Object Documentation: Mamaroneck Passive House in Mamaroneck

Projekt-ID: 2629

Project Designer: Andreas M. Benzing / a.m.Benzing architects pllc
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(T) 212.265.3424, contact@andreasbenzing.com
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This terraced house was built for a private client in the Village of Mamaroneck. The building is a 2 story wood frame construction with a masonry basement and is oriented 32 Degree east of south. The building is a retrofit and extension of an existing build originally built in 1963.

Special feature: 6.7 kW PV-System on the flat roof area which makes the building near-zero energy.

U-value exterior wall:	0.15 W/(m^{2}K)	PHPP Annual heating demand:	**22 kWh/(m^{2}a)**
U-value basement:	0.29 W/(m^{2}K)		
U-value terrace roof:	0.10 W/(m^{2}K)		
U-value roof:	0.12 W/(m^{2}K)	PHPP primary energy:	117 kWh/(m^{2}a)
U-value window:	0.84 W/(m^{2}K)		
Effective heat recovery:	70.9%	Pressure test n_{50}:	0.67 h^{-1}

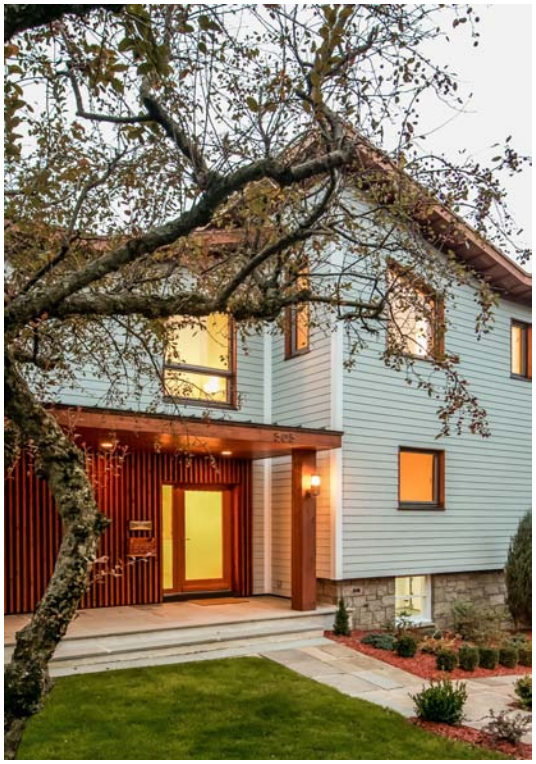
1. Description of construction task:

The entire retrofitted building is using the existing footprint and first floor framing of the existing building. The existing roof had to be carefully deconstructed and all asphalt shingles where recycled. An additional second floor was added and the south roof converted into a terrace to take advantage of the south view to the harbor. The entire building was insulated with an additional outside insulation layer and received a vented horizontal cladding.

2. Pictures of the Mamaroneck Passive House:

South Elevation

West Elevation



North Elevation

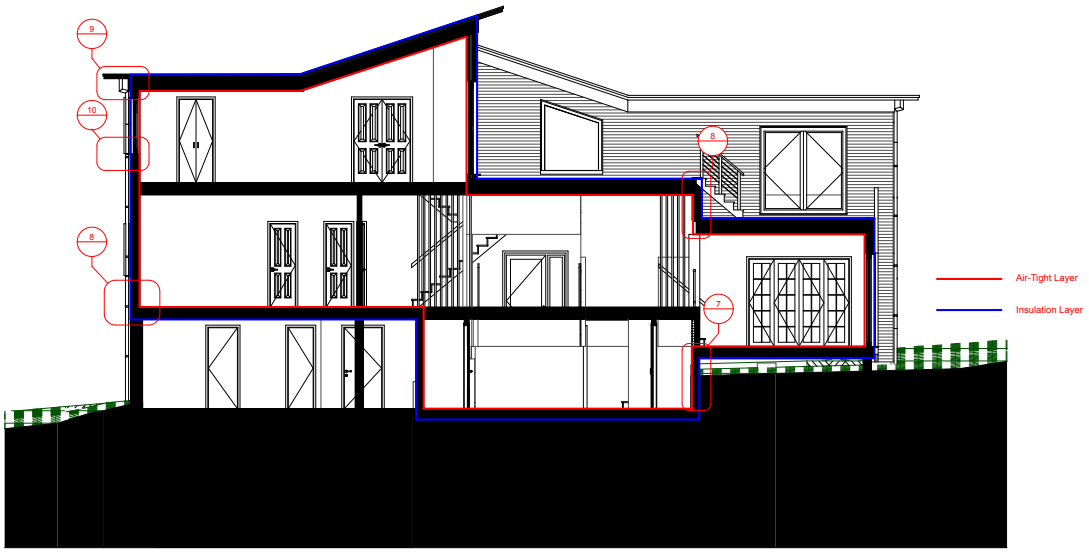
East Elevation

4. Pictures of the Interior:

Living room: open floor plan with a south orientation

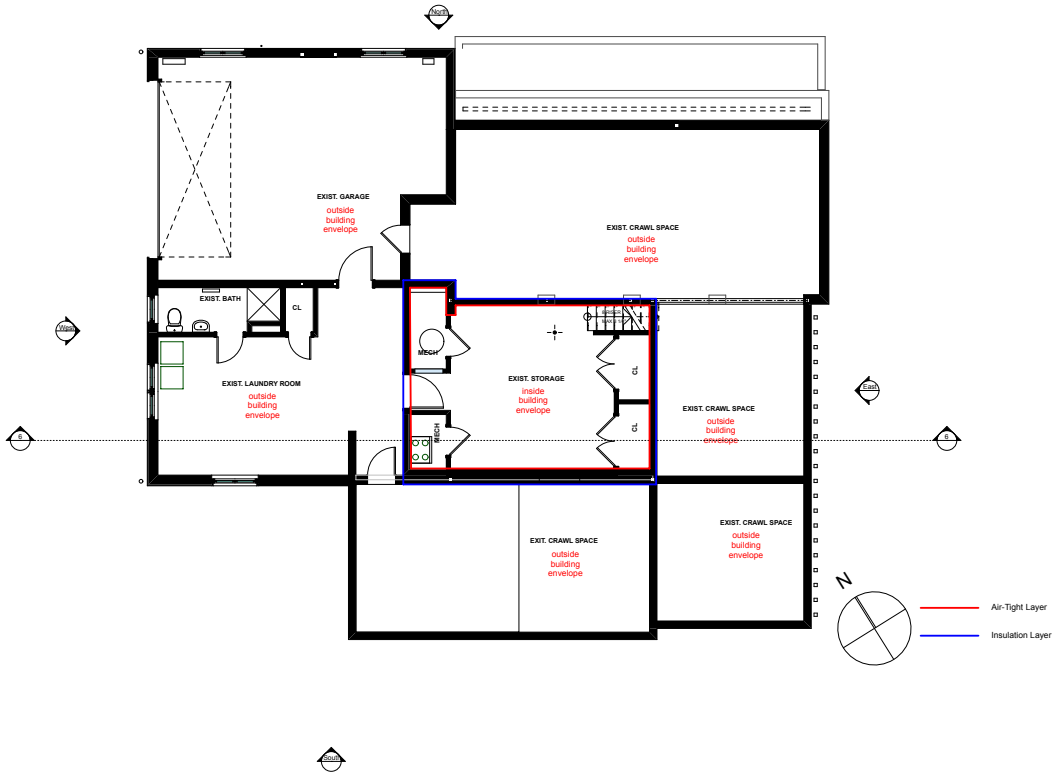
Kitchen: located on the north / east corner

