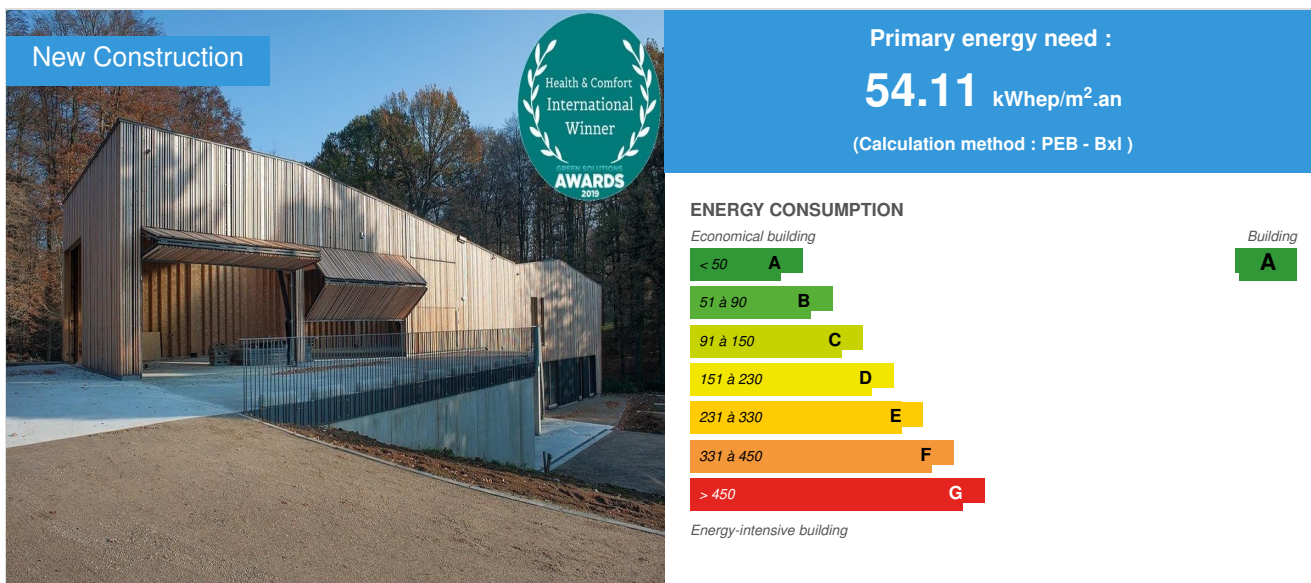


BRIGADE - CONSTRUCTION OF A FORESTRY BRIGADE, PASSIVE PROJECT AND ECO-CONSTRUCTION, IN THE FOREST OF SOIGNES IN UCLLE.

by B612 Associates / 2019-06-10 22:28:26 / Belgique / 8832 / FR



Building Type : Other building
Construction Year : 2018
Delivery year : 2018
Address 1 - street : Drève Saint Hubert 19 1180 BRUXELLES, Belgique
Climate zone : [Cfc] Marine Cool Winter & summer- Mild with no dry season.

Net Floor Area : 852 m² Autre type de surface nette
Construction/refurbishment cost : 1 756 543 €
Cost/m2 : 2061.67 €/m²

Certifications :



General information

Forestry Brigade won the Health & Comfort Award of the 2019 Green Solutions Awards at the Belgium level + the international Health & Comfort Award.

This building for rangers in the Soignes forest, Natura 2000 site and classified, establishes with its environment architectural and landscape relations just,

harmonious and quality. It creates a natural echo of the place, its function, its resources and its activities in synergy with the forest. It allows to live and work with and in the forest landscape and generates multiple and productive exchanges between man, fauna and flora while minimizing its environmental impact in terms of materials, energy, soil and nature .

The building includes relaxation areas, refectories, offices, cloakrooms ... and utilitarian spaces for storage, parking, tools ... necessary for forest managers in charge of forest management.

The forest activities develop in adequacy and synergy with the site, by the various functional and human relations established with the environment, views, access, paths, links, light ...

