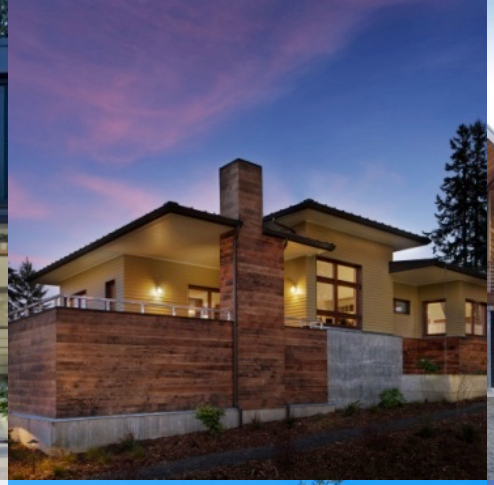
artisansgroup
DESIGN + BUILD

esco | energy systems consulting












Vogel Haus, PHI Certified, Olympia Washington

Design Ethos

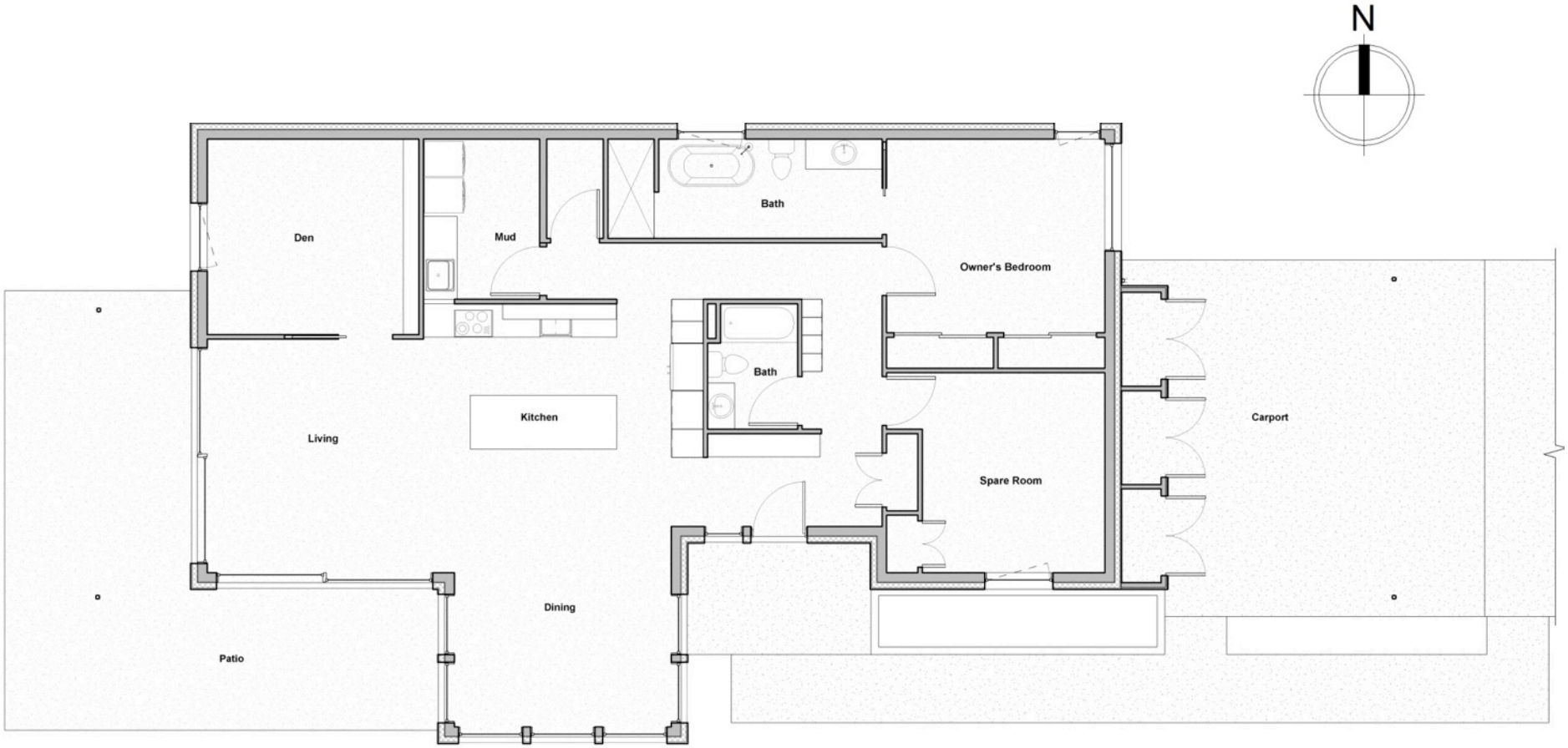
Simple home that sits lightly on the land and recedes into the landscape

Supports a small functioning farm

Lots of glass

An array of outdoor spaces embracing the garden both uncovered and covered

A *Parti* of articulated cubes



Vogel Haus

1,962 sf TFA

Vogel Haus

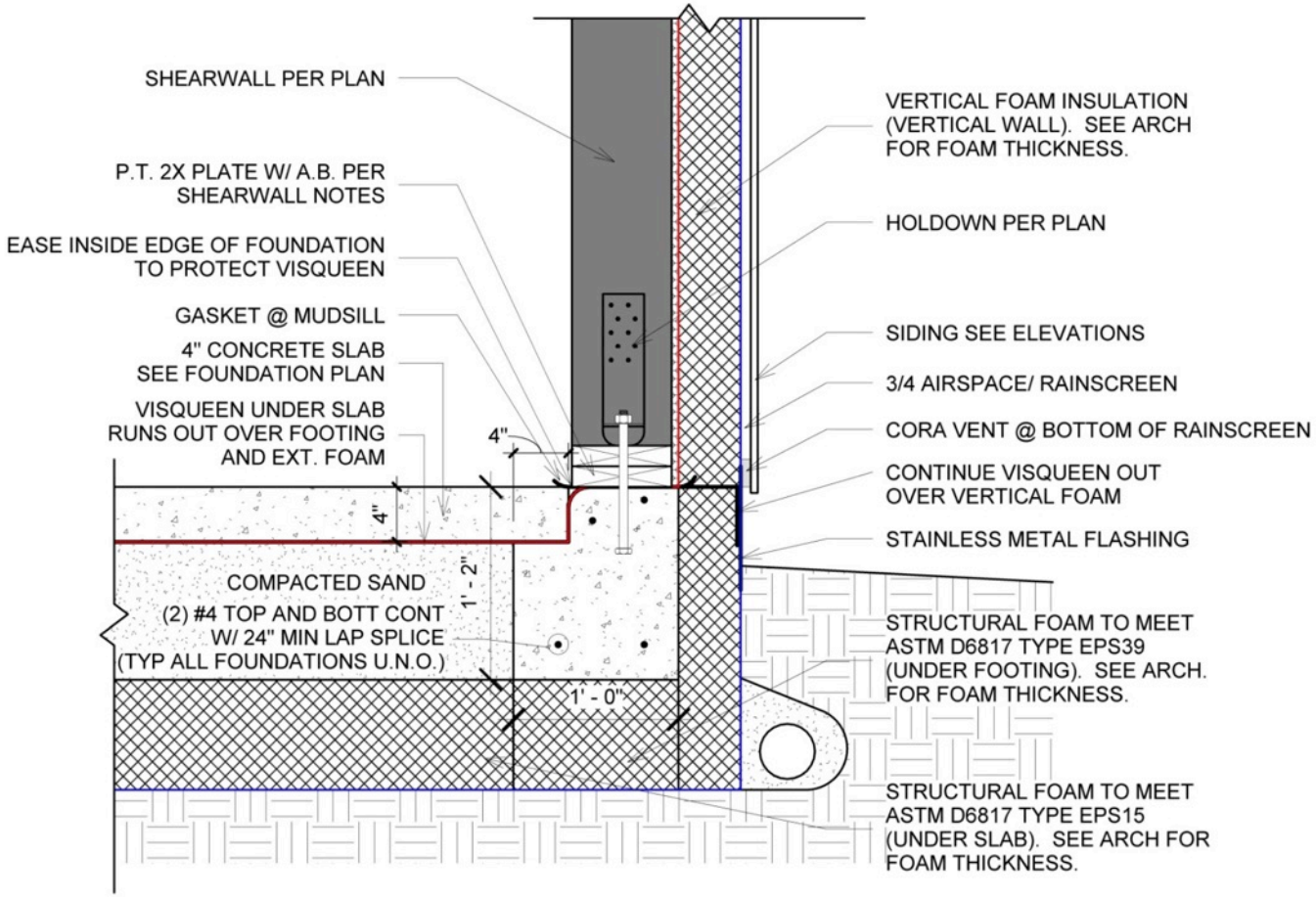
Passive House Specific Design Challenges

Sculpting the interior with light

Vogel Haus

Passive House Specific Design Challenges

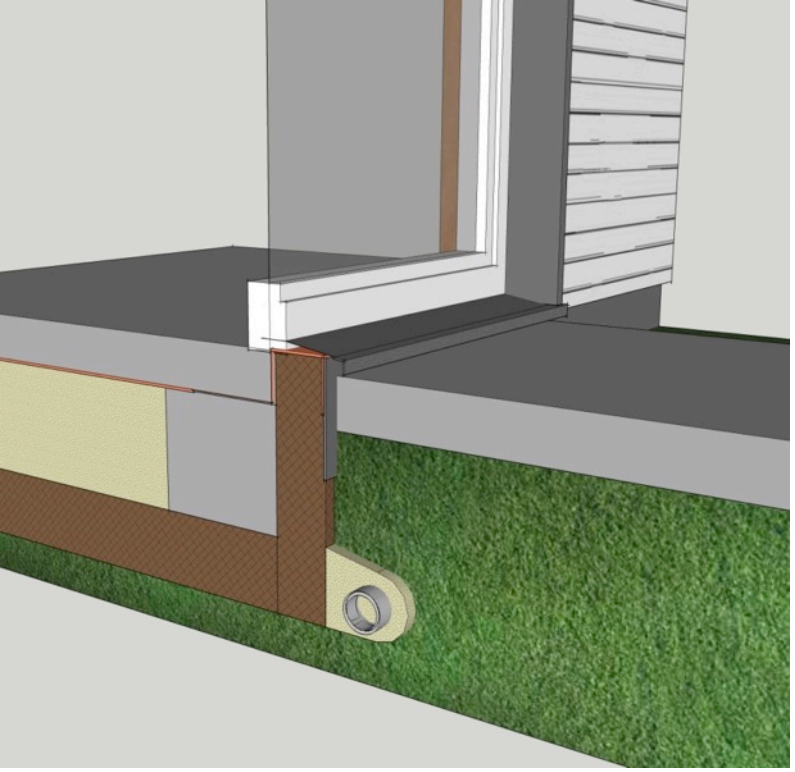
Floor to ceiling glass

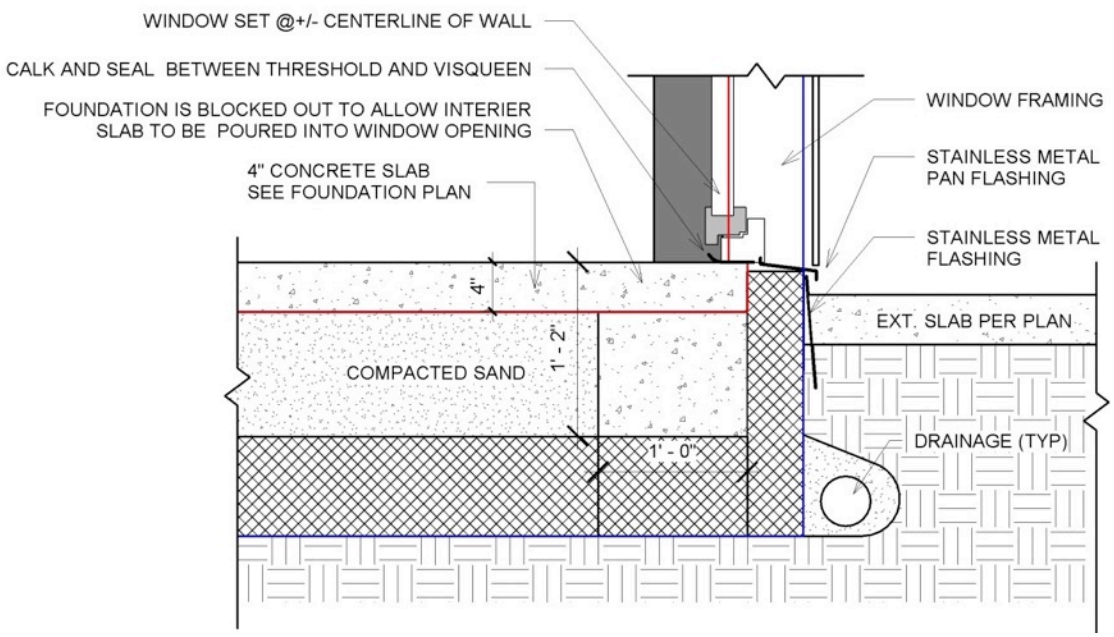


Vogel Haus

Passive House Specific Design Challenges

Simple is always best when planning building assemblies, but not always easy to achieve. Designers and field team should participate in planning out how the details will be handled during actual construction.