5. Cross Section:

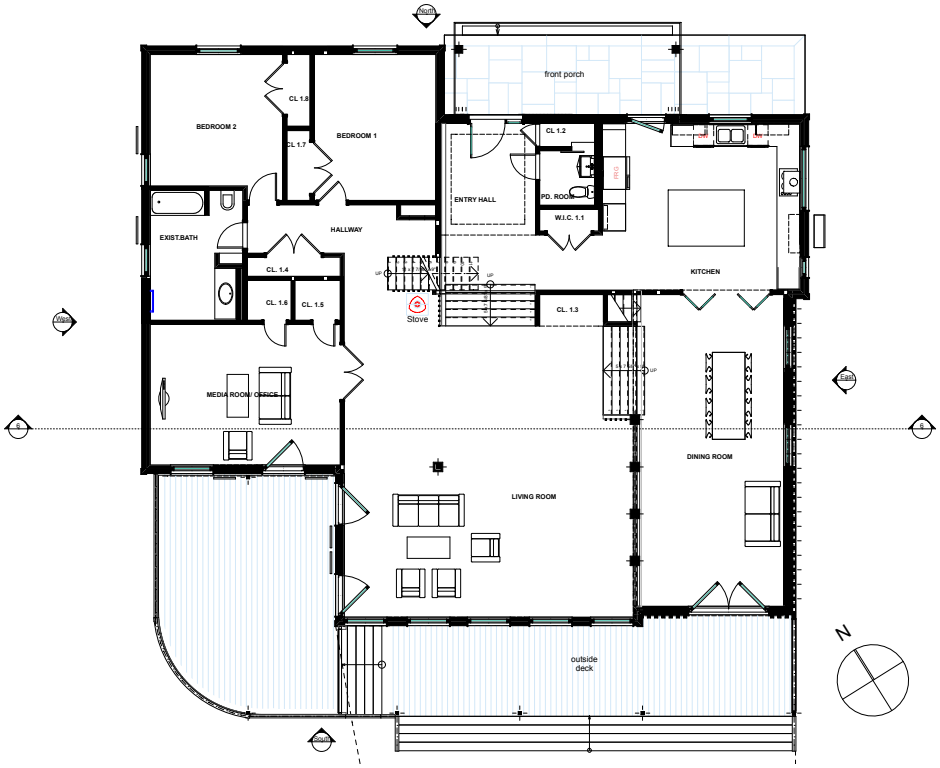


Section: shows the existing split level which continues to the new second floor. The laundry in the basement is kept outside of the building envelope.

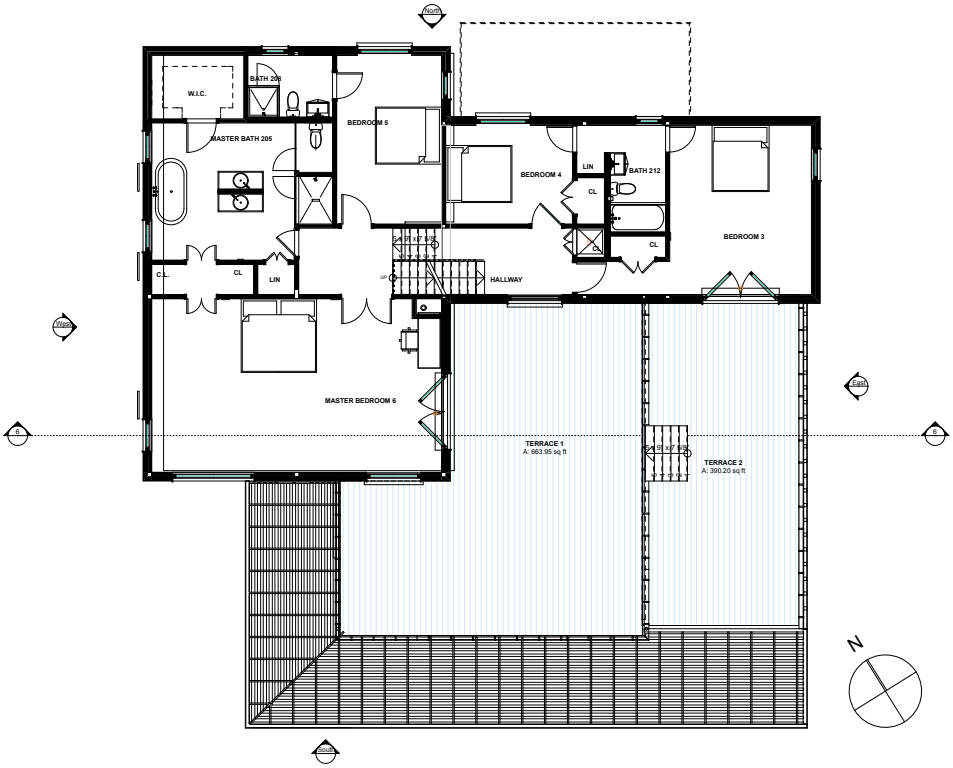
6. Floor Plan



Basement Floor Plan: existing floor plan with modified interior walls.

