Self-Build Zero-Energy Homes

Two Minnesota Case Studies

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In accordance with the Department of Labor and Industry's statute 326.0981, Subd. 11,

"This educational offering is recognized by the Minnesota Department of Labor and Industry as satisfying **1.5 hours** of credit toward **Building Officials and Residential Contractors code /1 hour energy** continuing education requirements."

For additional continuing education approvals, please see your credit tracking card.


Peterson


Abrahamson

Collaborative Design Process

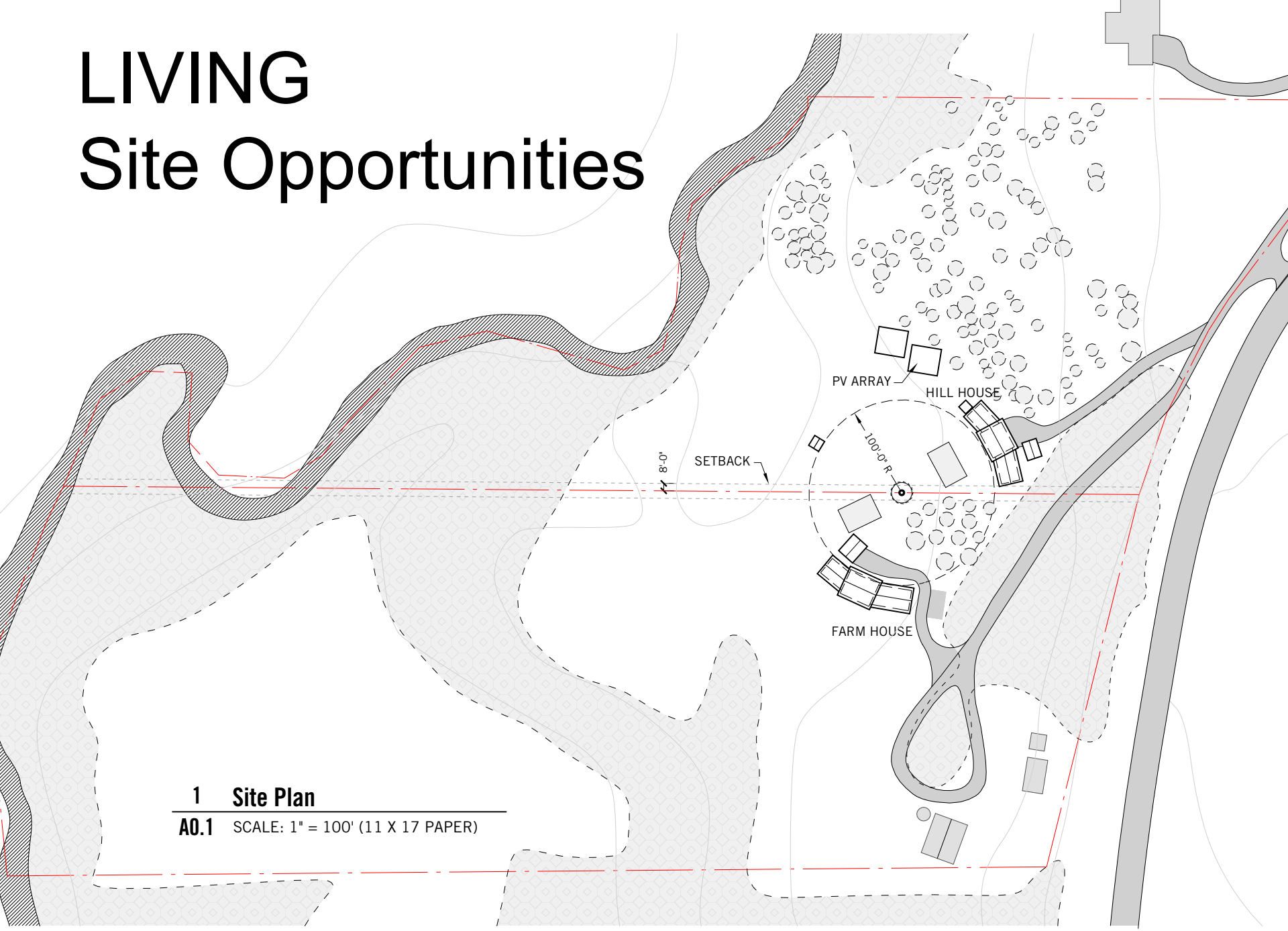
Shared Principles

- LIVING: Lifestyle and social dynamics
- BUILDING: Technical and system requirements


