

Project Documentation Gebäude-Dokumentation

Abstract | Zusammenfassung



Detached two-storey house in Dénia (Alicante) SPAIN

Data of building | Gebäudedaten

Year of construction Baujahr	2023	Space heating Heizwärmebedarf	15 kWh/(m²a)
U-value external wall U-Wert Außenwand	0,171 W/(m ² K)		
U-value basement U-Wert Kellerdecke	0,305 W/(m ² K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	46 kWh/(m ² a)
U-value roof U-Wert Dach	0,209 W/(m ² K)	Generation of renewable Energy Erzeugung erneuerb. Energie	71 kWh/(m ² a)
U-value window (average) U-Wert Fenster	1,46 W/(m ² K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	76 kWh/(m ² a)
Heat recovery Wärmerückgewinnung	83 %	Pressurization test n ₅₀ Drucktest n ₅₀	0,56 h ⁻¹
Special features Besonderheiten	Photovoltaic solar panels		

Brief Description

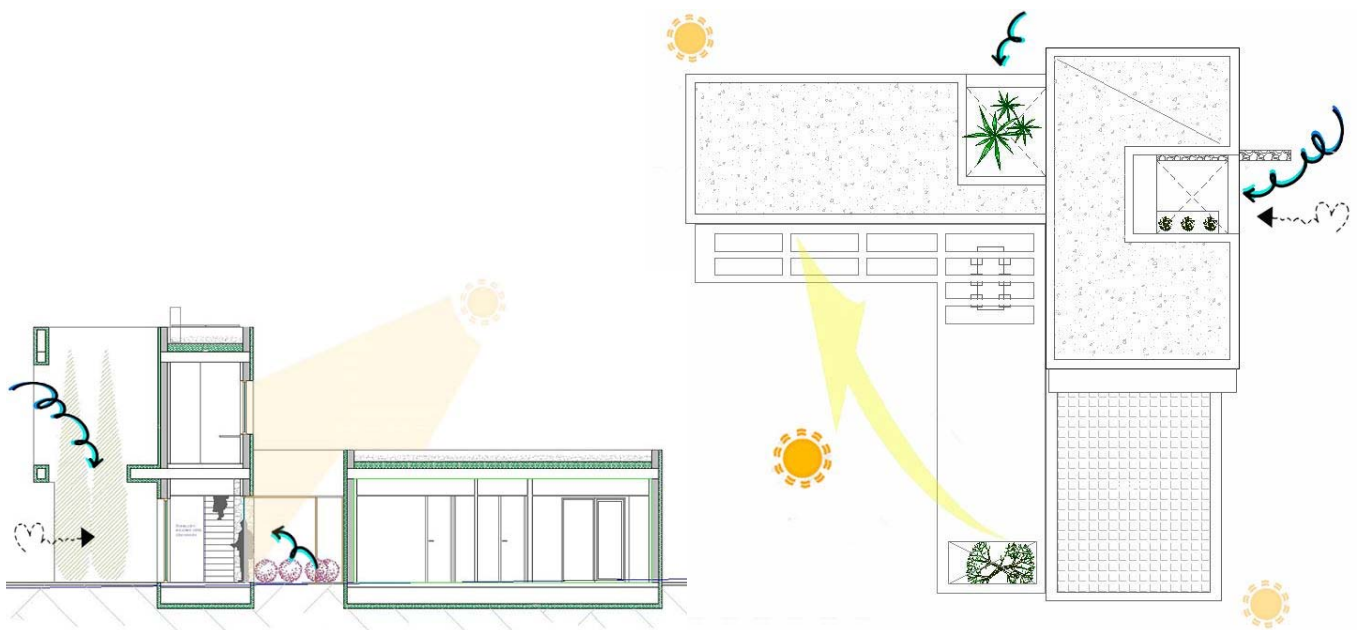
Passive House en Dénia

This single-family home with bright and serene spaces conceals within its walls the rigor in architectural design development, construction management, and the design and oversight of details and installations necessary for its Passive House Plus certification.

The house was designed with a compact L-shaped volume that encloses the main garden with south orientation in order to get the maximum sunlight possible. The architects cleverly break the rigidity of the union between the two volumes by creating two "patios" (one of them serving as the entrance to the house) that help ventilate and illuminate the rooms. This patios are located at the northern corner of the plot where the summer fresh sea air comes from.

The 216 sqm house is distributed over two stories, the upper floor exclusively dedicated to a master bedroom with a dressing area and bathroom, and its lower floor, in turn, includes an area with the vertical communication staircase, a combined living-dining-kitchen space, laundry room, gym, and a guest toilet and another area (the other arm of the L-shape) contains two guest bedrooms with a shared bathroom. This layout aims to maximize the efficiency of the facilities for day-to-day living, given that the owner only uses one bedroom.

The composition is marked by natural stone walls that enhance the visual appeal and accompany the spaces with warmth and exclusivity. Through the installation of movable elements and specially selected vegetation in terms of size and type, the necessary solar control is achieved without compromising views of the surroundings.



Responsible project participants Verantwortliche Projektbeteiligte

Architects Entwurfsverfasser	VIVES PONS HOMES Brígida Martínez Vives and Carlos Catalá Far. http://www.vivesponshomes.com
Implementation planning Ausführungsplanung	VIVES PONS HOMES and VAND ARQUITECTURA http://www.vivesponshomes.com http://www.vandarquitectura.info
Building systems Haustechnik	VIVES PONS HOMES http://www.vivesponshomes.com
Structural engineering Baustatik	VIVES PONS HOMES http://www.vivesponshomes.com
Building physics Bauphysik	VIVES PONS HOMES http://www.vivesponshomes.com
Passive House project planning Passivhaus-Projektierung	VIVES PONS HOMES Carlos Catalá Far (acting as PH Designer) http://www.vivesponshomes.com
Construction management Bauleitung	VIVES PONS HOMES Miguel Ángel Vives Pons (acting as PH Tradesperson) http://www.vivesponshomes.com

Certifying body Zertifizierungsstelle

VAND Arquitectura
www.vandarquitectura.info

Certification ID Zertifizierungs ID

7553

Project-ID (www.passivehouse-database.org)
Projekt-ID (www.passivhausprojekte.de)