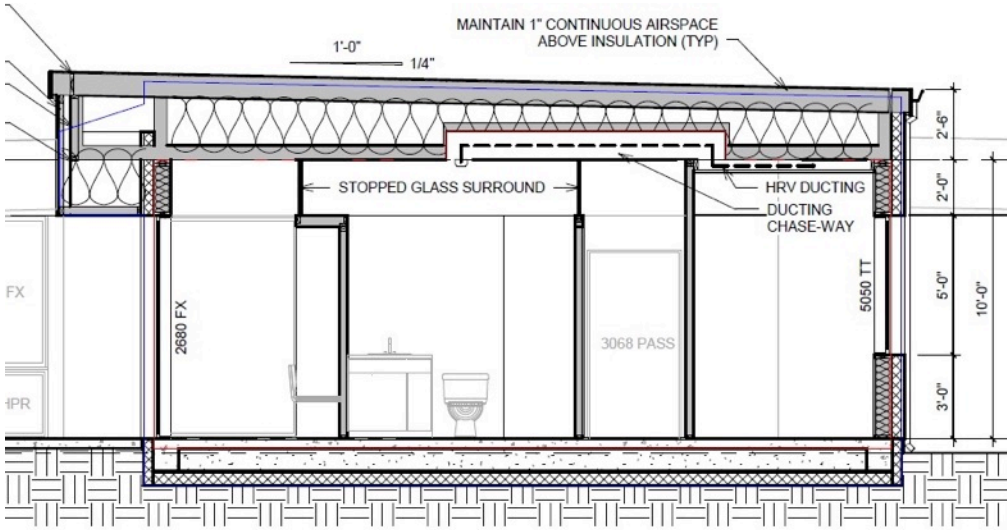




Vogel Haus

Passive House Specific Design Challenges

Floor to ceiling glass requires forethought on blocking out the concrete and attention to exactly what type of windows are specified.



Vogel Haus

Passive House Specific Design Challenges

Instead of designing ceiling installation layers, or a full false ceiling, use the depth and run of your trusses to seal in an OSB box, and if you need to make runs perpendicular to the trusses consider designing into the trusses a few trusses with a bottom chord to create a chase way.

Vogel Haus

Construction Lessons

Seal OSB “rips” installed above all interior walls prior to installing walls

Vogel Haus

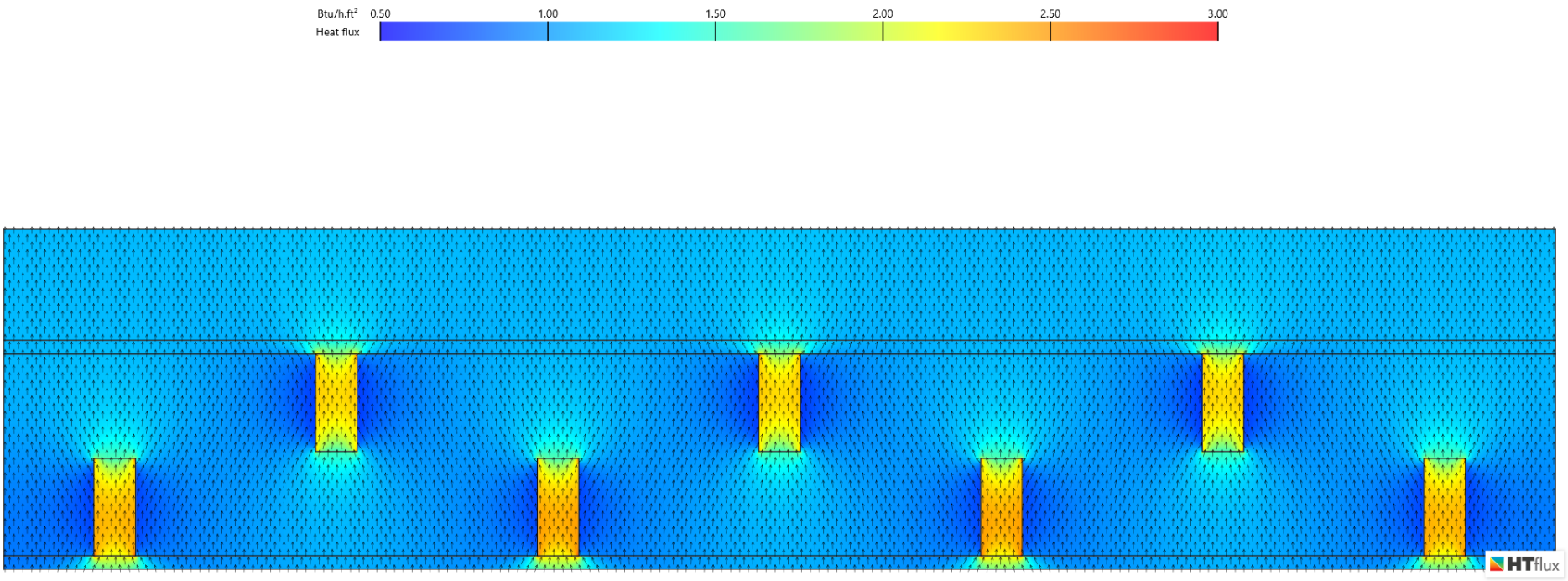
Construction Lessons

Remember to continue field (SUB!) training as not all team members know every motivation behind Passive House!

Above photo is an example of extra 2x8’s in Vogel walls, even though the plans called for staggered 2x4’s


PROSOCO
R•Guard
AIR & WATER BARRIERS
Cat 5
AIR AND WATERPROOF BARRIER

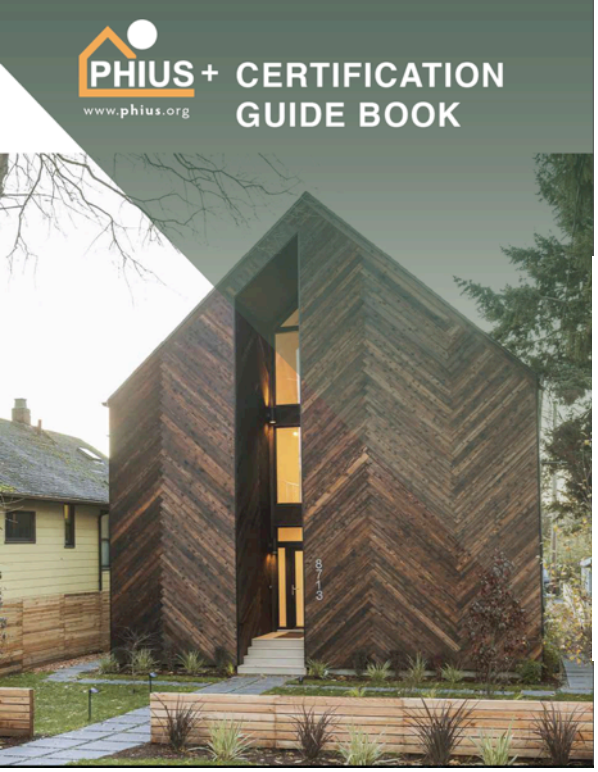

HomeWrap
HomeWrap
HomeWrap



Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis



6.1.4 Energy model inputs requiring additional documentation

- Ground Thermal Resistivity >0.1 hr.ft².F/BTU.in.
- Window psi Installation
  - For mid mounted, over-insulated window <0.015 BTU/hr.ft.F.
  - For mid mounted window <0.020 BTU/hr.ft.F.
- Subsoil Heat Exchanger efficiency >60%.
- Framing factors
  - Down to 15% for advanced framing, 24 in. OC.
  - Down to 12% if window psi-installation calculations are done, because some of the framing is accounted for in this calculation.

Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis

Assembly no.	Building assembly description	Interior insulation?
07ud	Wall	

Heat transmission resistance [hr.ft².F/BTU]

Orientation of building element	2-Wall	interior R_{si}	0.74
Adjacent to	3-Ventilated	exterior R_{se}	0.74

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Gypsum Board	0.91					0.50
HD Fiberglass	4.30	2x8 Framing	1.28			7.25
OSB	1.39					0.50
Neopor Type II	4.61					4.00

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
100%	0.0%		12.25 in

U-value supplement: BTU/hr.ft².°F

R-value: 52.24 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Center of Cavity Assembly Analysis

1.8 pcf fiberglass must be specified to achieve R-4.3/in

NOT standard practice

Use 75°F values for EPS

1.5 pcf R-4.2/in

2.0 pcf R-4.4/in

Made of Neopor® provided by BASF

Assembly no.	Building assembly description	Interior insulation?
07ud	Wall	

Heat transmission resistance [hr.ft².F/BTU]

Orientation of building element	2-Wall	interior R_{si}	0.74
Adjacent to	3-Ventilated	exterior R_{se}:	0.74

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Gypsum Board	0.91					0.50
HD Fiberglass	4.30	2x8 Framing	1.28			7.25
OSB	1.39					0.50
Neopor Type II	4.61					4.00

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
75%	25.0%		12.25 in

U-value supplement: BTU/hr.ft².°F

R-value: 42.47 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis w/ Framing Factors

Assembly no.	Building assembly description	Interior insulation?
07ud	Wall	

Heat transmission resistance [hr.ft².F/BTU]

Orientation of building element: 2-Wall
Adjacent to: 3-Ventilated

interior R_{si}: 0.74
exterior R_{se}: 0.74

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Gypsum Board	0.91					0.50
HD Fiberglass	4.30	2x8 Framing	1.28			7.25
OSB	1.39					0.50
Neopor Type II	4.61					4.00

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
85%	15.0%		12.25 in

U-value supplement: BTU/hr.ft².°F

R-value: 45.62 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis w/ Framing Factors

Assembly no.	Building assembly description	Interior insulation?
03ud	Wall	

Heat transmission resistance [hr.ft².F/BTU]

Orientation of building element	2-Wall	interior R_{si}	0.74
Adjacent to	3-Ventilated	exterior R_{se}:	0.74

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Gypsum Board	0.91					0.50
HD Fiberglass	4.30	2x8 Framing	1.280			7.25
OSB	1.390					0.50
Neopor Type II	4.61					4.00

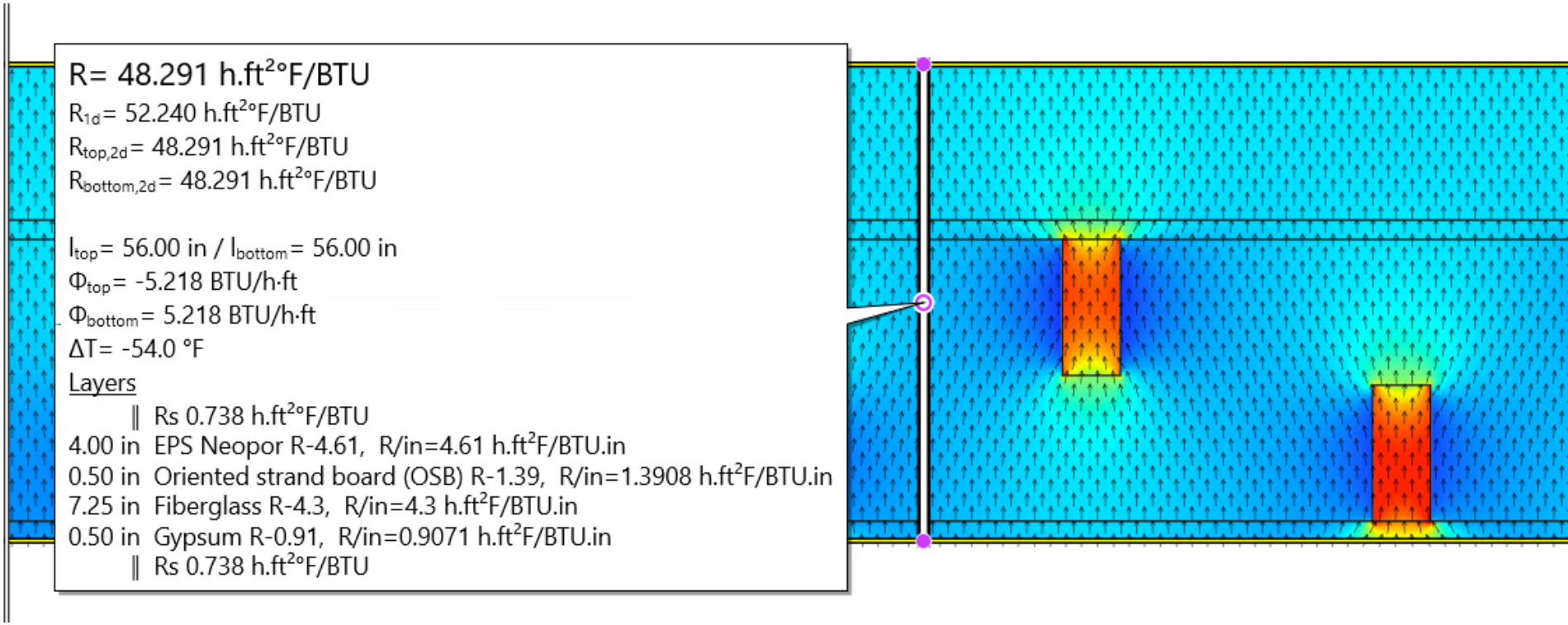
Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
88%	12.0%		12.25 in

U-value supplement: BTU/hr.ft².°F — 0.0214 — **R-value:** 46.72 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis w/ Framing Factors



Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis 2D w/ HTflux

Assembly no.	Building assembly description	Interior insulation?
03ud	Wall	

Heat transmission resistance [hr.ft².F/BTU]

Orientation of building element	2-Wall	interior R_{si}	0.74
Adjacent to	3-Ventilated	exterior R_{se}:	0.74

