BR+A CONSULTING ENGINEERS	
						617.925.8376 617.460.4694			
Epoxy Flooring, Paints	Sherwin Williams	8/13/2021	Call	Guidance on product options for high	Laboratory Flooring options. Epoxy or high	Mike Starner	michael.starner@sherwin.com	Mark T. Weiner, CSI-IIDA	mark.t.weiner@sherwin.com
			Email	performance flooring. EPDs for flooring	performance coatings. EPD data available	Business Development Manager		Specification Consultant	
				products.	from SW.	The Sherwin-Williams Co.		The Sherwin Williams Company	
						High Performance Flooring		Office 401-245-5176	
						484-624-2360		Mobile 617-438-1408	
aboratory Products	My Green Lab	8/19/2021	Call			James Connelly	James@mygreenlab.org		
and Materials						Chief Executive Officer			
						Work: +1.206.209.8961   Base: Spokane,			
						Washington, USA			
						Web: mygreenlab.org			
Epoxy Flooring	Righter Group, Inc.	8/4/2021	Call	Tnemic does not have EPDs		Michael Woessner I Coatings Consultant	mwoessner@rightergroup.com		
						Righter Group, Inc.   Cell: 978-697-0152			
aboratory Casework	Mott	8/2/2021	Calls, Emails	Lab casework information. Weights of	Mott does not have EPDs. Mott President is th		chipd@mott.ca		
				cabinets and countertop materials. Suggested	chair of SEFA board.	Development			
				EPDs for lab product raw materials.		Mott Manufacturing Ltd. 452 Hardy Road,			
						Brantford ON Canada N3T 5L8			
						C: 315.278.7477			
		- ( (				QUALITY BY DESIGN   www.mott.ca			
Concrete Block	Jandris Block	8/20/2021	Emails	Product data and EPDs.		Heidi Jandris	heidi@ajandris.com		
						646-812-0860			
aboratory Casework	Kewaunee	8/23/2021	Email Email	No EPD or information available  No EPD or information available		Virginia Kowalick	virginiakowalick@kewaunee.com		
Laboratory Casework	Kewaunee	8/23/2021				Rodney LaBelle	rodneylabelle@kewaunee.com		
Countertops	Fundermax	7/1/2021	Calls, Emails	EPD, Product information, suggestions for		Dawn Jacobs	Dawn_Jacobs@fundermax.biz		
	B	7/00/005	Cally Faranti	alternative products	D	B. L. C	h		
Countertops	Durcon	7/29/2021	Calls, Emails	No EPD or information available.	Durcon was curious about the process for	Beto Garcia	hgarcia@durcon.com		
					creating EPDs. They expressed concern about				
					the cost of EPDs and about intellectual	206 Allison Drive, Taylor, TX 76574			
9	tota da	/ In 4 Inne:	Colle Foreille	Lab Residence Porce Address to the Control of the C	property protection.	512.595.8024 (office)   737.215.2073 (cell)			
Flooring	Interface	6/24/2021	Calls, Emails	Lab flooring options. Advice about seeking		Mikhail Davis	mikhail.davis@interface.com		
				EPDS for products. Connections and advice fo		Director, Technical Sustainability – America			
				other MFRs.		mikhail.davis@interface.com   mobile +1 415	-		
						652-3099			

Report 10/15/2021 P Innovestion Incubestor - Low Carbon Lobs

J. Werner,

Low Carbon Labs				Product Data			Product Category Rule	Type of EPD	Declared Unit				Life	GWP Values (kg/CO2e	)													
Spec Section LCA Category 04 22 00 INTERIOR	LCA Subcategory Display Nam NONE PARTITIONS CMU	ne Product Name NONE CMU	Product Description No product / no data 8x8x16 Medium Weight CMU	Environmental Product Declaration (EPD)	Product Literature	Reference Link	PCR Name  Manuctured Concrete and Concrete Masonry	Type of EPD Product	nl Declared Unit Description  The ASTM PCR for concrete and concrete masonry products on	Unit Type	Declared Unit	Adjusment Factor to m² Mass (kg) : 0.001203814	2 Service Life (yrs) 75	1 A1-A3 1.00E-50 2.94E+02	A4 A 0.00E+00 0.00	5 B1 E+00 0.00E+00	B2 0.00E+00	B3 0.00E+00	B4 0.00E+00 0.00	1 C2 E+00 0.00E+00	C3 0.00E+00	C4 0.00E+00	D 0.00E+00	A1-D E	Biogenic Carbon 3 1.00E-50	A1-A3/kg /I	ogenic Carbon kg of product Note:	
04 22 00 INTERIOR	PARTITIONS CMU	CHIO	Block	urces/sustainability/EPD- MediumWeight pdf		y html	Products (UN CPC 3755)	Specific	covers the coadle-to-gote life-cycle stoges. Therefore, the declared unit for this IPD is one (I) 3d of concrete formed into manufactured concrete and concrete masony products. The IPD may be presented additionably per one (I) y3d of concrete REP may be presented additionably per one (I) y3d of concrete. This IPD covers only the condis-to-gote impacts of additionable additionable with the condision of the IPD covers only the IPD covers only the IPD covers only the IPD covers only the IPD covers on IPD		1 cu yd	0.001203814	75															
05 40 00 INTERIOR	PARTITIONS METAL STUD:	CMU 2  S Partitions	Manufactured concrete Block  CEMCO, Structural Stud and Track, Viperstud and Viper-) interior framing, Prox	https://info.nef.org/Certified/Sustain/F odCert/EP010054.pdf https://cemcosteel.com/app/up/cods/ 2020/08/CEMCO.ULE-EPD Revised-Mc 2018.5 lb 21.0 unfocked-pt.	/2 https://cemcosteel.com/product-	https://commercial.midwestblock.com/	Modulativitied Collected on Concrete Masonry Products (NN CPC 3756)   SCS PCR for Designated Steel Construction Products v1 2015	Specific  Product Specific	If a six in it is the concrete and concrete the confidence that covers the confidence date (fire confidence that declared unit for this EPD is one (f) in all cross returned formed into monothicitized concrete and concrete memory products. The EPD may be presented additionally per one (f) yild of concrete. The declared unit for one EPD is one metric ton of steel construction product.	y volume	1 cu ya 1 metric tonne	0.001203814	75														•	
05 40 00 INTERIOR	PARTITIONS METAL STUD:	DS   Cold Formed Steel Framing	Header, Sureboard, Sure- Span Floor Joist Framing System, CST, SLP-TRK, FAS Track 1000 Slotted Tracks, USG Shaftwall CH/H-STUD studs and track	https://www.clarkdietrich.com/sites/doublifiles/imce/pdi/SupportTook/FPD	lef https://www.lfools.clarkdietrich.com bmittalpro/dyn.pdf/%/88/20pdf typ	/eu https://www.itools.clarkdietrich.com/ipc	Ul. Part B: Designated Steel Construction Product EPD Requirements, v.20 (August 26, 2020)	Product Specific	The declared unit of calculation is one metric ton of Cold- formed steel product (000kg)	Mass	1 metric tonne	1.36723E-05	30	1.7IE+03													•	
06 17 13 INTERIOR	PARTITIONS WOOD STUD		Framing, Clips / Accessories  Roseburg Forest Products	HPD/IOL Clarkwestern%20Dietrich_Ei	P 22%34%22Individual product%22%2 22ncipiert product code%7Ci 22ncipiert product code%7Ci PDSIZE-IB- 50ksi-conting%7CG40F0%22%7D/C 62PDSIZE-IB-50ksi pdf https://www.roseburg.com/enginee wood/rigidiom-ht/.	862	FPInnovations: 2015. Product Category Rules (PCR) for preparing	g (Product Specific	The declared unit is I m³ of L*VL.	Volume	1 m²	0.000204391	75	2.74E+O2	0.00E+00 0.00	E+00	0.00E+00		0.00	E+00 0.00E+00	0.00E+00		0.00E+00	0.00E+00	-9.88E+02	-		
06 17 13 EXTERIOR  06 17 19 SUPERSTRUCT	PARTITIONS WOOD FRAMING  SLAB CLT	Stora Enso LVL (Laminated Veneer Lumber)	Nordic X-Lam	Rigitlam IVI-ledf https://portlewirende.com/api/api yl/EPUlbrary/Files/s5h3972f-7029-49! b427-4f3108dd95c6/Data https://www.nordic.co/data/files/data best/file/EPD.Nordic.X-Lam.pdf	V	https://www.nordic.co/en/documentati	Standards EN 15804 and EN 16485 provide the core product category rules for the assessment. Standard EN 15942 provides the communication format for EPO. Slogenic carbon content of wood is calculated in line with EN 1649 standard. FCR: North American Structurel and Architectural Wood	Product Specific Product	1 m² of LVL with a moisture content of 9%	Volume	1 m²	0.000204391	76	1.55E+02	7.59E+01 6.81E	+00									+8.04E+02		·	
UNE 07 21 00 EXTERIOR	INSULATION MINERAL WOOL INSULATION	Rockwool Cavityrock	Rockwool Mineral Wool Exterior Insulation	heet/file/EPD_Nordic_X-Lam.pdf https://www.rockwool.com/siteasets/ 2- packwool/documentation/epd/rockwool/documentation/epd/rockwool/documentation/epd/rockwool/ stone-wool-environmentati-product- declaration-epd.pdf#	fo https://pc.cdn.rockwool.com/siteassets/o2- cdn.rockwool.com/siteassets/o2- cotto-sheets/commercial/rocktrock- cotty-wall-and-rainscreen- applications- techdata.pdf?f=202I0&16145402	on/technical-documentallunitedatotes https://www.rockwool.com/north- america/products-and- applications/products/coultyrock/?sele- teds/cotecovityrock%/2%AE%20ciownio- adskgcilds/cjwK/AjwddeJiBhAGFwABv2 o2Nt- whiliBicski/jobhA/viajóSigQFnMyYOuy/ ÜksyoU7YK/SAAImSKBG/NELIOAVD BWG ÜksyoU7YK/SAAImSKBG/NELIOAVD	Products VJ. June 2015 (Interim Version).  Product Category Rules Prart & Calculation Bules for the Life Cycle Assessment and Requirements on the Background Repor Product Category Rules Part B: Mineral insulating materials	Specific Product t, Specific	1M2 of stone wool thermal insulation product with an RD=1 m2k/w (R = 5.68)	Area	1 m²	1	30	1.31E+OO	4.25E-01 2.65	E-01	0.00E+00		0.00	5.29E-03	0.00E+00		-9.93E-02				•	
07 21 00 EXTERIOR	INSULATION XPS INSULATION	FOAMULAR Extruded Polystyrene (XPS) Insulation	XPS Insulation	https://www.transparencycatalog.com assets/uploads/pdf/EPD- Foamular OwensCorning.pdf	n/ https://www.owenscorning.com/en- us/insulation/products/foamular-25	&gclsrc=aw.ds	Part B: Building Envelope Thermal Insulation EPD Requirements	Product Specific	The functional unit is 1 m2 of insulation material with a thickness that gives an average thermal resistance of RSI = 1m2*K/W (R = 5.678) and with a building service life of 60 years	Area	1 m²	1	60	2.19E+01	1.54E+01 2.10I	+03 2.86E+01				2.07E+02		7.39E+00						
07 21 00 EXTERIOR	INSULATION GPS INSULATION	Neopor Plus Graphite Polystyrene Insulation	GPS Insulation (TRACI)	https://neopor.boxf.us/files/pdf/EPDIG 27.pdf	33 https://neopor.bost.us/		DO 3990-037 and 81 8580-030 Act are no ethe con PCI doing with Protein Charging Palar for Adding Related Product and Services Pert A (Standard 1000 version 31 4 hr edition, May 2 930) and Product Catopy Rule (PCI) Guidance for Building-Related Products and Services Po 82 Building Thermol Insulation PCIP Requirements U. 1001-01 C and edition, Anni Oli 2000 and Product Complements U. 1001-01 C and Complement Complements U. 1001-01 C and Complement Complements U. 1001-01 C and Complements U. 1001-01 C an	rt .	In C. Introduct Network Place Graphite Polystyrene Type I marketim reserved in the Community of the Communit	Area	l m²	1	75	1.74E+00	7.97E-02 6.2ll	E-03	0.00E+00		2.24	E-02			-6.66E+04				-	
07 21 29 EXTERIOR	INSULATION SPF INSULATION	Spray Polyurethane Foam Insulation (HFC)	Industry Wide EPD - Closed Cell Insulation	https://www.astm.org/CERTIFICATION DOCS/450.EPD_for_SPFA_EPD_2018102 _HFC.pdf	L/ 29		Part A: Product Category Rules for Building Related Products and Services (UL Environment, 2018) - Part B: Building Envelope Thermal Insulation EPD Requirement (III Environment 2018)	Industry Wide	1 m² of installed insulation material with a thickness that gives an average thermal resistance RSI=1 m2-K/W (R = 5.678)	Area	1 m²	1	75	3.31E+OO	1.22E-01 3.82i	7.73E+00				3.70E-03		5.20E+00	-1.77E-04		0.00E+00	-	-	
07 21 29 EXTERIOR	INSULATION SPF INSULATION	Spray Polyurethane Foam Insulation (HFO)	Industry Wide EPD	https://www.astm.org/CERTIFICATION DOCS/451.EPD for SPFA EPD 20181020 HFO excl 2K-LP.pdf			Requirements (UL Environment, 2018) Part A: Product Category Rules for Building Related Products and Services (UL Environment, 2018) - Part B: Building Envelope Thermal Insulation EPD Requirements (UL Environment, 2018)	Industry Wide	an average thermal resistance RSI=1 m2-K/W (R = 5.678)	Area	1 m²	1	76	3.47E+00	1.22E-01 5.25	E-01 0.00E+00				3.40E-03		4.17E-02	-1.77E-04		0.00E+00	-	-	
07 42 10 EXTERIOR 07 42 10 EXTERIOR	CLADDING CLADDING SUBFRAMING CLADDING ALUMINUM FRAMING	ALUMINUM SPECIALTY		https://portal.environdec.com/api/api xl/EPDLibrary/Files/6a1cbe8b-3560- 4b45-a36a-e04fa18fca7b/Data https://www.certainteed.com/resourc- /10.1.CISCA_EPD_Aluminum_Specialty	es		Construction products and construction services (2012) v2.3  Institute Construction and Environment e.V. (IBU), 2014. PCR Guidance-Texts for Building-Related Products and Services. Pa	Product Specific Industry Wide	One linear foot (ILft) of GREENGirt  The declared unit for this EPD is 1 kg of aluminum specialty	Area Mass	1ft 1kg	0.09290304	76	9.54E+00	2.76	E-01								1.73E+00	0.00E+00	9.54	-	
	PRAMING	PRODUCTS AN INDUSTRY-AVERAGE ENVIRONMENTAL PROFILE		Products 20141217.pdf			8. Requirements on the EPD for Metal Ceilings, Version 1.6, 2014 U. Environment Addendum-Product Cetagory Rulse for preparing on environmental product declaration (EPD) for PCR IBD Product Category Rulse, Part B Requirements on the EPD for Metal Ceilings, October 2013. Version 1, 2014.		product. Note that calling gird is not included in the definition of aluminum specialty product. Due to the participation of multiple monufacturers and the offernational control of the products, it is not enteringly to declare on nature of the products, it is not enteringly to declare on nature of the products, it is not enteringly to declare on nature of the products, it is not enteringly to make a product of the products of																			
07 42 29 EXTERIOR 07 42 43 EXTERIOR	CLADDING TERRACOTTA CLADDING CLADDING METAL PANE	EL Metal Composite Panel	panels NBK Keramik GmbH		services/terrart-us/	icts-	PCR part B: Requirements relating to the EPD for ceramic panellings, L6, 07.2014, Institut Bauen und Umwelt e.V., 2014 UL Part B: Insulated Metal Panels, Metal Composite Panels, and	Product Specific Industry Wide	1 m² of ceramic façade panel  The main purpose of metal cladding and panels is to provide	Area	1 m² 100 m²	0.01	75 75	9.05E+01 2.80E+03							0.00E+00	1.52E+00	-1.61E+O1		0.00E+00			
07 44 50 EXTERIOR	CLADDING	System  NT Large-size fibre cement	Metal Composite Material Wall and Roaf Panel System The EPD refers to three type		*		Metal Cladding: Roof and Wall Panels, v2.0 October 29 2018  Fibre cement / Fibre concrete, 07 2014 (PCR tested and		weather protection for building wells and roofs. The portels create borries that control roots, well-can did ir transmission between an external environment and interior building spaces. Accordingly, the PCR's functional unit for metal panels, metal composite portels, and metal cladding is the coverage of 100 square meters (100.4 square feet) of building orea. The coverage orea refers to the projected flot area covered by the product as output, by the final manufacturing process step and does not account for losses due to overlap and crip auding installation.					1.28E+03														
	CADDNG	plates Swisspearl	of large-size fibre cement; plates that are produced in the plants of Swisspeard Group AG in Switzerland Eternit (Schweiz) AG, Niederumen, Austria Eternit Östereich GmbH, Vöcklahruck austria Eternit Östereich GmbH Particellen and Free-Erm F	https://www.swisspearl.com/fileadmin culturames. zaroisa/TachnicolEPD DePEPDOS S aspendi SN 2000.edf			role failinity from cut office of council of appears (SYR) approved by the independent council of appears (SYR).	Specific	The Mis-cycle assessment refers to 1 toon of fifting comment plottes to 1 toon of fifting to 1 toon of 1		lm²		50	9.76-100	1565-00 1278		0.005400	0.005400	0,005,00	E.O. 1995.0	0005400	79AE.CO	4350)					
U/ 44 DU EATERIUR	CLADDING CLADDING		products EQUITONE Linea and Lunara fibre cement sheets. This average produc is an autoclaved calcium silicate Eternit fiber cement sheet produced by ETEX Services NV at Kapelle-op- den-Bos factory in Belgium	nttes: revew.eduatione.com.retessister. ocuments/de-publice-lineari-lineari- cement-fibre-sheets-epd.pdf?v=492f6	a trips://www.aquitone.com/en- us/moterials-en-us/linea/.		nare cement y rate concrete, U.Z.use (n.k. creeced and approved by the SVR)	Product Specific	Immediately with a finite search of the sear	Area	i m-	·	50	y,/ye+u0	1.3/2	400 0.002400	0.002+00	0.002+00	0.002400	-OI 1.29E-UI	0.002+00	7.90E-UZ	-4.ZZ-UI					
07 46 23 EXTERIOR	CLADDING WOOD CLADDING	Typical Western Red Cedar Bevel Siding	and sold in Germany.	https://www.realcedar.com/static/6e/ fdcd0c8d7a7e440290b0b745d30\/Tvg cal-Cedar-Siding-EPD-Febuary-2018.p	57 <u>pi</u>		North American Structural and Architectural Wood Products UNCPC 31, NAIC 2012, June 2015. Prepared by Pfinnovations and available at www.fpinnovations.co. PCR panel chaired by	Industry Wide	lm2 of siding assumed installed over a wood-frame wall.	Area	1 m²	1	50	2.16E+OO	2.00E-01 1.89E	+00 7.10E-01	0.00E+00			1.30E-01		1.11E+00				-	-	
07 46 46 EXTERIOR	CLADDING FIBER CEMEN CLADDING	NT James Hardie FIBRE CEMENT CLADDING	HardiePanel	file:///C:/Users/wernerj/Downloads/S- 01432%2520EPD%2520Fibre%2520Cen ent%2520Cladding.pdf	P- n		and available at www.pinnovationis.ca. PL. R panel chaired by Thomas P. Gloria. The International EPD® System's PCR 2012-01 Construction products and Construction services, Version 2.3, 2018-11-15	Product Specific	1 square metre (Im2)	Area	1 m²	1	50	8.94E+00	1.45E+00											-	-	
08 00 00 INTERIOR	DOORS GLASS DOOR	R Optima Aluminum Framed Doors	Single-glazed door	https://optimosystems.com/resources mirrormental-product-steclarations/		<u> </u>	The CEN standard EN 15804 serves as the core PCR	Product Specific	The declared unit is a single door, width 990mm; helight 2.60m glass trickness 12mm in single-glazed, timm - 6mm in obtable-glazed. The declared unit includes on special set of door double-glazed the declared unit includes a special set of door indicator values are declared separately for double-glazed doors and single-glazed doors. For the reference product, the mass of the declared unit is 19kg for the single-glazed doors and single-glazed doors and single-glazed doors for the minimum mass of coulse-glazed doors of the minimum mass of minimum single-glazed doors of the series of the single-glazed doors of the special doors of the single-glazed door of the special doors door should be single-glazed door of the special doors doors and single-glazed door of the special doors doors and single-glazed door of the special doors doors and single-glazed door of the special doctared time single-glazed doors of the special doctared time single-glazed door of the special doctared time single-glazed doors and special doctared time single-glazed door of the special doctared time single-glazed door of the special doctared doctared time single-glazed door of the special doctare		1 Door		30	2.396+02											0.00E+00			
08 00 00 INTERIOR  08 00 00 INTERIOR		Assa Abloy Legion / UltraDo Doors SDI Steel Door		https://content.assaabloyusa.com/doc AADSS11764718.pdf https://steeldoor.org/wp-	<u>c/</u>	https://www.cecadoar.com/en/sustaina bility/resource-center/environmental- product-declaration/ https://steeldoar.org/	Commercial Steel Doors and/or Frames 9005  Product Category Rule (PCR) for Preparing an Environmental	Product Specific Product	The declaration refers to the functional unit of 1 unit (or piece) of ASSA ABLOY Legion / UltraDor Doors	Count	1 Door	51.40	30	1.40E+02	6.30E+00 1.50	E-01				4.90E-01	0.00E+00				0.00E+00	2.72	-	
	- ALLES SON			content/uploads/2020/04/SCS-EPD- 05020 SDI SteelDoorFrame 061418.pd	df		Product Calcigury was (FCS) for Proplaning an Environmental Product Dealcration (EPD) for Product Group: Commercial Stee Doors and/or Steel Frames UL 9005. Version: March 10, 2015	Specific Specific																				

