

MASTER STUDIO: SUSTAINABLE ARCHITECTURE

ARCH. S. DE WACHTER, ASSOC. PROF. AND ARCH. H. BARBIER, ASSIST. PROF.

'SimplyCity': Design of an energy efficient building complex, in a renovation area at the outskirts of the city of Vilvoorde. Use of the complex: part residential, part offices and commercial activities

Pieter Peerlings and Frederik De Smet

Introduction

The design is part of an urban renovation and development project based on a campus idea at Vilvoorde (*Het Broek*). Formally, the design of the buildings is geared to the spatial environment. Conceptually (technically, constructionally, in terms of experience), the concept can be applied anywhere, possibly in other building volumes.

Flexibility

The construction is designed for both residential and office use. As such, the function can change in time.

Modulation: use of prefab floor slabs (8x8m). Freely definable accommodation.

Rentability: techniques can be freely installed thanks to the well thought out technical equipment concept.

Durability: material minimisation and technical lifetime extension. Simple construction. Design for disassembly!

Floor slabs - units

The buildings are constructed from a grid of columns supporting square floor slabs. These slabs form the residential units, which can be accommodated as desired.

Vertical park / suspended gardens

Conceived as a semi-public buffer zone, the park allows both vertical and horizontal views from the units. The advantage of the gardens is that they provide both light and a view to the outside, without too much looking in, which has a positive psychological effect on the residents. The park and the units as a whole can be compared with a garden city that goes up into the sky. The prevailing atmosphere is one of security, yet without feeling locked in. Also from an energy point of view, this concept offers numerous advantages, such as:

Orientation to all wind directions. Cooling Thermal accumulation (phase shift). Generation of a bioclimate!

Intensive land use

The quality of the residential environment has absolute priority; to allow the quantitative requirements to be met, as formulated by the municipality of Vilvoorde, we have resorted to high-rise building. This typology is converted to 'residential units', whereby each unit has its own identity and the residential qualities, as if one lived on the ground, are raised into the air, and are even improved as a result!



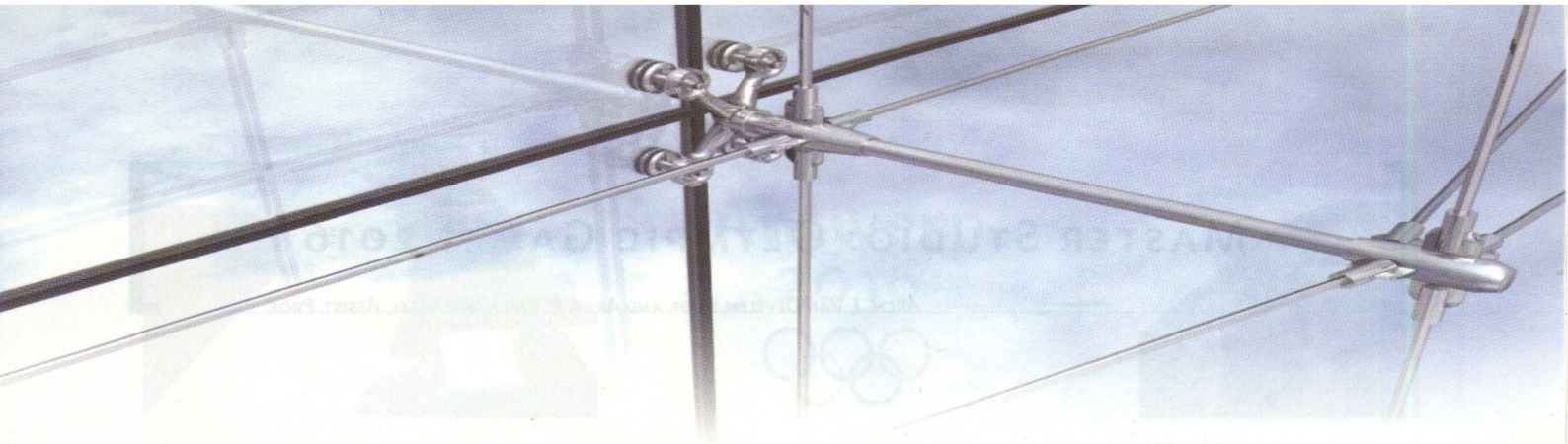
The units offer a panoramic view on Vilvoorde and the hanging gardens.



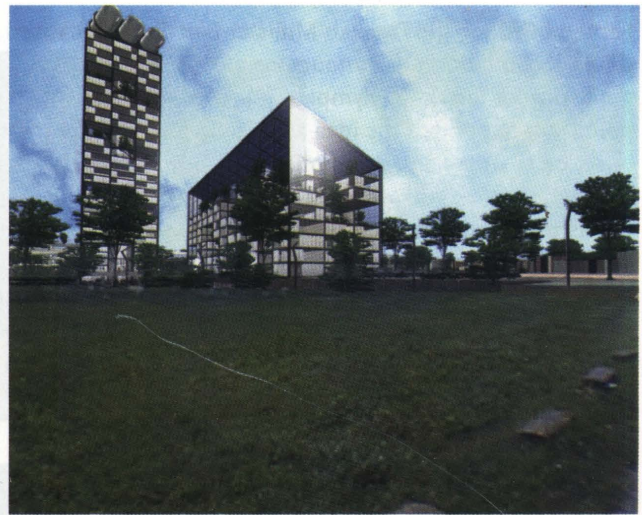
View from the marina. Three wind tunnels on top of the building provide energy for the whole complex.



The hanging gardens function as a climatological buffer.



View on the SimplyCity buildings and the shared sauaere.



View from the senior care center at the other side of the river Zenne.

Multiple space use

Space can be gained by having multiple users share the same space for as much of the time as possible. The square that is surrounded by the office tower and the residential building is an example of this. It can be used for sports and games, but also as a venue for markets or exhibitions. The hanging gardens in the building are a logical result of this concept. They are open to the public and thus take on the character of a park. The gardens are laid out so as to provide the residents with sufficient privacy in their residence and in their patch of green space.

Functional lifetime extension

The floor slabs can be reused in their entirety, the main supporting structure can be fully disassembled and therefore reused. Functional lifetime extension is guaranteed.

Livability

The recognisability of man as user of his environment is very important. No anonymous quarter but a recognisable environment. Natural materials, gardens, playgrounds, green spaces and everything that goes with it.

Security

Social: Overview, both horizontal and vertical, across the suspended gardens, and the surrounding area.

Physical: The desire for security for all should in no case lead to an area without difference in level, surveyability obtained through bareness, lack of surprises and lack of places where choices have to be made and alert reactions are required.

Participation

What the plan of the residence will look like is left to the discretion of the resident. The possibilities are limited only by the imagination of the owner. This principle is made possible through application of the flexible raised floor system.

Energy efficiency

The active façade is ideal as insulation and its annual thermal performance exceeds its thermal loss. Thus, the building acquires passive properties.

This means that its net energy demand is less than 15 kWh/m² per year.

To prevent overheating, we have opted for:

- a sun protection system in the inner skin of the cavity wall of the active façade (automatic control with manual override function)
- thermal mass
- (evaporation) cooling by waterfall system and vegetation from the suspended gardens, use of soil heat exchanger in combination with natural chimney effect and adjustable mechanical ventilation.

Material minimisation

The guiding motto of the design was: construction is finish. Minimisation of material use is possible by selectively leaving out finishes or building parts, a smart layout of the building and by applying intelligent constructions. Creative thinking is required to reap both financial benefits and environmental benefits.