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Gypsum Board	0.91					0.50
HD Fiberglass	4.30	2x8 Framing	1.280			7.25
OSB	1.390					0.50
Neopor Type II	4.61					4.00

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
92%	8.1%		12.25 in

U-value supplement: BTU/hr.ft².°F — 0.0207

R-value: 48.29 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Wall Assembly Analysis w/ Framing Factors

Assembly no.	Building assembly description	Interior insulation?
01ud	Composite Cavity Insulation Value for 2D Calcs	0

Surface Film Resistance [hr.ft².F/BTU] interior Rsi : 0.00
exterior Rse : 0.00

	Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
1.	HD Fiberglass	4.30	2x8 Framing	1.28			1.00
2.							0.00
3.							0.00
4.							0.00
5.							0.00
6.							0.00
7.							0.00
8.							0.00

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
88%	12.0%	0.0%	1.00 in

U-value supplement 0.00 BTU/hr.ft².°F

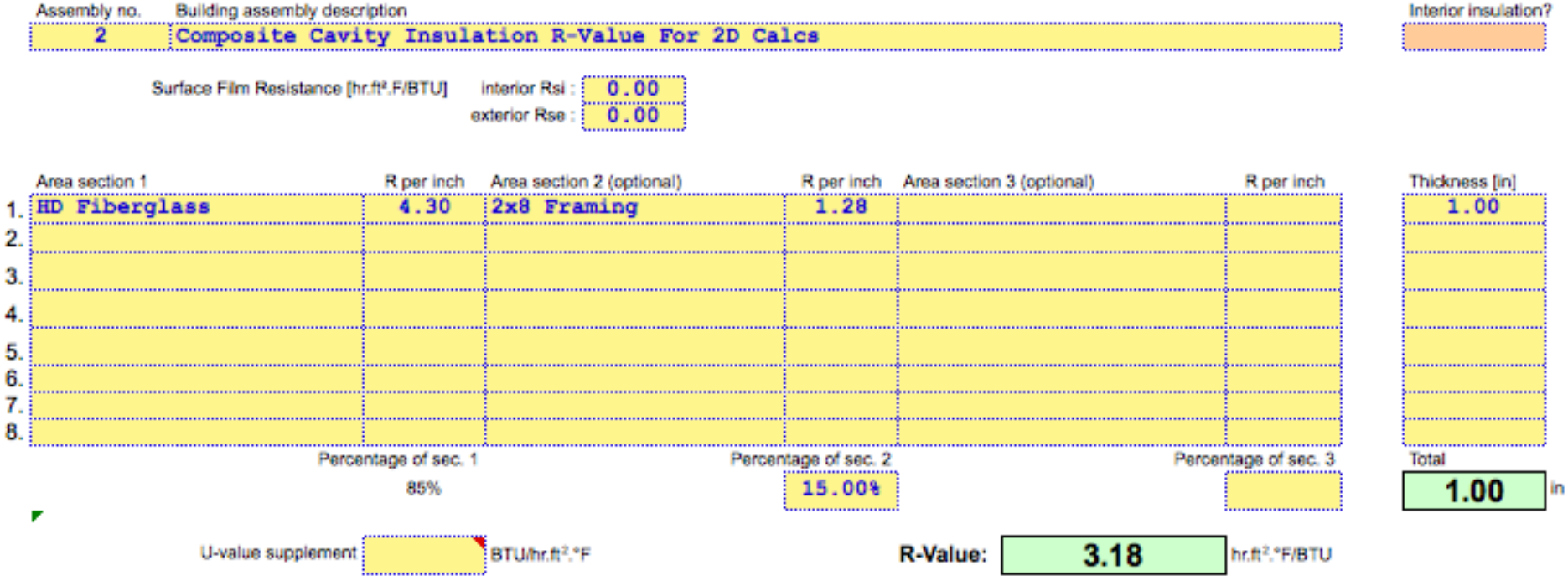
R-Value: 3.351 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Create Composite Material for 2D Simulations of Construction Details

Use PHPP 8.5 IP to Zero Out Surface Film Resistance Values



Assembly no.	Building assembly description	Interior insulation?
2	Composite Cavity Insulation R-Value For 2D Calcs	

Surface Film Resistance [hr.ft².F/BTU] — interior Rsi: 0.00 — exterior Rse: 0.00

	Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
1.	HD Fiberglass	4.30	2x8 Framing	1.28			1.00
2.							
3.							
4.							
5.							
6.							
7.							
8.							

Percentage of sec. 1: 85% — Percentage of sec. 2: 15.00% — Percentage of sec. 3: — Total: 1.00 in

U-value supplement: — BTU/hr.ft².°F — **R-Value:** 3.18 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

Create Composite Material for 2D Simulations of Construction Details

Use PHPP 8.5 IP to Zero Out Surface Film Resistance Values

Assembly no.	Building assembly description	Interior insulation?
2	Composite Cavity Insulation R-Value For 2D Calcs	

Surface Film Resistance [hr.ft².F/BTU] interior Rsi : 0.00
exterior Rse : 0.00

	Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
1.	HD Fiberglass	4.30	2x8 Framing	1.28			1.00
2.							
3.							
4.							
5.							
6.							
7.							
8.							
		Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3	Total
		92%		8.12%			1.00 in

U-value supplement BTU/hr.ft².°F

R-Value: 3.61 hr.ft².°F/BTU

Vogel Haus

Detailed Thermal Bridge Analysis

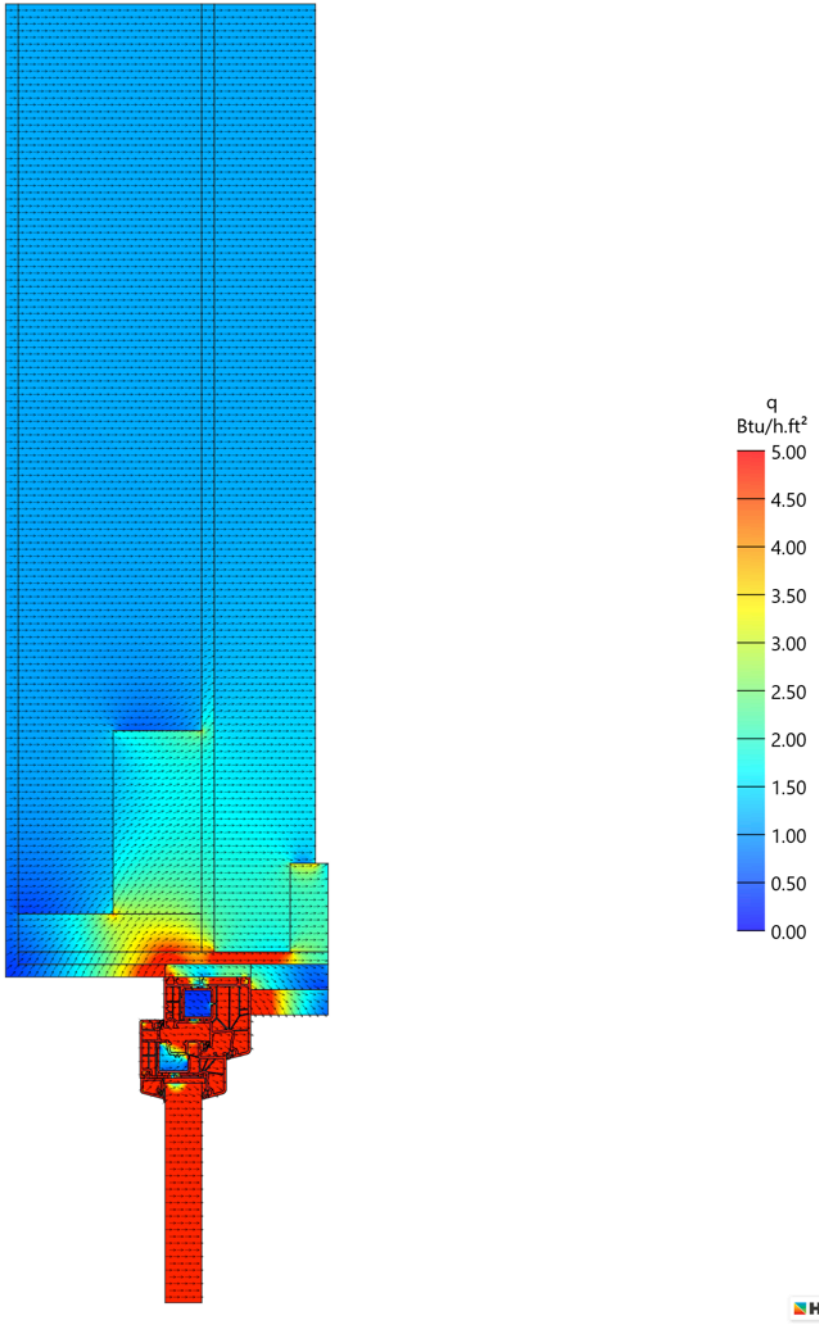
Create Composite Material for 2D Simulations of Construction Details

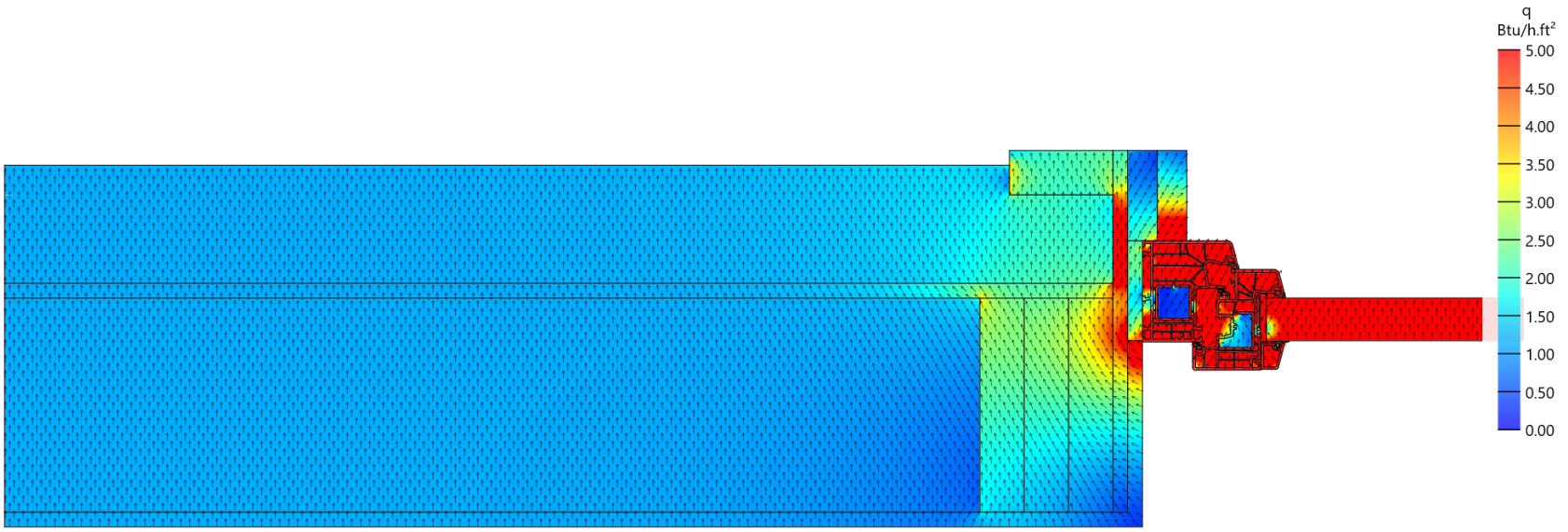
Use PHPP 8.5 IP to Zero Out Surface Film Resistance Values