Author of project documentation Verfasser der Gebäude-Dokumentation

Carlos Catalá Far
<http://www.vivesponshomes.com>

Date
Datum

14/05/2024

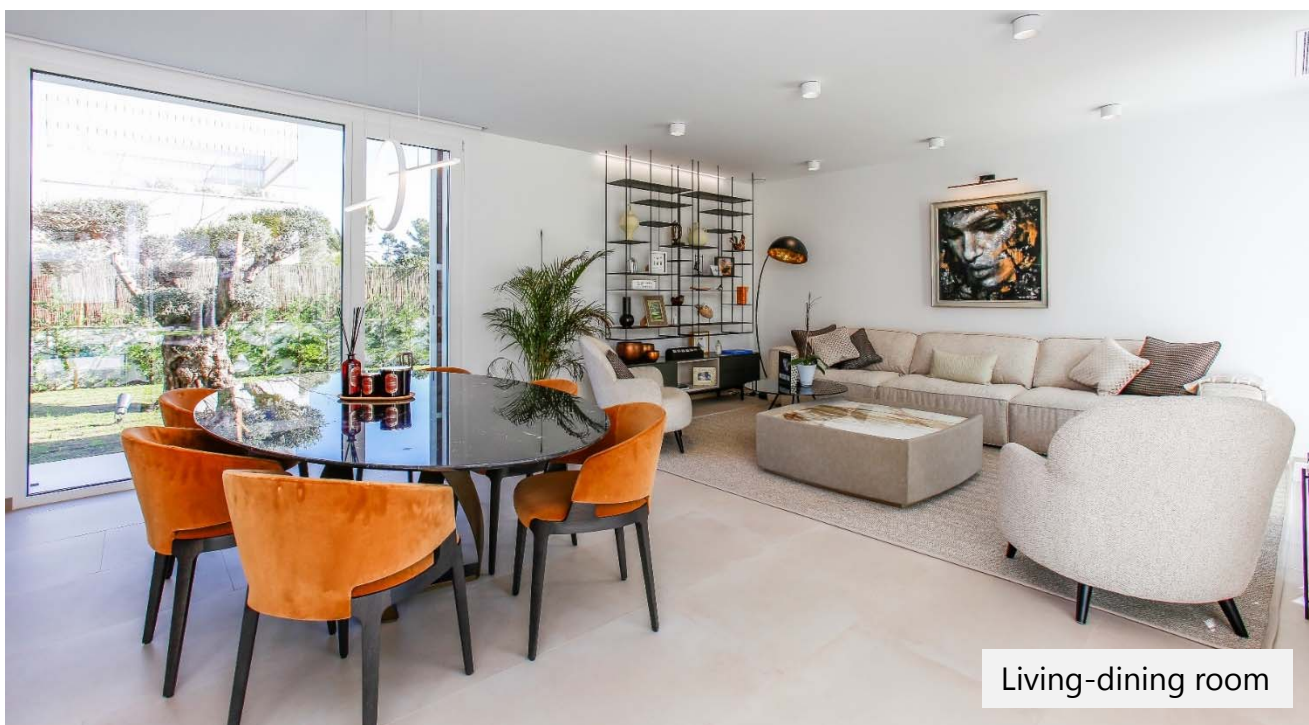
Signature
Unterschrift



