



# **CaliPASSIV**

## **A “Pocket Production” Passive House NAPHC 2017**

Seattle, WA, September 30, 2017



# Who We Are

- **Graham Irwin, Architect**
  - 1<sup>st</sup> Passive House Training in US
  - 1<sup>st</sup> Certified Passive House in California
  - 1<sup>st</sup> Certified Passive House Retrofit in US
  - Trainer, Lecturer, Passive House Fanatic
  
- **Spencer Dobrovolny, Builder**
  - Native of Champaign, IL
  - Passive House Pioneer
  - 15 Spec Projects in Illinois & California
  - “Building Addict,” Developer



# Paths Almost Crossed

Urbana/Champaign, IL, 2008-2009



**1<sup>st</sup> CPHC Training (2008)**



**Fairview II, e-colab (2008)**

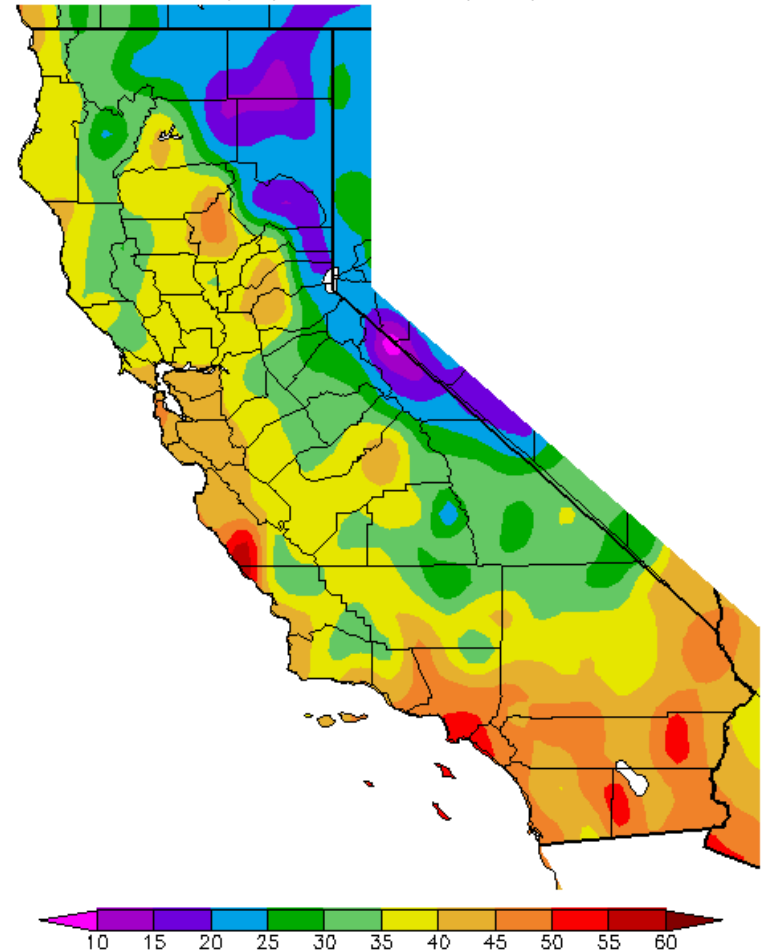


**Stanton House, e-colab (2009)**

# EH Architecture in California



Av. Min. Temperature (deg. F)  
01/1/2014 - 1/31/2014



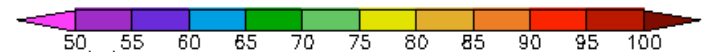
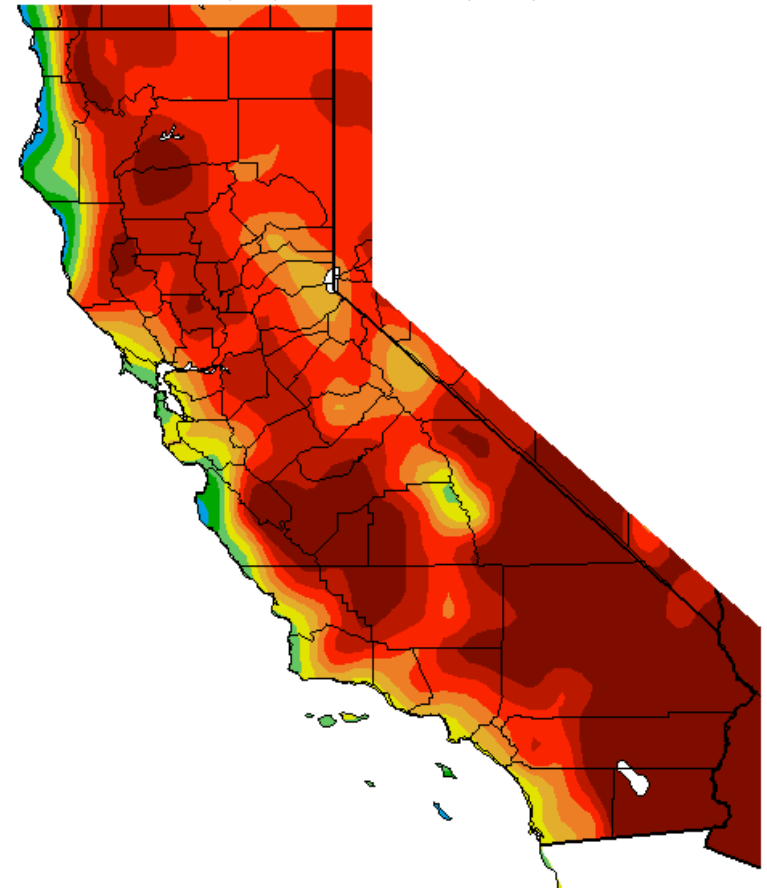
Generated 2/1/2014 at WRCC using provisional data.  
NOAA Regional Climate Centers



# EH Architecture in California



Av. Max. Temperature (deg. F)  
07/1/2013 – 7/31/2013



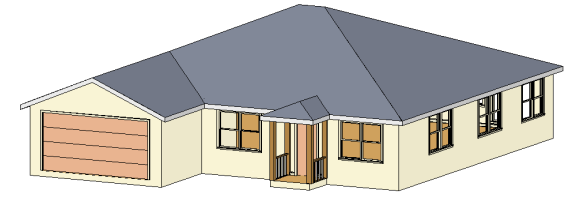
Generated 12/1/2013 at WRCC using provisional data.  
NOAA Regional Climate Centers














# Challenges to Wider Adoption

- Unknowns (What is Passive House? What will it do for me? Will it work here? What would it look like here?)
- Construction is very localized
- Passive House is highly specialized



# Passive House Across CA



Climate Zone & Location	Specific Demand (kBtu/ft <sup>2</sup> /yr) - Single Family, 1 Story, 2044 ft <sup>2</sup> TFA						Combined Demand Reduction (kBtu/yr)	# Optimized Buildings = 1 Standard Building (w/ 80% Heat Recovery)
	Standard Design (T24 "Budget")			Optimized Design (Passive House)				
	Heating	Cooling	Comb.	Heating	Cooling	Comb.		
Passive House Max.	4.75	4.75–6.66 <sup>1</sup>		4.75	4.75–6.66 <sup>1</sup>			
CZ01 Arcata	18.84	0.47	19.31	4.60	0.08	4.68	29,908	
CZ02 Santa Rosa	14.85	0.36	15.21	3.40	0.09	3.49	23,959	
CZ03 Oakland	8.78	1.33	10.11	4.50	0.38	4.88	10,692	
CZ04 San Jose	10.77	0.61	11.38	4.65	0.19	4.84	13,370	
CZ05 Santa Maria	8.61	1.13	9.74	4.12	0.28	4.40	10,917	
CZ06 Torrance/LAX <sup>2</sup>	4.24	0.92	5.16	2.93	0.22	3.15	4,109	 (  )
CZ07 San Diego	3.06	1.64	4.70	1.41	0.12	1.53	6,480	 (  )
CZ08 Fullerton	4.79	0.82	5.61	2.01	0.02	2.03	7,319	 (  )
CZ09 Burbank	5.15	1.48	6.63	2.41	0.14	2.55	8,341	 (  )
CZ10 Riverside	5.96	0.83	6.79	2.73	0.03	2.76	8,239	 (  )
CZ11 Red Bluff	13.32	3.7	17.02	2.50	0.99	3.49	27,659	
CZ12 Sacramento	12.15	0.65	12.80	2.24	0.03	2.27	21,526	
CZ13 Fresno	10.83	4.4	15.23	2.03	1.33	3.36	24,266	
CZ14 Palmdale	12.08	4.19	16.27	1.70	1.08	2.78	27,578	
<u>CZ15 Palm Springs</u>	1.27	22.43	23.70	0.01	<u>8.33</u>	8.34	31,400	
CZ16 Blue Canyon	25.95	1.13	27.08	4.30	0.15	4.45	46,262	

1. The specific cooling demand for CZ15 (Palm Springs) was climate-adjusted by PHPP v8.4 to 6.66 kBtu/ft<sup>2</sup>/yr maximum.