Vogel Haus

Detailed Thermal Bridge Analysis

Window Head Analysis 2D w/ HTflux





Vogel Haus

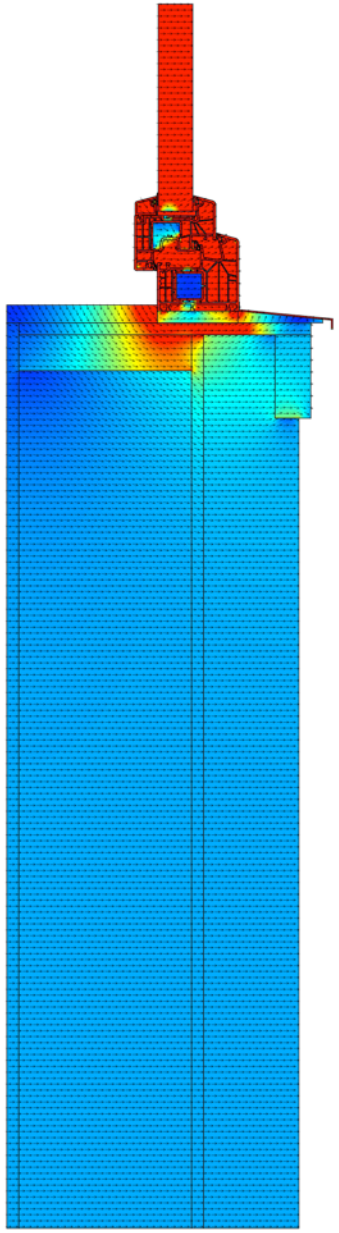
Detailed Thermal Bridge Analysis

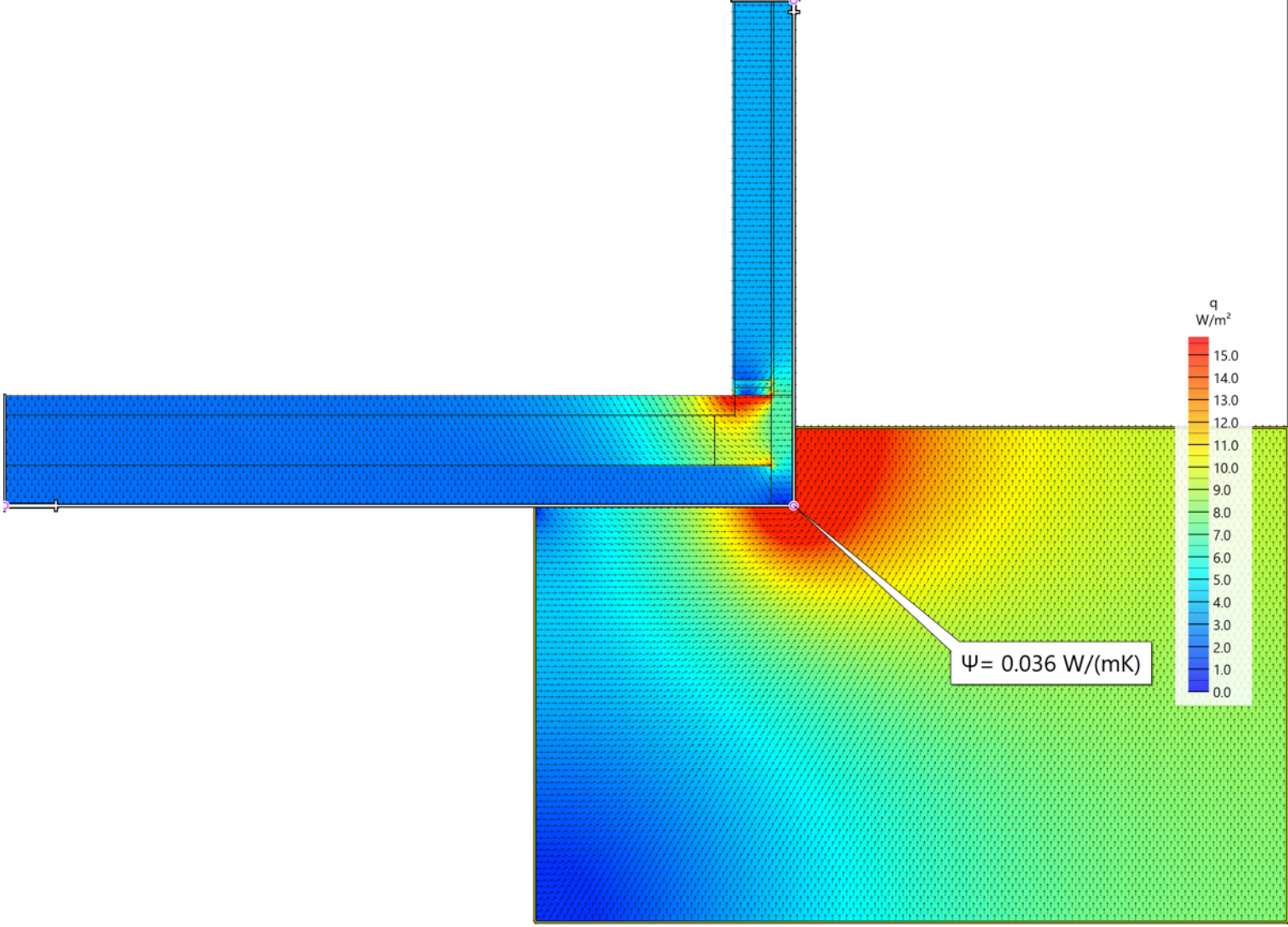
Window Jamb Analysis 2D w/ HTflux

Vogel Haus

Detailed Thermal Bridge Analysis

Window Sill Analysis 2D w/ HTflux

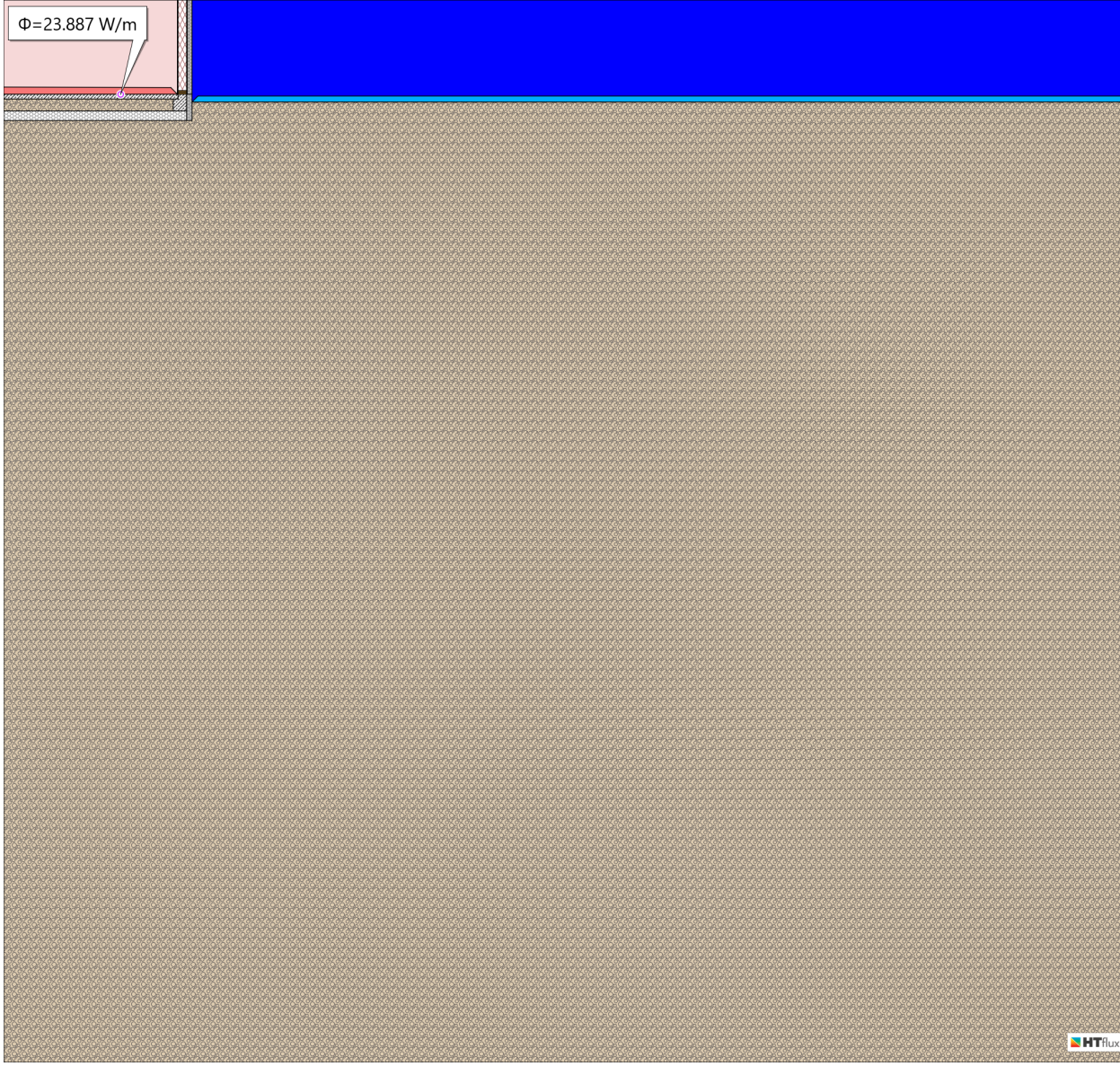




Vogel Haus

Detailed Thermal Bridge Analysis

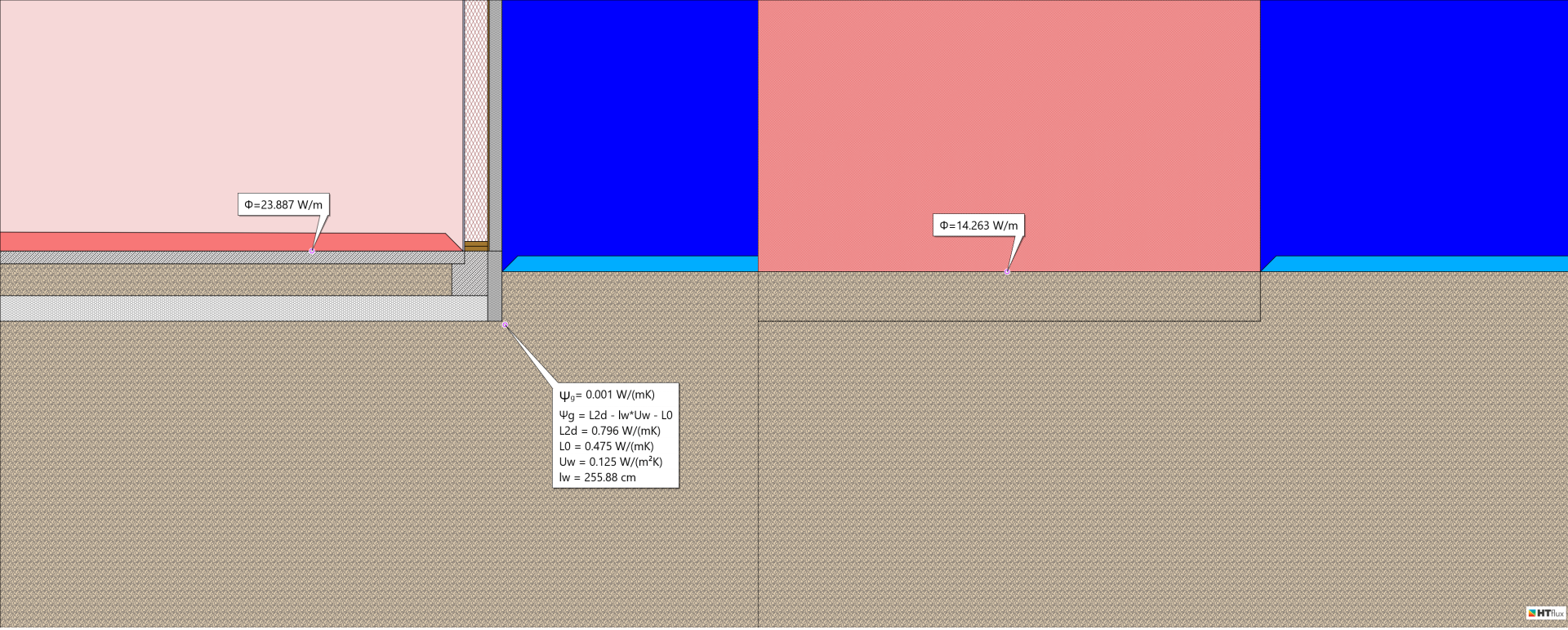
Slab Edge Analysis 2D w/ Htflux PHIUS Method



Vogel Haus

Detailed Thermal Bridge Analysis

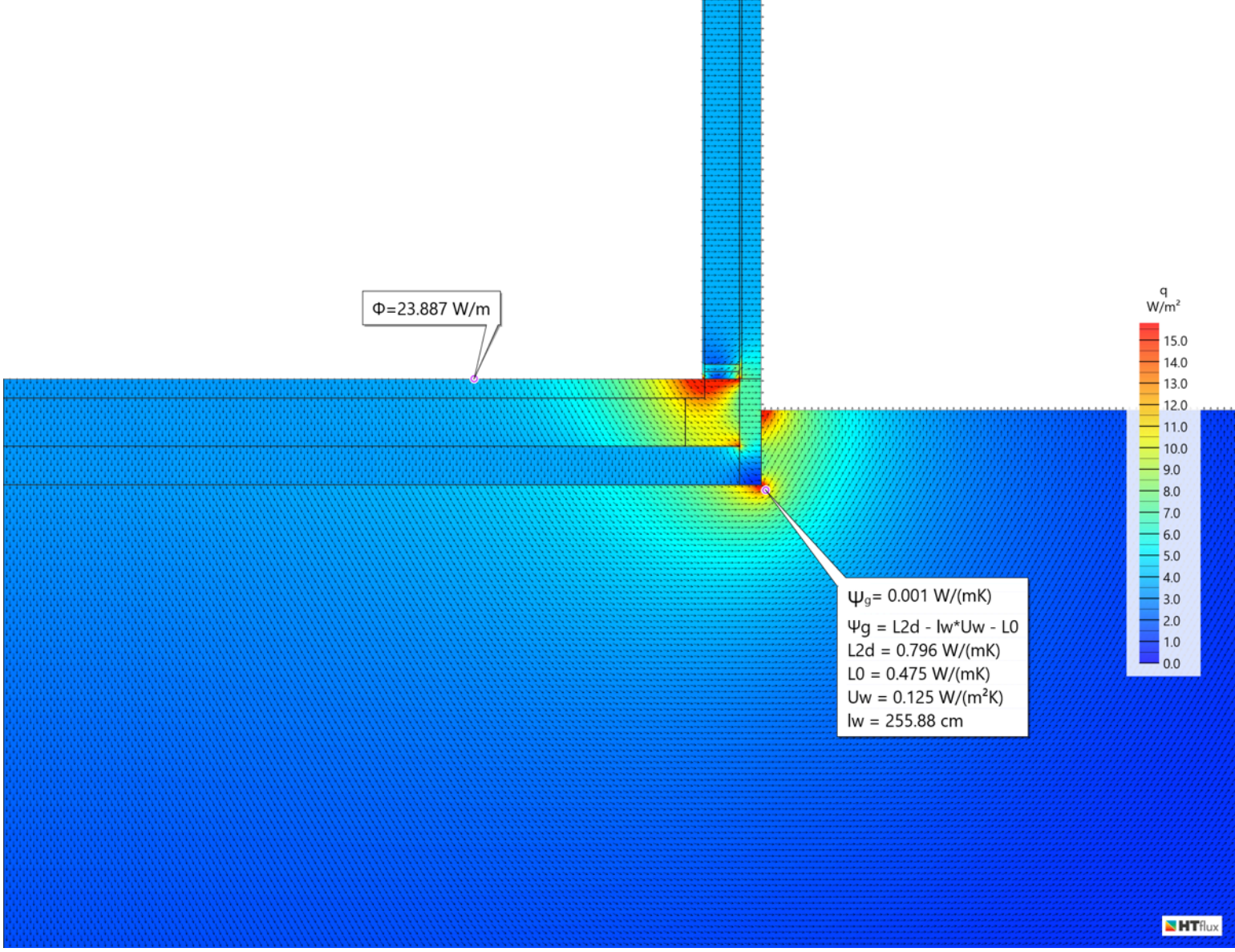
Slab Edge Analysis 2D w/ Htflux ISO 10211