LIVING
Self-Build


LIVING
Site Opportunities

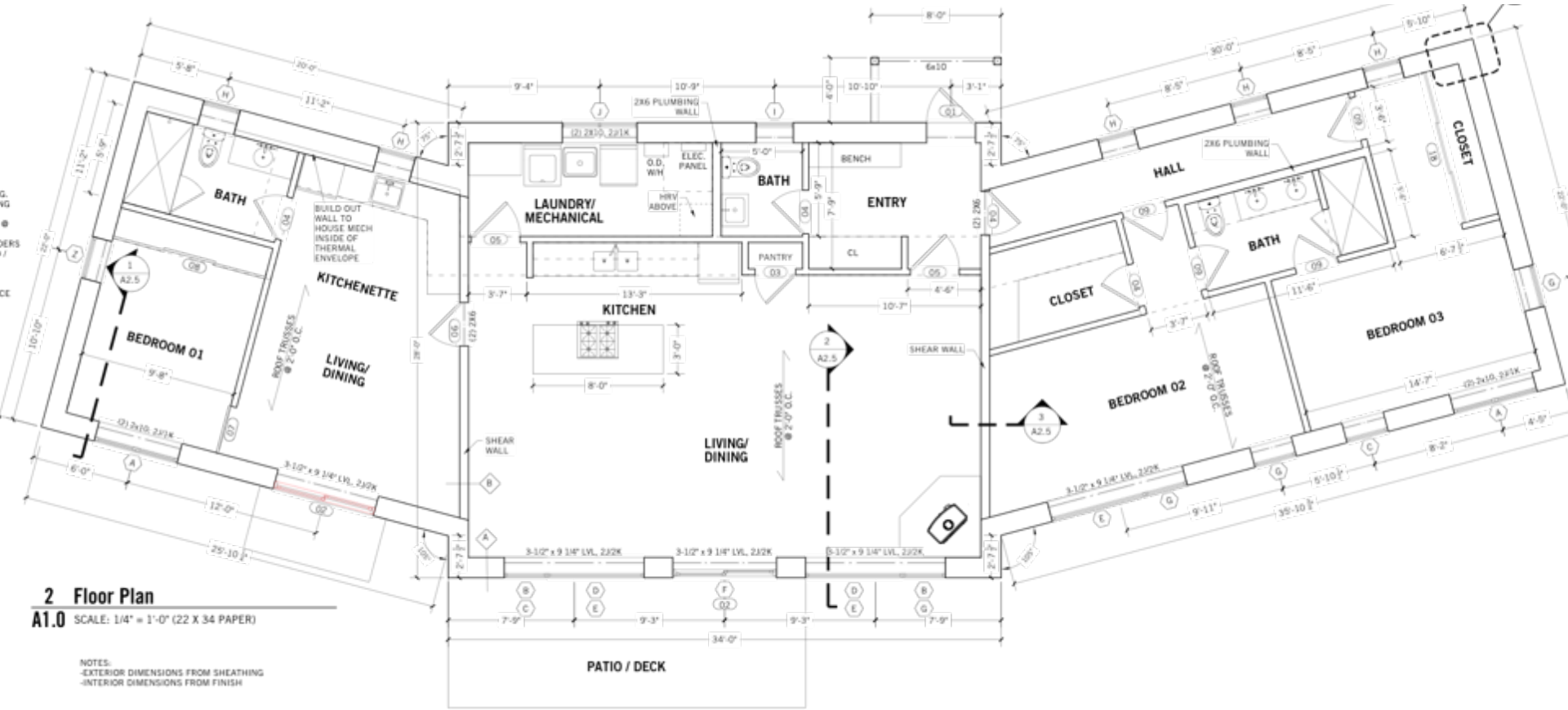
LIVING
