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Chapter 7

Finding shared ambitions to design for change: building the AZ Groeninge hospital

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with contributions from Wim Debacker, Anne Paduart and Niels De Temmerman

Open Building thinking in Belgium

Over the past two decades, a growing awareness and understanding of the built environment's ecological and societal impacts has steadily increased the number of architectural professionals exploring how design choices affect the long-term value of buildings. Central to that exploration is the search for buildings and building components that stay relevant after the requirements that shaped them have changed.

In Belgium, indications of this slowly shifting mind-set can be seen at various levels. Examples are the recurring demand for integrative life cycle assessments and the rise of performance-based contract models (Debacker & Manshoven, 2016). Another example are so-called *Green Deals*, i.e. declarations of commitment between policy agencies and individual organizations to engage frontrunners in creating lasting, sustainable impact (Circular Flanders, 2017). Little by little, through subsidies, contract models, project briefs and assessment tools, the idea that a building should have a long-term value is being cemented in place.

This also implies Open Building principles are supported by policy makers and feature in vision documents of governments, administrations and cities (Flemish government, 2017). For example, driven by the transition towards an economy of closed material loops, the Public Waste Agency of Flanders OVAM has put the need for 'dynamic and flexible construction and renovation' center-stage in its policy programme (OVAM, 2013).

At the Flemish policy level, the term *Design for Change* is used instead of Open Building. It has a broader scope, and is defined as such:

> *Design for Change* (DfC, in Dutch: *veranderingsgericht bouwen*, literally 'change-oriented construction') *is an umbrella term for design and construction strategies acknowledging that the needs and requirements of our built environment will always change; the aim of Design for Change is to create buildings that support change more efficiently.*
>
> (Galle & Herthogs, 2015)

The term was introduced as part of a common language commissioned by the Public Waste Agency of Flanders OVAM to facilitate communication between stakeholders from multiple backgrounds (Debacker et al., 2015; Galle & Herthogs, 2015).

While Design for Change is slowly gaining ground in Belgium, the idea itself is much older. That a building must cope with different uses or is changed from time to time is inherent in the act of building, and pervasive throughout the built environment, but most of the time only implicitly. The explicit goal to create buildings that intend to support change is relatively recent. Hamdi (1991, p. 51) described how *Flexibility* became a widespread design term in the 1960's in response to new demands placed on buildings, particularly on housing, because many things considered to be standard were changing, such as typical family size and composition, or expectations of comfort and efficiency. While change is inherent to the space we continuously create, it was only around this time that the capacity for change 'became accepted as a legitimate goal of architecture and planning' (Hamdi, 1991, p. 51).

Contemporary Belgian architecture also had its flexibility frontrunners. The idea echoes for example in the design practice of Lucien Kroll (°1927), most known for his iconic participatory development of *La MéMé*, a student housing project for the medical campus of the *Université de Louvain-la-Neuve* in Brussels (1968-1971). Kroll used the uncertain and divergent needs of students in the seventies as an opportunity to leave behind the conventional programming approach, resulting in a building that could support the needs of both more traditional and more progressive students while demonstrating in the design process the need for a change in role for architects and building users (Strauven, 1976). Similarly, architect Willy Van Der Meeren (1923-2002) identified temporality as a key characteristic of our society and the environment we constructed (Van Der Meeren, 1969). Correspondingly, he designed modular prefabricated student housing units on the new campus of the *Vrije Universiteit Brussel,* founded in 1970. Though remaining unchanged for decades, their generous concrete frames are now being transformed into research facilities such as a Circular Retrofit Lab (Bruzz, 2018). Another well-known point of view is that of bOb van Reeth (°1943), the first Flemish Government Architect, who stressed the importance of generality by understanding a building as a cultural ruin; a building with the same attitude and intentions as all buildings around it, that could have been there for ages, and can stay forever (Van Reeth, 2005).

In Belgium, as in other countries, the initial explorations into Open Building and similar schools of thought of the sixties and seventies remained a niche domain within architecture. In the eighties and nineties, the call for individualism and diverse lifestyles - a key precondition for the field at that time - was replaced by the emergence of contemporary consumerism. This situation started changing from the early 2000's, when the idea that buildings ought to be designed for change rose towards the mainstream once more; this time it was strongly tied to the need to transition to a much more sustainable, less resource-intensive construction sector and built environment.