2. Passive House uses "TMY-3" weather stations to derive climate data. The closest TMY-3 station to Torrance is Los Angeles International Airport (LAX).

# Paths Crossed

Fairfax, CA, 2016



## We Bought A Ruin!

### SITework



**A Shotcrete Retaining Wall**  
Shoring up an unstable slope, with minimal formwork

BY GRAHAM IRWIN

As an architect practicing in Marin County, Calif., I've designed dozens of remodels, additions, and new buildings in the last decade and a half, and I've served as architect and general contractor on several of my own properties. Since most of our area is built out, remodels and additions tend to be the most common projects.

Last year, my wife and I purchased a dilapidated 1927 Craftsman on a steep upslope lot in Fairfax, Calif., to rehab as a rental property. Among the many issues we encountered, the biggest challenge involved the foundation of the house and the concrete garage immediately below it. As was typical of hillside houses of the time, the garage was built at street level, downhill from the house, with

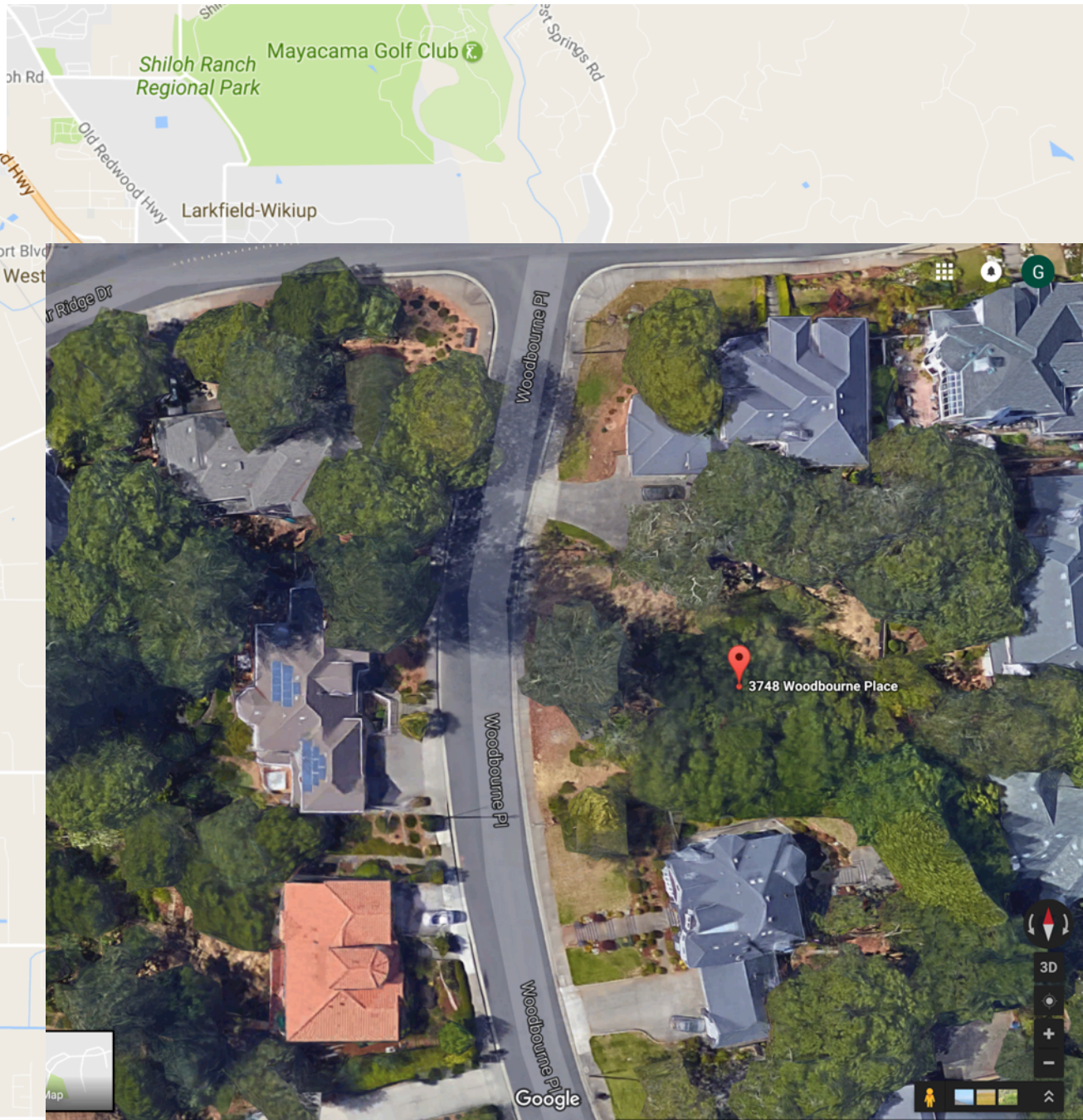
reinforced concrete walls and roof, and partially submerged in the hill. The garage's back wall was less than 7 feet from the foundation of the house up the hill behind it.

In the vicinity of the garage, the house foundation had settled noticeably, with the wooden cripple wall between the foundation and the framed floor nearly submerged into the soil. We raised the corner of the house by 6 inches to level the floors; trimmed and raised the bottom of the cripple wall to remove rot and increase separation from grade; and replaced large portions of the foundation. Because I was concerned about settling in what looked like loose fill, we dug the footing of the foundation to 24 inches below grade (rather than the typical 12 inches permitted by code).

Photos by Graham Irwin



# A Client!



# Initial Spark: T/K Architecture



ESSENTIAL  
HABITAT  
ARCHITECTURE





# T/K Architecture 2014



# T/K Architecture 2017





# PROGRAM CONSIDERATIONS

- Elemental, Compact Form
- Efficient Layout
- Multi-Generational
  - Universal Design, “Forever Home” That Learns
- Comfortable, Contemporary
- “Fresh” & Fun!

