

MATERIAL CARBON PROJECT RESULTS



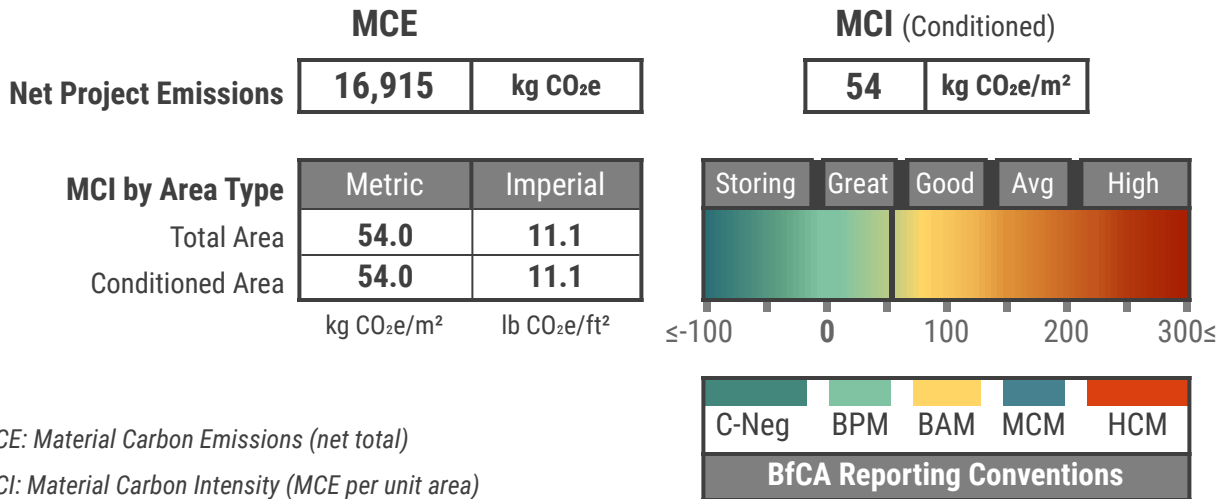
PROJECT INFORMATION

Project Name	Catherine Street Heritage House	Construction Year	1908
Design Firm(s)	Waymark Architecture	Number of Bedrooms	4
Engineering Firm(s)		Stories Above Grade	2
Builder / Developer	Michel Kajiura		
Development Project		CONDITIONED AREA	
Street Address	1021 Catherine Street	Above Grade	2477 ft ²
City	Victoria	Below Grade	896 ft ²
Province / State	British Columbia	Total	3372 ft ²
Country	Canada		
		GROSS AREA	
Building Type	Single Detached House	Excluding Garage	3373 ft ²
Construction Type	Energy Retrofit	Garage	0 ft ²
Project Stage	Construction Complete	Total	3373 ft ²

MATERIAL CARBON EMISSIONS BY SECTION

Footings & Slabs	5,106 kg CO ₂ e	
Foundation Walls	3,778 kg CO ₂ e	
Structural Elements	0 kg CO ₂ e	
Exterior Walls	1,137 kg CO ₂ e	
Party Walls	0 kg CO ₂ e	
Exterior Wall Cladding	794 kg CO ₂ e	
Windows	1,004 kg CO ₂ e	
Interior Walls	111 kg CO ₂ e	
Floors	2,724 kg CO ₂ e	
Ceilings	174 kg CO ₂ e	
Roof	2,087 kg CO ₂ e	
Garage	0 kg CO ₂ e	
NET TOTAL	16,915 kg CO ₂ e	0 MCE (kg CO ₂ e) 10,000

MATERIAL CARBON RESULTS



HIGHEST CARBON MATERIAL APPLICATIONS

SECTION	kg CO ₂ e	MATERIAL
Foundation Walls	3,521	Concrete – 26-30 MPa, Canadian Benchmark Aver
Footings & Slabs	2,640	Concrete – 0-25 MPa, Canadian Benchmark Avera
Footings & Slabs	2,294	Concrete – 0-25 MPa, Canadian Benchmark Avera
Floors	2,062	Hardwood flooring / CRAFT Artisan Wood Floors /
Windows	1,004	Window - double-glazed / Wood frame / BfCA Stuc
Roof	806	Wood roof truss / Gable Roof, Double Howe, 2x6 C
Roof	661	Asphalt Shingles [Industry Avg US & CA]
Exterior Walls	532	Plywood / 1/2" / AWC & CWC [Industry Avg US &
Floors	467	Plywood / 5/8" / AWC & CWC [Industry Avg US &
Exterior Wall Cladding	465	Drywall 1/2" [BEAM Avg US & CA]

LOWEST CARBON MATERIAL APPLICATIONS

SECTION	kg CO ₂ e	MATERIAL
Interior Walls	25	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry
Foundation Walls	59	Fiberglass batt / R 3.6/inch [BEAM Avg]
Foundation Walls	78	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry

COMMENTS

Some assumptions are made based on historical records of building construction assemblies typical to the time period. Item within assemblies which were unable to be viewed or verified may be listed based on R value and components which have data for embodied carbon.