Report
10/6/2021

P Innovestion Incubestor - Low Carbon Lobs

J. Werner,

Low Carbon Labs				Product Data			Bradust Catagony Bula	Type of EPD	Declared Unit				Life	GWP Values (kg/CO2o)												
2011 2011 2020							Troduct category naie	урсогаз	Co				Line	OW Tables (kg/ co26)												
Spec Section LCA Category 08 00 00 INTERIOR	LCA Subcategory Display Name DOORS STEEL DOOR	e Product Name	Product Description	Environmental Product Declaration (EPD) https://content.assaablovusa.com/doc/	Product Literature Refe	ference Link 0	PCR Name	Type of EPD Product	m n1 Declared Unit Description Unit Ty	Declare ype Unit 1 Door		o Mass (kg) 2	Service Life (yrs)	1 A1-A3 1.30E+02 6.30	A4 A5 0E+00 2.60E-01	B1	B2	B3 B4	а	C2 C3 DE-01 0.00E+00	C4	-6.50E+01	A1-D B	Siogenic Carbon 3	A1-A3 / kg / kg of pro	rbon sduct Notes
08 00 00 INTERIOR		Assa Abloy Regent and Omega Doors R Eggers Industries -	Steel Door 3 INTERIOR FLUSH DOOR,	AADSS1176472&.pdf https://www.vtindustries.com/webres/F			Commercial Steel Doors and/or Frames 9006 PCR for preparing an EPD for interior architectural wood door	Specific Product	The declaration represents a specific 3' x 7' x 1.75" thick steel door manufactured in the Milan, TN facility This environmental product declaration (EPD) covers Eggers Count	1 Door			30	1.30E+02 6.30	0E+00 2.60E-01				4.9	DE-01 0.00E+00	7.10E+01	-6.50E+01		0.00E+00		
		Architectural Wood Door Leaf	INTERIOR STILE AND RAIL DOOR.	ile/architectural- doors/Sustainability/101_1_Eggers_EPD_			leaves ASTM, 2015	Specific	interior flush and stile and rail doors, which include nonrated, rated, acoustical, bullet resistant, lead-lined and impact															/		
				Architectural%20Wood%20Door%20Le af.pdf					resistant constructions. These doors are designed for installation in interior spaces. The results represent a production-weighted average door leaf. The declared unit is a															/		
									wood door leaf measuring 21 ft2 (1.95 m2) at a nominal thickness of 1-3/4" (44.45 mm). The mass of the corresponding															/		
08 00 00 INTERIOR		R Lambton Doors - Particleboard Core Doors	Envirodesign Series	http://www.lambtondoors.com/wp-			PCR for preparing an EPD for North American Structural and Architectural Wood Products vl.1 FPInnovation May 2013.	Product Specific	reference flow is 126 lbs (57.1 kg).  Count	1 Door			40	1.93E+01										-5.10E+01		-
		Taracasoura core poors		content/uploads/2018/02/LAMBTON_D OORS_5-UFPC- EME_2018_1519149295.pdf			Parimeter a record record veri minoration way 2010.	opacine																/ 17		
08 00 00 INTERIOR	DOORS WOOD DOOR	R Masonite Architectural average wood door leaf		https://www.baillargeondoors.com/do wnload/Environmental-Product-			PCR for preparing an EPD for interior architectural wood door leaves ASTM, 2015	Product Specific	The declared unit is a wood door leaf, measuring 21 ft2 (1.95 m2 Count ) at a nominal 1-3/4 inch (44.45 mm) thickness. Results represent	1 Door				8.20E+01												
08 00 00 INTERIOR	DOORS WOOD DOOR	R VT Industries Architectural		Declaration-EPD-November.PDE http://info.nsf.org/Certified/Sustain/Pro			PCR for preparing an EPD for interior architectural wood door	Product	production weighted average wood door leaf.  Count	1 Door														/		
08 41 10 EXTERIOR	GLAZING ALUMINUM	Wood Door Leaf TRIFAB™ FRAMING SYSTEM	AS ALUMINUM STOREFRONT	https://www.kawneer.com/kawneer/na			leaves ASTM, 2015 Earthsure. "Cradle to Gate Window Product Category Rule.	Specific Product	The declared unit of the underlying life cycle assessment study Area	1 m²	1		50	3.55E+02										<del>-    </del>	_	-
	STOREFRONT	FRAMING SYSTEMS	FRAMING SYSTEMS	rth_america/catalog/EPD/EPD47868333 121.104.pdf			September 2015.	Specific	was one square meter (1 m²) of window (including frame) meeting the performance standards noted below. The reference flow is 37.1 kg of window unit with framing, with a															/ /		
									frame to glazing ration of 25.0% to 75.0% by mass. The 1.5m x 1.3m ribbon window standard size was used to															/ /		
08 44 00 EXTERIOR	GLAZING ALUMINUM STOREFRONT	Traditional Curtain Wall	Traditional Curtain Wall Aluminum Curtain Wall	https://www.kawneer.com/kawneer/no rth_america/catalog/EPD/EPD47868332			Earthsure. "Cradle to Gate Window Product Category Rule. September 2015.	Product Specific	derive the declared unit.  The declared unit of the underlying life cycle assessment study was one square meter (1 m2) of window (including frame)	1 m²	1		30	3.54E+02												-
			Systems	121.106.pdf					meeting the performance standards noted below. The reference flow is 35.6 kg of window unit with framing, with a															/ //		_
									frame to glazing ration of 21.9% to 78.1% by mass. The 1.5m x 1.6m curtain wall standard size was used to derive the declared unit															/ //		_
09 00 00 INTERIOR	FLOOR FINISH RUBBER FLOORING	Rubber Flooring	Rubber Flooring	https://a.mannington.io/docs/literature /cc4a28f9aba34a87a5fc9ba3e15167ec/	L		Part B: Flooring EPD requirements [UL Environment], v2.0 September 2018	Industry Wide	Area	1 m²	1	5.60	35	1.56E+01 1.3	12E-01 1.25E+00		6.10E+00		6.3	5E-02		-3.23E-02			2.79	
09 22 26 INTERIOR	CEILING DRYWALL	Drywall Grid System		pdf/2019 EPD - Rubber Flooring- 20190118145854.pdf	h		North American Product Category rule for Designated Steel	Donatora	A	l m²	1		30													
UVIII INTERIOR	FINISH	Diywaii Olid System		https://www.armstrongceilings.com/pd bupimages- clg/215785.pdf/download/epd-drywall-	bupimages- mm	ps://www.armstrongceilings.com/co nercial/en/performance/sustainable- lding-design/environmental-product-	North American Product Category rule for Designated Steel Construction Products by SCS global Services, May 5, 2015 v.1.O	Specific			· ·													/ 17		
				grid-systems.pdf	dgs-cross-tees.pdf dec	clarations.html#redirect_term=EPD						10.40		0.777.00												
09 25 00 INTERIOR	PARTITIONS DRYWALL FINISH	Gypsum Board	Conventional Gypsum Board	https://nationalgypsum.widen.net/view / pdf/sze7y4a7by/EPD-Type-X-Gypsum- Board Exp042025.pdf?t.download=tru	https://www.nationalgypsum.com/desi gn-resource-center/product- sustainability/epds		NSF International, Product Category Rule for Environmental Product Declarations: PCR for Gypsum Panel Products [5].	Product Specific	The declared unit is 92.9 m2 (1,000 square feet, 1 MSF) of 5/8"  Area Type X conventional gypsum	1 m²	1	10.40	30	2.77E+02											20.03	
			produced by Gypsum Association member	e&u=vtetuw																						
09 29 00 INTERIOR	PARTITIONS DRYWALL	1/2" Gypsum Board	companies for the USA and Canadian Markets. 1/2" Glass-mat Gypsum	https://natiopalavpsum.widen.net/view			Section 9; Content of an EPD. NSF International Product	Product	The declared unit is 92.9 m2 (1,000 square feet, 1 MSF) of glass-	92.9 m	0.010764263	943.00	30	4.37E+02											0.46	_
- I I I I I I I I I I I I I I I I I I I	FINISH	,,	Broad	/pdf/ayOwww7lsr/eXP-Sheathing- ONLY-1 2-and-5 8-Glass-Mat-Gypsum			Section 9: Content of an EPD, NSF International, Product Category Rule for Environmental Product Declarations: PCR for Gypsum Panel Products, April 2020 [5].	Specific	mat gypsum boards with a nominal finished thickness of 1/2* and 5/8* (Table 1).	72.7 117																
09 29 00 INTERIOR	PARTITIONS DRYWALL	DryWall Finishing Product	Joint Compound	Panels- EPD.pdf?t.download=true&u=vtetuw		ps://www.pationalaunaum/d/	UL Part A v1.3 & Part B: Joint compound EPD requirements (2016	h) Product	This declaration refers to the functional unit as prescribed by	100 m <sup>2</sup>	0.01	88.60	76	3.43E+01 4.5	1E+00 9.08E-02					6E-01	4.00E+00	-2.01E-01			0.30	_
09 29 00 IIVIERIOR	FINISH	Drywan Finishing Froduct	Joint Compound	https://nationalgypsum.widen.net/view /pdf/ndnjainxwr/Gypsum Industry EPD for Joint Compound.pdf?t.download=		resource-center/product- tainability/epds	or Part A VI.S & Part B: Joint compound 2PD requirements (2016	Specific	the PCR. The functional unit is defined as "100 m² of covered substrate considering an installation scenario as defined by a	IOO III	0.01	88.00	75	3.432701 4.5	9.082-02					BE-UI	4.002400	-2.0IE-01		/	0.37	
				true&u=vtetuw					GA-214 Level 4 finish with the quantity adjusted for the measured shrinkage (testing per ASTM C474) for a service life of 75 years." The following equation is used to calculate the																	
									functional unit (note that the formula calculates per 1000 ft2 but the functional unit is 100 m2, all values are presented per															/ /		
									functional unit): Functional Unit (gal/msf) = 10.1 gal/msf + [(1 - shrinkage rate) x (1 - installation waste																	
09 29 00 INTERIOR	PARTITIONS DRYWALL FINISH	5/8" Gypsum Board	5/8" Glass-mat Gypsum Board	https://nationalgypsum.widen.net/view /pdf/ayQwww7lsr/eXP-Sheathing- ONLY-1_2-and-5_8-Glass-Mat-Gypsum	https://www.nationalgypsum.com/desi gn-resource-center/product- sustainability/epds		NSF International, Product Category Rule for Environmental Product Declarations: PCR for Gypsum Panel Products [5].	Product Specific	The declared unit is 92.9 m2 (1,000 square feet, 1 MSF) of glass- mat gypsum boards with a nominal finished thickness of 1/2" and 5/8" (Table 1).	92.9 m	0.010764263	1,263.00	30	5.04E+02										/ /	0.40	<u> </u>
				Panels- EPD.pdf?t.download=true&u=vtetuw	austumation yr aptus																					
09 51 00 INTERIOR	CEILING	Armstrong Ultima Ceiling Panels		https://www.armstrongceilings.com/co ntent/dam/armstrongceilings/commerc	mmercial/en/commercial-ceilings- mm	ps://www.armstrongceilings.com/co nercial/en/performance/sustainable-	PCR Guidance for Building Related Products and Services, From the range of Environmental Product Declarations of UL Environment: "Part B: Non-Metal Ceiling Panel EPD	Product Specific	The declared unit for this EPD is 1 M2 of Ultima ceiling panel for use over 75 years.	1 m²	1	2.38	30	NA NA									1.24E+01	/		
09 51 00 INTERIOR	SYSTEM  CEILING ACOUSTICAL	. Armstrong Calla Ceiling		ial/north-america/epds/ultima-epd.pdt https://www.armstrongceilings.com/co	walls/ultima-high-nrc-ceiling-tiles.html buil dec	Iding-design/environmental-product- clarations.html	Environment: "Part B: Non-Metal Ceiling Panel EPD Requirements", October 2015v1. PCR Guidance for Building Related Products and Services, From	Product	Area	1 m²	1		30	NA.									1.10E+01			
		Panels		ntent/dam/armstrongceilings/commercial/north-america/epds/calla-epd.pdf			the range of Environmental Product Declarations of UL Environment: "Part B: Non-Metal Ceiling Panel EPD	Specific																/ /		_