The project is sober and poetic in its environment, nestled on the edge of clearing, establishing a rhythm with the 2 existing forest houses and in line with the topography and the wooded landscape of the site.

As a constituent part of the surrounding landscape and forestry activities, the wood is used in structure, exterior cladding, interior finishes and heating fuel. The fractured skyline of the project and its siding of formats and random spaces interacts with the wooded mass of the forest, its branches, trunks, foliage ...

The building aims to develop a specific image of its function, its presence and its activities for the public, neighbors, passers-by, walkers, commuters on the river ...

The project aims at high environmental quality, in terms of energy, materials, water use and biodiversity, thanks to its compactness, its green roof, its local and forest plantations, its particular attention to bats (intentional facade interstices, amber light ...), its wetlands, etc.

See more details about this project

<http://architectes.b612associates.com/portfolio/brigade/>

Data reliability

Assessor

Photo credit

Photographer Bernard Boccara and for the green roof photography: B612 associates

Stakeholders

Contractor

Name : IBGE

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Construction Manager

Name : Gillion Construct – Entreprise Générale

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Stakeholders

Function : Designer

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Function : Structures calculist

Greisch

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Function : Other consultancy agency

Matriciel (études des techniques spéciales et PEB)

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Function : Other consultancy agency

OLM Paysagistes (avis - étude pour le paysage)

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Owner approach of sustainability

In order to carry out the activities related to the management and maintenance of the Soignes Forest, this work aimed to create a forest brigade to improve the working conditions of the field staff and thus provide them with adequate adapted equipment. to their functions.

Architectural description

Architectural part of the proposed building and its insertion in the classified site

The building is part of a desire to ensure a rational implementation of the various functions, the heated premises have been grouped into a compact area. The living spaces are oriented towards the forest in such a way that vehicle access is limited to the maximum at the top of the site, closest to the public roads. These spaces thus include places of relaxation, refectories, offices, cloakrooms, etc. In addition to the utilitarian spaces of storage, parking, or tools necessary for the foresters in charge of the management of the forest. The forestry activities develop in adequacy and synergy with the site, by the various functional and human relations established with the environment, views, access, paths, links, light. The project is sober and poetic in its environment, nestled on the edge of clearing, establishing a rhythm with the 2 existing forest houses and in line with the topography and the wooded landscape of the site. The current implementation proposal allows:

- minimize the impact of volume and floor area by exploiting the natural relief. A level is accessible directly from the footpath and the second level is accessible by following the natural slope of the site along the frame. The perceptible volume from the footpath is therefore of one stage but the surface of occupation of the ground is divided by two by the organization of the functions on two levels.
- minimize the area of projection and waterproofing of soils. These are organized in such a way as to directly direct the waters towards the course of the valleys allowing themselves to depollute and infiltrate the waters. In case of heavy rain, the valley will direct the water towards the bottom of the plot. Finally, the extensive green roofs of this project also play a buffer role during this type of weather and are thus practically assimilated to permeable surfaces.
- ensure a long-lasting and legible presence: it is indeed an obvious and traditional implementation in a sloping site. In addition, the surroundings were fully reflected by a landscapist "OLM" which has ensured a smooth transition between regional roads, buildings, meadows, and the dominant limit of the Soig Soignes forest.

Then, as part of the surrounding landscape and forestry activities, the wood is used in structure, exterior cladding, interior finishes and heating fuel. Always in a sustainable and ecological thought, the wood chosen to dress the facade of the Brigade is local larch Nibe class 1a.

The fractured skyline of the project and its siding of formats and random spacings interacts with the wooded mass of the forest, its branches, trunks, foliage. The building aims to develop a specific image of its function, its presence and its activities for the public, neighbors, passers-by, walkers, commuters on the river ...

