**Pedro Reyna** Re-accreditation as Passivhaus Designer

# Project Documentation
# **Casa Biguá, Tigre**
ID6939

Certified
Passive House
Passive House Institute
| **classic** | plus | premium |


## Abstract

A weekend home located deep in the Tigre Delta in Buenos Aires. The building is elevated over the ground to allow for the frequent flooding of the river to flow underneath.

The project, made in timber structural modules made of glue lam beams and using SIPs and dry construction, bases its strategy in bioclimatic design favouring orientation and solar control as well as natural and mechanical ventilation.


## Data of building

| | | | |
|---|---|---|---|
| Year of Construction | 2022 | Space Heating | **9** kWh /(m2a ) |
| U Value External Wall | 0.286 W/(m$^2$K) | | |
| U Value Floor slab | 0.358 W/(m$^2$K) | Space Cooling | **15** kWh /(m2a **)** |
| U Value Roof | 0.299 W/(m$^2$K) | | |
| U Value Window | 1.22 W/(m$^2$K) | Primary Energy Renewabe (PER) | **41** kWh /(m2a ) |
| U Value of Glass | 1.14 W/(m$^2$K) | G Value of Glass | **0.5** |
| Heat Recovery | 80% | Non-Renewable Primary Energy (PE) | **87** kWh /(m2a |
| Special Features | | Air tightness $n_{50}$ | 0.6 /h |

## Brief Description

A weekend home located deep in the Tigre Delta in Buenos Aires. The building is elevated over the ground to allow for the frequent flooding of the river to flow underneath.

The project, made in timber structural modules made of glue lam beams and using SIPs and dry construction, bases its strategy in bioclimatic design favouring orientation and solar control as well as natural and mechanical ventilation.

## Responsible project participants

| | |
|---|---|
| Architect | MAPA Architects |
| Local Architect | Joaquín Berdés |
| Builder | Horacio Battagliero - BATTAGLIERO CONSTRUCTIONS |
| Passivhaus Designer | Pedro Reyna (Dipl Arch. March) |
| Building Systems | Diego Vázquez - DUARQS |
| Construction Management | Joaquín Berdés |

## Certifying Body

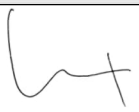
| |
|---|
| Passive House Institute Darmstadt |

## Certification ID

| | |
|---|---|
| ID: 6939 | https://passivehouse-database.org/index.php?lang=en#d_6939 |