REVIEW PROJECT MATERIALS

16,915
16,915
0

SECTION	CATEGORY	MATERIAL	NET EMISSIONS (kg CO ₂ e)	CARBON EMISSIONS (kg CO ₂ e)	CARBON STORAGE (kg CO ₂ e)
Footings & Slabs	CONTINUOUS CONCRETE FOOTINGS	Concrete – 0-25 MPa, Canadian Benchmark Average / CRMCA [Industry Avg CA]	2,294	2,294	0
Footings & Slabs	CONCRETE SLABS	Concrete – 0-25 MPa, Canadian Benchmark Average / CRMCA [Industry Avg CA]	2,640	2,640	0
Footings & Slabs	REBAR FOR SLABS	Rebar / Concrete Reinforcing Steel Institute [Industry Avg N.America] / 15M	172	172	0
Foundation Walls	CONCRETE FOUNDATION WALLS	Concrete – 26-30 MPa, Canadian Benchmark Average / CRMCA [Industry Avg CA]	3,521	3,521	0
Foundation Walls	LIGHT WOOD FRAME WALLS	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry Avg US & CA]	78	78	0
Foundation Walls	CAVITY INSULATION	Fiberglass batt / R 3.6/inch [BEAM Avg]	59	59	0
Foundation Walls	INTERIOR WALL CLADDING	Drywall 1/2" [BEAM Avg US & CA]	121	121	0
Exterior Walls	LIGHT WOOD FRAME WALLS	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry Avg US & CA]	268	268	0
Exterior Walls	STRUCTURAL SHEATHING	Plywood / 1/2" / AWC & CWC [Industry Avg US & CA]	532	532	0
Exterior Walls	CAVITY INSULATION	Fiberglass loose fill / ~R2.6/inch [BEAM Avg]	337	337	0
Exterior Wall Cladding	EXTERIOR WALL CLADDING	Cedar Siding / Western Red Cedar Lumber Assn / 1x6 Boards [Industry Avg CA]	329	329	0
Exterior Wall Cladding	INTERIOR CLADDING FOR EXTERIOR WALLS	Drywall 1/2" [BEAM Avg US & CA]	465	465	0
Windows	WINDOWS – DOUBLE-GLAZED	Window - double-glazed / Wood frame / BfCA Study [US & CA]	1,004	1,004	0
Interior Walls	LIGHT WOOD FRAME INTERIOR WALLS	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry Avg US & CA]	25	25	0
Interior Walls	CLADDING FOR INTERIOR WALLS	Drywall 1/2" [BEAM Avg US & CA]	87	87	0
Floors	LIGHT WOOD FLOOR FRAMING	Wood / SPF / 2x8 Lumber / AWC & CWC [Industry Avg US & CA]	195	195	0
Floors	SUB FLOORING	Plywood / 5/8" / AWC & CWC [Industry Avg US & CA]	467	467	0
Floors	FLOORING	Hardwood flooring / CRAFT Artisan Wood Floors / Engineered / 5/8", SFI Certified	2,062	2,062	0
Ceilings	CEILING FINISHES	Drywall 1/2" [BEAM Avg US & CA]	174	174	0
Roof	WOOD ROOF FRAMING	Wood roof truss / Gable Roof, Double Howe, 2x6 Chords, 2x4 Webs, 4:12 Pitch / QWEB [Industry Avg CA]	806	806	0
Roof	ROOF DECKING	Plywood / 5/8" / AWC & CWC [Industry Avg US & CA]	452	452	0
Roof	ROOFING	Asphalt Shingles [Industry Avg US & CA]	661	661	0
Roof	ROOF CAVITY INSULATION	Fiberglass batt / R 3.6/inch [BEAM Avg]	169	169	0