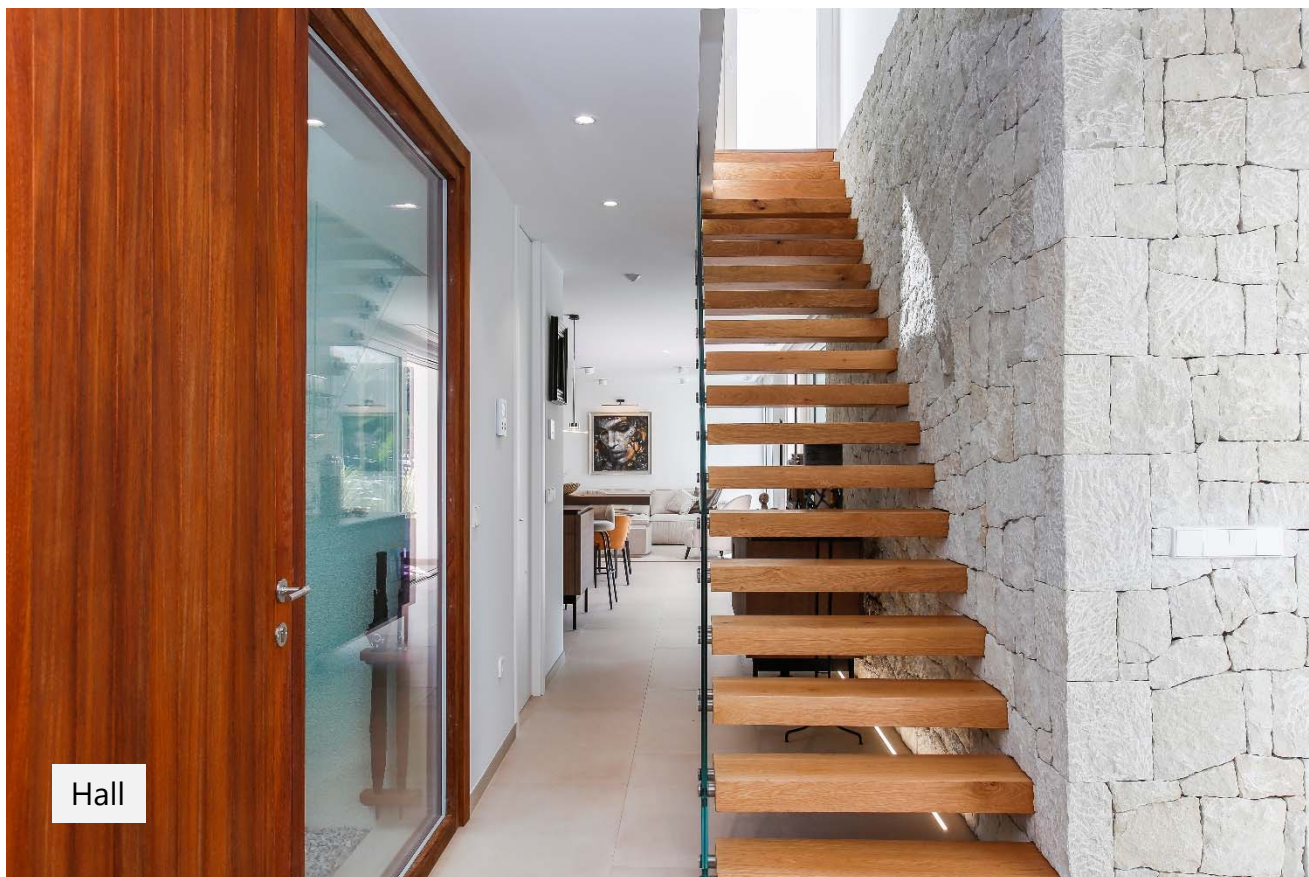
1. Photos



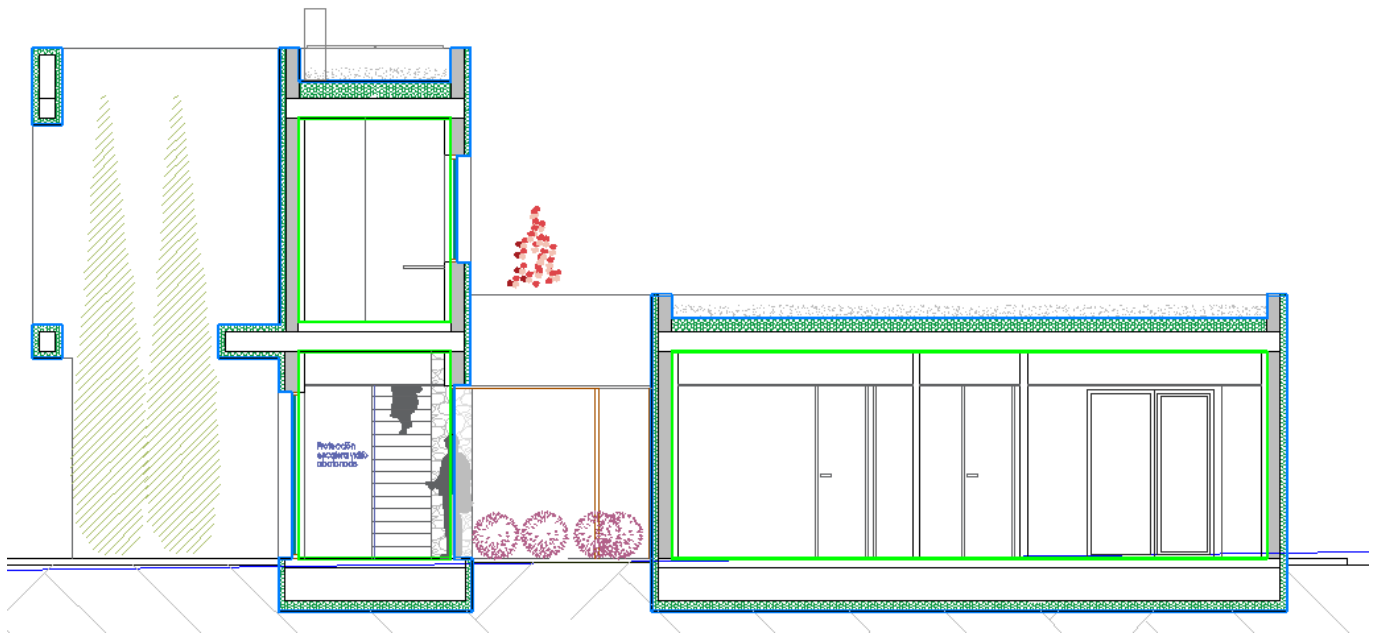
2. Interior photos



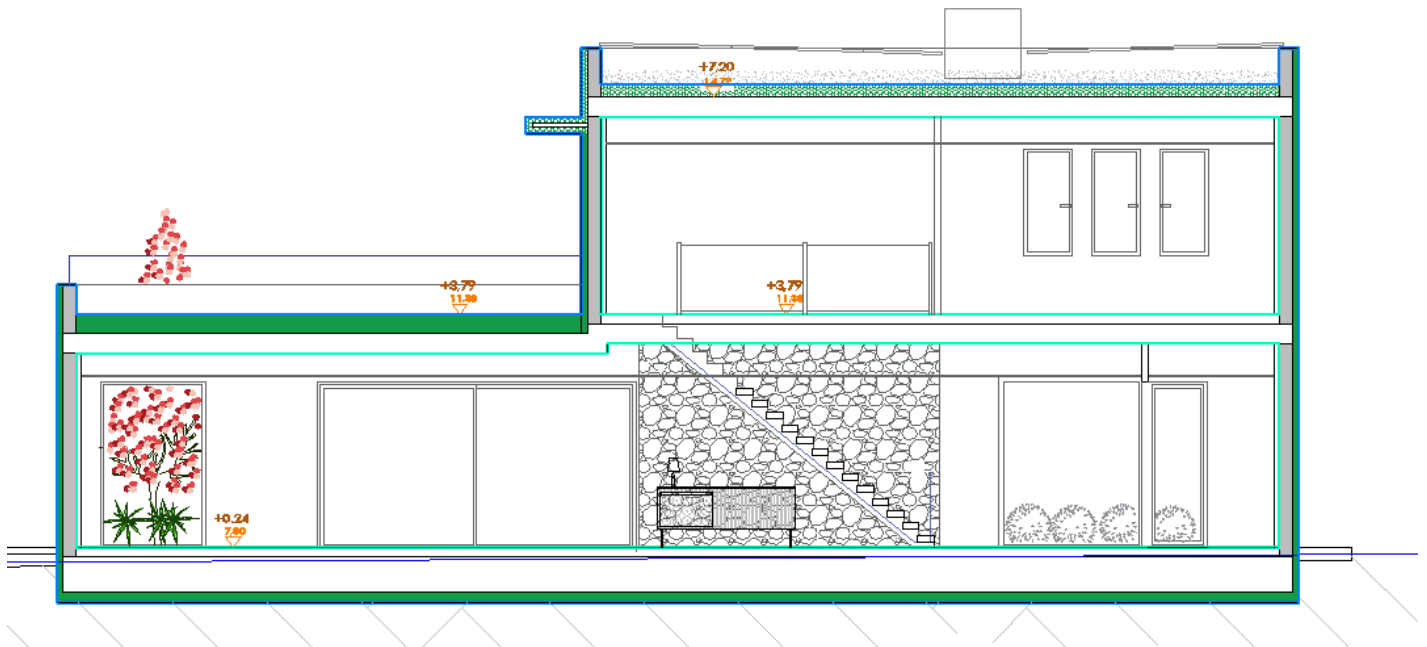
2. Interior photos



3. Section

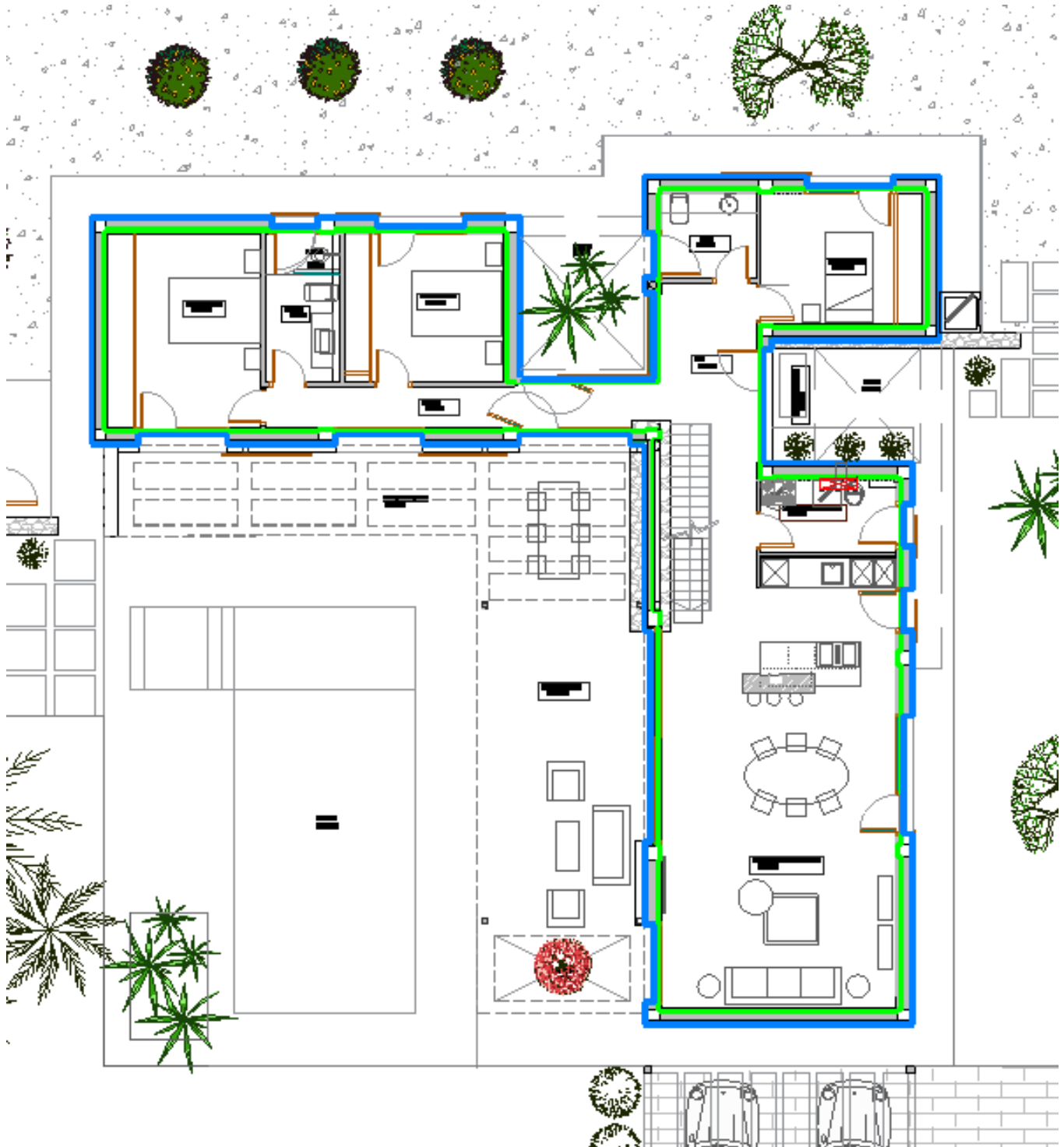


Section A-A'



