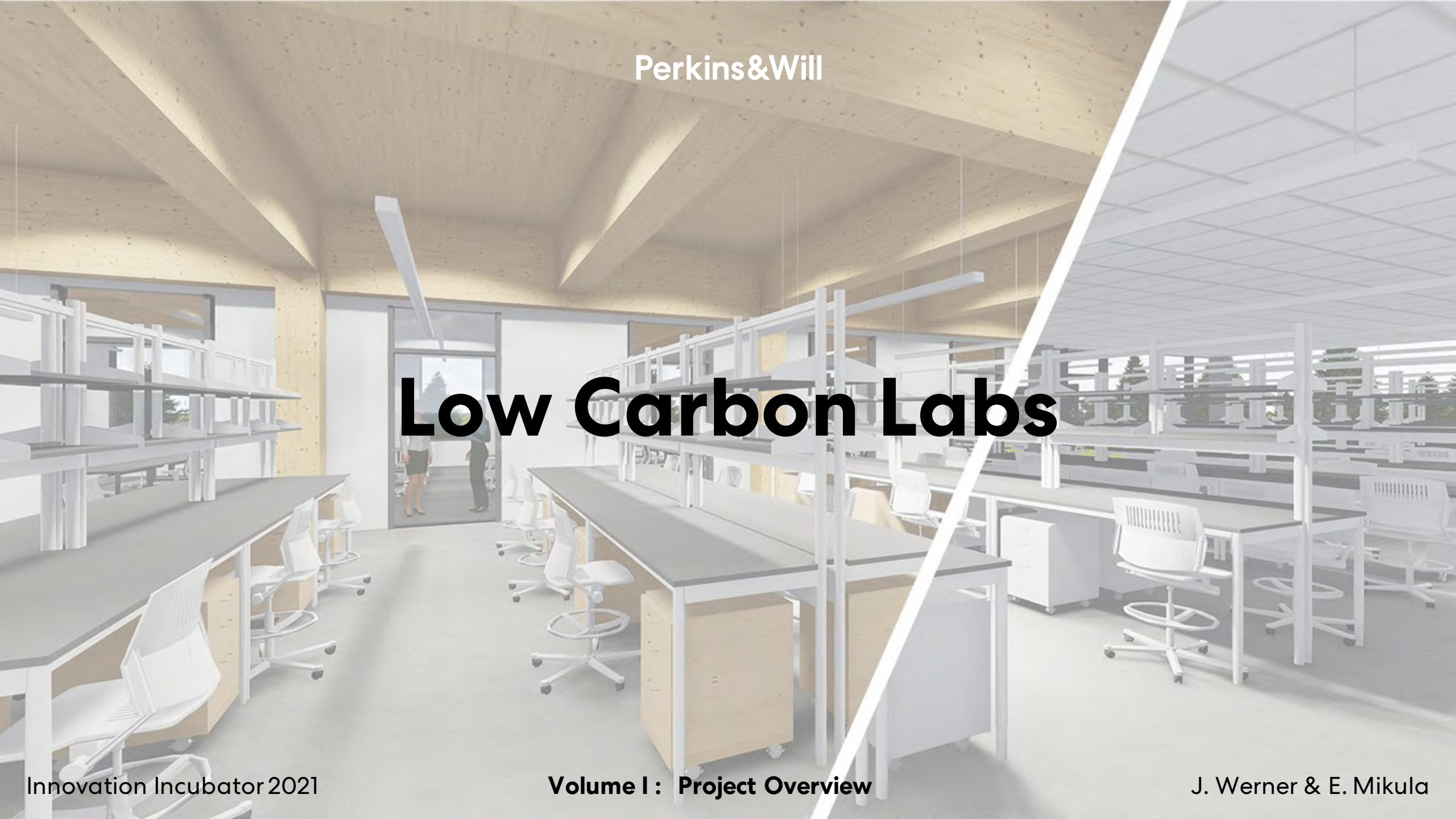
Perkins&Will

Low Carbon Labs



Innovation Incubator 2021

Volume I : Project Overview

J. Werner & E. Mikula

Low Carbon Labs - Executive Summary

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

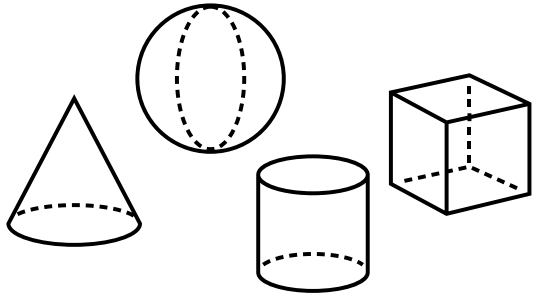
A standard kit of parts for lab planning and lab materials choices has emerged over the past 50+ years. Lab designers have become familiar with a predictable set of choices applying to many projects.

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.

Low Carbon Labs - Executive Summary

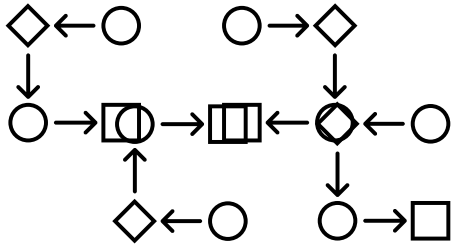
Caveats



“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

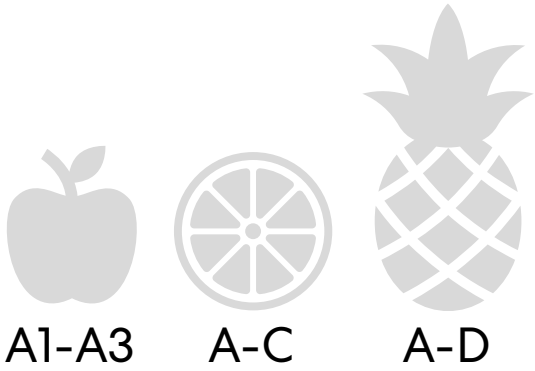
Low Carbon Labs is a simplified model of building systems. It does not include all the systems and products required to make a lab building. But it does demonstrate a method for evaluating individual design choices to improve future projects. We hope that the methods and examples help building owners 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

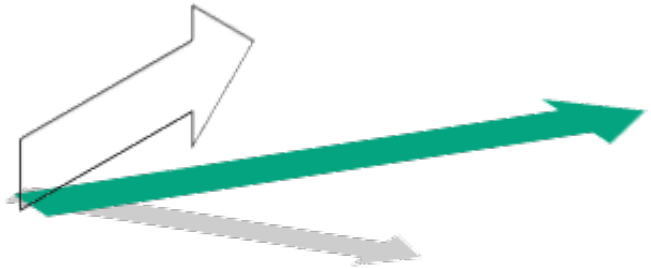
This study intentionally mixes EPD data from a variety of sources with different Product Category Rules (PCRs), modules (aka. product life cycle stages), and EPD types (ex. product specific vs. industry average).

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).

Low Carbon Labs - Executive Summary

Caveats

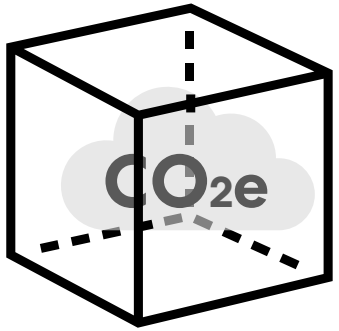


Directionality vs. Magnitude

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 system-by-system choices. This has two advantages:

1. 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.

Low Carbon Labs - Executive Summary

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.

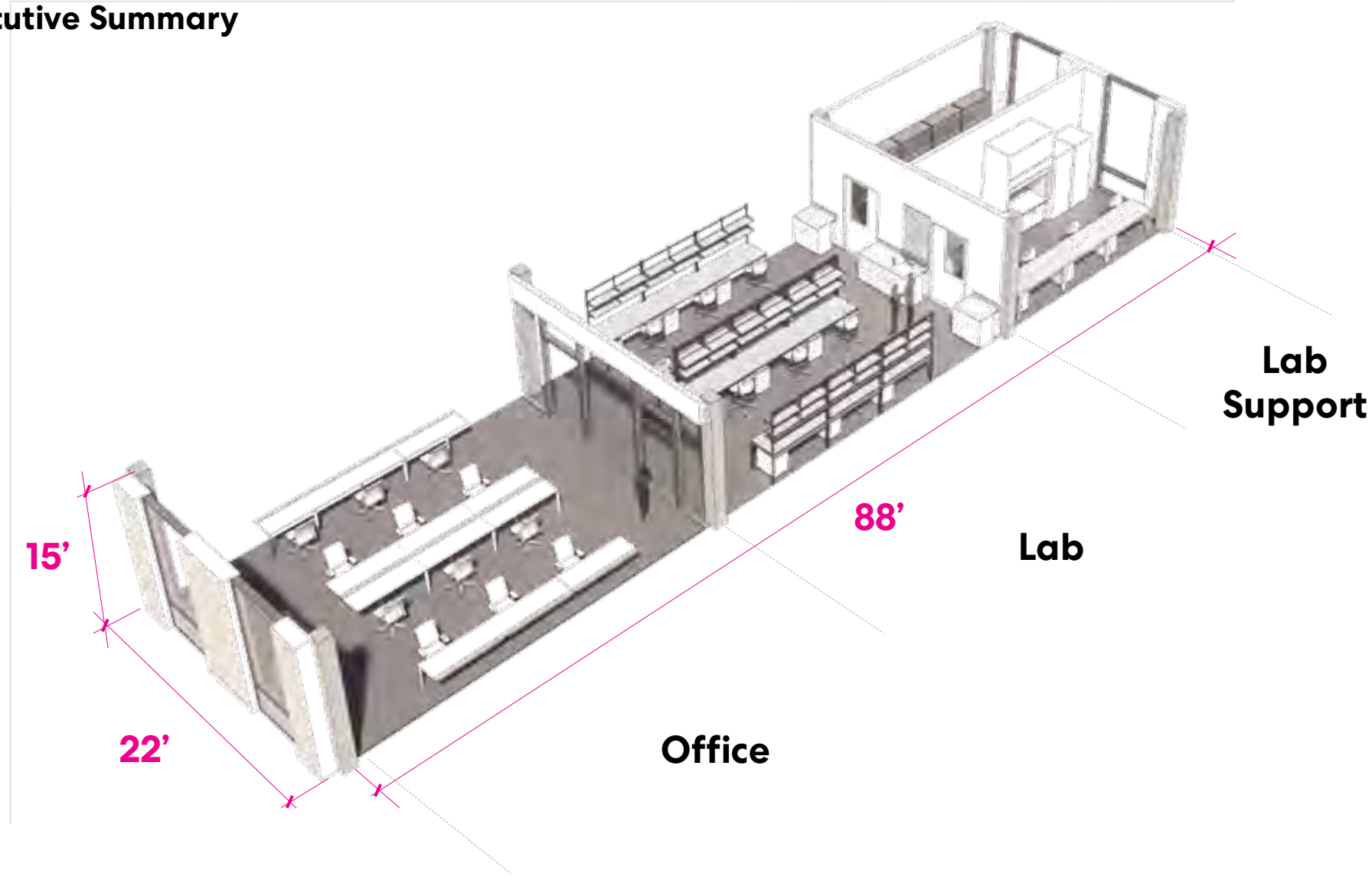
RESULTS

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

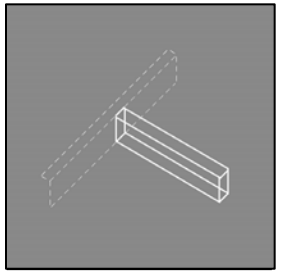
Improved: The sum of the studied systems within the 22x88 module equates to ~130,000 kg CO2e/sf, or a reduction of 26% from the baseline. The savings is equivalent to 2-7 years of operational carbon.

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



STRUCTURE

Special thanks to LeMessurier

ENVELOPE OPAQUE

PARTITIONS

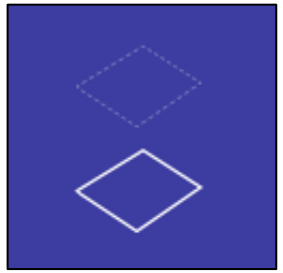
CEILINGS

OFFICE SYSTEMS

LAB BENCHTOP

ENVELOPE GLAZING (%)

DOORS

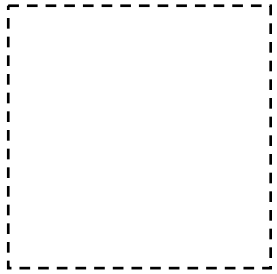


FLOORS

LAB CASEWORK

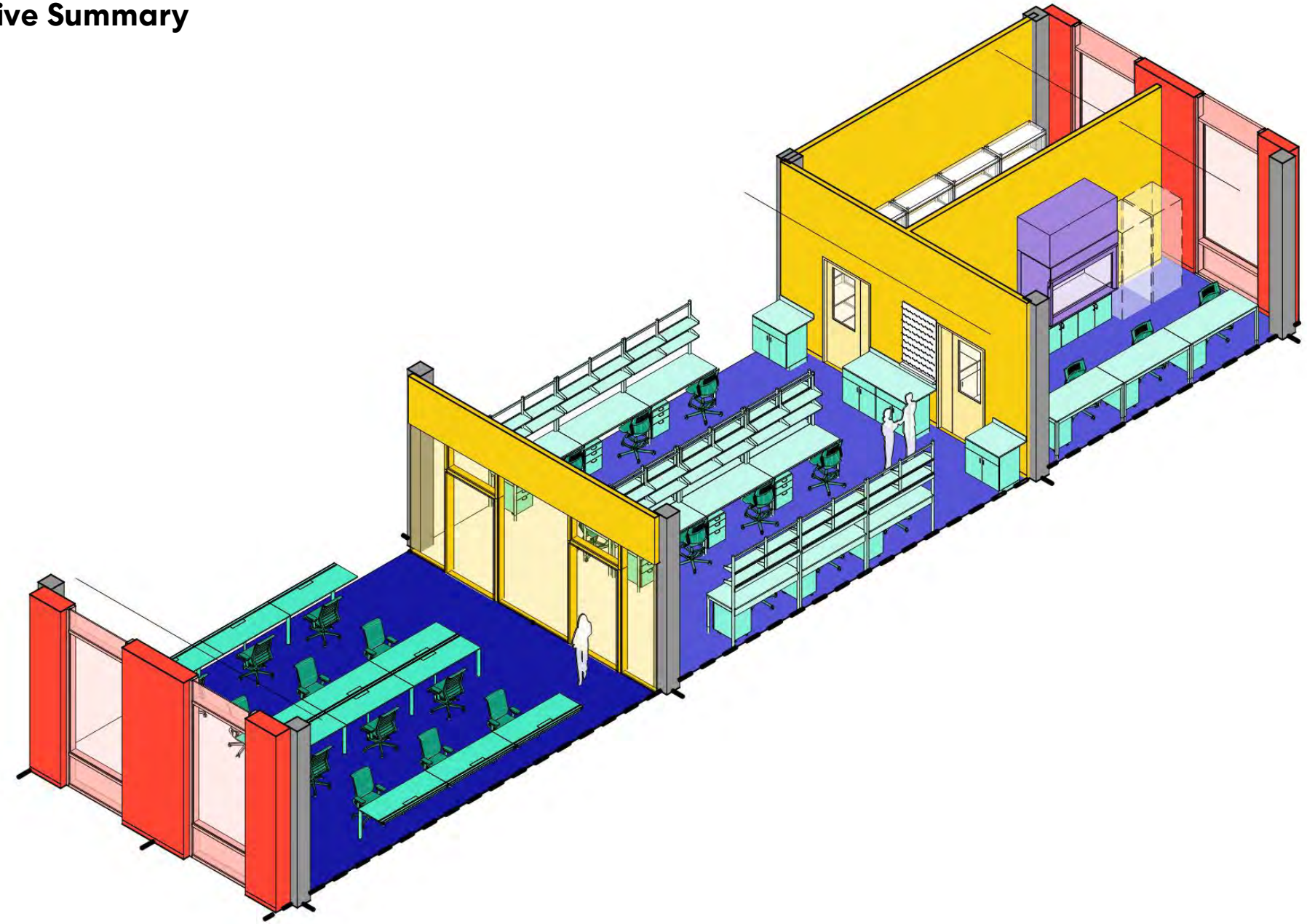
LAB FUMEHOODS

Special thanks to BR+A



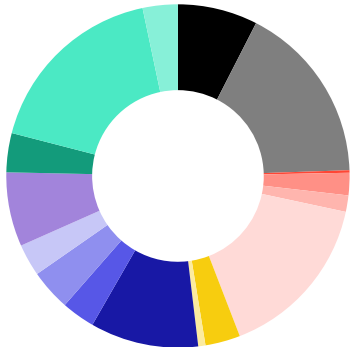
MEP SYSTEMS

Systems

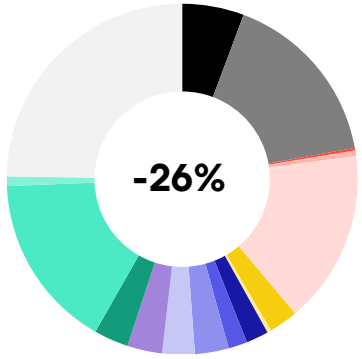


Scenarios

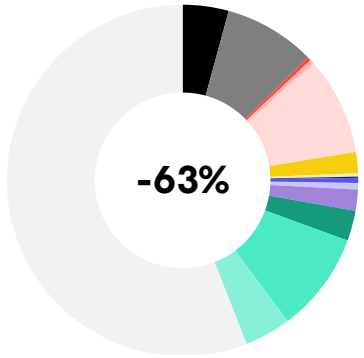
BASELINE



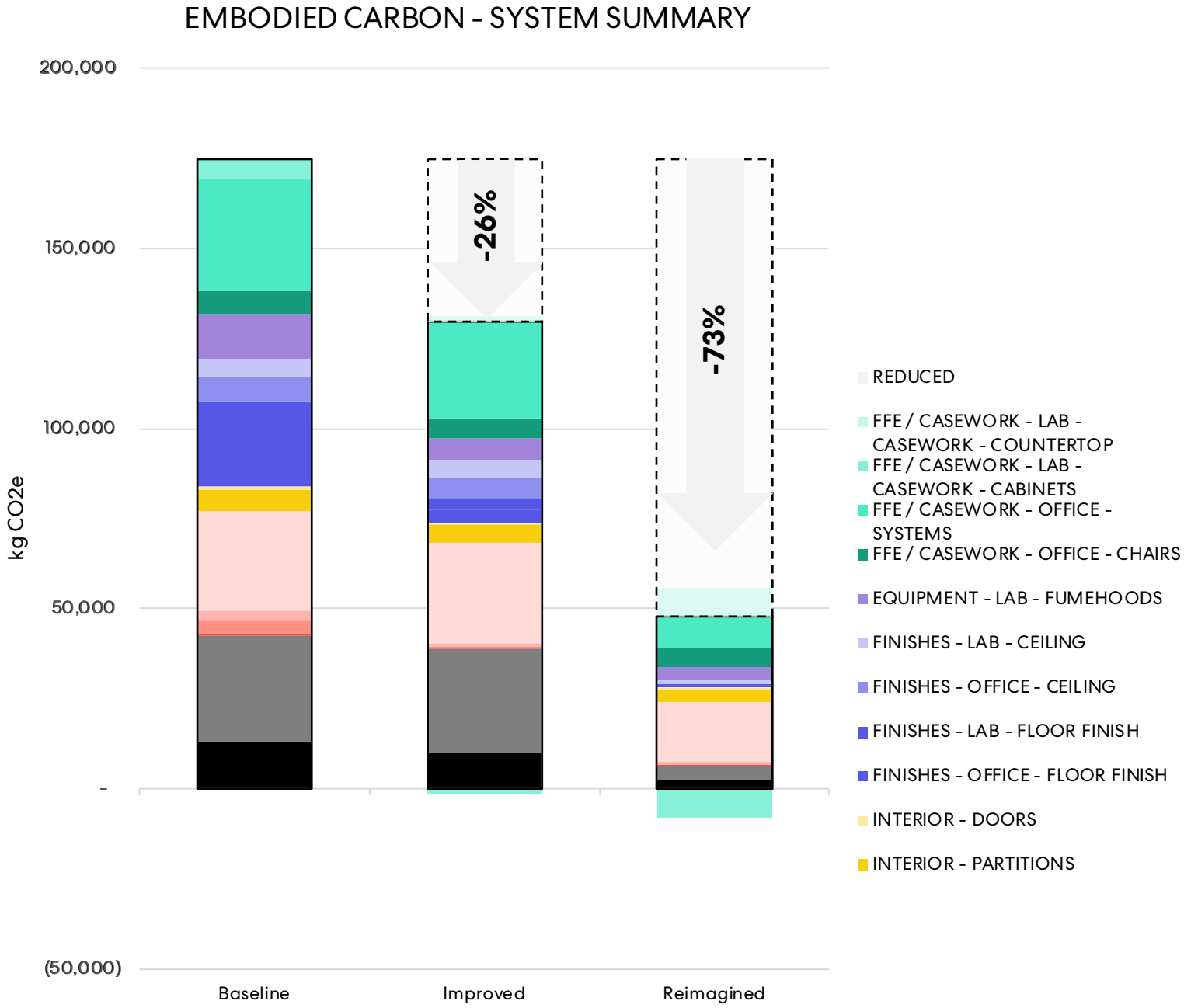
IMPROVED



REIMAGINED



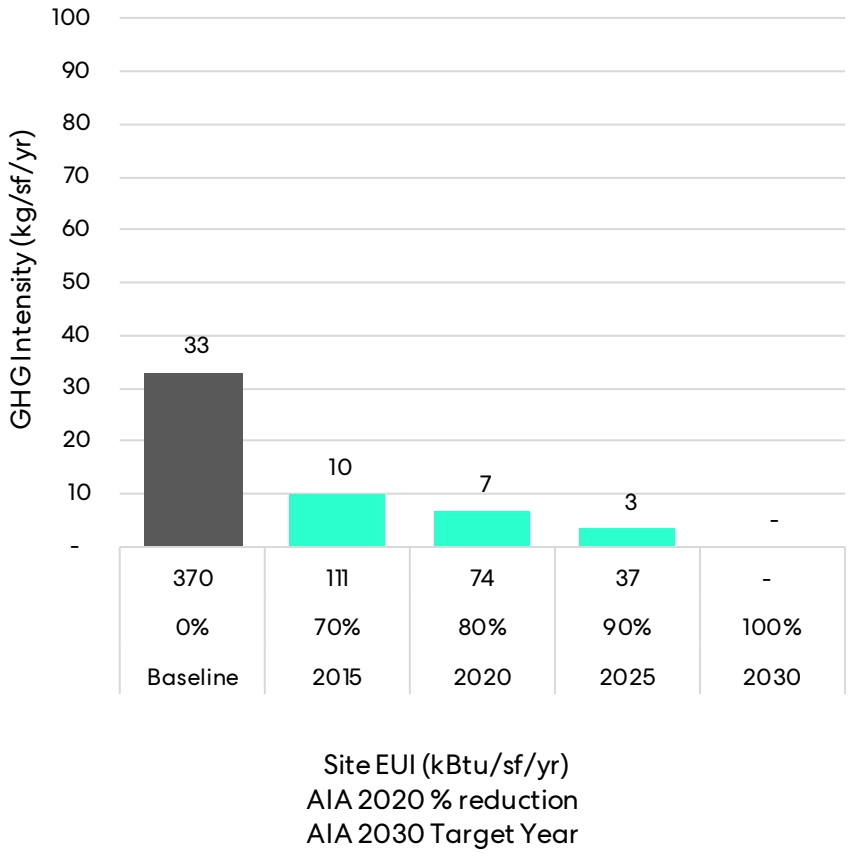
Results


EMBODIED CARBON - SYSTEM SUMMARY
200,000
150,000
100,000
50,000
-
(50,000)
kg CO2e
-26%
-73%
Baseline
Improved
Reimagined
REDUCED
FFE / CASEWORK - LAB - CASEWORK - COUNTERTOP
FFE / CASEWORK - LAB - CASEWORK - CABINETS
FFE / CASEWORK - OFFICE - SYSTEMS
FFE / CASEWORK - OFFICE - CHAIRS
EQUIPMENT - LAB - FUMEHOODS
FINISHES - LAB - CEILING
FINISHES - OFFICE - CEILING
FINISHES - LAB - FLOOR FINISH
FINISHES - OFFICE - FLOOR FINISH
INTERIOR - DOORS
INTERIOR - PARTITIONS

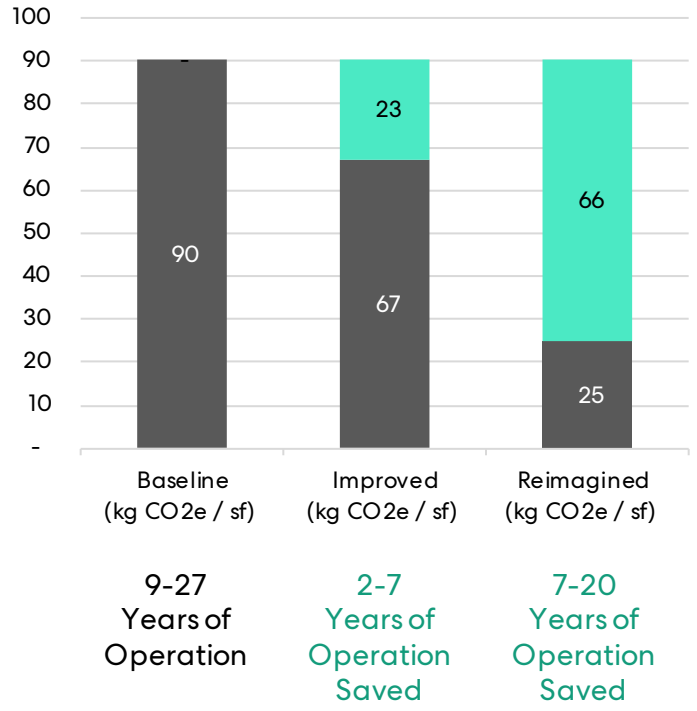
Context

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



Embodied Carbon Intensity All Design Choices



Why do we care?

How We Thought We'd Do It

How We Did It

Looking Ahead

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

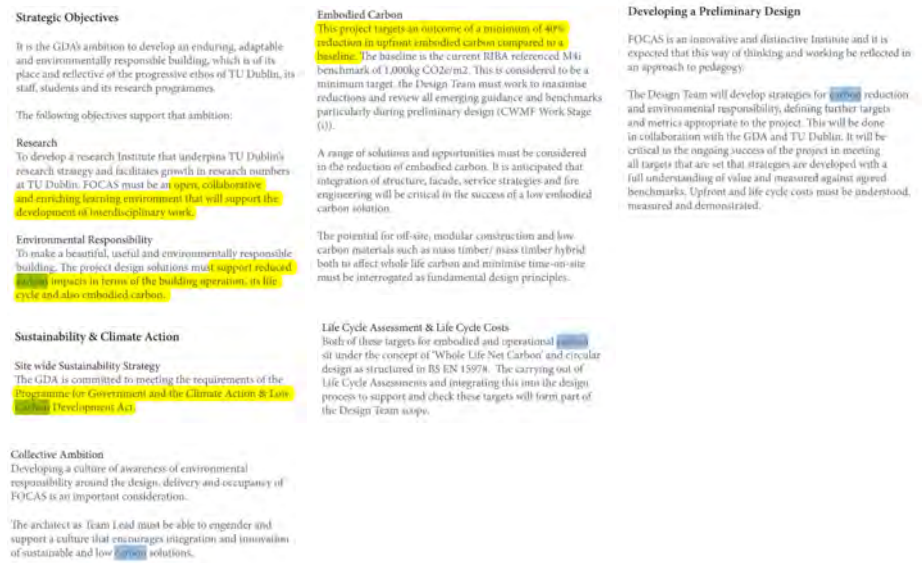
Who's Asking?

FOCAS

Technical University Dublin

Ireland, 2020

Competition Brief - Stage I



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:

Research

To develop a research Institute that underpins TU Dublin's research strategy and facilitates growth in research numbers at TU Dublin. FOCAS must be an 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

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.

Embodied Carbon

This project targets an outcome of a minimum of 40% reduction in upfront 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 (i)).

A range of solutions and opportunities must be considered in the reduction of embodied carbon. It is anticipated that integration of structure, façade, 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

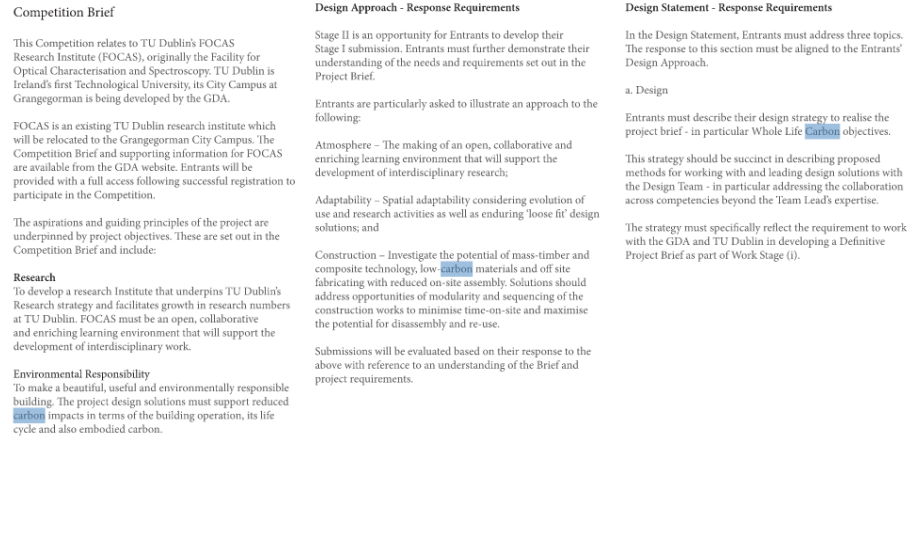
Both of these targets for embodied and operational carbon sit under the concept of 'Whole Life Net Carbon' and circular design as structured in BS EN 15978. The carrying out of Life Cycle Assessments and integrating this into the design process to support and check these targets will form part of the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

Competition Regulations



Competition Brief

This Competition relates to TU Dublin's FOCAS Research Institute (FOCAS), originally the Facility for Optical Characterisation and Spectroscopy. TU Dublin is Ireland's first Technological University, its City Campus at Grangegorman is being developed by the GDA.

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 are available from the GDA website. Entrants will be provided with a full access following successful registration to participate in the Competition.

The aspirations and guiding principles of the project are underpinned by project objectives. These are set out in the Competition Brief and include:

Research

To develop a research Institute that underpins TU Dublin's Research strategy and facilitates growth in research numbers at TU Dublin. FOCAS must be an 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.

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 following:

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-carbon 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. Design

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.

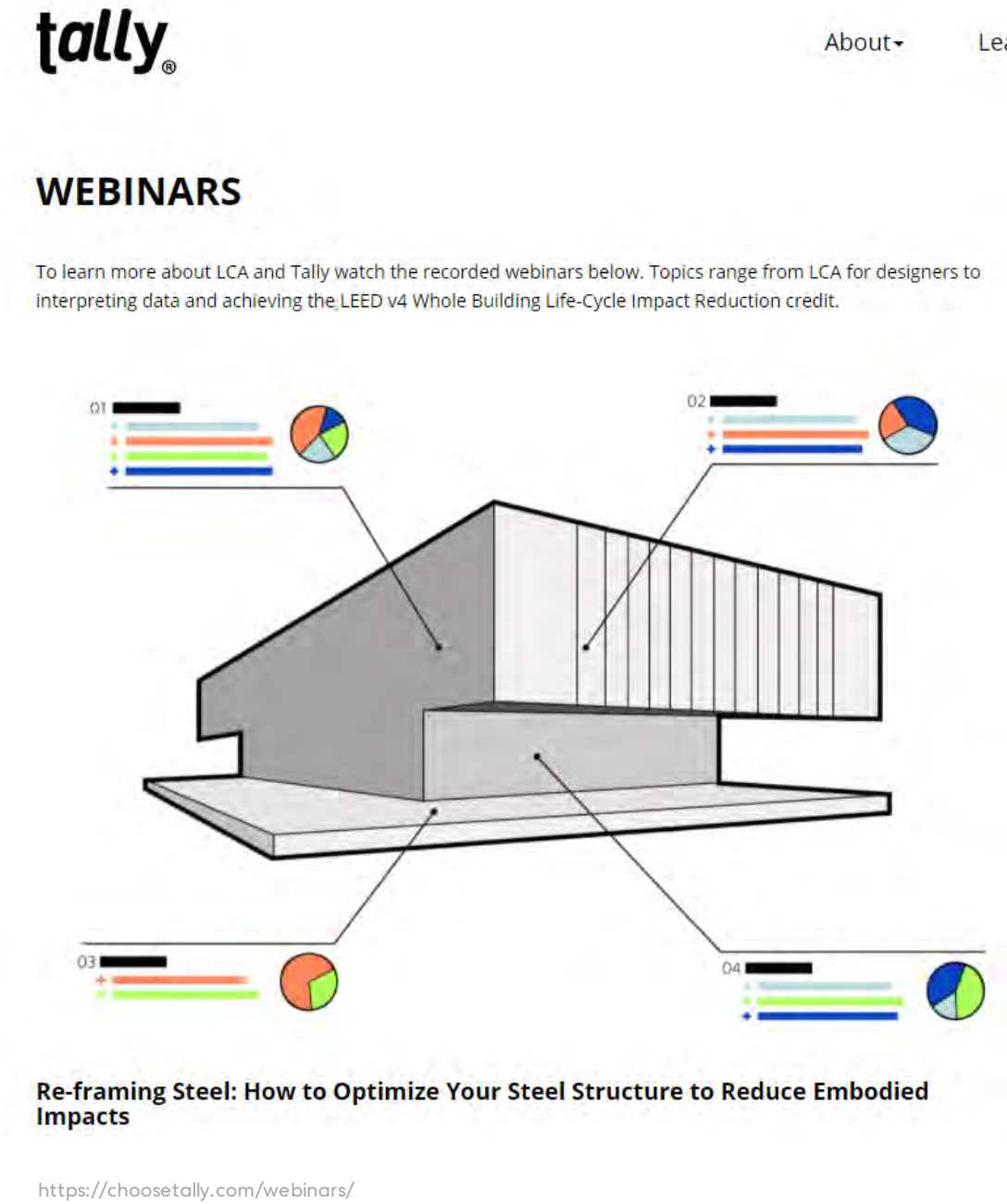
The strategy must specifically reflect the requirement to work with the GDA and TU Dublin in developing a Definitive Project Brief as part of Work Stage (i).