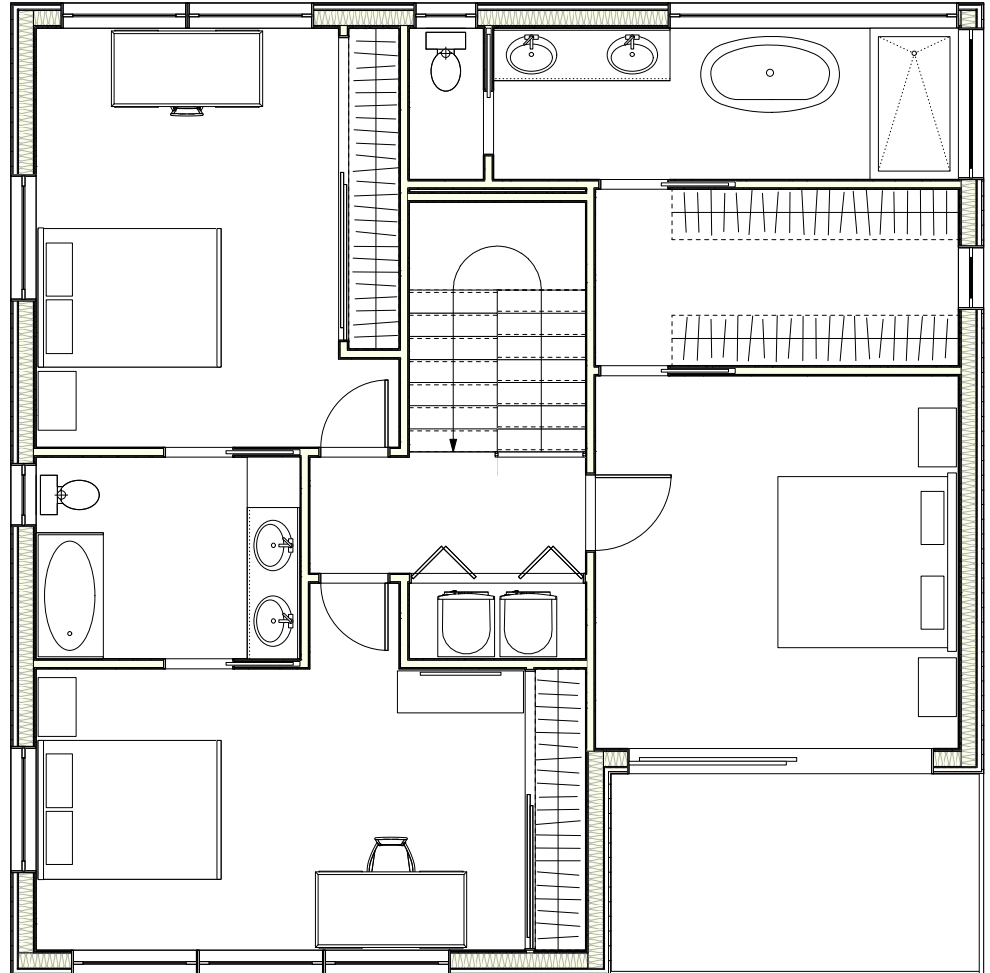


# CaliPASSIV1

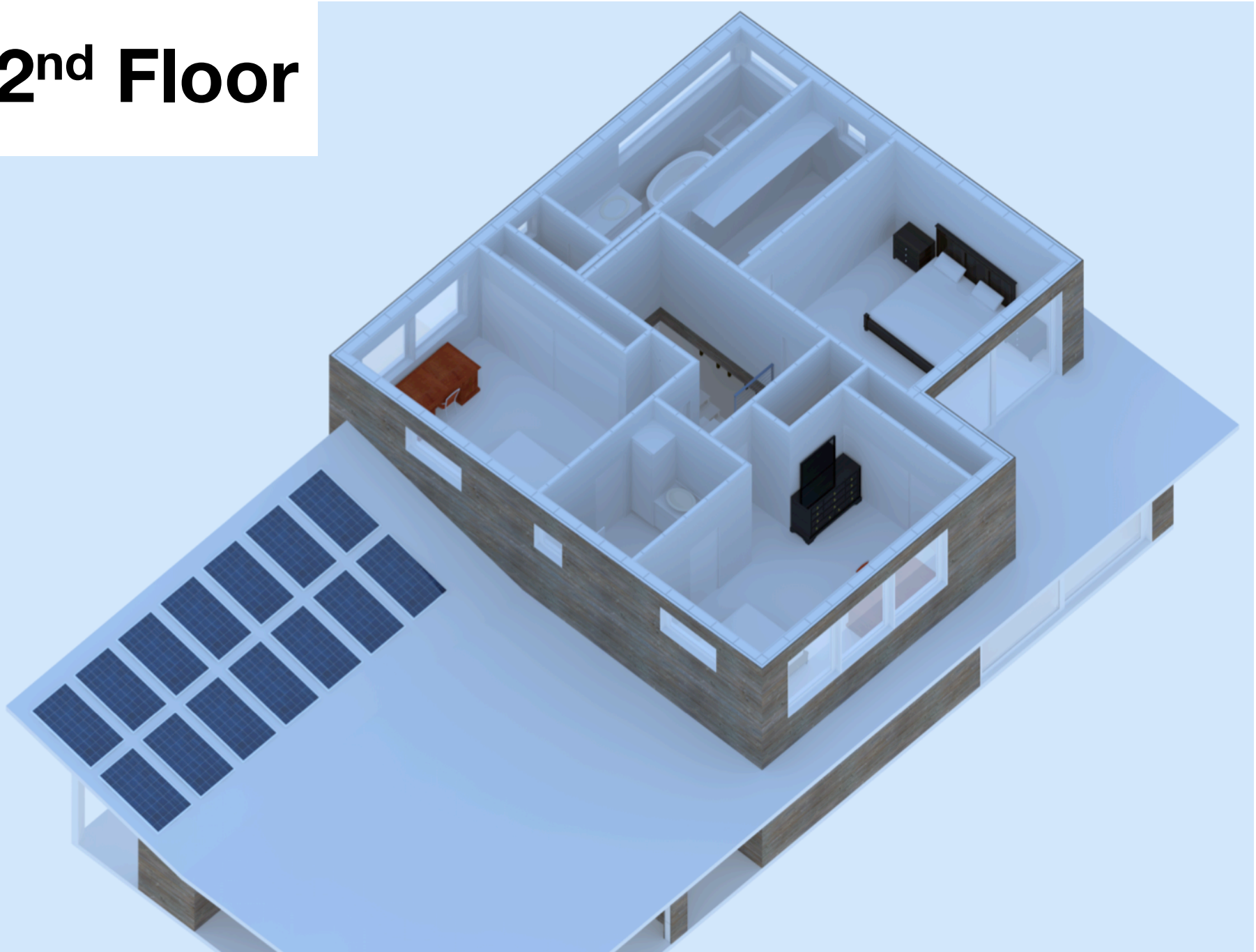
4 BR / 3½ BA, 2800 SF



# 2<sup>nd</sup> Floor – 3 BR/2 BA, 1300 SF

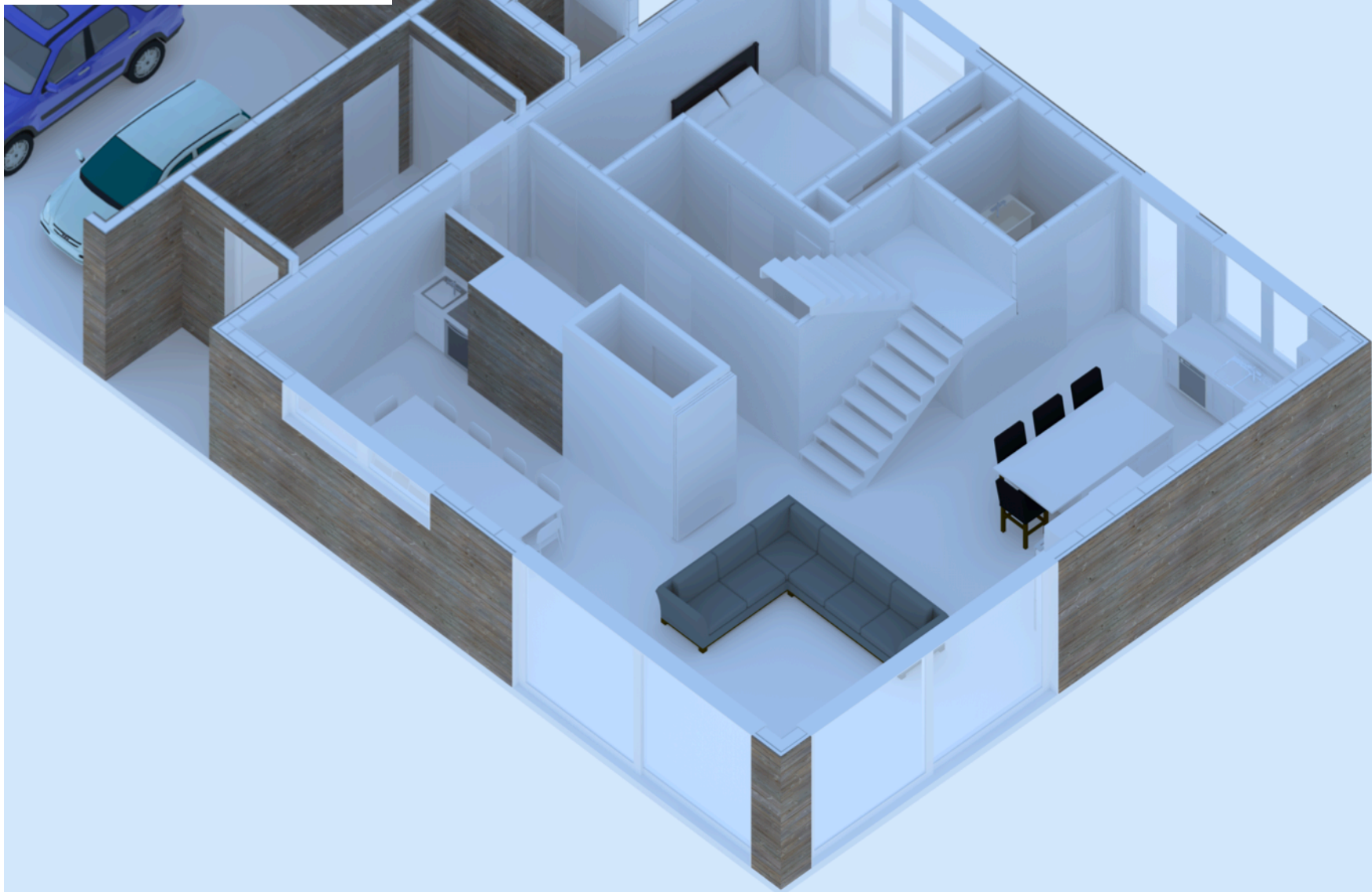