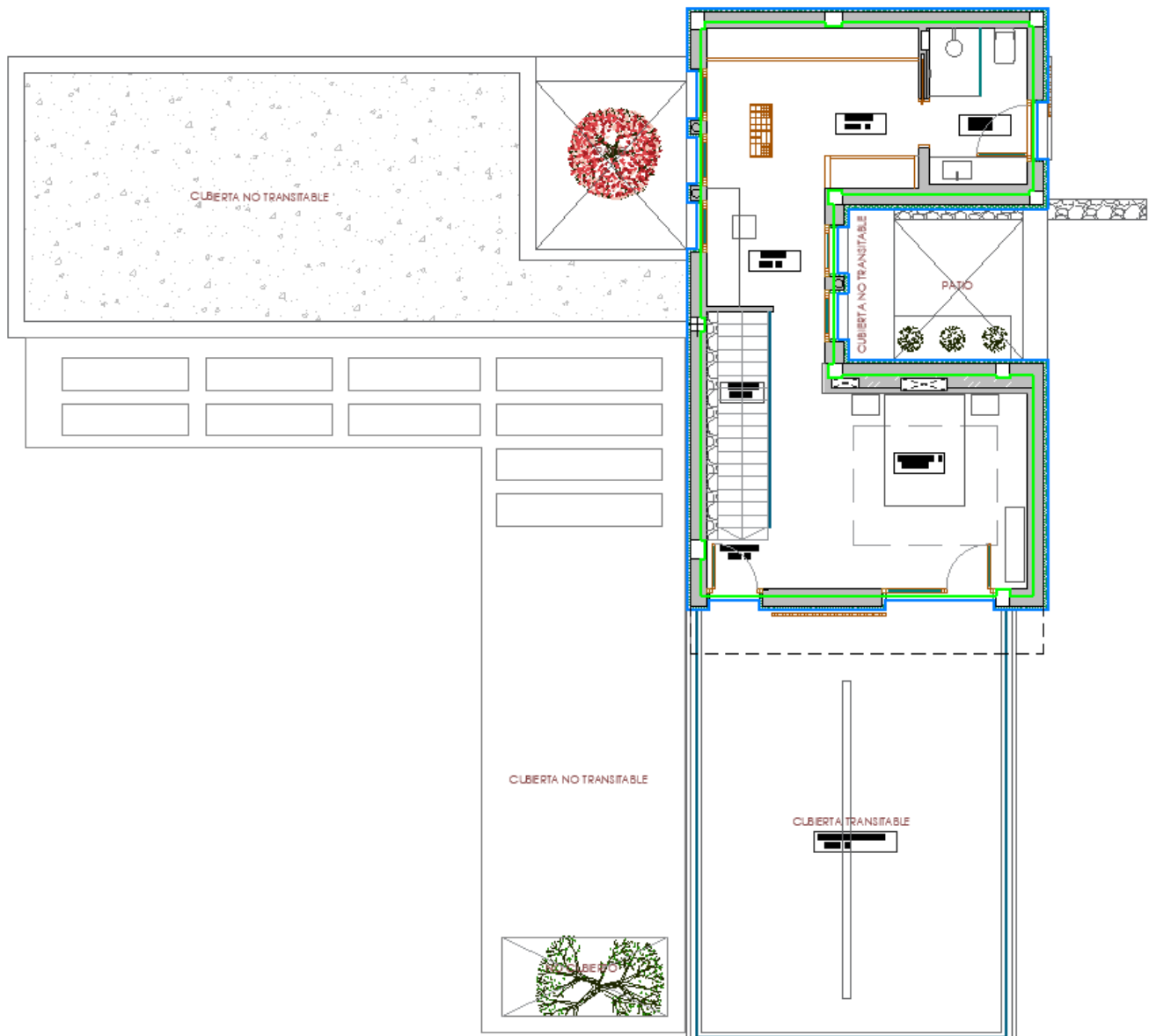
Section B-B'