## Autor of project documentation

| |
|---|
| Pedro Reyna (Dipl Arch. March) |

| Date | Signature |
|---|---|
| 1/08/2022 |  |

## 1. Exterior photographs

North Side

North West Side

West Side

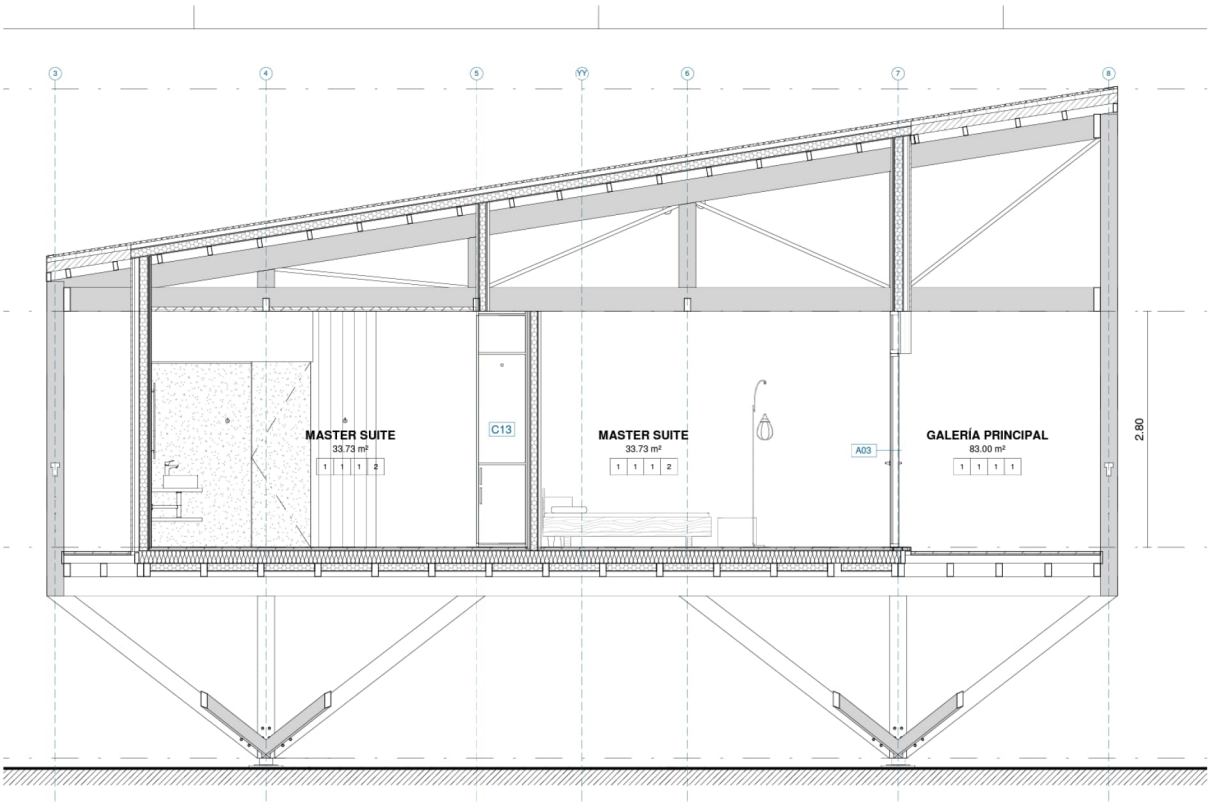
East Side

North Gallery

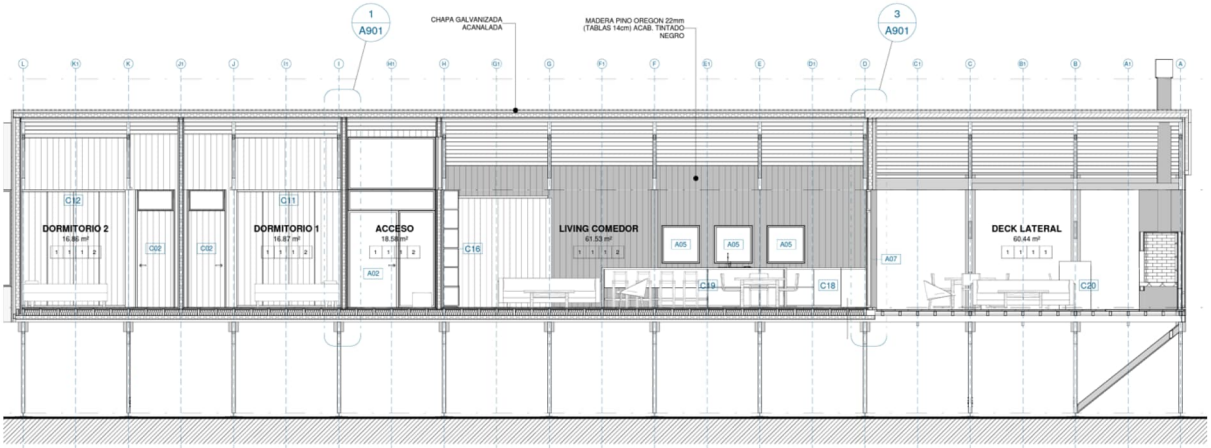
South Side