# 2<sup>nd</sup> Floor

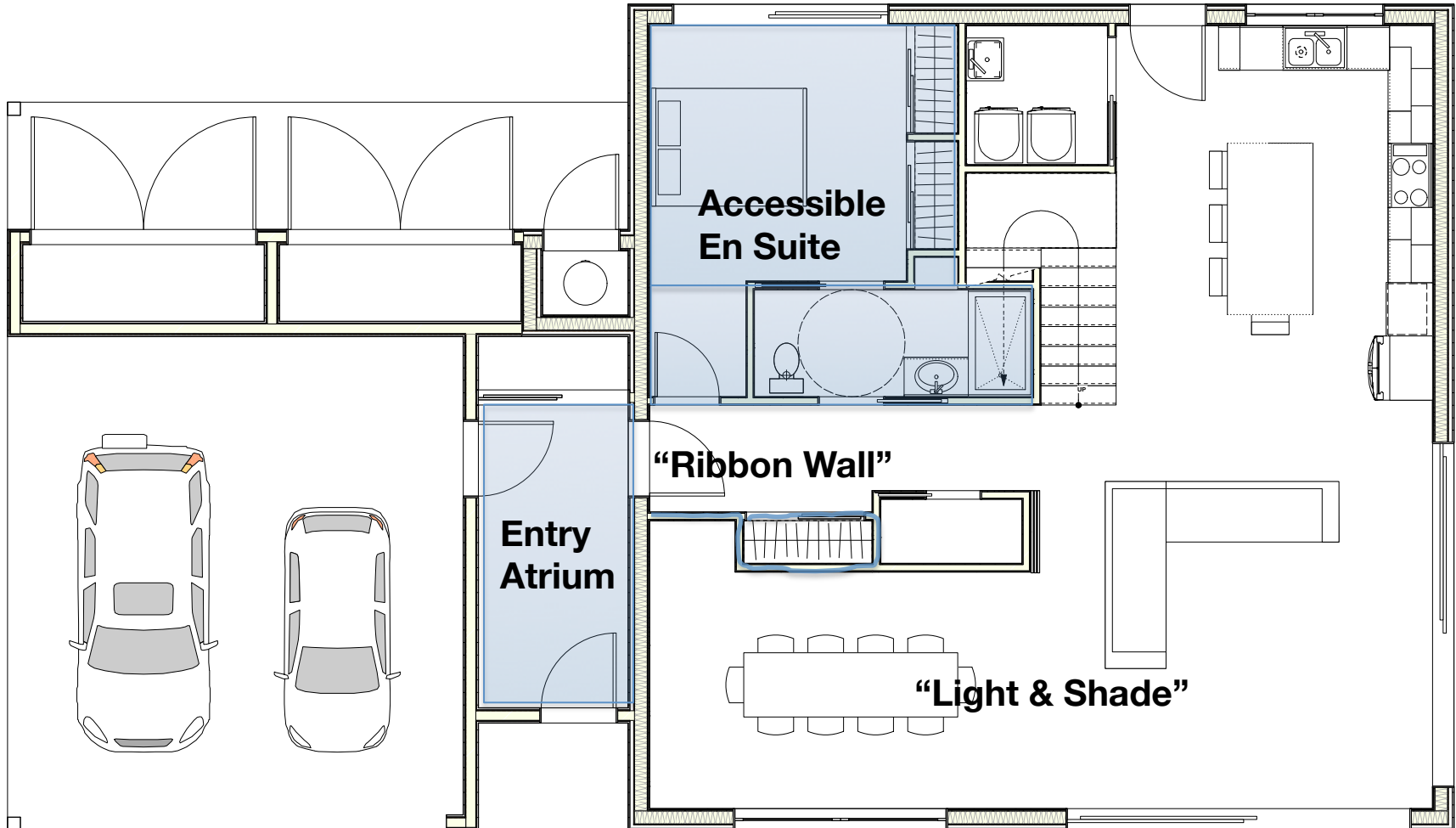




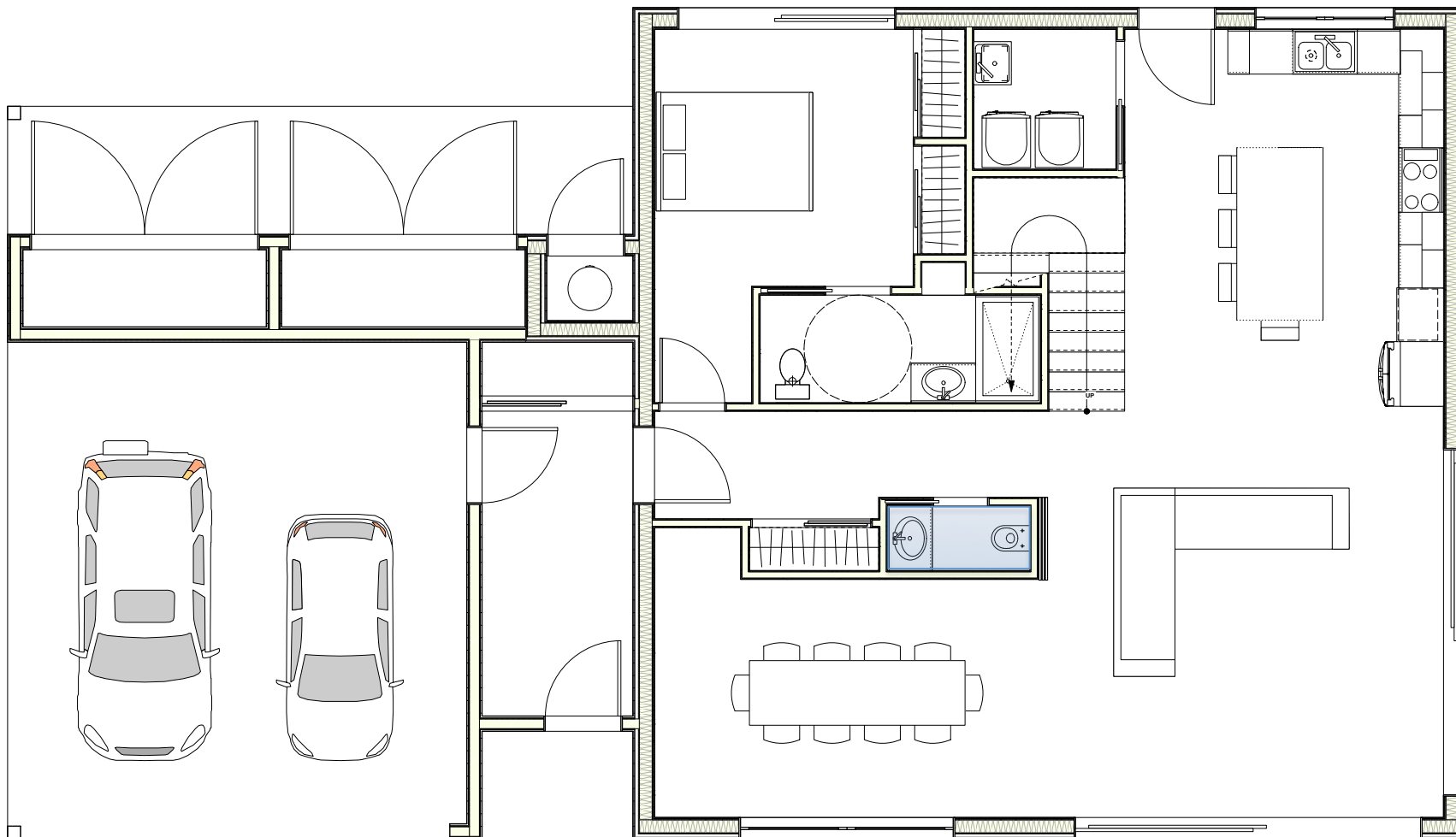
# 1st Floor



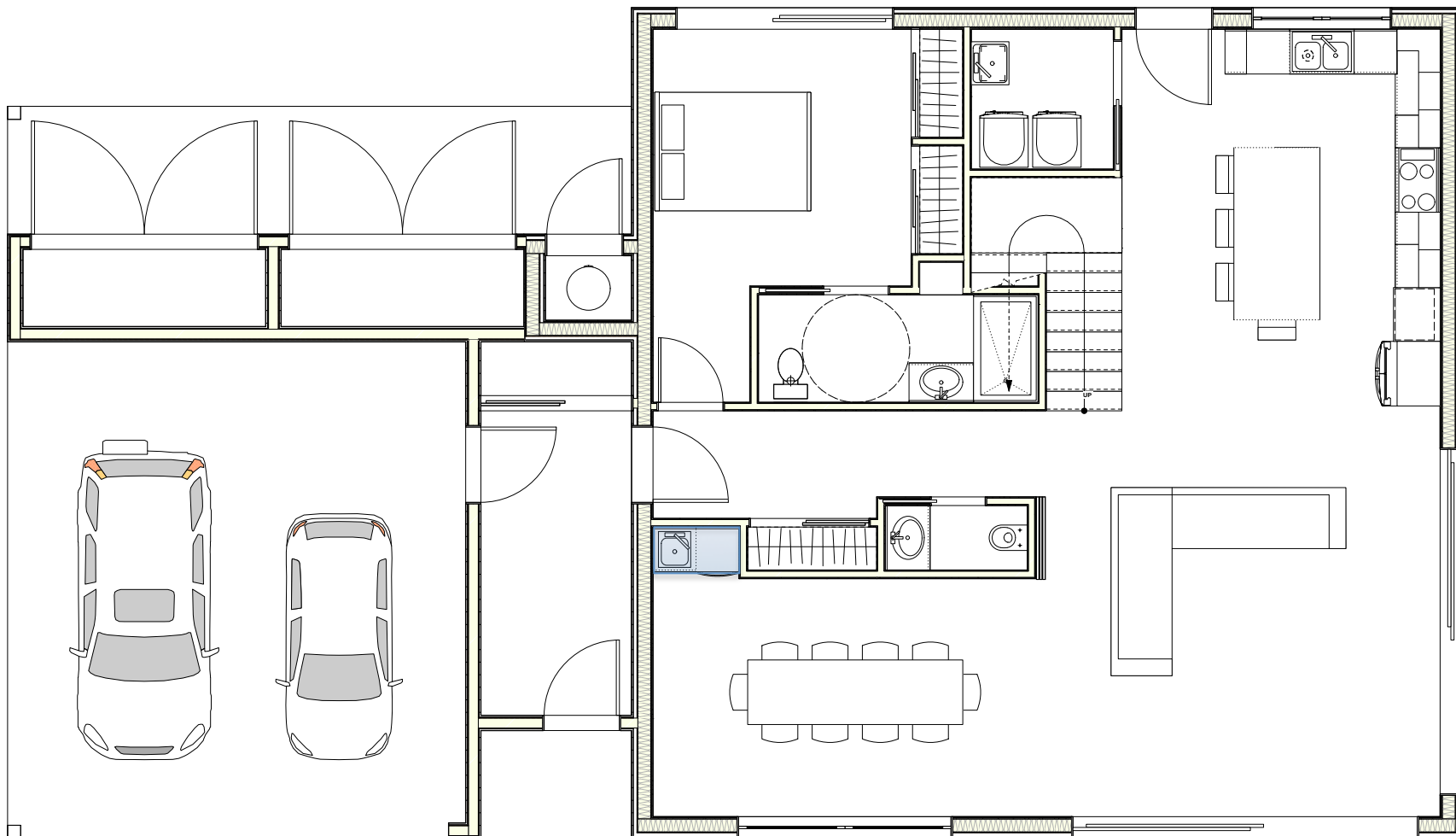