4. Floor plans



Ground floor

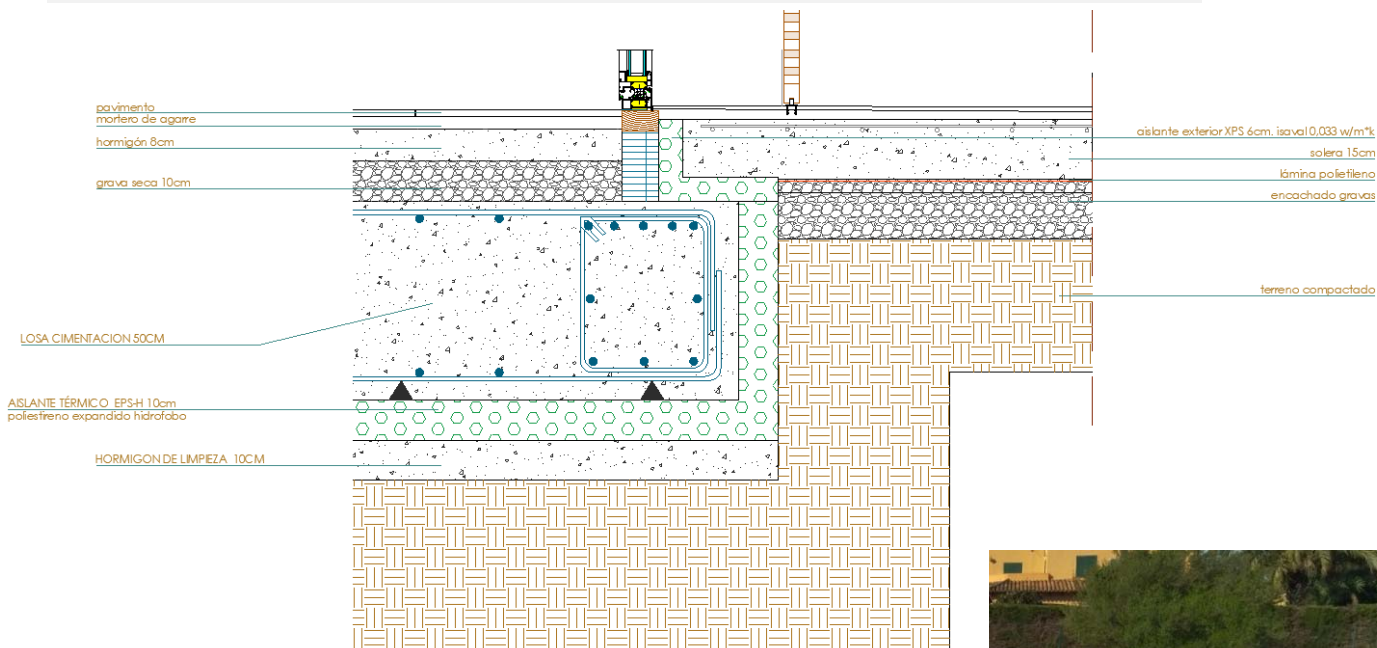
4. Floor plans



First floor

5. Construction of foundations

Detail of Foundation, Ground Floor, and Terrace

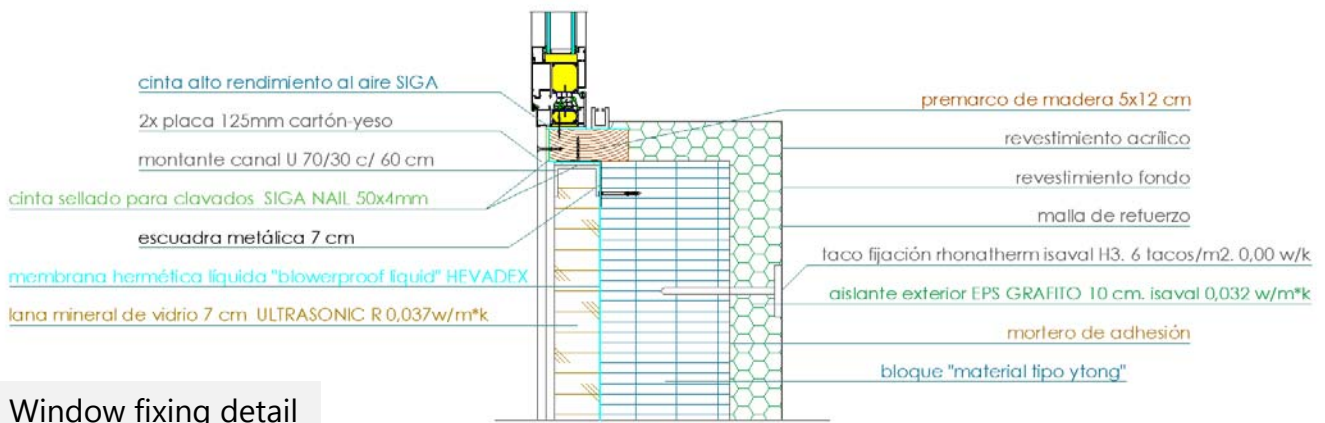


Foundations insulation



Denominación del elemento constructivo		Nr. elemento constructivo	
Solera		01ud	
Orientación del elemento constructivo (o R _{si})		¿Aislamiento interior?	
Adyacente a (o R _{se})		Suplemento al valor-U [W/(m²K)]	
Superficie parcial 1	λ [W/(mK)]	Sup. parcial 2 (opcional)	λ [W/(mK)]
		Sup. parcial 3 (opcional)	λ [W/(mK)]
			Espesor [mm]
Aislamiento	0,035		100
Hormigón armado	2,300		500
Grava seca	2,000		80
Hormigón	2,000		80
Mortero	1,300		20
Pavimento	2,000		10
Porcentaje superficie parcial 1:	100%	Porcenta. sup. parcial 2:	Porcenta. sup. parcial 3:
Coeficientes de resistencia térmica superficial		Espesor total [cm]: 79,0	
Interior R _{si} :	0,10 m²K/W	Valor-U [W/(m²K)]: 0,305	
Exterior R _{se} :	0,00 m²K/W		

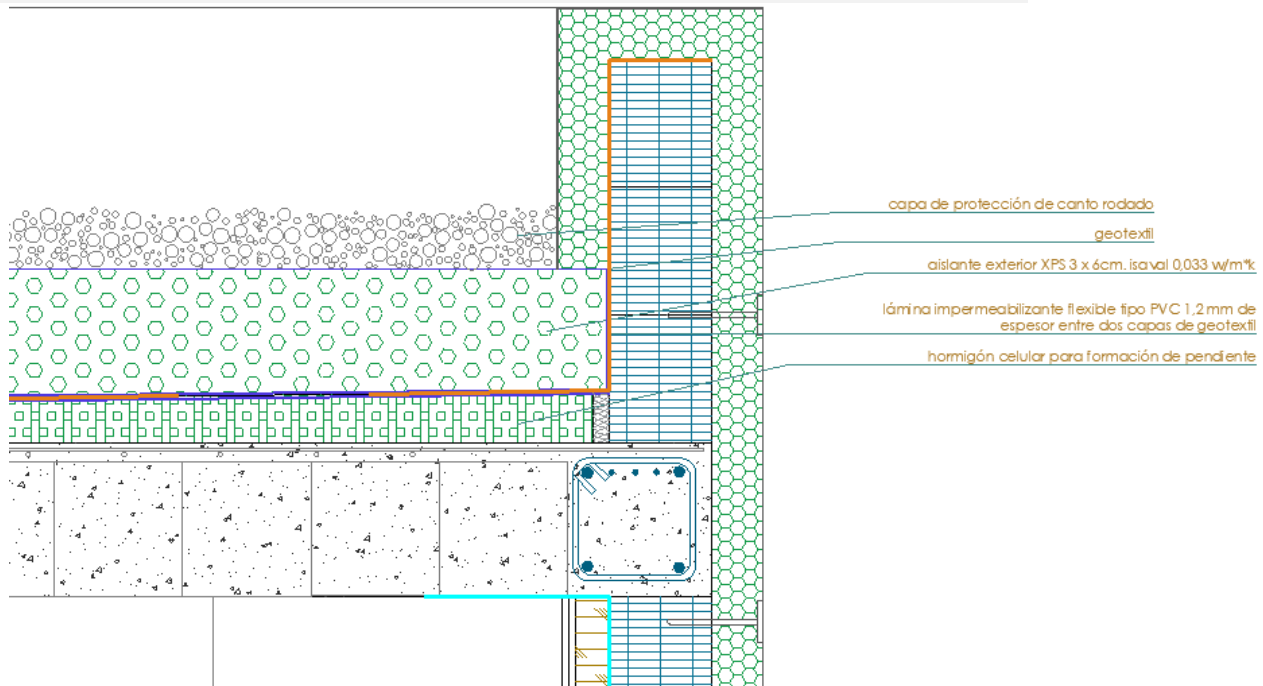
6. Construction of external walls



Denominación del elemento constructivo						Nr. elemento constructivo	
Fachada SATE general						02ud	
Orientación del elemento constructivo (o R _{si})		2-Muro		¿Aislamiento interior?			
Adyacente a (o R _{se})		1-Aire exterior		Suplemento al valor-U [W/(m²K)]		0,009	
Superficie parcial 1	λ [W/(mK)]	Sup. parcial 2 (opcional)	λ [W/(mK)]	Sup. parcial 3 (opcional)	λ [W/(mK)]	Espesor [mm]	
Mortero de terminación	1,300					10	
Aislamiento térmico	0,032					100	
Ytong	0,119					200	
Lana de roca	0,037	Subestructura	50,000			70	
Cartón yeso	0,250					25	
Porcentaje superficie parcial 1:	100%	Porcenta. sup. parcial 2:	0,2%	Porcenta. sup. parcial 3:			
Coeficientes de resistencia térmica superficial						Espesor total [cm]:	
Interior R _{si} :		0,13		m²K/W		40,5	
Exterior R _{se} :		0,04		m²K/W		Valor-U [W/(m²K)]:	
						0,171	