## 2. Interior Photographs

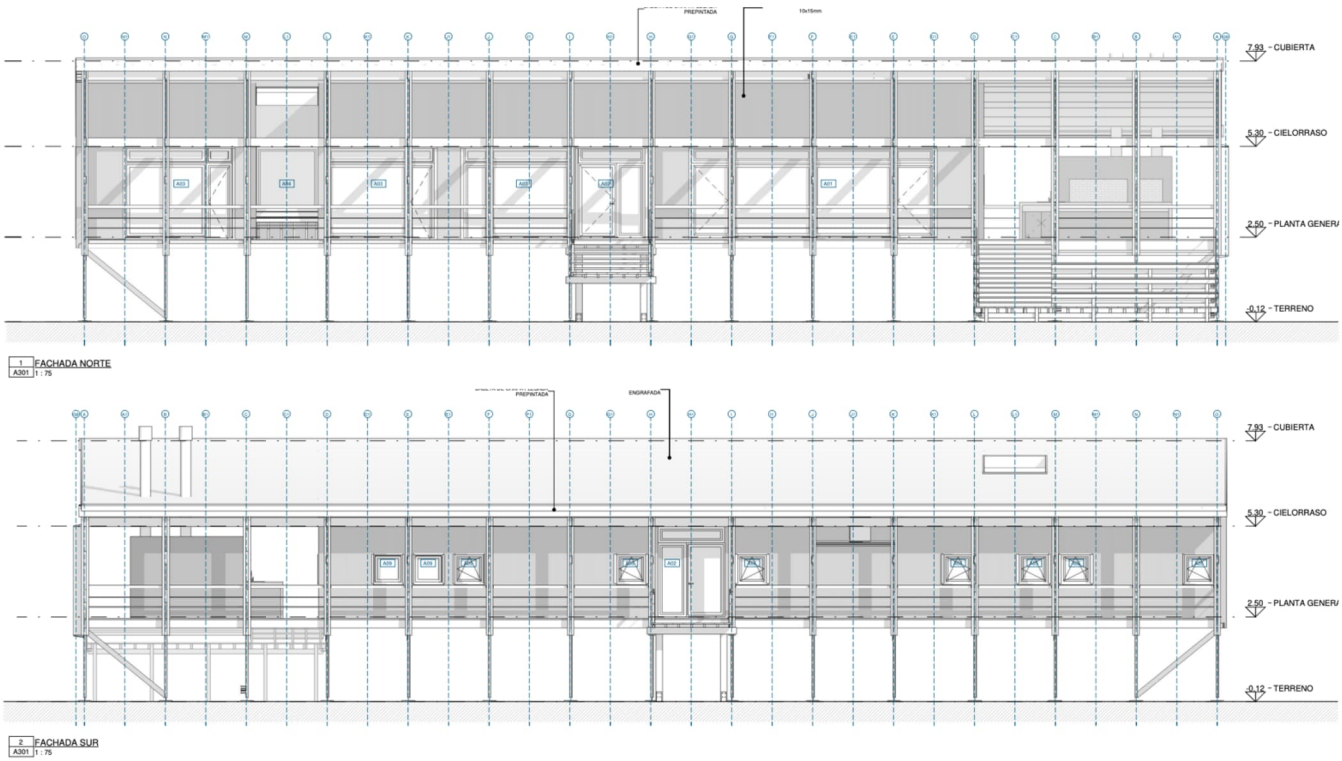
## 3. Building Sections and Elevations



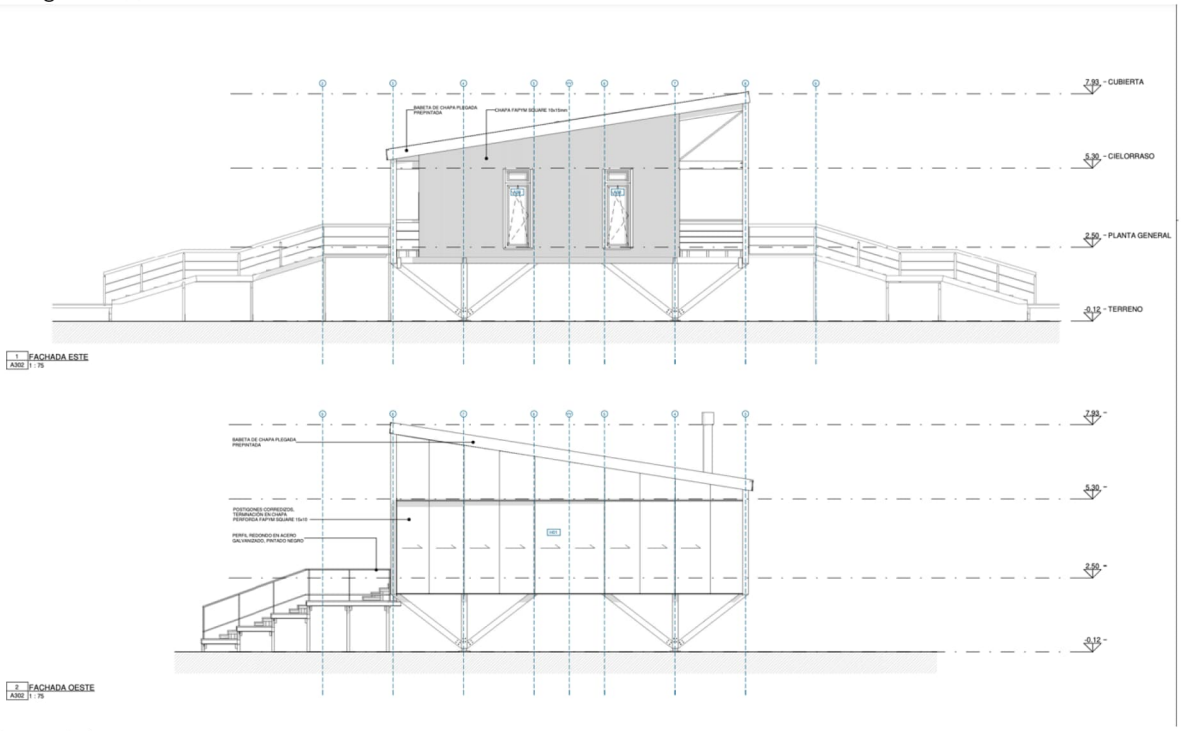

Cross Section




Long Section

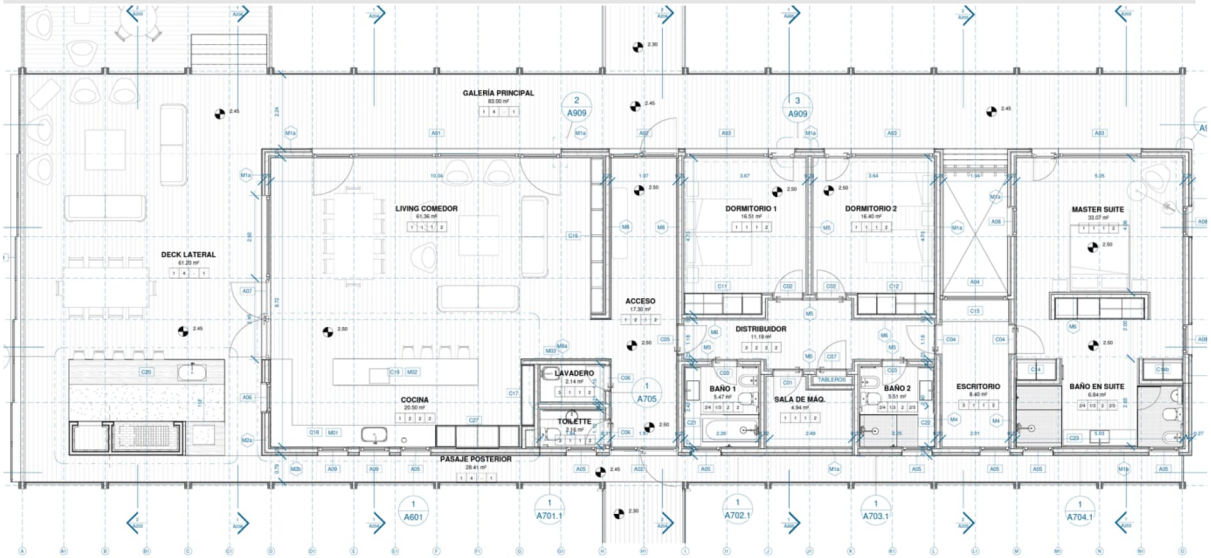



Long Elevations

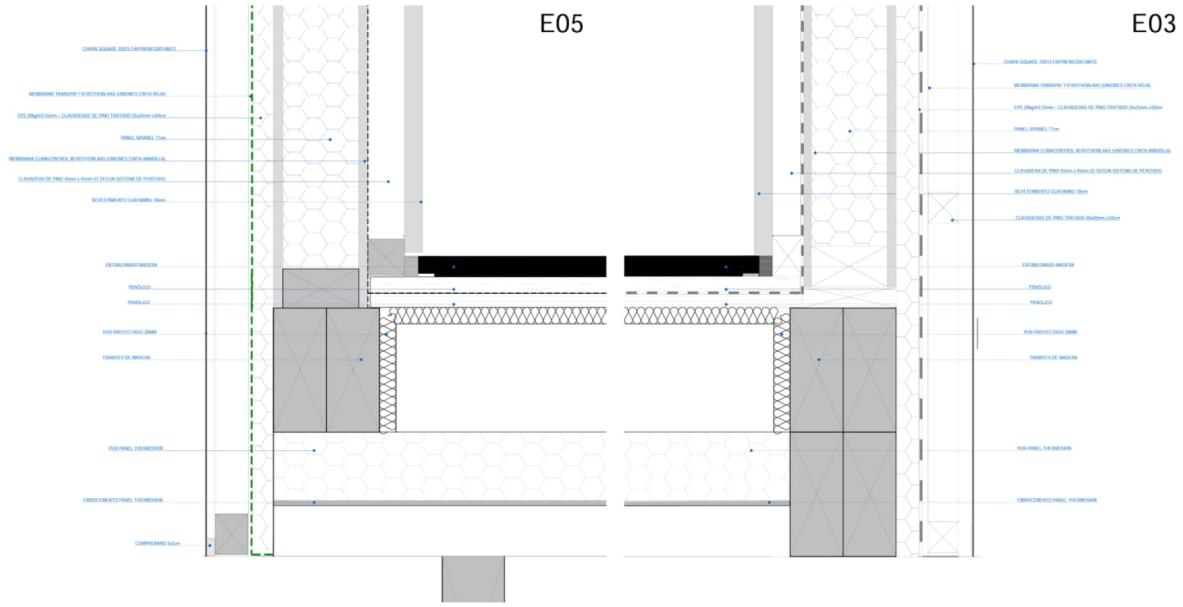



Short Elevations

## 4. Ground Floor Plan

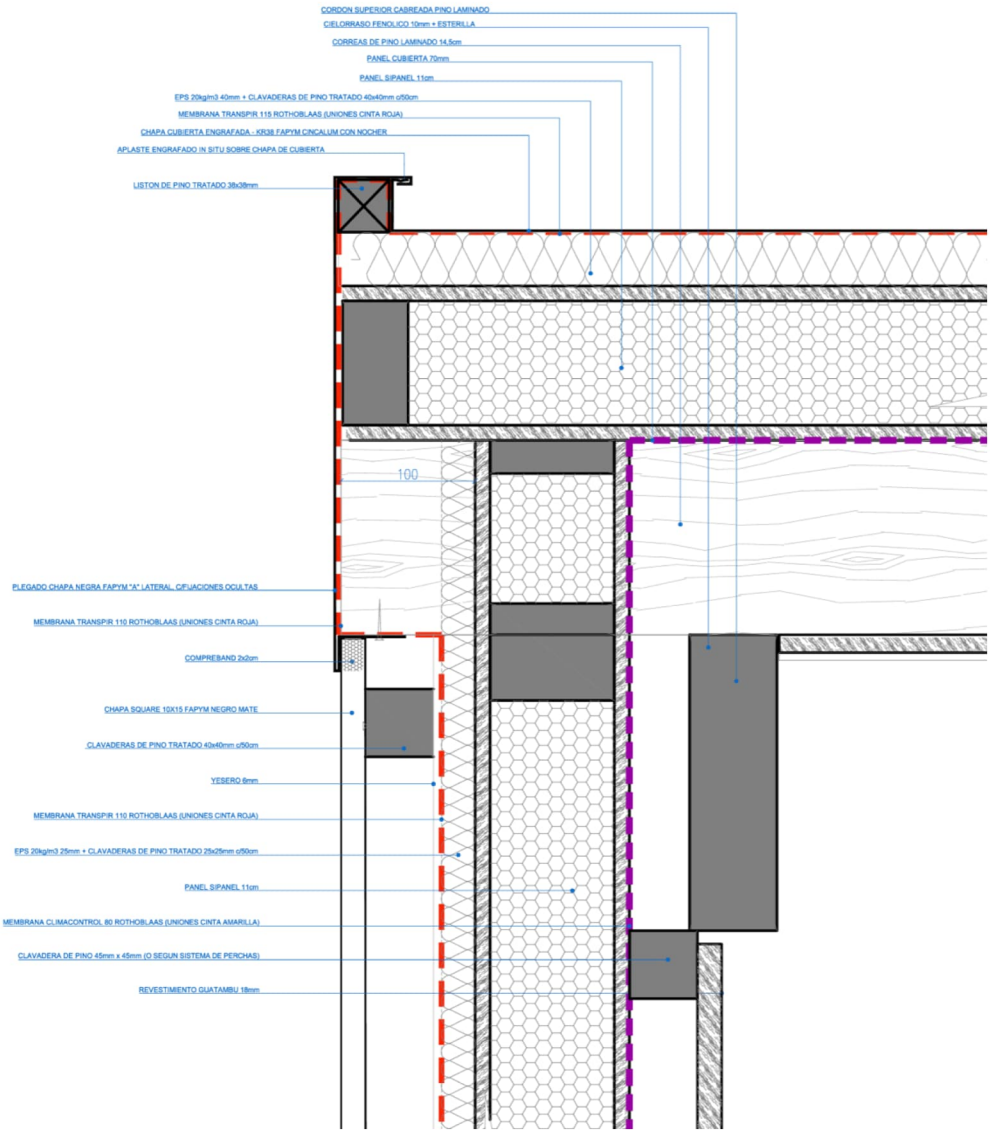