How We Thought We'd Do It

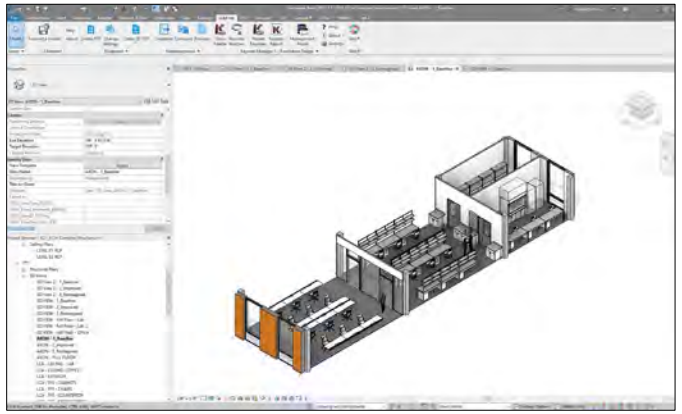
Tally

Tally, a tool originally developed by Kieran Timberlake, “allows Revit users to imbue their BIM with the complete information about the building materials and architectural products their structures will ultimately contain. Tally quantifies a building or material's embodied environmental impacts to land, air, and water systems...Tally gives its users the power to conduct whole building LCAs during design and to use LCA data to run comparative analyses of various design options that show their differing environmental impacts. ”

- https://kierantimberlake.com/page/tally

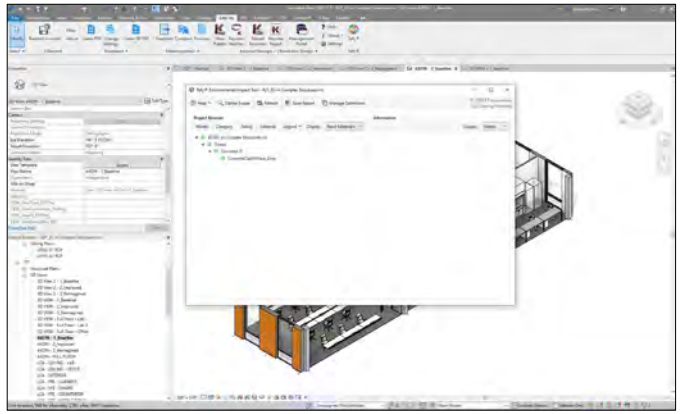


Low Carbon Labs



Model in Revit

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

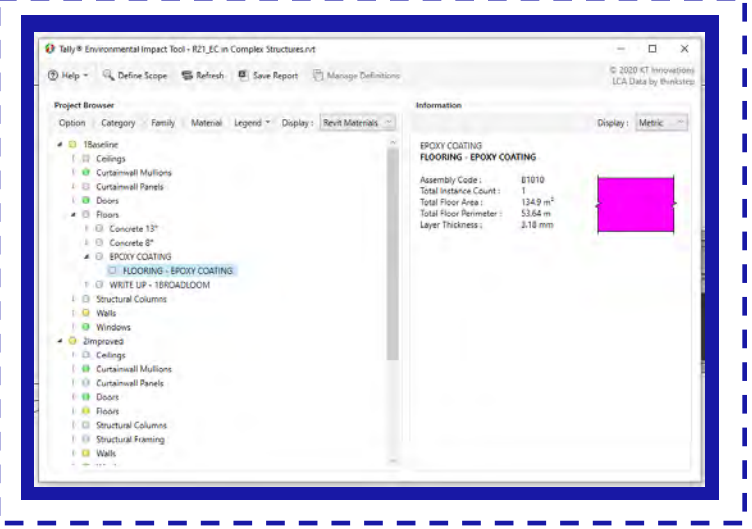


Use Tally to Assign Materials

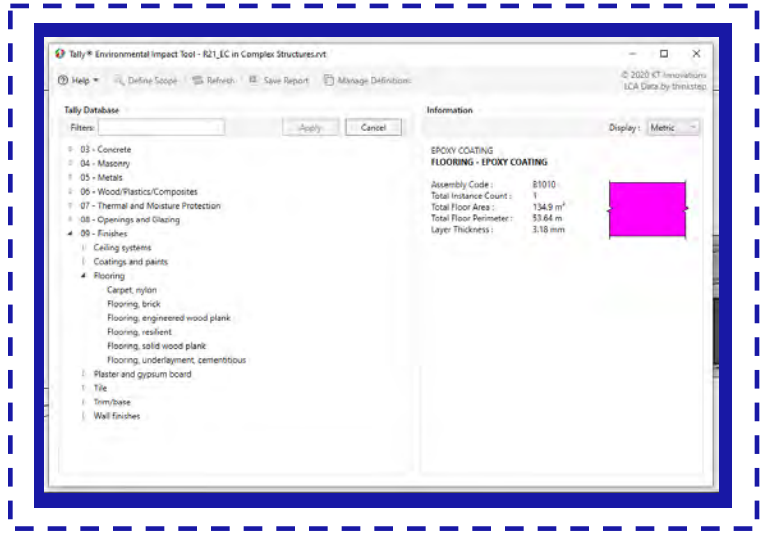
Utilizing Tally Revit Plug-in, assign materials aligned with materials specified in Laboratory projects

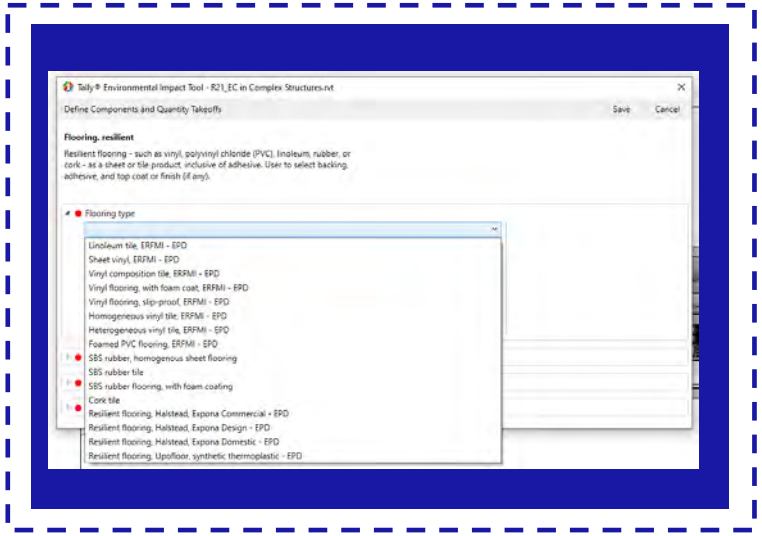
Report produced by Tally for Material Assessment

Tally



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

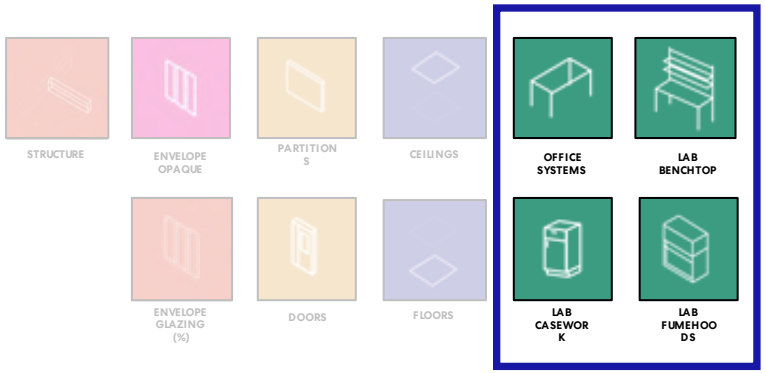




For available categories, material options currently available in Tally do not yet include the laboratory finishes typically specified.

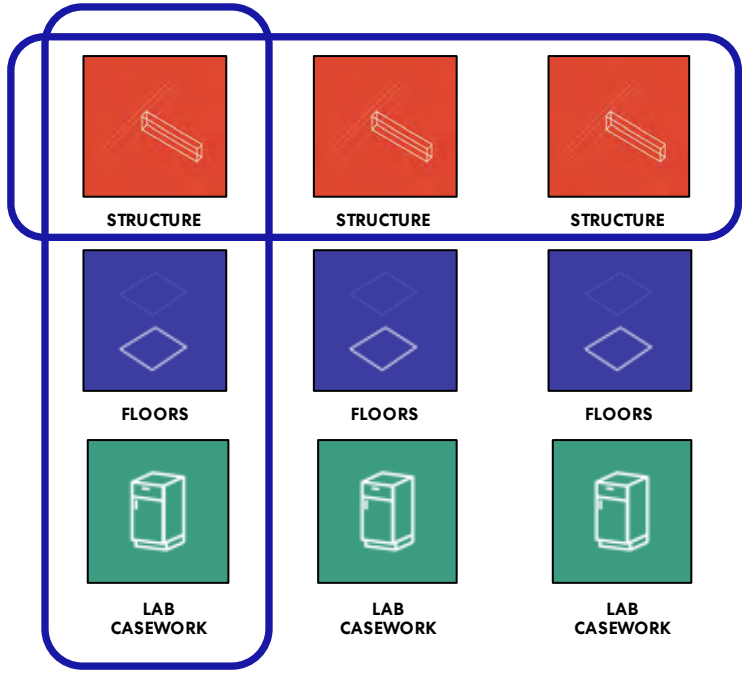
Tally

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.



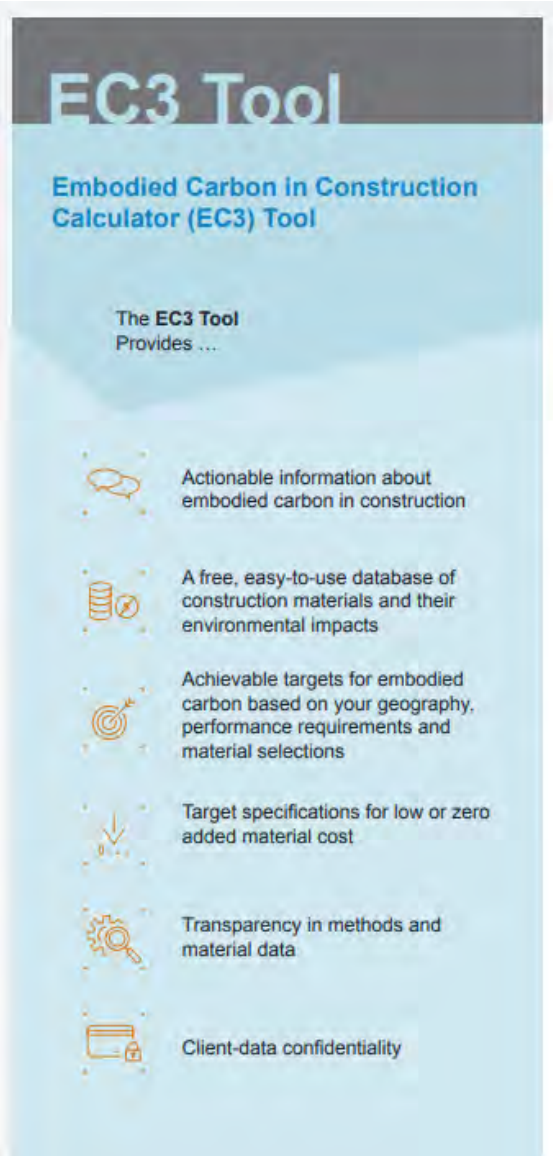
Tally assessment is geared towards whole-building LCA – could not review system by system, to understand individual impact of specific material choice.

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).

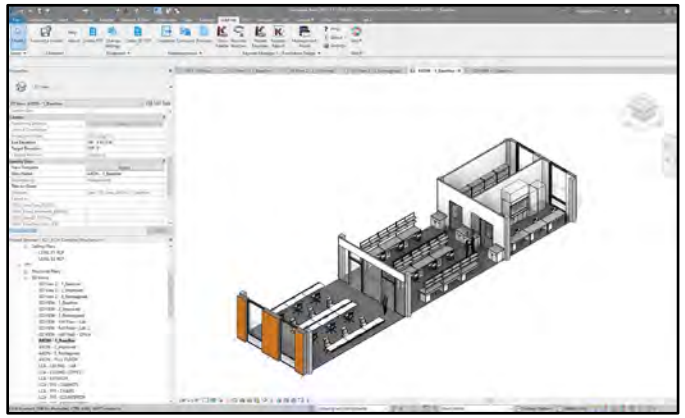
The tool and its subsequent effect on the industry is driving demand for low-carbon solutions and incentivizing construction materials manufacturers and suppliers to invest in disclosure, transparency and material innovations that reduce the carbon emissions of their products.”

- https://carbonleadershipforum.org/what-we-do/initiatives/ec3/

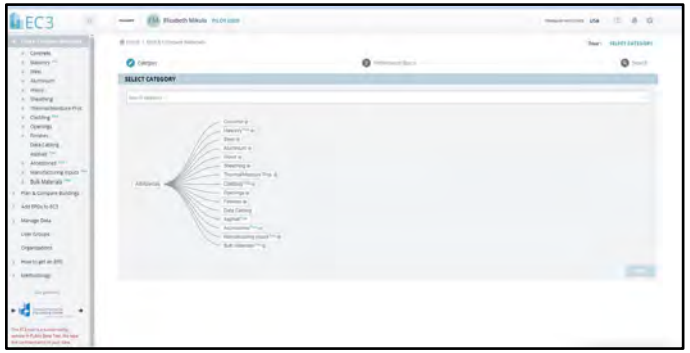


https://buildingtransparency-live-87c7ea3ad4714-809eeaa.divio-media.com/filer_public/61/f3/61f3b402-7627-402b-82ee-3619eb91525e/ec3_product_brief_pdf.pdf

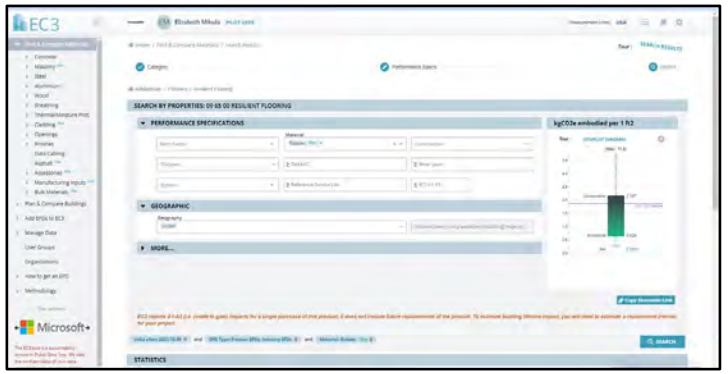
Low Carbon Labs



Model in Revit



Import to EC3 from BIM360



Assign Materials and Compare Options in EC3

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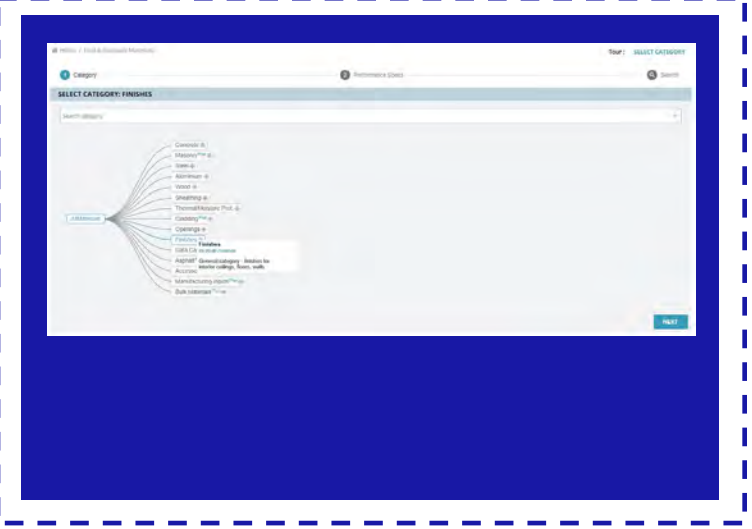
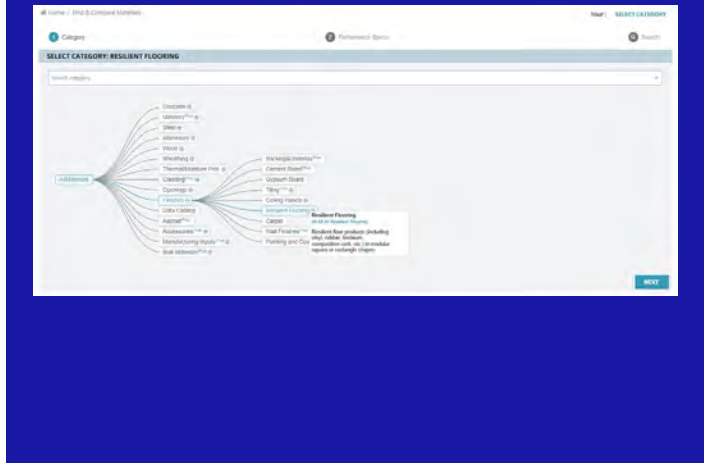
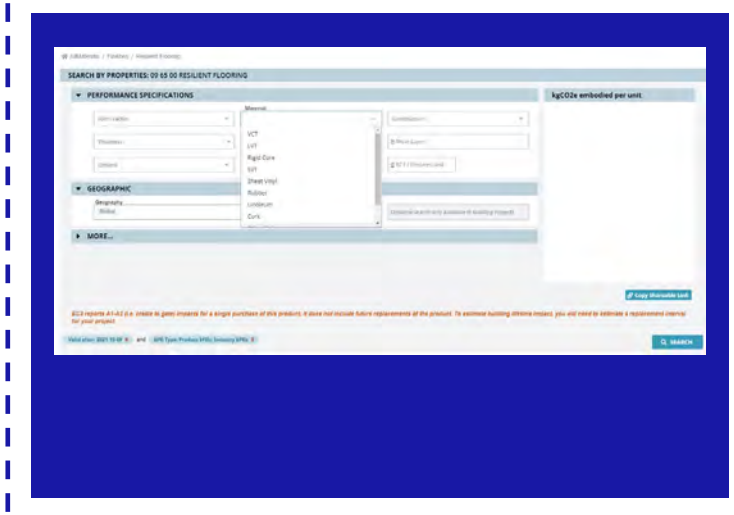


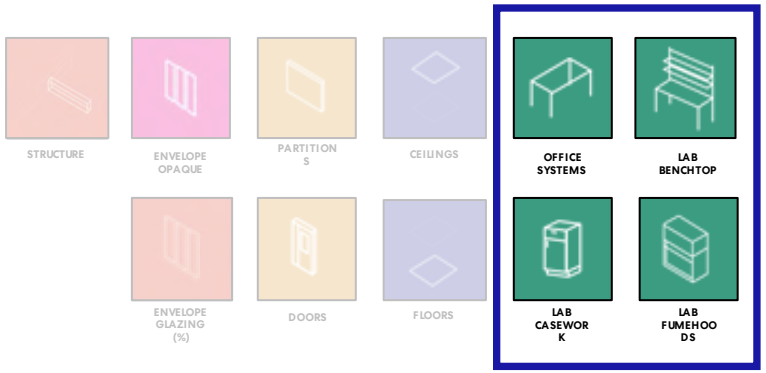
Material Categories currently available in EC3 cover some, but not all categories relevant to an embodied carbon in laboratories analysis. (even with Pilot program access)



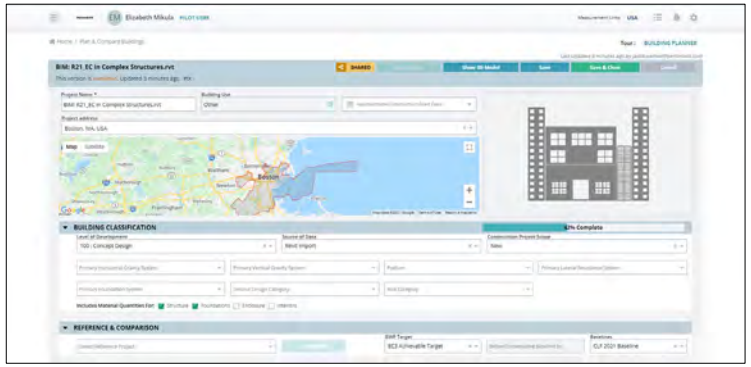


For available categories, material options currently available in EC3 do not yet include the laboratory finishes typically specified.

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.

How We Did It

Method

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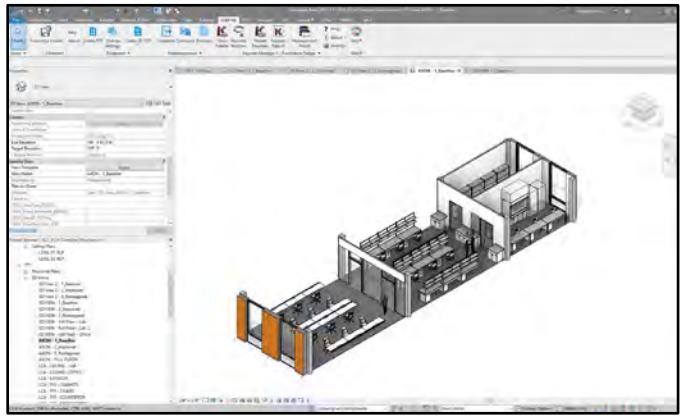
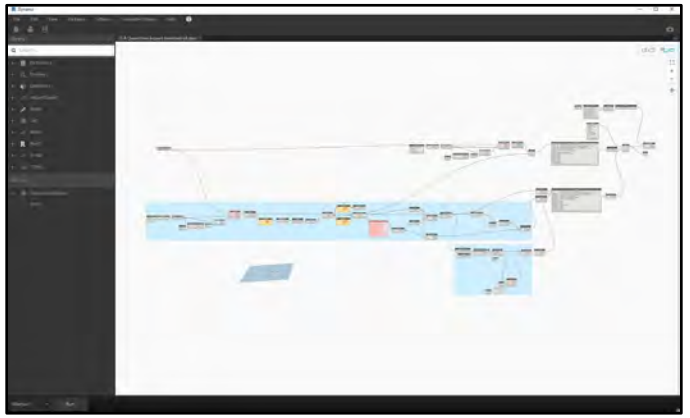


Model in Revit

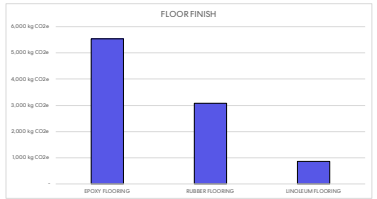


Use Dynamo to Extract Information

Utilize Dynamo script to extract material quantity data

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 Enviroincare Sentica (part of 913 line)	Forbo Marmoleum	None
PCR Name	Part A (IBU/UL v1.2), Part B (IBU) Requirements for floor coverings. UL Part B addendum	IBU Part B: Requirements on the EPD for Floor coverings, version 1.2 02-2018	EN 16810: 2017 Resilient, Textile and Laminate floor coverings - Environmental Product Declarations - Product Category Rules	0
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)	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



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

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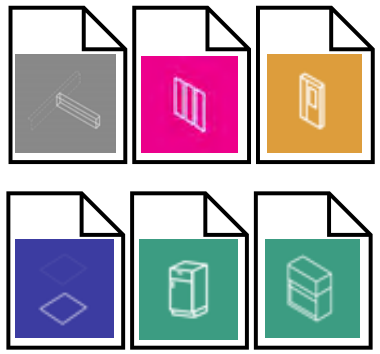
Data flow

Excel File

EPDs



LCA Settings
Biogenic
Module Size

EPD Table

Conversions
Studs, CMU, etc.

Quantity Table

Revit Model

Dynamo

System

System

System

System

System

Summary

Dashboard

I2SL LBT
Operational
Carbon Data

AIA 2030
Operational
Carbon Targets

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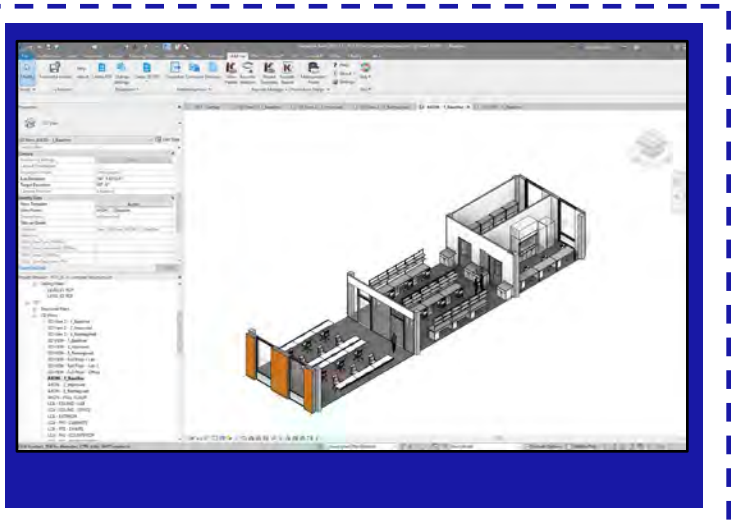
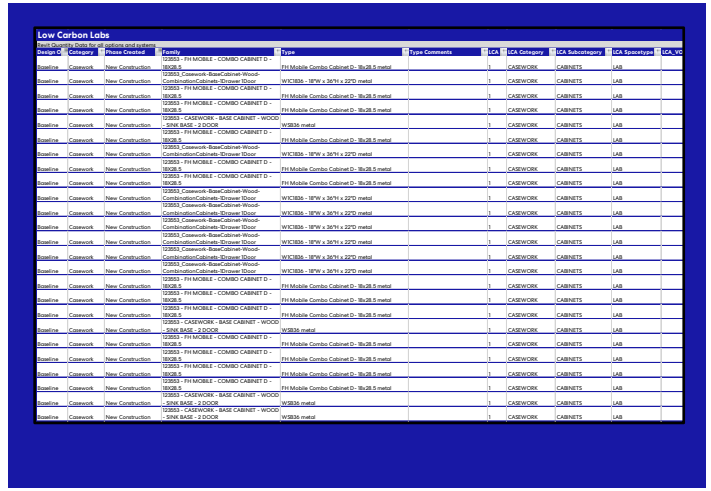


Use module modeled in Revit, to pull relevant material quantity data via Dynamo script.



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

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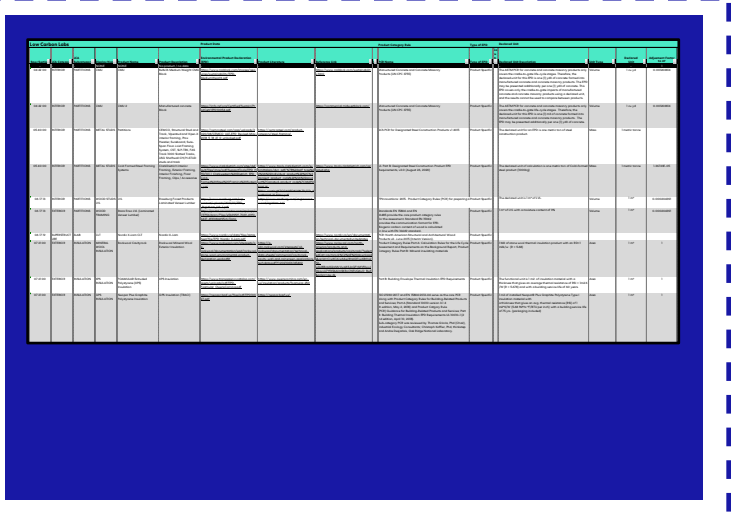
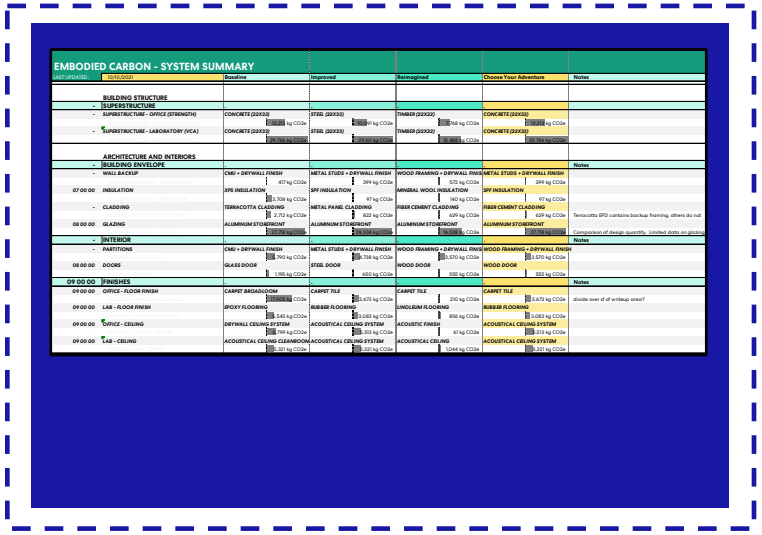


Given the specificity of laboratory material selection, a separate EPD resource was created to reference, listing products typically specified.