Energy

Energy consumption

Primary energy need : 54,11 kWh/m².an

Primary energy need for standard building : 177,12 kWh/m².an

Calculation method : PEB - Bxl

CEEB : 0.0001

Final Energy : 64,00 kWh/m².an

Breakdown for energy consumption :

according to PEB evaluation: heating: 49 kWhbois / m² / year cooling: - domestic hot water: not quantified lighting: 8.8 kWhelec / m² / year pumps and fans: 6.2 kWhelec / m² / year total: 64 kWh / m² / year (take care to mix kWhwood and kWhelec not addable in practice)

More information :

the consumptions listed above are theoretical consumptions evaluated according to the EPB calculation which does not take into account the renewable and local character of the non-manufactured wood fuel coming directly from the forest in which the building is implanted and which imposes a very poor performance of theoretical production. The building has been in operation since the end of 2018, which makes it impossible to know the actual consumption resulting.

Envelope performance

Envelope U-Value : 0,29 W.m⁻².K⁻¹

More information :

Envelope designed according to passive standards:

U_{mur} = 0.14 W / m²K

Building Compactness Coefficient : 0,85

Air Tightness Value : 0,60

Renewables & systems

Systems

Heating system :

- Wood boiler

Hot water system :

- Heat pump
- Wood boiler

Cooling system :

- No cooling system

Ventilation system :

- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Wood boiler
- Heat pump

Renewable energy production : 100,00 %

Other information on HVAC :

Winter heating and hot water needs are covered by a log boiler. In summer, heat pumps take over for the production of hot water. Therefore, renewable production covers 100% of heating needs and according to the PEB calculation, covers 62% of total primary energy consumption (excluding the notional cooling consumption). No sensors are installed because of the shading of the forest.

see above (wood boiler ...)

Solutions enhancing nature free gains :

Building built according to passive standards. Presence detector for HVAC lighting and valves (changing rooms) Flow regulation according to the level of CO2 in the refectory. 100% LED

Smart Building

BMS :

Wifi and DATA

Environment

Urban environment

CONTEXTUAL AND LANDSCAPE ANALYSIS OF THE SITE The Soignes Forest is a major natural heritage of high quality that marks the south-eastern edge of Brussels by its presence along the Chaussée de Waterloo. The project site of the forest brigade is located in a wider area, included in the forest, consisting of several meadows of varied quality. A legible and rich contrast in which we register appears between the residential stretches on the other side of the road, the Soignes forest (its wooded mass, its majestic trees, its alignments, its drèves) and the site of the forest brigade open glade. The two forest houses present on the site constitute a built heritage richness. They contribute to the memory of the site by their historical presence at the corner of the chaussée de Waterloo and the Drève Saint-Hubert, and in terms of their architecture, present a typology functional and rural very interesting in the Brussels Region. The houses, classed, composed and built with art and care, have their main facade of majestic and neat access, oriented towards the Drève Saint-Hubert. They are articulated by an "L" typology, around a south-west oriented semi-open working space, and fit topographically in the direction of the slope through a fence wall allowing a functional circulation in the east from the main building to the annex building below.

CHOICE OF IMPLANTATION Three options excluded during the pre-draft: a first option deformed the Forest of Soignes, its orientation was not favorable and, according to Brussels-Mobility, it would have presented in term of car safety a significant danger . The second option precluded a clear reading of the qualities of the nearest forest house, and the relationship between the two existing houses, and required the demolition prior to the work of the existing facilities and, therefore, its temporary relocation to another one place with the inherent negative impacts both biological and environmental. The third option compromised the balance, living space and intimacy of the two existing houses, it induced a density built locally by its proximity to the other two houses, was established in a lower and humid area, and destroyed the orchard by introducing heavy traffic. Therefore, as a result of this in-depth analysis, we opted for an implementation at the east end of the site. This proposal presents, with regard to the listed heritage built on the site, an attitude of dialogue and respect: by its distance from the forest house, the project restores its readability lost in the current situation, by releasing the side of its wall of fence and allowing a perception and a clear understanding of its typology, its volumetry, and its inscription in the site and in the relief; it also allows the forestry house to fulfill its housing function without suffering any nuisance due to the activity of the Brigade - noise, privacy, traffic. The house will regain its real volumetry of yesteryear once it will be released from light and temporary constructions. By this gap also, the project makes it possible to consolidate and make legible the current morphology of the site consisting of a sequence, a rhythm of constructed volumes and alternating open spaces alternately; the project creates a third open space framed and a third volume built in respect of morphology and current rhythms. As a result, the project proposes to create an overall reading of the site: 1 set of 3 forest buildings linked in terms of rhythm, open spaces and volumetry (rather than creating a set of 2 forest houses + 1 building of forest brigade).