## 5. Floor detail



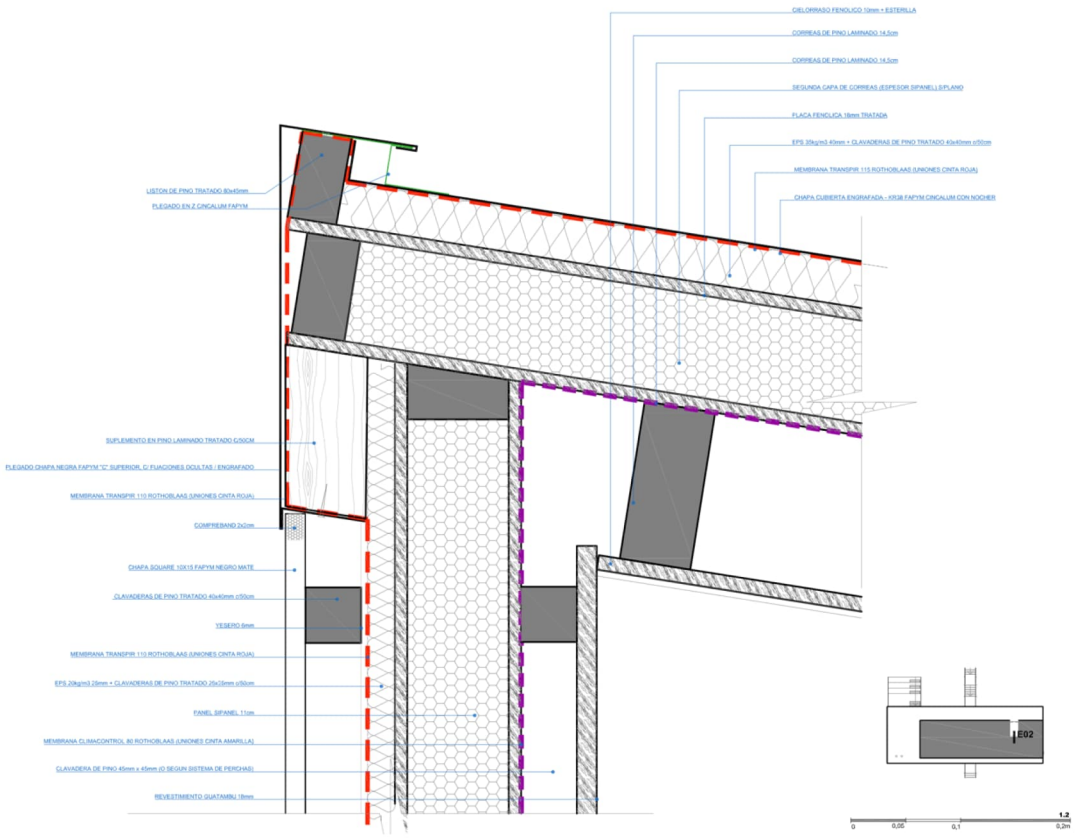

The building is elevated of the ground. Wooden trusses raise the building off the ground to protect it from frequent flooding in the area. Structurally the floor is a simple wooden grid insulated with PUR panels from the SIP family to guarantee continuous insulation with the rest of the building. See U values in cover sheet.