Vogel Haus

Detailed Thermal Bridge Analysis

Slab Edge Analysis 2D w/ Htflux ISO 10211



Vogel Haus

Detailed Thermal Bridge Analysis

Slab Edge Analysis 2D w/ Htflux ISO 10211

(0.001 W/mK vs 0.030 W/mK) Heating Demand 4.60 to 4.75 kBTU/(ft²yr)

Delphi Haus, PHIUS Certified

Artisans Group, Olympia Washington

Delphi Haus Design Ethos

Modern home that takes full advantage of views of Mt. St Helens and Mt. Rainier

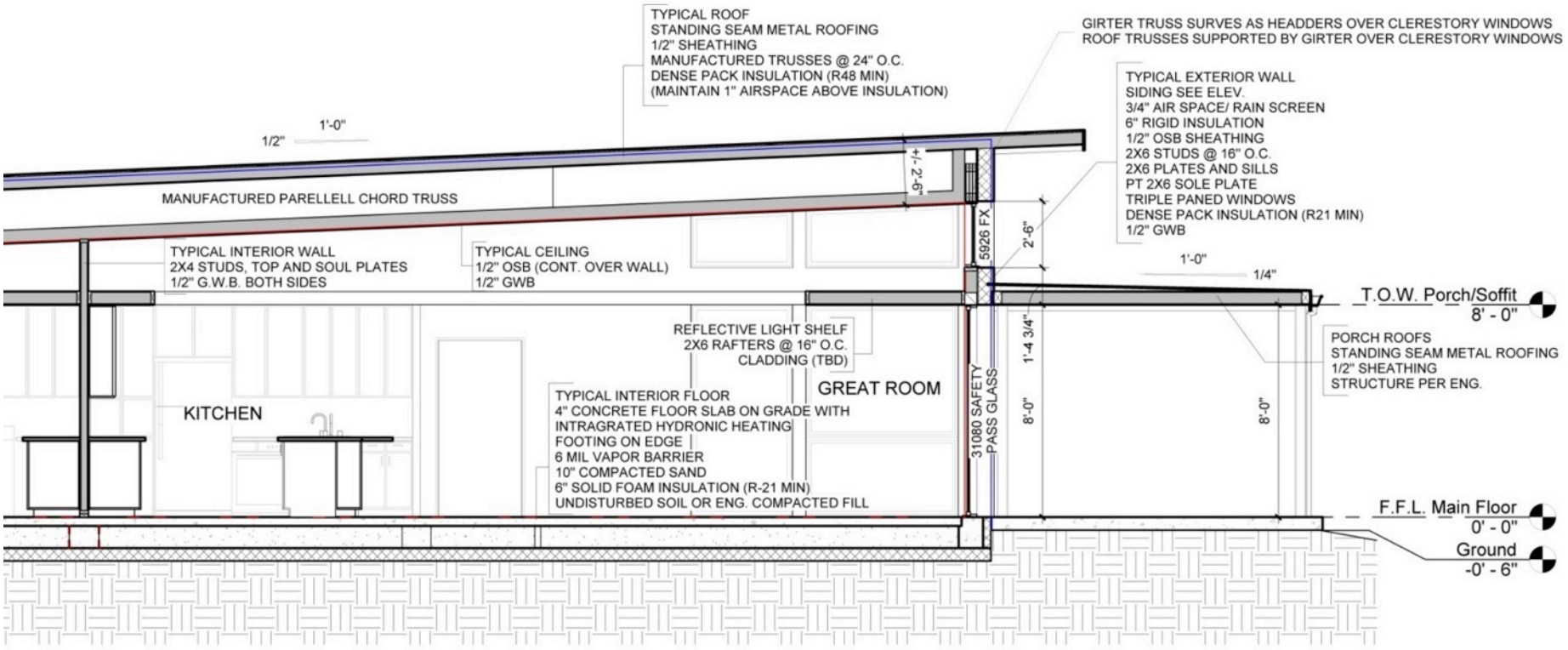
Designed to maintain independence decreases

Designed to be glowing with natural light but have little direct light

Lots of glass

An array of outdoor spaces both uncovered and covered and some with wind protection

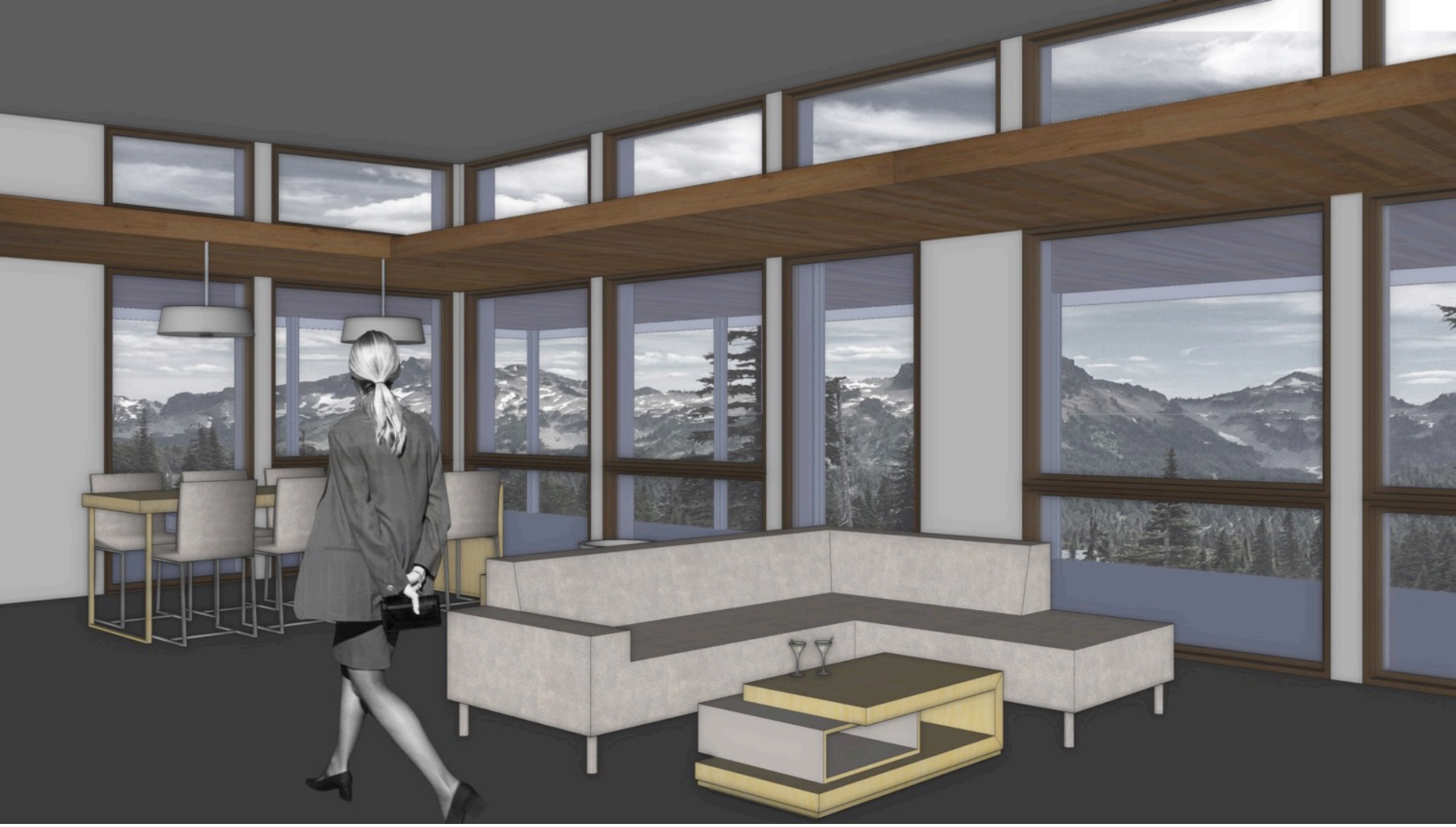
A *Parti* of flying soffits that seemingly extend from inside the house to out



Delphi Haus

Passive House Specific Design Challenges

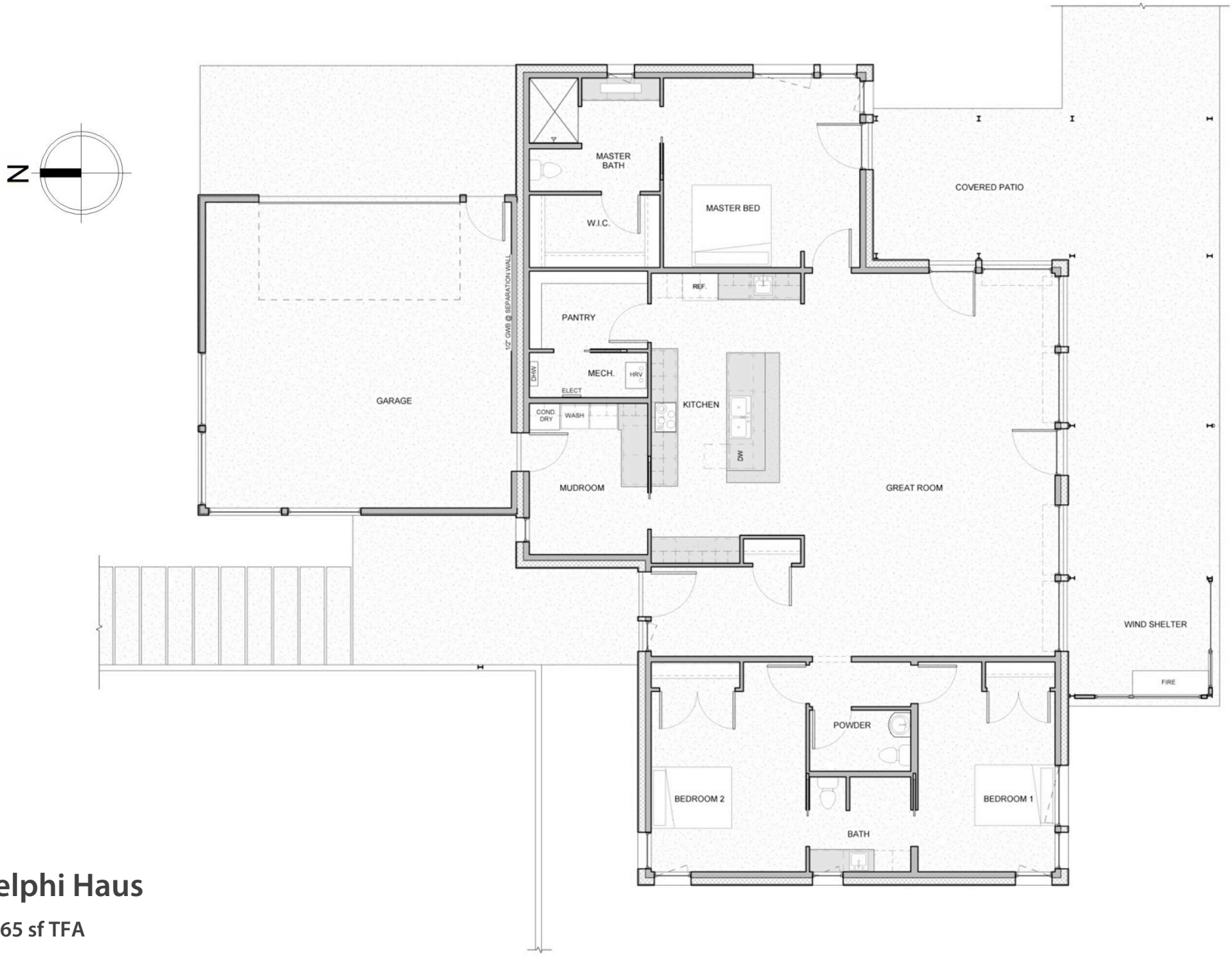
Sculpting the interior with light, this is diffused, non direct light