Land plot area : 2 502,00 m²

Built-up area : 25,00 %

Green space : 1 859,00

Product

Stormwater Management

Product category : Aménagement extérieurs / Gestion des eaux pluviales

We have installed two types of controlled flow retention and evacuation devices to the wetland: extensive green roofs with a retention of $> 16 \text{ l} / \text{m}^2$ and retention volume for rain storm management landscape way. At the exit of the green roof, a rainwater tank needed for maintenance, cleaning and watering, sized according to the actual needs harvests 60% of the water of the latter, the rest is directly directed to the valleys. Finally, a review was also carried out for the management of greywater and black water. The choice of the drainage system was made taking into account a hydrological study carried out by the Belgian Pedological Service and by the advice of Vivaqua. All the wastewater will be directed down the valley after a so-called mixed purification through a pre-settling tank, intensive biological purification and finally purification by planted basins.



Well accepted

Passive system, an eco-construction

Product category : Gros œuvre / Système passif

Passive building, energy consumption for heating below $15 \text{ kWh} / \text{m}^2 \cdot \text{year}$ and airtight (at a difference of 50Pa) less than $0.6 \text{ vol} / \text{h}$

Well accepted



Framing - waterproofing - vegetal roof

Product category : Gros œuvre / Charpente, couverture, étanchéité

Framework in softwood and glued laminated timber, waterproofing in EPDM and extensive green roof

Well accepted



Facade and structure - Wood

Product category : Gros œuvre / Structure, maçonnerie, façade

Frame made of softwood and laminated wood, cellulose insulation and exterior cladding in larch labeled FSC

Well accepted



Exterior wood furnishings

Product category : Second œuvre / Menuiseries extérieures

Triple glazed wooden frame FSC labeled

Well accepted

Construction and exploitation costs

Total cost of the building : 1 756 543 €

Energy bill

Forecasted energy bill/year : 5 500,00 €

Real energy cost/m2 : 6.46

Real energy cost/none : 458.33

Health and comfort

Water management

Consumption of harvested rainwater : 55,00 m³

Water is a major concern in the Brussels Region, given the occupancy and waterproofing of soils. More specifically In the case of the Forest Brigade, given the synergy of this activity with the natural elements, given the exemplary role that can play Brussels-Environment, and given the lack of public sewer network, we made it a priority ecological target. Impacts of project impervious surfaces are minimized to reduce runoff rainwater. All the water is then taken care of by new developments: the water is naturally absorbed by the earth via a system of valleys which channels and redirects the water towards the creek located at the bottom of the plot. The wastewater treatment system (pretreatment, biological purification and lagooning) is dimensioned for 17EH. Only the surfaces intended for the circulation of the vehicles (except outside parking and access ramp) are impermeable. These impervious zones are of two types: • Watertight areas, intended for work, whose water harvesting will be the subject of an appropriate treatment system. • the rolling zones, whose water harvest will also be ensured by a set of slopes and planted valleys. In addition, we have also installed two types of controlled flow retention and evacuation devices to the wetland: extensive green roofs for retention > 16 l / m² and retention volume for rain management. Storm realized in a landscape way. At the exit of the green roof, a rainwater tank of 10 m³ needed for maintenance, cleaning and watering, sized according to the actual needs harvest 60% of the waters of it, the rest is directly headed to the valleys. Finally, a review was also carried out for the management of greywater and black water. The choice of the drainage system was made taking into account a hydrological study carried out by the Belgian Pedological Service and by the advice of Vivaqua. All the wastewater will be directed down the valley after a so-called mixed purification through a pre-settling tank, intensive biological purification and finally purification by planted basins

Indoor Air quality

Not known yet but:

The building is equipped with mechanical ventilation sized 36 m³ / h / pers.