## 6. Outer wall construction



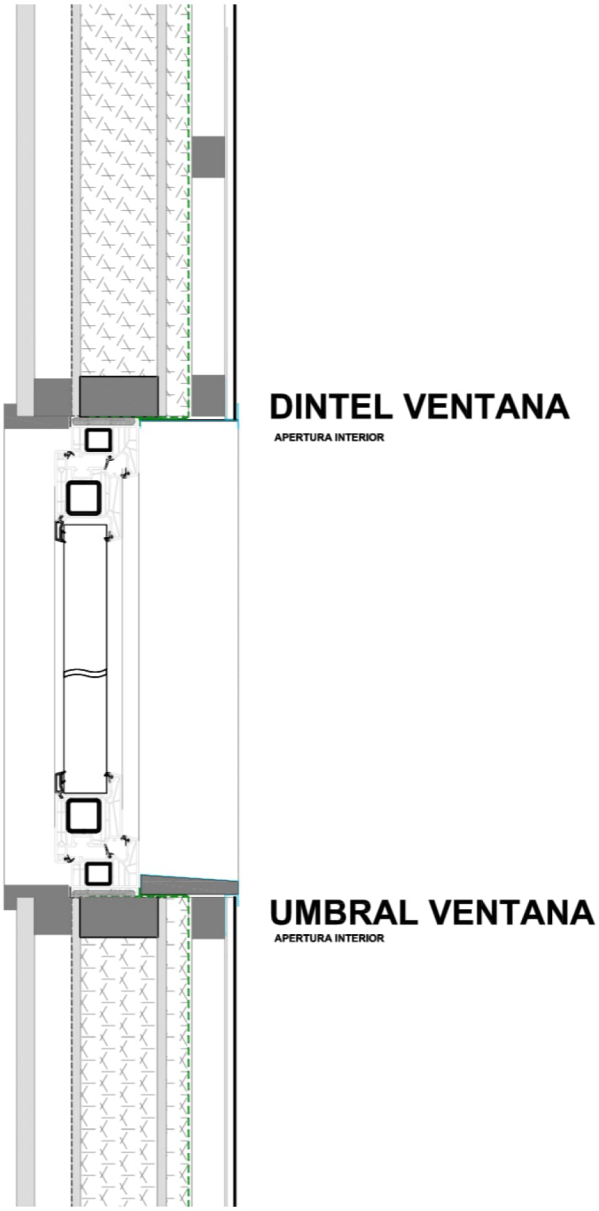

SIP system was used all around the building skin. This system helped the thermal break free construction. Metal sheeting cladding was used on walls. The interiors are mostly cladded in tong and groove wooden planks. See U values in cover sheet.