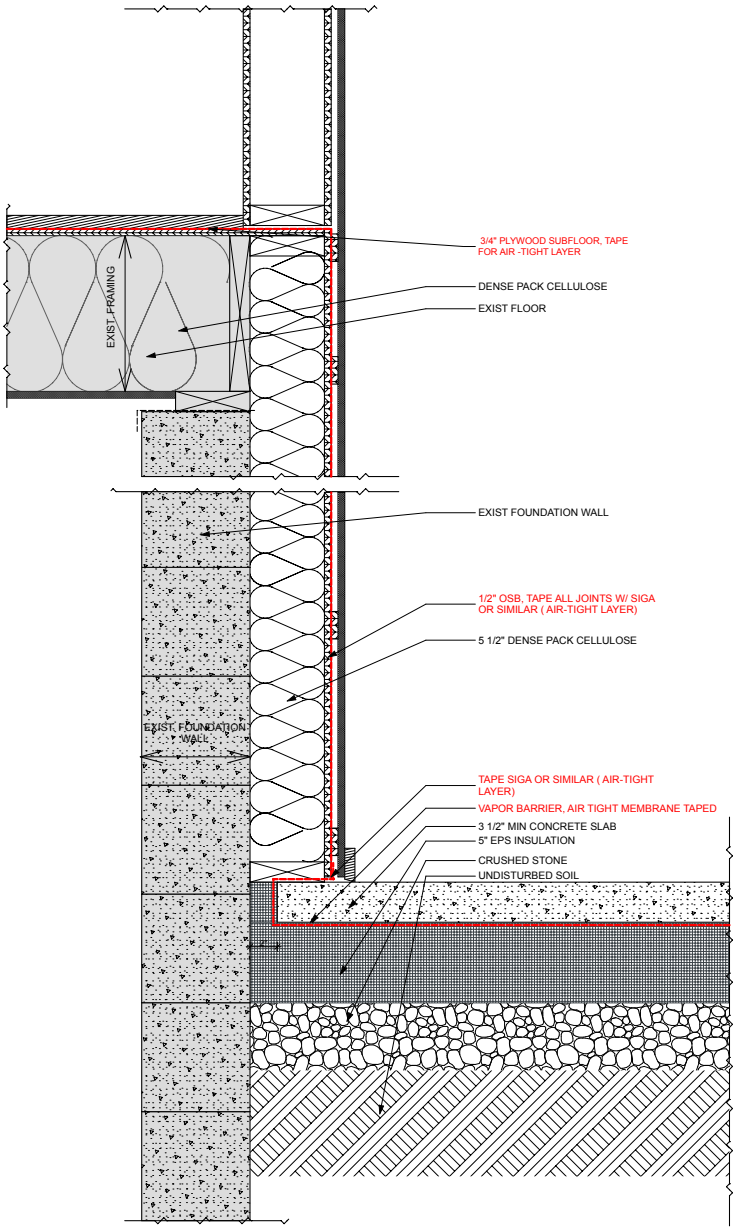


First Floor Plan: existing floor plan with modified interior walls.



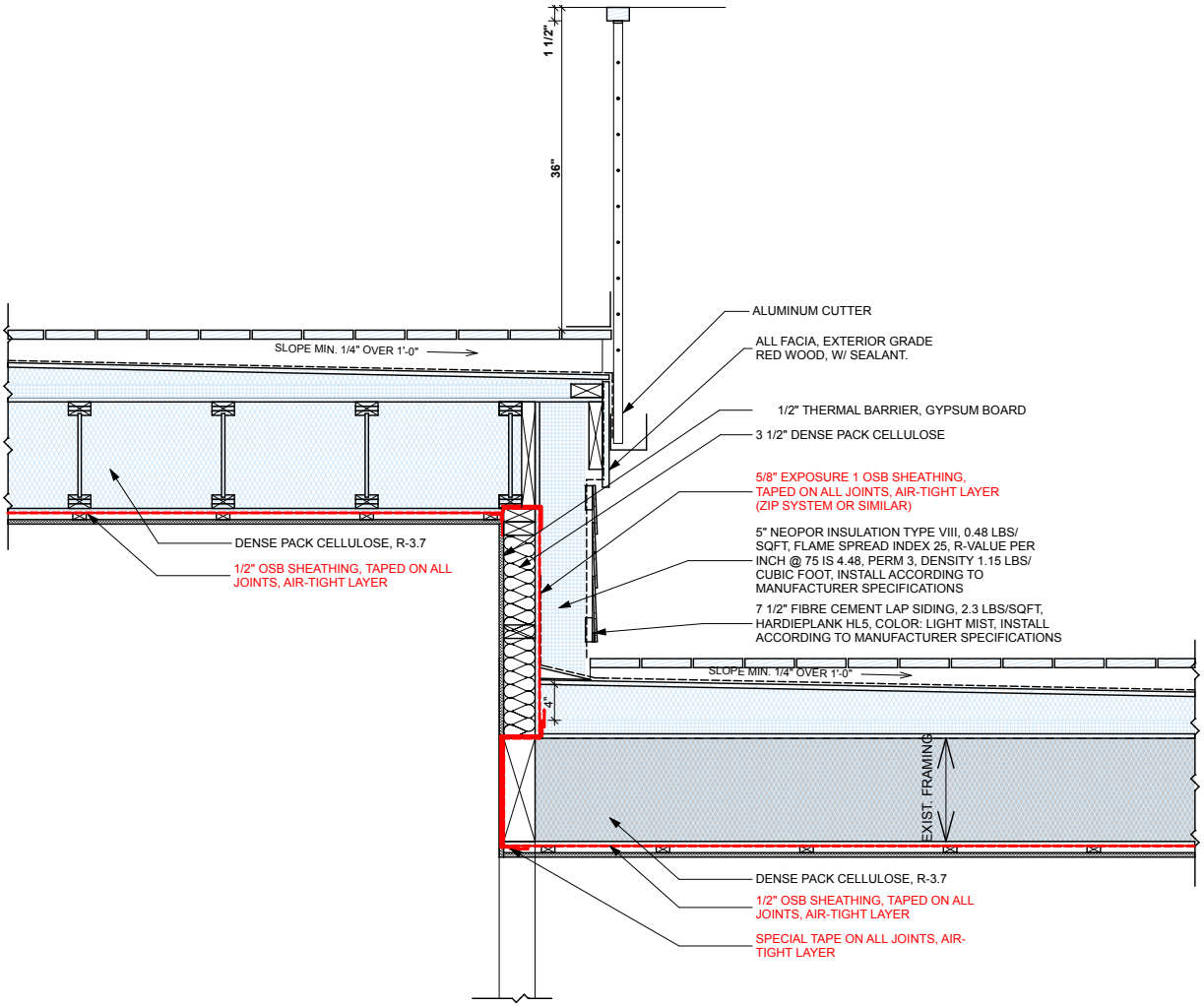
Second Floor Plan: new construction with converted terrace to the south