# 1<sup>st</sup> Floor – 1500 SF



# 1<sup>st</sup> Floor – Add ½ Bath

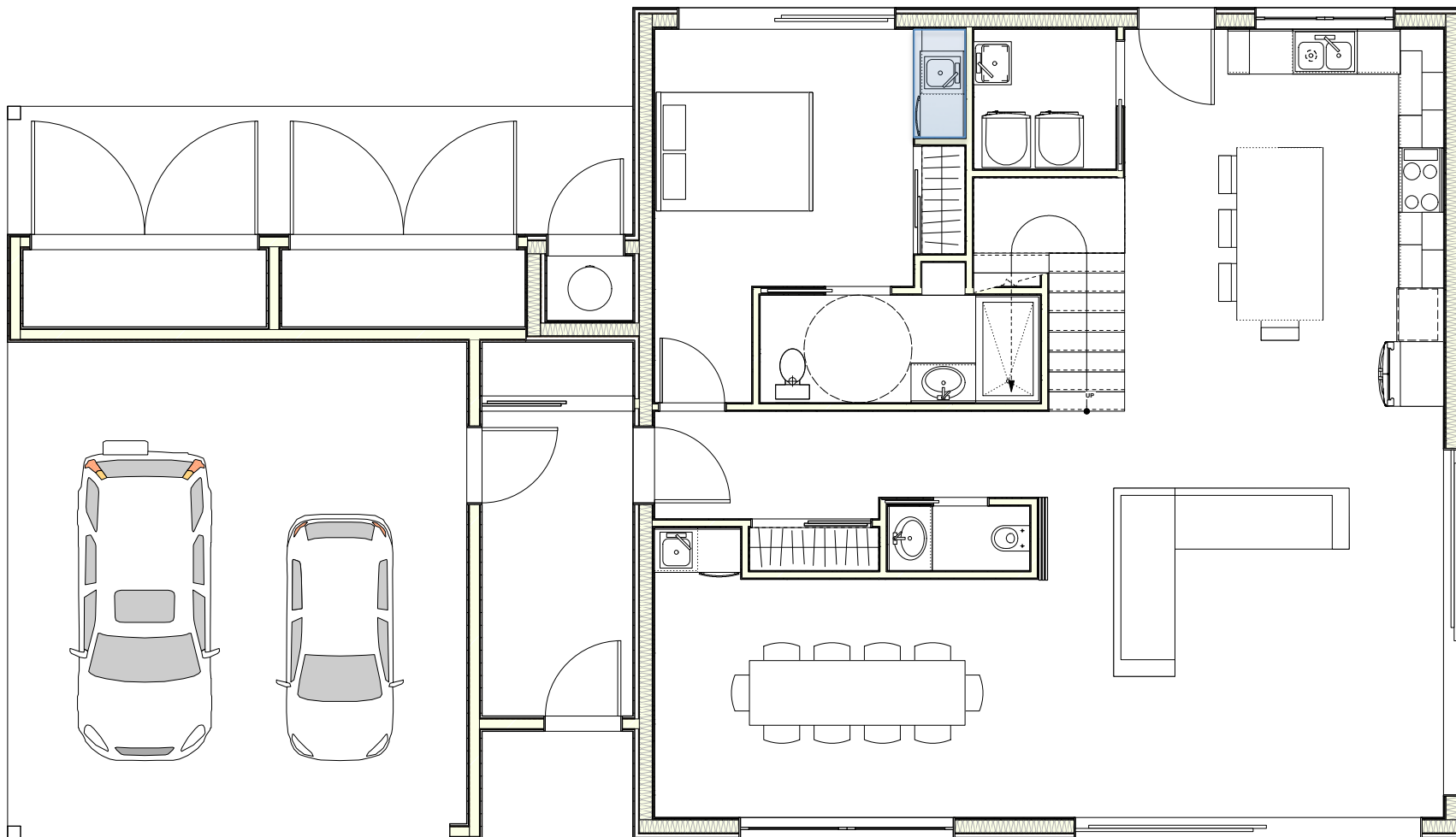


# 1<sup>st</sup> Floor – “Cali” Wet Bar

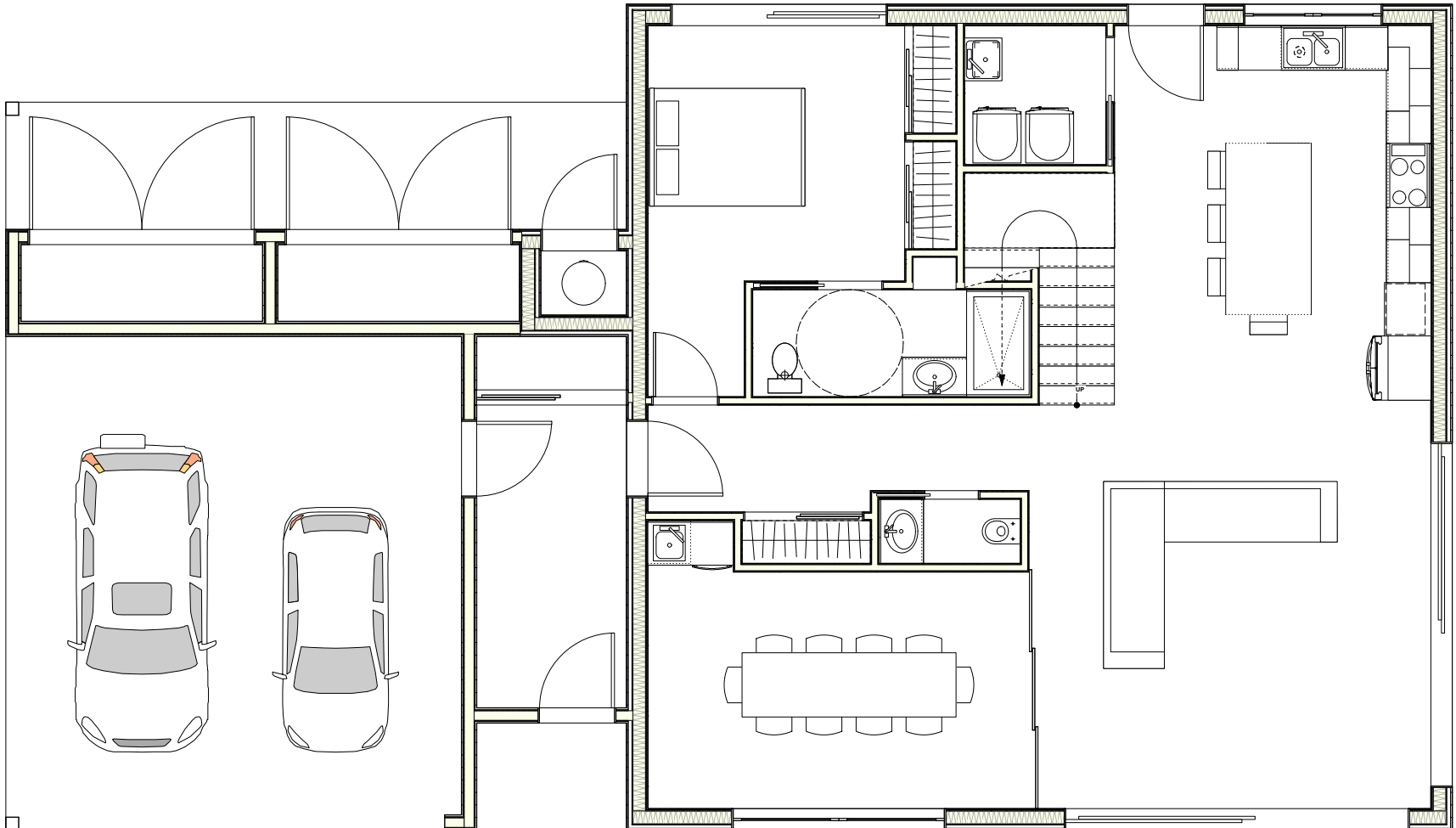