MATERIAL CARBON PROJECT RESULTS Insulation Upgrade



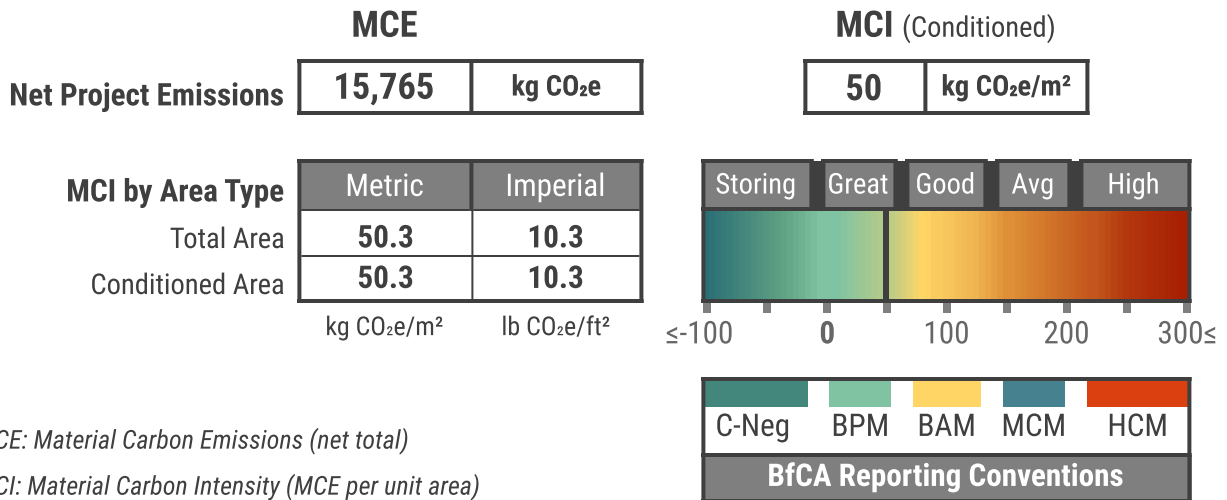
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Building Type	Single Detached House	Excluding Garage	3373 ft ²
Construction Type	Energy Retrofit	Garage	0 ft ²
Project Stage	Construction Complete	Total	3373 ft ²

MATERIAL CARBON EMISSIONS BY SECTION

Footings & Slabs	5,106 kg CO ₂ e	
Foundation Walls	3,623 kg CO ₂ e	
Structural Elements	0 kg CO ₂ e	
Exterior Walls	537 kg CO ₂ e	
Party Walls	0 kg CO ₂ e	
Exterior Wall Cladding	794 kg CO ₂ e	
Windows	1,004 kg CO ₂ e	
Interior Walls	164 kg CO ₂ e	
Floors	2,724 kg CO ₂ e	
Ceilings	174 kg CO ₂ e	
Roof	1,639 kg CO ₂ e	
Garage	0 kg CO ₂ e	
NET TOTAL	15,765 kg CO ₂ e	0 MCE (kg CO ₂ e) 10,000

MATERIAL CARBON RESULTS



HIGHEST CARBON MATERIAL APPLICATIONS

SECTION	kg CO ₂ e	MATERIAL
Foundation Walls	3,521	Concrete – 26-30 MPa, Canadian Benchmark Aver
Footings & Slabs	2,640	Concrete – 0-25 MPa, Canadian Benchmark Avera
Footings & Slabs	2,294	Concrete – 0-25 MPa, Canadian Benchmark Avera
Floors	2,062	Hardwood flooring / CRAFT Artisan Wood Floors /
Windows	1,004	Window - double-glazed / Wood frame / BfCA Stuc
Roof	806	Wood roof truss / Gable Roof, Double Howe, 2x6 C
Roof	661	Asphalt Shingles [Industry Avg US & CA]
Exterior Walls	532	Plywood / 1/2" / AWC & CWC [Industry Avg US &
Floors	467	Plywood / 5/8" / AWC & CWC [Industry Avg US &
Exterior Wall Cladding	465	Drywall 1/2" [BEAM Avg US & CA]

LOWEST CARBON MATERIAL APPLICATIONS

SECTION	kg CO ₂ e	MATERIAL
Exterior Walls	-600	Cellulose / batt / CMS / EcoCell / R 3.6/inch
Roof	-448	Cellulose / batt / CMS / EcoCell / R 3.6/inch
Foundation Walls	-156	Cellulose / batt / CMS / EcoCell / R 3.6/inch

COMMENTS

Once a building is constructed the damage in terms of embodied carbon is already done, however by choosing renovations that include carbon storage you can begin to offset the impact done by the original materials. Renovations that include a reduction of overall energy used can play a significant role in reducing future GHG emissions through the operation of the building.

The term "carbon" may refer to material carbon, operational carbon, or both. It may include carbon emissions and carbon storage, or the net result of both wherein emissions are positive values and storage is negative. "Carbon" is shorthand for the global warming impact of an equivalent mass of carbon dioxide equivalent (kg CO₂e) emissions over a fixed time horizon, typically 100 years. In simpler terms, it means how many CO₂ molecules in the atmosphere would cause the same global warming increase as the amount of actual emissions in question, over the same period of time after release. Mathematically, it is a sum of the products of each mass of greenhouse gas (GHG) emissions multiplied by the global warming potential (GWP) of that particular greenhouse gas (GHG). Carbon dioxide gas was strategically chosen as the standard reference gas for comparing the GWP of all GHGs so that any gas' impacts could be converted to and summed together in one common unit, CO₂e. The GWP for CO₂ was thus set as 1.