09 51 00 INTERIOR	CEILING ACOUSTICAL	Armstrong Clean Room FL Ceiling Panels	Mineral Fiber Prelude XL, Prelude Plus XL, Prelude XL	https://www.armstrongceilings.com/co ntent/dam/armstrongceilings/commerce			Requirements", October 2015v1. PCR Guidance for Building Related Products and Services, From the range of Environmental Product Declarations of UL	Product Specific	The declared unit for this EPD is 1 M2 of Clean room FL ceiling panel for use over 75 years.	1 m²	1		30	NA NA									1.10E+01	0.00E+00		
	CLEANROOM	4	Fire Guard, Cleanr Room, Suspension Systems Steel	ial/north-america/epds/clean-room-fl- epd.pdf			Environment: "Part B: Non-Metal Ceiling Panel EPD																			
09 51 00 INTERIOR	CEILING ACOUSTICAL CEILING	Armstrong Optima Ceiling Panels	HIGH PERFORMANCE FIBERGLASS Prelude XL,	https://www.armstrongceilings.com/co ntent/dam/armstrongceilings/commerce			Requirements / Cocober 2010/1. PCR Guidance for Building Related Products and Services, From the range of Environmental Product Declarations of UL Environment: "Part B: Non-Metal Ceiling Panel EPD	Product Specific	The declared unit for this EPD is 1 M2 of Optima ceiling panel for use over 75 years.	1 m²	1		30	NA NA									8.37E+00	/ 17		
			Interlude XL Suspension Systems Steel	ial/north-america/epds/optima- epd.pdf			Requirements*, October 2016v1.																	/ /		_
09 53 00 INTERIOR	CEILING DRYWALL CEILING	Grid Suspension System		https://www.armstrongceilings.com/co ntent/dam/armstrongceilings/commerce	mm	ps://www.armstrongceilings.com/co nercial/en/performance/sustainable-	North American Product Category rule for Designated Steel Construction Products by SCS global Services, May 5, 2015 v.1.O	Product Specific					30											/		
	SYSTEM			ial/north-america/epds/suprafine-xl- epd.pdf	buil dec	Iding-design/environmental-product- clarations.html#redirect_term=EPD																		/		
09 58 13 INTERIOR	CEILING DRYWALL CEILING SYSTEM	USG Ensemble	Acoustical drywall ceiling USG, including backup	https://www.usg.com/content/dam/US G Marketing Communications/united	https://www.usg.com/content/usgcom/ en/products/ceilings/integrated-ceiling-		NSF International PCR for Gypsum Panel Products, vl.1 April 23 2020	Product Specific	1,000 sf Area	1,000 s	0.01076391		30	1.42E+03 2.76	8E+02 3.45E+02	0.00E+00	0.00E+00 0.	0.00E+00 0.00E	0.00E+00 0.0	0.00E+00	4.70E+01	0.00E+00				
	SYSTEM		framing	finished assets/usg-ensemble-	en/products/ceilings/integrated-ceiling- systems/ensemble-acoustical-drywall- ceiling.html																			/ 17		
09 58 13 INTERIOR	CEILING DRYWALL	Acoustical Dry Wall Ceiling	Ensemble Acoustical Drywal	acoustical-drywall-ceiling-epd-en- usa.pdf https://www.usa.com/content/dam/US			NSF International PCR for Gypsum Panel Products, v1.1 April 23	Product					30													_
	CEILING SYSTEM			G Marketing Communications/united states/product promotional materials/			2020	Specific																/		
				finished_assets/usg-ensemble- acoustical-drywall-ceiling-epd-en- usa.pdf																				/		
09 60 00 INTERIOR	FLOOR FINISH CARPET TILE	INTERFACE CQUEST BIOX		https://interfaceinc.scene7.com/is/cont ent/interfaceinc/interface/Americas/W ebsiteContentAssets/Documents/Techn			Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.2, 2018 Part B: Flooring EPD Requirements, Version 2.0, 2018	Product Specific	CQUEST BloX Modular Flooring Tile; Functional Unit of 1 square meter of floor covering	1 m²	1		16	-3.69E-01 1.2	3E-01 1.10E-01	3.91E-01			4.8	PE-03	3.17E-01					
				cal/EPDBriefs/CQuestBioX/wc_am-			Part B: Flooring EPD Requirements, Version 2.0, 2018																			
09 60 00 INTERIOR	FLOOR FINISH CARPET TILE	INTERFACE GLASBAC TYPE 66 NYLON		cquestbiox-epd.pdf https://interfoceinc.scene7.com/is/cont ent/Interfoceinc/Interfoce/Americas/W			Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.2, 2018	Product Specific	Area	1 m²	1		15	6.54E+00 1.0	0E-01 3.25E-02		4.41E-01		9.4	4E-02						
				ebsiteContentAssets/Documents/Techn cal/EPDBriefs/GlasBacNylon66/wc_am-			Part B: Flooring EPD Requirements, Version 2.0, 2018																			
09 60 00 INTERIOR	FLOOR FINISH CARPET TILE	Mohawk Ecoflex Matrix Modular Carpet Tiles		epdglasbacnylon66oct2016.pdf https://www.mohawkgroup.com/sitefile s/resources/EPD-EcoFlexMatrix.pdf	https://www.mohawkgroup.com/sustai nability/product-transparency		UL Product Category Rule (PCR) Guidence for Building-Related Products and Serivces Part B: Flooring EPD Requirements v.2.0	Product Specific	1 m² Area	l m²	1	1.76	16	1.00E+01 1.34	4E+00 1.32E+00		1.70E+00		0.00E+00 2.5	0.00E+00		0.00E+00			5.68	
09 60 00 INTERIOR	FLOOR FINISH CARPET	Mohawk Tufted Nylon		https://mohawk.blob.core.windows.net,	https://www.mohawkgroup.com/sustai		September 2018 UL Product Category Rule (PCR) Guidence for Building-Related	Product	Tufted Nylon Carpet on Weldlok OnGuard Backing. Functional Area	1 m²	1	2.31	15	5.29E+01 6.8	99E-01 9.86E-02		2.74E+01		2.7	5E-02					22.94	
09 60 00 INTERIOR		d Carpet on Weldlok Ongua Backing AtlasMasland Broadloom	rd	mohawkgroup/pdfs/EPD/MG_EPD_Wel dlok_OnGuard.pdf https://info.nsf.org/Certified/Sustain/Pr			Products and Serivces Part B: Flooring EPD Requirements v.2.0 September 2018 Product Category Rule for Environmental Product Declarations	Specific	Unit lm2  The functional unit has been defined as one square meter as Area	1 m²	1		15	5.39E+01												
UNIERIOR INTERIOR	BROADLOOM	AtlasMasland Broadloom  Carpet Family		https://info.nsf.org/Certified/Sustain/Pr odCert/EPD10348.pdf			Product Category Rule for Environmental Product Declarations Flooring: Carpet, Resilient, Laminate, Ceramic, Wood (NSF International, 2014)	Specific	this product group is 15 years while the reference service life for	ımı			10	S.SYETOI												
0045.00	CLOOR DAVIOUR	Neverle 5		harrifolds to				0	a building is 60 years. Additionally, use phase data are accumulated on a 1-year basis	1 m²		2.00	**	5.87E+00 1.8	12E-01 4.64E-01		3.99E-01		4155.00	3E-03 2.48E+00		-9.57E-01	9.405-00	0.005:00	10.70	
09 65 00 INTERIOR	FLOOR FINISH RUBBER FLOORING	Noraplan Environcare Sentica (part of 913 line)		https://interfaceinc.scene7.com/is/cont ent/InterfaceInc/Interface/Americas/W ebsiteContentAssets/Documents/Techn			IBU Part B: Requirements on the EPD for Floor coverings, version 1.2 02-2018	Specific	Area	l m²	1	0.30	30	b.87E+00 1.8	12E-01 4.64E-01		3.99E-01		4.15E-02 7.8	se-us 2.48E+00		-y.b/E-01	8.49E+00	0.00E+00	19.70	
				cal/EPDBriefs/noraplan/wc_am- epdnoraplanstandard913.pdf																						
09 65 00 INTERIOR	FLOOR FINISH LINOLEUM FLOORING	Forbo Marmoleum		https://forbo.blob.core.windows.net/for bodocuments/13127/Forbo Marmoleum	https://forbo.blob.core.windows.net/for bodocuments/27547I/ProductGuide 12 bod 2 2020 Web.ndf Mr.	ps://forbo.blob.core.windows.net/for documents/13127/Forbo_Marmoleum arbied_2_082.5mm_EPD_p.df	EN 16810: 2017 Resilient, Textile and Laminate floor coverings – Environmental Product Declarations – Product Category Rules	Product Specific	The declation refers to the declared/functional unit of 1m <sup>2</sup> of installed flooring product. Values	e 1 m²	1	3.00	16	-4.25E-02 3.9	7.55E-01		3.31E-01		2.46E-01 2.0	5E-02 5.39E+00		-1.07E+00	6.03E+00	0.00E+00	(0.01)	LCA service life is for 1 year.
09 65 00 INTERIOR	FLOOR FINISH RESILIENT FLOORING	Armstrong Medinpure		Marbled 2.0825mm EPD.pdf https://www.armstrongflooring.com/pd bupimages-fir/222612.pdf	http mm	arbled 2.082.5mm EPD.pdf ps://www.armstrongflooring.com/co nercial/en-us/resources/resource-	Part A: PCR for building-related products, 2018 Part B: Flooring EPD Requirements [UL Environment], v2.0	Product Specific	The functional unit for this EPD is 1 m2 of 2.0 mm Homogeneous PVC-Free Sheet Flooring for use over 1 year. Flooring System	1 m²	1	527,300.00	75	1.44E+01 6.3	1.70E-01		3.00E-02		1.75E+01 5.5	DE-02 1.09E-01		0.00E+00	3.52E+01		0.00	- 75 year life includes replacement (84) @ 1.5 times
	(PVC FREE)				resu q=8	ults.html?contentType=documents& &filters%3AcontentType=Environmen	September, 2018		View: In order to understand the complete view of a flooring system, life cycle information is included for the total flooring																	
					7	%20Product%20Declaration%20(EPD			system based on 1 square meter (m2) view. This includes the flooring, adhesives and finishes applied during the use stage.																	
09 67 23 INTERIOR	FLOOR FINISH EPOXY FLOORING	Dur-A-Flex Epoxy Flooring		https://www.dur-g-flex.com/wp- content/uploads/2020/02/dur-g-	https://www.dur-a-flex.com/architect- center/product-data-sheets/	ps://www.dur-a-flex.com/architect- nter/	Part A (IBU/UL v1.2), Part B (IBU) Requirements for floor coverings. UL Part B addendum	Product Specific	The declared unit according to the PCR is 1 m2 of finished flooring.	1 m²	1	0.38	25	9.33E+00 3.5	55E-01 8.7IE-03				0.00E+00 3.3	4E-02 0.00E+00				0.00E+00	24.56	
09 67 23 INTERIOR	FLOOR FINISH EPOXY	SW Deco Quartz	AKA General Polymers	flex_epd_epoxy-floor- system.pdf?qb=1624282647130			PCR for Resinous Floor Coatings = 12/2018	Product	Im2 of covered and protected substrate for a period of 60 years Area	1 m²	1		30	1.48E+01 1.96	6E+00 1.70E-01	0.00E+00	1.09E+01 O.	00E+00 1.69E-	0.00E+00 6.0	DE-02 0.00E+00	1.50E-01	-1.10E-01				-
market	FLOORING		CERAMIC CARPET #400	https://industrial.sherwin- williams.com/content/dam/pcg/sherwi n-williams/protective-marine/na/ca/en	-marine/catalog/product/products-by-		gr WANN	Specific	(the assumed average lifetime of a building)	71111			~	1.90	5 55501					3.552.750						
				us/pdfs/flooring-resources/flooring- epds/epd10167-ceramiccarpet400.pdf	industry.11543396/resuflor-deco-quartz- bc23.12322101.html																					
09 67 23 INTERIOR	FLOORING	SW Fastop Topfloor SL57	AKA General Polymers FasTop 12S	http://info.nsf.org/Certified/Sustain/ProdCert/EPD10170.pdf	t .		PCR for Resinous Floor Coatings = 12/2018	Product Specific					30													
09 67 23 INTERIOR	FLOOR FINISH EPOXY FLOORING	SW Resuftor Deco Flake BC	AKA General Polymers DECORATIVE MOSAIC	https://industrial.sherwin- williams.com/content/dam/pcg/sherwi			PCR for Resinous Floor Coatings = 12/2018	Product Specific					30													
			EPOXY COATING SYSTEM	n-williams/protective-marine/na/us/en us/pdfs/marketing-uploads/flooring- resources/flooring-epds/EPD10168-	1																					
09 67 23 INTERIOR	FLOOR FINISH EPOXY	SW Resuftor Terrazzo TG	AKA General Polymers THIN	Decorative-Mosaic.pdf https://industrial.sherwin-			PCR for Resinous Floor Coatings = 12/2018	Product					30													_
	FLOORING		SET EPOXY TERRAZZO #1100	williams.com/content/dam/pcg/sherwi n-williams/protective-marine/na/ca/en				Specific																		
				us/pdfs/flooring-resources/flooring- epds/EPDI0171-Thin-Set-Epoxy- Terrozzo.pdf																						