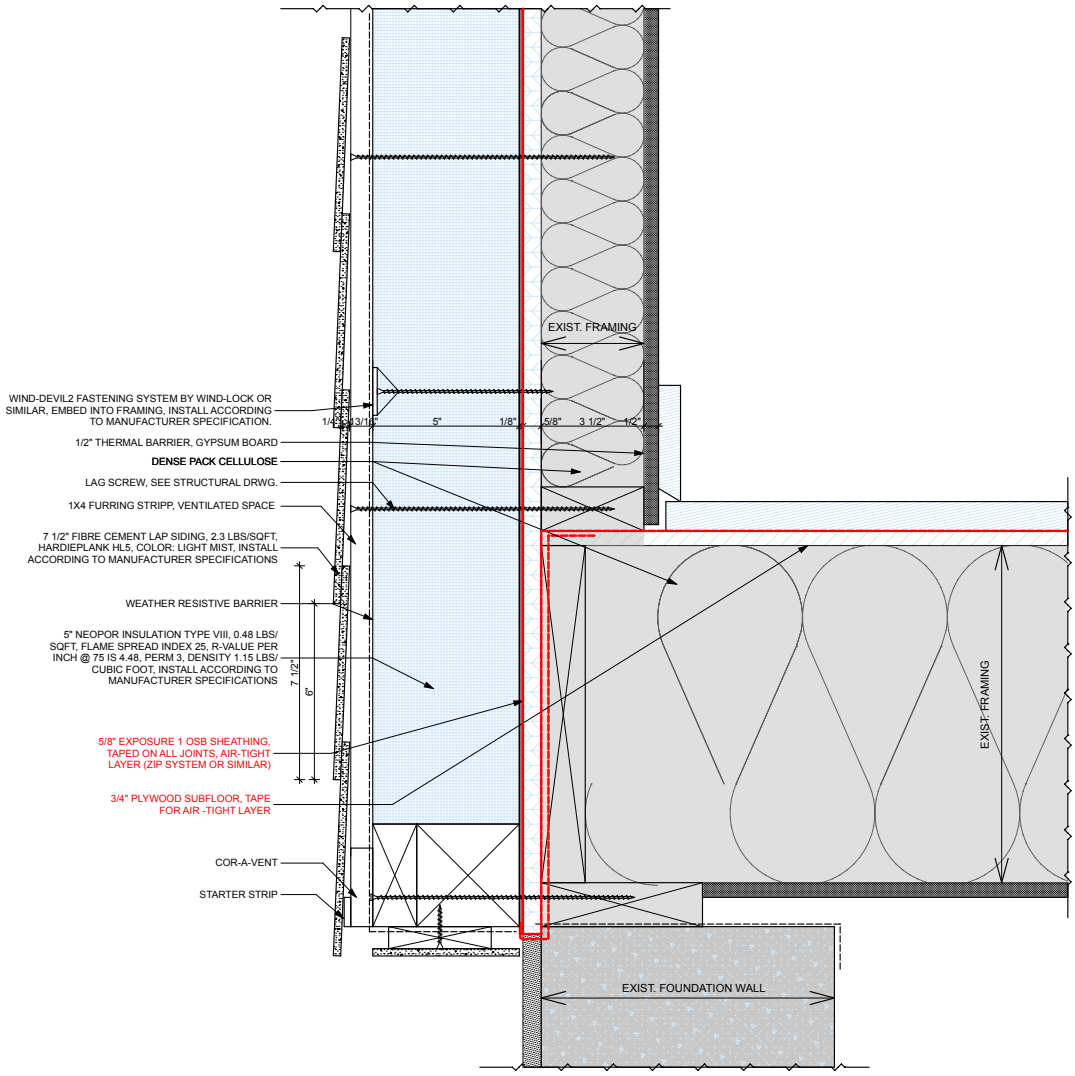
7 Detail Slab on Grade:



Detail above: Basement Slab Detail and Basement Ceiling /Wall Detail
Explanation: Existing basement had a wood framed floor which was removed and replaced with a concrete slab on grade. The concrete slab was insulated with 5 inch of EPS.

8. Details: Exterior Wall



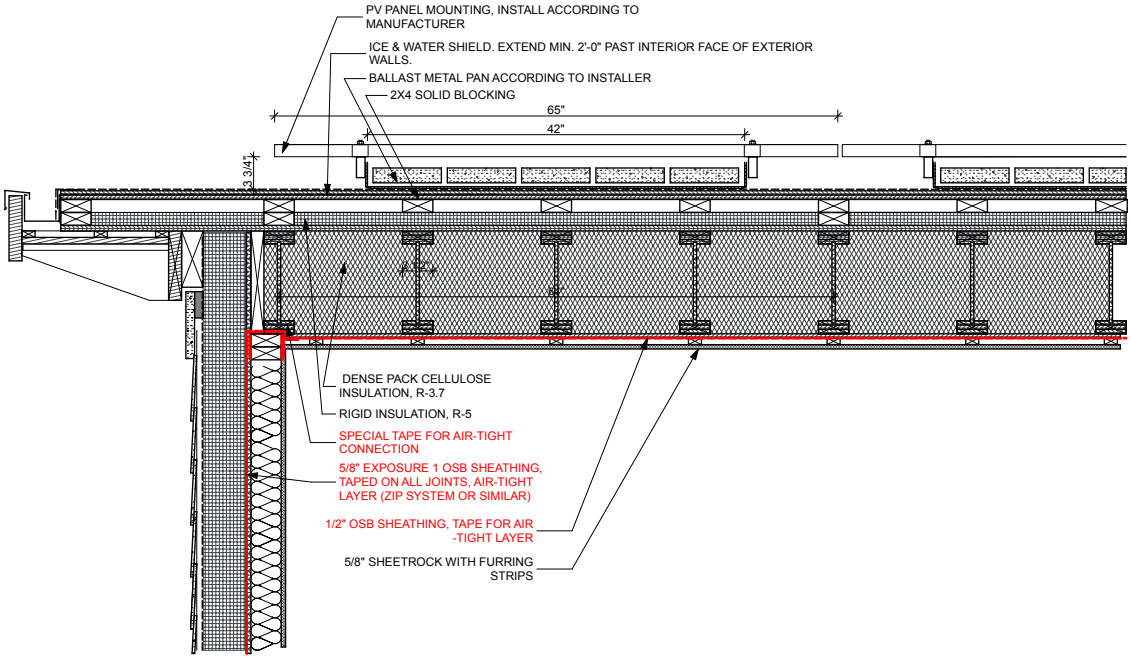


Detail above: New Exterior Wall Detail
Explanation: Split level terrace detail with flat roof EPDM system and continuous insulation layer which replaced the existing hip roof.