7. Construction of roofs

Detail of non-accessible roof



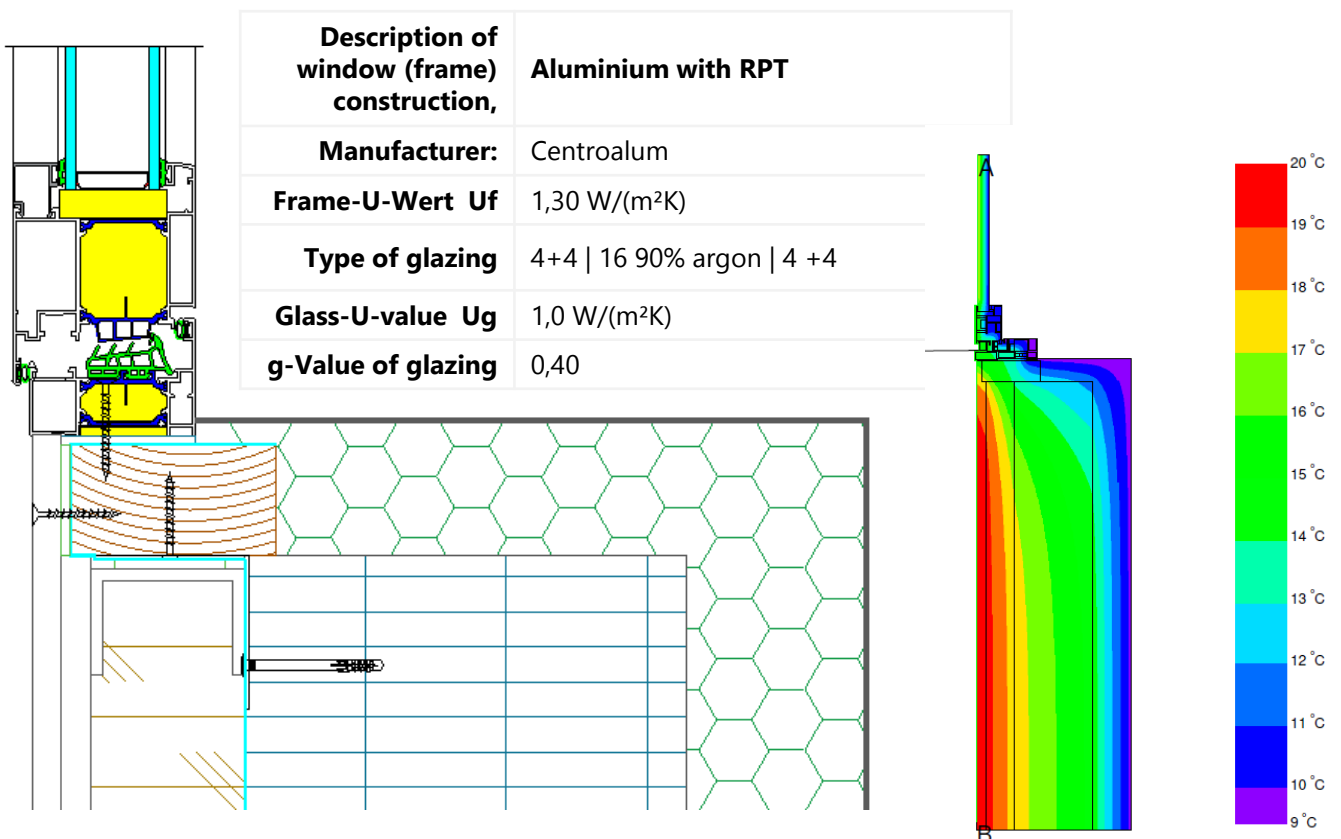
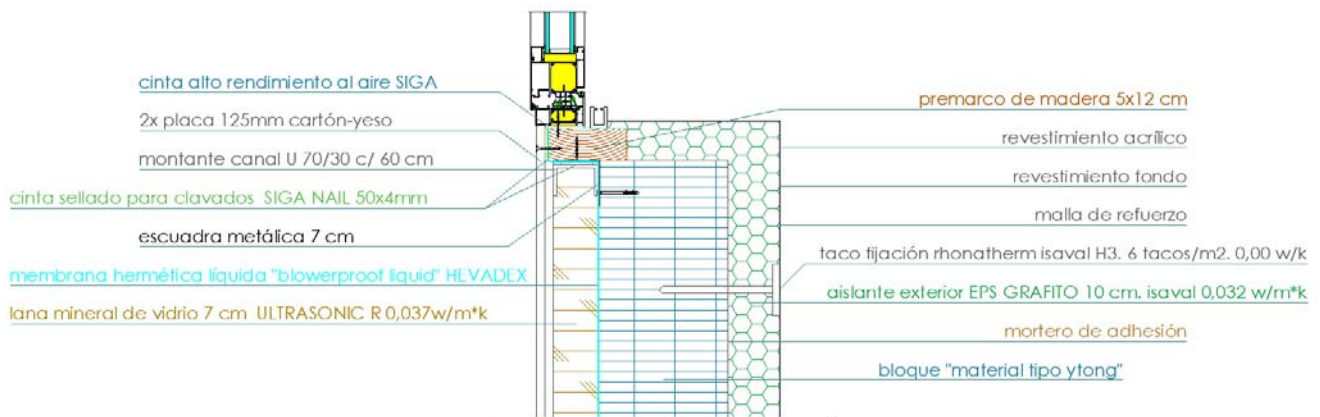
Roof insulation



Roof walls insulstaion

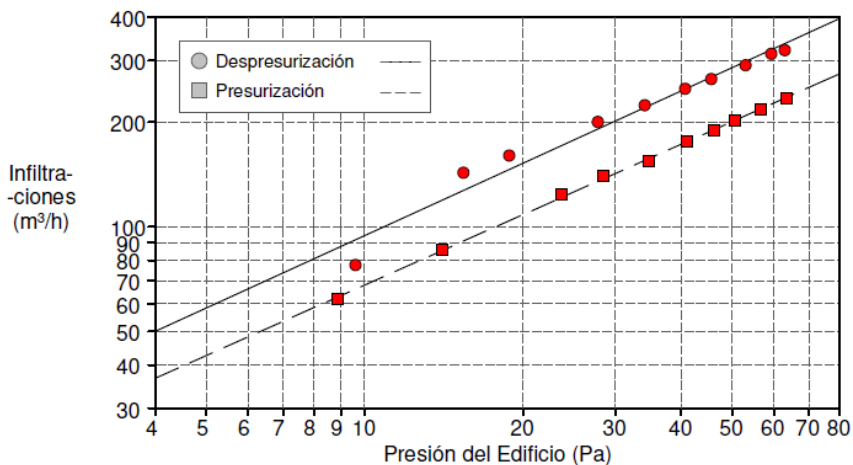
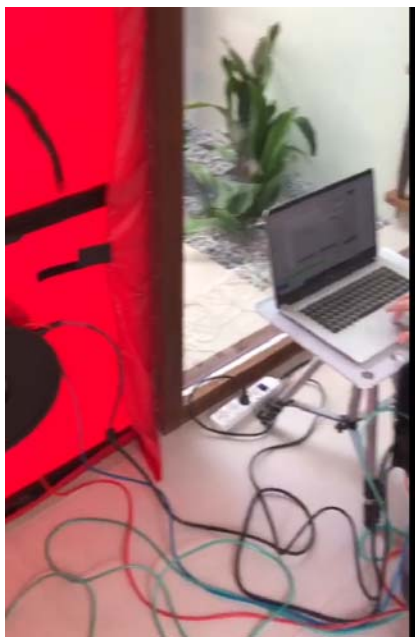
Denominación del elemento constructivo						Nr. elemento constructivo	
Cubierta de grava						06ud	
Orientación del elemento constructivo (o R _{si})			1-Techo		¿Aislamiento interior?		
Adyacente a (o R _{se})			1-Aire exterior		Suplemento al valor-U [W/(m²K)]		
Superficie parcial 1	λ [W/(mK)]	Sup. parcial 2 (opcional)	λ [W/(mK)]	Sup. parcial 3 (opcional)	λ [W/(mK)]	Espesor [mm]	
Grava							
Aislamiento térmico	0,042					180	
Mortero de cemento	1,300					20	
Hormigón aligerado	1,150					80	
Forjado unidireccional	1,429					300	
Porcentaje superficie parcial 1:	100%	Porcenta. sup. parcial 2:		Porcenta. sup. parcial 3:			
Coeficientes de resistencia térmica superficial						Espesor total [cm]:	
Interior R _{si} :		0,17	m²K/W		58,0		
Exterior R _{se} :		0,04	m²K/W		Valor-U [W/(m²K)]:		
						0,209	

8. Window and window installation



9. Description of Airtight envelope

The final pressure test was carried out after completion of the airtight shell on 7/3/2024 by the engineering office ALTERMAT



Airtightness concept

Painted hermetic membrane

Resultados del test a 50 Pa:

q₅₀ : m³/h (Caudal de Aire)
 n₅₀ : 1/h (Tasa de Renovación de Aire)
 qF₅₀ : m³/(h·m² Área del Suelo)
 qE₅₀ :

<u>Despresurización</u>	<u>Presurización</u>	<u>Media</u>
287 (+/- 7.7 %)	200 (+/- 1.2 %)	244
0.66	0.46	0.56
1.80	1.26	1.53

FICHA TÉCNICA

BLOWERPROOF[®]