Over the past two decades, Open Building thinking has re-emerged internationally, both in architectural practice and research. On the one hand, the increased call to design buildings for change is driven by a need for a sustainable built environment, which brings with it a need for policy-making, quantification and research. Here too, current researchers are in part building on the experience of early fore-runners. For example, the *Design for Change* research conducted at the Architectural Engineering department of the Vrije Universiteit Brussel had its roots in the teachings of Willy Van Der Meeren and his colleague Hendrik Hendrickx, both design professors at the department (Galle, 2013). On the other hand, because change is inherent to the act of building, Design for Change principles have always been implicitly interwoven into architectural design, which makes it relatively easy for architects to venture into this topic based on past experiences. Almost anecdotally, Coussée & Goris Architecten's insertion of a removeable steel-and-glass café into the Medieval Great Butcher's Hall of Ghent illustrates an awareness about different paces of change in the built environment (Mattelaer, 2009). Similarly, both renowned and rapidly emerging offices, such as 51N4E, KADERSTUDIO and BC Architects & Studies, propose general structures as solutions for diverse settings and sites, to open up possibilities rather than to define use. Clearly, contemporary Belgian architectural practice demonstrates it has the potential to implement Design for Change or Open Building principles. Nevertheless, it seems to lack the coherence to respond effectively to the challenge of consistently adding long-term value to its interventions. This is where support from research and policy can play a guiding role.

The design and construction of the AZ Groeninge hospital illustrates this point. A review of the project confirms it is the result of a confluence of design insight, implied principles and increasing awareness. The hospital was the product of individual experiences and ambitions, not of a sector-wide vision. In this chapter, we examine the design choices made by Baumschlager Eberle Architekten, OSAR Architects and the larger design team, the corresponding process, and resulting advantages and disadvantages. Lessons learned are offered to complement existing approaches and could form the basis of a design framework that is, at the uptake of a new architectural paradigm, more needed than ever before.

AZ Groeninge, a hospital for the future

The AZ Groeninge hospital was built on the outskirts of the Belgian city of Kortrijk, on a fourteen-hectare (34.5 acre) unbuilt plot. AZ Groeninge is a general and teaching hospital. It accommodates various facilities and services such as twenty-two operating theatres, including a robot surgery room, and trains nursing students and clinical fellows in various specialties. On its completion in 2017, AZ Groeninge was the fifth largest hospital organization in Belgium, located on the largest hospital site of the country (AZ Groeninge, 2017). The project emerged through the consolidation of four existing hospitals in Kortrijk. In reaction to the previous fragmentation of hospital activities in the city, the ambition was to realize a centralised 'health village', characterised by an increased efficiency that would improve the delivered quality and patient satisfaction (Mattelaer, 2009).

The assignment, a forward-thinking and open design brief

To create the design, the hospital board selected a consortium of offices: Baumschlager Eberle Architekten (Austria) and OSAR Architects (Belgium). The design brief the consortium received, which at the time of writing was about 20 years old, did not ask for an adaptable or open building, like some local governments do today (for example, as part of Flanders' Green Deals). Rather the brief asked for a hospital for the future. This was an open question that required many site visits, observations and discussions with the hospital management and employees before shaping the design concept, according to discussions with Hilde Vermolen, partner of the architectural office OSAR Architects in March 2018.

Baumschlager Eberle Architekten (2018) argued that a courtyard lay-out was the most appropriate solution. The design called for five interconnected blocks, three or four levels high, with interior courtyards of about 20 by 60 meters (65 by 197 ft) meant to reduce the building's size to human proportions (Figure 1). The central courtyard was surrounded by a medical-technical block that houses the hospital's main entrance and served as a circulation hub. The versatile, 'use-neutral' design of the four surrounding blocks facilitated a phased realisation of the complex and enabled it to accommodate changes or even transformations to other functions. It was believed that the building's uniform façade gave the complex a serene appearance (Corrodi, 2007).

Figure 1: AZ Groeninge has five interconnected blocks, either three or four levels high; introducing interior courtyards of twenty by sixty meter created spaces closer to human scale, despite the large site.