Wall (from inside to outside):

1. 5/8” Sheetrock
2. 2x4 Wood framing @ 16” O.C. with dens pack cellulose insulation, λ [W/(mK)] 0.038
3. 5/8” OSB sheathing all seams taped, air-tight layer
4. 5” Rigid insulation, λ [W/(mK)] 0.032
5. 3/4” Furring strips, vented gap
6. Fiber cement horizontal siding

9. Details: Roof

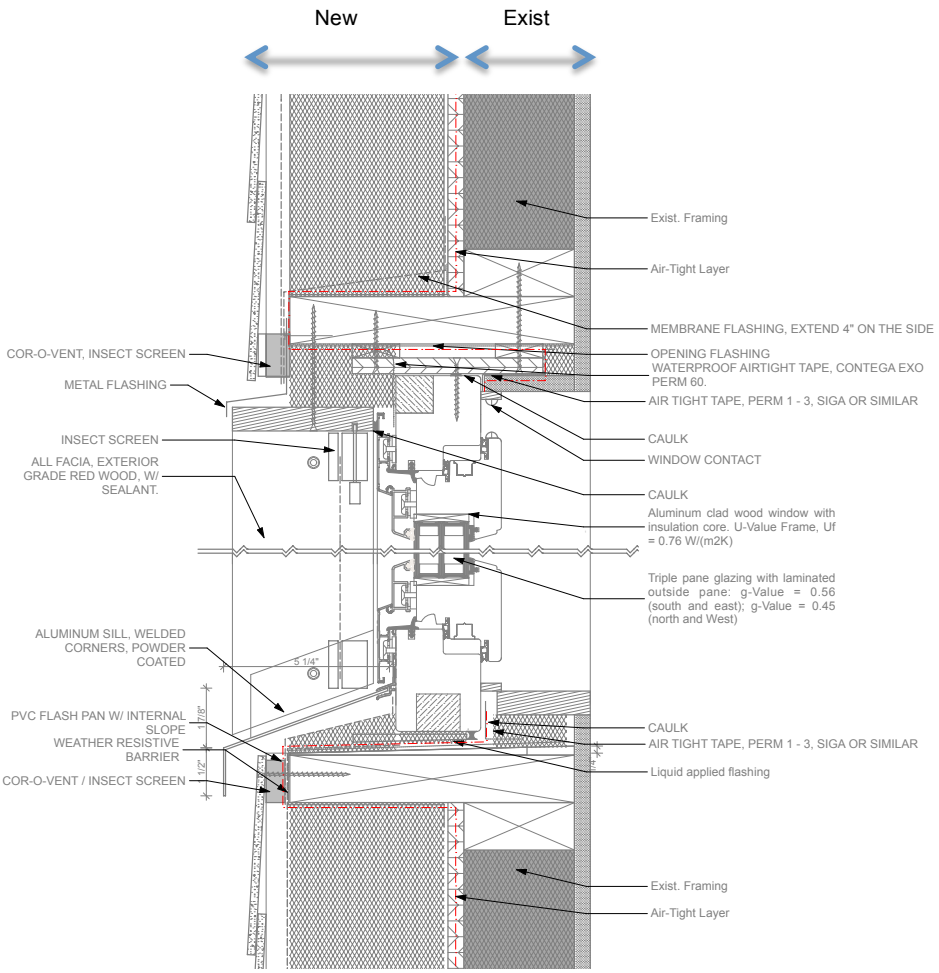


Detail above: New Roof Detail
Explanation*:* Detail shows cornice with vented cladding and PV system,

Roof (from inside to outside):

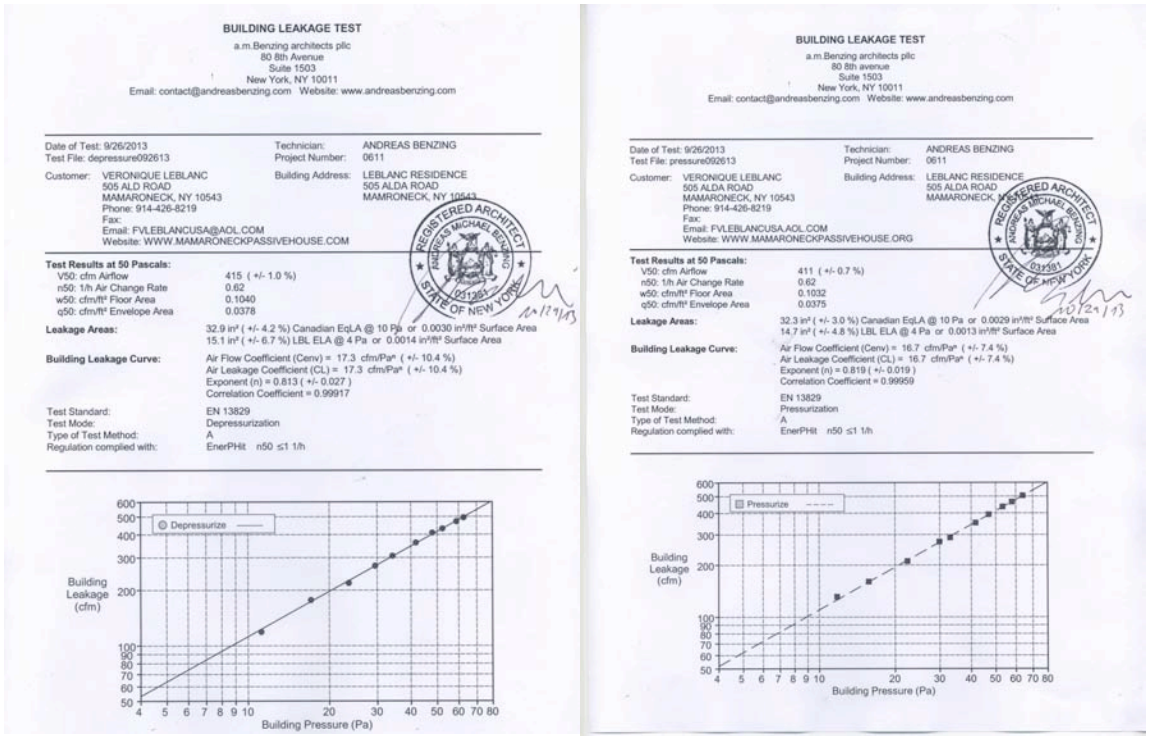
1. 5/8” Sheetrock
2. 5/8” furring strips, installation layer
3. ½” OSB sheathing all seams taped, air-tight layer, roof OSB layer is connected to wall air-tight layer by special tape
4. Roof joists with dens pack cellulose insulation, λ [W/(mK)] 0.038
5. 5/8” OSB sheathing
6. 1 ½” Rigid insulation, λ [W/(mK)] 0.032
7. 1 ½” Furring strips, vented gap
8. Plywood sheathing
9. Asphalt shingle roof