Delphi Haus

Passive House Specific Design Challenges

Sculpting the interior with light, this is diffused, non direct light



Delphi Haus

2,265 sf TFA

Delphi Haus

Construction Lessons

Walk your slab insulation before forming for concrete

Delphi Haus

Construction Lessons

Walk your slab insulation before forming for concrete

Delphi Haus

Construction Lessons

Walk your slab insulation before forming for concrete

Delphi Haus

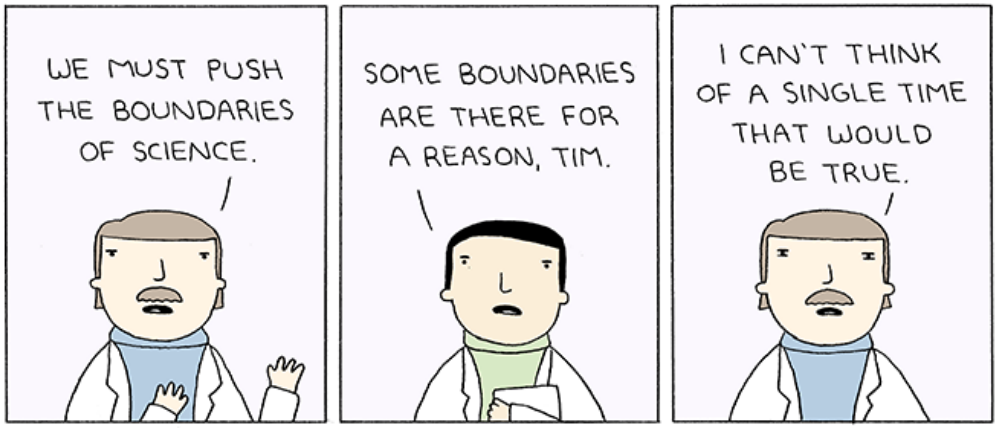
Construction Lessons

Walk your slab insulation before forming for concrete

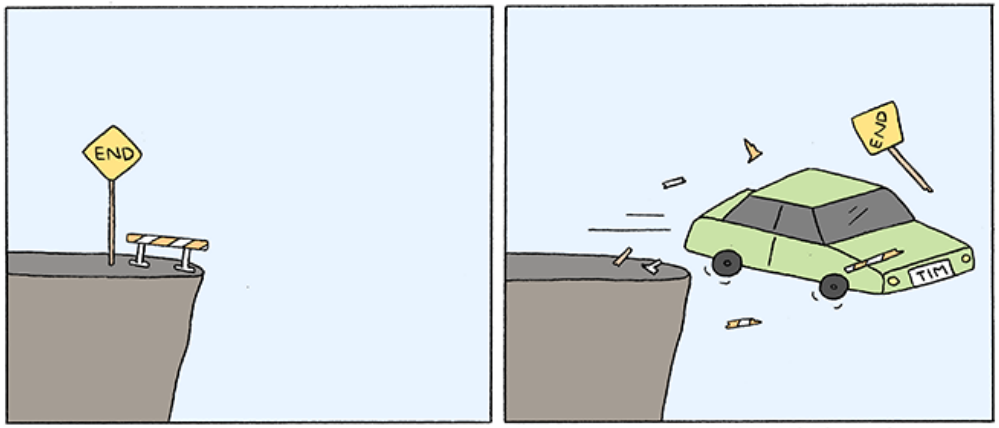
Delphi Haus

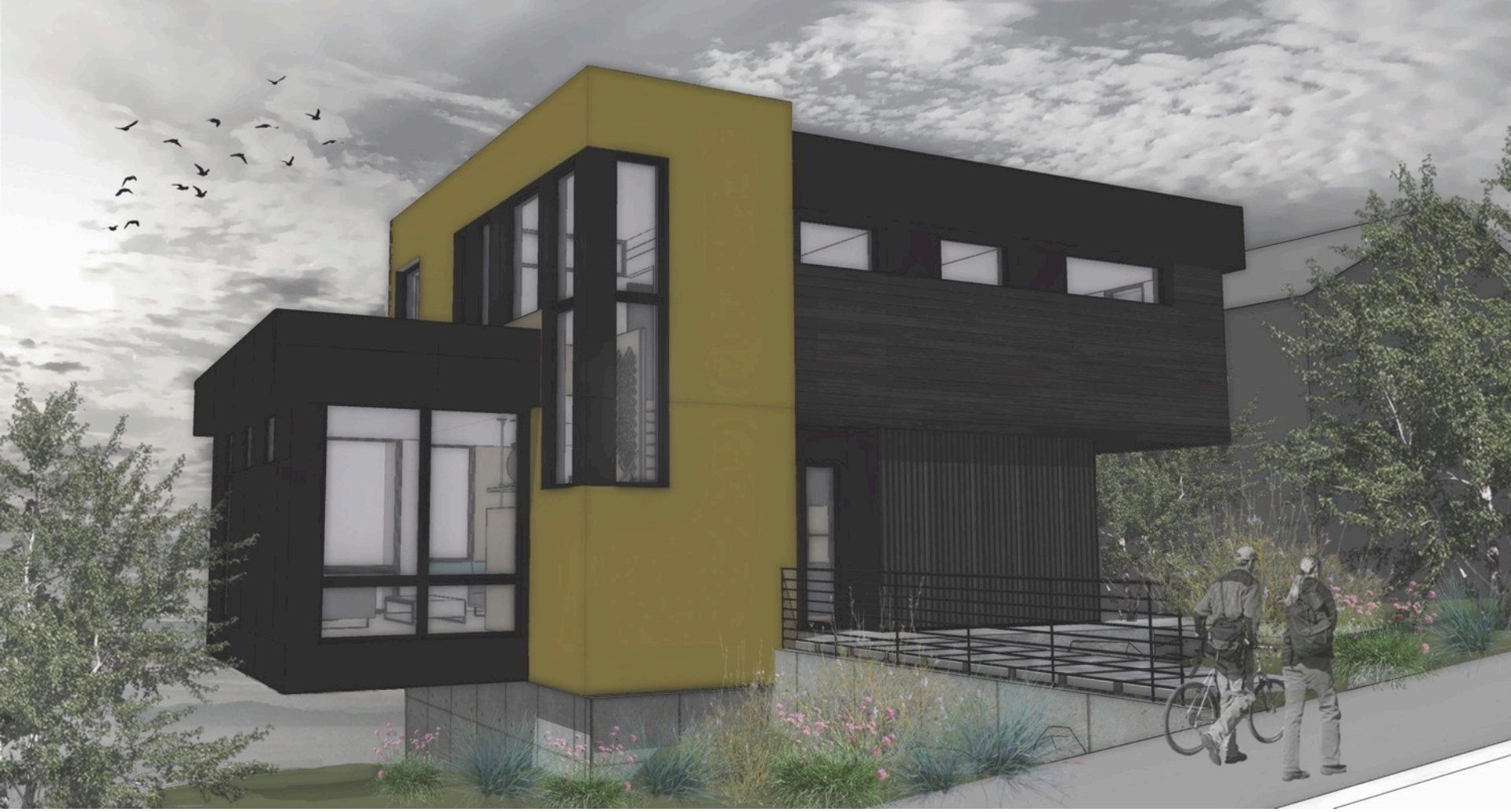
Construction Lessons

Walk your slab insulation before forming for concrete



LATER...





Queen Anne Passive, PHIUS Certified, Seattle Washington

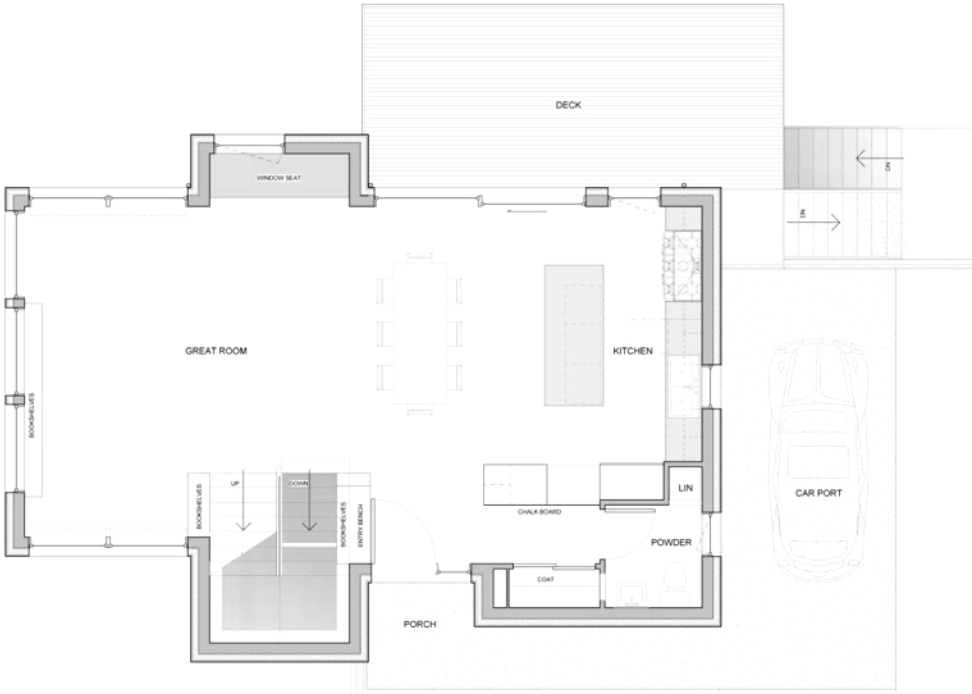
Design Ethos

Sculptural home that respects scale of neighborhood

Lots of glass to views of the sounds

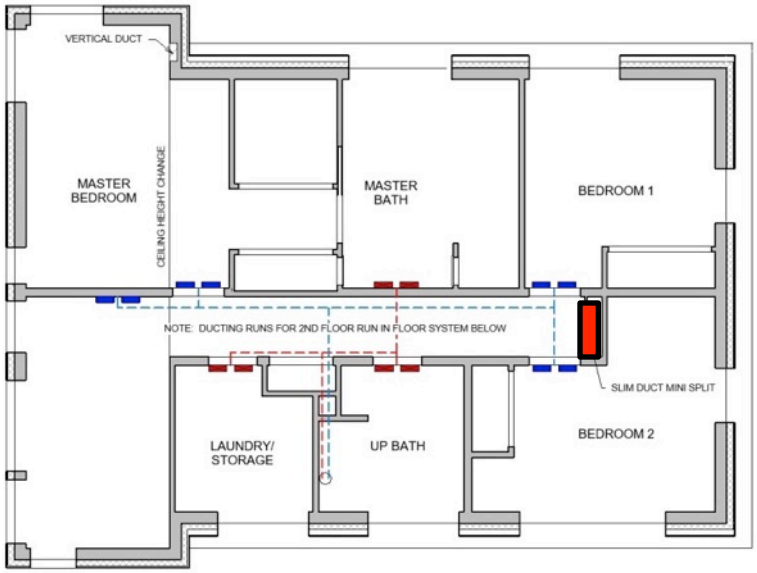
Flexible for a growing family

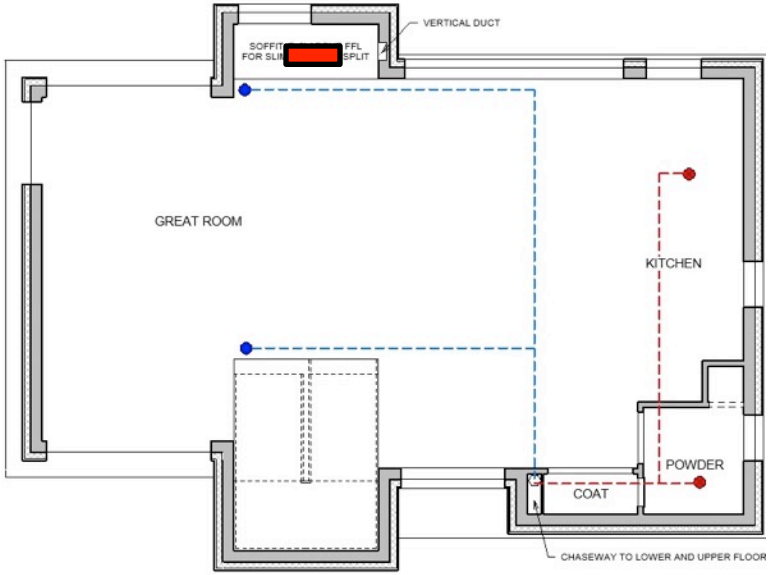
A *Parti* of cantilevered forms with heavy patterns and rhythms