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

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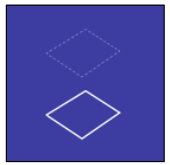
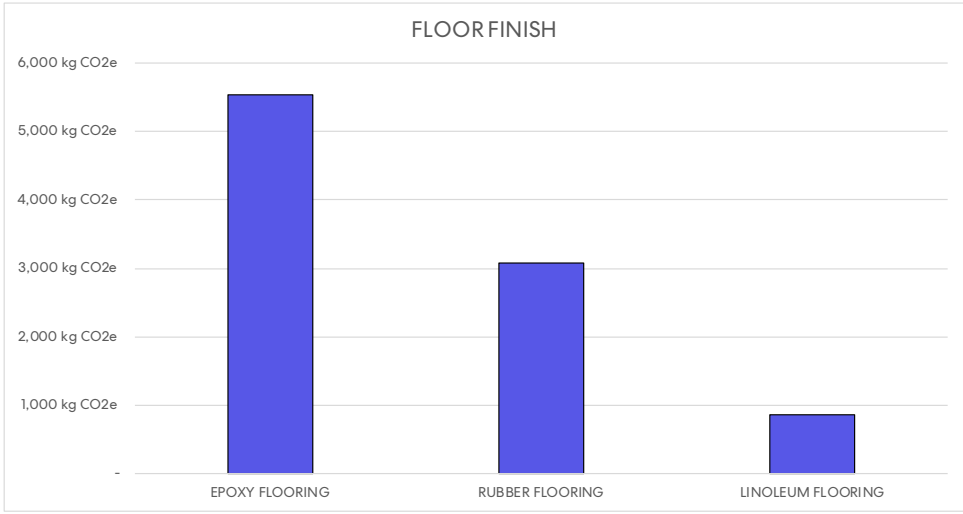
LAB	Baseline	Improved	Reimagined	Alt 1
FLOOR FINISH	EPOXY FLOORING	RUBBER FLOORING	LINOLEUM FLOORING	NONE
Category	*FLOOR FINISH*	*FLOOR FINISH*	*FLOOR FINISH*	*FLOOR FINISH*
EPD	*Dur-A-Flex Epoxy Flooring*	*Noraplan Environcare Sentica (part of 913 line)*	*Forbo Marmoleum*	*None*
PCR Name	Part A (IBU/UL v1.2), Part B (IBU) Requirements for floor coverings. UL Part B addendum	IBU Part B: Requirements on the EPD for Floor coverings, version 1.2 02-2018	EN 16810: 2017 Resilient, Textile and Laminate floor coverings - Environmental Product Declarations - Product Category Rules	0
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 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



Low Carbon Labs

Materials Analyzed

EMBODIED CARBON - SYSTEM SUMMARY

LAST UPDATED:	10/15/2021	Baseline	Improved	Reimagined
	BUILDING STRUCTURE			
-	**Foundations**	.	.	.
Multiple	*FOUNDATIONS*	*CONCRETE*	*CONCRETE WITH CARBON CURE*	*??*
		-	-	-
-	**SUPERSTRUCTURE**	.	.	.
-	*SUPERSTRUCTURE - OFFICE (STRENGTH)*	*CONCRETE (22X33)*	*STEEL (22X33)*	*TIMBER (22X22)*
		13,068 kg CO2e	9,946 kg CO2e	2,541 kg CO2e
-	*SUPERSTRUCTURE - LABORATORY (VCA)*	*CONCRETE (22X33)*	*STEEL (22X33)*	*TIMBER (22X22)*
		29,403 kg CO2e	28,919 kg CO2e	3,630 kg CO2e
	ARCHITECTURE AND INTERIORS			
-	**BUILDING ENVELOPE**	.	.	.
-	*WALL BACKUP*	*CMU + DRYWALL FINISH*	*METAL STUDS + DRYWALL FINISH*	*WOOD FRAMING + DRYWALL FINIS*
		417 kg CO2e	399 kg CO2e	572 kg CO2e
07 00 00	*INSULATION*	*XPS INSULATION*	*SPF INSULATION*	*MINERAL WOOL INSULATION*
		3,708 kg CO2e	97 kg CO2e	140 kg CO2e
-	*CLADDING*	*TERRACOTTA CLADDING*	*METAL PANEL CLADDING*	*FIBER CEMENT CLADDING*
		2,712 kg CO2e	822 kg CO2e	629 kg CO2e
08 00 00	*GLAZING*	*ALUMINUM STOREFRONT*	*ALUMINUM STOREFRONT*	*ALUMINUM STOREFRONT*
		27,718 kg CO2e	28,334 kg CO2e	16,528 kg CO2e
-	**INTERIOR**	.	.	.
-	*PARTITIONS*	*CMU + DRYWALL FINISH*	*METAL STUDS + DRYWALL FINISH*	*WOOD FRAMING + DRYWALL FINIS*
		5,790 kg CO2e	4,738 kg CO2e	3,570 kg CO2e
08 00 00	*DOORS*	*GLASS DOOR*	*STEEL DOOR*	*WOOD DOOR*
		1,195 kg CO2e	650 kg CO2e	555 kg CO2e
09 00 00	**FINISHES**	.	.	.
09 00 00	*OFFICE - FLOOR FINISH*	*CARPET BROADLOOM*	*CARPET TILE*	*CARPET TILE*
		17,905 kg CO2e	3,673 kg CO2e	210 kg CO2e
09 00 00	*LAB - FLOOR FINISH*	*EPOXY FLOORING*	*RUBBER FLOORING*	*LINOLEUM FLOORING*
		5,543 kg CO2e	3,083 kg CO2e	856 kg CO2e
09 00 00	*OFFICE - CEILING*	*DRYWALL CEILING SYSTEM*	*ACOUSTICAL CEILING SYSTEM*	*ACOUSTIC FINISH*
		6,799 kg CO2e	5,513 kg CO2e	61 kg CO2e
09 00 00	*LAB - CEILING*	*ACOUSTICAL CEILING CLEANROOM*	*ACOUSTICAL CEILING SYSTEM*	*ACOUSTICAL CEILING*
		5,321 kg CO2e	5,321 kg CO2e	1,044 kg CO2e
11 00 00	**EQUIPMENT**	.	.	.
11 53 13	*LAB - FUMEHOODS*	*Conventional 100 fpm*	*High Performance 60 fpm*	*Filter Fumehoods*
		12,271 kg CO2e	5,684 kg CO2e	3,560 kg CO2e
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 CO2e
12 00 00	*OFFICE - SYSTEMS*	*SPINE BASED WORKSTATION*	*PANEL BASED WORKSTATION*	*BENCHING*
		31,041 kg CO2e	28,596 kg CO2e	16,919 kg CO2e
12 35 53	*LAB - CASEWORK - CABINETS*	*STEEL SHEET*	*BAMBOO*	*PLYWOOD*
		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*
		-	33 kg CO2e	23 kg CO2e
	CARBON IMPACT OF CHOICES	175,169 kg CO2e	129,893 kg CO2e	48,109 kg CO2e
	MODULE SIZE	1,936 sf	1,936 sf	1,936 sf
	CARBON INTENSITY OF CHOICES	90.5 kg CO2e/sf	67.1 kg CO2e/sf	24.8 kg CO2e/sf
	% REDUCTION	0%	-26%	-73%

Low Carbon Labs

Materials Analyzed

EMBODIED CARBON - SYSTEM SUMMARY

	LAST UPDATED: 10/15/2021	Baseline	Improved	Reimagined
	ARCHITECTURE AND INTERIORS			
-	**BUILDING ENVELOPE**	.	.	.
-	***WALL BACKUP***	***CMU + DRYWALL FINISH***	***METAL STUDS + DRYWALL FINISH***	***WOOD FRAMING + DRYWALL FINIS***
Y	*BUILDING ENVELOPE - WALL BACKUP*	417 kg CO2e	399 kg CO2e	572 kg CO2e
07 00 00	***INSULATION***	***XPS INSULATION***	***SPF INSULATION***	***MINERAL WOOL INSULATION***
Y	*BUILDING ENVELOPE - INSULATION*	3,708 kg CO2e	97 kg CO2e	140 kg CO2e
-	***CLADDING***	***TERRACOTTA CLADDING***	***METAL PANEL CLADDING***	***FIBER CEMENT CLADDING***
Y	*BUILDING ENVELOPE - CLADDING*	2,712 kg CO2e	822 kg CO2e	629 kg CO2e
08 00 00	***GLAZING***	***ALUMINUM STOREFRONT***	***ALUMINUM STOREFRONT***	***ALUMINUM STOREFRONT***
Y	*BUILDING ENVELOPE - GLAZING*	27,718 kg CO2e	28,334 kg CO2e	16,528 kg CO2e
-	**INTERIOR**	.	.	.
-	***PARTITIONS***	***CMU + DRYWALL FINISH***	***METAL STUDS + DRYWALL FINISH***	***WOOD FRAMING + DRYWALL FINIS***
Y	*INTERIOR - PARTITIONS*	5,790 kg CO2e	4,738 kg CO2e	3,570 kg CO2e
08 00 00	***DOORS***	***GLASS DOOR***	***STEEL DOOR***	***WOOD DOOR***
Y	*INTERIOR - DOORS*	1,195 kg CO2e	650 kg CO2e	555 kg CO2e
09 00 00	**FINISHES**	.	.	.
09 00 00	***OFFICE - FLOOR FINISH***	***CARPET BROADLOOM***	***CARPET TILE***	***CARPET TILE***
Y	*FINISHES - OFFICE - FLOOR FINISH*	17,905 kg CO2e	3,673 kg CO2e	210 kg CO2e
09 00 00	***LAB - FLOOR FINISH***	***EPOXY FLOORING***	***RUBBER FLOORING***	***LINOLEUM FLOORING***
Y	*FINISHES - LAB - FLOOR FINISH*	5,543 kg CO2e	3,083 kg CO2e	856 kg CO2e

Low Carbon Labs

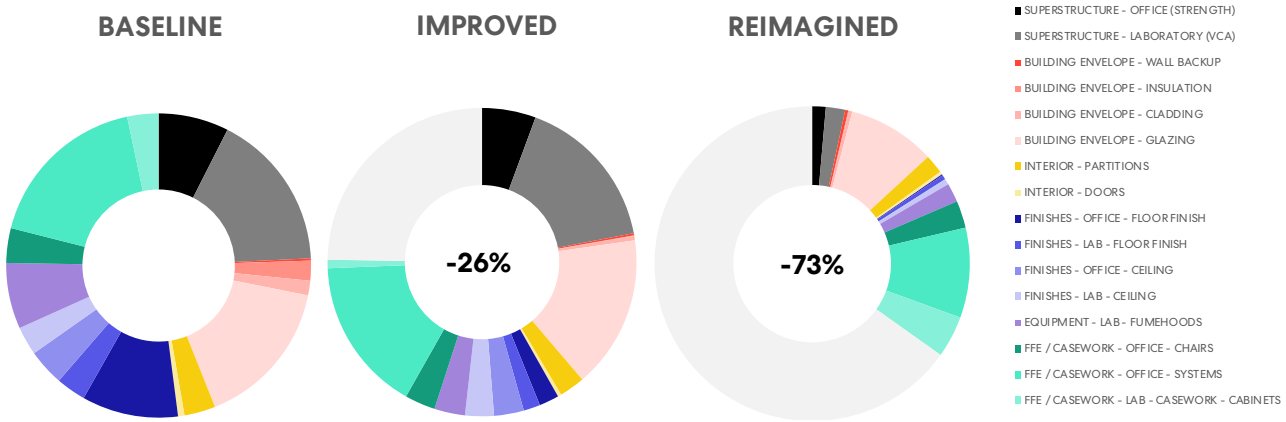
Materials Analyzed

EMBODIED CARBON - SYSTEM SUMMARY				
LAST UPDATED:	10/15/2021	Baseline	Improved	Reimagined
09 00 00	OFFICE - CEILING	DRYWALL CEILING SYSTEM	ACOUSTICAL CEILING SYSTEM	ACOUSTIC FINISH
Y	FINISHES - OFFICE - CEILING	6,799 kg CO2e	5,513 kg CO2e	61 kg CO2e
09 00 00	LAB - CEILING	ACOUSTICAL CEILING CLEANROOM	ACOUSTICAL CEILING SYSTEM	ACOUSTICAL CEILING
Y	FINISHES - LAB - CEILING	5,321 kg CO2e	5,321 kg CO2e	1,044 kg CO2e
11 00 00	EQUIPMENT	.	.	.
11 53 13	LAB - FUMEHOODS	Conventional 100 fpm	High Performance 60 fpm	Filter Fumehoods
Y	EQUIPMENT - LAB - FUMEHOODS	12,271 kg CO2e	5,684 kg CO2e	3,560 kg CO2e
12 00 00	FFE / CASEWORK	.	.	.
12 00 00	OFFICE - CHAIRS	TASK CHAIR	TASK CHAIR	TASK CHAIR
Y	FFE / CASEWORK - OFFICE - CHAIRS	6,468 kg CO2e	5,652 kg CO2e	5,118 kg CO2e
12 00 00	OFFICE - SYSTEMS	SPINE BASED WORKSTATION	PANEL BASED WORKSTATION	BENCHING
Y	FFE / CASEWORK - OFFICE - SYSTEMS	31,041 kg CO2e	28,596 kg CO2e	16,919 kg CO2e
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 CO2e
	CARBON IMPACT OF CHOICES	175,169 kg CO2e	129,893 kg CO2e	48,109 kg CO2e
	MODULE SIZE	1,936 sf	1,936 sf	1,936 sf
	CARBON INTENSITY OF CHOICES	90.5 kg CO2e/sf	67.1 kg CO2e/sf	24.8 kg CO2e/sf
	% REDUCTION	0%	-26%	-73%

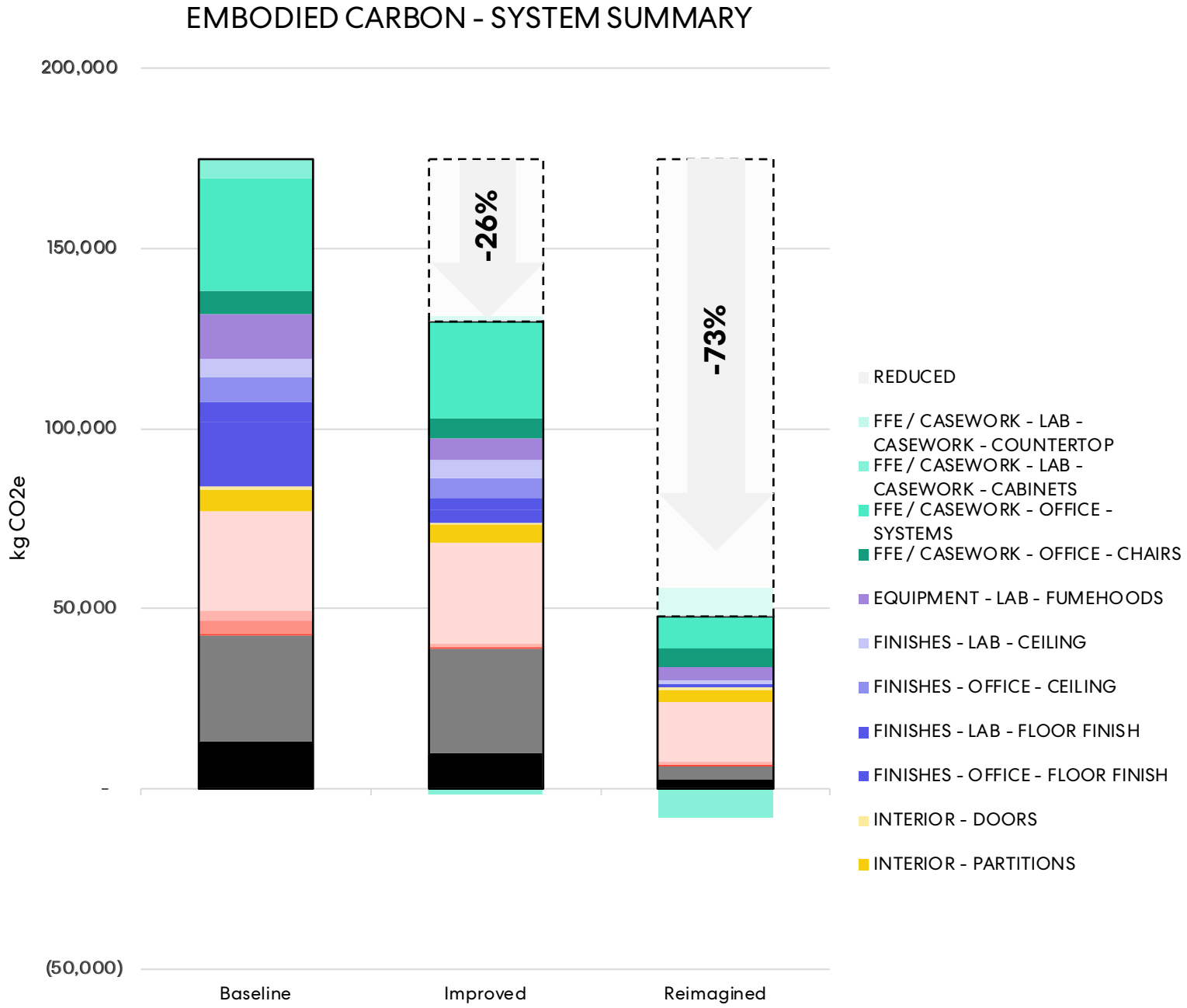
Data Summary

LOW CARBON LABS
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
REDUCED	-	45,276	127,060



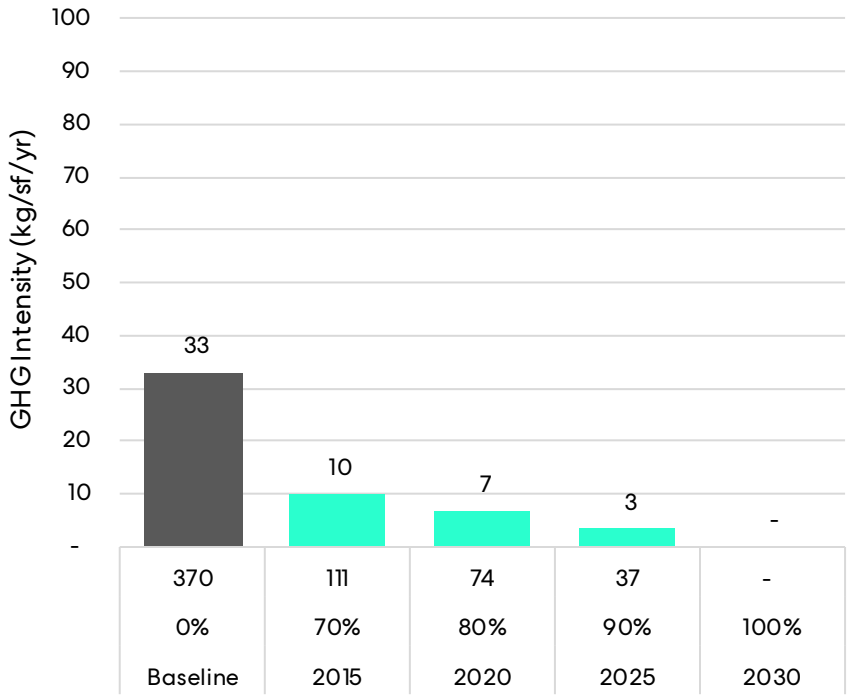
Data Summary



Data Summary

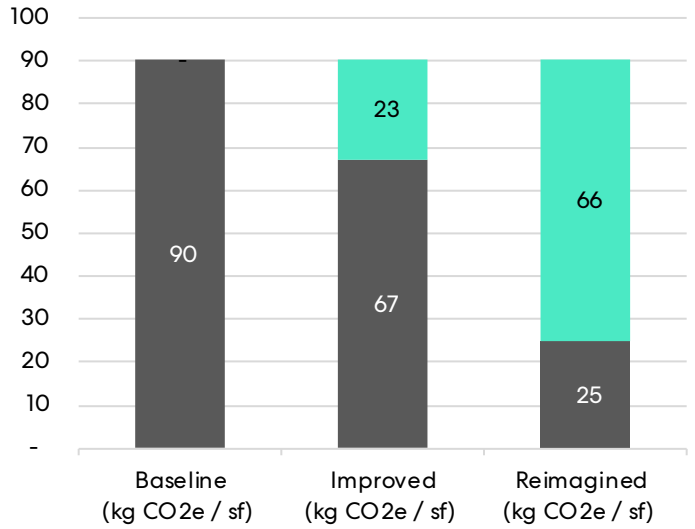
Note: the "module" represents "net" program area of lab space. A real building would contain "gross" areas such as corridors, stairways, mechanical spaces, and storage. These may equate to 35-50% of the total building area included in the operational carbon assessments. So, the comparison of embodied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



9-27 Years of Operation

2-7 Years of Operation Saved

7-20 Years of Operation Saved

Low Carbon Labs

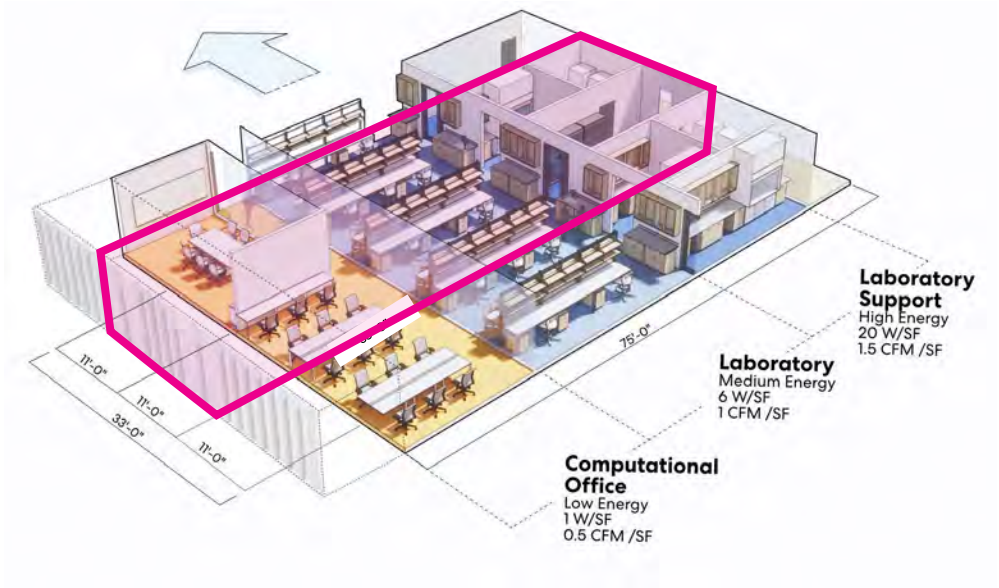
Scope and Strategy

Low Carbon Labs

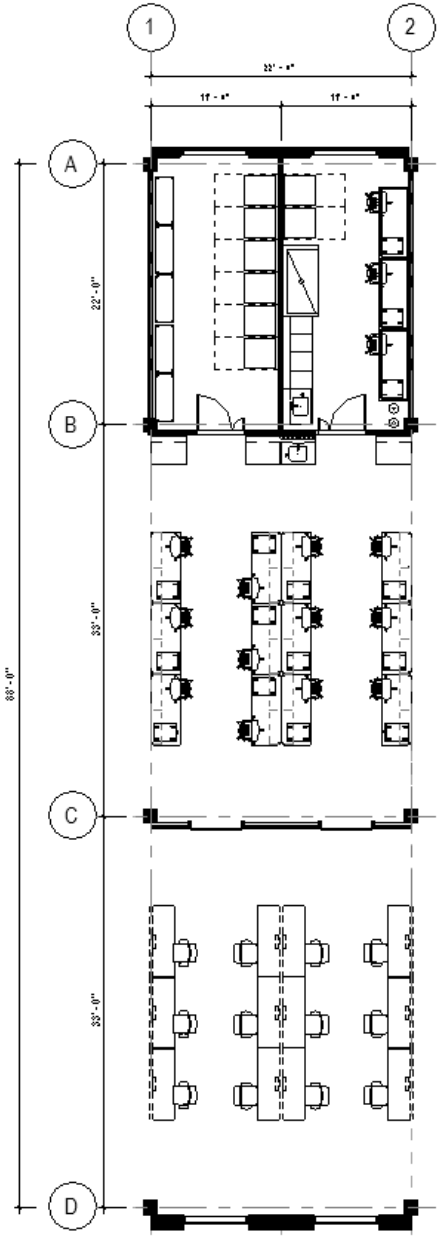
Module for Analysis

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.

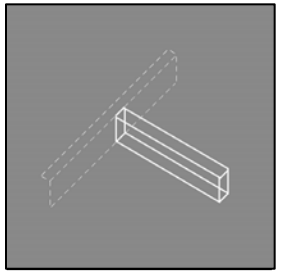


Example Laboratory Building Section



Project Analysis Module

Systems



STRUCTURE

Special thanks to LeMessurier

ENVELOPE OPAQUE

PARTITIONS

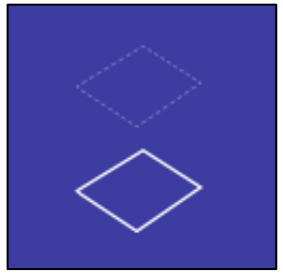
CEILINGS

OFFICE SYSTEMS

LAB BENCHTOP

ENVELOPE GLAZING (%)

DOORS

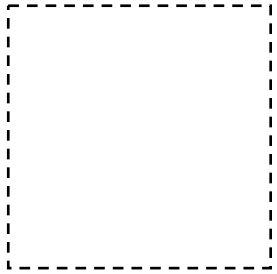


FLOORS

LAB CASEWORK

LAB FUMEHOODS

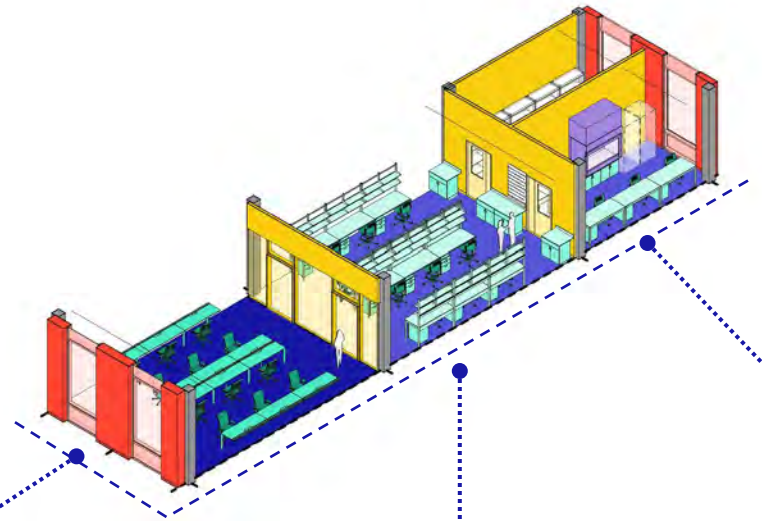
Special thanks to BR+A

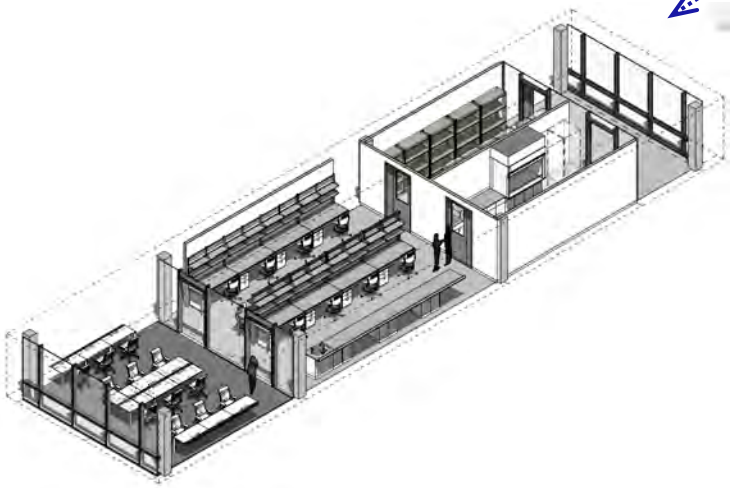


MEP SYSTEMS

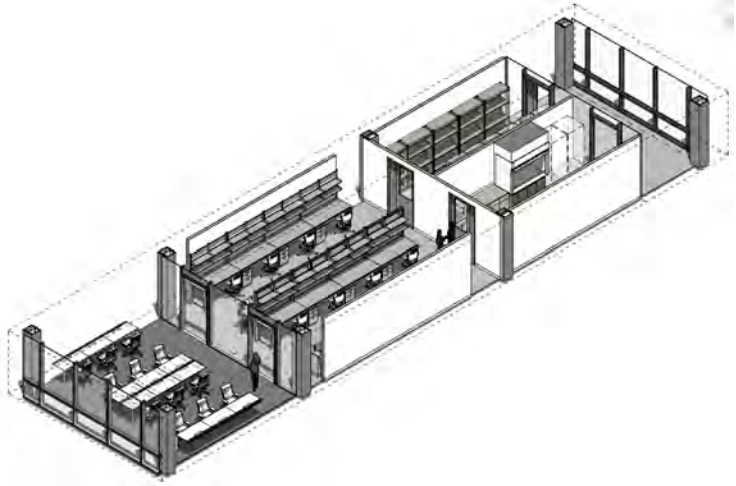
Low Carbon Labs

Scope :
Systems Visualized

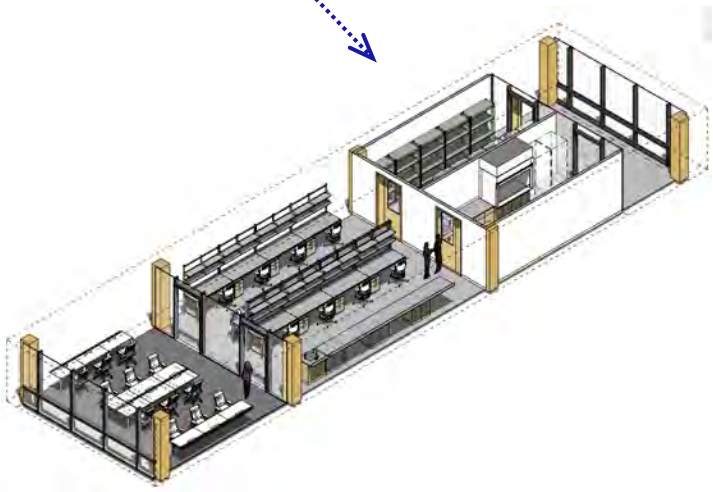




Baseline



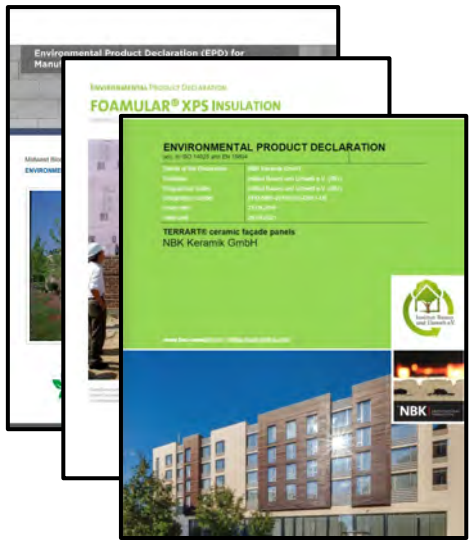
Improved



Reimagined

Low Carbon Labs

ENVELOPE
OPAQUE



CMU + Drywall + XPS Insulation + Terracotta Cladding

Baseline

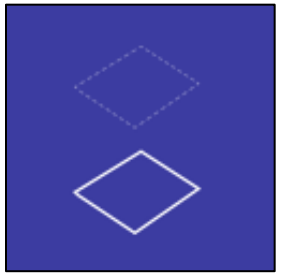
Metal Studs + Drywall + SPF Insulation + Metal Panel Cladding

Improved

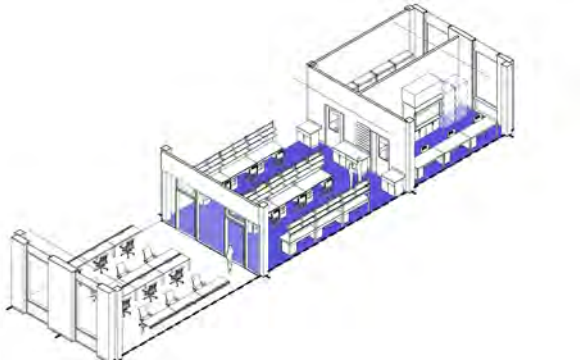
Wood Framing + Drywall + Mineral Wool Insulation + Fiber Cement Cladding

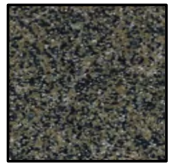
Reimagined

Low Carbon Labs

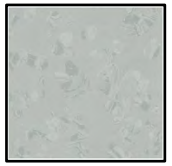


FLOORS (LAB)





Dur-A-Flex Epoxy Flooring



Noraplan Environcare Sentica

Forbo Marmoleum

Epoxy

Baseline

Rubber

Improved

Linoleum

Reimagined

Low Carbon Labs

LAB CASEWORK
(RAW MATERIALS)

Cold Formed Steel Framing

Steel Sheet

Baseline

Flat and Edge Grain Plyboo

Bamboo

Improved

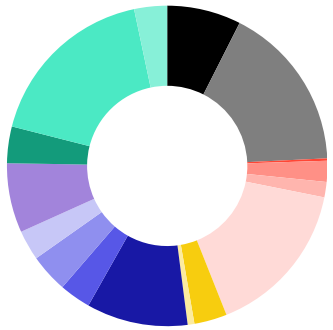
North American Softwood Plywood

Plywood

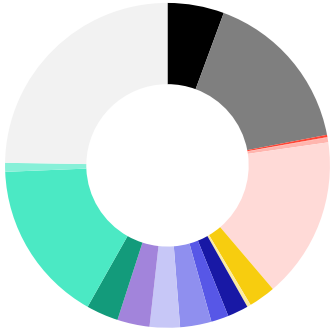
Reimagined

Scenarios

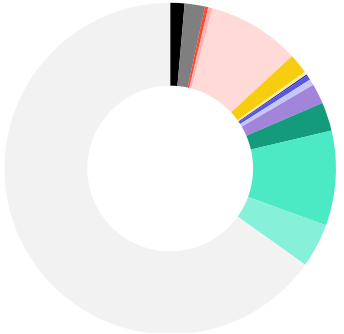
BASELINE



IMPROVED



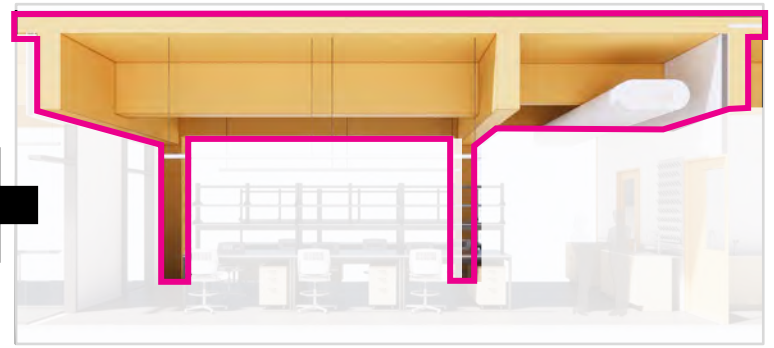
REIMAGINED



Scenarios : Choose your own Adventure

BASELINE
Floor
Ceiling

IMPROVED
Lab casework
Fumehoods



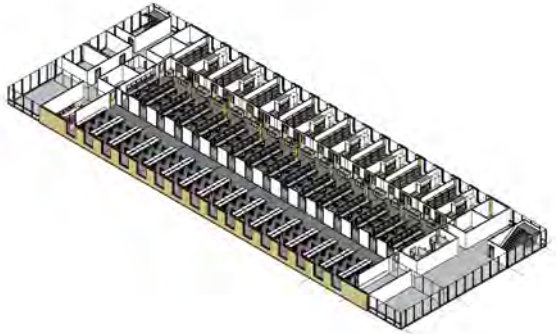
REIMAGINED
Structure

Looking Ahead

Future Research

More Systems

MEP ?
Other systems ?



Expanded Physical Scope

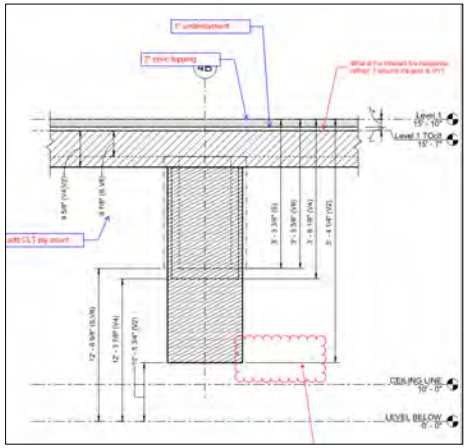
From Module to Floor
From Floor to Building

More Products

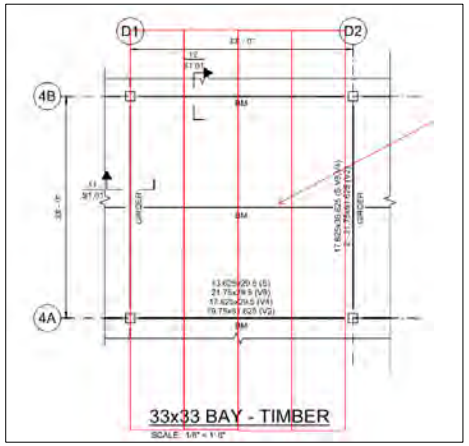
Additional glazing systems
Additional lab casework types

Parallel Research : Structure - LeMessurier

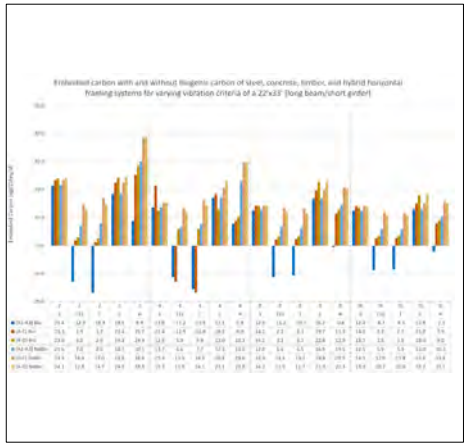
Structural Options
Concrete, Steel, Timber, and Hybrid Scenarios



Structural Fire Resistance
Options for Lab Buildings



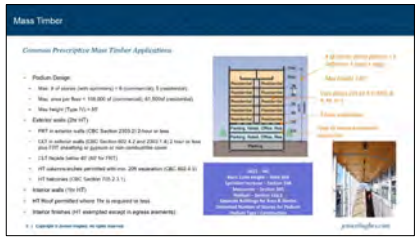
Low Vibration Design
Options for Lab Buildings



Optimization
Fire Resistance, Low Vibration, with Low Carbon Profiles

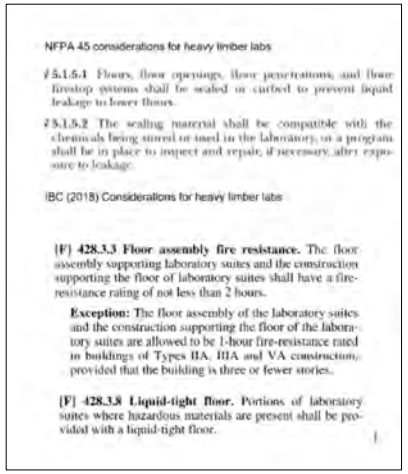
** Preliminary Results*

Parallel Research : Code - Jensen Hughes



Code Pathways Currently Available:

Prescriptive & Performance Based



NFPA 45 considerations for heavy timber labs

5.1.5.1 Floors, floor openings, floor penetrations, and floor firestop systems shall be sealed or curbed to prevent liquid leakage to lower floors.