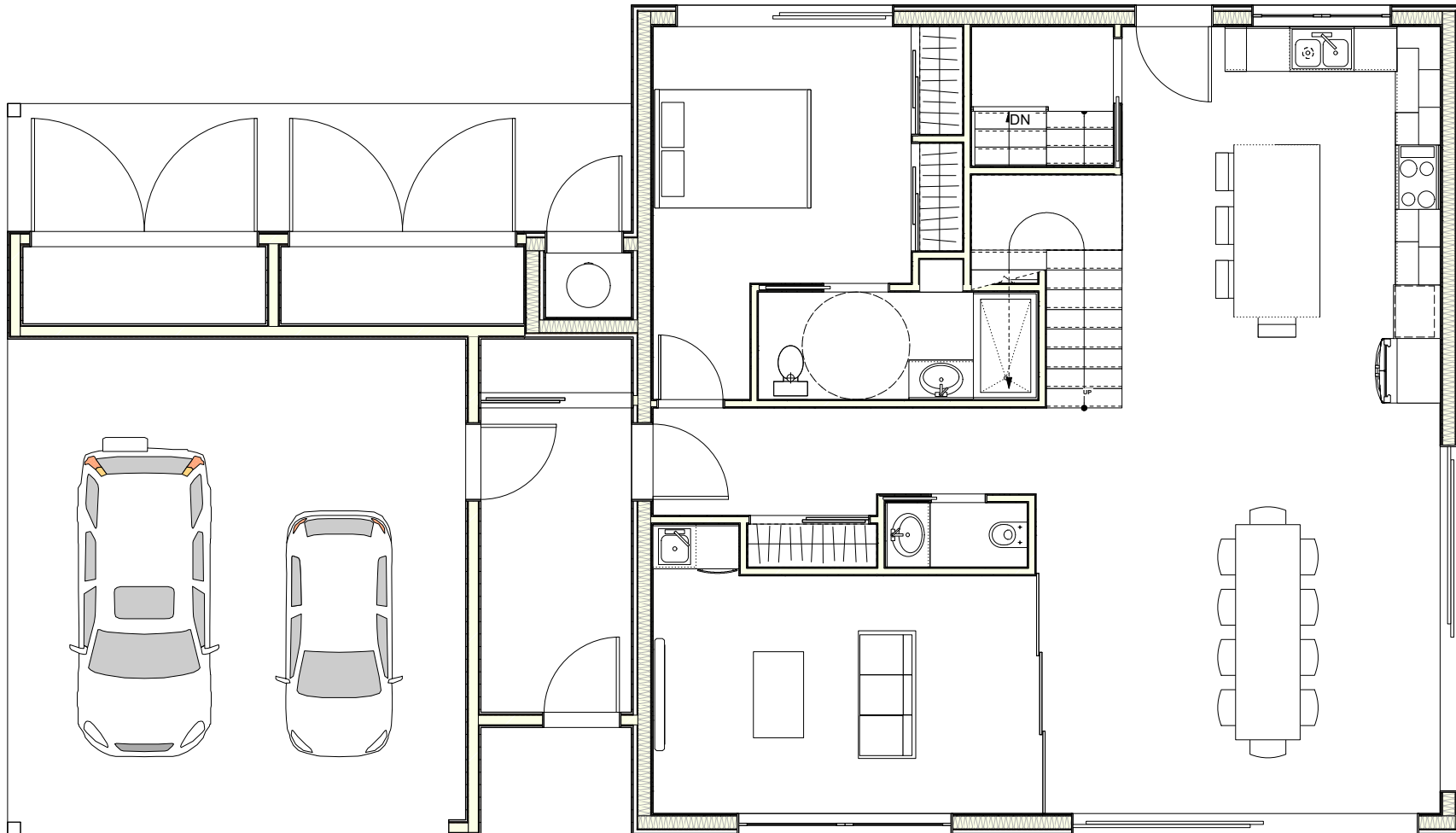
# 1st Floor – ADU



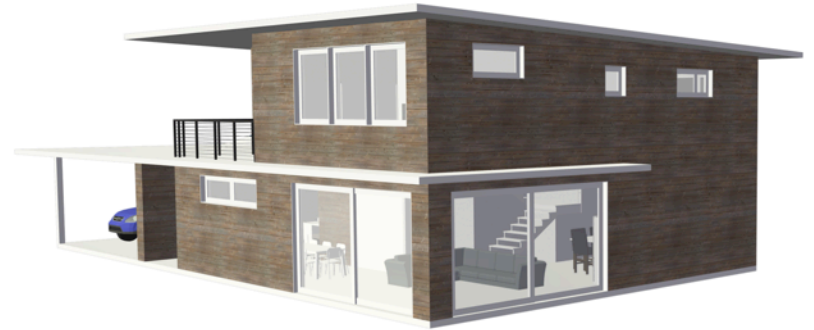
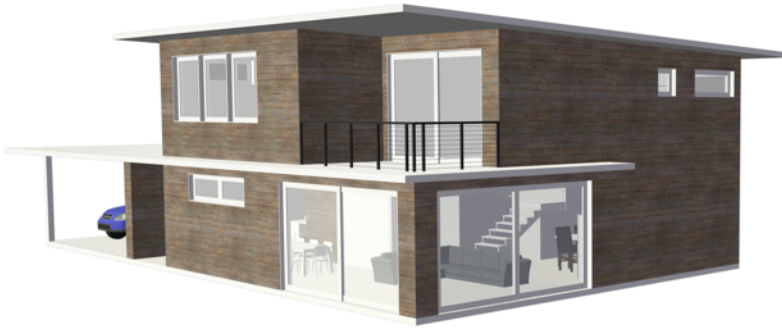
# 1st Floor – “Broken Plan”



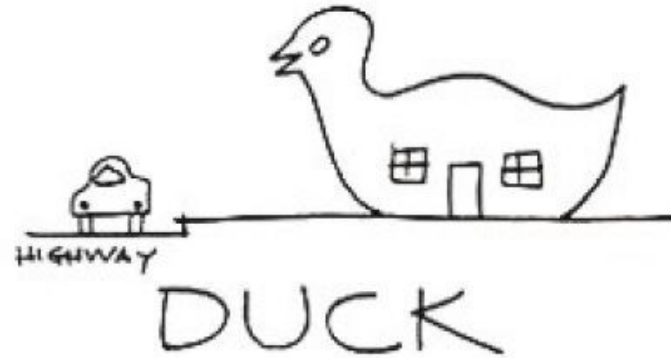