Site Opportunities



1 Site Plan

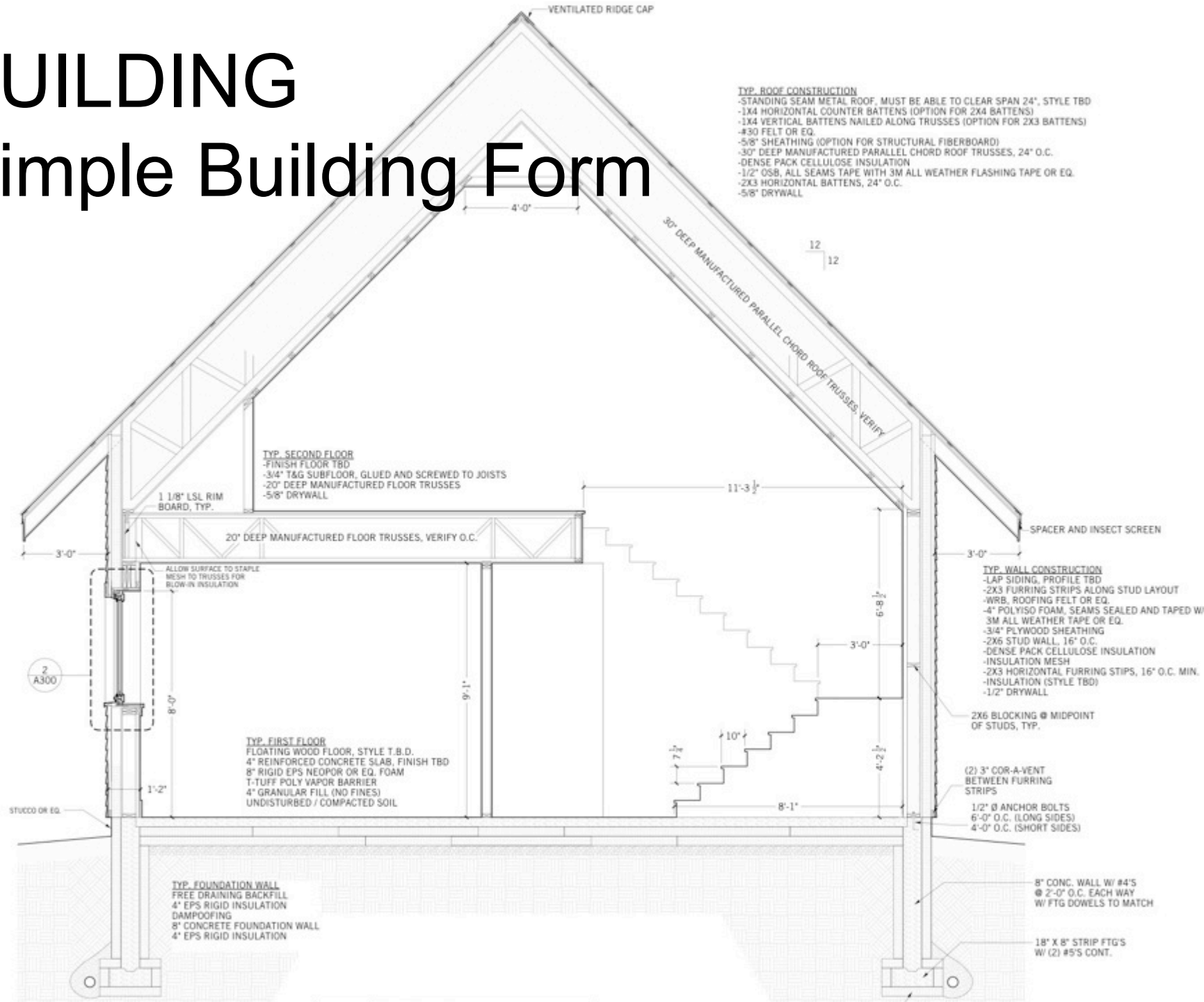
A0.1 SCALE: 1" = 100' (11 X 17 PAPER)