LIQUID

10. Ventilation unit

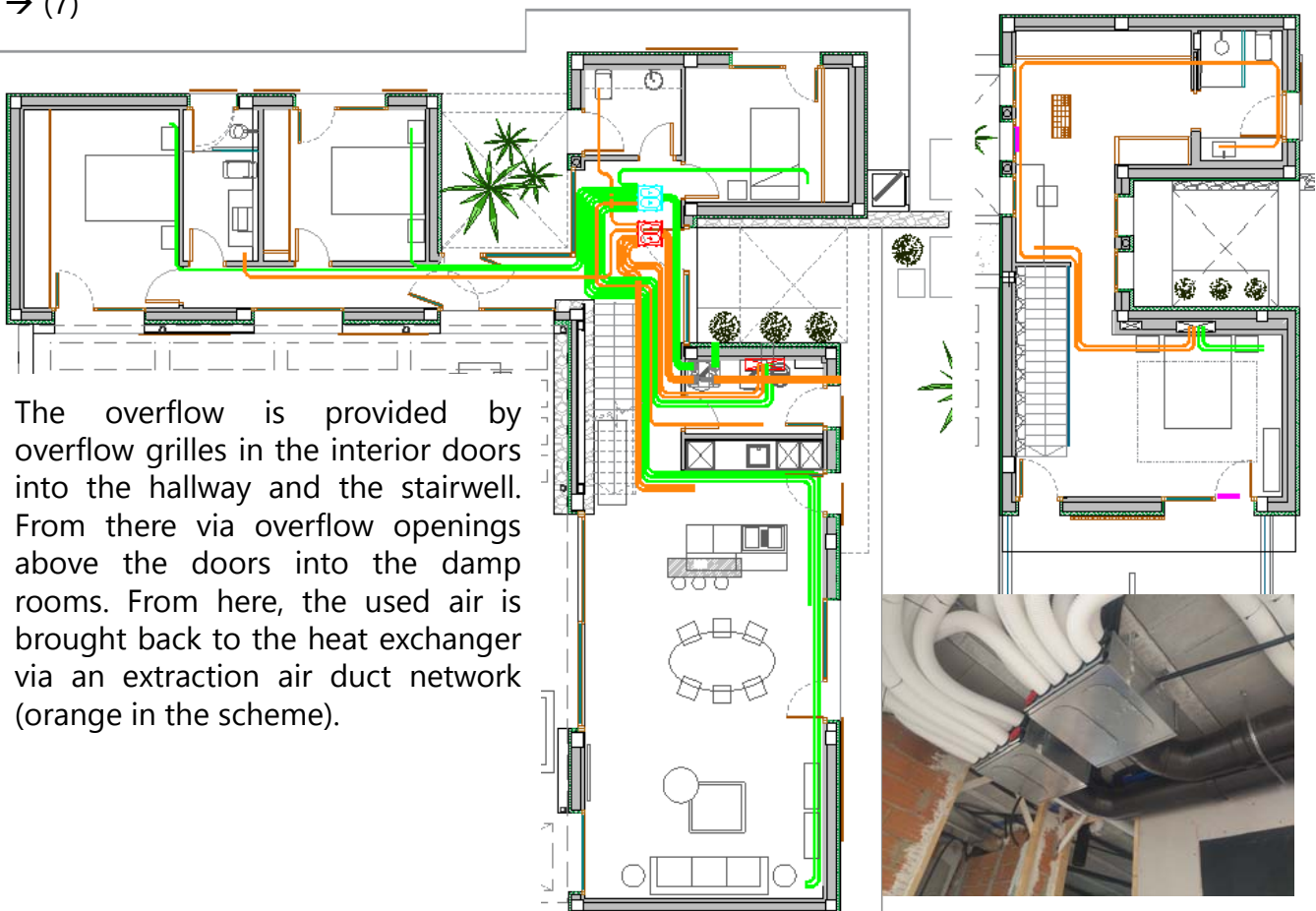
In order to greatly reduce ventilation losses, a balanced supply/exhaust air system with a highly efficient counterflow air-to-air heat exchanger was used.

Ventilation system	Zehnder ComfoAir Q450
Effective heat supply degree	83 %
Electrical Efficiency	0,21 Wh/m ³



11. Ventilation planning

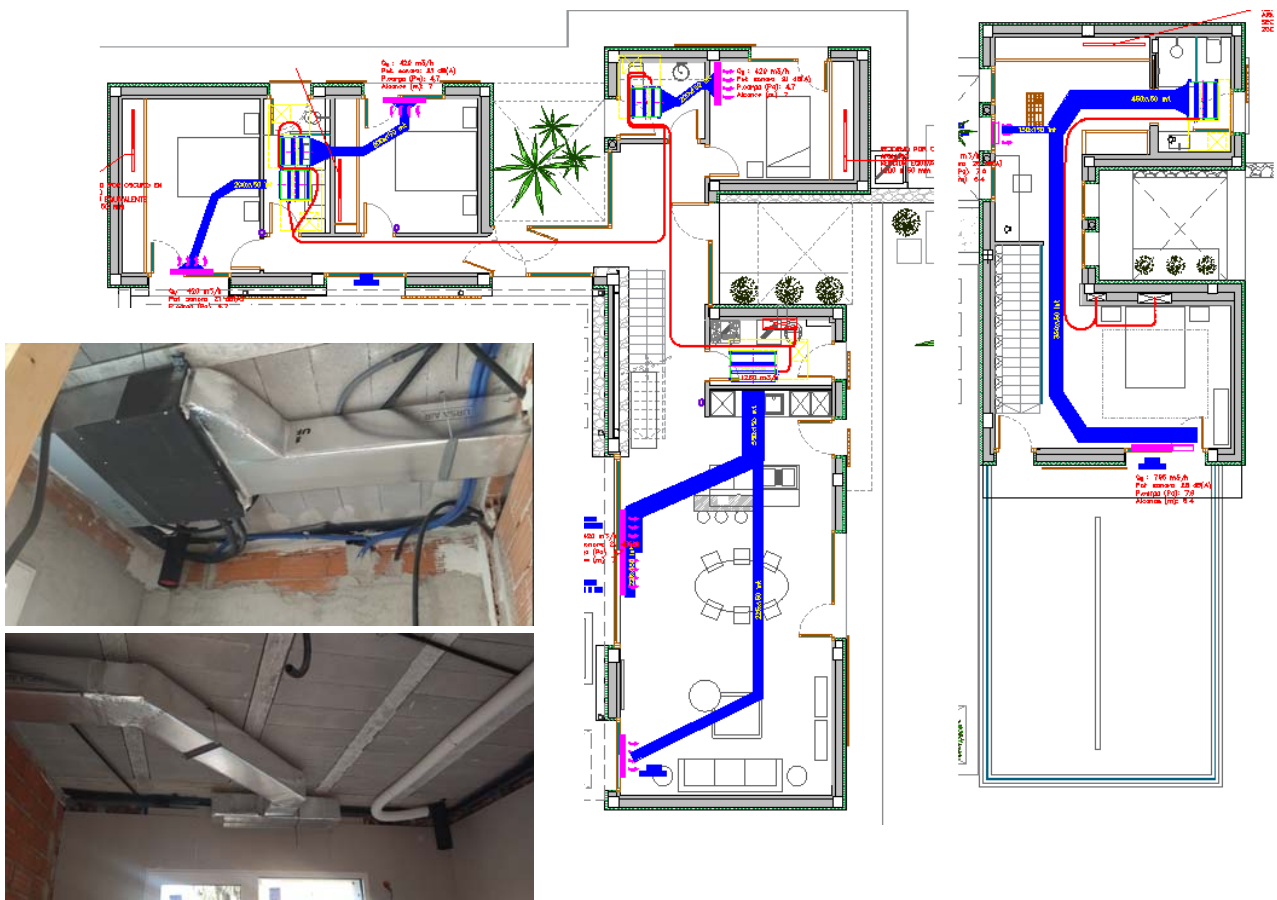
Supplying air rooms are all main recreation rooms (green: supply air ducts): Living room (2), Guest's bedrooms (2), spare room / gym (1), main bedroom (2) → (7)
 Extraction air rooms are bathrooms (2), toilet (1), kitchen (2), utility room (1) and study (1) → (7)



The overflow is provided by overflow grilles in the interior doors into the hallway and the stairwell. From there via overflow openings above the doors into the damp rooms. From here, the used air is brought back to the heat exchanger via an extraction air duct network (orange in the scheme).