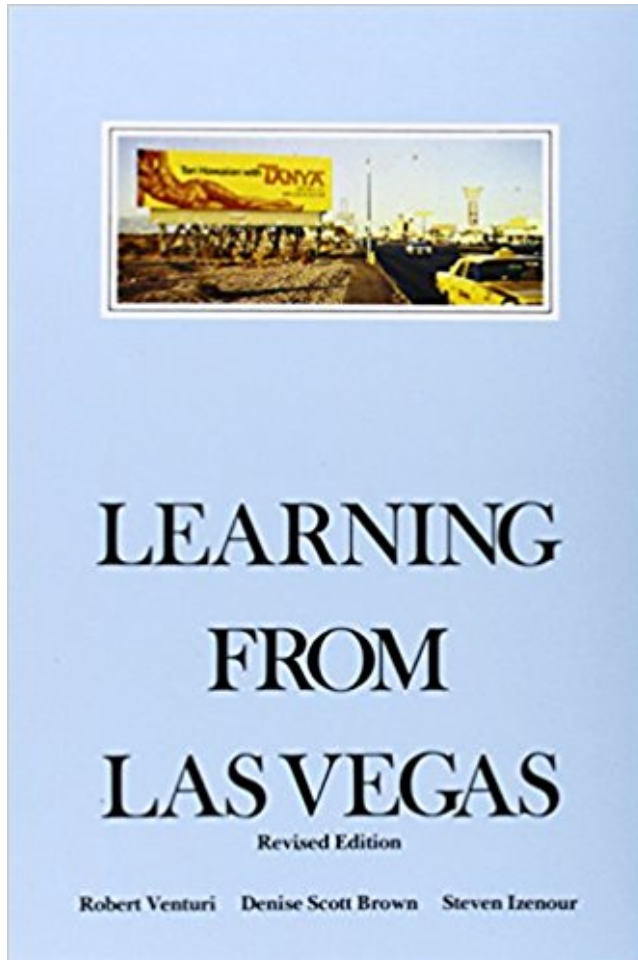
# 1<sup>st</sup> Floor – Flex Space



# Site Responsive (4 in 1)

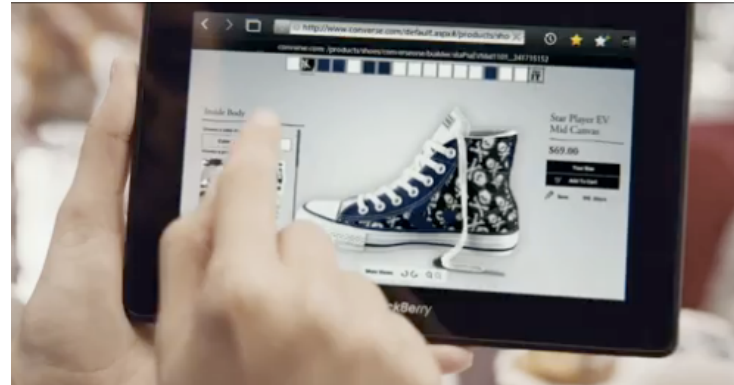
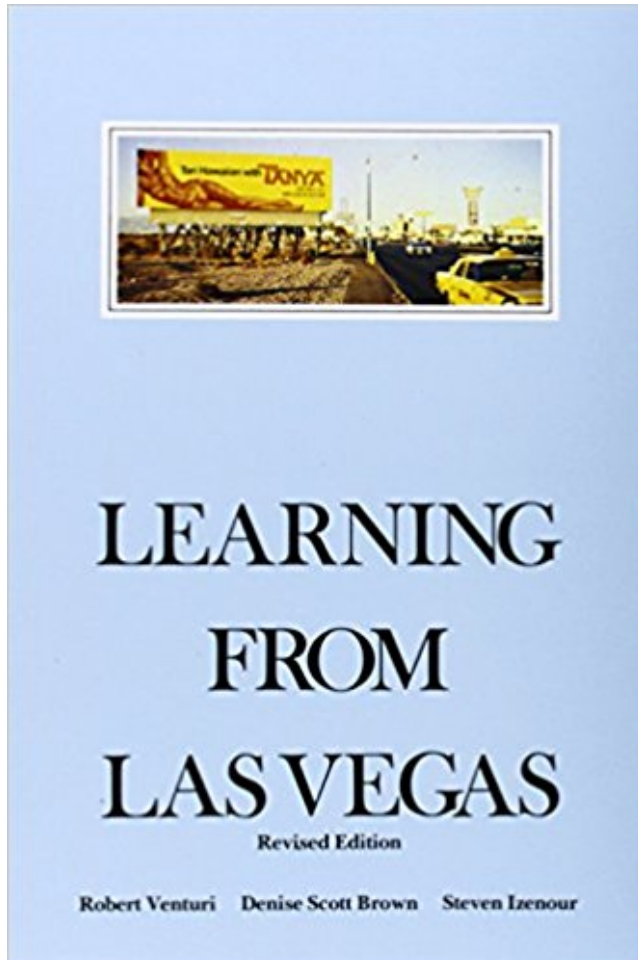