LIVING
Support Multi-Generational Living

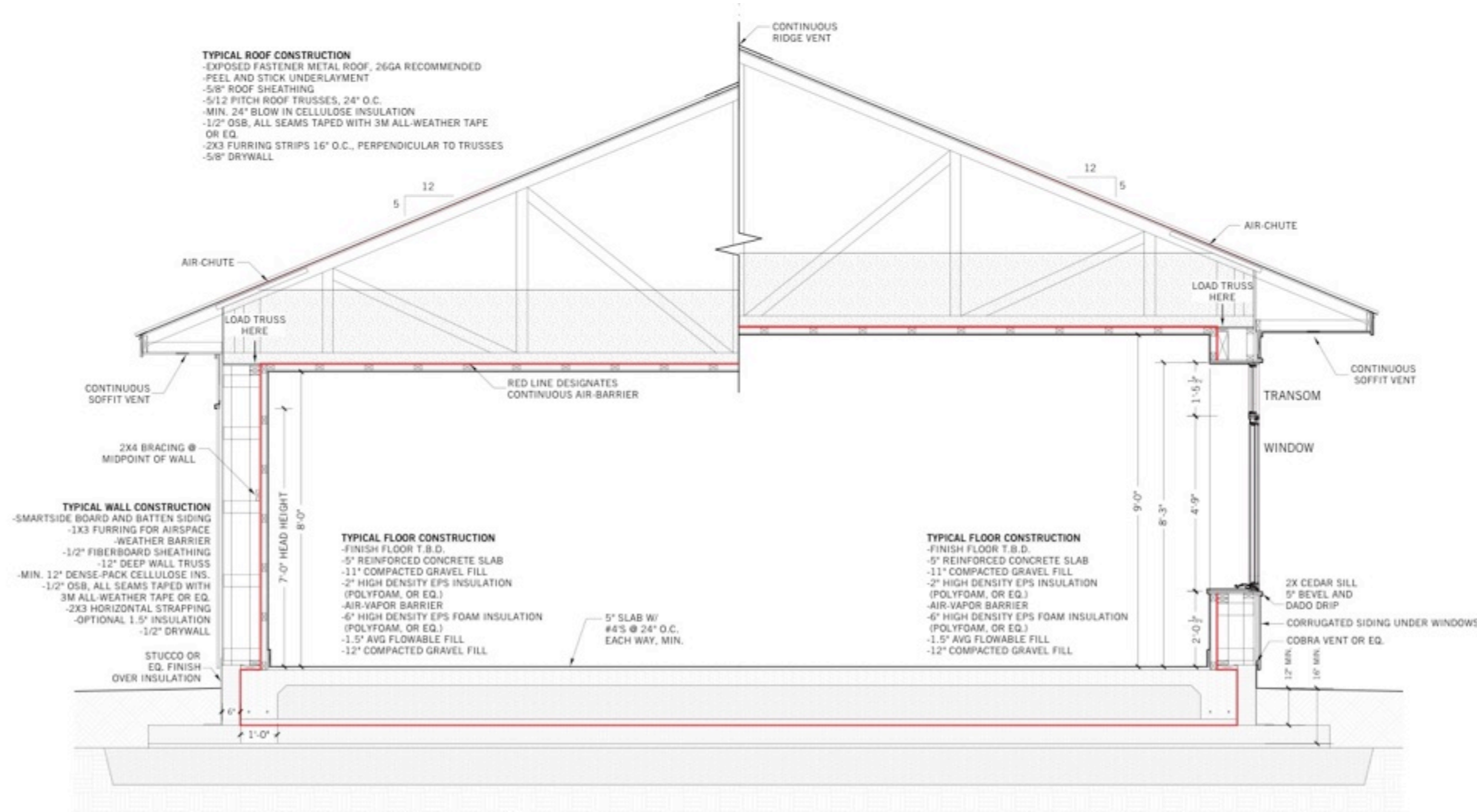


BUILDING
Solar Access

BUILDING
Simple Building Form



BUILDING
Insulated and Air-Sealed



BUILDING
Energy Modeling

	South windows	A	349	ft²	Window areas are subtracted from individual opaque areas.		South windows
5	West windows	A	13	ft²	which is displayed in the "Windows" worksheet.		West windows
6	Horizontal windows	A	0	ft²			Horizontal windows
7	Exterior door	A	0	ft²	*Please subtract area of door from respective building assembly*		Exterior door
8	Exterior wall - Ambient	A	1674	ft²	*Temperature zone "A" is ambient air*		Exterior wall - Ambient
9	Exterior wall - Ground	B	0	ft²	*Temperature zone "B" is the ground*		Exterior wall - Ground
0	Roof/Ceiling - Ambient	A	2182	ft²			Roof/Ceiling - Ambient
1	Floor slab / Basement ceiling	B	2182	ft²			Floor slab / Basement cei
2			0	ft²	*Temperature zones "A", "B", "P" and "X" may be used. NOT "I"*		
3			0	ft²	*Temperature zones "A", "B", "P" and "X" may be used. NOT "I"*	Factor for X	
4		X	0	ft²	*Temperature zone "X". Please provide user-defined reduction factor (0 < ft < 1).*	75%	
							Thermal bridges - Overvi
5	Thermal bridges Ambient	A	0	ft	*Units in ft*		Thermal bridges Ambient
6	Perimeter thermal bridges	P	0	ft	*Units in ft; temperature zone "P" is perimeter (see Ground worksheet)*		Perimeter thermal bridge
7	Thermal bridges FS/BC	B	0	ft	*Units in ft*		Thermal bridges FS/BC
8	Partition wall to neighbor	I	0	ft²	*No heat losses, only considered for the heating load calculation*		Partition wall to neighbor
l thermal envelope			6498	ft²			Average therm. envelope