## 7. Roof construction




The roof buildup is made of a wooden structure insulated with SIPs and metal roof cladding. PUR is the main insulating material and special attention has been given to the geometrical continuity of the insulation. All geometrical corners of the building have been evaluated in term® for thermal flow to identify potential thermal bridges. See U values in cover sheet.

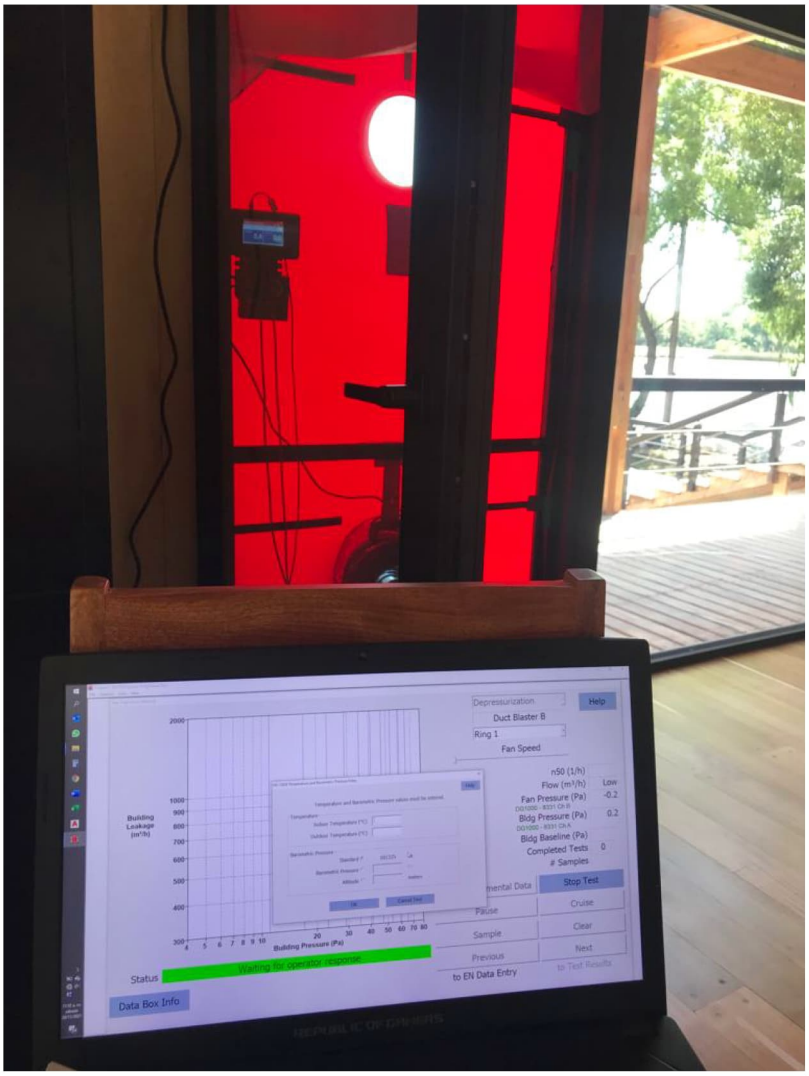
## 8. Window Installation



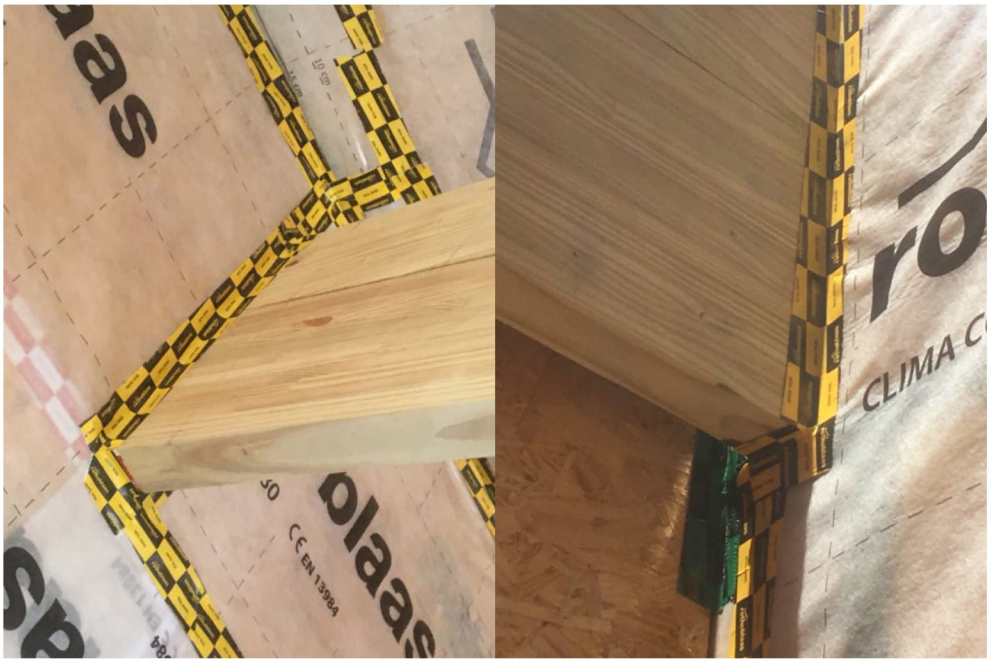

All doors and windows are made of UPVC. The frame model used was Schücko Living 82, certified window frames. See U values in cover sheet. Triple glazing with low e filter, warm edge separation and argon gas filled cavities was used. See U values in cover sheet.