5.1.5.2 The sealing material shall be compatible with the chemicals being stored or used in the laboratory, or a program shall be in place to inspect and repair, if necessary, after exposure to leakage.

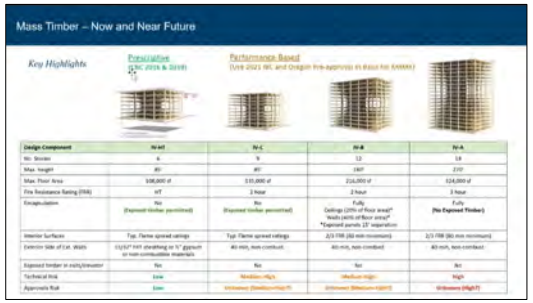
IBC (2018) Considerations for heavy timber labs

[F] 428.3.3 Floor assembly fire resistance. The floor assembly supporting laboratory suites and the construction supporting the floor of laboratory suites shall have a fire-resistance rating of not less than 2 hours.

Exception: The floor assembly of the laboratory suites and the construction supporting the floor of the laboratory suites are allowed to be 1-hour fire-resistance rated in buildings of Types IIA, IIIA and VA construction, provided that the building is three or fewer stories.

[F] 428.3.8 Liquid-tight floor. Portions of laboratory suites where hazardous materials are present shall be provided with a liquid-tight floor.

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

Graphics

Typical Adaptable Lab
Frameworks

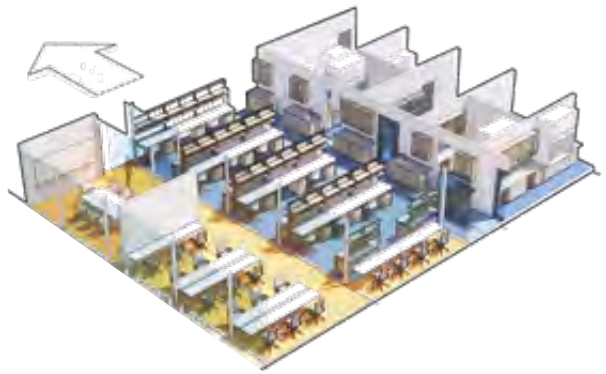
Laminated

Reverse Laminated

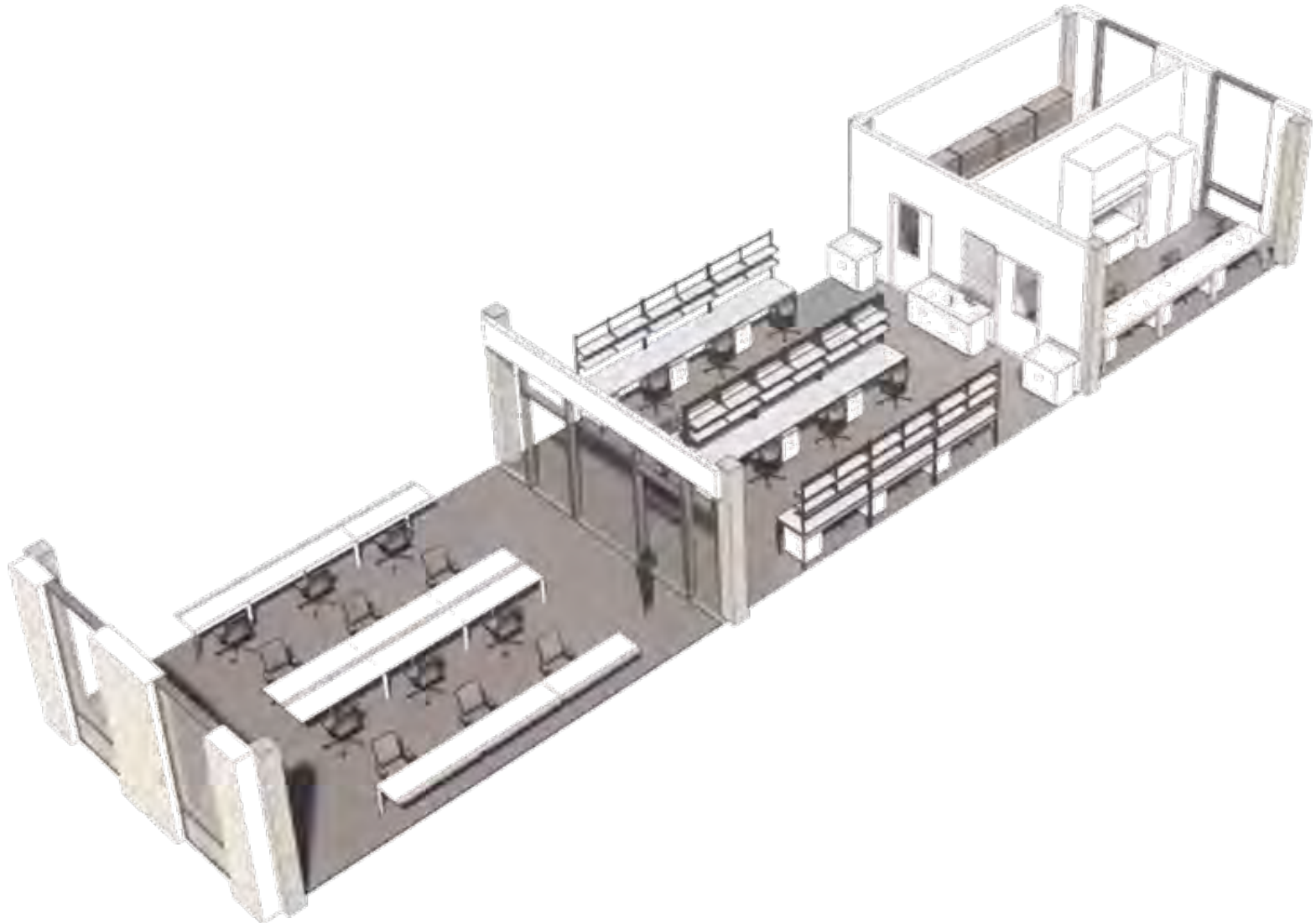
Clustered

Laminated
Wet Lab + Support

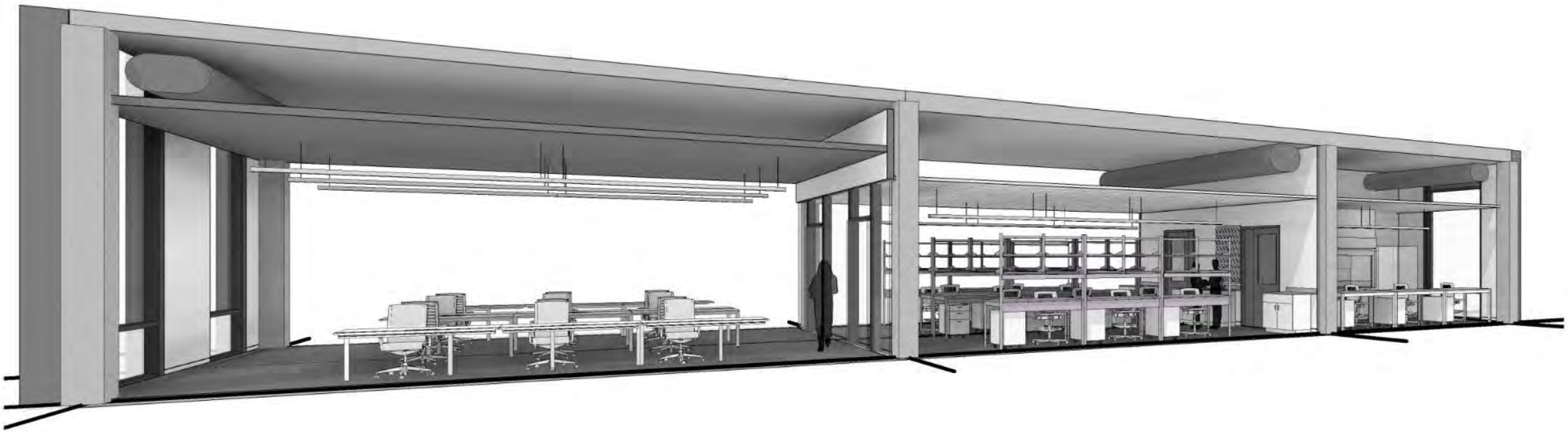
Laminated
Chemistry



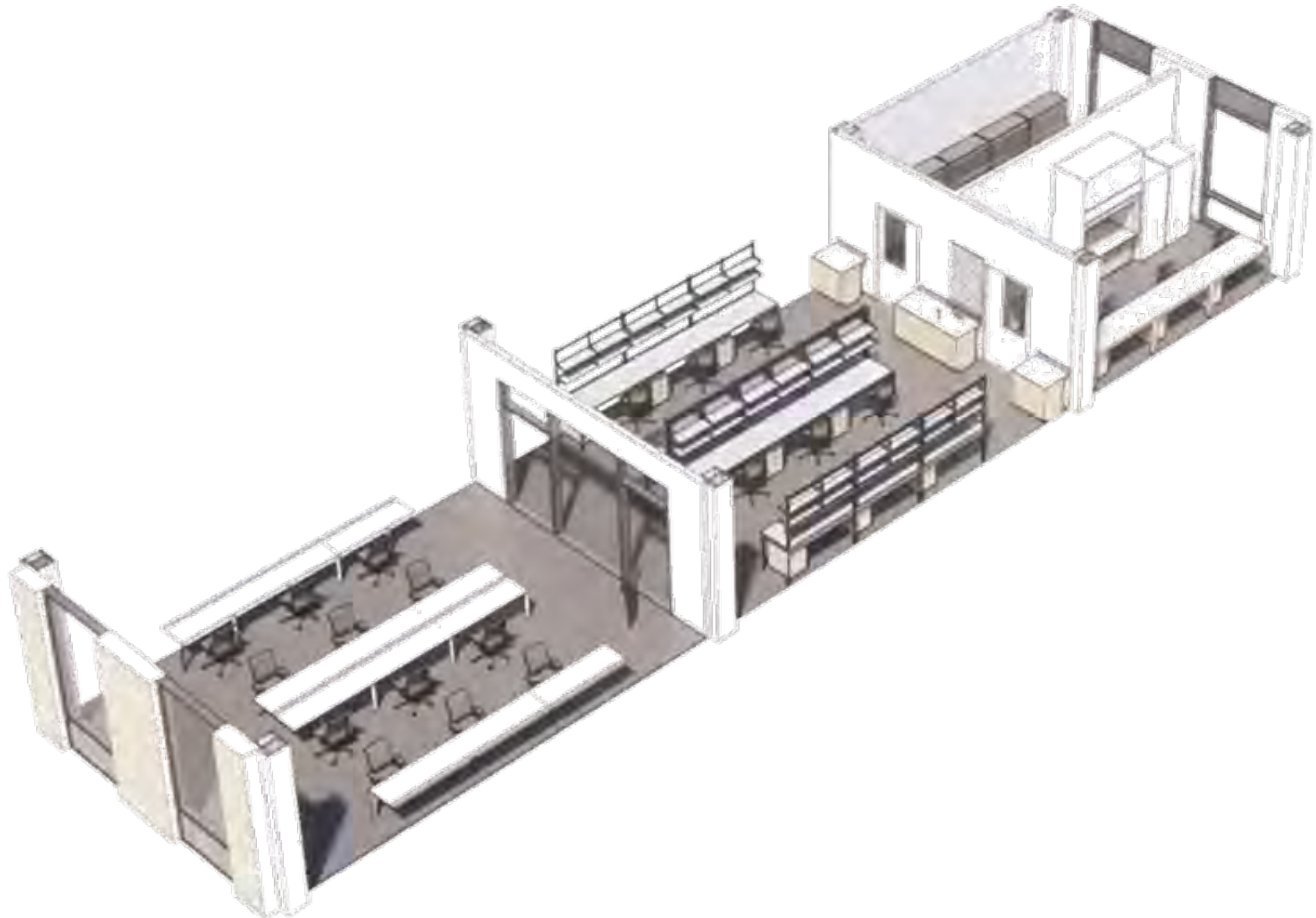
Laminated
Lab + Collaboration



Baseline

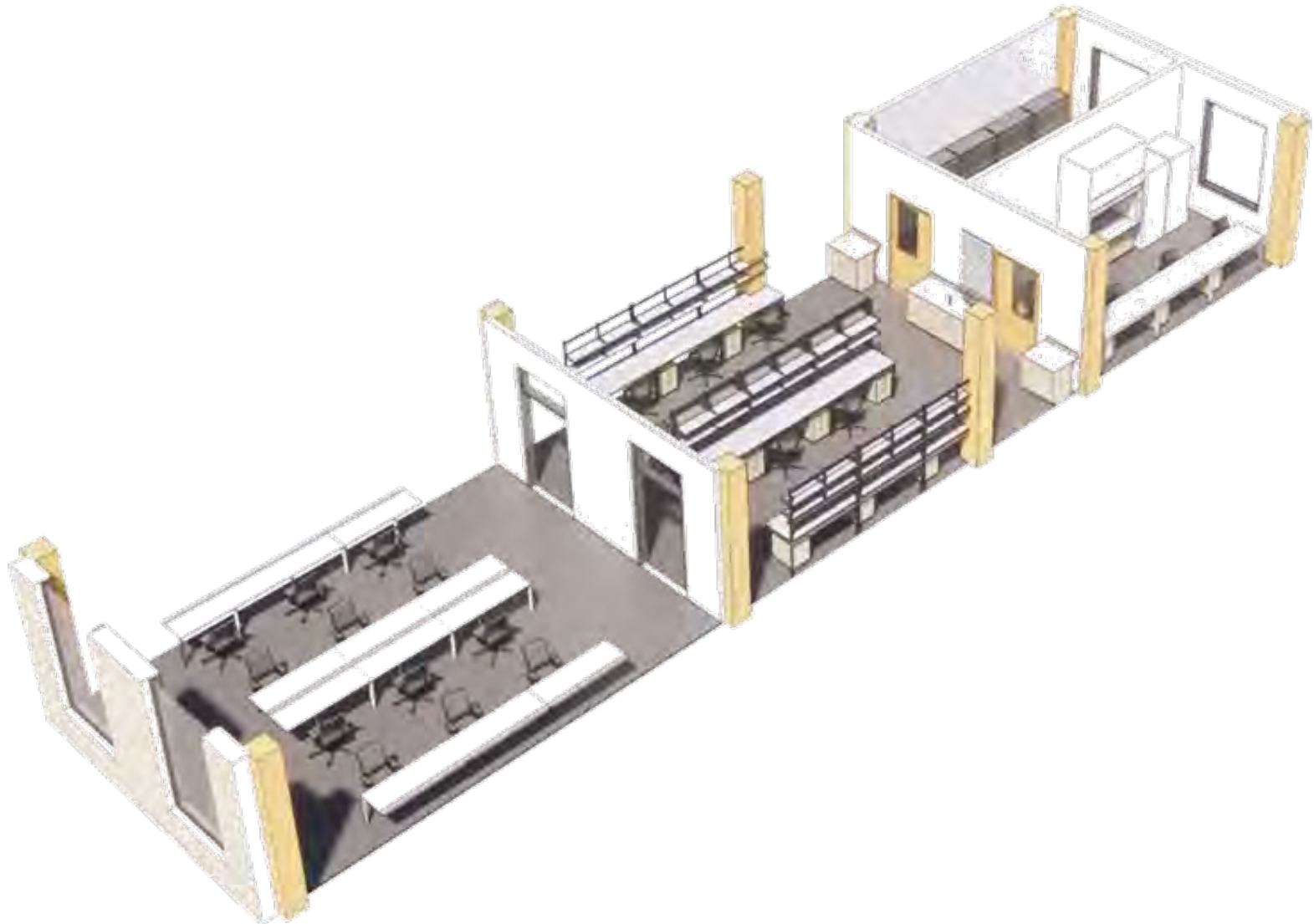


Baseline

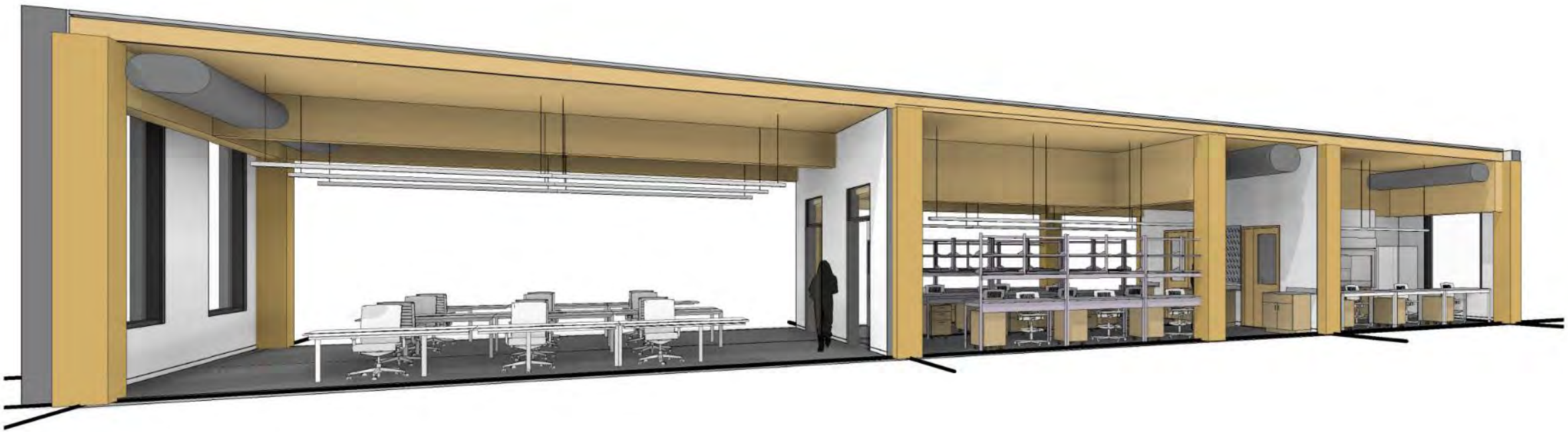


Improved

Improved



Re-Imagined



Re-Imagined

Re-Imagined Laboratory

Re-Imagined Laboratory

Re-Imagined Office / Write Up


Perkins&Will
Thank you!
Innovation Incubator 2021
J. Werner & E. Mikula

Citations for product images

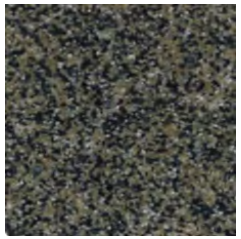
Structure

Structure

Structure

Structure

Flooring



Baseline – Epoxy

https://www.dur-a-flex.com/products/accelera-hq/

6524 Frost Bite

Improved - Rubber

https://www.nora.com/united-states/en/products/noraplan-sentica

Moon stone

Reimagined - Linoleum

https://forbo.blob.core.windows.net/forbodocuments/1136333/2020%20Colorex%20Brochure.pdf

Other

Baseline – Steel Sheet

https://www.scscertified.com/products/cert_pdfs/SCS-EPD-07103_SFIA_052821.pdf

Improved - Plyboo

https://www.plyboo.com/wp-content/uploads/files-migrated/downloads/Smith_Fong_Plyboo_EPD.pdf

Reimagined - Plywood

https://www.awc.org/pdf/greenbuilding/epd/AWC_EPD_NorthAmericanSoftwoodPlywood_20200605.pdf

Low-Carbon Labs

Exploring low embodied carbon design choices for complex building typologies

Volume II : Data Overview

2030 **2020**

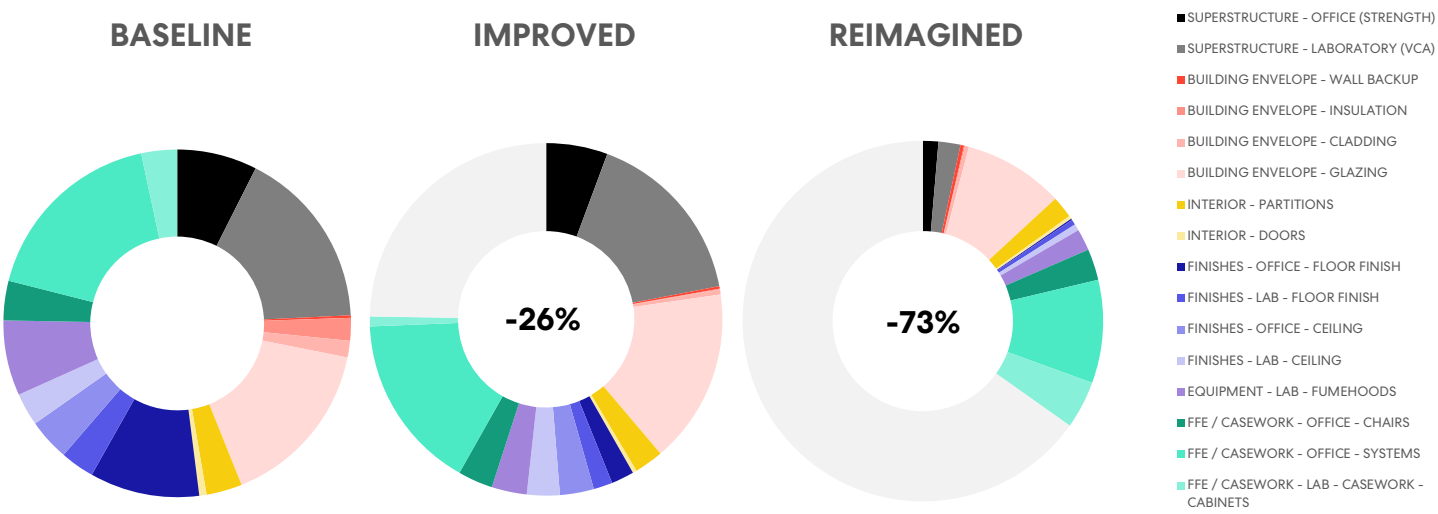
Jacob Werner + Elizabeth Mikula - Innovation Incubator Spring 2021

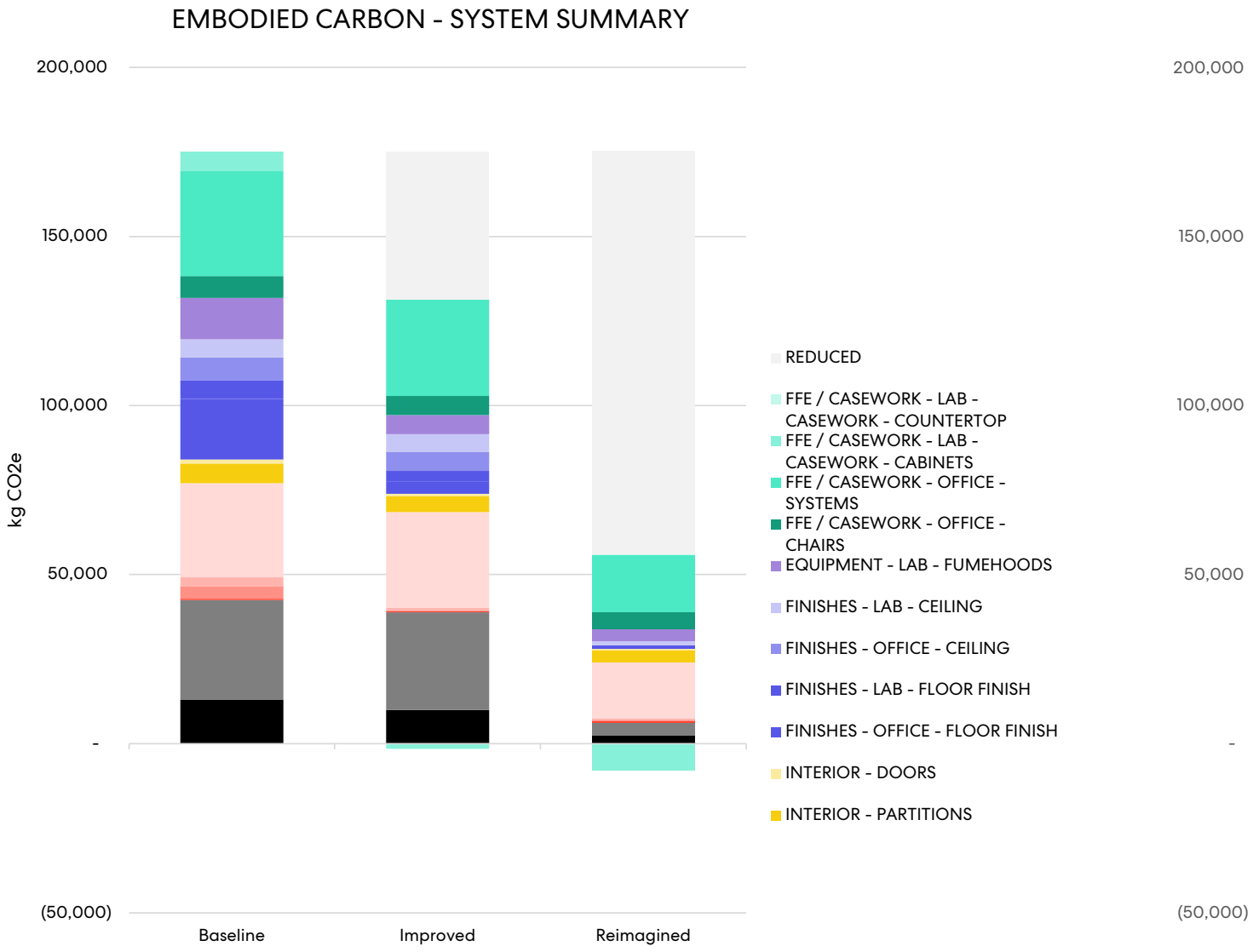
SUMMARY

EMBODIED CARBON - SYSTEM SUMMARY

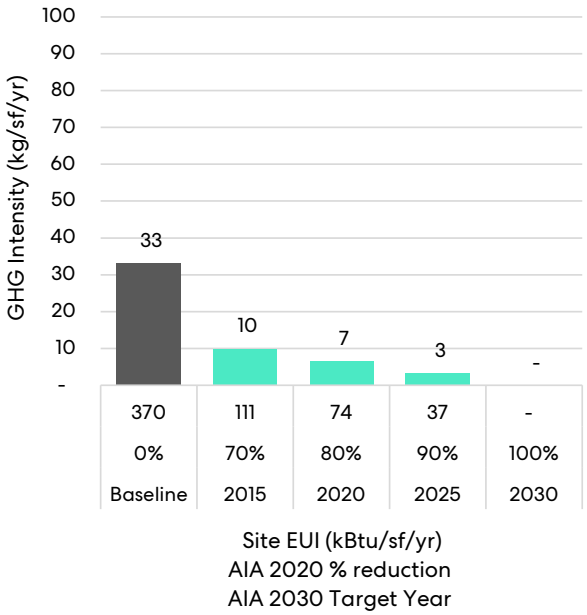
LAST UPDATED: 10/15/2021

		Baseline	Improved	Reimagined
	BUILDING STRUCTURE			
-	**Foundations**	.	.	.
Multiple	*FOUNDATIONS*	*CONCRETE*	*CONCRETE WITH CARBON CURE*	*??*
	FOUNDATIONS	-	-	-
-	**SUPERSTRUCTURE**	.	.	.
-	*SUPERSTRUCTURE - OFFICE (STRENGTH)*	*CONCRETE (22X33)*	*STEEL (22X33)*	*TIMBER (22X22)*
Y	*SUPERSTRUCTURE - OFFICE (STRENGTH)*	13,068 kg CO2e	9,946 kg CO2e	2,541 kg CO2e
-	*SUPERSTRUCTURE - LABORATORY (VCA)*	*CONCRETE (22X33)*	*STEEL (22X33)*	*TIMBER (22X22)*
Y	*SUPERSTRUCTURE - LABORATORY (VCA)*	29,403 kg CO2e	28,919 kg CO2e	3,630 kg CO2e
	ARCHITECTURE AND INTERIORS			
-	**BUILDING ENVELOPE**	.	.	.
-	*WALL BACKUP*	*CMU + DRYWALL FINISH*	*METAL STUDS + DRYWALL FINISH*	*WOOD FRAMING + DRYWALL FINIS*
Y	*BUILDING ENVELOPE - WALL BACKUP*	417 kg CO2e	399 kg CO2e	572 kg CO2e
07 00 00	*INSULATION*	*XPS INSULATION*	*SPF INSULATION*	*MINERAL WOOL INSULATION*
Y	*BUILDING ENVELOPE - INSULATION*	3,708 kg CO2e	97 kg CO2e	140 kg CO2e
-	*CLADDING*	*TERRACOTTA CLADDING*	*METAL PANEL CLADDING*	*FIBER CEMENT CLADDING*
Y	*BUILDING ENVELOPE - CLADDING*	2,712 kg CO2e	822 kg CO2e	629 kg CO2e
08 00 00	*GLAZING*	*ALUMINUM STOREFRONT*	*ALUMINUM STOREFRONT*	*ALUMINUM STOREFRONT*
Y	*BUILDING ENVELOPE - GLAZING*	27,718 kg CO2e	28,334 kg CO2e	16,528 kg CO2e
-	**INTERIOR**	.	.	.
-	*PARTITIONS*	*CMU + DRYWALL FINISH*	*METAL STUDS + DRYWALL FINISH*	*WOOD FRAMING + DRYWALL FINIS*
Y	*INTERIOR - PARTITIONS*	5,790 kg CO2e	4,738 kg CO2e	3,570 kg CO2e
08 00 00	*DOORS*	*GLASS DOOR*	*STEEL DOOR*	*WOOD DOOR*
Y	*INTERIOR - DOORS*	1,195 kg CO2e	650 kg CO2e	555 kg CO2e
09 00 00	**FINISHES**	.	.	.
09 00 00	*OFFICE - FLOOR FINISH*	*CARPET BROADLOOM*	*CARPET TILE*	*CARPET TILE*
Y	*FINISHES - OFFICE - FLOOR FINISH*	17,905 kg CO2e	3,673 kg CO2e	210 kg CO2e
09 00 00	*LAB - FLOOR FINISH*	*EPOXY FLOORING*	*RUBBER FLOORING*	*LINOLEUM FLOORING*
Y	*FINISHES - LAB - FLOOR FINISH*	5,543 kg CO2e	3,083 kg CO2e	856 kg CO2e
09 00 00	*OFFICE - CEILING*	*DRYWALL CEILING SYSTEM*	*ACOUSTICAL CEILING SYSTEM*	*ACOUSTIC FINISH*
Y	*FINISHES - OFFICE - CEILING*	6,799 kg CO2e	5,513 kg CO2e	61 kg CO2e
09 00 00	*LAB - CEILING*	*ACOUSTICAL CEILING CLEANROOM*	*ACOUSTICAL CEILING SYSTEM*	*ACOUSTICAL CEILING*
Y	*FINISHES - LAB - CEILING*	5,321 kg CO2e	5,321 kg CO2e	1,044 kg CO2e
11 00 00	**EQUIPMENT**	.	.	.
11 53 13	*LAB - FUMEHOODS*	*Conventional 100 fpm*	*High Performance 60 fpm*	*Filter Fumehoods*
Y	*EQUIPMENT - LAB - FUMEHOODS*	12,271 kg CO2e	5,684 kg CO2e	3,560 kg CO2e
12 00 00	**FFE / CASEWORK**	.	.	.
12 00 00	*OFFICE - CHAIRS*	*TASK CHAIR*	*TASK CHAIR*	*TASK CHAIR*
Y	*FFE / CASEWORK - OFFICE - CHAIRS*	6,468 kg CO2e	5,652 kg CO2e	5,118 kg CO2e
12 00 00	*OFFICE - SYSTEMS*	*SPINE BASED WORKSTATION*	*PANEL BASED WORKSTATION*	*BENCHING*
Y	*FFE / CASEWORK - OFFICE - SYSTEMS*	31,041 kg CO2e	28,596 kg CO2e	16,919 kg CO2e
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 - COUNTER*	-	33 kg CO2e	23 kg CO2e
	CARBON IMPACT OF CHOICES	175,169 kg CO2e	129,893 kg CO2e	48,109 kg CO2e
	MODULE SIZE	1,936 sf	1,936 sf	1,936 sf
	CARBON INTENSITY OF CHOICES	90.5 kg CO2e/sf	67.1 kg CO2e/sf	24.8 kg CO2e/sf
	% REDUCTION	0%	-26%	-73%

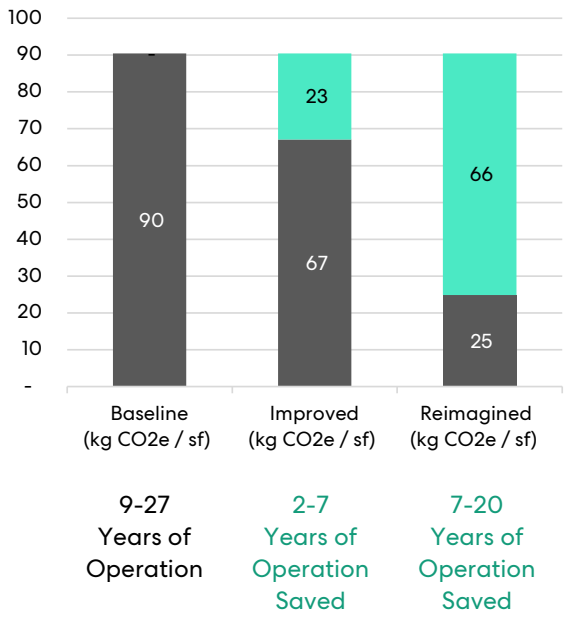

BASELINE
IMPROVED
REIMAGINED
-26%
-73%
SUPERSTRUCTURE - OFFICE (STRENGTH)
SUPERSTRUCTURE - LABORATORY (VCA)
BUILDING ENVELOPE - WALL BACKUP
BUILDING ENVELOPE - INSULATION
BUILDING ENVELOPE - CLADDING
BUILDING ENVELOPE - GLAZING
INTERIOR - PARTITIONS
INTERIOR - DOORS
FINISHES - OFFICE - FLOOR FINISH
FINISHES - LAB - FLOOR FINISH
FINISHES - OFFICE - CEILING
FINISHES - LAB - CEILING
EQUIPMENT - LAB - FUMEHOODS
FFE / CASEWORK - OFFICE - CHAIRS
FFE / CASEWORK - OFFICE - SYSTEMS
FFE / CASEWORK - LAB - CASEWORK - CABINETS