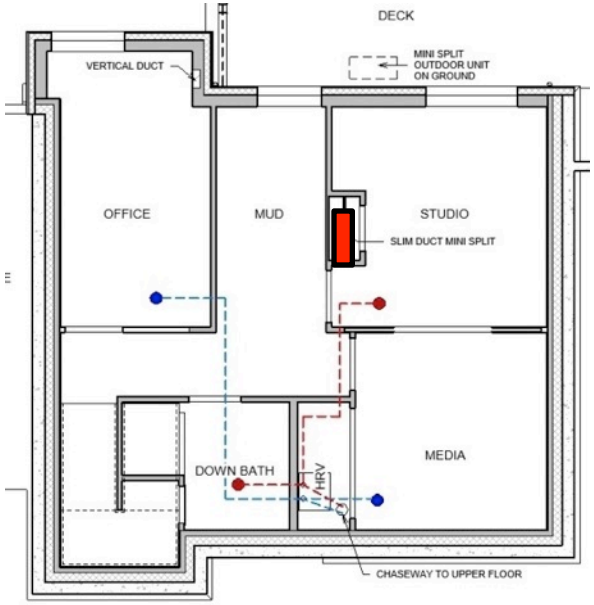


Queen Anne Passive

2,386 sf TFA

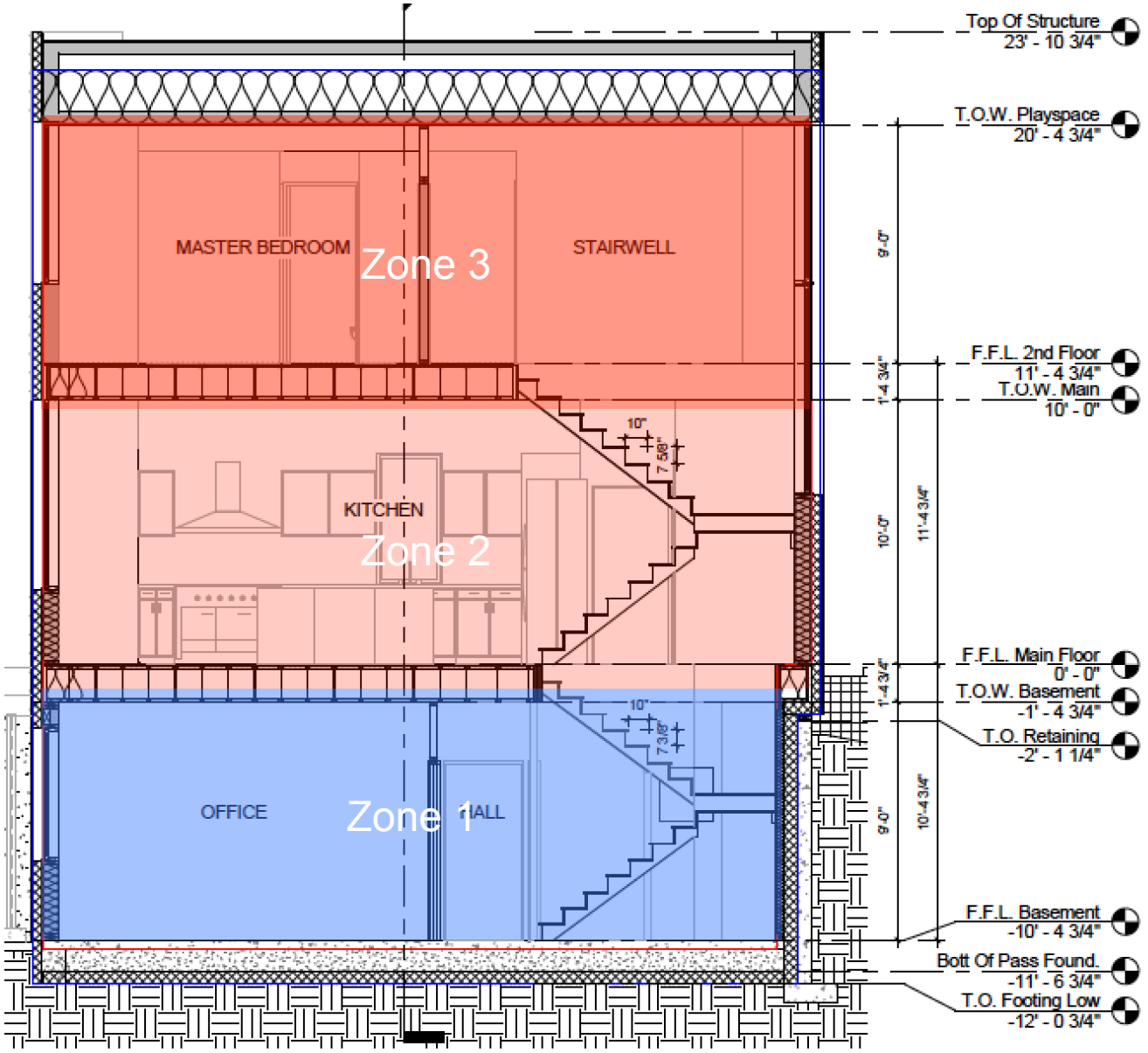






HRV DUCTING LEGEND

- EXHAUST DUCTING
- CEILING MOUNT EXHAUST FIXTURE
- WALL MOUNT EXHAUST FIXTURE
- SUPPLY DUCTING
- CEILING MOUNT SUPPLY FIXTURE
- WALL MOUNT SUPPLY FIXTURE