10. Details: Window



Detail above: Window Detail
Explanation: Connection of window to wall with custom produces aluminum sill and custom screens. The windows are taped to the air-tight layer of the window box which is composed of a liquid applied membrane. The liquid applied membrane connects to the ZIP panel system.
Aluminum clad wood window with insulation core (Bieber Window). U-Value Frame, U_f = 0.76 W/(m^2K)
Triple pane glazing with laminated outside pane: g-Value = 0.56 (south and east); g-Value = 0.45 (north and West), U_g = 0.60 W/(m^2K) (center of glass)

11. Air Tight Envelope:



BUILDING LEAKAGE TEST

a.m.Benzing architects pllc
80 8th Avenue
Suite 1503
New York, NY 10011
Email: contact@andreasbenzing.com Website: www.andreasbenzing.com

Date of Test: 9/26/2013
Test File: depressure092613
Technician: ANDREAS BENZING
Project Number: 0611
Customer: VERONIQUE LEBLANC
505 ALD ROAD
MAMARONECK, NY 10543
Phone: 914-426-8219
Fax:
Email: FVLEBLANCUSA@AOL.COM
Website: WWW.MAMARONECKPASSIVEHOUSE.COM
Building Address: LEBLANC RESIDENCE
505 ALDA ROAD
MAMRONECK, NY 10543

Test Results at 50 Pascals:
V50: cfm Airflow 415 (+/- 1.0 %)
n50: 1/h Air Change Rate 0.62
w50: cfm/ft² Floor Area 0.1040
q50: cfm/ft² Envelope Area 0.0378

Leakage Areas: 32.9 in² (+/- 4.2 %) Canadian EqLA @ 10 Pa or 0.0030 in²/ft² Surface Area
15.1 in² (+/- 6.7 %) LBL ELA @ 4 Pa or 0.0014 in²/ft² Surface Area

Building Leakage Curve: Air Flow Coefficient (Cenv) = 17.3 cfm/Pa^n (+/- 10.4 %)
Air Leakage Coefficient (CL) = 17.3 cfm/Pa^n (+/- 10.4 %)
Exponent (n) = 0.813 (+/- 0.027)
Correlation Coefficient = 0.99917

Test Standard: EN 13829
Test Mode: Depressurization
Type of Test Method: A
Regulation complied with: EnerPHit n50 ≤1 1/h

BUILDING LEAKAGE TEST

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Website: WWW.MAMARONECKPASSIVEHOUSE.ORG
Building Address: LEBLANC RESIDENCE
505 ALDA ROAD
MAMARONECK, NY

Test Results at 50 Pascals:
V50: cfm Airflow 411 (+/- 0.7 %)
n50: 1/h Air Change Rate 0.62
w50: cfm/ft² Floor Area 0.1032
q50: cfm/ft² Envelope Area 0.0375

Leakage Areas: 32.3 in² (+/- 3.0 %) Canadian EqLA @ 10 Pa or 0.0029 in²/ft² Surface Area
14.7 in² (+/- 4.8 %) LBL ELA @ 4 Pa or 0.0013 in²/ft² Surface Area

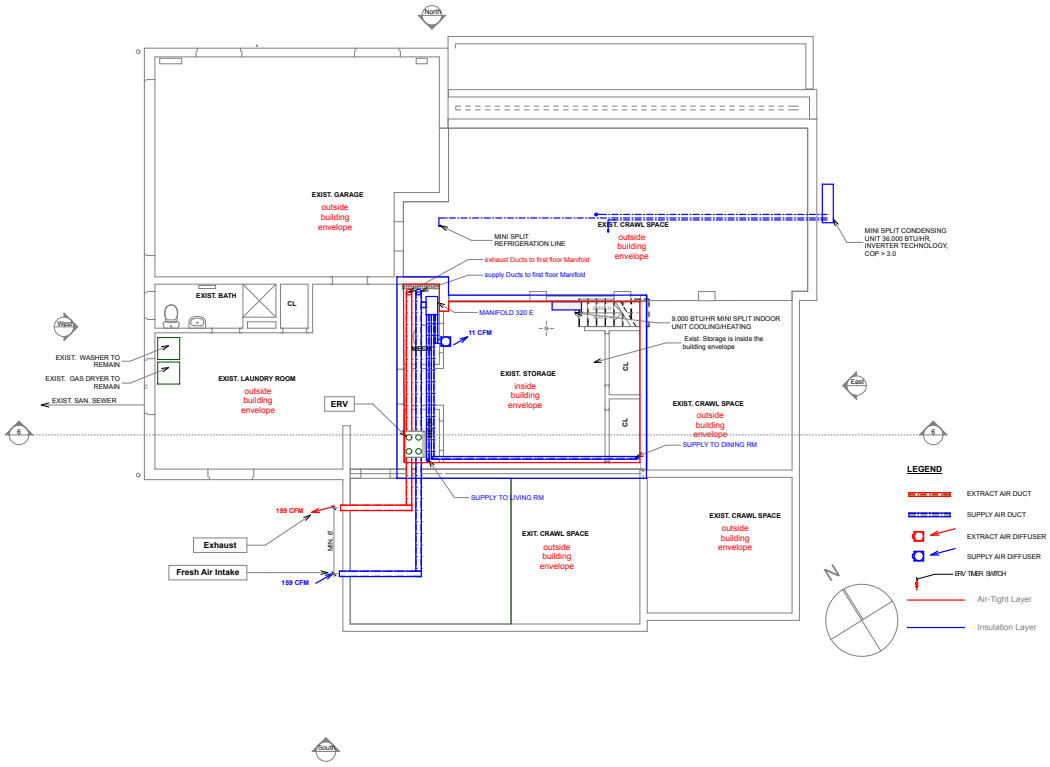
Building Leakage Curve: Air Flow Coefficient (Cenv) = 16.7 cfm/Pa^n (+/- 7.4 %)
Air Leakage Coefficient (CL) = 16.7 cfm/Pa^n (+/- 7.4 %)
Exponent (n) = 0.819 (+/- 0.019)
Correlation Coefficient = 0.99959