## 9. Blower Door Test

| | Depressurization | Pressurization | Average |
|---|---|---|---|
| **Test Results at 50 Pascals:** | | | |
| V50: m³/h50 (Airflow) | 506 (+/- 2.2 %) | 544 (+/- 4.1 %) | 525 |
| n50: 1/h (Air Change Rate) | 0.60 | 0.64 | 0.62 |
| w50: m³/(h·m² Floor Area) | 2.30 | 2.48 | 2.39 |
| q50: m³/(h·m² Envelope Area) | 0.57 | 0.61 | 0.59 |
| **Leakage Areas:** | | | |
| Canadian EqLA @ 10 Pa (cm²) | 197.0 (+/- 4.7 %) | 194.5 (+/- 7.8 %) | 195.7 |
| cm²/m² Surface Area | 0.22 | 0.22 | 0.22 |
| LBL ELA @ 4 Pa (cm²) | 104.5 (+/- 7.8 %) | 98.3 (+/- 13.0 %) | 101.4 |
| cm²/m² Surface Area | 0.12 | 0.11 | 0.11 |
| **Building Leakage Curve:** | | | |
| Air Flow Coefficient (Cenv) m³/(h·Paⁿ) | 39.5 (+/- 12.5 %) | 34.4 (+/- 21.0 %) | |
| Air Leakage Coefficient (CL) m³/(h·Paⁿ) | 39.2 (+/- 12.5 %) | 34.2 (+/- 21.0 %) | |
| Exponent (n) | 0.654 (+/- 0.035) | 0.707 (+/- 0.059) | |
| Correlation Coefficient | 0.99459 | 0.98592 | |
| Test Standard: | EN 13829 | | |
| Test Mode: | Depressurization and Pressurization | | |
| Type of Test Method: | A | | |
| Regulation complied with: | EN-13829 y Passivhaus n50 ≤ 0.6 1/h | | |



The air tight layer of the building was performed in the interior side of the SIP system. Rothoblass Clima Control 80 was used to achieve air tightness along with a host of different types of tapes install around windows, beams and to accommodate the geometry of the building.



## 10. Ventilation Unit

A Zehnder Q600 Enthalpic unit was used. The climate in Tigre is fairly humid and this unit helps remove unwanted humidity in the air. See Spec sheet below for the Heat Recovery Ventilation Unit

| | |
|---|---|
| Category: | **Air handling unit with heat recovery** |
| Manufacturer: | **Zehnder Group Zwolle B.V. Netherlands** |
| Product name: | **ComfoAir Q600 ERV, Comfort Vent Q600 ERV** |
| Specification: | Airflow rate < 600 $m^3/h$ |
| Heat exchanger: | Recuperative |

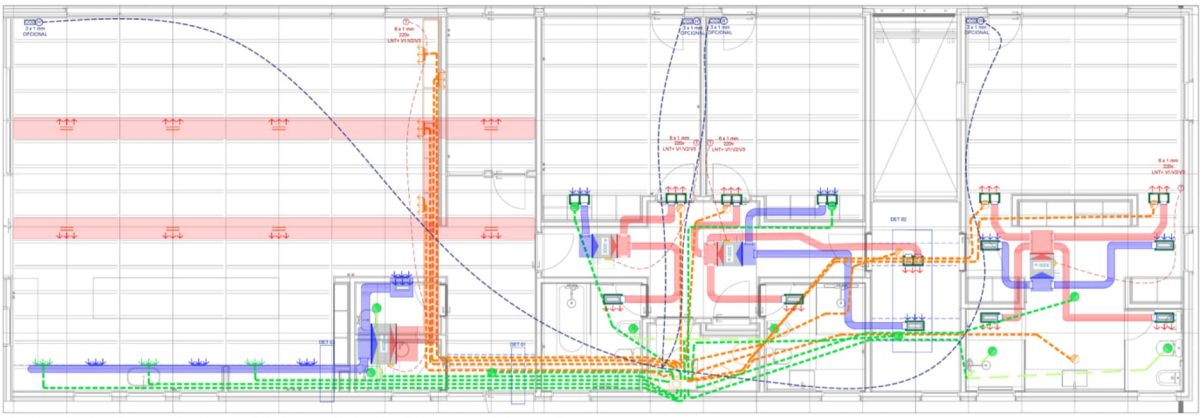
**This certificate was awarded based on the product meeting the following main criteria**

| | | | |
|---|---|---|---|
| Heat recovery rate | $\eta_{HR}$ | $\geq$ | 75 % |
| Specific electric power | $P_{el,spec}$ | $\leq$ | 0.45 $Wh/m^3$ |
| Leakage | | < | 3 % |
| Comfort | Supply air temperature $\geq$ 16.5 °C at outdoor air temperature of –10 °C | | |

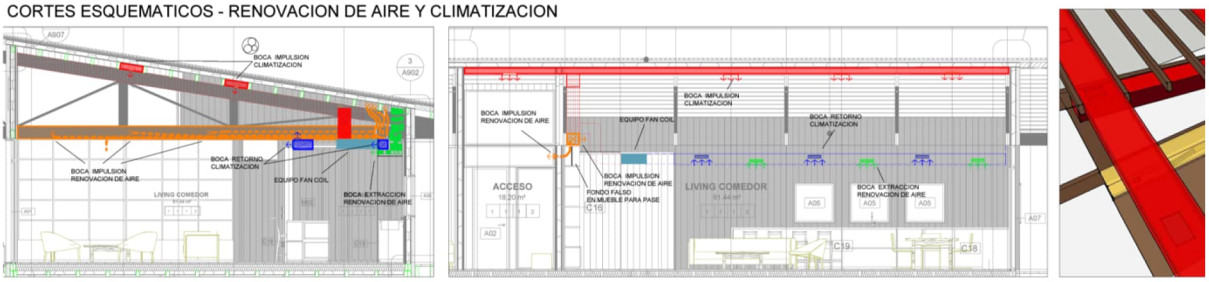
| Airflow range |
|---|
| 70–460 $m^3/h$ |
| **Heat recovery rate** |
| $\eta_{HR}$ = 80 % [1)] |
| **Specific electric power** |
| $P_{el,spec}$ = 0.22 $Wh/m^3$ |
| **Humidity recovery** |
| $\eta_x$ = 68 % |