EMBODIED CARBON - SYSTEM SUMMARY
200,000
150,000
100,000
50,000
-
(50,000)
kg CO2e
Baseline
Improved
Reimagined
REDUCED
FFE / CASEWORK - LAB - CASEWORK - COUNTERTOP
FFE / CASEWORK - LAB - CASEWORK - CABINETS
FFE / CASEWORK - OFFICE - SYSTEMS
FFE / CASEWORK - OFFICE - CHAIRS
EQUIPMENT - LAB - FUMEHOODS
FINISHES - LAB - CEILING
FINISHES - OFFICE - CEILING
FINISHES - LAB - FLOOR FINISH
FINISHES - OFFICE - FLOOR FINISH
INTERIOR - DOORS
INTERIOR - PARTITIONS

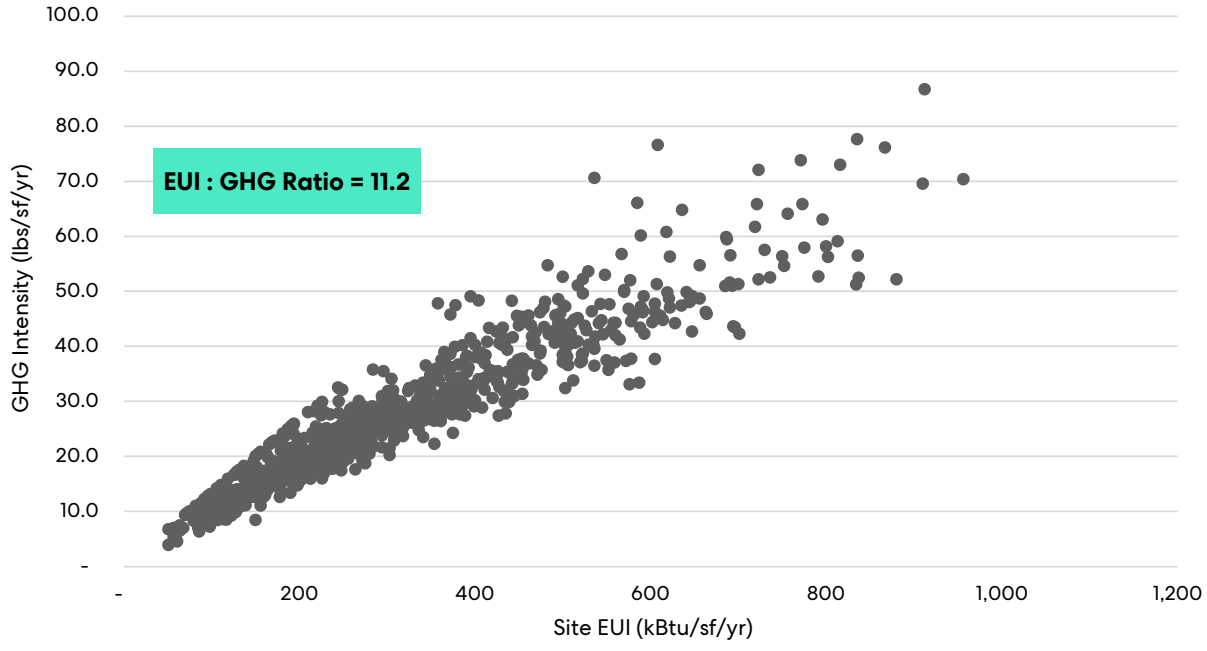
Operational Carbon Intensity Labs

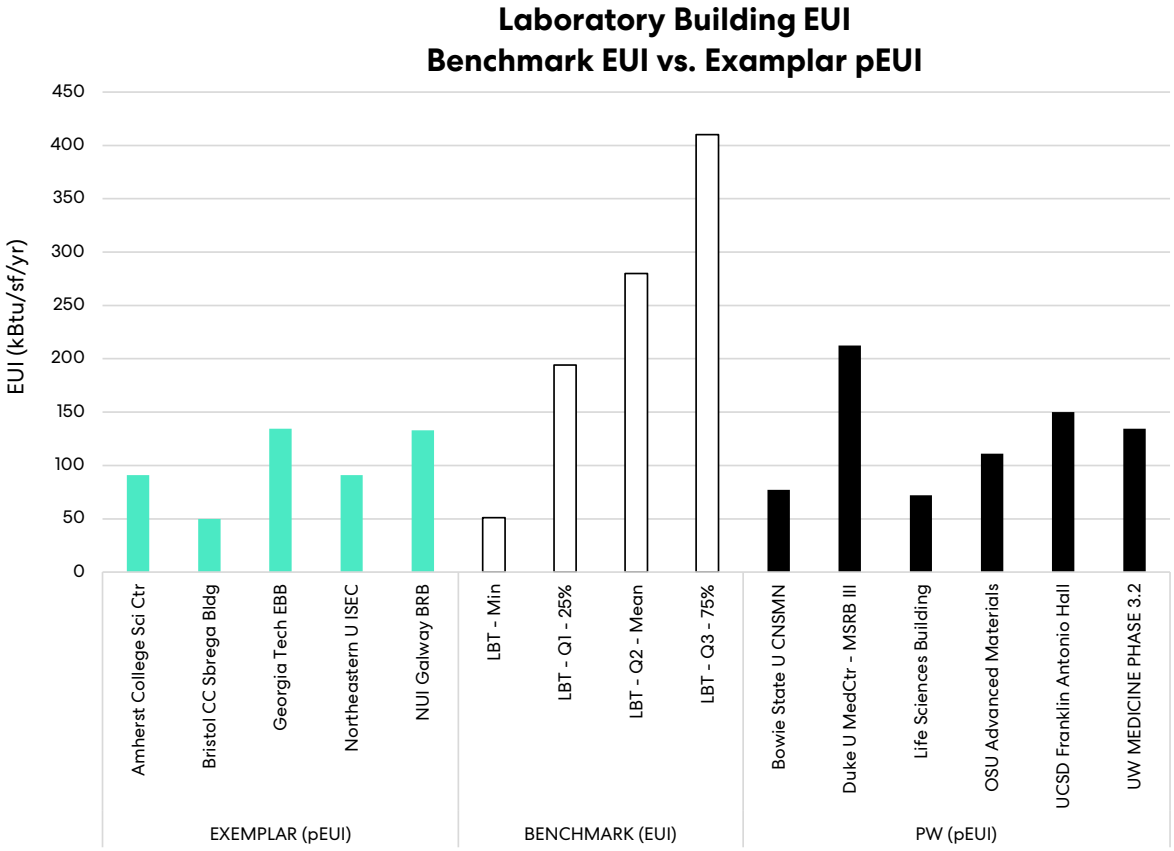


Embodied Carbon Intensity All Design Choices



I2SL LAB BENCHMARKING TOOL




Laboratory Building EUI
Benchmark EUI vs. Examplar pEUI
EUI (kBtu/sf/yr)
450
400
350
300
250
200
150
100
50
0
Amherst College Sci Ctr
Bristol CC Sbrega Bldg
Georgia Tech EBB
Northeastern U ISEC
NUI Galway BRB
LBT - Min
LBT - Q1 - 25%
LBT - Q2 - Mean
LBT - Q3 - 75%
Bowie State U CNSMN
Duke U MedCtr - MSRB III
Life Sciences Building
OSU Advanced Materials
UCSD Franklin Antonio Hall
UW MEDICINE PHASE 3.2
EXEMPLAR (pEUI)
BENCHMARK (EUI)
PW (pEUI)

ASSUMPTIONS

Low Carbon Labs

Basic Assumptions

Last Updated:	9/29/2021	

LCA Settings

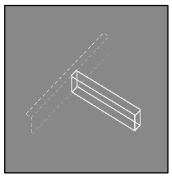
Building Service Life	75	Years
Include Biogenic Carbon ?	Yes	Yes / No

Quantity Takeoff Settings

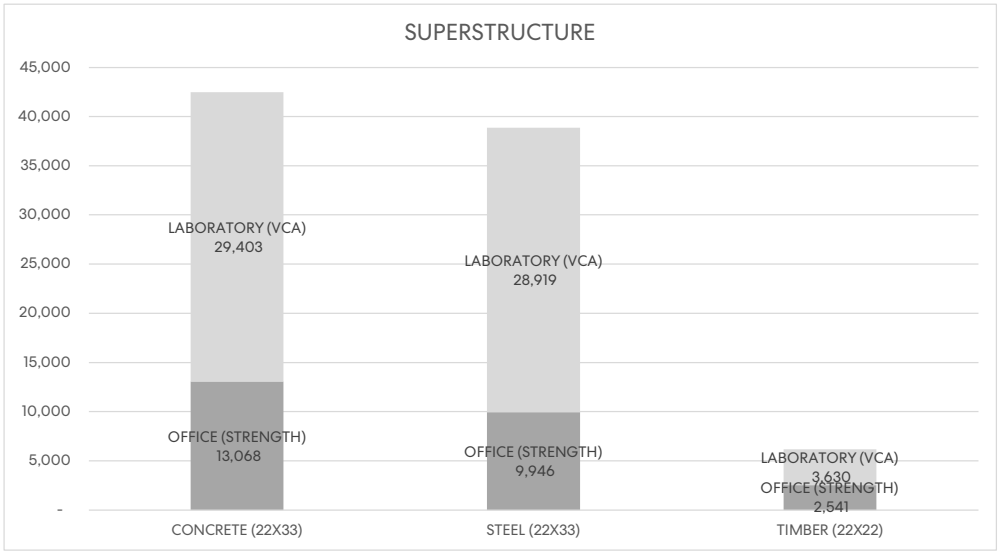
Revit Model Units	ft²	for LCA units conversion
Reference Module		
Grid X dimension	22	Feet
Grid Y dimension	88	Feet
Module Size	1,936	Square Feet
	179.9	Square Meters
# Floors	1	

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	*2 C*	*2 S*	*2 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)	24.3	23.9	3	#N/A
Total Quantity in Module (square feet)	1,210	1,210	1,210	1,210
Total Embodied Carbon (kg CO2e)	29,403	28,919	3,630	#N/A
Total Embodied Carbon (kg CO2e)	42,471 kg CO2e	38,865 kg CO2e	6,171 kg CO2e	#N/A



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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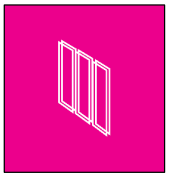
LeMessurier

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	*CMU*	*Cold Formed Steel Framing Systems*	*Stora Enso LVL (Laminated Veneer Lumber)*	*None*
PCR Name	Manuctured Concrete and Concrete Masonry Products (UN CPC 3755)	UL Part B: Designated Steel Construction Product EPD Requirements, v2.0 (August 26, 2020)	Standards EN 15804 and EN 16485 provide the core product category rules 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.	0
EPD Declared Unit	1 cu yd	1 metric tonne	1 m³	-
EPD Scope	A1-A3	A1-A3	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)	-	-	- 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)	0.35 kg CO2e	0.02 kg CO2e	- 0.13 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/m²)	0.35 kg CO2e	0.06 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	*5/8" Gypsum Board*	*5/8" Gypsum Board*	*5/8" Gypsum Board*	*None*
PCR Name	or Environmental Product Declar	or Environmental Product Declar	or Environmental Product Declar	0
EPD Declared Unit	92.9 m²	92.9 m²	92.9 m²	-
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)	0.010764	0.010764	0.010764	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	30 yrs	30 yrs	75 yrs
Replacements in building lifespan	1.5	1.5	1.5	-
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)	30 SM	29 SM	43 SM	-
Total Embodied Carbon (kg CO2e)	417 kg CO2e	399 kg CO2e	572 kg CO2e	-
INSULATION	XPS INSULATION	SPF INSULATION	MINERAL WOOL INSULATION	NONE
Category	*INSULATION*	*INSULATION*	*INSULATION*	*INSULATION*
EPD	*FOAMULAR Extruded Polystyrene (XPS) Insulation*	*Spray Polyurethane Foam Insulation (HFC)*	*Rockwool Cavityrock*	*None*
PCR Name	Envelope Thermal Insulation EPD	nvironment, 2018)- Part B: Buildi	nt and Requirements on the Back	0
EPD Declared Unit	1 m²	1 m²	1 m²	-
EPD Scope	A1-A3	A1-A3	A1-A3	A1-A3
EPD GWP (kg CO2e)	21.9 kg CO2e	3.3 kg CO2e	1.3 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	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)	21.9 kg CO2e	3.3 kg CO2e	1.3 kg CO2e	0.0 kg CO2e
LCA Duration (building lifespan)	75 yrs	75 yrs	75 yrs	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)	3.52	3.52	3.52	3.52
Total Embodied Carbon (kg CO2e/m²)	124 kg CO2e	15 kg CO2e	15 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)	30 SM	29 SM	43 SM	-
Total Embodied Carbon (kg CO2e)	3,708 kg CO2e	97 kg CO2e	140 kg CO2e	-
CLADDING SUBFRAMING	NONE	ALUMINUM FRAMING	ALUMINUM FRAMING	NONE
Category	*CLADDING*	*CLADDING*	*CLADDING*	*CLADDING*
EPD	*None*	*ALUMINUM SPECIALTY PRODUCTS AN INDUSTRY-AVERAGE ENVIRONMENTAL PROFILE*	*ALUMINUM SPECIALTY PRODUCTS AN INDUSTRY-AVERAGE ENVIRONMENTAL PROFILE*	*None*

PCR Name	0	Institute Construction and Environment e.V. (IBU), 2014. PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Metal Ceilings, Version 1.6, 2014. UL Environment Addendum-Product Category Rules for preparing an environmental product declaration (EPD) for PCR: IBU Product Category Rules, Part B: Requirements on the EPD for Metal Ceilings, October 2013, Version 1.2014	Institute Construction and Environment e.V. (IBU), 2014. PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Metal Ceilings, Version 1.6, 2014. UL Environment Addendum-Product Category Rules for preparing an environmental product declaration (EPD) for PCR: IBU Product Category Rules, Part B: Requirements on the EPD for Metal Ceilings, October 2013, Version 1.2014	0
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

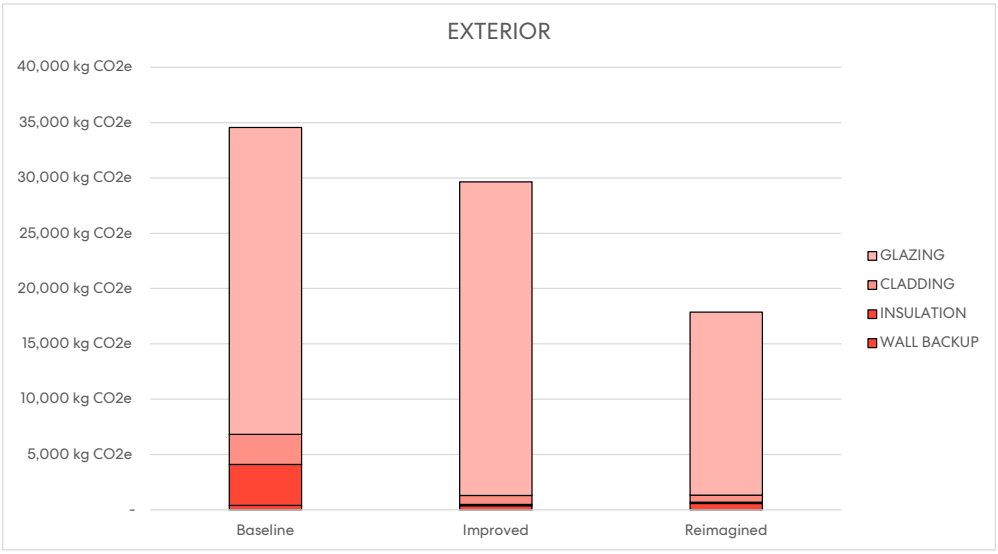
CLADDING	TERRACOTTA CLADDING	METAL PANEL CLADDING	FIBER CEMENT CLADDING	NONE
Category	*CLADDING*	*CLADDING*	*CLADDING*	*CLADDING*
EPD	*Terrart*	*Metal Composite Panel System*	*EQUITONE (Linea / Lunara) fibre cement sheets*	*None*
PCR Name	PCR part B: Requirements relating to the EPD for ceramic panellings, 1.6, 07.2014, Institut Bauen und Umwelt e.V., 2014	UL Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, v2.0 October 23 2018	Fibre cement / Fibre concrete, 07.2014 (PCR checked and approved by the SVR)	0
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	28 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	Gate Window Product Category	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	-



ENVELOPE OPAQUE

ENVELOPE GLAZING (%)



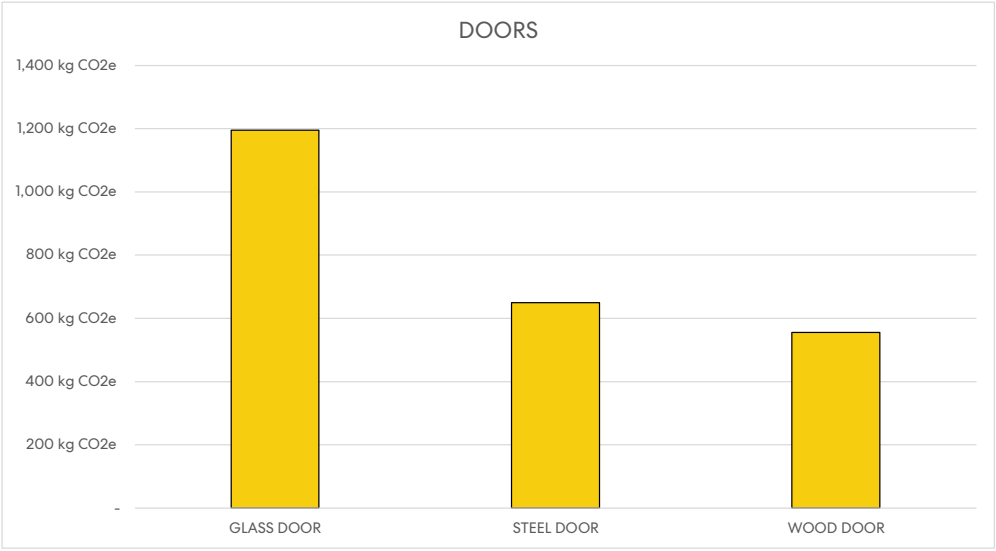
INTERIOR	Baseline	Improved	Reimagined	Alt 1
PARTITIONS	CMU + DRYWALL FINISH	METAL STUDS + DRYWALL	WOOD FRAMING + DRYWALL	NONE + NONE
WALL FRAMING	CMU	METAL STUDS	WOOD FRAMING	NONE
Category	*PARTITIONS*	*PARTITIONS*	*PARTITIONS*	*PARTITIONS*
EPD	*CMU*	*Cold Formed Steel Framing Systems*	*Stora Enso LVL (Laminated Veneer Lumber)*	*None*
PCR Name	Manuctured Concrete and Concrete Masonry Products (UN CPC 3755)	UL Part B: Designated Steel Construction Product EPD Requirements, v2.0 (August 26, 2020)	Standards EN 15804 and EN 16485 provide the core product category rules 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.	0
EPD Declared Unit	1 cu yd	1 metric tonne	1 m³	-
EPD Scope	A1-A3	A1-A3	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)	-	-	- 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)	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	-
INTERIOR FINISH	DRYWALL FINISH	DRYWALL FINISH	DRYWALL FINISH	NONE
Category	*PARTITIONS*	*PARTITIONS*	*PARTITIONS*	*PARTITIONS*
EPD	*5/8" Gypsum Board*	*5/8" Gypsum Board*	*5/8" Gypsum Board*	*None*
EPD Declared Unit	92.9 m²	92.9 m²	92.9 m²	-
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	-
Total Embodied Carbon (kg CO2e/m²)	14 kg CO2e	14 kg CO2e	14 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)	119 SM	129 SM	130 SM	-
Total Embodied Carbon (kg CO2e)	1,610 kg CO2e	1,752 kg CO2e	1,768 kg CO2e	-
GLAZING	INTERIOR GLAZING	INTERIOR GLAZING	INTERIOR GLAZING	NONE
Category	*GLAZING*	*GLAZING*	*GLAZING*	*GLAZING*
EPD	*DIRTT Solid Glass Interior Wall (Savannah)*	*DIRTT Solid Glass Interior Wall (Savannah)*	*DIRTT Solid Glass Interior Wall (Savannah)*	*None*
PCR Name	Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	0
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)	81.0 kg CO2e	81.0 kg CO2e	81.0 kg CO2e	0.0 kg CO2e
Biogenic Carbon (BCRP)	-	-	-	0.0 kg CO2e
Embodied Carbon (kg CO2e)	81.0 kg CO2e	81.0 kg CO2e	81.0 kg CO2e	0.0 kg CO2e
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
Replacements in building lifespan	1.5	1.5	1.5	-
Total Embodied Carbon (kg CO2e/m²)	203 kg CO2e	203 kg CO2e	203 kg CO2e	0 kg CO2e
Total Quantity in Module (m²)	20 SM	15 SM	9 SM	-
Total Embodied Carbon (kg CO2e)	4,139 kg CO2e	2,979 kg CO2e	1,819 kg CO2e	-
Total Embodied Carbon (kg CO2e)	5,790 kg CO2e	4,738 kg CO2e	3,570 kg CO2e	-

PARTITIONS


PARTITIONS
7,000.00 kg CO2e
6,000.00 kg CO2e
5,000.00 kg CO2e
4,000.00 kg CO2e
3,000.00 kg CO2e
2,000.00 kg CO2e
1,000.00 kg CO2e
-
- 1,000.00 kg CO2e
Baseline
Improved
Reimagined
GLAZING
INTERIOR FINISH
WALL FRAMING

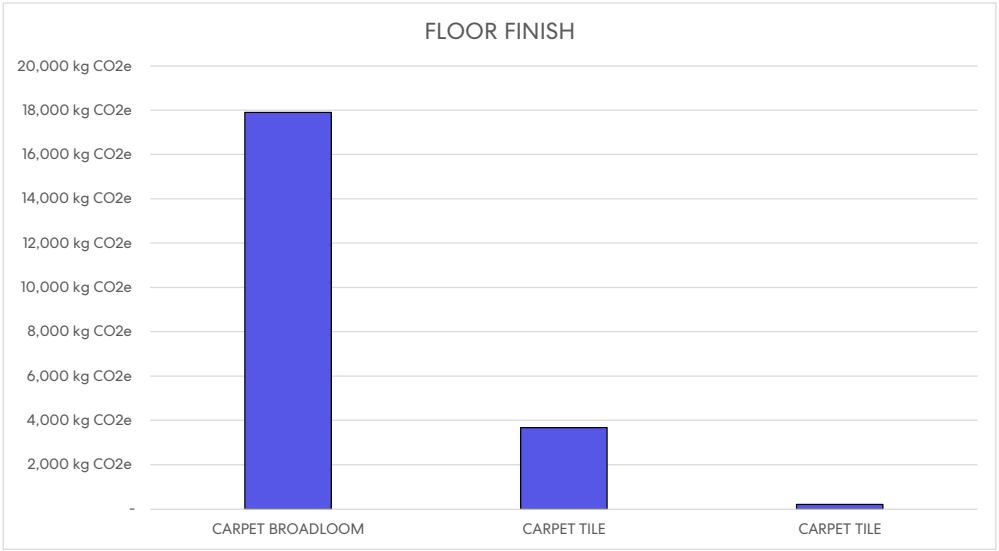
INTERIOR	Baseline	Improved	Reimagined	Alt 1
DOORS	GLASS DOOR	STEEL DOOR	WOOD DOOR	NONE
Category	*DOORS*	*DOORS*	*DOORS*	*DOORS*
EPD	*Optima Aluminum Framed Doors*	*Assa Abloy Regent and Omega Doors*	*Eggers Industries - Architectural Wood Door Leaf*	*None*
PCR Name	The CEN standard EN 15804 serves as the core PCR	Commercial Steel Doors and/or Frames 9005	PCR for preparing an EPD for interior architectural wood door leaves ASTM, 2015	0
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	-
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

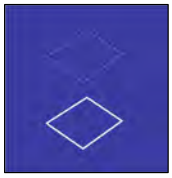


OFFICE	Baseline	Improved	Reimagined	Alt 1
FLOOR FINISH	CARPET BROADLOOM	CARPET TILE	CARPET TILE	NONE
Category	*FLOOR FINISH*	*FLOOR FINISH*	*FLOOR FINISH*	*FLOOR FINISH*
EPD	*Mohawk Tufted Nylon Carpet on Weldlok Onguard Backing*	*Mohawk Ecoflex Matrix Modular Carpet Tiles*	*INTERFACE CQUEST BIOX*	*None*
PCR Name	UL Product Category Rule (PCR) Guidence for Building-Related Products and Serivces Part B: Flooring EPD Requirements v.2.0 September 2018	UL Product Category Rule (PCR) Guidence for Building-Related Products and Serivces Part B: Flooring EPD Requirements v.2.0 September 2018	Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.2, 2018 Part B: Flooring EPD Requirements, Version 2.0, 2018	0
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	-

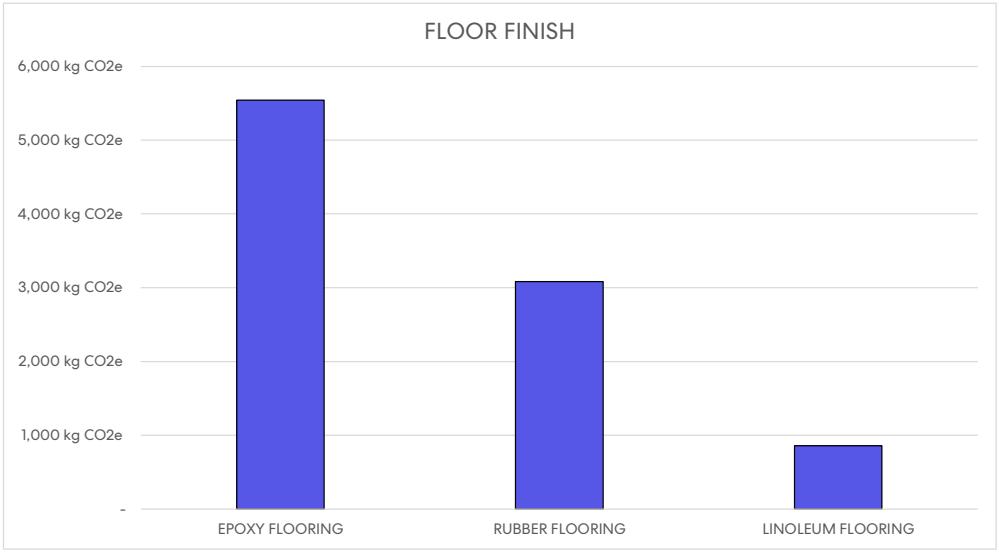
FLOORS



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) Requirements for floor coverings. UL Part B addendum	IBU Part B: Requirements on the EPD for Floor coverings, version 1.2 02-2018	EN 16810: 2017 Resilient, Textile and Laminate floor coverings - Environmental Product Declarations - Product Category Rules	0
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	1 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	-

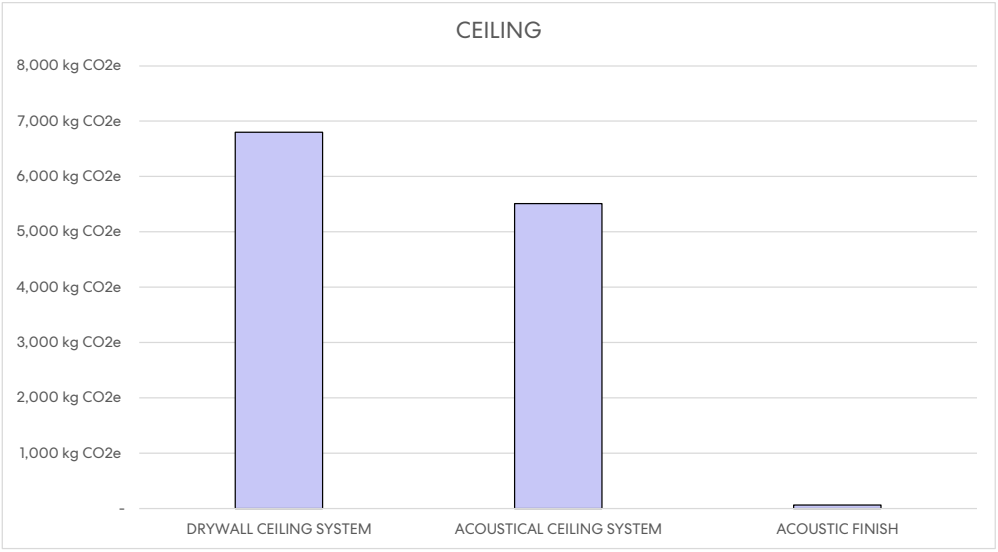


FLOORS



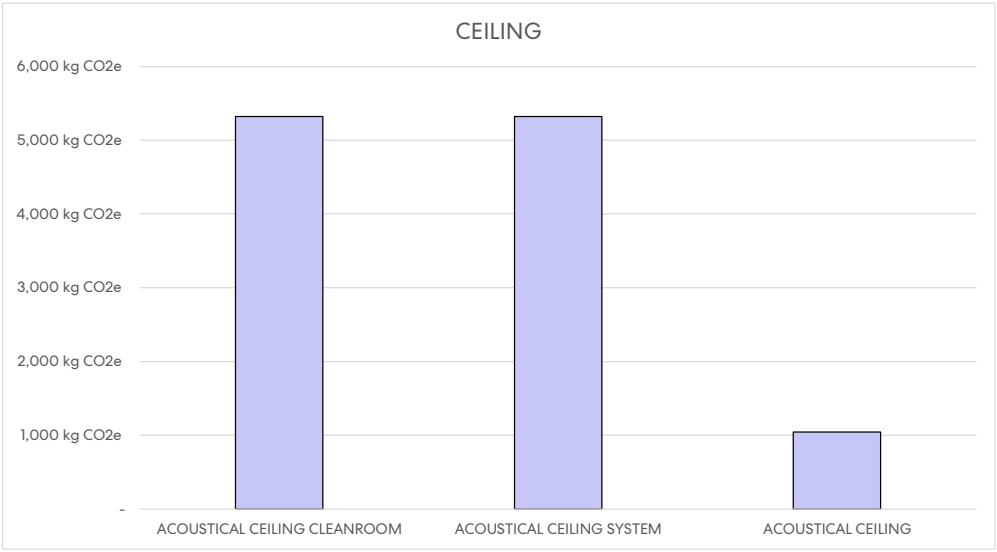
OFFICE	Baseline	Improved	Reimagined	Alt 1
CEILING	DRYWALL CEILING SYSTEM	ACOUSTICAL CEILING SYSTEM	ACOUSTIC FINISH	NONE
Category	*CEILING*	*CEILING*	*CEILING*	*CEILING*
EPD	*USG Ensemble*	*Armstrong Ultima Ceiling*	*International Cellulose K-13*	*None*
PCR Name	NSF International PCR for Gypsum Panel Products, v1.1 April 23 2020	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 Reauirements". October 2015v1.	Product Category Rules (PCR) Guidance for Building-Related Products and Services Part B: Building Envelope Thermal Insulation EPD Requirements	0
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	-
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 CLEANROOI	ACOUSTICAL CEILING SYSTEM	ACOUSTICAL CEILING	NONE
Category	*CEILING*	*CEILING*	*CEILING*	*CEILING*
EPD	*Armstrong Clean Room FL Ceiling Panels*	*Armstrong Calla Ceiling Panels*	*Armstrong Optima Ceiling Panels*	*None*
PCR Name	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 Reauirements". October 2015v1.	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 Reauirements". October 2015v1.	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 Reauirements". October 2015v1.	0
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
FUMEHOODS	*Conventional 100 fpm*	*High Performance 60 fpm*	*Filter 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	3,560 kg CO2e	