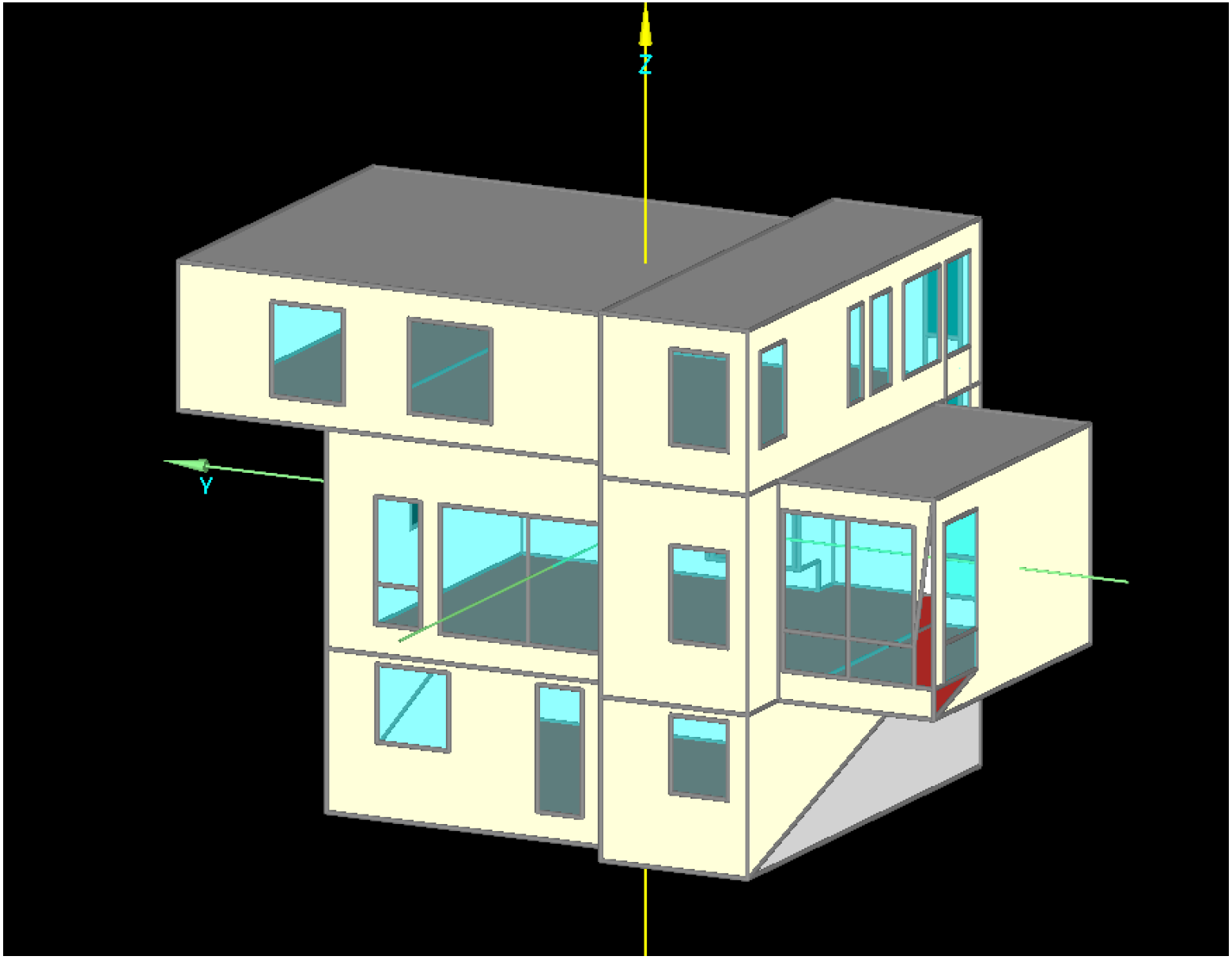


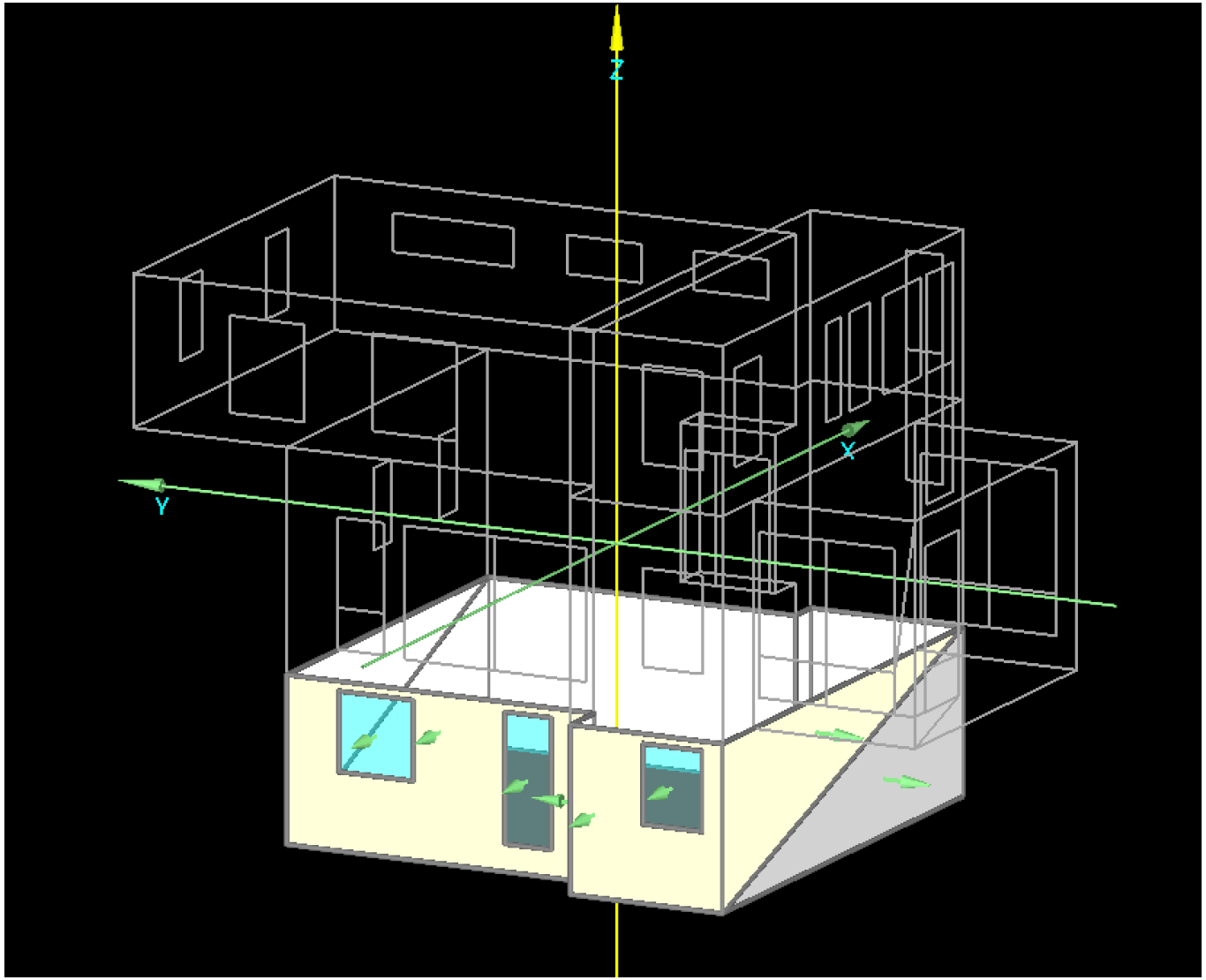
2
A302

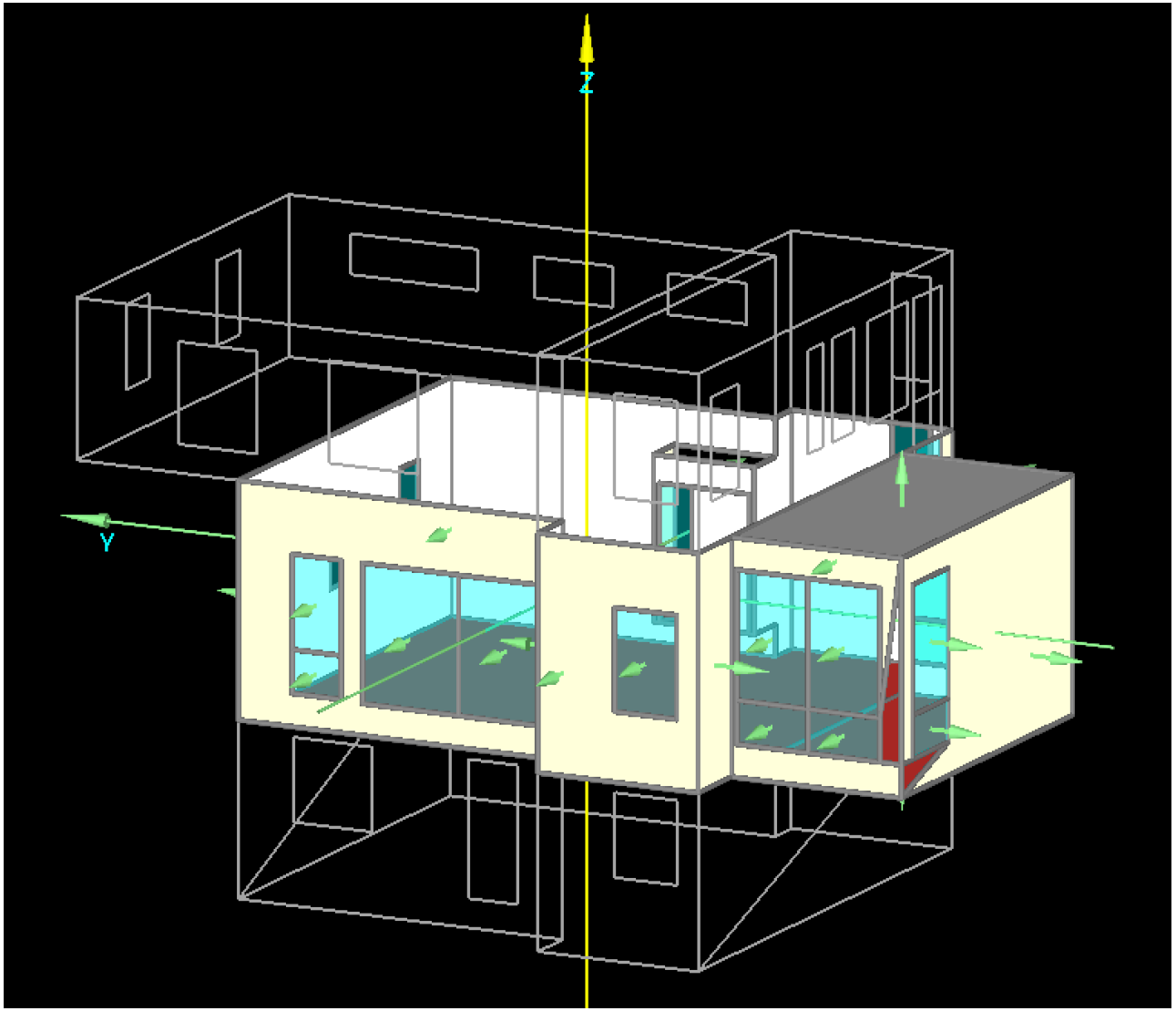
Section - E/W Tower

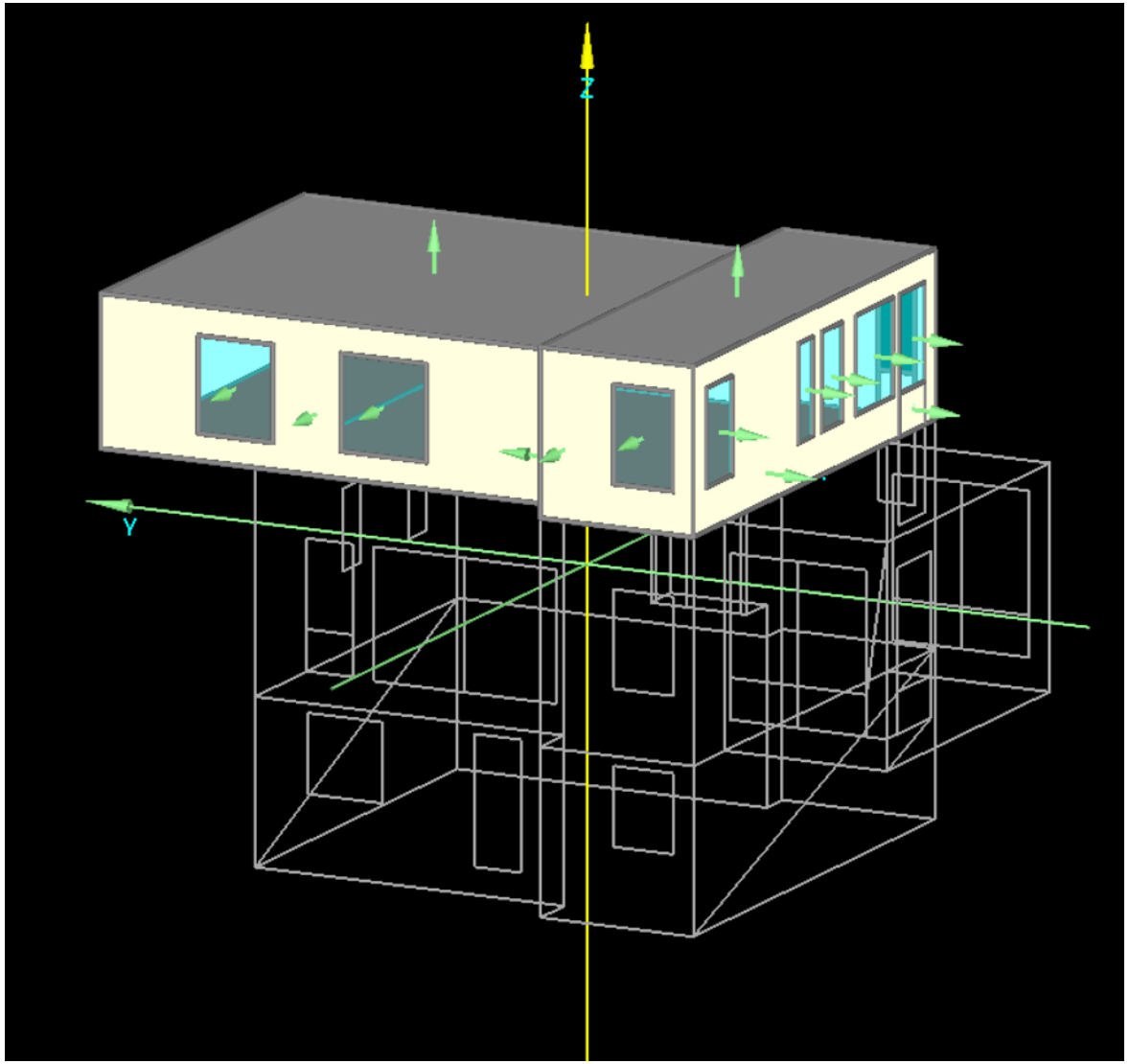
1/4" = 1'-0"

0' 1' 2' 4' 8'

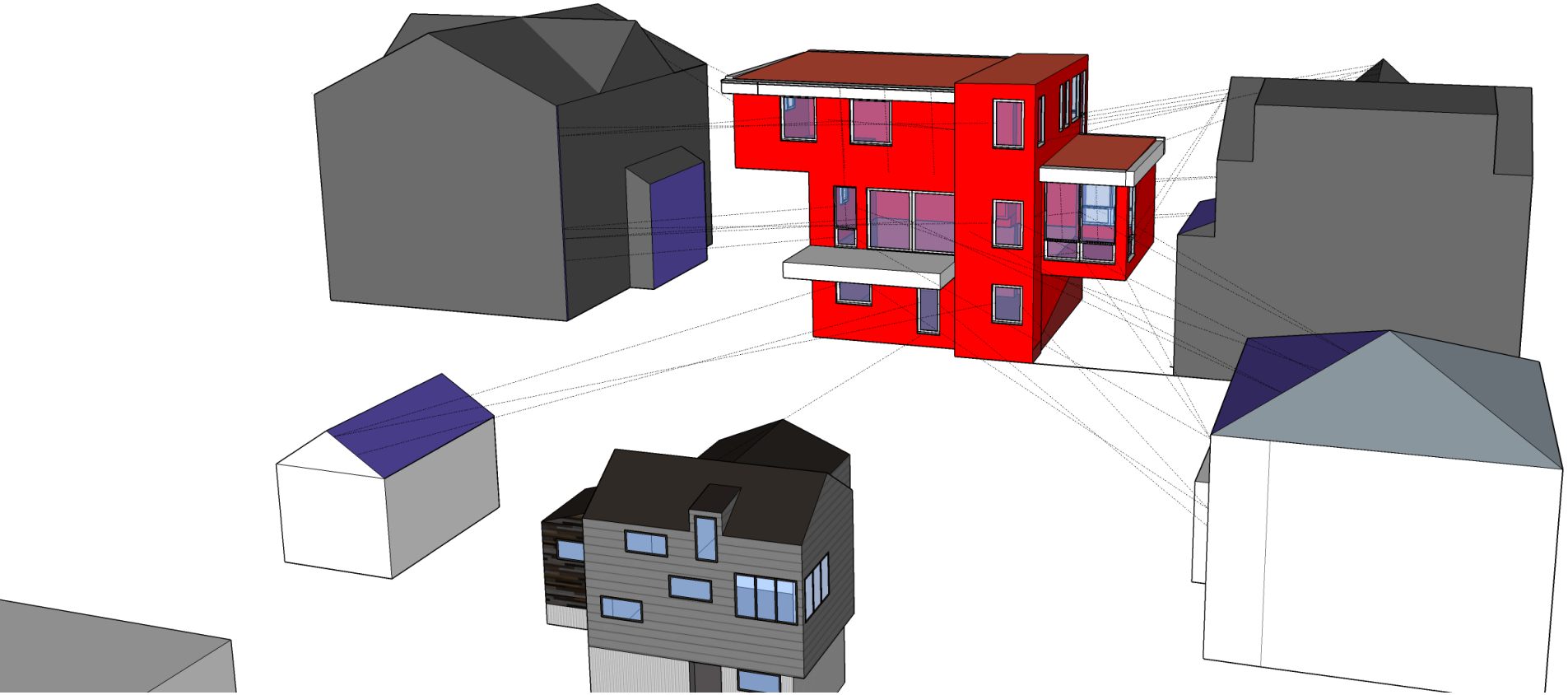

Z
Y

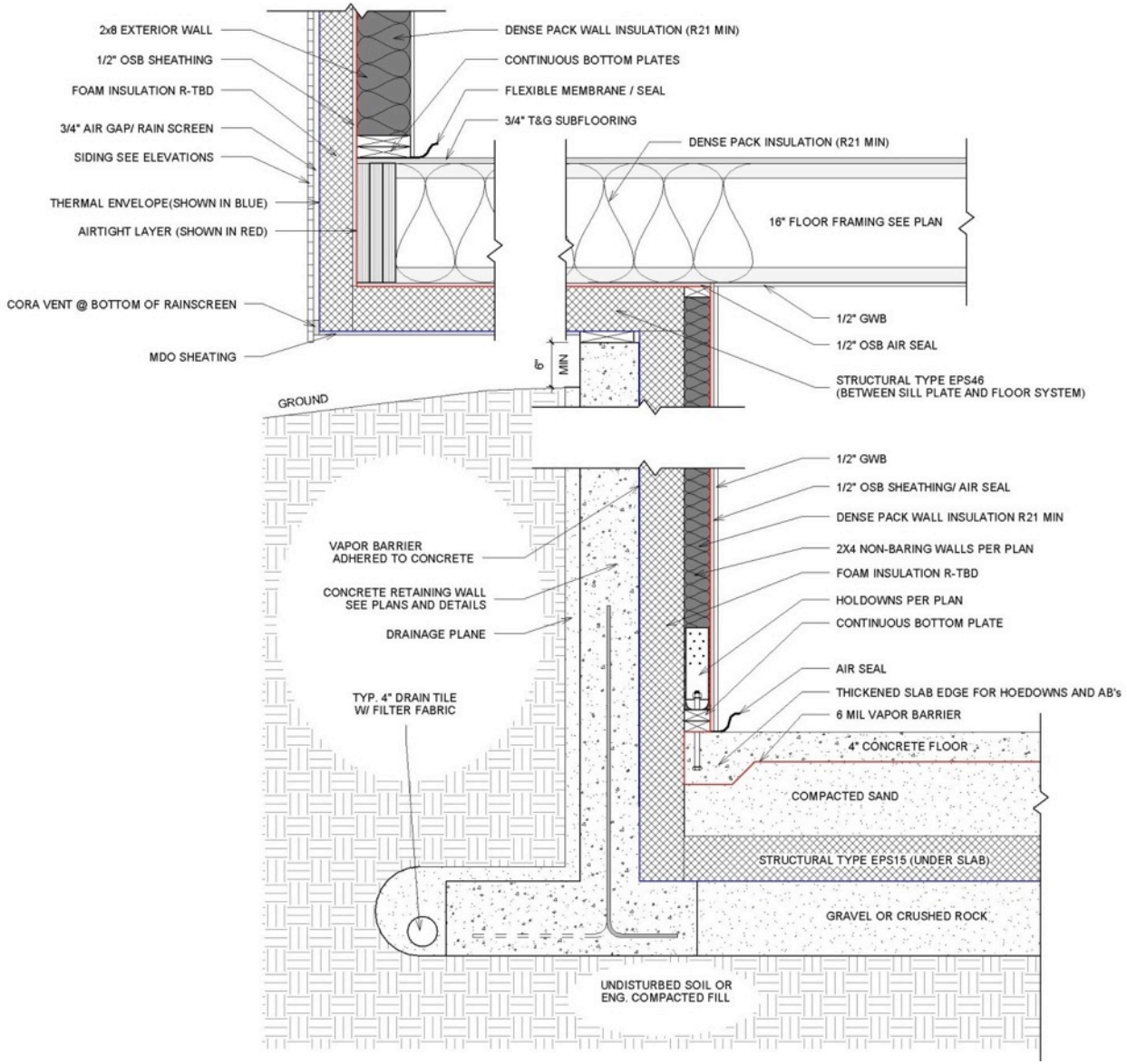

Z
X
Y


Z
Y


Z
Y

Climate: Germany: PHPP-Standard
Qh Inf kWh/m²yr
TFA --- m² (CHECK TFA CALC!)
FHLF Inf





Queen Anne

Passive House Specific Design Challenges

Creating complex cantilevers that ARE NOT thermal bridges

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