Test Standard: EN 13829
Test Mode: Pressurization
Type of Test Method: A
Regulation complied with: EnerPHit n50 ≤1 1/h

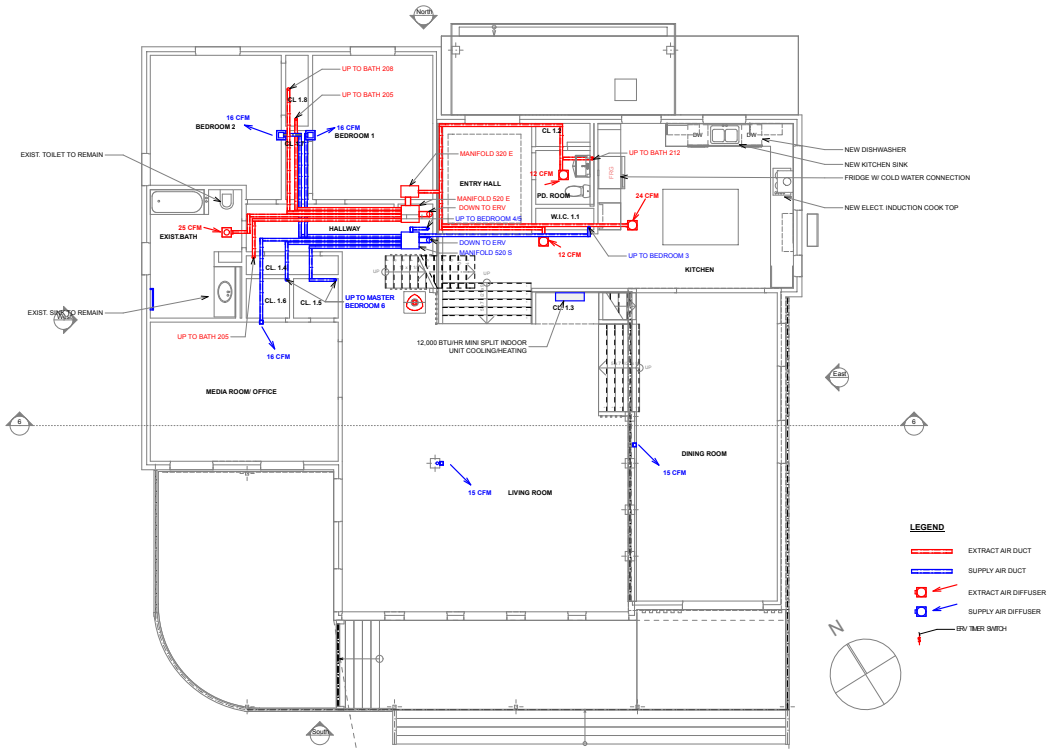
Documents above: Building Leakage Test Report
Explanation: The ZIP system is the air-tight layer for the entire structure. The ZIP panels are taped with a special ZIP tape. The window boxes are treated with a liquid applied membrane which is taped to the window frame. The plywood subfloor is taped and connected to the ZIP wall panels with tapes. The Roof has OSB sheathing with is taped and taped to the Wall ZIP panels.

*Picture above: T*aped *air tight layer of interior OSB roof sheeting.*
Explanation: The wall air tight layer is composed of a taped OSB sheeting with connects to the taped plywood subfloor and a taped OSB interior roof sheeting.