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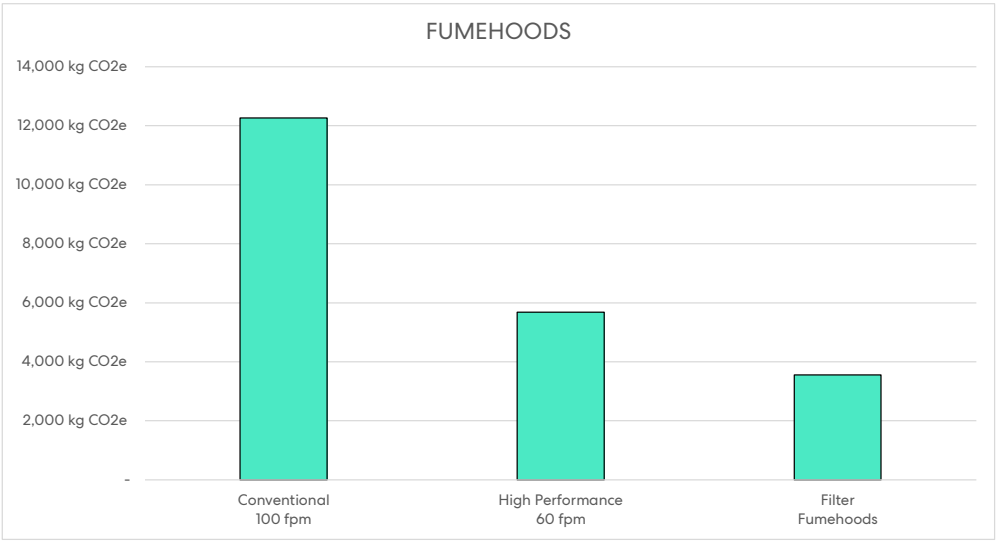
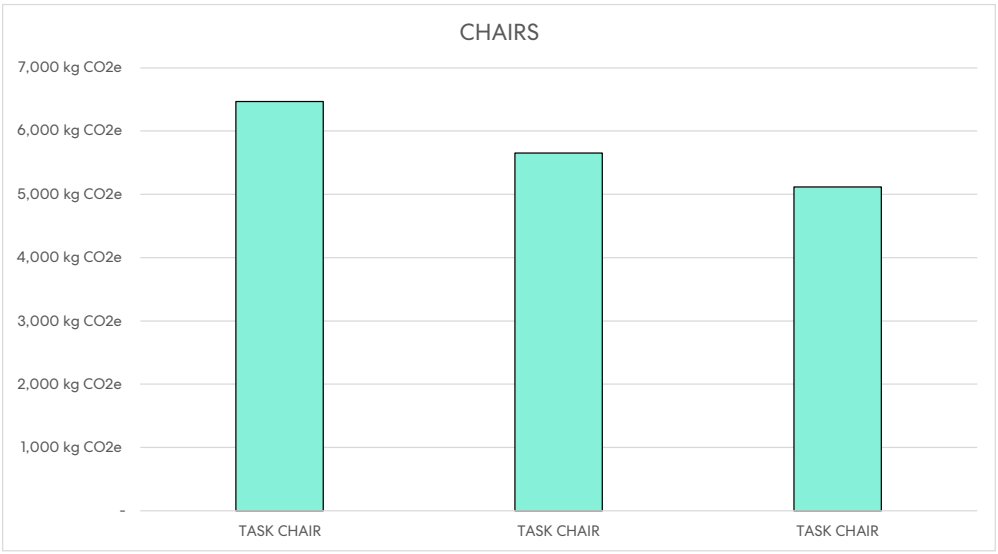


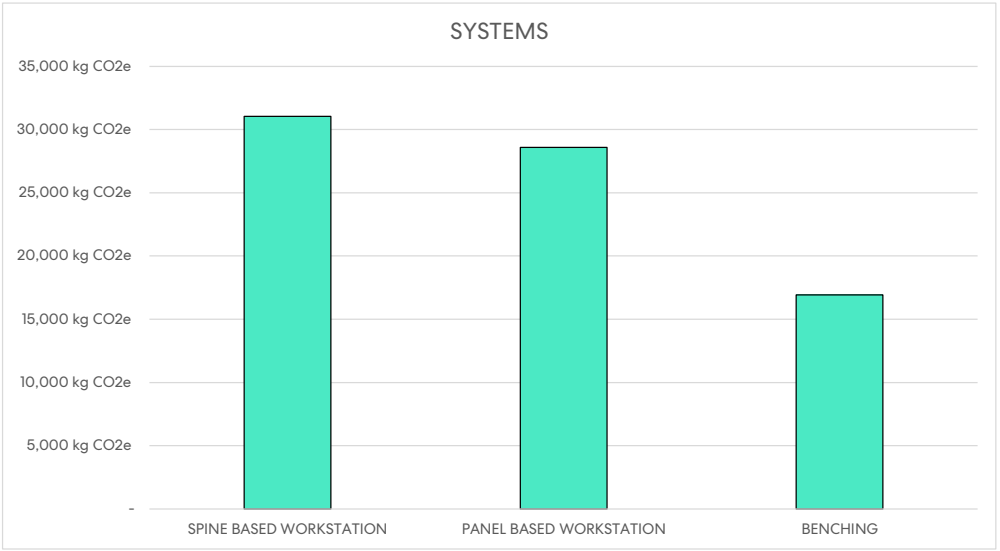
OFFICE	Baseline	Improved	Reimagined	Alt 1
CHAIRS	TASK CHAIR	TASK CHAIR	TASK CHAIR	NONE
Category	*CHAIRS*	*CHAIRS*	*CHAIRS*	*CHAIRS*
EPD	*Knoll Ollo Light Task Chair*	*Steelcase Think Chair*	*New Aeron Chair*	*None*
PCR Name	PCR 2012:01 Construction Products And Construction Services, Version 2.3, UN CPC 314	[Not specified]	Reference PCR: Product Category Rule for Environmental Product Declaration BIFMA PCR for	0
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



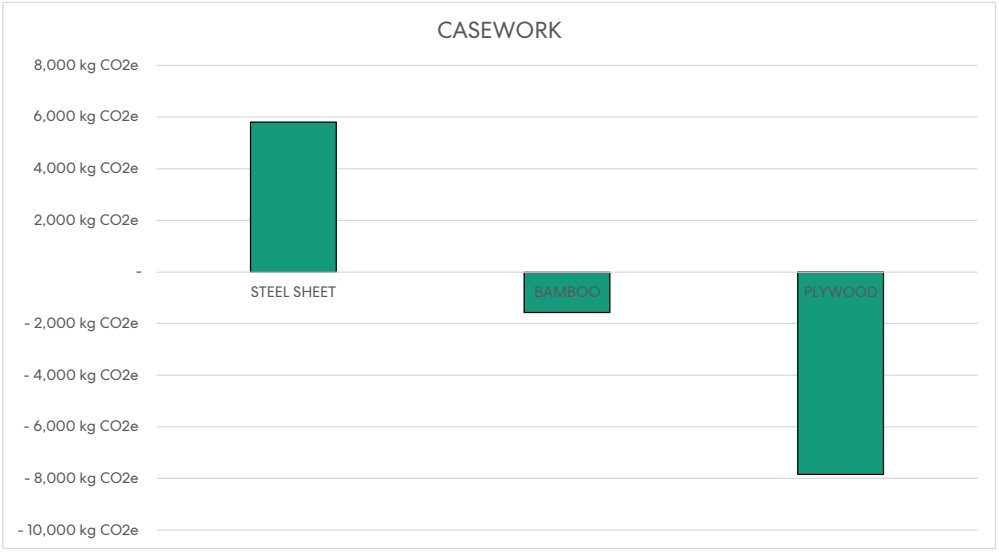
OFFICE	Baseline	Improved	Reimagined	Alt 1
SYSTEMS	SPINE BASED WORKSTATION	PANEL BASED WORKSTATION	BENCHING	NONE
Category	*SYSTEMS*	*SYSTEMS*	*SYSTEMS*	*SYSTEMS*
EPD	*Knoll Currents*	*Knoll Dividends Horizon*	*Knoll Antenna Workspaces*	*None*
PCR Name	NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	0
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



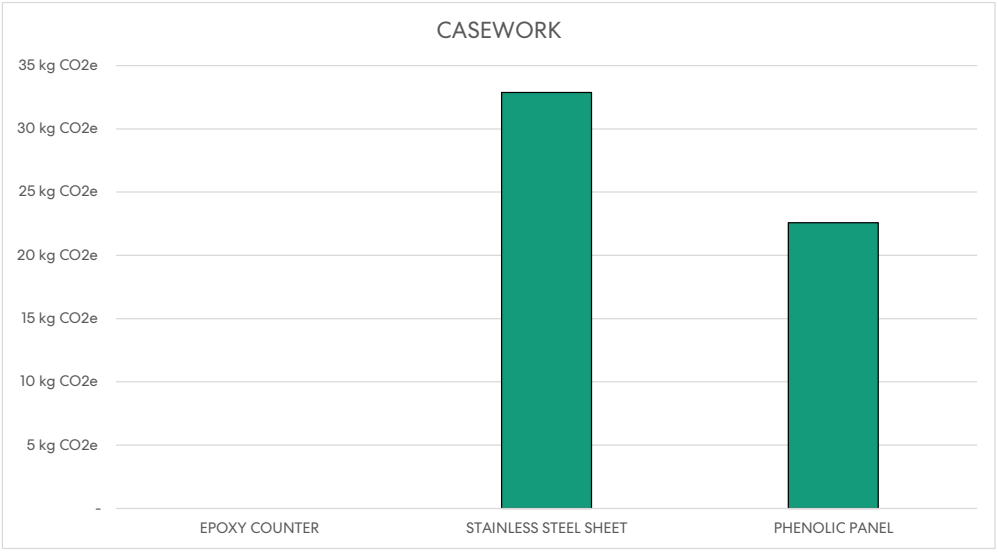
LAB	Baseline	Improved	Reimagined	Alt 1
CASEWORK	STEEL SHEET	BAMBOO	PLYWOOD	NONE
CABINETS	*CABINETS*	*CABINETS*	*CABINETS*	*CABINETS*
EPD	*Cold Formed Steel Framing*	*Flat and Edge Grain Plyboo*	*North American Softwood Plywood*	*None*
PCR Name	ISO 14044 and Product Category Rules (PCR) for Construction Products and Services.	ISO 14044 and Product Category Rules (PCR) for Construction Products and Services.	UL Environment: Product Category Rules for Building-Related Products and 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 Reauirements . v1.0	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 lbs	*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

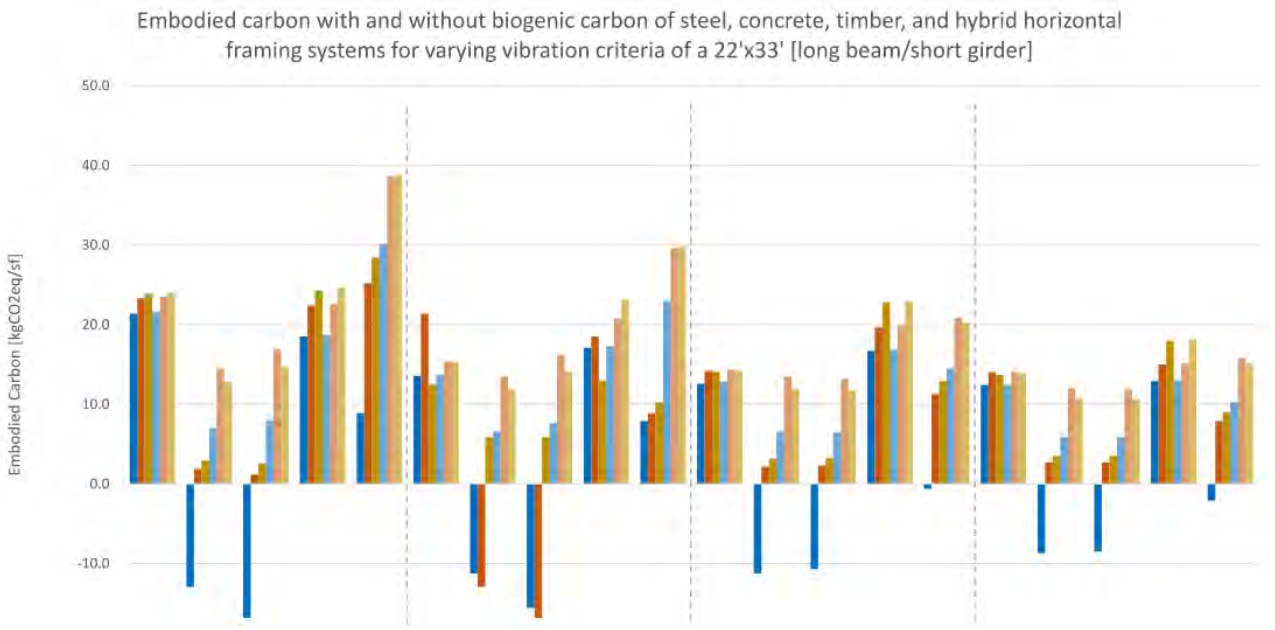


LAB	Baseline	Improved	Reimagined	Alt 1
CASEWORK	EPOXY COUNTER	STAINLESS STEEL SHEET	PHENOLIC PANEL	NONE
COUNTERTOP	*COUNTERTOP*	*COUNTERTOP*	*COUNTERTOP*	*COUNTERTOP*
EPD	*Durcon Greenstone*	*Cold Rolled Stainless Steel Outokumpu Oyj*	*Fundermax Max Panels*	*None*
PCR Name	[No EPD Available]	Structural steels, 07.2014 (PCR checked and approved by the SVR)	Laminates, 10.2018 (PCR checked and approved by the SVR)	0
EPD Type	Product Specific	Product Specific	Product Specific	0
EPD Declared Unit	NA	1 metric tonne	1 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/ft²	*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



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

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LeMessurier.

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.

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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

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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				
Interior Metal Stud Mass / LF	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	1.11	lbs	/	1	LF
Conversion Factor (Pound to Metric Ton)	0.000454				
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	'	-	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 m² of wall area

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

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LVL STUD CONVERSION CALCULATION

EPD Link	https://portal.environdec.com/api/api/v1/EPDLibrary/Files/e5b39f2f-7029-49f0-b427-4f3108dd95c6/Data					
EPD Units	1	m³				
Approx stud volume per unit SF of wall area						
Wall Height	14	'	-	6	"	High
Stud Spacing	0	'	-	16	"	O.C.
Vertical Studs Length / SF	0.75	LF	/	SF		
Horizontal Studs Length / SF	0.14	LF	/	SF		
Subtotal	0.89	LF	/	SF		
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	ft²				
Volume ft³ / m² of wall area	0.00721801	ft³	/	m²		
erior stud framing volume m³ / m² of wall area	0.0002044	m³	/	m²		

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ALUMINUM ZEE GIRT CONVERSION CALCULATION

Depth of Zee	Dim A	4.5	"					NOTES
Face of Zee	Dim B	1.0	"					Wall Cavity Depth
Gauge	(16 Ga.)	0.0630	"					Attachment Surfaces
Cross Section	Area	0.4095	sq.in.	/	LF			Thickness
Conversion Factor (sq.in. to m²)		0.00065						
	Cross Section	0.00026	m²	/	LF			
Wall Height		14	'	-	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

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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
						Hood + 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
						Hood + 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
						Hood + 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, CO2	https://www.epa.gov/energy/greenhouse-gas-equivalencies-calcu
				Filters		210
			Hood + Ductwork + Filters			375

	Global Warming Potential		
LCA Data (OneClickLCA)	kgCO2e/ kg	kgCO2e/ lb	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

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RESOURCES

Type	Name	Link
EPD Database	**The International EPD System / Envirodec**	https://www.environdec.com/library
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 Accounting of Biogenic Carbon in Product Carbon Footprint (PCF) Standards**	https://www.bio.org/sites/default/files/legacy/bioorg/docs/Position_Carbon_Footprint_PCF.pdf
EPD Database	**HPN Ecoguide**	https://ecoguide.housingpartnership.net/ecoguide/certification/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 Calculator**	https://www.omnicalculator.com/construction/concrete-block-fill#:~:text=The%20core%20volume%20of%20a,3%20or%200.006424%20m3.&text=From%20our%20calculations%20above%2C%20we,use%20to%20construct%20our%20wall.

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COMMUNICATIONS

Product / Research Area	Company	Latest Communication	Type	Info Provided	Discussion	Contact	Contact Email	Contact 2	Contact 2 Email
Laboratory Structural Systems	LeMessurier	10/7/2021	Calls. Joint research.			Michael C. Gryniuk, P.E. Associate LeMessurier 1380 Soldiers Field Road Boston, MA 02135 T 617-868-1200 x413	mgryniuk@lemessurier.com		
Building / Fire Code issues in Lab Buildings	Jensen Hughes		Calls. Joint research.			JEREMY LEBOWITZ, PE | Practice Leader – Industrial Jensen Hughes +1 508-273-8482	jlebowitz@jensenhughes.com		
Laboratory Mechanical Systems	BR+A		Calls. Joint research.			JACOB KNOWLES Associate Principal Director of Sustainable Design BR+A CONSULTING ENGINEERS 617.925.8376 617.460.4694	jknowles@brplusa.com	TURAN KARAKUS Sustainable Design 617.925.8305 direct BR+A CONSULTING ENGINEERS	TKarakus@brplusa.com
Epoxy Flooring, Paints	Sherwin Williams	8/13/2021	Call Email	Guidance on product options for high performance flooring. EPDs for flooring products.	Laboratory Flooring options. Epoxy or high performance coatings. EPD data available from SW.	Mike Starner Business Development Manager The Sherwin-Williams Co. High Performance Flooring 484-624-2360	michael.starner@sherwin.com	Mark T. Weiner,CSI-IIDA Specification Consultant The Sherwin Williams Company Office 401-245-5176 Mobile 617-438-1408	mark.t.weiner@sherwin.com
Laboratory Products and Materials	My Green Lab	8/19/2021	Call			James Connelly Chief Executive Officer Work: +1.206.209.8961 | Base: Spokane, Washington, USA Web: mygreenlab.org	James@mygreenlab.org		
Epoxy Flooring	Righter Group, Inc.	8/4/2021	Call	Tnemic does not have EPDs		Michael Woessner I Coatings Consultant Righter Group, Inc. | Cell: 978-697-0152	mwoessner@rightergroup.com		
Laboratory Casework	Mott	8/2/2021	Calls, Emails	Lab casework information. Weights of cabinets and countertop materials. Suggested EPDs for lab product raw materials.	Mott does not have EPDs. Mott President is the chair of SEFA board.	Chip Diefendorf | Director of Business Development Mott Manufacturing Ltd.|452 Hardy Road, Brantford ON Canada N3T 5L8 C: 315.278.7477 QUALITY BY DESIGN | www.mott.ca	chipd@mott.ca		
Concrete Block	Jandris Block	8/20/2021	Emails	Product data and EPDs.		Heidi Jandris 646-812-0860	heidi@ajandris.com		
Laboratory Casework	Kewaunee	8/23/2021	Email	No EPD or information available		Virginia Kowalick	virginiakowalick@kewaunee.com		
Laboratory Casework	Kewaunee	8/23/2021	Email	No EPD or information available		Rodney LaBelle	rodneylabelle@kewaunee.com		
Countertops	Fundermax	7/1/2021	Calls, Emails	EPD, Product information, suggestions for alternative products		Dawn Jacobs	Dawn.Jacobs@fundermax.biz		
Countertops	Durcon	7/29/2021	Calls, Emails	No EPD or information available.	Durcon was curious about the process for creating EPDs. They expressed concern about the cost of EPDs and about intellectual property protection.	Beto Garcia Architectural Specs Manager 206 Allison Drive, Taylor, TX 76574 512.595.8024 (office) | 737.215.2073 (cell)	bgarcia@durcon.com		
Flooring	Interface	6/24/2021	Calls, Emails	Lab flooring options. Advice about seeking EPDS for products. Connections and advice for other MFRs.		Mikhail Davis Director, Technical Sustainability – Americas mikhail.davis@interface.com | mobile +1 415-652-3099	mikhail.davis@interface.com		

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Spec Section	LCA Category	LCA Subcategory	Display Name	Product Name	Product Description	Environmental Product Declaration (EPD)	Product Literature	Reference Link	0
					Product Data				
-	-	-	NONE	NONE	No product / no data	-	-	-	
04 22 00	INTERIOR	PARTITIONS	CMU	CMU	8x8x16 Medium Weight CMU Block	https://www.rcpblock.com/images/resources/sustainability/EPD-MediumWeight.pdf		https://www.rcpblock.com/sustainability.html	
04 22 00	INTERIOR	PARTITIONS	CMU	CMU 2	Manufactured concrete Block	https://info.nsf.org/Certified/Sustain/ProdCert/EPD10054.pdf		https://commercial.midwestblock.com/	
05 40 00	INTERIOR	PARTITIONS	METAL STUDS	Partitions	CEMCO, Structural Stud and Track, Viperstud and Viper-X interior framing, Prox 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://cemcosteel.com/app/uploads/2020/08/CEMCO_ULE-EPD_Revised-May-2018_5_18_21_0_unlocked.pdf	https://cemcosteel.com/product-category/steel-framing/		
05 40 00	INTERIOR	PARTITIONS	METAL STUDS	Cold Formed Steel Framing Systems	ClarkDietrich Interior Framing, Exterior Framing, Interior Finishing, Floor Framing, Clips / Accessories	https://www.clarkdietrich.com/sites/default/files/imce/pdf/SupportTools/EPD_HPD/101.1_Clarkwestern%20Dietrich_EPD_Cold-Formed%20Steel%20Framing%20Systems.pdf	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	https://www.itools.clarkdietrich.com/iprostud.php	
06 17 13	INTERIOR	PARTITIONS	WOOD STUDS LVL	LVL	Roseburg Forest Products Laminated Veneer Lumber	https://www.roseburg.com/wp-content/uploads/2021/01/EPD_-_RigidLam_LVL-1.pdf	https://www.roseburg.com/engineered-wood/rigidlam-lvl/		
06 17 13	EXTERIOR	PARTITIONS	WOOD FRAMING	Stora Enso LVL (Laminated Veneer Lumber)		https://portal.environdec.com/api/api/v1/EPDLibrary/Files/e5b39f2f-7029-49f0-b427-4f3108dd95c6/Data			
06 17 19	SUPERSTRUCTURE	SLAB	CLT	Nordic X-Lam CLT	Nordic X-Lam	https://www.nordic.ca/data/files/datasheet/file/EPD_Nordic_X-Lam.pdf		https://www.nordic.ca/en/documentation/technical-documents#unitedstates	
07 21 00	EXTERIOR	INSULATION	MINERAL WOOL INSULATION	Rockwool Cavityrock	Rockwool Mineral Wool Exterior Insulation	https://www.rockwool.com/siteassets/o2-rockwool/documentation/epd/rockwool-stone-wool-environmental-product-declaration-epd.pdf#	https://p-cdn.rockwool.com/siteassets/o2-rockwool/documentation/technical-data-sheets/commercial/cavityrock-cavity-wall-and-rainscreen-applications-techdata.pdf?f=20210616145402	https://www.rockwool.com/north-america/products-and-applications/products/cavityrock/?selectedCat=cavityrock%C2%AE%20downloads&gclid=CjwKCAjw64eJBhAGEiwABr9o2Nt-wbU8BczsKj2qMyVuqi6SJgQFnMVf0uyJ0kxyvU7YfX5AAlmSKRoCNEUQAvD_BwE&gclsrc=aw.ds	
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	https://www.owenscorning.com/en-us/insulation/products/foamular-250		
07 21 00	EXTERIOR	INSULATION	GPS INSULATION	Neopor Plus Graphite Polystyrene Insulation	GPS Insulation (TRACI)	https://neopor.basf.us/files/pdf/EPD10327.pdf	https://neopor.basf.us/		
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_20181029_HFC.pdf			
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_20181029_HFO_excl_2K-LP.pdf			
07 42 10	EXTERIOR	CLADDING	CLADDING SUBFRAMING	GreenGirt		https://portal.environdec.com/api/api/v1/EPDLibrary/Files/6a1cbe8b-3560-4b45-a36a-e04fa18fca7b/Data			
07 42 10	EXTERIOR	CLADDING	ALUMINUM FRAMING	ALUMINUM SPECIALTY PRODUCTS AN INDUSTRY-AVERAGE ENVIRONMENTAL PROFILE		https://www.certainteed.com/resources/101.1_CISCA_EPD_Aluminum_Specialty_Products_20141217.pdf			
07 42 29	EXTERIOR	CLADDING	TERRACOTTA CLADDING	Terrart	TERRART® ceramic façade panels NBK Keramik GmbH	https://nbkterracotta.com/en/download/epd/	https://nbkterracotta.com/en/products-services/terrart-us/		
07 42 43	EXTERIOR	CLADDING	METAL PANEL CLADDING	Metal Composite Panel System	Metal Composite Material Wall and Roof Panel System	https://d371dyuip757b1.cloudfront.net/downloads/Alucobond%20EPD%20with%20MCA.pdf			
07 44 50	EXTERIOR	CLADDING	FIBER CEMENT CLADDING	Large-size fibre cement plates Swisspearl	The EPD refers to three types of large-size fibre cement plates that are produced in the plants of Swisspearl Group AG in Switzerland Eternit (Schweiz) AG, Niederurnen, Austria Eternit Österreich GmbH, Vöcklabruck and FibreCem Deutschland GmbH Porschendorf. Proportionally, about 90 % of large-size fibre cement plates are produced in Switzerland and Austria. Three average products from the two plants are declared. Thus, the EPD is representative of the large-size plates of Swisspearl Group AG.	https://www.swisspearl.com/fileadmin-customer-service/Technical/EPD_DoP/EPD005_Swisspearl-EN_2023.pdf			
07 44 50	EXTERIOR	CLADDING	FIBER CEMENT CLADDING	EQUITONE (Linea / Lunara) fibre cement sheets	This EPD presents the average of two products EQUITONE Linea and Lunara fibre cement sheets. This average product is an autoclaved calcium silicate Eternit fiber cement sheet produced by ETEX Services NV at Kapelle-op-den-Bos factory in Belgium and sold in Germany.	https://www.equitone.com/siteassets/documents/de/equitone-linea-lunara-cement-fibre-sheets-epd.pdf?v=492f62	https://www.equitone.com/en-us/materials-en-us/linea/		
07 46 23	EXTERIOR	CLADDING	WOOD CLADDING	Typical Western Red Cedar Bevel Siding		https://www.realcedar.com/static/6e57fdcd0c8d7a7e440290b0b745d301/Typical-Cedar-Siding-EPD-Febuary-2018.pdf			
07 46 46	EXTERIOR	CLADDING	FIBER CEMENT CLADDING	James Hardie FIBRE CEMENT CLADDING	HardiePanel	file:///C:/Users/wernerj/Downloads/S-P-01432%2520EPD%2520Fibre%2520Cement%2520Cladding.pdf			
08 00 00	INTERIOR	DOORS	GLASS DOOR	Optima Aluminum Framed Doors	Single-glazed door	https://optimasystems.com/resources/environmental-product-declarations/	https://optimasystems.com/wp-content/uploads/Optima-Doors-EPD-October-2018-FOR-WEB.pdf		
08 00 00	INTERIOR	DOORS	STEEL DOOR	Assa Abloy Legion / UltraDor Doors	Steel Door 1	https://content.assaabloyusa.com/doc/AADSS1176471&.pdf		https://www.cecodoor.com/en/sustainability/resource-center/environmental-product-declaration/	
08 00 00	INTERIOR	DOORS	STEEL DOOR	SDI Steel Door	Steel Door 2	https://steeldoor.org/wp-content/uploads/2020/04/SCS-EPD-05020_SDI_SteelDoorFrame_061418.pdf		https://steeldoor.org/	

Product Name	PCR Name	Type of EPD	Column1	Declared Unit Description	Unit Type	Declared Unit	Adjusment Factor to m²	Mass (kg)	2	Service Life (yrs)	1
	Product Category Rule	Type of EPD		Declared Unit						Life	
NONE				-		-	1	0.00		75	
CMU	Manuctured Concrete and Concrete Masonry Products (UN CPC 3755)	Product Specific		The ASTM PCR for concrete and concrete masonry products only covers the cradle-to-gate life-cycle stages. Therefore, the declared unit for this EPD is one (1) yd3 of concrete formed into manufactured concrete and concrete masonry products. The EPD may be presented additionally per one (1) yd3 of concrete. This EPD covers only the cradle-to-gate impacts of manufactured concrete and concrete masonry products using a declared unit, and the results cannot be used to compare between products.	Volume	1 cu yd	0.001203814			75	
CMU 2	Manuctured Concrete and Concrete Masonry Products (UN CPC 3755)	Product Specific		The ASTM PCR for concrete and concrete masonry products only covers the cradle-to-gate life-cycle stages. Therefore, the declared unit for this EPD is one (1) m3 of concrete formed into manufactured concrete and concrete masonry products. The EPD may be presented additionally per one (1) yd3 of concrete.	Volume	1 cu yd	0.001203814			75	
Partitions	SCS PCR for Designated Steel Construction Products v1 2015	Product Specific		The declared unit for an EPD is one metric ton of steel construction product.	Mass	1 metric tonne					
Cold Formed Steel Framing Systems	UL Part B: Designated Steel Construction Product EPD Requirements, v2.0 (August 26, 2020)	Product Specific		The declared unit of calculation is one metric ton of Cold-formed steel product (1000kg)	Mass	1 metric tonne	1.36723E-05			30	
LVL	FPInnovations: 2015. Product Category Rules (PCR) for preparing	Product Specific		The declared unit is 1 m³ of LVL.	Volume	1 m³	0.000204391			75	
Stora Enso LVL (Laminated Veneer Lumber)	Standards EN 15804 and EN 16485 provide the core product category rules 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.	Product Specific		1 m³ of LVL with a moisture content of 9%	Volume	1 m³	0.000204391			75	
Nordic X-Lam CLT	PCR: North American Structural and Architectural Wood Products v2. June 2015 (Interim Version).	Product Specific								75	
Rockwool Cavityrock	Product Category Rules Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, Product Category Rules Part B: Mineral insulating materials	Product Specific		1 M2 of stone wool thermal insulation product with an RD=1 m2k/w (R = 5.68)	Area	1 m²	1			30	
FOAMULAR Extruded Polystyrene (XPS) Insulation	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	
Neopor Plus Graphite Polystyrene Insulation	ISO 21930:2017 and EN 15804:2012-04 serve as the core PCR along with Product Category Rules for Building-Related Products and Services; Part A (Standard 10010 version 3.1 4 th edition, May 2, 2018) and Product Catgory Rule (PCR) Guidance for Building-Related Products and Services; Part B: Building Thermal Insulation EPD Requirements UL 10010-1 (2 nd edition, April 10, 2018). Sub-category PCR was reviewed by Thomas Gloria, Phd (Chair), Industrial Ecology Consultants; Christoph Koffler, Phd, thinkstep and Andre Desjarlais, Oak Ridge National Laboratory.	Product Specific		1 m2 of installed Neopor® Plus Graphite Polystyrene Type I insulation material with a thickness that gives an avg. thermal resistance (RSI) of 1 m2*K/W (5.68 ft2*hr.*F/BTU per inch) with a building service life of 75 yrs. (packaging included)	Area	1 m²	1			75	
Spray Polyurethane Foam Insulation (HFC)	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		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	
Spray Polyurethane Foam Insulation (HFO)	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		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	
GreenGirt	Construction products and construction services (2012) v2.3	Product Specific		One linear foot (1Lft) of GREENGirt	Area	1 ft	0.09290304			75	
ALUMINUM SPECIALTY PRODUCTS AN INDUSTRY-AVERAGE ENVIRONMENTAL PROFILE	Institute Construction and Environment e.V. (IBU), 2014. PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Metal Ceilings, Version 1.6, 2014. UL Environment Addendum- Product Category Rules for preparing an environmental product declaration (EPD) for PCR: IBU Product Category Rules, Part B: Requirements on the EPD for Metal Ceilings, October 2013. Version 1, 2014.	Industry Wide		The declared unit for this EPD is 1 kg of aluminum specialty product. Note that ceiling grid is not included in the definition of aluminum specialty product. Due to the participation of multiple manufacturers and the often-customized nature of the products, it is not meaningful to declare a reference panel that is accurate for all participating manufacturers. Therefore mass was chosen as the extensive property to normalize energy, materials, and impact assessment results.	Mass	1 kg	0.009171094	1.00		75	
Terrart	PCR part B: Requirements relating to the EPD for ceramic panellings, 1.6, 07.2014, Institut Bauen und Umwelt e.V., 2014	Product Specific		1 m² of ceramic façade panel	Area	1 m²	1			75	
Metal Composite Panel System	UL Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, v2.0 October 23 2018	Industry Wide		The main purpose of metal cladding and panels is to provide weather protection for building walls and roofs. The panels create barriers that control noise, water, and air transmission between an external environment and interior building space. Accordingly, the PCR's functional unit for metal panels, metal composite panels, and metal cladding is the coverage of 100 square meters (1076.4 square feet) of building area. The coverage area refers to the projected flat area covered by the product as output by the final manufacturing process step and does not account for losses due to overlap and scrap during installation.	Area	100 m²	0.01			75	
Large-size fibre cement plates Swisspearl	Fibre cement / Fibre concrete, 07.2014 (PCR tested and approved by the independent council of experts (SVR))	Product Specific		The life-cycle assessment refers to 1 ton of fibre cement plates							
EQUITONE (Linea / Lunara) fibre cement sheets	Fibre cement / Fibre concrete, 07.2014 (PCR checked and approved by the SVR)	Product Specific		The production of 1 m2 of an "EQUITONE [Linea / Lunara]" fibre cement sheets with a thickness of 10mm, and it's related impacts over cradle-to-grave life cycle stages, where the product's expected average reference service life is of 50 years.	Area	1 m²	1			50	
Typical Western Red Cedar Bevel Siding	North American Structural and Architectural Wood Products UNCPC 31, NAIC 321,v2. June 2015. Prepared by FPInnovations and available at www.fpinnovations.ca. PCR panel chaired by Thomas P. Gloria.	Industry Wide		1m2 of siding assumed installed over a wood-frame wall.	Area	1 m²	1			50	
James Hardie FIBRE CEMENT CLADDING	The International EPD® System's PCR 2012:01 Construction products and Construction services, Version 2.3, 2018-11-15	Product Specific		1 square metre (1m2)	Area	1 m²	1			50	
Optima Aluminum Framed Doors	The CEN standard EN 15804 serves as the core PCR	Product Specific		The declared unit is a single door, width 990mm; height 2.60m, glass thickness 12mm in single-glazed, 8mm + 6mm in double-glazed. The declared unit includes a typical set of door hardware: a lock, handles, hinges, and a door closer/spring. Indicator values are declared separately for double-glazed doors and single-glazed doors. For the reference product, the mass of the declared unit is 91kg for the single-glazed door and 105kg for the double-glazed door. The minimum mass of a single-glazed door of the specified dimensions is 72kg (10mm glass); its maximum is 100kg (12mm glass). The minimum mass of double-glazed door of the specified dimensions (6mm + 6mm glass) is 84kg; its maximum is 127kg (both faces in 8mm glass).	Count	1 Door				30	
Assa Abloy Legion / UltraDor Doors	Commercial Steel Doors and/or Frames 9005	Product Specific		The declaration refers to the functional unit of 1 unit (or piece) of ASSA ABLOY Legion / UltraDor Doors	Count	1 Door		51.40		30	
SDI Steel Door	Product Category Rule (PCR) for Preparing an Environmental Product Declaration (EPD) for Product Group: Commercial Steel Doors and/or Steel Frames UL 9005. Version: March 10, 2015	Product Specific			Count	1 Door				30	