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P Innovation Includer - Low Carbon Labs

J. Warner, E

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The second control of		
Note   100	0.008+00	
March   Marc	0.006+00	
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Marches of the temporal of the temporal and the temporal		
disumbrant frome, cottons  for coded by  for		
10 26 13 INTEROR WALL CONNER BENCHMONT COLUMNER BEN		
Part & Wall and Door Protection EPP Requirements, Version 1.0, 2019   Product Seeding Grain Pyboo   Stop Seeding Grain Pyboo	-4.30E+00	3.60 (4.30)
12 25 53 CASEWORK CABINETS STEEL SHEET Cold Formed Steel Froming Street, Poly Science (CC) for Construction Product and Services.  15 MO44 and Product Category Rules (PCI) for Construction Product Interior conficiency in metric ton of industry-overaged cold formed steel froming Secret.  15 Secret. Sec	0.00E+00	2.44
12.35.53 CASEWORK CABNETS PLYWOOD North American Softwood Plywood Software Configuration and Software	-2.13E+03	0.45 (4.40)
22.55.53 CASEWORK COUNTERTOP PR LAMINATE Willocord sop box confut/EPDCs report Extension to the EPD for Laminates, 07/2014 Product Specific for Composit RP, with 8 mm thickness Area on discharged the following impregnated discorporate impregnated impregnated discorporate impregnated impregnated impregnated impregnated discorporated impregnated impre	0.008+00 0.008+00	336.99 .
2.355 OASWORK COUNTERTOP PHRSOUL Fundamenus (Amenipus Countertop) Phrsould East Countertop) Phrs	-8.745-00 0.005-00 -1.505+03 0.005+00	3.59
12 35 53 CASEWORK COUNTERTOP PHRHOLIC Traps Topicab State (Information in information count of the product of t		199
25   20   PURNITURE   CHARS   TASK CHAR   Real City   Task Chair   T		
Section Sectio		•
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Phrovatolin includator - Low Corbon Labs J. Werner,

Low Carbo	n Labs					Product Data			Product Category Rule	Type of EPD	Declared Unit					Life	GWP Values (kg/0	CO2e)														
Ener Section II	A Category	LCA Subcategory	Display Name	Product Name	Product Description	Environmental Product Declaration	Product Literature	Paramora Link	0 DCD Nome	Type of FPD	Co lu m mil Declared Unit Description	Helt Type	Declared Heit	Adjusment Factor to	Mass (ka)	2 Service Life (vrs)	1 41-42		AS	B1	B2	92	B4	a	C	G	C4	D 41	D. Biographs	arbon 3 Al-A	Biogenic Co	bon Notes
12 59 00 F				Knoll Dividends Horizon		https://info.nsf.org/Certified/Sustain/F adCert/EPD10338.pdf	r https://www.knoll.com/product/divide ds-horizon%3Fsection=design	D.	NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814		The functional unit is one square meter (Im2) of workspace for a period of 10 years. L shaped workstation with panel walls and pedestal storage.	Area	1 m²	ï	mass (kg)	16	4.56E+02	~~	2		-							, .	o biogetiic (	V AIA	7 19 7 19 19 19 19 19 19 19 19 19 19 19 19 19	
12 59 00 F		SYSTEMS	SPINE BASED WORKSTATIO N	Knoll Currents	Knoll	https://www.knoll.com/document/135/ 855393817/KNL21-EPD-Currents- final.pdf	k .		NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	Specific	The functional unit is one square meter (Im2) of workspace for a period of 10 years. L shaped workstation with panel walls and pedestal storage.		1 m²	1		15	4.95E+02														-	
12 59 00 F				Knoll Antenna Workspace		https://www.knoll.com/document/135/ 855390897/KNL21-EPD- Antenng-Workspaces-final.pdf	k .		NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	Product Specific	The functional unit is one square meter (Im2) of workspace for a period of 10 years. Four linked desks with pedestal storage for each desk	Area	1 m²	1		15	2.70E+02														-	
12 59 00 F	JRNITURE :	SYSTEMS	DESK	Steelcase B-Free Desk	Steelcase	https://www.ocs.plus/sites/default/file /EPD B-Free.pdf	5			Product Specific	The model chosen for analysis at the most representative line (reference = N31012700) from the B-Free desk range. Standard features on this model include: -1.800 x 800 mm top size -1.400 mm height -1.740 mm height -1.740 mm height -1.740 mm features or -1.740 mm f	Count	1 Desk			15	1.00E+02															
	ASEWORK	COUNTERTOP	P EPOXY COUNTER	Durcon Greenstone	Epoxy Countertop		https://www.durcon.com/greenstone- classictop-flat-101-b01-4		[No EPD Available]	Product Specific	EPD Not available		NA			30	NA												0.00E-	-00	-	•
8 46 23 E	CTERIOR (	CLADDING	CLADDING	Accoya Wood - decking, cladding and planed timb for joinery applications	er	https://www.occoya.com/app/upload 2020/05/Environmental-Product- Declaration-XE2%80%93-cladding- decking-planed-timber-XE2%80%93- EN-15804.pdf	¥		The CEN Norm EN 15804 serves as the core PCR	Product Specific	The declared unit is 1 m3 of Accoya planed timber	Volume	l m²	1		60	-4.33E+02															

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# **Low Carbon Labs**

Revit Quantity Data for all options and systems LCA 1 Phase Created New Construction Type Comments