Area input

Sort: BY ID

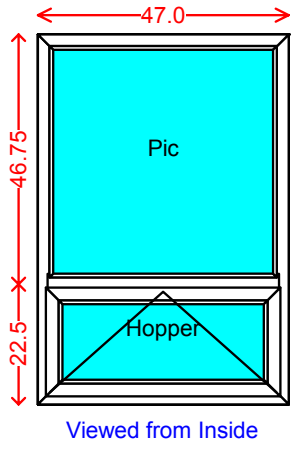
a Nr.	Building assembly description	Group Nr.	Assigned to group	Qty	x (	Length [ft]		Length [in]		x	Width [ft]		Width [in]		+	User determined [ft²]	-	User sub-traction [ft²]	-	Subtracted window areas [ft²]	) =	Area [ft²]	Selection of building assembly / certified building sy
	Treated floor area	1	Treated floor area	1	x (		ft		in	x		ft		in	+	1818.8	-				) =	1818.8	
	North windows	2	North windows																			84.3	From 'Windows' worksheet
	East windows	3	East windows																			13.3	From 'Windows' worksheet
	South windows	4	South windows																			349.1	From 'Windows' worksheet
	West windows	5	West windows																			13.3	From 'Windows' worksheet
	Horizontal windows	6	Horizontal windows																			0.0	From 'Windows' worksheet
	Exterior door	7	Exterior door		x (		ft		in	x		ft		in	+		-		) -		=		R-value exterior door:
1	Wall_195403_N	8	Exterior wall - Ambient	1	x (	20.00	ft	0.00	in	x	8.00	ft	7.00	in	+		-		) -	10.9	=	160.8	83ud PH External wall
2	Wall_195440_N	8	Exterior wall - Ambient	1	x (	30.00	ft	0.00	in	x	8.00	ft	7.00	in	+		-		) -	16.3	=	241.2	83ud PH External wall
3	Wall_195544_N	8	Exterior wall - Ambient	1	x (	34.00	ft	0.00	in	x	9.00	ft	7.00	in	+		-		) -	57.1	=	268.8	83ud PH External wall
4	Wall_195272_E	8	Exterior wall - Ambient	1	x (	22.00	ft	0.00	in	x	8.00	ft	7.00	in	+		-		) -	13.3	=	175.5	83ud PH External wall
5	Wall_195341_E	8	Exterior wall - Ambient	1	x (		ft		in	x		ft		in	+	72.84	-		) -	0.0	=	72.8	83ud PH External wall
6	Wall_195321_S	8	Exterior wall - Ambient	1	x (	25.00	ft	10.74	in	x	8.00	ft	7.00	in	+		-		) -	88.7	=	133.6	83ud PH External wall
7	Wall_195359_S	8	Exterior wall - Ambient	1	x (	34.00	ft	0.00	in	x	9.00	ft	7.00	in	+		-		) -	164.2	=	161.6	83ud PH External wall