# CaliPASSIV - Make It Your Own!

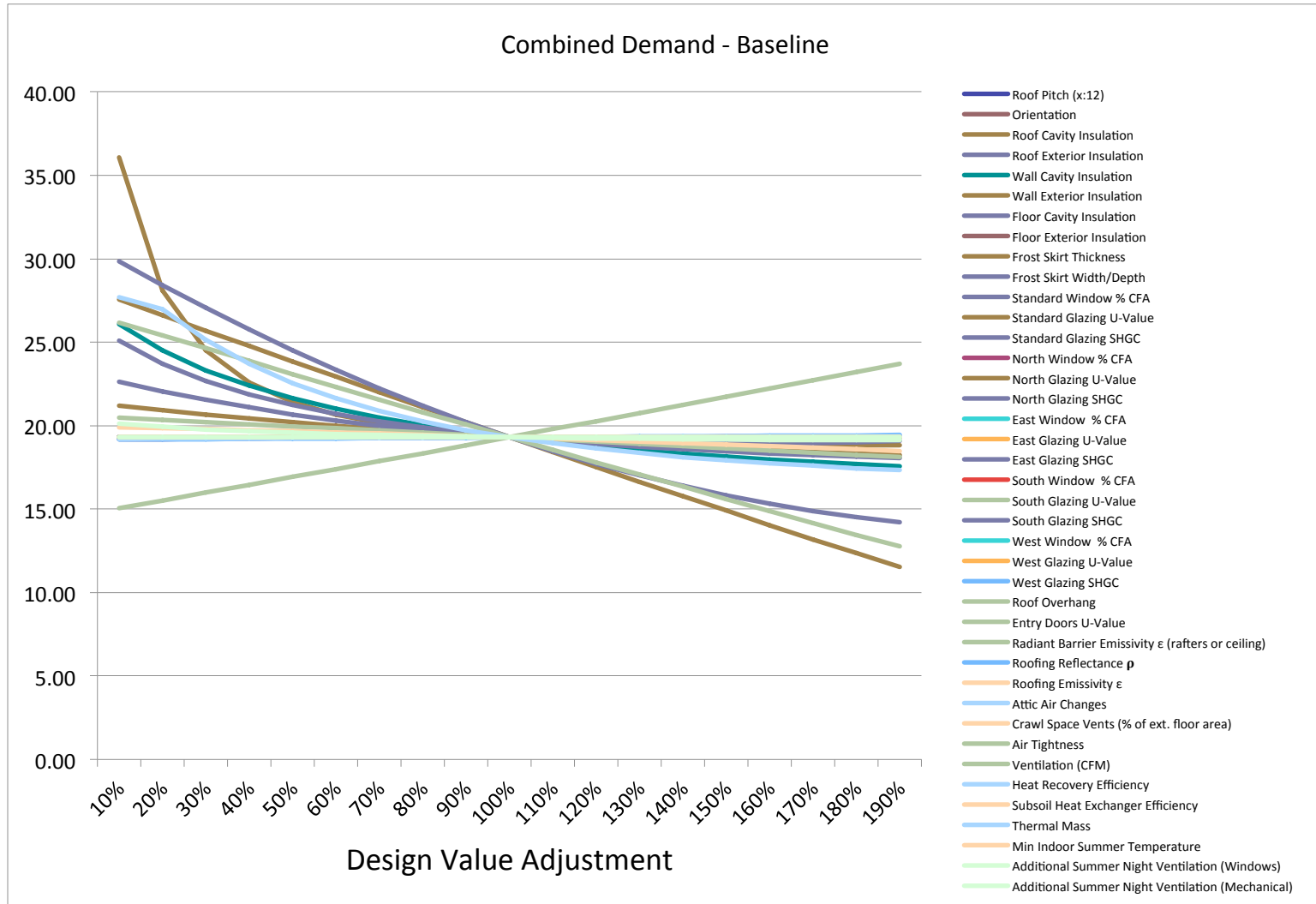




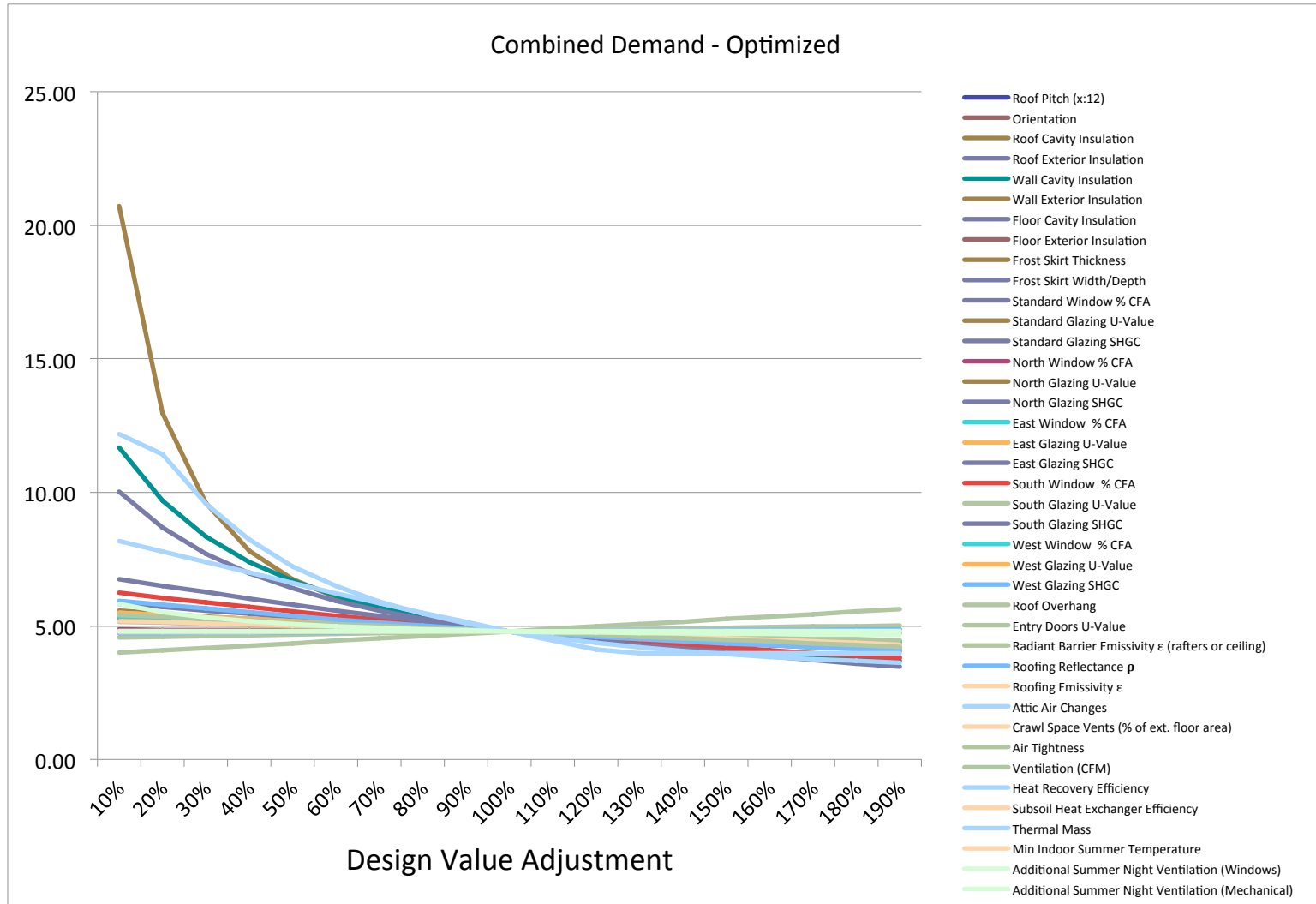
# CaliPASSIV - Make It Your Own!



# Razor Sharp Energy Modeling



# Razor Sharp Energy Modeling



# Other Features & Options

- Wired & Plumbed for Solar
- Car Charging
- Graywater & Rainwater Ready
- Whole House Energy Monitoring
- ZNE, Living Building Challenge, etc.





**Business Proposition:**

**PASSIVE  
HOUSE FOR  
FREE**



# How? (Production Building)

- Simplify
- Refine
- Repeat
- IDP & IPD
- Economies of Scale
- Enable the Existing Building Industry
- Streamline Certification



# Business Model

1. Design/Build Prototype(s)
2. Enable Builder Partners
3. Transition to Developer
4. Other Designs, ADUs, Multi-Family



# Benefits for Industry Partners

1. Brand Recognition
2. Market Access (CA is World's 6<sup>th</sup> Largest Economy)
3. Consistent, Replicated Orders



# Benefits for Builder Partners

- Marketing & Name Recognition
- Pre-Qualified, Pre-Sold Clients
- Access to Volume Discounts
- Debugged, Buildable, Complete Plans
- Support, Advice & Training
- Creativity Without Change Order Stress
- Referral Fee Opportunities





# QUIZ

**What must we emphasize for wider acceptance of Passive House?**



# PASSIVE HOUSE IS FUN!

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