Living spaces with variable occupancy are equipped with a CO2 sensor control

designed to maintain a maximum CO2 level of 1000 ppm

Comfort

Health & comfort :

The energy consumption of the buildings, the comfort as well as the external and internal relations in an architecture are important and to answer these requests, our proposals are the following ones:

- Optimization of electricity consumption by natural and abundant lighting, including the presence of skylights equipped with sunscreen and bays mainly oriented south and west and the presence of an artificial lighting system and economically designed in an intelligent way by opting for a functional zoning principle and for devices limiting electricity consumption.
- offers various protected outdoor workspaces, allowing the occupants of the site to work, rest, and meet as a group. In addition, this open architecture thanks to large windows that offer generous views of its environment, and concerned about its impact on it, also incorporates details to accommodate the surrounding wildlife: such as shelters for bats between-other.

- The heating and ventilation were designed and designed to achieve the Passive label according to the criteria of the PMP. Thus, the net heating requirement is <15 kWh / M2 year. These performances are achieved by minimizing the losses of the heated volume, as well by its compact and globally rectangular configuration, the thermal quality of its materials and the reduction of the lost air flows, as by the composition of the windows in frontage to optimize the balance between the enjoyment of views, sunshine, and natural lighting, and the need for insulation naturally more efficient opaque walls. The thicknesses of insulation used are 30 cm of cellulose blown between wood structure, the thermal bridges will be drastically reduced, and the glazing will be of low emissivity type super insulation, triple glazing. Airtightness: air leakage is reduced to a minimum of <0.6 n50 / h.
- Ventilation will be provided by a pulse / extraction unit equipped with a high efficiency heat recuperator greater than 90%. In order to limit the flow of pulses, an air transfer system between the premises is set up. The heat exchanger will be by-passed in summer when the indoor temperature will be higher than the outside temperature, so as to ensure free cooling and optimal comfort in summer. The ventilation of the shed will be ensured in a natural way by ventilation grilles placed in the bottom of the doors, and by the windows and the opening skylights.

Calculated indoor CO2 concentration :

Non connu

Measured indoor CO2 concentration :

voir ci-dessus

Calculated thermal comfort : la température de consigne hivernale est de 21°C. le confort d'été prévisible a été évalué par simulation thermique dynamique au moyen du logiciel TRNsys 17. les simulations montrent que, sans refroidissement mécanique, les températures période d'occupati

Measured thermal comfort : non connu

Acoustic comfort :

The acoustic comfort of the project has been meticulously studied by B612 associates so that foresters can have a pleasant and functional working environment.

Daylight factor : Non connu

Carbon

GHG emissions

GHG in use : 9,85 KgCO₂/m²/an

Methodology used :

next PEB calculation

Contest

Reasons for participating in the competition(s)

The project proposes an intervention and a transversal approach with a unifying concept that is clear, coherent and legible, across different scales and across different disciplines.



Landscape, topographic, climatic and architectural design and integration guided the first steps of the project.

The functional aspect was developed immediately in parallel so as to respond very precisely and adequately to the practical nature of the building. Beside the functional aspect, the human aspect, well-being and well-working, guided the architecture of the project: what spaces, what lights, what views, what relations with the outside ...

Naturally, environmental respect and wood (local) material are the guidelines of the project, both in terms of architecture and landscape, structure and special techniques: the building is very compact, passive, wood-fired, ventilated with heat recovery, responsible water management contributes to the landscape and biodiversity ...


It is a modest intervention, serving the forest and the community, which is simple, functional and poetic, within a grandiose site.

Building candidate in the category

Energie & Climats Tempérés







Bas Carbone



Santé & Confort



Smart Building



Prix du public