The answer: architects rethinking their way of designing

'Our experience with the hospital sector triggered us to rethink our way of designing; we learned from previous projects that the design program demanded in the brief would never be built. Regulations, financing and the entire hospital landscape are changing constantly' (Vermolen, 2018). When merging the city's hospitals, the public sector's organization questioned its role and program. The chance it will again question that role in the future is also likely - history has shown a continuous fluctuation between centralised and decentralised service provision for patients (Vermolen & Ost, 2014). Unable to predict the future, Baumschlager Eberle and OSAR Architects focused on the concept of combining a capacious support with an adaptable infill.

It is important to realize that the design team did not start from a particular theory. Today, the concept Design for Change is part of an emerging discussion in the architectural and urban design discipline. At the start of the project there was indeed a historical background of Habraken's writings and resultant work by architects around the world, but the results of practical implementation were not available to the design team (Vermolen, 2018). Rather, the whole concept was based only on insights created by the design team during previous building projects within the same sector (Vermolen, 2018).

Designing for change, searching for shared ambitions

Acknowledging uncertainty, shaping ambitions and buildings

Compared to commercial real estate or office buildings, hospitals are not transformed as often. 'After all, conventionally built health care facilities, and nursing units in particular, postpone necessary refurbishments as the impact of such interventions impedes the hospital's overall operation.' (Vermolen, 2018). 'By designing and constructing with a change-oriented approach, however, refurbishments can be facilitated, fostering faster, more efficient and effective responses to changing market demands' (ibid.). Although the brief did not necessarily demand such an adaptable building, the hospital board was easily convinced of the concept Baumschlager Eberle Architekten and OSAR Architects proposed. The board's acknowledgment of uncertainty was key, as was the individual experience with construction projects in the health care sector of the advisors representing the hospital board (Vermolen, 2018).

To achieve a change-oriented building, many choices must be made, balancing concepts and functional demands with budget, location and time restrictions. 'This approach is far more interesting for us architects than the increasing administrative burdens. After all, it is a result-oriented process, determining the way the building will and can be used by the client now and in the future' (Vermolen, 2018). '[Designing for change] does not require more creativity, but holds other challenges for designers' (ibid.). Those challenges can be rephrased as follows.

First, designing for change is a unique way of thinking and working. It requires designers to question assumptions and previous choices, and to engage in new kinds of dialogue with external experts. In the context of the AZ Groeninge project, an advisory group was established with representatives of the hospital board, as well as others with specific experience in hospital management, health care procedures and medical techniques (Vermolen & Ost, 2014). They did not intervene directly in the design decision-making but were crucial to identify ongoing and emerging trends in the sector. They helped to identify the uncertainties that must be tackled in the design proposals, and the relative importance of those unknowns.

Second, the ability to maintain a design-oriented concept throughout the extensive project period relied on integrated decision making, according to Vermolen (2018). This implies that all construction disciplines involved in the hospital's design had to be addressed simultaneously, and as early as possible in the project. 'This integration is illustrated by the choice for post-tensioned flat floor slabs, avoiding the use of beams and facilitating the horizontal routing and rerouting of technical services' (ibid.). This collaborative approach avoids problems during design, fostering solid and sustainable building concepts, and ideally a future-proof building.

Third, a change-oriented building and its design process currently do not fit conventional procedures or paper-work. How does one go about requesting a building permit for a building with a program of uses that might change? Or how does one request reversible connections in a contractors' tendering procedure? One answer is finding common interests. For this to happen, each partner must look beyond the boundaries of commonly assigned tasks. For example, during the AZ Groeninge project, stakeholders wondered how the project could contribute to the accessibility from the neighbourhood, in terms of bicycling connections from the city center. In the end, the team actively participated in the redevelopment of the urban infrastructure around the site.

Baumschlager Eberle Architekten stated that '[t]oday, issues relating to the practical value of a building are largely decided by the quality of the environment it provides or by the extent to which it enables the architecture to achieve lasting added value despite quickly changing use requirements' (2018). This points towards the exploration of an interesting tension – and symbiosis – between immediate and long-term value, between generality and adaptability. The resulting design could be simplified to the separation between support and infill, but a closer examination reveals a more elaborate approach and framework, characterised by four challenges: 1) finding the optimal generality for the load bearing frame (the structural concept); 2) balancing the dependence and independence of spaces (the spatial concept); 3) negotiating the long- and short-term value of an factory-made building skin (the façade concept); and 4) deciding on whether or not to embed technical services into other building elements (the technical concept).