Design Option	LCA Category	LCA Subcategory	LCA Spacetype	Туре	#	VOLUME (m3)	AREA (m2)
Baseline	CASEWORK	COUNTERTOP	LAB		5	0	8
Baseline	CASEWORK	MOBILE BENCH	LAB		15	1	71
Baseline	CASEWORK	CABINETS	LAB		28	4	60
Baseline	DOORS		LAB		2	0	7
Baseline	EQUIPMENT	FUMEHOOD	LAB		1	2	16
Baseline	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Terracotta - Air	6	12	29
Baseline	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Terracotta - Concrete Masonry Units	6	12	29
Baseline	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Terracotta - Exterior Cladding Terracotta	6	12	29
Baseline	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Terracotta - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall	6	12	29
Baseline	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Terracotta - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic	6	12	29
Baseline	FURNITURE	CHAIRS	LAB		15	0	22
Baseline	FURNITURE	CHAIRS	OFFICE		12	0	24
Baseline	FURNITURE	SYSTEMS	OFFICE		9	0	26
Baseline	INTERIOR	FLOOR FINISH	LAB		1	0	112
Baseline	INTERIOR	FLOOR FINISH	OFFICE		1	2	66
Baseline	INTERIOR	PARTITIONS	LAB		15	44	356
Baseline	INTERIOR	CEILING	LAB		4	13	223
Baseline	INTERIOR	CEILING	OFFICE		2	14	133
Baseline	SUPERSTRUCTURE	COLUMN	LAB		6	3	
Baseline	SUPERSTRUCTURE		OFFICE		2	1	
Baseline	SUPERSTRUCTURE	SLAB	LAB		1	37	111
Baseline	SUPERSTRUCTURE		OFFICE		i	14	69
Improved	CASEWORK	COUNTERTOP	LAB		4	0	7
Improved	CASEWORK	MOBILE BENCH	LAB		15	1	71
Improved	CASEWORK	CABINETS	LAB		27	3	56
•	DOORS	CADINETS	LAB		2	0	7
Improved	EQUIPMENT	FUMEHOOD	LAB		1	2	16
Improved		OPAQUE		Exterior Swiggnood Air	6	11	29
Improved	EXTERIOR		EXTERIOR	Exterior - Swisspearl - Air	6	11	29
Improved	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Swisspearl - Exterior Cladding Swisspearl		11	
Improved	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Swisspearl - PW_Metal_Stud_Gray_Matte_Generic	6		29
Improved	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Swisspearl - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall	6	11	29
Improved	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Swisspearl - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic	6	11	29
Improved	FURNITURE	CHAIRS	LAB		15	0	22
Improved	FURNITURE	CHAIRS	OFFICE		12	0	24
Improved	FURNITURE	SYSTEMS	OFFICE		9	0	26
Improved	INTERIOR	FLOOR FINISH	LAB		1	0	113
Improved	INTERIOR	FLOOR FINISH	OFFICE		1	2	67
Improved	INTERIOR	PARTITIONS	LAB		15	48	388
Improved	INTERIOR	CEILING	LAB		4	13	223
Improved	INTERIOR	CEILING	OFFICE		2	14	133
Improved	SUPERSTRUCTURE		LAB		6	1	
Improved	SUPERSTRUCTURE		OFFICE		4	0	
Improved	SUPERSTRUCTURE	COLUMN	LAB		6	0	
Improved	SUPERSTRUCTURE	COLUMN	OFFICE		2	0	
Improved	SUPERSTRUCTURE	SLAB	OFFICE		1	30	180
Reimagined	CASEWORK	COUNTERTOP	LAB		4	0	7
Reimagined	CASEWORK	MOBILE BENCH	LAB		15	1	71
Reimagined	CASEWORK	CABINETS	LAB		27	3	56
Reimagined	DOORS		LAB		2	0	7
Reimagined	EQUIPMENT	FUMEHOOD	LAB		1	2	16
Reimagined	EQUIPMENT	OWNER EQUIPMENT	LAB		15	16	65
Reimagined	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Wood - Air	2	15	43
Reimagined	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Wood - Exterior Cladding Wood	2	15	43
Reimagined	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Wood - Laminated Veneer Lumber	2	15	43
Reimagined	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Wood - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall	2	15	43
Reimagined	EXTERIOR	OPAQUE	EXTERIOR	Exterior - Wood - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic	2	15	43
Reimagined	FURNITURE	CHAIRS	LAB		15	0	22
Reimagined	FURNITURE	CHAIRS	OFFICE		12	0	24
Reimagined	FURNITURE	SYSTEMS	OFFICE		9	0	26
Reimagined	INTERIOR	FLOOR FINISH	OFFICE		í	2	66
Reimagined	INTERIOR	PARTITIONS	LAB		15	48	391
Reimagined	SUPERSTRUCTURE		LAB		6	5	0,1
Reimagined	SUPERSTRUCTURE		EXTERIOR	18" x 18"	4	4	
agiiiea	JOI EROTROGIORE	3020	EATERION.	18 X.18	7	-4	

P Innovation Incubator - Low Carbon Labs

Low Ca	rbon Labs										
Revit Quanti	ty Data for all options and	systems									
<b>Design Option</b>		Phase Created	Family	Туре	Type Comments I	LCA LCA Category		LCA Spacetype			LCA_AREA_COUNTER_M2
Baseline	Casework	New Construction		FH Mobile Combo Cabinet D- 18x28.5 metal		I CASEWORK	CABINETS	LAB LAB	0.168799694	1.293698096	
Baseline Baseline	Casework Casework	New Construction  New Construction	123553_Casework-BaseCabinet-Wood-CombinationC 123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	! 1	I CASEWORK I CASEWORK	CABINETS CABINETS	LAB	0.061181196 0.168799694	2.485341643 1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK I		1	I CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC	a W1C1836 - 18"W x 36"H x 22"D metal	1	I CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC			I CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC			I CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		I	I CASEWORK I CASEWORK	CABINETS CABINETS	LAB LAB	0.061181196 0.061181196	2.485341643 2.485341643	
Baseline Baseline	Casework Casework	New Construction  New Construction	123553_Casework-BaseCabinet-Wood-CombinationC 123553 Casework-BaseCabinet-Wood-CombinationC			I CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123533_Casework-BaseCabinet-Wood-CombinationC			I CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal		I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK I	B, WSB36 metal	1	I CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal		I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK I		I	I CASEWORK	CABINETS	LAB LAB	0.108588701	4.125514166	
Baseline Baseline	Casework Casework	New Construction New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK I 123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal		I CASEWORK I CASEWORK	CABINETS CABINETS	LAB	0.108588701 0.168799694	4.125514166 1.293698096	
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal	1	I CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK I		 1	I CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	I CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	I CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	I CASEWORK	COUNTERTOP	LAB	0.0778712	3.342572521	3.158702
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	I CASEWORK	COUNTERTOP	LAB	0.038474096	1.662247812	1.560630948
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	I CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Baseline	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"	]	I CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Baseline	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-O"	I	I CASEWORK I CASEWORK	MOBILE BENCH MOBILE BENCH	LAB LAB	0.058776205 0.058776205	2.798219005 2.798219005	
Baseline Baseline	Casework Casework	New Construction  New Construction	123554_Lab Casework-Mobile Table 123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS		I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	ا	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS		I CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS FH Distinction - 6 ft STAINLESS	I	I CASEWORK I CASEWORK	MOBILE BENCH MOBILE BENCH	LAB LAB	0.094244767	5.247662002 5.247662002	1.393545 1.393545
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	115313 - FUME HOOD - VERTICAL SLIDING SASH	!	I CASEVVORK	MOBILE BEINCH	LAD	0.094244767	5.247002002	1.393545
Baseline	Specialty Equipment	New Construction	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAN)		1	I EQUIPMENT	FUMEHOOD	LAB	1.822942956	15.76786965	
Dasemie	opecialty Equipment	New Construction	TOOLO TOMETIOOD VERTICAL SEIDITO SAOTI (STATE	M2055 - Shelving Storage Wire CRS w Adjustable		L LGOII WILIVI	TOWENOOD	LAD	1.022742700	10.70700700	
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel	,		0 EQUIPMENT	OWNER EQUIPME	N LAB	1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	(	0 EQUIPMENT	OWNER EQUIPME		1.3167312	3.932248507	
				M2055 - Shelving Storage Wire CRS w Adjustable							
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel		(	0 EQUIPMENT	OWNER EQUIPME	N LAB	1.112926445	6.562888053	
				M2055 - Shelving Storage Wire CRS w Adjustable							
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel		(	0 EQUIPMENT	OWNER EQUIPME	N LAB	1.112926445	6.562888053	
	0			M2055 - Shelving Storage Wire CRS w Adjustable			A.L				
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel			0 EQUIPMENT	OWNER EQUIPME		1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	(	0 EQUIPMENT	OWNER EQUIPME	IN LAB	1.3167312	3.932248507	
Basslin -	Specialty Earlings	Now Construction	M2055 Sholying Starges Wire CBS A disease to Start	M2055 - Shelving Storage Wire CRS w Adjustable		0 EQUIPMENT	OWNED FOLLIDA 45	INIT I A D	1 110004 445	6.562888053	
Baseline Baseline	Specialty Equipment Specialty Equipment	New Construction New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel Lab Equipment Matrix	VI Shelves O1-REFRIGERATOR		0 EQUIPMENT 0 EQUIPMENT	OWNER EQUIPME OWNER EQUIPME		1.112926445	3.932248507	
Baseline	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0 EQUIPMENT	OWNER EQUIPME		0.062472825	0.571017499	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	O1-REFRIGERATOR		O EQUIPMENT	OWNER EQUIPME		1.3167312	3.932248507	
	to a series of self-conserve		re transfer and the								

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P Innovation Incubator - Low Carbon Labs

Design Onti	on Category	Phase Created	Family	Туре	Type Comments	LCA	LCA Category	ICA Subcatego	ry LCA Spacetype	LCA_VOLUME_M3 LCA_AR	EA_M2 LCA_AREA_COUNTER_M2
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	O1-REFRIGERATOR	Type Comments	0	EQUIPMENT	OWNER EQUIP		1.3167312	3.932248507
Baseline	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIP		0.062472825	0.571017499
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	O1-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIP		1.3167312	3.932248507
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	O1-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIP		1.3167312	3.932248507
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIP		1.3167312	3.932248507
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Air		1	EXTERIOR	OTTILICEGOII	EXTERIOR	6.083619903	15.328995
24000	***************************************		24010 11411	Exterior - Terracotta -		•	Z/((Z)((G)(		27.112.11.01.	0.0000.7700	10.1020770
				PW_ThermalProtection_RigidInsulation_Gray_Matte							
Baseline	Walls	New Construction	Basic Wall	_Generic		1	EXTERIOR		EXTERIOR	6.083619903	15.328995
				Exterior - Terracotta -							
				PW_ThermalProtection_RigidInsulation_Gray_Matte							
Baseline	Walls	<b>New Construction</b>	Basic Wall	_Generic		1	EXTERIOR		EXTERIOR	5.807091726	14.6322225
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Concrete Masonry Units		1	EXTERIOR		EXTERIOR	5.807091726	14.6322225
				Exterior - Terracotta -							
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWa							
Baseline	Walls	New Construction	Basic Wall	II		1	EXTERIOR		EXTERIOR	5.807091726	14.6322225
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Air		1	EXTERIOR		EXTERIOR	5.807091726	14.6322225
				Exterior - Terracotta -							
	<b>NA7</b> II	N 6:	D : W !!	PW_Plaster_GypsumBoard_Gray_Matte_GenericWa		,	EVTERIOR		EVERIOR	/ 000/10000	15 000005
Baseline	Walls	New Construction	Basic Wall			1	EXTERIOR		EXTERIOR	6.083619903	15.328995
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Concrete Masonry Units		1	EXTERIOR	CLAZING	EXTERIOR	6.083619903	15.328995
Baseline	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ,, (Screw Spline) 2-1/2" x 7-1/2" Kawneer - 1600 SSâ,, (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR EXTERIOR	GLAZING GLAZING	EXTERIOR EXTERIOR		8.01288375 8.01288375
Baseline Baseline	Walls Walls	New Construction  New Construction	Curtain Wall Curtain Wall	Kawneer - 1600 SSâ,,¢ (Screw Spline) 2-1/2 x 7-1/2 Kawneer - 1600 SSâ,,¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		7.6644975
Baseline	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSa, 4 (Screw Spline) 2-1/2" x 7-1/2"  Kawneer - 1600 SSa, 4 (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		7.6644975
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Exterior Cladding Terracotta		1	EXTERIOR	OPAQUE	EXTERIOR	6.083619903	15.328995
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Exterior Cladding Terracotta		1	EXTERIOR	OPAQUE	EXTERIOR	5.807091726	14.6322225
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		<u> </u>	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms Non-Upholstered wo/Arms		1	FURNITURE FURNITURE	CHAIRS CHAIRS	LAB LAB	0.013428797 0.013428797	1.458204617 1.458204617
Baseline Baseline	Furniture Furniture	New Construction New Construction	Coalesse_Kart_StoolOnCasters Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholsterv		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		ı	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Baseline	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS SYSTEMS	OFFICE OFFICE	0.033918462	1.724921909
Baseline	Furniture	New Construction New Construction	Steelcase - FrameOne - Dual Sided Extensions1 Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End 24" x 72" - End		1	FURNITURE FURNITURE	SYSTEMS	OFFICE	0.074584624 0.074584624	5.252544969 5.252544969
Baseline Baseline	Furniture Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions  Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.074564624	1.724921909
Baseline	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Baseline	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Baseline	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Baseline	Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End		1	FURNITURE	SYSTEMS	OFFICE	0.074584624	5.252544969
Baseline	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
				Interior Wall - Tally -							
Baseline	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.62280246	29.25859824
				LAB CEILING - 1_ACT -							
				PW_Ceiling_AcousticTile_White_LightGraySpeckles_		_					
Baseline	Ceilings	New Construction	Compound Ceiling	24x24-Generic_APC2 (New)		1	INTERIOR		LAB	2.547020362	44.56733956