## 11. Climatization
## 12. Ductwork

ESQUEMA DE TENDIDO INSTALACION RENOVACION DE AIRE Y CLIMATIZACION



CORTES ESQUEMATICOS - RENOVACION DE AIRE Y CLIMATIZACION




The heating and cooling system is provided by an air-source heat pump. Chilled / warm water is distributed to split units in each room from where conditioned air is injected into the rooms. The Air distribution is commissioned with flexible PVC ducting that is completely independent from the ducting of the climatization system.

## 13. Building Cost

Aprox. USD 480.000 (Undisclosed)

## 14. PHPP RESULTS

# Casa Pasiva Comprobación

| | | | |
|---|---|---|---|
| **Edificio:** | BIGUÁ / REFUGIO EN EL DELTA | | |
| Calle: | Rio Parana Mini y Arroyo Felicaria | | |
| CP / Ciudad: | 1647 | Delta de San Fernando | |
| Provincia/País: | Buenos Aires | AR-Argentina | |
| Tipo de edificio: | Vivienda unifamiliar aislada | | |
| Datos climáticos: | ud---01-AR0001a-Buenos Aires | | |
| Zona climática: | 5: Cálida | Altitud de la localización: | 7 m |
| **Propietario / cliente:** | EDUARDO Y ERICA HEIDENREICH | | |
| Calle: | Av del Libertados 3752 12A | | |
| CP / Ciudad: | 1425 | Capital Federal | |
| Provincia/País: | Buenos Aires | AR-Argentina | |

| | | | |
|---|---|---|---|
| **Arquitectura:** | MAPA Arquitecto | | |
| Calle: | Luis A. de Herrera 1042 | | |
| CP / Ciudad: | L01 11300 | Montevideo | |
| Provincia/País: | Montevideo | UY-Uruguay | |
| **Consult. energética:** | Pedro Reyna | | |
| Calle: | Alvarez Igarzábal 1010 | | |
| CP / Ciudad: | X5009 | Córdoba | |
| Provincia/País: | Córdoba | AR-Argentina | |

| | | | |
|---|---|---|---|
| **Ingeniería:** | Joaquin Berdes Arquitectos | | |
| Calle: | General Guido 4154, 3 | | |
| CP / Ciudad: | 1643 | Beccar | |
| Provincia/País: | Buenos Aires | AR-Argentina | |
| **Certificación:** | Passivhaus Institut GmbH | | |
| Calle: | Rheinstraße 44-46 | | |
| 0 boo | 64294 | Darmstadt | |
| Provincia/País: | Hesse | DE-Alemania | |

| | | | | | |
|---|---|---|---|---|---|
| Año construcción: | 2022 | Temp. interior invierno [°C]: | 20.0 | Temp. interior verano [°C]: | 25.0 |
| Nr. de viviendas | 1 | Ganancias internas de calor (GIC); caso calefacción [W/m²]: | 2.3 | GIC caso refrig. [W/m²]: | 2.3 |
| Nr. de personas: | 3.1 | Capacidad específica [Wh/K por m² de SRE]: | 95 | Refrigeración mecánica: | x |

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

| | | | | | Criterio | Criterios alternativos | ¿Cumplido?[2] |
|---|---|---|---|---|---|---|---|
| | Superficie de referencia energética | m² | 219.9 | | | | |
| **Calefacción** | Demanda de calefacción | kWh/(m²a) | 9 | ≤ | 15 | - | Sí |
| | Carga de calefacción | W/m² | 20 | ≤ | - | 10 | |
| **Refrigeración** | Demanda refrigeración & deshum. | kWh/(m²a) | 15 | ≤ | 15 | 15 | Sí |
| | Carga de refrigeración | W/m² | 24 | ≤ | - | 10 | |
| | Frecuencia de sobrecalentamiento (> 25 °C) | % | - | ≤ | - | | - |
| | Frecuencia excesivamente alta humedad (> 12 g/kg) | % | 0 | ≤ | 10 | | Sí |
| **Hermeticidad** | Resultado ensayo presión $n_{50}$ | 1/h | 0.6 | ≤ | 0.6 | | Sí |
| **Energía Primaria no renovable (EP)** | Demanda EP | kWh/(m²a) | 87 | ≤ | - | | - |
| **Energía Primaria Renovable (PER)** | Demanda PER | kWh/(m²a) | 41 | ≤ | 60 | 60 | Sí |
| | Generación de Energía Renovable (en relación con área de la huella del edificio proyectado) | kWh/(m²a) | 0 | ≥ | - | - | |

[2] Celda vacía: Falta dato; '-': Sin requerimiento

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 comprobación.

**¿Casa Pasiva Classic?** Sí

| Función: | Nombre: | Apellido: | Firma: |
|---|---|---|---|
| 2-Certificador | Soraya | López García | |

| ID Certificado | Emisión: | Ciudad: |
|---|---|---|
| 35364_PHI_PH_20220701_SL | 27.06.2022 | Darmstadt, Alemania |

Project data imported from designPH 2.0.06

Código desplegado PHPP9:

## 15. Literature