Product Name	A1-A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	D	A1-D	Biogenic Carbon	3	A1-A3 / kg	Biogenic Carbon / kg of product	Notes
	GWP Values (kg/CO2e)																	
NONE	1.00E-50	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-50		-	-	
CMU	2.94E+02															-	-	
CMU 2																-	-	
Partitions																-	-	
Cold Formed Steel Framing Systems	1.71E+03															-	-	
LVL	2.74E+02	0.00E+00	0.00E+00		0.00E+00			0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00	-9.88E+02		-	-	
Stora Enso LVL (Laminated Veneer Lumber)	1.55E+02	7.59E+01	6.81E+00											-8.04E+02		-	-	
Nordic X-Lam CLT	1.22E+02															-	-	
Rockwool Cavityrock	1.31E+00	4.25E-01	2.65E-01		0.00E+00			0.00E+00	5.29E-03	0.00E+00		-9.93E-02				-	-	
FOAMULAR Extruded Polystyrene (XPS) Insulation	2.19E+01	1.54E+01	2.10E+03	2.86E+01					2.07E+02		7.39E+00					-	-	
Neopor Plus Graphite Polystyrene Insulation	1.74E+00	7.97E-02	6.21E-03		0.00E+00			2.24E-02				-6.66E+04				-	-	
Spray Polyurethane Foam Insulation (HFC)	3.31E+00	1.22E-01	3.82E+00	7.73E+00					3.70E-03		5.20E+00	-1.77E-04		0.00E+00		-	-	
Spray Polyurethane Foam Insulation (HFO)	3.47E+00	1.22E-01	5.25E-01	0.00E+00					3.40E-03		4.17E-02	-1.77E-04		0.00E+00		-	-	
GreenGirt													1.73E+00			-	-	
ALUMINUM SPECIALTY PRODUCTS AN INDUSTRY-AVERAGE ENVIRONMENTAL PROFILE	9.54E+00		2.76E-01											0.00E+00		9.54	-	
Terrart	9.05E+01									0.00E+00	1.52E+00	-1.61E+01		0.00E+00		-	-	
Metal Composite Panel System	2.80E+03															-	-	
Large-size fibre cement plates Swisspearl	1.28E+03															-	-	
EQUITONE (Linea / Lunara) fibre cement sheets	9.79E+00	1.58E+00	1.37E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-01	1.29E-01	0.00E+00	7.96E-02	-4.22E-01				-	-	
Typical Western Red Cedar Bevel Siding	2.16E+00	2.00E-01	1.89E+00	7.10E-01	0.00E+00				1.30E-01		1.11E+00					-	-	
James Hardie FIBRE CEMENT CLADDING	8.94E+00	1.45E+00														-	-	
Optima Aluminum Framed Doors	2.39E+02													0.00E+00		-	-	
Assa Abloy Legion / UltraDor Doors	1.40E+02	6.30E+00	1.50E-01						4.90E-01	0.00E+00				0.00E+00		2.72	-	
SDI Steel Door																-	-	

Low Carbon Labs						Product Data				Product Category Rule	Type of EPD		Declared Unit						Life		GWP Values (kg/CO2e)																	
Spec Section	LCA Category	LCA Subcategory	Display Name	Product Name	Product Description	Environmental Product Declaration (EPD)	Product Literature	Reference Link	0	PCR Name	Type of EPD	Column1	Declared Unit Description	Unit Type	Declared Unit	Adjusment Factor to m^2	Mass (kg)	2	Service Life (yrs)	1	A1-A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	D	A1-D	Biogenic Carbon	3	A1-A3 / kg	Biogenic Carbon / kg of product	Notes
08 00 00	INTERIOR	DOORS	STEEL DOOR	Assa Abloy Regent and Omega Doors	Steel Door 3	https://content.assaabloyusa.com/doc/AADSS1176472&.pdf				Commercial Steel Doors and/or Frames 9005	Product Specific		The declaration represents a specific 3' x 7' x 1.75" thick steel door manufactured in the Milan, TN facility	Count	1 Door				30		1.30E+02	6.30E+00	2.60E-01						4.90E-01	0.00E+00	7.10E-01	-6.50E+01		0.00E+00		-	-	
08 00 00	INTERIOR	DOORS	WOOD DOOR	Eggers Industries - Architectural Wood Door Leaf	INTERIOR FLUSH DOOR, INTERIOR STILE AND RAIL DOOR.	https://www.vtindustries.com/webres/File/architectural-doors/Sustainability/101_1_Eggers_EPD_Architectural%20Wood%20Door%20Leaf.pdf				PCR for preparing an EPD for interior architectural wood door leaves ASTM, 2015	Product Specific		This environmental product declaration (EPD) covers Eggers interior flush and stile and rail doors, which include nonrated, rated, acoustical, bullet resistant, lead-lined and impact 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 reference flow is 126 lbs (57.1 kg).	Count	1 Door				30		1.11E+02															-	-	
08 00 00	INTERIOR	DOORS	WOOD DOOR	Lambton Doors - Particleboard Core Doors	Envirodesign Series	http://www.lambtondoors.com/wp-content/uploads/2018/02/LAMBTON_DOORS_5-UFPC-EME_2018_1519149295.pdf				PCR for preparing an EPD for North American Structural and Architectural Wood Products v1.1 FPInnovation May 2013.	Product Specific			Count	1 Door				40		1.93E+01													-5.10E+01		-	-	
08 00 00	INTERIOR	DOORS	WOOD DOOR	Masonite Architectural average wood door leaf		https://www.baillargeondoors.com/download/Environmental-Product-Declaration-EPD-November.PDF				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) at a nominal 1-3/4 inch (44.45 mm) thickness. Results represent a production weighted average wood door leaf.	Count	1 Door						8.20E+01															-	-	
08 00 00	INTERIOR	DOORS	WOOD DOOR	VT Industries Architectural Wood Door Leaf		http://info.nsf.org/Certified/Sustain/ProdCert/EPD10536.pdf				PCR for preparing an EPD for interior architectural wood door leaves ASTM, 2015	Product Specific			Count	1 Door																					-	-	
08 41 10	EXTERIOR	GLAZING	ALUMINUM STOREFRONT	TRIFAB™ FRAMING SYSTEMS AND STOREFRONT FRAMING SYSTEMS	ALUMINUM STOREFRONT FRAMING SYSTEMS	https://www.kawneer.com/kawneer/north_america/catalog/EPD/EPD47868332121.104.pdf				Earthsure. "Cradle to Gate Window Product Category Rule. September 2015.	Product Specific		The declared unit of the underlying life cycle assessment study was one square meter (1 m^2) 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 derive the declared unit.	Area	1 m^2	1			50		3.55E+02															-	-	
08 44 00	EXTERIOR	GLAZING	ALUMINUM STOREFRONT	Traditional Curtain Wall	Traditional Curtain Wall Aluminum Curtain Wall Systems	https://www.kawneer.com/kawneer/north_america/catalog/EPD/EPD47868332121.105.pdf				Earthsure. "Cradle to Gate Window Product Category Rule. September 2015.	Product Specific		The declared unit of the underlying life cycle assessment study was one square meter (1 m2) of window (including frame) 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	Area	1 m^2	1			30		3.54E+02															-	-	
09 00 00	INTERIOR	FLOOR FINISH	RUBBER FLOORING	Rubber Flooring	Rubber Flooring	https://a.mannington.io/docs/literature/cc4a28f9aba34a87a5fc9ba3e15167ec/pdf/2019_EPD_-_Rubber_Flooring-20190118145854.pdf				Part B: Flooring EPD requirements [UL Environment], v2.0 September 2018	Industry Wide			Area	1 m^2	1	5.60		35		1.56E+01	1.32E-01	1.25E+00		6.10E+00				6.35E-02			-3.23E-02				2.79	-	
09 22 26	INTERIOR	CEILING	DRYWALL FINISH	Drywall Grid System		https://www.armstrongceilings.com/pdbupimages-clg/215785.pdf/download/epd-drywall-grid-systems.pdf	https://www.armstrongceilings.com/pdbupimages-clg/228191.pdf/download/data-sheet-6-dgs-cross-tees.pdf	https://www.armstrongceilings.com/commercial/en/performance/sustainable-building-design/environmental-product-declarations.html#redirect_term=EPD		North American Product Category rule for Designated Steel Construction Products by SCS global Services, May 5, 2015 v.1.O	Product Specific			Area	1 m^2	1			30																	-	-	
09 25 00	INTERIOR	PARTITIONS	DRYWALL FINISH	Gypsum Board	An industry average cradle-to -gate EPD for 5/8" Type X Conventional Gypsum Board produced by Gypsum Association member companies for the USA and Canadian Markets.	https://nationalgypsum.widen.net/view/pdf/sze7y4a7by/EPD-Type-X-Gypsum-Board_Exp042025.pdf?t.download=true&u=vtetuw	https://www.nationalgypsum.com/design-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" Type X conventional gypsum	Area	1 m^2	1	10.40		30		2.77E+02															26.63	-	
09 29 00	INTERIOR	PARTITIONS	DRYWALL FINISH	1/2" Gypsum Board	1/2" Glass-mat Gypsum Broad	https://nationalgypsum.widen.net/view/pdf/ay0www71sr/eXP-Sheathing-ONLY-1_2-and-5_8-Glass-Mat-Gypsum-Panels-EPD.pdf?t.download=true&u=vtetuw				Section 9; Content of an EPD, NSF International, Product Category Rule for Environmental Product Declarations: PCR for Gypsum Panel Products, April 2020 [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).	Area	92.9 m^2	0.010764263	943.00		30		4.37E+02															0.46	-	
09 29 00	INTERIOR	PARTITIONS	DRYWALL FINISH	DryWall Finishing Product	Joint Compound	https://nationalgypsum.widen.net/view/pdf/ndnjainxwr/Gypsum_Industry_EPD_for_Joint_Compound.pdf?t.download=true&u=vtetuw		https://www.nationalgypsum.com/design-resource-center/product-sustainability/epds		UL Part A v1.3 & Part B: Joint compound EPD requirements (2016)	Product Specific		This declaration refers to the functional unit as prescribed by the PCR. The functional unit is defined as "100 m2 of covered substrate considering an installation scenario as defined by a 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	Area	100 m^2	0.01	88.60		75		3.43E+01	4.51E+00	9.08E-02						2.46E-01		4.00E+00	-2.01E-01				0.39	-	
09 29 00	INTERIOR	PARTITIONS	DRYWALL FINISH	5/8" Gypsum Board	5/8" Glass-mat Gypsum Board	https://nationalgypsum.widen.net/view/pdf/ay0www71sr/eXP-Sheathing-ONLY-1_2-and-5_8-Glass-Mat-Gypsum-Panels-EPD.pdf?t.download=true&u=vtetuw	https://www.nationalgypsum.com/design-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).	Area	92.9 m^2	0.010764263	1,263.00		30		5.04E+02															0.40	-	
09 51 00	INTERIOR	CEILING	ACOUSTICAL CEILING SYSTEM	Armstrong Ultima Ceiling Panels		https://www.armstrongceilings.com/content/dam/armstrongceilings/commercial/north-america/epds/ultima-epd.pdf	https://www.armstrongceilings.com/commercial/en/commercial-ceilings-walls/ultima-high-nrc-ceiling-tiles.html	https://www.armstrongceilings.com/commercial/en/performance/sustainable-building-design/environmental-product-declarations.html		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 Requirements", October 2015v1.	Product Specific		The declared unit for this EPD is 1 M2 of Ultima ceiling panel for use over 75 years.	Area	1 m^2	1	2.38		30		NA												1.24E+01			-	-	
09 51 00	INTERIOR	CEILING	ACOUSTICAL CEILING SYSTEM	Armstrong Calla Ceiling Panels		https://www.armstrongceilings.com/content/dam/armstrongceilings/commercial/north-america/epds/calla-epd.pdf				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 Requirements", October 2015v1.	Product Specific			Area	1 m^2	1			30		NA												1.10E+01			-	-	
09 51 00	INTERIOR	CEILING	ACOUSTICAL CEILING CLEANROOM	Armstrong Clean Room FL Ceiling Panels	Mineral Fiber Prelude XL, Prelude Plus XL, Prelude XL Fire Guard, Cleanr Room, Suspension Systems Steel	https://www.armstrongceilings.com/content/dam/armstrongceilings/commercial/north-america/epds/clean-room-fl-epd.pdf				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 Requirements", October 2015v1.	Product Specific		The declared unit for this EPD is 1 M2 of Clean room FL ceiling panel for use over 75 years.	Area	1 m^2	1			30		NA												1.10E+01	0.00E+00		-	-	
09 51 00	INTERIOR	CEILING	ACOUSTICAL CEILING	Armstrong Optima Ceiling Panels	HIGH PERFORMANCE FIBERGLASS Prelude XL, Suprafine XL, Silhouette XL, Interlude XL Suspension Systems Steel	https://www.armstrongceilings.com/content/dam/armstrongceilings/commercial/north-america/epds/optima-epd.pdf				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 Requirements", October 2015v1.	Product Specific		The declared unit for this EPD is 1 M2 of Optima ceiling panel for use over 75 years.	Area	1 m^2	1			30		NA												8.37E+00			-	-	
09 53 00	INTERIOR	CEILING	DRYWALL CEILING SYSTEM	Grid Suspension System	Ceiling Grid Suspension System	https://www.armstrongceilings.com/content/dam/armstrongceilings/commercial/north-america/epds/suprafine-xl-epd.pdf		https://www.armstrongceilings.com/commercial/en/performance/sustainable-building-design/environmental-product-declarations.html#redirect_term=EPD		North American Product Category rule for Designated Steel Construction Products by SCS global Services, May 5, 2015 v.1.O	Product Specific								30																	-	-	
09 58 13	INTERIOR	CEILING	DRYWALL CEILING SYSTEM	USG Ensemble	Acoustical drywall ceiling USG, including backup framing	https://www.usg.com/content/dam/USG_Marketing_Communications/united_states/product_promotional_materials/finished_assets/usg-ensemble-acoustical-drywall-ceiling-epd-en-usa.pdf	https://www.usg.com/content/usgcom/en/products/ceilings/integrated-ceiling-systems/ensemble-acoustical-drywall-ceiling.html			NSF International PCR for Gypsum Panel Products, v1.1 April 23 2020	Product Specific		1,000 sf	Area	1,000 sf	0.01076391			30		1.42E+03	2.78E+02	3.45E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.70E+01	0.00E+00				-	-	
09 58 13	INTERIOR	CEILING	DRYWALL CEILING SYSTEM	Acoustical Dry Wall Ceiling	Ensemble Acoustical Drywall Ceiling USG Corporation	https://www.usg.com/content/dam/USG_Marketing_Communications/united_states/product_promotional_materials/finished_assets/usg-ensemble-acoustical-drywall-ceiling-epd-en-usa.pdf				NSF International PCR for Gypsum Panel Products, v1.1 April 23 2020	Product Specific								30																	-	-	
09 60 00	INTERIOR	FLOOR FINISH	CARPET TILE	INTERFACE CQUEST BIOX		https://interfaceinc.scene7.com/is/content/InterfaceInc/Interface/Americas/WebsiteContentAssets/Documents/Technical/EPDBriefs/CQuestBioX/wc_am-cquestbiox-epd.pdf				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 BioX Modular Flooring Tile; Functional Unit of 1 square meter of floor covering	Area	1 m^2	1			15		-3.69E-01	1.23E-01	1.10E-01	3.91E-01					4.89E-03		3.17E-01					-	-	
09 60 00	INTERIOR	FLOOR FINISH	CARPET TILE	INTERFACE GLASBAC TYPE 66 NYLON		https://interfaceinc.scene7.com/is/content/InterfaceInc/Interface/Americas/WebsiteContentAssets/Documents/Technical/EPDBriefs/GlasBacNylon66/wc_am-epdglasbacnylon66oct2016.pdf				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			Area	1 m^2	1			15		6.54E+00	1.00E-01	3.25E-02		4.41E-01				9.44E-02							-	-	
09 60 00	INTERIOR	FLOOR FINISH	CARPET TILE	Mohawk Ecoflex Matrix Modular Carpet Tiles		https://www.mohawkgroup.com/sitefiles/resources/EPD_EcoFlexMatrix.pdf	https://www.mohawkgroup.com/sustainability/product-transparency			UL Product Category Rule (PCR) Guidence for Building-Related Products and Serivces Part B: Flooring EPD Requirements v.2.0 September 2018	Product Specific		1 m^2	Area	1 m^2	1	1.76		15		1.00E+01	1.34E+00	1.32E+00		1.70E+00			0.00E+00	2.53E+00	0.00E+00		0.00E+00				5.68	-	
09 60 00	INTERIOR	FLOOR FINISH	CARPET BROADLOOM	Mohawk Tufted Nylon Carpet on Weldlok Onguard Backing		https://mohawk.blob.core.windows.net/mohawkgroup/pdfs/EPD/MG_EPD_Weldlok_OnGuard.pdf	https://www.mohawkgroup.com/sustainability/product-transparency			UL Product Category Rule (PCR) Guidence for Building-Related Products and Serivces Part B: Flooring EPD Requirements v.2.0 September 2018	Product Specific		Tufted Nylon Carpet on Weldlok OnGuard Backing. Functional Unit 1m2	Area	1 m^2	1	2.31		15		5.29E+01	6.89E-01	9.86E-02		2.74E+01				2.76E-02							22.94	-	
09 60 00	INTERIOR	FLOOR FINISH	CARPET BROADLOOM	AtlasMasland Broadloom Carpet Family		https://info.nsf.org/Certified/Sustain/ProdCert/EPD10348.pdf				Product Category Rule for Environmental Product Declarations Flooring: Carpet, Resilient, Laminate, Ceramic, Wood (NSF International, 2014)	Product Specific		The functional unit has been defined as one square meter as defined in section 6.2 of the PCR. The reference service life for this product group is 15 years while the reference service life for a building is 60 years. Additionally, use phase data are accumulated on a 1-year basis	Area	1 m^2	1			15		5.39E+01															-	-	
09 65 00	INTERIOR	FLOOR FINISH	RUBBER FLOORING	Noraplan Environcare Sentica (part of 913 line)		https://interfaceinc.scene7.com/is/content/InterfaceInc/Interface/Americas/WebsiteContentAssets/Documents/Technical/EPDBriefs/noraplan/wc_am-epdnoraplanstandard913.pdf				IBU Part B: Requirements on the EPD for Floor coverings, version 1.2 02-2018	Product Specific			Area	1 m^2	1	0.30		30		5.87E+00	1.82E-01	4.64E-01		3.99E-01			4.15E-02	7.88E-03	2.48E+00		-9.57E-01	8.49E+00	0.00E+00		19.70	-	
09 65 00	INTERIOR	FLOOR FINISH	LINOLEUM FLOORING	Forbo Marmoleum		https://forbo.blob.core.windows.net/forbodocuments/13127/Forbo_Marmoleum_Marbled_2.0&2.5mm_EPD.pdf	https://forbo.blob.core.windows.net/forbodocuments/275471/ProductGuide_12_2_2020_Web.pdf	https://forbo.blob.core.windows.net/forbodocuments/13127/Forbo_Marmoleum_Marbled_2.0&2.5mm_EPD.pdf		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^2 of installed flooring product.	Volume	1 m^3	1	3.00		15		-4.25E-02	3.97E+01	7.55E-01		3.31E-01			2.46E-01	2.06E-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 (PVC FREE)	Armstrong Medinpure		https://www.armstrongflooring.com/pdbupimages-flr/222612.pdf		https://www.armstrongflooring.com/commercial/en-us/resources/resource-results.html?contentType=documents&q=&filters%3AcontentType=Environmental%20Product%20Declaration%20(EPD)		Part A: PCR for building-related products, 2018 Part B: Flooring EPD Requirements [UL Environment], v2.0 September, 2018	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 View: In order to understand the complete view of a flooring system, life cycle information is included for the total flooring system based on 1 square meter (m2) view. This includes the flooring, adhesives and finishes applied during the use stage.	Area	1 m^2	1	527,300.00		75		1.44E+01	6.30E-01	1.70E-01		3.00E-02			1.75E+01	5.50E-02	1.09E-01		0.00E+00	3.52E+01			0.00	-	75 year life includes replacement (B4) @ 1.5 times
09 67 23	INTERIOR	FLOOR FINISH	EPOXY FLOORING	Dur-A-Flex Epoxy Flooring		https://www.dur-a-flex.com/wp-content/uploads/2020/02/dur-a-flex_epd_epoxy-floor-system.pdf?qb=1624282547130	https://www.dur-a-flex.com/architect-center/product-data-sheets/	https://www.dur-a-flex.com/architect-center/		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.	Area	1 m^2	1	0.38		25		9.33E+00	3.55E-01	8.71E-03					0.00E+00	3.34E-02	0.00E+00				0.00E+00		24.56	-	
09 67 23	INTERIOR	FLOOR FINISH	EPOXY FLOORING	SW Deco Quartz	AKA General Polymers CERAMIC CARPET #400	https://industrial.sherwin-williams.com/content/dam/pcg/sherwin-williams/protective-marine/na/ca/en-us/pdfs/flooring-resources/flooring-epds/epd10167-ceramiccarpet400.pdf	https://industrial.sherwin-williams.com/na/us/en/protective-marine/catalog/product/products-by-industry.11543396/resuflor-deco-quartz-bc23.12322101.html			PCR for Resinous Floor Coatings – 12/2018	Product Specific		1m2 of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building)	Area	1 m^2	1			30		1.48E+01	1.96E+00	1.70E-01	0.00E+00	1.09E+01	0.00E+00	1.69E+01	0.00E+00	6.00E-02	0.00E+00	1.50E-01	-1.10E-01				-	-	
09 67 23	INTERIOR	FLOOR FINISH	EPOXY FLOORING	SW Fastop Topfloor SL57	AKA General Polymers FasTop 12S	http://info.nsf.org/Certified/Sustain/ProdCert/EPD10170.pdf				PCR for Resinous Floor Coatings – 12/2018	Product Specific								30																	-	-	
09 67 23	INTERIOR	FLOOR FINISH	EPOXY FLOORING	SW Resuflor Deco Flake BC	AKA General Polymers DECORATIVE MOSAIC EPOXY COATING SYSTEM	https://industrial.sherwin-williams.com/content/dam/pcg/sherwin-williams/protective-marine/na/us/en-us/pdfs/marketing-uploads/flooring-resources/flooring-epds/EPD10168-Decorative-Mosaic.pdf				PCR for Resinous Floor Coatings – 12/2018	Product Specific								30																	-	-	
09 67 23	INTERIOR	FLOOR FINISH	EPOXY FLOORING	SW Resuflor Terrazzo TG	AKA General Polymers THIN-SET EPOXY TERRAZZO #1100	https://industrial.sherwin-williams.com/content/dam/pcg/sherwin-williams/protective-marine/na/ca/en-us/pdfs/flooring-resources/flooring-epds/EPD10171-Thin-Set-Epoxy-Terrazzo.pdf				PCR for Resinous Floor Coatings – 12/2018	Product Specific								30																	-	-	

Low Carbon Labs						Product Data				Product Category Rule	Type of EPD		Declared Unit						Life		GWP Values (kg/CO2e)																	
Spec Section	LCA Category	LCA Subcategory	Display Name	Product Name	Product Description	Environmental Product Declaration (EPD)	Product Literature	Reference Link	0	PCR Name	Type of EPD	Column1	Declared Unit Description	Unit Type	Declared Unit	Adjusment Factor to m²	Mass (kg)	2	Service Life (yrs)	1	A1-A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	D	A1-D	Biogenic Carbon	3	A1-A3 / kg	Biogenic Carbon / kg of product	Notes
09 67 23	INTERIOR	FLOOR FINISH	EPOXY FLOORING	SW Resuflor Topfloor SL23	AKA General Polymers TRAFFICOTE #105 FLOORING SYSTEM	https://industrial.sherwin-williams.com/content/dam/pcg/sherwin-williams/protective-marine/na/ca/en-us/pdfs/flooring-resources/flooring-epds/epd10172-trafficote-105.pdf				PCR for Resinous Floor Coatings – 12/2018	Product Specific								30																	-	-	
09 83 16	INTERIOR	CEILING	ACOUSTIC FINISH	International Cellulose K-13	K-13 is a total system of recycled natural fibers, chemical treatment, binding system and application method. The K-13 system begins with specially prepared cellulose fibers which are chemically treated. K-13 is produced in a strict, quality controlled manufacturing process. K-13 is applied by an international network of licensed applicators through approved fiber machines and nozzles for control of the fiber/binder ratio.	https://www.transparencycatalog.com/assets/uploads/pdf/ICC_K-13_EPD_May21.pdf				Product Category Rules (PCR) Guidance for Building-Related Products and Services Part B: Building Envelope Thermal Insulation EPD Requirements	Product Specific		One square meter of installed insulation material, packaging included, with a thickness that gives an average thermal resistance of RSI=1m2·K/W over a period of 75 years.	Area	1 m²	1			75		1.37E+00															-	-	
10 22 19	INTERIOR	GLAZING	INTERIOR GLAZING	DIRTT Solid Willow Glass Interior wall	This EPD is for an interior solid wall, consisting of an aluminum frame, cotton-denim insulation and painted Willow Glass adhered to a NAF (no added formaldehyde) MDF (medium density fiberboard) tile. This assembly is manufactured at: 155 Knowlton Way, Savannah, GA 31407 United States DIRTT's interior walls are designed and manufactured offsite, then installed in a building with a floor-to-ceiling vertical span. They provide a sight, sound, and air barrier; allow for integrated technology and can be disassembled and moved without losing any performance characteristics.	https://www.astm.org/CERTIFICATION/DOCS/444.EPD_for_DIRTT_Solid_Willow_Glass_Interior_Wall_Savannah.pdf	https://www.astm.org/CERTIFICATION/DOCS/439.EPD_for_DIRTT_Solid_Willow_Glass_Interior_Wall_Phoenix.pdf			Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Product Specific		The functional Unit is one square meter (1 m²) of demountable interior wall for 30 years, meeting the performance standards of the International Building Code.	Area	1 m²	1			30		1.64E+02													0.00E+00		-	-	
10 22 19	INTERIOR	GLAZING	INTERIOR GLAZING	Optima Aluminum Glass partitions, single glazed		https://optimasystems.com/wp-content/uploads/Optima-Partitions-EPD-October-2018-FOR-WEB.pdf	https://optimasystems.com/wp-content/uploads/Optima-Partitions-EPD-October-2018-FOR-WEB.pdf			The CEN standard EN 15804 serves as the core PCR	Product Specific								15															0.00E+00		-	-	
10 22 19	INTERIOR	PARTITIONS	DEMOUNTABLE PARTITION	Allsteel Beyond Frameless Demountable Partition		https://www.scscertified.com/products/cert_pdfs/SCS-EPD-05294_Allsteel_Beyond-Frameless_011419.pdf	https://www.allsteeloffice.com/products/architectural/architectural-walls/beyond			Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Product Specific		board (Table 1).	Area	1 m²	1			30																	-	-	
10 22 19	INTERIOR	Glazing	INTERIOR GLAZING	KI Genius Architectural Wall		https://ki.widen.net/content/72iummigwg/pdf/Genius-Wall-Glass-Panel-with-1-tier-Environmental-Product-Declaration.pdf?u=vzbxfu				Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Product Specific								15																	-	-	
10 23 13	INTERIOR	GLAZING	INTERIOR GLAZING	DIRTT Solid Glass Interior Wall (Savannah)	This EPD is for an interior solid wall, consisting of an aluminum frame and glass insert. This assembly is manufactured at: 155 Knowlton Way, Savannah, GA 31407 United States DIRTT's interior walls are designed and manufactured offsite, then installed in a building with a floor-to-ceiling vertical span. They provide a sight, sound, and air barrier; allow for integrated technology and can be disassembled and moved without losing any performance characteristics.	https://www.astm.org/CERTIFICATION/DOCS/441.EPD_for_DIRTT_Solid_Glass_Interior_Wall_Savannah.pdf	https://www.dirtt.com/			Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Product Specific		The functional Unit is one square meter (1 m²) of demountable interior wall for 30 years, meeting the performance standards of the International Building Code.	Area	1 m²	1			30		8.10E+01															-	-	
10 23 13	INTERIOR	PARTITIONS	DEMOUNTABLE PARTITION	DIRTT Solid Thermofoil Interior Wall (Savannah)	This EPD is for an interior solid wall, consisting of an aluminum frame, cotton-denim insulation and a NAF (no added formaldehyde) MDF (medium density fiberboard) tile with a thermofoil finish. This assembly is manufactured at: 7303 30 St SE, Calgary, AB T2C 1N6 Canada. DIRTT's interior walls are designed and manufactured offsite, then installed in a building with a floor-to-ceiling vertical span. They provide a sight, sound, and air barrier; allow for integrated technology and can be disassembled and moved without losing any performance characteristics.	https://www.astm.org/CERTIFICATION/DOCS/443.EPD_for_DIRTT_Solid_Thermofoil_Interior_Wall_Savannah.pdf				Earthsure Product Category Rule 30162403:2014 for Interior Wall Systems	Product Specific		This EPD is for an interior solid wall, consisting of an aluminum frame, cotton-denim insulation and a NAF (no added formaldehyde) MDF (medium density fiberboard) tile with a thermofoil finish. This assembly is manufactured at: 7303 30 St SE, Calgary, AB T2C 1N6 Canada. DIRTT's interior walls are designed and manufactured offsite, then installed in a building with a floor-to-ceiling vertical span. They provide a sight, sound, and air barrier; allow for integrated technology and can be disassembled and moved without losing any performance characteristics.						30		1.35E+02															-	-	
10 26 13	INTERIOR	WALL PROTECTION	CORNER GUARDS	8PH Corner Guards		https://info.nsf.org/Certified/Sustain/ProdCert/EPD10506.pdf				Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.2, 2018 Part B: Wall and Door Protection EPD Requirements, Version 1.0, 2019	Product Specific								15																	-	-	
12 35 53	CASEWORK	CABINETS	BAMBOO	Flat and Edge Grain Plyboo		https://www.plyboo.com/wp-content/uploads/files-migrated/downloads/Smith_Fong_Plyboo_EPD.pdf				ISO 14044 and Product Category Rules (PCR) for Construction Products and Services.	Product Specific		The declared unit aims at providing a reference to which the data inputs and outputs are normalized in such a way that the same level of service is represented. The declared unit for this study is 1 kilogram (kg) of final bamboo product (plyboo). The bamboo product assessed in this study is flat and edge grain Plyboo used for various interior applications.	Mass	1 kg		1.00		30		3.60E+00													-4.30E+00		3.60	(4.30)	
12 35 53	CASEWORK	CABINETS	STEEL SHEET	Cold Formed Steel Framing		https://www.scscertified.com/products/cert_pdfs/SCS-EPD-07103_SFIA_052821.pdf				ISO 14044 and Product Category Rules (PCR) for Construction Products and Services.	Product Specific		1 metric ton of industry-averaged cold formed steel framing	Mass	1 metric tonne		1,000.00		30		2.44E+03													0.00E+00		2.44	-	
12 35 53	CASEWORK	CABINETS	PLYWOOD	North American Softwood Plywood		https://www.awc.org/pdf/greenbuilding/epd/AWC_EPD_NorthAmericanSoftwoodPlywood_20200605.pdf				UL Environment: Product Category Rules for Building-Related Products and 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	Industry Wide		The declared unit of the underlying LCA study was "the production of one cubic meter (1 m³) of softwood plywood produced in North America"	Volume	1 m³	1	484.00		30		2.19E+02													-2.13E+03		0.45	(4.40)	
12 35 53	CASEWORK	COUNTERTOP	HPL LAMINATE	Wilsonart High Pressure Laminate		https://wilsonart.app.box.com/v/EPDCompactLaminate				Part B: Requirements on the EPD for Laminates, 07/2014	Product Specific		The declared unit is 1 m2 of Compact HPL with 8 mm thickness and a density of at least 1350 kg/m³. The declared unit refers to the Compact HPL products manufactured with phenolic impregnated kraft paper core and melamine impregnated decor paper. Special decors, fire retardants or alternative core productiontechnologies are not included. The declared unit refers to the average Compact HPL products manufactured by ICDLI aisbl members (weighted average).	Area	1 m²	1	0.09		30		3.12E+01													0.00E+00		336.93	-	
12 35 53	CASEWORK	COUNTERTOP	PHENOLIC PANEL	Fundermax Max Panels	Phenolic Resin Countertop	https://fundermax.us/sustainability/	https://www.fundermax.at/en/downloads/			Laminates, 10.2018 (PCR checked and approved by the SVR)	Product Specific		1 m² Compactplatte	Area	1 m²	1	11.90		30		2.09E+01									1.89E+01		-8.74E+00		0.00E+00		1.76	-	
12 35 53	CASEWORK	COUNTERTOP	STAINLESS STEEL SHEET	Cold Rolled Stainless Steel Outokumpu Oyj	Stainless Steel Raw material	https://otke-cdn.outokumpu.com/-/media/files/sustainability/epd-cold-rolled-stainless-steel.pdf?revision=cc4d53d2-3e02-4b4c-9015-38af8221d28f&modified=20191102013928				Structural steels, 07.2014 (PCR checked and approved by the SVR)	Product Specific		The declaration applies to one ton of cold rolled stainless steel product. The declared unit is the production and recycling of one ton of cold rolled stainless steel product.	Mass	1 metric tonne		1,000.00		30		3.39E+03									2.48E+00		-1.50E+03		0.00E+00		3.39	-	
12 35 53	CASEWORK	COUNTERTOP	PHENOLIC PANEL	Trespa TopLab		https://portal.environdec.com/api/api/v1/EPDLibrary/Files/46ada3b8-55f1-494f-802c-d1aa12f25934/Data	https://www.trespa.com/sites/trespa.com/files/other-language-docs-files/14700_v1.1_01-2021_TrespaToplab_brochure_LR.pdf	https://www.trespa.com/toplab		PCR 2012:01 Construction Products And Construction Services, Version 2.3, UN CPC 314	Product Specific		In accordance to the PCR the declared unit is 1 m² of product. The Trespa® Toplab® HPL product with 16 mm thickness has an area weight of 22.4 kg/m².	Area	1 m²	1	22.40		50		4.46E+01															1.99	-	
12 51 20	FURNITURE	CHAIRS	TASK CHAIR	Knoll Ollo Light Task Chair	Task Chair	https://www.knoll.com/document/1356409813900/Ollo%20Light%20Task%20Chair%20EPD.pdf				PCR 2012:01 Construction Products And Construction Services, Version 2.3, UN CPC 314	Product Specific			Count	1 Chair				15		1.08E+02															-	-	
12 51 20	FURNITURE	CHAIRS	TASK CHAIR	Steelcase Think Chair	Task Chair	https://www.steelcase.com/content/uploads/sites/10/2015/01/EPD-Think.pdf				[Not specified]	Product Specific			Count	1 Chair				15		9.42E+01															-	-	
12 51 20	FURNITURE	CHAIRS	TASK CHAIR	New Aeron Chair		https://www.hermanmiller.com/content/dam/hermanmiller/documents/news_events_media/2016_aeron_remastered_presskit/20161017-new_aeron_chair_epd_2016.pdf				Reference PCR: Product Category Rule for Environmental Product Declaration BIFMA PCR for Seating. Valid through September 26, 2021	Product Specific		One unit of seating for one individual, maintained over a 10-year period, including packaging materials used for the final assembled product.	Count	1 Chair				15		8.53E+01															-	-	
12 59 00	FURNITURE	SYSTEMS	BENCH	Steelcase FrameOne Bench	Steelcase	https://www.steelcase.com/content/uploads/sites/10/2015/01/EMEA-EN-FrameOne-Bench-EPD.pdf					Product Specific		One desk. Standard features on this model include: - Top dimensions: 3200 mm x 1600 mm (5.12 m² / four tops of 1600 x 800 mm each) - Melamine top - Steel legs - Cable way for cable management	Count	1 Desk				15		3.71E+02															-	-	