D : 0 !!		DI C I I	F 2	_		164 1646	10101	1010	LOA VOLUME MA	24 ADEA 140	CA AREA COUNTER MA
Design Option	on Category	Phase Created	Family	Type  LAB CEILING - 1 ACT -	Type Comments	LCA LCA Category	LCA Subcategory	/ LCA Spacetype	LCA_VOLUME_M3 LC	CA_AREA_M2 L	.CA_AREA_COUNTER_M2
				PW_Ceiling_AcousticTile_White_LightGraySpeckles_							
Baseline	Ceilings	New Construction	Compound Ceiling	24x24-Generic_APC2 (New)	=	1 INTERIOR		LAB	3.8254227	66.9366115	
	9-			Interior Wall - Tally -							
Baseline	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	2.718341887	21.9537869	
				Interior Wall - Tally -							
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	а						
Baseline	Walls	New Construction	Basic Wall			1 INTERIOR		LAB	3.774662284	30.48500655	
D I'm .	VAZ III-	Nieus Comotomosticos	Desir MANI	Interior Wall - Tally -		1 INTERIOR		LAD	0.001005.400	0.005141000	
Baseline	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic Interior Wall - Tally -		1 INTERIOR		LAB	0.991235483	8.005141833	
Baseline	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	3.774662284	30.48500655	
				Interior Wall - Tally -							
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	а						
Baseline	Walls	New Construction	Basic Wall	II		1 INTERIOR		LAB	2.718341887	21.9537869	
				Interior Wall - Tally -							
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWo	a						
Baseline	Walls	New Construction	Basic Wall			1 INTERIOR		LAB	0.991235483	8.005141833	
				Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	~						
Baseline	Walls	New Construction	Basic Wall	II	u	1 INTERIOR		LAB	3.62280246	29.25859824	
Dasemie	** GIIS	14CW Construction	Dasic Wall	Interior Wall - Tally -		1 IIVIERIOR		LAD	0.02200240	27.20007024	
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	a						
Baseline	Walls	New Construction	Basic Wall	II		1 INTERIOR		LAB	3.590284785	28.99597791	
				Interior Wall - Tally -							
Baseline	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	3.590284785	28.99597791	
				WRITE UP - 1_GWB -							
D !!	C '11'	N 6	6 16 11	PW_Plaster_GypsumBoard_Gray_Matte_GenericFo	r	1 INTERIOR		OFFICE	7 17170000	// 40/00014	
Baseline	Ceilings	New Construction	Compound Cailing	Ceilings		1 INTERIOR 1 INTERIOR	CEILING	OFFICE LAB	7.171788808 3.8254227	66.43629014 66.9366115	
Baseline Baseline	Ceilings Ceilings	New Construction New Construction	Compound Ceiling Compound Ceiling			1 INTERIOR	CEILING	LAB	2.547020362	44.56733956	
Baseline	Ceilings	New Construction	Compound Ceiling			1 INTERIOR	CEILING	OFFICE	7.171788808	66.43629014	
Baseline	Doors	New Construction	081113_Single HG with Leaf	Type F 96" x 84"		1 INTERIOR	DOORS	LAB	0.133150565	3.628196827	
Baseline	Doors	New Construction	081113_Single HG with Leaf	Type F 96" x 84"		1 INTERIOR	DOORS	LAB	0.133150565	3.628196827	
Baseline	Floors	New Construction	Floor	EPOXY COATING - FLOORING - EPOXY COATING		1 INTERIOR	FLOOR FINISH	LAB	0.356909667	112.41263	
				WRITE UP - 1_BROADLOOM - WRITEUP -							
Baseline	Floors	New Construction	Floor	1_BROADLOOM		1 INTERIOR	FLOOR FINISH	OFFICE	2.109349649	66.43629014	
Baseline	Walls	New Construction	Curtain Wall	GENERIC (Butt Glazed) 6"		1 INTERIOR	GLAZING	LAB		20.43866	
				Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	7						
Baseline	Walls	New Construction	Basic Wall			1 INTERIOR	PARTITIONS	LAB	0.991235483	8.005141833	
24000	***************************************		240.0	Interior Wall - Tally -			.,	27.0	0,77,200,100	0,000,1,000	
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	а						
Baseline	Walls	<b>New Construction</b>	Basic Wall	II		1 INTERIOR	PARTITIONS	LAB	3.62280246	29.25859824	
				Interior Wall - Tally -							
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	a						
Baseline	Walls	New Construction	Basic Wall			1 INTERIOR	PARTITIONS	LAB	2.718341887	21.9537869	
				Interior Wall - Tally -	_						
Baseline	Walls	New Construction	Basic Wall	PW_Plaster_GypsumBoard_Gray_Matte_GenericWo		1 INTERIOR	PARTITIONS	LAB	3.590284785	28.99597791	
Dasenne	vvuii3	New Construction	Busic Wull	Interior Wall - Tally -		1 INTERIOR	TARTITIONS	LAD	3.370204703	20.77077771	
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWe	a						
Baseline	Walls	New Construction	Basic Wall	II		1 INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655	
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1 SUPERSTRUCTURE		LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1 SUPERSTRUCTURE		LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1 SUPERSTRUCTURE		LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1 SUPERSTRUCTURE		LAB	0.54862571		
Baseline	Structural Columns	New Construction	Concrete Postangular Column	16 x 16		1 SUPERSTRUCTURE		LAB	0.536380496 0.54862571		
Baseline Baseline	Structural Columns Structural Columns	New Construction New Construction	Concrete-Rectangular-Column  Concrete-Rectangular-Column	16 x 16		<ul><li>SUPERSTRUCTURE</li><li>SUPERSTRUCTURE</li></ul>		LAB OFFICE	0.552439793		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1 SUPERSTRUCTURE		OFFICE	0.552439793		
Baseline	Floors	New Construction	Floor	Concrete 13" - Concrete_CastInPlace_Gray		1 SUPERSTRUCTURE		LAB	36.72492316	111.2203748	
Baseline	Floors	New Construction	Floor	Concrete 8" - Concrete_CastInPlace_Gray		1 SUPERSTRUCTURE		OFFICE	13.94759716	68.63983317	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Plywood	Sheathing	1	EXTERIOR			17.37555253	14.6322225
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Plywood	Sheathing	1	EXTERIOR			17.37555253	14.6322225
Improved	Floors	New Construction	Floor	LW Concrete on Metal Deck - 6 1/2" - Concrete	Cast-in-Place gray	1	SUPERSTRUCTUR	E SLAB		97.42427933	179.860208
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK E			CASEWORK	CABINETS	145	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood		1 CASEWORK	CABINETS	LAB	0.168799694	1.293698096	

J. Werner, E. Mikula

Design Onti	on Cartonom.	Dhara Cuantad	Femilie	Toward Control of the	Time Comments 16	A ICA Catanami	ICA Subartanama ICA Sanasta	ma ICA VOLUME M2	ADEA MO	ADEA COUNTED MO
Design Opti	Casework	Phase Created New Construction	Family 123553 - FH MOBILE - COMBO CABINET D - 18X28.5	Type FH Mobile Combo Cabinet D- 18x28.5 wood	Type Comments LC	A LCA Category  CASEWORK	LCA Subcategory LCA Spacety CABINETS LAB	/pe LCA_VOLUME_M3 LCA 0.168799694	_AREA_M2 LCA_/ 1.293698096	AREA_COUNTER_M2
Improved Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		1	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK		1	CASEWORK	CABINETS LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK		 1	CASEWORK	CABINETS LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK		1	CASEWORK	CABINETS LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK		1	CASEWORK	CABINETS LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC	Cal W1C1836 - 18"W x 36"H x 22"D	1	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		1	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		1	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		1	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		<u>l</u>	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		<u>l</u>	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationC		<u>l</u>	CASEWORK	CABINETS LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	<u>l</u>	CASEWORK	CABINETS LAB	0.168799694	1.293698096	
Improved	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5 123553 - COUNTERTOP - STRAIGHT	FH Mobile Combo Cabinet D- 18x28.5 wood	I	CASEWORK	CABINETS LAB	0.168799694	1.293698096	0.7004755
Improved	Casework	New Construction		30" Deep x 36" High (Backsplash)	1	CASEWORK	COUNTERTOR	0.0194678	0.851610833	0.7896755
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK CASEWORK	COUNTERTOP LAB COUNTERTOP LAB	0.038474096	1.662247812 0.851610833	1.560630948 0.7896755
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK		0.0194678 0.0194678	0.851610833	0.7896755
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK	COUNTERTOP LAB  COUNTERTOP LAB	0.0194678	3.342572521	3.158702
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT 123553 - FH DISTINCTION - 6 FT	30" Deep x 36" High (Backsplash) FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH LAB	0.07/8/12		1.393545
Improved	Casework Casework	New Construction		FH Distinction - 6 ft STAINLESS  FH Distinction - 6 ft STAINLESS		CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002 5.247662002	1.393545
Improved	Casework	New Construction  New Construction	123553 - FH DISTINCTION - 6 FT 123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u>'</u>	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u>'</u>	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u>'</u>	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123554 Lab Casework-Mobile Table	6'-0"	<u>'</u>	CASEWORK	MOBILE BENCH LAB	0.058776205	2.798219005	1.070040
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u>.</u>	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u>.</u>	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"	<u>.</u>	CASEWORK	MOBILE BENCH LAB	0.058776205	2.798219005	
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
Improved	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"	1	CASEWORK	MOBILE BENCH LAB	0.058776205	2.798219005	
Improved	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH LAB	0.094244767	5.247662002	1.393545
1				115313 - FUME HOOD - VERTICAL SLIDING SASH						
Improved	Specialty Equipment	New Construction	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAN		1	EQUIPMENT	FUMEHOOD LAB	1.822942956	15.76786965	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMEN' LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMEN' LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMEN' LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMEN' LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMEN" LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMEN LAB	1.3167312	3.932248507	
				M2055 - Shelving Storage Wire CRS w Adjustable						
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable She		0	EQUIPMENT	OWNER EQUIPMEN LAB	1.112926445	6.562888053	
				M2055 - Shelving Storage Wire CRS w Adjustable						
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable She		0	EQUIPMENT	OWNER EQUIPMENT LAB	1.112926445	6.562888053	
				M2055 - Shelving Storage Wire CRS w Adjustable						
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable She		0	EQUIPMENT	OWNER EQUIPMENT LAB	1.112926445	6.562888053	
Improved	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50	0		OWNER EQUIPMENT LAB	0.062472825	0.571017499	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0		OWNER EQUIPMENT LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50	0	EQUIPMENT	OWNER EQUIPMENT LAB	0.062472825	0.571017499	
				M2055 - Shelving Storage Wire CRS w Adjustable						]
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable She		0	EQUIPMENT	OWNER EQUIPMENT LAB	1.112926445	6.562888053	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPMENT LAB	1.3167312	3.932248507	
				M2055 - Shelving Storage Wire CRS w Adjustable						
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable She	lv Shelves	0	EQUIPMENT	OWNER EQUIPMENT LAB	1.112926445	6.562888053	

				_						
Design Opti		Phase Created	Family	Туре	Type Comments	LCA LCA Category	LCA Subcatego		LCA_VOLUME_M3 LCA_AREA_N	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Air		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
				Exterior - Swisspearl - PW_Plaster_GypsumBoard_Gray_Matte_GenericWo						
Improved	Walls	New Construction	Basic Wall	II	ı	1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
Improved	Walls	New Construction	Busic Wall	Exterior - Swisspearl -		I LATERIOR		LATERIOR	3.270001770	14.0322223
Improved	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
Improved	vv ans	New Construction	Dasic Wall	Exterior - Swisspearl -		1 EXTERIOR		EXTERIOR	0.270001770	14.0022220
				PW_ThermalProtection_RigidInsulation_Gray_Matte	<b>.</b>					
Improved	Walls	New Construction	Basic Wall	Generic		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Air		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
1				Exterior - Swisspearl -		-				
				PW_ThermalProtection_RigidInsulation_Gray_Matte	)					
Improved	Walls	New Construction	Basic Wall	_Generic		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
				Exterior - Swisspearl -						
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWo	1					
Improved	Walls	New Construction	Basic Wall	II		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
				Exterior - Swisspearl -						
Improved	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 EXTERIOR		EXTERIOR	5.296061976	14.6322225
Improved	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ,,¢ (Screw Spline) 2-1/2" x 7-1/2"		1 EXTERIOR	GLAZING	EXTERIOR		8.01288375
Improved	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ,,¢ (Screw Spline) 2-1/2" x 7-1/2"		1 EXTERIOR	GLAZING	EXTERIOR		8.01288375
Improved	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ,¢ (Screw Spline) 2-1/2" x 7-1/2"		1 EXTERIOR	GLAZING	EXTERIOR		8.01288375
Improved	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ,¢ (Screw Spline) 2-1/2" x 7-1/2"		1 EXTERIOR	GLAZING	EXTERIOR	5.00/0/107/	8.01288375
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Exterior Cladding Swisspearl		1 EXTERIOR	OPAQUE	EXTERIOR	5.296061976	14.6322225
Improved	Walls	New Construction	Basic Wall Coalesse Kart StoolOnCasters	Exterior - Swisspearl - Exterior Cladding Swisspearl Non-Upholstered wo/Arms		1 EXTERIOR 1 FURNITURE	OPAQUE CHAIRS	EXTERIOR LAB	5.296061976	14.6322225 1.458204617
Improved	Furniture Furniture	New Construction  New Construction	Coalesse_Kart_StoolOnCasters  Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797 0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters  Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters  Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURNITURE	CHAIRS	LAB	0.013428797	1.458204617
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1 FURNITURE	CHAIRS	OFFICE OFFICE	0.019884726	2.027641036
Improved	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery Standard Upholstery		1 FURNITURE 1 FURNITURE	CHAIRS CHAIRS	OFFICE	0.019884726 0.019884726	2.027641036 2.027641036
Improved	Furniture	New Construction	-	Standard Opholstery Standard Upholstery				OFFICE		
Improved Improved	Furniture Furniture	New Construction  New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End		1 FURNITURE 1 FURNITURE	CHAIRS SYSTEMS	OFFICE	0.019884726 0.074584624	2.027641036 5.252544969
Improved	Furniture	New Construction	Steelcase - FrameOne - Single Sided Bases1	24" x 72" - End Unit		1 FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Improved	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1 FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Improved	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1 FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Improved	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1 FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Improved	Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End		1 FURNITURE	SYSTEMS	OFFICE	0.074584624	5.252544969
Improved	Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End		1 FURNITURE	SYSTEMS	OFFICE	0.074584624	5.252544969
Improved	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1 FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
Improved	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1 FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
			•	Interior Wall - Tally -		·	· · · · · · · · · · · · · · · · · · ·		•	
Improved	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	3.740781541	30.21137818
				Interior Wall - Tally -						
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWo	1					
Improved	Walls	New Construction	Basic Wall			1 INTERIOR		LAB	3.740781541	30.21137818
				Interior Wall - Tally -						
				PW_Plaster_GypsumBoard_Gray_Matte_GenericWo	1					
Improved	Walls	New Construction	Basic Wall			1 INTERIOR		LAB	3.774662284	30.48500655
-										