Finding the optimal generality, the structural concept

The load bearing structure of the hospital wings uses precast façade elements and two longitudinal rows of concrete columns, occasionally alternated with staircases, technical shafts and patios (Figure 2 and Figure 6). The three resulting longitudinal zones of 8.1, 5.4 and 8.1 meter (26.5, 17.1 and 26.5 ft) follow a 0.9-meter (3 ft) planning module that shapes the entire hospital complex. For example, a typical patient room is 3.6 meter (11.8 ft) wide, and the 4.5-meter-wide single-bed suites (14.7 ft) fit into the same structure (De Troyer et al., 2006).

Figure 2: Precast façade elements and two rows of concrete columns, alternated with staircases, technical shafts and patios, form the structure of every hospital wing.

In health care, regulations and management strategies will continue to shift, but also society's notion of healing and healthcare itself. Because of the rise of digital technologies, nanotechnical instruments, and renewed insights in health psychology, the design team also projected other functional programs onto the building structure. Minimising the number of load bearing elements in the two perimeter (longitudinal) zones of the building ensured ample freedom to develop various room layouts and enables a multi-purpose interpretation of the building. In addition, each wing has a finished floor-to-ceiling clear height of 3.61 meter (11.8 ft) on every floor (this is the height of the operating theatres), identical staircases and consistent circulation patterns and technical service schemes. As a result, each wing can easily be changed from an outpatient clinic into, for example, a nursing ward with patient rooms, changing and facility rooms, offices and consulting rooms, or even classrooms (Vermolen & Ost, 2014).

During the design phase, changes in the regulations on patient room sizes illustrated the added value of the dimensional module (Vermolen, 2018). Because the triple-bed rooms that were planned had to be replaced by rooms with one and two beds, the infill had to be redrawn. However, the elements of the load bearing structure, including mechanical system cores and shafts, did not have to be redesigned, and their specifications and related tendering documents did not need to change. Moreover, in 2013, after the completion of the first construction phase, seven 3.6-meter rooms (11.8 ft) in the maternity department were transformed into five studio rooms, without inconveniencing the hospital's operation. Thanks to a carefully planned support and infill system, the hospital management could quickly transform a surplus of rooms into a smaller set with increased user comfort and satisfaction.

The convenient, generous framework provided by a coherent building layout and straightforward structural system further encouraged the hospital management to think more systemically, and increase the robustness and resilience of the hospital's working schemes and processes. The generalised organisation of different departments, individual nursing wards and even mobile care stations, combining standard and department-specific elements wisely, resulted in freedom and efficiency when allocating staff and supply (Vermolen & Ost, 2014).

Balancing the dependence and independence of spaces, the spatial concept

AZ Groeninge has a straight-forward circulation principle that guarantees that the benefits of the planning module (i.e. the dimensioning grid) and the open load-bearing structure can be exploited in case of adaptations and transformations. As a rule, consulting rooms and laboratories are located on the lowest floors, with the related nursing departments located on the floors above; the result is that most circulation should not cross into other units. Further, a circulation network in the basement provides access to all supporting services. In the future, if there would be less demand for nursing departments, it is possible to change a wing into, for example, a care-related educational function, with its own entrance in the central hall and connection to laboratories and services.

This circulation systems also allowed the hospital to stay open during its multiple construction phases (Figure 3). For a hospital, phasing is linked to subsidies. In this case, there is a difference between the financial projects (seven) and the construction phases (two) of the complex's realization. To build a hospital, there are a minimum number of services that need to be provided (to operate as an emergency care hospital, it needs enough specialised departments); hence, the first two financial projects were realised at the same time, in the first construction phase. Afterwards, the financial (subsidy) landscape changed significantly; as a result, the next five financial projects were constructed simultaneously in the second phase.

Figure 3: A well-considered building lay-out of the hospital wings, implemented in the first construction phase, allowed the first wings to remain operational during the subsequent construction phase.

More demanding medical facilities, such as operating theatres, are clustered in the central block of the hospital and equipped with all necessary technical services, including specialised ventilation, heating and cooling installations. As the relocation and transformation of these facilities was deemed unlikely for financial reasons, it was decided to group and locate them centrally in the complex. Because of specialised HVAC requirements, the spans in this block differ from the spans in other blocks but are still a multiple of 0.9 meters (3 ft). For example, the central block's northern wing has a dimensioning grid of 10.8, 5.4 and 8.1 meter (35.4,17.7 and 26.5 ft).