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						Product Data				Product Category Rule		Type of EPD		Declared Unit						Life		GWP Values (kg/CO2e)														
Spec Section	LCA Category	LCA Subcategory	Display Name	Product Name	Product Description	Environmental Product Declaration (EPD)	Product Literature	Reference Link	0	PCR Name	Type of EPD	Co nt ain s	Declared Unit Description	Unit Type	Declared Unit	Adjusment Factor to m²	Mass (kg)	2	Service Life (yrs)	1	A1-A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	D	A1-D	Biogenic Carbon	3	A1-A3 / kg	Biogenic Carbon / kg of product	Notes
12 59 00	FURNITURE	SYSTEMS	PANEL BASED WORKSTATION	Knoll Dividends Horizon	Knoll	https://info.nsf.org/Certified/Sustain/ProdCert/EPD10338.pdf	https://www.knoll.com/product/dividends-horizon%3Fsection=design			NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	Product Specific		The functional unit is one square meter (1m2) of workspace for a period of 10 years. L shaped workstation with panel walls and pedestal storage.	Area	1 m²	1			15		4.56E+02														-	-	
12 59 00	FURNITURE	SYSTEMS	SPINE BASED WORKSTATION	Knoll Currents	Knoll	https://www.knoll.com/document/13568553931177/KNL21-EPD-Currents-final.pdf				NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	Product Specific		The functional unit is one square meter (1m2) of workspace for a period of 10 years. L shaped workstation with panel walls and pedestal storage.	Area	1 m²	1			15		4.95E+02														-	-	
12 59 00	FURNITURE	SYSTEMS	BENCHING	Knoll Antenna Workspaces	Knoll	https://www.knoll.com/document/13568539289774/KNL21-EPD-AntennaWorkspaces_final.pdf				NSF International-BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814	Product Specific		The functional unit is one square meter (1m2) 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	FURNITURE	SYSTEMS	DESK	Steelcase B-Free Desk	Steelcase	https://www.ocs.plus/sites/default/files/EPD_B-Free.pdf					Product Specific		The model chosen for analysis is the most representative line (reference # N31102700) from the B-Free desk range. Standard features on this model include: - 1600 x 800 mm top size - 740 mm height - facility manager sliding top function - cable brackets	Count	1 Desk				15		1.00E+02														-	-	
13 35 53	CASEWORK	COUNTERTOP	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	EXTERIOR	CLADDING	WOOD CLADDING	Accoya Wood - decking, cladding and planed timber for joinery applications		https://www.accoya.com/app/uploads/2020/05/Environmental-Product-Declaration-%E2%80%93-cladding-decking-planed-timber-%E2%80%93-by-19804.pdf				The CEN Norm EN 15804 serves as the core PCR	Product Specific		The declared unit is 1 m3 of Accoya planed timber	Volume	1 m³	1			60		-4.33E+02														-	-	

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Revit Quantity Data for all options and systems

LCA	1
Phase Created	New Construction
Type Comments	

Design Option	LCA Category	LCA Subcategory	LCA Spacetype	Type	#	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	**COLUMN**	OFFICE		2	1	
Baseline	SUPERSTRUCTURE	**SLAB**	LAB		1	37	111
Baseline	SUPERSTRUCTURE	**SLAB**	OFFICE		1	14	69
Improved	CASEWORK	**COUNTERTOP**	LAB		4	0	7
Improved	CASEWORK	**MOBILE BENCH**	LAB		15	1	71
Improved	CASEWORK	**CABINETS**	LAB		27	3	56
Improved	DOORS		LAB		2	0	7
Improved	EQUIPMENT	**FUMEHOOD**	LAB		1	2	16
Improved	EXTERIOR	**OPAQUE**	EXTERIOR	Exterior - Swisspearl - Air	6	11	29
Improved	EXTERIOR	**OPAQUE**	EXTERIOR	Exterior - Swisspearl - Exterior Cladding Swisspearl	6	11	29
Improved	EXTERIOR	**OPAQUE**	EXTERIOR	Exterior - Swisspearl - PW_Metal_Stud_Gray_Matte_Generic	6	11	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	**BEAM**	LAB		6	1	
Improved	SUPERSTRUCTURE	**BEAM**	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		1	2	66
Reimagined	INTERIOR	**PARTITIONS**	LAB		15	48	391
Reimagined	SUPERSTRUCTURE	**COLUMN**	LAB		6	5	
Reimagined	SUPERSTRUCTURE	**COLUMN**	EXTERIOR	18" x 18"	4	4	

Low Carbon Labs

Revit Quantity Data for all options and systems

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Baseline	Casework	New Construction	123553 - FH MOBILE - COMBO CABINET D - 18X28.5	FH Mobile Combo Cabinet D- 18x28.5 metal		1	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	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	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	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 metal		1	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	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	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	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	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Baseline	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D metal		1	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	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	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	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 metal		1	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	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	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	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	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 metal		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 metal		1	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	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	CASEWORK	CABINETS	LAB	0.168799694	1.293698096	
Baseline	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 metal		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0778712	3.342572521	3.158702
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.038474096	1.662247812	1.560630948
Baseline	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Baseline	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"		1	CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Baseline	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"		1	CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Baseline	Casework	New Construction	123554_Lab Casework-Mobile Table	6'-0"		1	CASEWORK	MOBILE BENCH	LAB	0.058776205	2.798219005	
Baseline	Casework	New Construction	123553 - FH DISTINCTION - 6 FT	FH Distinction - 6 ft STAINLESS		1	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	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	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	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	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	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	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	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	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	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	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	CASEWORK	MOBILE BENCH	LAB	0.094244767	5.247662002	1.393545
Baseline	Specialty Equipment	New Construction	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAND	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAND ALONE)		1	EQUIPMENT	FUMEHOOD	LAB	1.822942956	15.76786965	
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIPMEN	LAB	0.062472825	0.571017499	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIPMEN	LAB	0.062472825	0.571017499	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Air		1	EXTERIOR		EXTERIOR	6.083619903	15.328995	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic		1	EXTERIOR		EXTERIOR	6.083619903	15.328995	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - PW_ThermalProtection_RigidInsulation_Gray_Matte_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	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	EXTERIOR		EXTERIOR	5.807091726	14.6322225	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Air		1	EXTERIOR		EXTERIOR	5.807091726	14.6322225	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	EXTERIOR		EXTERIOR	6.083619903	15.328995	
Baseline	Walls	New Construction	Basic Wall	Exterior - Terracotta - Concrete Masonry Units		1	EXTERIOR		EXTERIOR	6.083619903	15.328995	
Baseline	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ„¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		8.01288375	
Baseline	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ„¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		8.01288375	
Baseline	Walls	New Construction	Curtain Wall	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 SSâ„¢ (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		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	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		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 - 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 - 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	
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	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.62280246	29.25859824	
Baseline	Ceilings	New Construction	Compound Ceiling	LAB CEILING - 1_ACT - PW_Ceiling_AcousticTile_White_LightGraySpeckles_24x24-Generic_APC2 (New)		1	INTERIOR		LAB	2.547020362	44.56733956	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Baseline	Ceilings	New Construction	Compound Ceiling	LAB CEILING - 1_ACT - PW_Ceiling_AcousticTile_White_LightGraySpeckles_ 24x24-Generic_APC2 (New)		1	INTERIOR		LAB	3.8254227	66.9366115	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	2.718341887	21.9537869	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.774662284	30.48500655	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	0.991235483	8.005141833	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.774662284	30.48500655	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	2.718341887	21.9537869	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	0.991235483	8.005141833	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.62280246	29.25859824	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.590284785	28.99597791	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.590284785	28.99597791	
Baseline	Ceilings	New Construction	Compound Ceiling	WRITE UP - 1_GWB - PW_Plaster_GypsumBoard_Gray_Matte_GenericFor Ceilings		1	INTERIOR		OFFICE	7.171788808	66.43629014	
Baseline	Ceilings	New Construction	Compound Ceiling			1	INTERIOR	CEILING	LAB	3.8254227	66.9366115	
Baseline	Ceilings	New Construction	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	
Baseline	Floors	New Construction	Floor	WRITE UP - 1_BROADLOOM - WRITEUP - 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	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	0.991235483	8.005141833	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.62280246	29.25859824	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	2.718341887	21.9537869	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.590284785	28.99597791	
Baseline	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655	
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	LAB	0.54862571		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	LAB	0.536380496		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	LAB	0.54862571		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	OFFICE	0.552439793		
Baseline	Structural Columns	New Construction	Concrete-Rectangular-Column	16 x 16		1	SUPERSTRUCTURE	COLUMN	OFFICE	0.552439793		
Baseline	Floors	New Construction	Floor	Concrete 13" - Concrete_CastInPlace_Gray		1	SUPERSTRUCTURE	SLAB	LAB	36.72492316	111.2203748	
Baseline	Floors	New Construction	Floor	Concrete 8" - Concrete_CastInPlace_Gray		1	SUPERSTRUCTURE	SLAB	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	SUPERSTRUCTURE	SLAB			97.42427933	179.860208
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B/	WSB36 wood			CASEWORK	CABINETS		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	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
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-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 wood		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 wood		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 wood		1	CASEWORK	CABINETS	LAB	0.108588701	4.125514166	
Improved	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 wood		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-CombinationCa	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-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Improved	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	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 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)			CASEWORK	COUNTERTOP		0.0194678	0.851610833	0.7896755
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.038474096	1.662247812	1.560630948
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0194678	0.851610833	0.7896755
Improved	Casework	New Construction	123553 - COUNTERTOP - STRAIGHT	30" Deep x 36" High (Backsplash)		1	CASEWORK	COUNTERTOP	LAB	0.0778712	3.342572521	3.158702
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	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	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	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
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
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
Improved	Specialty Equipment	New Construction	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAND	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAND ALONE)		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	
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Improved	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIPMEN	LAB	0.062472825	0.571017499	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIPMEN	LAB	0.062472825	0.571017499	
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Improved	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Improved	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Air		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - PW_Metal_Stud_Gray_Matte_Generic		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - Air		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	EXTERIOR		EXTERIOR	5.296061976	14.6322225	
Improved	Walls	New Construction	Basic Wall	Exterior - Swisspearl - 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		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	Exterior - Swisspearl - Exterior Cladding Swisspearl		1	EXTERIOR	OPAQUE	EXTERIOR	5.296061976	14.6322225	
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	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	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 - 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	
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	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.740781541	30.21137818	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	INTERIOR		LAB	3.740781541	30.21137818	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	INTERIOR		LAB	3.774662284	30.48500655	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Improved	Ceilings	New Construction	Compound Ceiling	LAB CEILING - 1_ACT - PW_Ceiling_AcousticTile_White_LightGraySpeckles_ 24x24-Generic_APC2 (New)		1	INTERIOR		LAB	2.547020362	44.56733956	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.774662284	30.48500655	
Improved	Ceilings	New Construction	Compound Ceiling	LAB CEILING - 1_ACT - PW_Ceiling_AcousticTile_White_LightGraySpeckles_ 24x24-Generic_APC2 (New)		1	INTERIOR		LAB	3.8254227	66.9366115	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.774662284	30.48500655	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	1.83767818	14.84125425	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.774662284	30.48500655	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	1.83767818	14.84125425	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	2.866001844	23.14627741	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	2.866001844	23.14627741	
Improved	Ceilings	New Construction	Compound Ceiling	WRITE UP - 1_GWB - PW_Plaster_GypsumBoard_Gray_Matte_GenericFor Ceilings		1	INTERIOR		OFFICE	7.171788808	66.43629014	
Improved	Ceilings	New Construction	Compound Ceiling			1	INTERIOR	CEILING	LAB	2.547020362	44.56733956	
Improved	Ceilings	New Construction	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	
Improved	Floors	New Construction	Floor	WRITE UP - 1_BROADLOOM - WRITEUP - 1_BROADLOOM		1	INTERIOR	FLOOR FINISH	OFFICE	2.120165094	66.77693447	
Improved	Walls	New Construction	Curtain Wall	GENERIC (Butt Glazed) 6"		1	INTERIOR	GLAZING	LAB		14.70964167	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	2.866001844	23.14627741	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.740781541	30.21137818	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	1.83767818	14.84125425	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655	
Improved	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655	
Improved	Floors	New Construction	Floor	LW Concrete on Metal Deck - 6 1/2" - PW_Metal_AluminumDeck_DarkBronze_Anodized_ GrayShading_MRK		1	SUPERSTRUCTURE		OFFICE	29.69488427	179.860208	
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1	SUPERSTRUCTURE	BEAM	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	BEAM	LAB	0.25527225		
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1	SUPERSTRUCTURE	BEAM	LAB	0.10194353		
Improved	Structural Framing	New Construction	W-Wide Flange	W24X84		1	SUPERSTRUCTURE	BEAM	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	W16X31		1	SUPERSTRUCTURE	BEAM	OFFICE	0.057274591		
Improved	Structural Framing	New Construction	W-Wide Flange	W16X31		1	SUPERSTRUCTURE	BEAM	OFFICE	0.057274591		
Improved	Structural Framing	New Construction	W-Wide Flange	W18X40		1	SUPERSTRUCTURE	BEAM	OFFICE	0.05030804		
Improved	Structural Framing	New Construction	W-Wide Flange	W16X31		1	SUPERSTRUCTURE	BEAM	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	COLUMN	LAB	0.074277887		
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	COLUMN	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	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
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	COLUMN	OFFICE	0.074277887		
Improved	Structural Columns	New Construction	W-Wide Flange-Column	W14X90		1	SUPERSTRUCTURE	COLUMN	OFFICE	0.074277887		
Reimagined	Floors	New Construction	Floor	CLT 7 PLY 9-5/8" - Softwood	Lumber			SUPERSTRUCTURE	SLAB		144.2628752	179.860208
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Plywood	Sheathing		1	EXTERIOR			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 B	WSB36 wood			CASEWORK	CABINETS		0.108588701	4.125514166	
Reimagined	Casework	New Construction	123553 - CASEWORK - BASE CABINET - WOOD - SINK B	WSB36 wood		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 B	WSB36 wood		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 B	WSB36 wood		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 B	WSB36 wood		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-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	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_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	CASEWORK	CABINETS	LAB	0.061181196	2.485341643	
Reimagined	Casework	New Construction	123553_Casework-BaseCabinet-Wood-CombinationCa	W1C1836 - 18"W x 36"H x 22"D		1	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-CombinationCa	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		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
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
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
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
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
Reimagined	Specialty Equipment	New Construction	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAND	115313 - FUME HOOD - VERTICAL SLIDING SASH (STAND ALONE)		1	EQUIPMENT	FUMEHOOD	LAB	1.822942956	15.76786965	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIPMEN	LAB	0.062472825	0.571017499	
Reimagined	Specialty Equipment	New Construction	SE - Support - Vessels	Cylinder Generic 10x50		0	EQUIPMENT	OWNER EQUIPMEN	LAB	0.062472825	0.571017499	
Reimagined	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Reimagined	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Reimagined	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Reimagined	Specialty Equipment	New Construction	M2055 - Shelving Storage Wire CRS w Adjustable Shelv	M2055 - Shelving Storage Wire CRS w Adjustable Shelves		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.112926445	6.562888053	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Specialty Equipment	New Construction	Lab Equipment Matrix	01-REFRIGERATOR		0	EQUIPMENT	OWNER EQUIPMEN	LAB	1.3167312	3.932248507	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Laminated Veneer Lumber		1	EXTERIOR		EXTERIOR	7.229497807	19.974145	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	EXTERIOR		EXTERIOR	7.229497807	19.974145	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Air		1	EXTERIOR		EXTERIOR	7.229497807	19.974145	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic		1	EXTERIOR		EXTERIOR	7.229497807	19.974145	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Air		1	EXTERIOR		EXTERIOR	8.196251057	22.64510625	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - PW_Plaster_GypsumBoard_Gray_Matte_GenericWall		1	EXTERIOR		EXTERIOR	8.196251057	22.64510625	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Laminated Veneer Lumber		1	EXTERIOR		EXTERIOR	8.196251057	22.64510625	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - PW_ThermalProtection_RigidInsulation_Gray_Matte_Generic		1	EXTERIOR		EXTERIOR	8.196251057	22.64510625	
Reimagined	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ„¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		5.3419225	
Reimagined	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ„¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		5.3419225	
Reimagined	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ„¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		4.006441875	
Reimagined	Walls	New Construction	Curtain Wall	Kawneer - 1600 SSâ„¢ (Screw Spline) 2-1/2" x 7-1/2"		1	EXTERIOR	GLAZING	EXTERIOR		4.006441875	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Exterior Cladding Wood		1	EXTERIOR	OPAQUE	EXTERIOR	7.229497807	19.974145	
Reimagined	Walls	New Construction	Basic Wall	Exterior - Wood - Exterior Cladding Wood		1	EXTERIOR	OPAQUE	EXTERIOR	8.196251057	22.64510625	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Coalesse_Kart_StoolOnCasters	Non-Upholstered wo/Arms		1	FURNITURE	CHAIRS	LAB	0.013428797	1.458204617	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - Seating - Think 465 Series - Chair - Arm	Standard Upholstery		1	FURNITURE	CHAIRS	OFFICE	0.019884726	2.027641036	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - single Sided Bases1	24" x 72" - End Unit		1	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End		1	FURNITURE	SYSTEMS	OFFICE	0.074584624	5.252544969	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions1	24" x 72" - End		1	FURNITURE	SYSTEMS	OFFICE	0.074584624	5.252544969	
Reimagined	Furniture	New Construction	Steelcase - FrameOne - Dual Sided Extensions1	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	FURNITURE	SYSTEMS	OFFICE	0.033918462	1.724921909	

Design Option	Category	Phase Created	Family	Type	Type Comments	LCA	LCA Category	LCA Subcategory	LCA Spacetype	LCA_VOLUME_M3	LCA_AREA_M2	LCA_AREA_COUNTER_M2
Reimagined	Ceilings	New Construction	Compound Ceiling	LAB CEILING - 1_ACT - PW_Ceiling_AcousticTile_White_LightGraySpeckles_ 24x24-Generic_APC2 (New)			INTERIOR			2.547020362	44.56733956	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	2.417858154	19.52704931	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	2.726252242	22.01767032	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.598347112	29.06108864	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	2.417858154	19.52704931	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.774662284	30.48500655	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.774662284	30.48500655	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.598347112	29.06108864	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Metal_Stud_Gray_Matte_Generic		1	INTERIOR		LAB	3.630937808	29.32429869	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	3.630937808	29.32429869	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR		LAB	2.726252242	22.01767032	
Reimagined	Ceilings	New Construction	Compound Ceiling				INTERIOR	CEILING		2.547020362	44.56733956	
Reimagined	Doors	New Construction	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			INTERIOR	FLOOR FINISH		0.356909667	112.41263	
Reimagined	Floors	New Construction	Floor	WRITE UP - 2_CARPET TILE - WRITEUP_2-CARPET TILE		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	
Reimagined	Floors	New Construction	Floor	WRITE UP - 2_CARPET TILE - WRITEUP_2-CARPET TILE		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	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	2.726252242	22.01767032	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.630937808	29.32429869	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.774662284	30.48500655	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	3.598347112	29.06108864	
Reimagined	Walls	New Construction	Basic Wall	Interior Wall - Tally - PW_Plaster_GypsumBoard_Gray_Matte_GenericWa ll		1	INTERIOR	PARTITIONS	LAB	2.417858154	19.52704931	
Reimagined	Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"			SUPERSTRUCTURE	BEAM		3.065096956		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"			SUPERSTRUCTURE	BEAM		4.439456244		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"			SUPERSTRUCTURE	BEAM		3.065096956		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5"			SUPERSTRUCTURE	BEAM		1.362971322		
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	BEAM		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	BEAM		2.919969259		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"			SUPERSTRUCTURE	BEAM		2.89529755		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"			SUPERSTRUCTURE	BEAM		4.439456244		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	4'-4" x 1'-1 5/8"			SUPERSTRUCTURE	BEAM		4.439456244		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5"			SUPERSTRUCTURE	BEAM		1.987126678		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5"			SUPERSTRUCTURE	BEAM		1.987126678		
Reimagined	Structural Framing	New Construction	Glulam-Western Species	11.5" x 27.5"			SUPERSTRUCTURE	BEAM		1.987126678		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	EXTERIOR	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	EXTERIOR	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	EXTERIOR	0.8893245		

Design Option	Category	Phase Created	Family	Type	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	SUPERSTRUCTURE	COLUMN	EXTERIOR	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.8893245		
Reimagined	Structural Columns	New Construction	Parallel Strand Lumber	18" x 18"		1	SUPERSTRUCTURE	COLUMN	LAB	0.8893245		
Reimagined	Floors	New Construction	Floor	Concrete 2" - Concrete_CastInPlace_Gray			SUPERSTRUCTURE	SLAB		9.136887467	179.860208	

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: https://transform.aia.org/confluence/pages/viewpage.action?pageId=81756799

US National Avg EUI Laboratories 370 kBtu/sf/yr

Energy Star Portfolio Manager

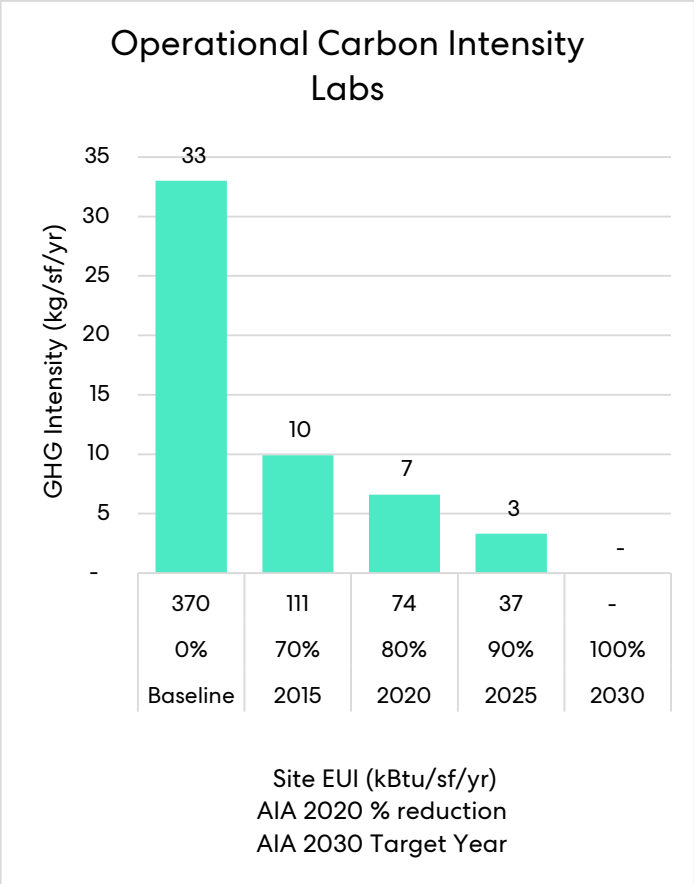
Emissions Factors https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf?dee6-4951

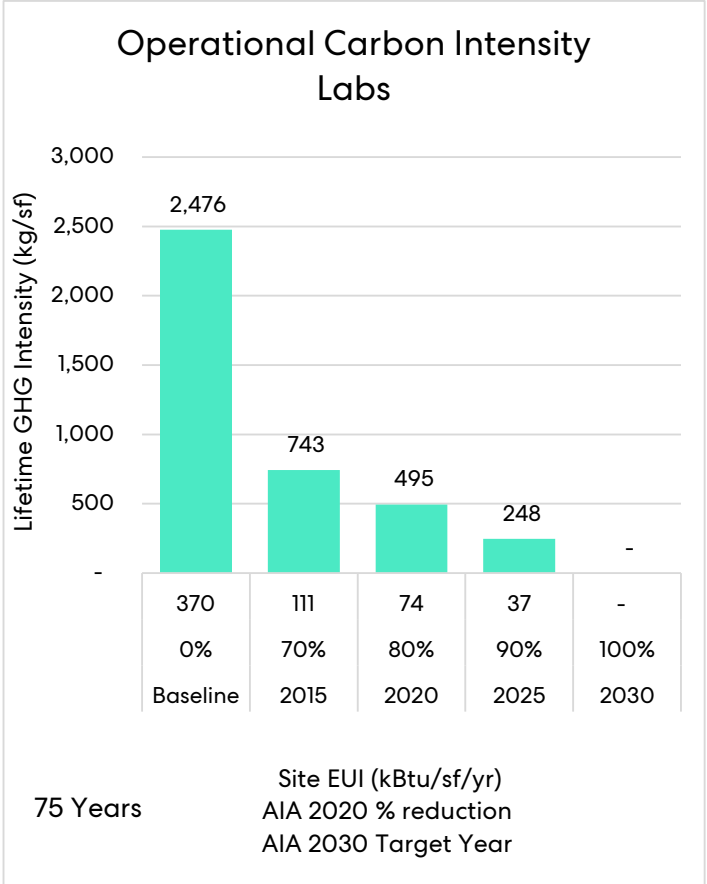
Indirect GHG Factors - US Electricity 0.1182 kg CO2e / kBtu

I2SL Lab Benchmarking tool (LBT)

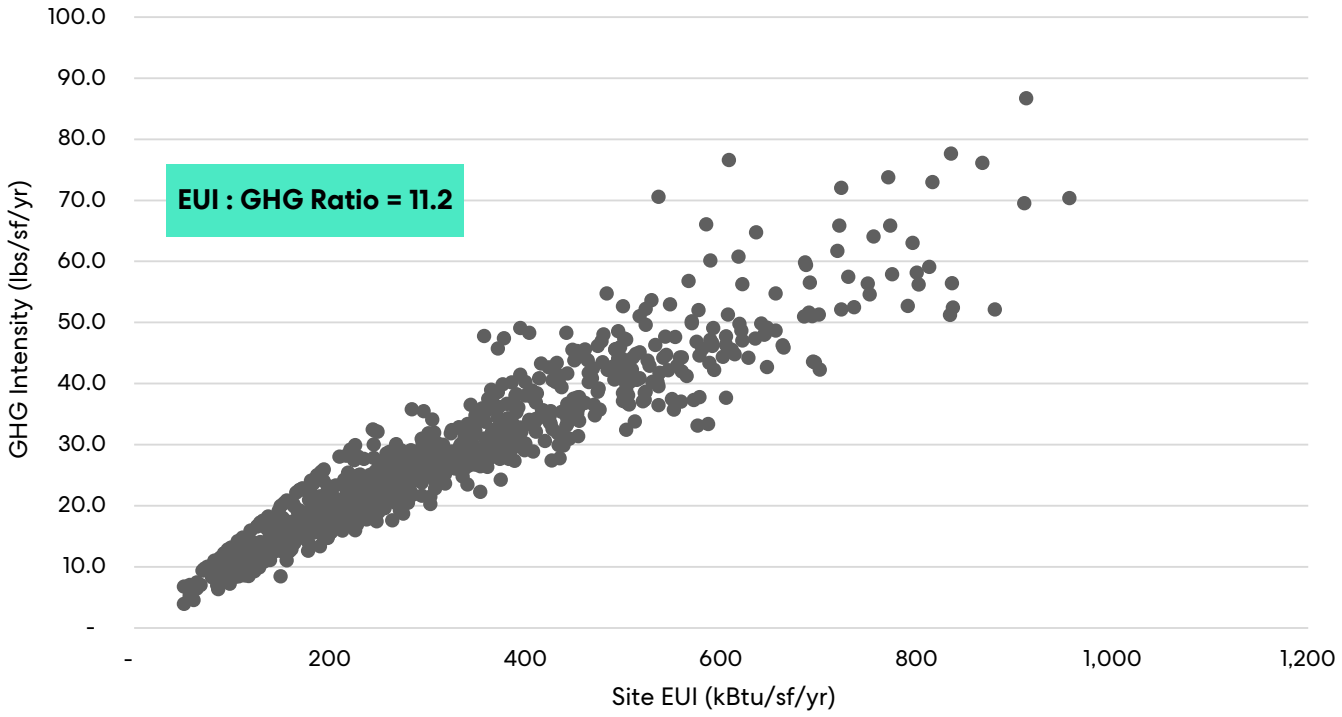
Analysis https://lbt.i2sl.org/buildings/charts

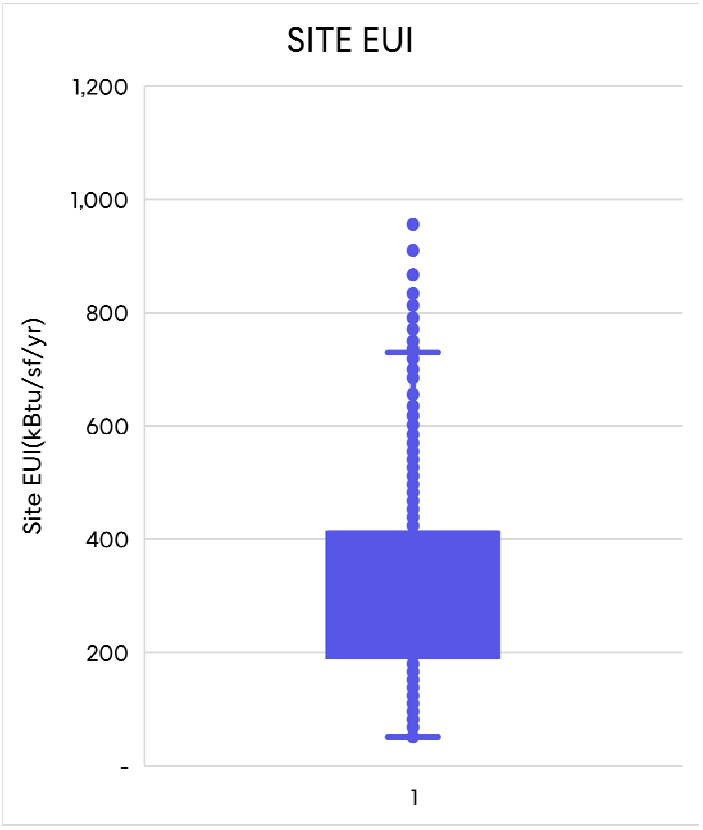
Avg GHG/EUI 0.1935 kg CO2e / kBtu

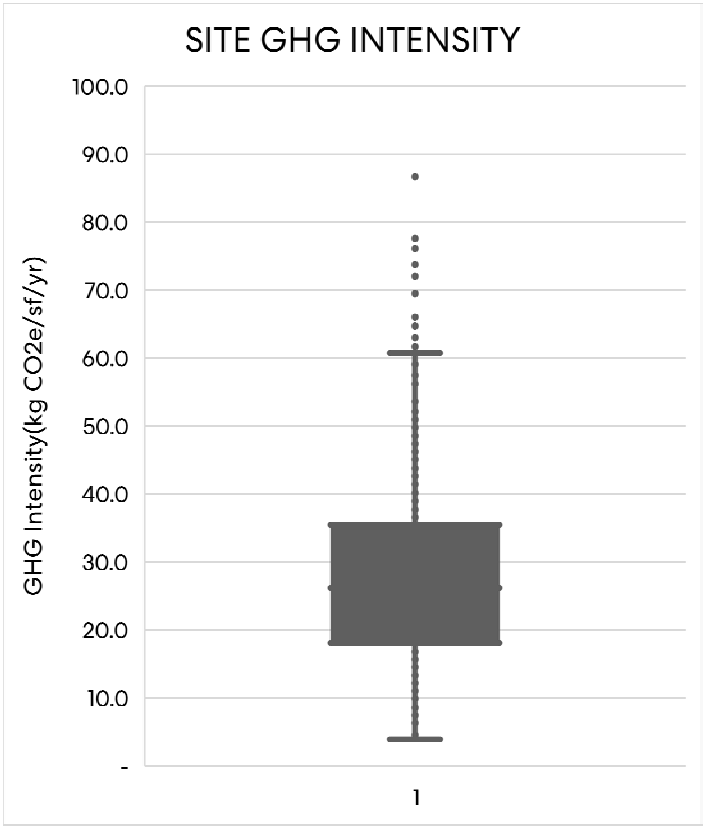




I2SL LAB BENCHMARKING TOOL


EUI : GHG Ratio = 11.2
GHG Intensity (lbs/sf/yr)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
-
-
200
400
600
800
1,000
1,200
Site EUI (kBtu/sf/yr)


SITE EUI
Site EUI(kBtu/sf/yr)
1,200
1,000
800
600
400
200
-
1


SITE GHG INTENSITY
GHG Intensity(kg CO2e/sf/yr)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
-
1