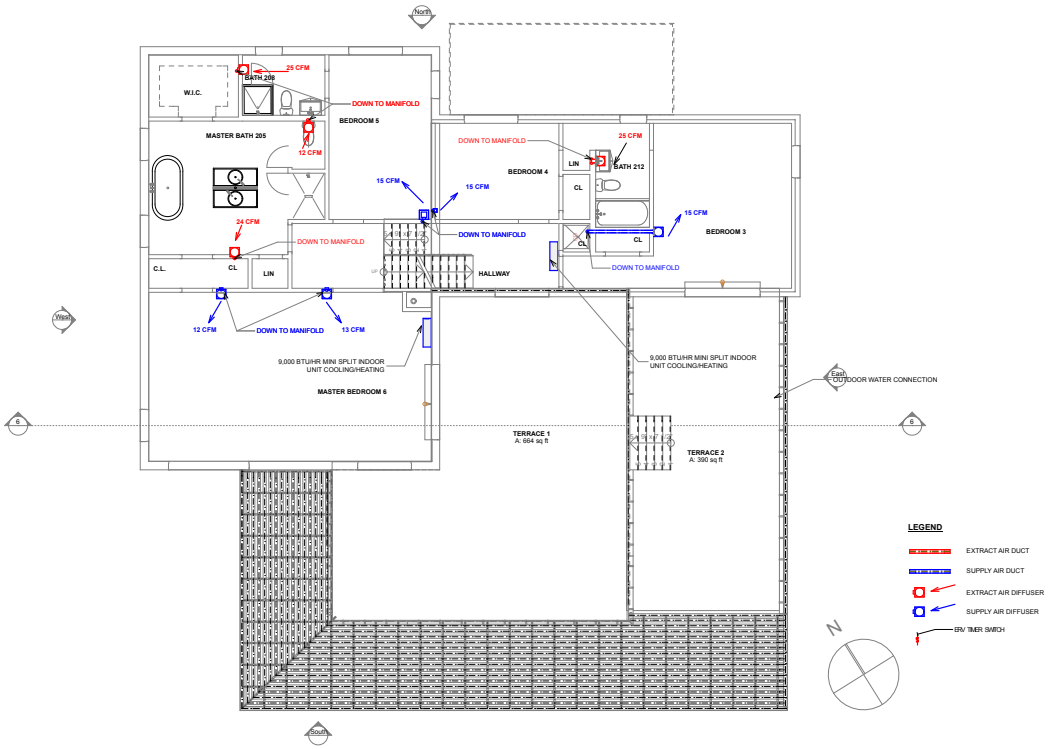
12. Ventilation Distribution System



Basement Floor Plan: Mechanical Plan



First Floor Plan: Mechanical Plan



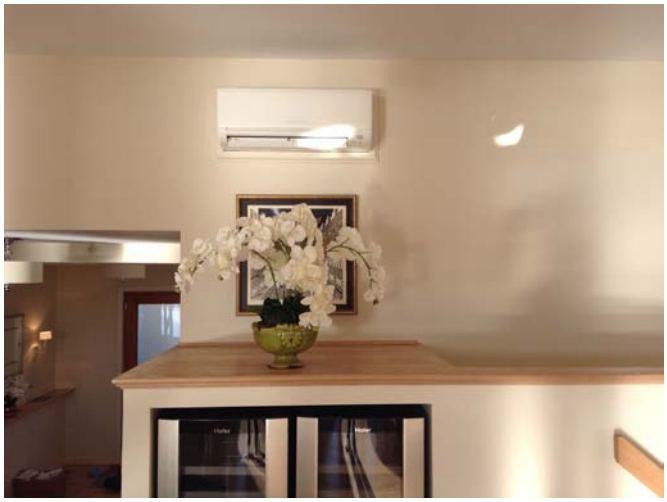
Second Floor Plan: Mechanical Plan

Explanation: The ventilation system is a Zehnder ERV unit with the comfort distribution system. All duct work is contained inside the building envelop. Each bedroom and living room has a fresh air vent using a 3 inch home run duct to a manifold. Each Bathroom and the kitchen has a exhaust vent using 3 inch home run ducts to a manifold. The ERV is located in the basement close to the building envelope and easy to access for changing the filters.

13. Heat Recovery Unit

Picture above: Zehnder ComfoAir 550
Explanation*:* Effective heat recovery: 70.9%, Electric Efficiency: 0.31 Wh/m^3. The ERV is located inside the thermal envelop in the basement. An ERV was specified because of the humidity in the summer period.

14. Heating System



Picture above: Picture of wall hung interior unit
Explanation*:* The heating and cooling system was specified as a ductless Mitsubishi mini split system. The exterior condenser unite is located on the east side which is not visible. The interior wall hung unites are located throughout the building. In addition there is a natural gas stove from Jotul for ambient heat and for resiliency in case of a power outage. The stove has 20,000 Btu/hr heat output and is located in the center of the first floor next to the stairs, the heat is distributed by natural convection and radiation, in addition a small fan integrated into the stove can boost heat distrubution. The DHW system is a 80 gal HP-tank from Stiebel Eltron which is located in the basement.

15. Verification

Certificate

133 Union Street, Brooklyn, NY 11231.

Authorised by:
Passive House Institute
Dr. Wolfgang Feist
Rheinstraße 44/46
64283 Darmstadt, Germany

Certificate ID:
8864_MosArt_EP_20140404_TOL

Passive House Academy hereby awards the EnerPHit certificate to the following building:

505 Alda Road Mamaroneck NY 10543

EnerPHit Certified Retrofit Passive House Institute

Client:	Veronique LeBlanc
Architecture & Building Services:	a.m.Benzing architects pllc, Andreas Benzing 80 Eighth Avenue Suite 1503 New York NY 10011
General Contractor:	North Shore Construction Services INC. Dave Taormina 136 Woodbury Rd Woodbury NY 11797

This building was designed to meet the Passive House component energy retrofit criteria as defined by the Passive House Institute Darmstadt. Given appropriate on-site implementation, this building has the following characteristics:

Building characteristics:	Achieved	Required	
Annual specific space heating demand	22 kWh/(m²a)	≤ 25 kWh/(m²a)	✔
Annual specific primary energy demand[2] for heating, DHW, ventilation and all other electric appliances for standard use	117 kWh/(m²a)	≤ 128 kWh/(m²a)	✔
Airtightness of building envelope n_{50} as per test result	0.7 h^{-1}	≤ 1.0 h^{-1}	✔
Mean value of individual building component thermal protection :			
Exterior insulation to ambient Thermal transmittance (U-value)	0.14 W/(m²K)	≤ 0.15 W/(m²K)	-[1]
Exterior insulation to ground[2] Thermal transmittance (U-value)	0.29 W/(m²K)	≤ 0.19 W/(m²K)	-[1]
Interior insulation to ambient Thermal transmittance (U-value)	N/A W/(m²K)	≤ 0.35 W/(m²K)	-[1]
Interior insulation to ground Thermal transmittance (U-value)	N/A W/(m²K)	≤ 0.61 W/(m²K)	-[1]
Thermal bridges Δ_U Building envelope (window installation excluded)	N/A W/(m²K)	No limiting value	
Windows Thermal transmittance $U_{w,installed}$	0.84 W/(m²K)	≤ 0.85 W/(m²K)	-[1]
Exterior doors Thermal transmittance $U_{w,installed}$	1.02 W/(m²K)	≤ 0.80 W/(m²K)	-[1]
Ventilation unit Effective efficiency of heat recovery	75 %	≥ 75 %	-[1]

[1]Limiting value is not relevant [2]Limiting value differs for each building [3]The requirements can not be met (exception applies)

Certification criteria met? Selection of the evalulation method		
	Space heating demand	✔
	Component quality	

issued: 04/04/2014
133 Union Street
Brooklyn,
NY 11231.

certifier:
Tomas O'Leary

16. Total Cost: $ 1,400,000.-
17. Building Cost: $ 1,100,000.-
18. Year of Construction: 2013
19. Architectural Design: a.m.Benzing architects pllc
20. Building Service: a.m.Benzing architects pllc
21. Building Physics: a.m.Benzing architects pllc
22. Structural Design: John O`Brien Architect
23. Experience: N/A.
24. Publication: http://www.mamaroneckpassivehouse.com
http://www.nbcnewyork.com/video/#!/blogs/open-house/-Inside-a-Passive-House-Full-of-Style/256993121