8	Wall_195259_S	8	Exterior wall - Ambient	1	x (	35.00	ft	10.74	in	x	8.00	ft	7.00	in	+		-		) -	96.3	=	211.8	83ud PH External wall
9	Wall_195395_W	8	Exterior wall - Ambient	1	x (	22.00	ft	0.00	in	x	8.00	ft	7.00	in	+		-		) -	13.3	=	175.5	83ud PH External wall
0	Wall_195368_W	8	Exterior wall - Ambient	1	x (		ft		in	x		ft		in	+	72.84	-		) -	0.0	=	72.8	83ud PH External wall
1	Roof_195385_H	10	Roof/Ceiling - Ambient	1	x (		ft		in	x		ft		in	+	504.84	-		) -	0.0	=	504.8	84ud PH Roof
2	Roof_195307_H	10	Roof/Ceiling - Ambient	1	x (	34.00	ft	0.00	in	x	28.00	ft	0.00	in	+		-		) -	0.0	=	952.0	84ud PH Roof
3	Roof_195285_H	10	Roof/Ceiling - Ambient	1	x (		ft		in	x		ft		in	+	724.84	-		) -	0.0	=	724.8	84ud PH Roof
4	Floor_195229_D	11	Floor slab / Basement ceiling	1	x (		ft		in	x		ft		in	+	2181.69	-		) -	0.0	=	2181.7	85ud PH Floor
5					x (		ft		in	x		ft		in	+		-		) -	0.0	=		
6					x (		ft		in	x		ft		in	+		-		) -	0.0	=		

Please complete in Windows worksheet only!

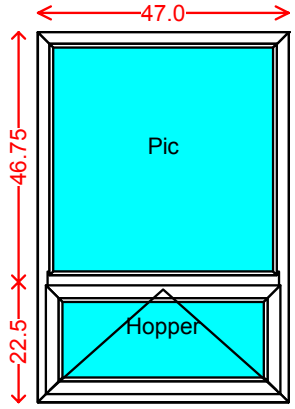
BUILDING
Air Quality

BUILDING
Budget

0008	5/6	Living Room 1-OFF 47.0000w x 69.2500h LoE 180 3P 3/41 WASCO 90% Argon Fill 3P Dimensions Frame Color White Painted? No Handleset London Hardware Color? White Screen Color Rehau White A. Brake Stay? No Designo? No **Nailing Fin ?** **Yes** Geneo PHZ No	1	907.90	907.90
0009	5/6	Dining Room West 1-OFF 47.0000w x 69.2500h LoE 366/180 3P 3/41 WASCO 90% Argon Fill 3P Dimensions Frame Color White Painted? No Handleset London Hardware Color? White Screen Color Rehau White A. Brake Stay? No Designo? No **Nailing Fin ?** **Yes** Geneo PHZ No	1	918.14	918.14
0010	5/6	Dining Room West			



Viewed from Inside



Viewed from Inside

BUILDING
Low Energy and Durable Materials

PETERSON


Sub Slab Prep

Sub Slab Prep


Slab Prep


Slab Prep


Walls


Walls

Walls


Walls

Roof

Roof


Trench


Roof

Sheathing


Framing


Windows


Enclosed