Whereas the choice to group all medical-technical facilities is a pragmatic way of dealing with the generality of the support, the integration of other quasi-permanent but specific elements within that structure challenges the basic concept of changeability. This includes the thick concrete walls of the radiotherapy department, custom-designed for very specific medical equipment with very specific dimensions. As that equipment evolves as fast as other techniques, it is unclear how these 'bunkers' will be able to meet future needs, or if they might jeopardise the structure's inherent transformational potential.

Negotiating between the short- and long-term value of a factory-produced skin, the façade concept

As the façade is part of the load bearing structure, it belongs to the permanent support. The building's skin is made of prefabricated concrete elements including different types of columns, back beams, parapets, column heads and floor-column nodes (Figure 4). They give the architecture a calm unity. Floor-to-ceiling windows form a curtain wall behind these concrete elements, aligned to the 0.9-meter (3 ft) module, giving all rooms ample light. Placing the columns of the facade elements at an angle created permanent sun screens (Figure 5).

Figure 4: The prefabrication and on-site assembly of the façade reduced construction costs and enabled the designers to allocate more of the budget towards other aspects to improve the building's generality.

Figure 5: The columns of the facade elements are angled, serving as permanent sun blinds while providing the building it's serene appearance.

According to Febelarch (2018), the national organisation for manufacturers of elements in architectural concrete, prefabrication saved several hundred thousand euros. The load bearing façade helped optimize the construction cost, shifting more budget to other design features, such as the post-tensioned concrete floor slabs avoiding beams, or the production of window frames following a 1.8-meter (6 ft) grid. A general and adaptable building concept can have higher initial costs. Separating the structural façade and the curtain wall, installing a modular heating system and decentralised ventilation all require more initial material and work, but these investments are expected to deliver a return on investment throughout the life span of the building.

However, the load-bearing façade elements impede large changes to the façade. Hence, some of the elements, i.e. those that would need to be removed in subsequent construction phases, were made demountable. In addition, the reinforcement in the floors where these demountable elements were located was sized accordingly. Despite taking all the necessary precautions, the demountable façade elements were not reused during the second construction phase. Their disassembly would have impacted the functioning of the existing parts of the hospital, both in terms of general nuisance and perimeter security. Aside from their removal, reinstalling the elements would have been difficult: despite their near identical appearance, some elements are still unique (their rainwater drainage is different, fully embedded); and the (labour) costs required to carefully disassemble, move and replace a façade element would exceed the production price of a new one.

Whether or not to embed services: the technical concept

The hospital design features a clear difference between support and infill, as we know it from Habraken (Hoogstraten et al., 2000). But as shown above, in this case the goal of separation this does not necessarily result in a strict separation between load-bearing structure and skin, or between structure and technical services; the in-situ cast concrete floor slabs have a series of ducts embedded in them (Figure 6). For vertical services, the floors feature cast openings (450 by 350 mm - 1.48 by 1.15 ft), through which wastewater pipes can be placed every 2.7 meter (8.8 ft) in alignment with the columns and every 0.9 meter (3 ft) at a 1.8-meter (6 ft) offset from those columns. Tubes to hold wiring are embedded every 3.6 meter (11.8 ft) aligned to the columns or every 0.9 meter (3 ft) aligned to the façade. The post-tensioned slabs have embedded horizontal ventilation ducts with a nominal diameter of 100 mm (4 inches) every 1.8 meter (6 ft) distributing fresh air from the corridor zone to the perimeter of the building. Although the technical services in a building have a high replacement rate, these distribution ducts and pipes cannot be altered; however, the mechanical equipment can be replaced. Yet the idea of providing a large number of potential connections and aligning them to the building’s modular grid adds generality to structure and reduces or avoids entanglement of services.

Figure 6: This typical section shows how a series of ducts has been integrated in the concrete structure: by providing placeholder ducts at regular intervals in the structure, the framework for technical services adds generality to the support.

As all floor openings are strategically positioned and cast-in-place, the whole drainage system is adapted to them. All drains run in the one meter (3.2 ft) plenum space above the lowered ceiling in the corridors, directed towards one of the vertical shafts in the central zone of each wing. The central vertical shafts are sufficiently large to support a hospital program, assuring that they have sufficient capacity for any other future building function. Larger technical equipment has been housed in technical rooms on top of the building. The roof above these rooms features a special zone where a steel plate covering can be removed after the roof tiling has been cut away; this is a potential entry point to remove and replace large technical equipment.