PROJECT MATERIALS With Additional Carbon Storage Options

15,765

17,296

1,532

SECTION	CATEGORY	MATERIAL	NET EMISSIONS (kg CO ₂ e)	CARBON EMISSIONS (kg CO ₂ e)	CARBON STORAGE (kg CO ₂ e)
Footings & Slabs	CONTINUOUS CONCRETE FOOTINGS	Concrete – 0-25 MPa, Canadian Benchmark Average / CRMCA [Industry Avg CA]	2,294	2,294	0
Footings & Slabs	CONCRETE SLABS	Concrete – 0-25 MPa, Canadian Benchmark Average / CRMCA [Industry Avg CA]	2,640	2,640	0
Footings & Slabs	REBAR FOR SLABS	Rebar / Concrete Reinforcing Steel Institute [Industry Avg N.America] / 15M	172	172	0
Foundation Walls	CONCRETE FOUNDATION WALLS	Concrete – 26-30 MPa, Canadian Benchmark Average / CRMCA [Industry Avg CA]	3,521	3,521	0
Foundation Walls	LIGHT WOOD FRAME WALLS	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry Avg US & CA]	78	78	0
Foundation Walls	CAVITY INSULATION	Fiberglass batt / R 3.6/inch [BEAM Avg]	59	59	0
Foundation Walls	CAVITY INSULATION	Cellulose / batt / CMS / EcoCell / R 3.6/inch	-156	43	198
Foundation Walls	INTERIOR WALL CLADDING	Drywall 1/2" [BEAM Avg US & CA]	121	121	0
Exterior Walls	LIGHT WOOD FRAME WALLS	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry Avg US & CA]	268	268	0
Exterior Walls	STRUCTURAL SHEATHING	Plywood / 1/2" / AWC & CWC [Industry Avg US & CA]	532	532	0
Exterior Walls	CAVITY INSULATION	Fiberglass loose fill / ~R2.6/inch [BEAM Avg]	337	337	0
Exterior Walls	CAVITY INSULATION	Cellulose / batt / CMS / EcoCell / R 3.6/inch	-600	164	764
Exterior Wall Cladding	EXTERIOR WALL CLADDING	Cedar Siding / Western Red Cedar Lumber Assn / 1x6 Boards [Industry Avg CA]	329	329	0
Exterior Wall Cladding	INTERIOR CLADDING FOR EXTERIOR WALLS	Drywall 1/2" [BEAM Avg US & CA]	465	465	0
Windows	WINDOWS – DOUBLE-GLAZED	Window - double-glazed / Wood frame / BfCA Study [US & CA]	1,004	1,004	0
Interior Walls	LIGHT WOOD FRAME INTERIOR WALLS	Wood / SPF / 2x4 Lumber / AWC & CWC [Industry Avg US & CA]	25	25	0
Interior Walls	CLADDING FOR INTERIOR WALLS	Drywall 1/2" [BEAM Avg US & CA]	87	87	0
Interior Walls	CLADDING FOR INTERIOR WALLS	Drywall 1/2" / CertainTeed / AirRenew / 1/2" (12.7 mm)	53	53	0
Floors	LIGHT WOOD FLOOR FRAMING	Wood / SPF / 2x8 Lumber / AWC & CWC [Industry Avg US & CA]	195	195	0
Floors	SUB FLOORING	Plywood / 5/8" / AWC & CWC [Industry Avg US & CA]	467	467	0
Floors	FLOORING	Hardwood flooring / CRAFT Artisan Wood Floors / Engineered / 5/8", SFI Certified	2,062	2,062	0
Ceilings	CEILING FINISHES	Drywall 1/2" [BEAM Avg US & CA]	174	174	0
Roof	WOOD ROOF FRAMING	Wood roof truss / Gable Roof, Double Howe, 2x6 Chords, 2x4 Webs, 4:12 Pitch / QWEB [Industry Avg CA]	806	806	0



PROJECT MATERIALS
With Additional Carbon Storage Options

15,765

17,296

1,532

SECTION	CATEGORY	MATERIAL	NET EMISSIONS (kg CO ₂ e)	CARBON EMISSIONS (kg CO ₂ e)	CARBON STORAGE (kg CO ₂ e)
Roof	ROOF DECKING	Plywood / 5/8" / AWC & CWC [Industry Avg US & CA]	452	452	0
Roof	ROOFING	Asphalt Shingles [Industry Avg US & CA]	661	661	0
Roof	ROOF CAVITY INSULATION	Fiberglass batt / R 3.6/inch [BEAM Avg]	169	169	0
Roof	ROOF CAVITY INSULATION	Cellulose / batt / CMS / EcoCell / R 3.6/inch	-448	122	570