Design Optio	n Category	Phase Created	Family	Type	Type Comments	LCA LCA Category	LCA Subcategor	y LCA Spacetype L	LCA_VOLUME_M3 LCA_A	REA_M2 LCA_AREA_COUNTER_M2
				LAB CEILING - 1_ACT - PW_Ceiling_AcousticTile_White_LightGraySpeckle:	•					
Improved	Ceilings	New Construction	Compound Ceiling	24x24-Generic_APC2 (New)	s_	1 INTERIOR		LAB	2.547020362	44.56733956
p.ovou			compound coming	Interior Wall - Tally -				2.13	2.0 020002	1 1100700700
Improved	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	3.774662284	30.48500655
				LAB CEILING - 1_ACT -						
				PW_Ceiling_AcousticTile_White_LightGraySpeckle	s_					
Improved	Ceilings	New Construction	Compound Ceiling	24x24-Generic_APC2 (New)		1 INTERIOR		LAB	3.8254227	66.9366115
	Walls	Na Camatuustian	Basic Wall	Interior Wall - Tally -		1 INTERIOR		LAB	3.774662284	30.48500655
Improved	waiis	New Construction	Basic wall	PW_Metal_Stud_Gray_Matte_Generic Interior Wall - Tally -		I INTERIOR		LAD	3.774002284	30.48300655
Improved	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	1.83767818	14.84125425
				Interior Wall - Tally -						
				PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Improved	Walls	New Construction	Basic Wall	II		1 INTERIOR		LAB	3.774662284	30.48500655
				Interior Wall - Tally -						
1	VA/ II -	Niero Comotomostico	Desir Mell	PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va	1 INTERIOR		LAD	1 007/7010	14 0 4105 405
Improved	Walls	New Construction	Basic Wall	II Interior Wall - Tally -		1 INTERIOR		LAB	1.83767818	14.84125425
Improved	Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic		1 INTERIOR		LAB	2.866001844	23.14627741
p.ovou	***************************************	Trem contendencia	245.5	Interior Wall - Tally -				2.13	2.00000.0	261116217 11
				PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Improved	Walls	New Construction	Basic Wall	II		1 INTERIOR		LAB	2.866001844	23.14627741
				WRITE UP - 1_GWB -						
	G :::			PW_Plaster_GypsumBoard_Gray_Matte_GenericF	or			0.551.05	7.171700000	// 10/00014
Improved	Ceilings Ceilings	New Construction	Compound Calling	Ceilings		1 INTERIOR 1 INTERIOR	CEILING	OFFICE LAB	7.171788808 2.547020362	66.43629014 44.56733956
Improved Improved	Ceilings	New Construction  New Construction	Compound Ceiling Compound Ceiling			1 INTERIOR	CEILING	LAB	3.8254227	66.9366115
Improved	Ceilings	New Construction	Compound Ceiling			1 INTERIOR	CEILING	OFFICE	7.171788808	66.43629014
Improved	Doors	New Construction	081113_Single HG with Leaf	Type F 96" x 84"		1 INTERIOR	DOORS	LAB	0.133150565	3.628196827
Improved	Doors	New Construction	081113_Single HG with Leaf	Type F 96" x 84"		1 INTERIOR	DOORS	LAB	0.133150565	3.628196827
Improved	Floors	New Construction	Floor	EPOXY COATING - FLOORING - EPOXY COATING		1 INTERIOR	FLOOR FINISH	LAB	0.357991211	112.7532743
				WRITE UP - 1_BROADLOOM - WRITEUP -						
Improved	Floors	New Construction	Floor	1_BROADLOOM		1 INTERIOR	FLOOR FINISH	OFFICE	2.120165094	66.77693447
Improved	Walls	New Construction	Curtain Wall	GENERIC (Butt Glazed) 6" Interior Wall - Tally -		1 INTERIOR	GLAZING	LAB		14.70964167
				PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Improved	Walls	New Construction	Basic Wall			1 INTERIOR	PARTITIONS	LAB	2.866001844	23.14627741
				Interior Wall - Tally -						
				PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Improved	Walls	New Construction	Basic Wall	II		1 INTERIOR	PARTITIONS	LAB	3.740781541	30.21137818
				Interior Wall - Tally -	,					
Improved	Walls	New Construction	Racia Wall	PW_Plaster_GypsumBoard_Gray_Matte_GenericV	va	1 INTERIOR	PARTITIONS	LAB	1.83767818	14.84125425
improved	vvuiis	New Construction	Busic Wali	Interior Wall - Tally -		1 INTERIOR	FARTHONS	LAD	1.83707616	14.04125425
				PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Improved	Walls	New Construction	Basic Wall			1 INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655
				Interior Wall - Tally -						
				PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Improved	Walls	New Construction	Basic Wall			1 INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655
				LW Concrete on Metal Deck - 6 1/2" - PW_Metal_AluminumDeck_DarkBronze_Anodized						
Improved	Floors	New Construction	Floor	GrayShading_MRK	=	1 SUPERSTRUCTURE		OFFICE	29.69488427	179.860208
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1 SUPERSTRUCTURE		LAB	0.10194353	
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1 SUPERSTRUCTURE	BEAM	LAB	0.262914603	
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1 SUPERSTRUCTURE		LAB	0.25527225	
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1 SUPERSTRUCTURE		LAB	0.10194353	
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1 SUPERSTRUCTURE		LAB	0.10194353	
Improved	Structural Framing Structural Framing	New Construction	W-Wide Flange W-Wide Flange	W24X84 W16X31		1 SUPERSTRUCTURE 1 SUPERSTRUCTURE		LAB OFFICE	0.262914603 0.057274591	
Improved Improved	Structural Framing Structural Framing	New Construction  New Construction	W-Wide Flange	W16X31		1 SUPERSTRUCTURE		OFFICE	0.057274591	
Improved	Structural Framing	New Construction	W-Wide Flange	W18X40		1 SUPERSTRUCTURE		OFFICE	0.05030804	
Improved	Structural Framing	New Construction	W-Wide Flange	W16X31		1 SUPERSTRUCTURE		OFFICE	0.057274591	
Improved	Structural Columns	New Construction	W-Wide Flange-Column	W14X90		1 SUPERSTRUCTURE	COLUMN	LAB	0.074277887	
Improved	Structural Columns	New Construction	W-Wide Flange-Column	W14X90		1 SUPERSTRUCTURE		LAB	0.074277887	
Improved	Structural Columns	New Construction	W-Wide Flange-Column	W14X90		1 SUPERSTRUCTURE		LAB	0.074277887	
Improved	Structural Columns	New Construction	W-Wide Flange-Column	W14X90		1 SUPERSTRUCTURE		LAB	0.074277887	
Improved	Structural Columns	New Construction	W-Wide Flange-Column	W14X90		1 SUPERSTRUCTURE	COLUMN	LAB	0.074277887	

Design Option Category	Phase Created	Family	Туре	Type Comments LC	CA LCA Category	LCA Subcategory		LCA_VOLUME_M3 LCA_ARE	A_M2	LCA_AREA_COUNTER_M2
Improved Structural Columns	New Construction	W-Wide Flange-Column	W14X90	<u>l</u>	SUPERSTRUCTUR		LAB	0.074277887		
Improved Structural Columns Improved Structural Columns	New Construction	W-Wide Flange-Column W-Wide Flange-Column	W14X90 W14X90	1	SUPERSTRUCTURI SUPERSTRUCTURI		OFFICE OFFICE	0.074277887 0.074277887		
Improved Structural Columns Reimagined Floors	New Construction  New Construction	Floor	CLT 7 PLY 9-5/8" - Softwood	Lumber	SUPERSTRUCTUR	SUPERSTRUCTURE		0.074277887	144.2628752	179.860208
Reimagined Walls	New Construction	Basic Wall	Exterior - Wood - Plywood	Sheathing	1	EXTERIOR	JLAD		26.89062012	22.64510625
Reimagined Walls	New Construction	Basic Wall	Exterior - Wood - Plywood	Sheathing	1	EXTERIOR			23.71885364	19.974145
Reimagined Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK E	·	onearmig	CASEWORK	CABINETS		0.108588701	4.125514166	17.774140
Reimagined Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK E		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK E		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK E		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK E			CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5		<u> </u>	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction  New Construction	123553_Casework-BaseCabinet-Wood-CombinationCo 123553 Casework-BaseCabinet-Wood-CombinationCo		1	CASEWORK	CABINETS	LAB LAB	0.061181196	2.485341643 2.485341643	
Reimagined Casework  Reimagined Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCo		1	CASEWORK CASEWORK	CABINETS CABINETS	LAB	0.061181196 0.061181196	2.485341643	
Reimagined Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCo		: 1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5		1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCo		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCo		· · ·	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 wood	1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Reimagined Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCo	a W1C1836 - 18"W x 36"H x 22"D	1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		CASEWORK	COUNTERTOP		0.0194678	0.851610833	0.7896755
Reimagined Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Reimagined Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Reimagined Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK	COUNTERTOP	LAB	0.0778712	3.342572521	3.158702
Reimagined Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)	1	CASEWORK	COUNTERTOP	LAB	0.038474096	1.662247812	1.560630948
Reimagined Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"	1	CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS		CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u> </u>	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545 1.393545
Reimagined Casework	New Construction New Construction	123553 - FH DISTINCTION - 6 FT 123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS FH Distinction - 6 ft STAINLESS	1	CASEWORK CASEWORK	MOBILE BENCH MOBILE BENCH	LAB LAB	0.094244767 0.094244767	5.247662002 5.247662002	1.393545
Reimagined Casework  Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	<u> </u>	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	· · ·	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"	1	CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Reimagined Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"	1	CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Reimagined Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS	1	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
			115313 - FUME HOOD - VERTICAL SLIDING SASH							
Reimagined Specialty Equipment	<b>New Construction</b>	115313 - FUME HOOD - VERTICAL SLIDING SASH (STANI	) (STAND ALONE)	1	EQUIPMENT	FUMEHOOD	LAB	1.822942956	15.76786965	
Reimagined Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPME	N⁻LAB	1.3167312	3.932248507	
Reimagined Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPME		1.3167312	3.932248507	
Reimagined Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50	0		OWNER EQUIPME		0.062472825	0.571017499	
Reimagined Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50	0	EQUIPMENT	OWNER EQUIPME	N1LAB	0.062472825	0.571017499	
			M2055 - Shelving Storage Wire CRS w Adjustable							
Reimagined Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel		0	EQUIPMENT	OWNER EQUIPME	N <sup>-</sup> LAB	1.112926445	6.562888053	
			M2055 - Shelving Storage Wire CRS w Adjustable			O			, -,	
Reimagined Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel		0	EQUIPMENT	OWNER EQUIPME	n lab	1.112926445	6.562888053	
Define with a discount of the State of the S	Name Carrie 11	MODEL Chaldra Channa W. CDO A C. C. C.	M2055 - Shelving Storage Wire CRS w Adjustable	-	EQUIPMAENT.	OWNED FOLUS: 15	NIT LAD	132007445	/ [/0000050	
Reimagined Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shel		0	EQUIPMENT	OWNER EQUIPMEN		1.112926445	6.562888053	
Reimagined Specialty Equipment	New Construction	Lab Equipment Matrix	O1-REFRIGERATOR	0		OWNER EQUIPME		1.3167312	3.932248507	
Reimagined Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR	0	EQUIPMENT	OWNER EQUIPME	IN LAB	1.3167312	3.932248507	