12. Air-conditioning system

The air conditioning system has been solved by Mitsubishi Heat Pump Outdoor Unit ECODAN City Multi S PUMY-P140VKM4 combined with Hydrobox for heating/cooling ceiling concealed ducted indoor units and DHW



13. Construction cost

The total cost of the project has been privately covered by the owner. It is only possible to apply for a subsidy for the photovoltaic installation.

At the time of preparing this descriptive report for the Coxon house, an economic study of the additional costs compared to traditional construction has not been conducted yet. It is worth noting that VIVES PONS already constructs their homes with an external insulation system, ventilation through heat recovery systems, a high thickness of insulation in the roof, and a camera filled with rock wool. Therefore, the difference in constructing this particular house has involved replacing traditional concrete blocks with low density blocks, using glass with 90% argon gas, PVC separators in the glass camera, wooden frames instead of aluminum, implementing airtight membranes, installing shutters where there were no blinds, and insulating rainwater collection ducts.

15. Comfort

The comfort of the house in summer is contingent upon the user correctly implementing the passive strategies outlined in the project (shading, nighttime ventilation, and use of the dehumidifier). The user has been duly informed about these strategies.

Shading

To prevent overheating of the house, shading will be achieved by using exterior roller blinds in the bedrooms and dressing room/study; sliding shutters (with 7% shading factor) in the bedrooms, bathroom 1, bathroom 2, northeast window of the living-dining area, kitchen, utility room, and southeast facade hallway (fixed panel); an exterior blind on the window leading to the terrace from the staircase on the first floor; and interior blinds (with 50% shading factor) in the southwest and northeast windows of the living-dining area, bedrooms, southeast hallway windows (hinged panel), northwest hallway windows, entrance, and dressing room/study.



15. Confort

Dehumidifier

According to the PHPP calculations, the use of a dehumidifier is deemed necessary during the months of July and August. A unit is installed in the laundry/utility room connected to the drainage system.



Nighttime ventilation

Nighttime ventilation will be implemented to expel any excess heat that may accumulate during the day, provided that the outside temperature is lower than that inside the dwelling. It is deemed essential that the solar shading protections be open for effective ventilation.

The strategy defined in the PHPP (Passive House Planning Package) is as follows:

Cálculo secundario: ventilación adicional nocturna a través de las ventanas							
Parámetros para ventilación nocturna adicional a través de las ventanas para refrigeración en verano							
Descripción	planta 1	planta baja					
Factor de reducción	50%	50%					
Condiciones de contorno climáticas							
Diferencia de temp. interior-exterior	1	1	1	1	1	1	K
Velocidad del viento	0	0	0	0	0	0	m/s
Grupo de ventanas 1							
Cantidad	1	2					
Anchura libre	0,80	0,87					m
Altura libre	2,10	2,10					m
¿Ventanas oscilantes? (marque X)	x	x					
Sección de abertura (vent. oscilante)	0,050	0,050					m
Grupo de ventanas 2 (en el caso de ventilación cruzada)							
Cantidad	3	2					
Anchura libre	0,74	0,87					m
Altura libre	1,54	2,10					m
¿Ventanas oscilantes? (marque X)	x	x					
Sección de abertura (vent. oscilante)	0,050	0,050					m
Diferencia de nivel a gpo. ventanas 1	0,00						m
Resultado: tasa de ventilación nocturna	0,07	0,10	0,00	0,00	0,00	0,00	Total 0,17 1/h

Note:

This nighttime ventilation strategy is perfectly viable since the noise levels in the area where the building is located do not compromise the comfort of the users during the nighttime period, nor are there any other reasons why the planned rate of nighttime ventilation cannot be guaranteed for this purpose.

16. PHPP-Results

Casa Pasiva-Comprobación

10.4ES
PHPP



Arquitectura: Vives Pons Homes
Calle: Calle Marqués de Campo, 37D bajo
CP / Ciudad: 3700 Denia
Provincia/País: Alicante ES-España

Consult. energética: Carlos Catalá Far - Vives Pons Homes
Calle: Calle Marqués de Campo, 37D bajo
CP / Ciudad: 3700 Denia, Alicante
Provincia/País: Alicante ES-España

Año de construcción: 2023
Nr. de viviendas: 1
Nr. de personas: 3,0

Edificio: Casa Coxon
Calle:
CP / Ciudad: Denia
Provincia/País: Alicante ES-España
Tipo de edificio: 1-Vivienda unifamiliar aislada
Datos climáticos: ES0009b-Alicante, Altitud corregida
Zona climática: 5: Cálida Altitud de la localización: 8 m

Propietario / cliente:
Calle:
CP / Ciudad: 3700
Provincia/País: Alicante ES-España

Ingeniería: Vives Pons Homes
Calle: Calle Marqués de Campo, 37D bajo
CP / Ciudad: 3700 Denia
Provincia/País: Alicante ES-España

Certificación: Anne Vogt - VAND Arquitectura
Calle: Calle Finisterre 8, local 2
CP / Ciudad: 28029 Madrid
Provincia/País: Madrid ES-España

Temp. interior invierno [°C]: 20,0 Temp. interior verano [°C]: 25,0
Ganancias internas de calor (GIC) en invierno [W/m²]: 2,4 GIC verano [W/m²]: 2,4
Capacidad calorífica específica [Wh/K por m² de SRE]: 140 Refrigeración mecánica: x

Valores específicos del edificio con referencia a la superficie de referencia energética

		Superficie de referencia energética m ²			Criterios		¿Cumplido? ²
					Criterio	alternativo	
Calefacción	Demanda de calefacción	kWh/(m ² a)	15	≤	15	-	Sí
	Carga de calefacción	W/m ²	13	≤	-	10	
	Refrigeración	Demanda refrigeración & deshum.	kWh/(m ² a)	18	≤	18	-
	Frecuencia de sobrecalentamiento (> 25 °C)	%	-	≤	-	-	-
	Frecuencia excesivamente alta humedad (> 12 g/kg)	%	0	≤	10	-	Sí
Hermeticidad	Resultado ensayo de presión n50	1/h	1	≤	0,6	-	Sí
Energía Primaria no renovable (EP)	Demanda EP	kWh/(m ² a)	76	≤	-	-	-
Energía Primaria Renovable (PPR)	Demanda PER	kWh/(m ² a)	46	≤	45	46	Sí
	Generación ER <small>(en relación al área huella proyectada)</small>	kWh/(m ² a)	71	≥	60	61	

Confirmo que los valores aquí presentados han sido determinados siguiendo la metodología de PHPP y están basados en los valores característicos del edificio. Los cálculos de PHPP están adjuntos a esta

¿Casa Pasiva Plus?

Sí

Función: 1-Diseño Nombre: Carlos Apellido: Catalá Far
Número de identificación (ID) del certificado: 42382_VAND_PH_20240415_AV Emisión: 10/04/24 Ciudad: Alicante

Firma:

Datos de proyecto impartador desde dorighPH2.1.112023-03-15 08:43:21+0100

Licencia PHPP Carlos Catalá Far: FAVES_010424_234973566_es10

Although the initial design of this project did not aim to meet passive house standards, the owner decided to heed the advice of VIVES PONS and commit to adapting the project to meet these criteria and comply with the PHPP (Passive House Planning Package).

A temperature, humidity, and CO₂ sensor has been installed to monitor and assess the results over the course of a year.