Margine   Septimin   Control   Con					_		101 1010			1010		
Process   Proc			Phase Created	Family	Type	Type Comments						
March   Section   Proceedings   March   Marc												
March   Marc	Reimaginea	Specialty Equipment	New Construction	Lab Equipment Matrix			U EQUIP	PIVIEINI	OWNER EQUIPME	N LAB	1.310/312	3.932246507
March   Marc	Peimagined	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CPS w Adjustable She	,		O EOUIE	DMENIT	OWNED FOLIDME	NT LAR	1 112026445	6 562888053
Image   Property   P	Keimaginea	Specialty Equipment	New Construction	W2000 - Shelving Storage Wire CR3 w Adjustable She			O LGOII	IVILIVI	OWNER EGOII WIE	1 LAD	1.112720440	0.302000003
Application	Reimagined	Specialty Fauipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable She	,		0 FQUIE	PMFNT	OWNER FOUIPME	NT LAB	1.112926445	6.562888053
April   Company   Compan												
Authors		<u> </u>										
Part												
Process   Proc	Ü				Exterior - Wood -							
Part					PW_Plaster_GypsumBoard_Gray_Matte_GenericWa							
No.   Section	Reimagined	Walls	New Construction	Basic Wall	II		1 EXTER	RIOR		EXTERIOR	7.229497807	19.974145
Part	Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Air		1 EXTER	RIOR		EXTERIOR	7.229497807	19.974145
American					Exterior - Wood -							
West   West   West   West   Personal Control of Personal Control					$PW\_Thermal Protection\_Rigid Insulation\_Gray\_Matte$							
Part	Reimagined	Walls	New Construction	Basic Wall	_Generic		1 EXTER	RIOR			7.229497807	19.974145
Section   Wils   New Contraction   Section	Reimagined	Walls	New Construction	Basic Wall			1 EXTER	RIOR		EXTERIOR	8.196251057	22.64510625
American   Mode   New Contraction   Contra												
Marc Committee   Marc Committee   Part   P					PW_Plaster_GypsumBoard_Gray_Matte_GenericWa							
Commonwealth   Comm												
Per	Keimagined	Walls	New Construction	Basic Wall			I EXTER	RIOR		EXTERIOR	8.196251057	22.64510625
Montange												
Comparing   Well   New Construction   Content will   Knowners   100 SBAS   Serve Signed   1/2 × 1/2 × 1   EXTENDED   SALVING	Dains	\/\alla	Now Comptend	Paris Wall	<del>-</del>		1 57755	DI O D		EVTERIOR	0.104051057	22 4 45104 25
									CLAZINIC		8.196251057	
Angele					* * * * * * * * * * * * * * * * * * * *							
New Construction   New Constru					` ' '							
New   New Construction   New World   Patients - Wood - Printer Classing World   Patients - Wood - Printer Classing World   Patients - Wood - Printer Classing World   Patients - Wood - Patient					* ( 1 / 2 - 2							
Part					· · · · ·						7 229497807	
Seminaring and   Filipher Tiple   Colones   Fi												
Furniture   New Construction   Colletes Face, Secol OnContents   Non-Upschiedered work/mrs   1 FURNITURE   CHARS   LAB   0.01442877   1.4850.0487					<u> </u>							
Furniture   New Construction   Colleses Kntl Stock OnCollest   Non-Uponisted work/arms   1 FURNITURE   CHAIRS   LAB   O.0194/8797   1.48900467					•							
	Reimagined				· · · · · · · · · · · · · · · · · · ·							
Fundamental	Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURN	IITURE	CHAIRS	LAB	0.013428797	1.458204617
Furniture   New Construction   Contense Kmr. 15860/Contents   Non-Upholstered wor/Arms   1 FURNITURE   CHARS   LAB   0.013428777   1.458004017	Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURN	IITURE	CHAIRS	LAB	0.013428797	1.458204617
Filtering   Furniture   New Construction   Coolises Kort, Stocol/Coctaster   Neu-Upholstered wor/Arms   1 FURNITURE   CHARS   LAB   0.013428777   1.485204617	Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURN	IITURE	CHAIRS	LAB	0.013428797	1.458204617
Femograph   Fumbure   New Contruction   Colleses Korf, \$100   Contruction   Colleses Korf, \$100   Colleses K	Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURN	IITURE	CHAIRS	LAB	0.013428797	1.458204617
Partiture   New Construction   Collears Kert Stool OnCasters   Nov-Upholstered wy/Ams   1 FUNNITUE   CHAIRS   LAB   0.01342877   L458200467	Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURN	IITURE	CHAIRS	LAB	0.013428797	1.458204617
Elemograf   Furniture   New Construction   Coolesse_Kart_StoolOnCoaters   Non-Upholitered wo/Arms   1 FURNITURE   CHARS   LAB   O.013428797   1.488204617	Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1 FURN	IITURE	CHAIRS	LAB	0.013428797	1.458204617
Furniture   New Construction   Coolesse, Kort_Stool/OnCasters   Non-Upholstered wo/Arm   1 FURNITURE   CHAIRS   LB   0,01428797   1,458204407	Reimagined	Furniture	New Construction		•							
Fundamental Fundamental Printure   New Construction   New Constructi	Reimagined											
Elemogried   Furniture   New Construction   Coolesse, Kort, StoolOnCosters   Non-Upholsteed wor/Arms   1   FURNITURE   CHAIRS   LAB   0.013428797   1.45820.4617	Reimagined											
Elemagined Furniture   New Construction   Coalese, Kort StoolOnCoasters   Non-Upholstered wo/Arms   1 FURNITURE   CHAIRS   LAB   0.013428777   L488204617												
New Construction   Steelcose - Seating - Think 465 Series - Chair - Arm   Standard Uphobatery   1 FURNITURE   CHAIRS   OFFICE   0.019884726   2.027641036												
New Construction   Steelcase - Seating - Think 465 Series - Chair - Arm   Standard Upholstery   1   FURNITURE   CHAIRS   OFFICE   0.019884726   2.02764036					•							
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New Construction   Steelcase - Seating - Think 465 Series - Chair - Arm   Standard Upholstery   1 FURNITURE   CHAIRS   OFFICE   0.019884726   2.027641036				<u> </u>								
Furniture   New Construction   Steelcase - Seating - Think 465 Series - Chair - Arm   Standard Upholstery   1 FURNITURE   CHAIRS   OFFICE   0.019884726   2.027641036				<u> </u>								
Relmagined Furniture New Construction Steelcase - Seating - Think 465 Series - Chair - Arm Standard Upholstery 1 FURNITURE CHAIRS OFFICE 0.019884726 2.027641036 1 FURNITURE CHAIRS OFFICE 0.019884726 2.027641036				-								
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Reimagined Furniture New Construction Steelcase - FrameOne - single Sided Bases 24" x 72" - End Unit 1 FURNITURE SYSTEMS OFFICE 0.033918462 1.724921909  Reimagined Furniture New Construction Steelcase - FrameOne - Dual Sided Extensions 24" x 72" - End 1 FURNITURE SYSTEMS OFFICE 0.074584624 5.252544969  Reimagined Furniture New Construction Steelcase - FrameOne - Dual Sided Extensions 24" x 72" - End 1 FURNITURE SYSTEMS OFFICE 0.074584624 5.252544969  Reimagined Furniture New Construction Steelcase - FrameOne - Dual Sided Extensions 24" x 72" - End 1 FURNITURE SYSTEMS OFFICE 0.074584624 5.252544969	Reimagined	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1 FURN	IITURE	SYSTEMS	OFFICE	0.033918462	1.724921909
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P Innovation Incubator - Low Carbon Labs

Design Option Category	Phase Created	Family	Туре	Type Comments LCA	LCA Category	LCA Subcategory	LCA Spacetype LCA_	VOLUME_M3 LCA_ARE	A_M2 LCA_AREA_COUNTER_M2
			LAB CEILING - 1_ACT -						
Daine main and California	N C	Communication of Collins	PW_Ceiling_AcousticTile_White_LightGraySpeckle	es_	INITEDIOD			0.5.4700007.0	445/70005/
Reimagined Ceilings	New Construction	Compound Ceiling	24x24-Generic_APC2 (New) Interior Wall - Tally -		INTERIOR			2.547020362	44.56733956
Reimagined Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic	1	INTERIOR		LAB	2.417858154	19.52704931
itemagnica Wans	14cw construction	Basic Wall	Interior Wall - Tally -	<u>'</u>	INTERIOR		LAD	2.417000104	17.027 04701
Reimagined Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic	1	INTERIOR		LAB	2.726252242	22.01767032
			Interior Wall - Tally -						
			PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Reimagined Walls	New Construction	Basic Wall	II	1	INTERIOR		LAB	3.598347112	29.06108864
			Interior Wall - Tally -						
			PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Reimagined Walls	New Construction	Basic Wall	II	1	INTERIOR		LAB	2.417858154	19.52704931
			Interior Wall - Tally -						
Define a single Wells	N C	Desir Mall	PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va	INTERIOR		LAD	0.774770004	00 40500755
Reimagined Walls	New Construction	Basic Wall	Interior Wall - Tally -	I	INTERIOR		LAB	3.774662284	30.48500655
Reimagined Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic	1	INTERIOR		LAB	3.774662284	30.48500655
Reimaginea Walls	New Construction	Dasic Wall	Interior Wall - Tally -	<u> </u>	INTERIOR		LAD	3.774002204	30.40300033
Reimagined Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic	1	INTERIOR		LAB	3.598347112	29.06108864
			Interior Wall - Tally -	•					
Reimagined Walls	New Construction	Basic Wall	PW_Metal_Stud_Gray_Matte_Generic	1	INTERIOR		LAB	3.630937808	29.32429869
			Interior Wall - Tally -						
			PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Reimagined Walls	New Construction	Basic Wall	II	1	INTERIOR		LAB	3.630937808	29.32429869
			Interior Wall - Tally -						
B :	N	D : W !!	PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va	INITEDIOD		LAD	0.70/050040	00 017/ 7000
Reimagined Walls Reimagined Ceilings	New Construction	Basic Wall	II .	I	INTERIOR INTERIOR	CEILING	LAB	2.726252242 2.547020362	22.01767032 44.56733956
Reimagined Ceilings Reimagined Doors	New Construction  New Construction	Compound Ceiling  081113_Single HG with Leaf	Type F 96" x 84"	1	INTERIOR	DOORS	LAB	0.133150565	3.628196827
Reimagined Doors	New Construction	081113_Single HG with Leaf	Type F 96 "x 84"	1	INTERIOR	DOORS	LAB	0.133150565	3.628196827
Reimagined Floors	New Construction	Floor	EPOXY COATING - FLOORING - EPOXY COATING	<u>'</u>	INTERIOR	FLOOR FINISH	LAD	0.356909667	112.41263
noagou 1.00.0								0.000707007	
Reimagined Floors	New Construction	Floor	WRITE UP - 2_CARPET TILE - WRITEUP_2-CARPET T	ILE 1	INTERIOR	FLOOR FINISH	OFFICE	2.109349649	66.43629014
Reimagined Walls	New Construction	Curtain Wall	GENERIC (Butt Glazed) 6"	1	INTERIOR	GLAZING	LAB		4.490311667
Reimagined Walls	New Construction	Curtain Wall	GENERIC (Butt Glazed) 6"	1	INTERIOR	GLAZING	LAB		4.490311667
			Interior Wall - Tally -						
			PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Reimagined Walls	New Construction	Basic Wall		1	INTERIOR	PARTITIONS	LAB	2.726252242	22.01767032
			Interior Wall - Tally -	A/					
Reimagined Walls	New Construction	Basic Wall	PW_Plaster_GypsumBoard_Gray_Matte_GenericV	1	INTERIOR	PARTITIONS	LAB	3.630937808	29.32429869
Reimaginea Walls	New Construction	Busic Wali	Interior Wall - Tally -	'	INTERIOR	FARITIONS	LAD	3.030737808	27.32427007
			PW_Plaster_GypsumBoard_Gray_Matte_Generic\	Va					
Reimagined Walls	New Construction	Basic Wall		1	INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655
			Interior Wall - Tally -						
			PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va					
Reimagined Walls	New Construction	Basic Wall	II	1	INTERIOR	PARTITIONS	LAB	3.598347112	29.06108864
			Interior Wall - Tally -						
Deine main and AMA !!	Name Caracter at	Davis Wall	PW_Plaster_GypsumBoard_Gray_Matte_GenericV	Va -	INITEDIOS	DADTITIONS	LAD	0.41705015.4	10 5070 4001
Reimagined Walls Reimagined Structural Framing	New Construction New Construction	Basic Wall Glulam-Western Species	   4'-4" x 1'-1 5/8"	11	INTERIOR SUPERSTRUCTURE	PARTITIONS	LAB	2.417858154 3.065096956	19.52704931
Reimagined Structural Framing Reimagined Structural Framing	New Construction  New Construction	Glulam-Western Species Glulam-Western Species	4'-4" x 1'-15/8" 4'-4" x 1'-15/8"		SUPERSTRUCTURE			4.439456244	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			3.065096956	
Reimagined Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5"		SUPERSTRUCTURE			1.362971322	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			2.744364746	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE	BEAM		2.744364746	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			2.744364746	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			2.919969259	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			2.89529755	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			4.439456244	
Reimagined Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"		SUPERSTRUCTURE			4.439456244	
Reimagined Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5"		SUPERSTRUCTURE			1.987126678	
Reimagined Structural Framing Reimagined Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5" 11.5" x 27.5"		SUPERSTRUCTURE SUPERSTRUCTURE			1.987126678 1.987126678	
Reimagined Structural Framing Reimagined Structural Columns	New Construction New Construction	Glulam-Western Species Parallel Strand Lumber	11.5" X 27.5" 18" X 18"	1	SUPERSTRUCTURE		EXTERIOR	0.8893245	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	SUPERSTRUCTURE		EXTERIOR	0.8893245	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	SUPERSTRUCTURE		EXTERIOR	0.8893245	
g	Sometiaction			<u> </u>				0.00,0240	

Design Option Category	Phase Created	Family	Туре	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	1	SUPERSTRUCTURE	COLUMN	EXTERIOR	0.88932	15	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	1	SUPERSTRUCTURE	COLUMN	LAB	0.88932	15	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	1	SUPERSTRUCTURE	COLUMN	LAB	0.88932	15	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	1	SUPERSTRUCTURE	COLUMN	LAB	0.88932	15	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	1	SUPERSTRUCTURE	COLUMN	LAB	0.88932	15	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"	1	1	SUPERSTRUCTURE	COLUMN	LAB	0.88932	15	
Reimagined Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.88932	15	
Reimagined Floors	New Construction	Floor	Concrete 2" - Concrete_CastInPlace_Gray			SUPERSTRUCTURE	SLAB		9.1368874	57 17	9.860208

AIA 2030 Target Year	AIA 2020 % reduction	Site EUI (kBtu/sf/yr)	Lifetime EUI (kBtu/sf)	GHG Intensity (kg/sf/yr)	Lifetime GHG Intensity (kg/sf)
Baseline	0%	370	27,750	33	2,476
2015	70%	111	8,325	10	743
2020	80%	74	5,550	7	495
2025	90%	37	2,775	3	248
2030	100%	-	-	-	-

# AIA 2030 Design Data Exchange

**DDx Support Page:** <a href="https://transform.aia.org/confluence/pages/viewpage.action?pageId=81756799">https://transform.aia.org/confluence/pages/viewpage.action?pageId=81756799</a>

US National Avg EUI Laboratories 370 kBtu/sf/yr

# **Energy Star Portfolio Manager**

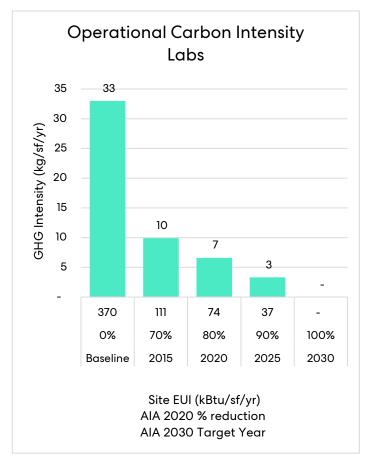
**Emissions Factors** <a href="https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf?dee6-4951">https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf?dee6-4951</a>

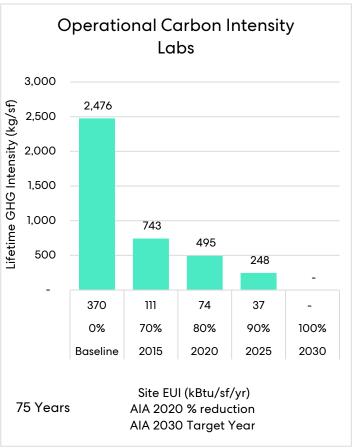
Indirect GHG Factors - US Electricity 0.1182 kg CO2e / kBtu

# **I2SL Lab Benchmarking tool (LBT)**

Analysis https://lbt.i2sl.org/buildings/charts

Avg GHG/EUI 0.1935 kg CO2e / kBtu





# **12SL LAB BENCHMARKING TOOL**