Unfortunately, the grid-based placement of embedded ducts and pipes was not implemented in each wing of the project. Because of budget cuts in the outpatient department, the sanitary cells of these rooms do not have showers, and thus no pipe sleeve every 0.9 meter (3 ft). This reduces the future utility of that floor and increases the refurbishment costs. When the early transformations in the maternity department took place in 2013, it clearly demonstrated the added value of the general pipe and duct sleeve layout in the concrete structure, and the decision not to implement the system in every wing was regretted. The designers and the client refrained from these short-term budget cuts during the second construction phase (Vermolen, 2018).

Conclusion

The design of the AZ Groeninge hospital brought together a client with an open-ended request for a hospital for the future and an architectural consortium with experience in the health care sector. Their acknowledgement of uncertainty resulted in the ambition to create a change-oriented building and enabled an effective collaboration. Their common understanding of the long-term impacts of initial choices helped to form a vision for a general infrastructure that has the capacity to support not only its users, but also the neighbourhood, city and region.

The decision to design for change has also proven to be an effective paradigm in use, supporting the ambitions of the client even in the short term: changes in room size regulations could be implemented at the infill level, without impacting the support level, and the rooms of the maternity department were successfully transformed into suites while the hospital was in use.

One of the core challenges of an architect is deciding on the buildings’ appearance, how it should be shaped, and which components it should be constructed with. This is far from straightforward when designing for permanence and change. It forces designers to think beyond a conventional architectural program, and include time, space and budget as interdependent parameters rather than prescribed boundary conditions.

In this case, both the clients’ program and the site were two influential parameters. A hospital is a very particular, location-based building, and needs to be more adaptable per definition, because of its uniqueness – in case of something as ubiquitous as a house, people can adapt simply by moving. Less straightforward is to what extent the design for change of AZ Groeninge is related to its location on a large greenfield site. According to Vermolen (2018), the empty site was not a necessary precondition to create an open building. Nevertheless, the freedom of an open plot made it easy to make technical and spatial choices that might not be possible within an existing building or urban fabric, and which have for example helped create flexibility in allocating the budget.

Despite the success of this particular project, the research for this chapter has demonstrated that there is not a system in place to facilitate learning from this example. In case of a building designed to last for a long time, a loss of knowledge could jeopardise its long-term value. This was also noted by the design team, who wondered who would be responsible for all the information on the projects' technical possibilities, twenty or thirty years in the future. The development of a formal knowledge transfer system between building design and management seems necessary for future success. Information is available in the tendering and as-built documents, but it is difficult to interpret and thus may be difficult to use during future interventions.

This suggests that there is no single formula to produce buildings with long-term value. AZ Groeninge also demonstrates that such a formula is not indispensable to create added value; in this case, the knowledge, skills and insight needed to create a building that supports change relied on the individual experiences of those involved. However, architectural practice cannot depend on singular experiences alone if it desires to contribute to a sustainable built environment. With the understanding that the long-term value of buildings is increasingly important, developing a formal (and practical) framework to support the transfer of that knowledge, skills and insight might be a way forward – for the education of construction professionals, fostered in practice, established by regional governments, and shared through learning networks of architect and advisors. This new paradigm could be an opportunity to give a new meaning to the architectural profession at a time when it is questioned, and increase the understanding of the built environment's ecological and societal impacts.

Fact and figures of the program

Location President Kennedylaan 4, 8500 Kortrijk, Belgium (50°48'6"N 3°15'53"E).

Client AZ Groeninge, a non-profit public-private partnership between the city of Kortrijk and the Boards of the former Christian hospitals; general manager during the project was Jan Deleu.

Architect Baumschlager Eberle Architekten (Vaduz) and OSAR Architects (Antwerp) **Management** Christian Tabernigg (BE), Hilde Vermolen (OSAR), Louis Lateur (BE), Bert Van Boxelaere (OSAR) **Consultants** Topokor (infrastructure), Atelier GRAS (landscaping), Jan Van Aelst (stability), Ingenium, Sorane SIA and Lenum (services), Scala (acoustics) **Art** Dan Graham, Bernd Lohaus, Richard Venlet, Koenraad Dedobbeleer, Müller & Wehberg, Ian Kiair **Contractors** Cordeel (structural work phase 1), THV Jan De Nul & CEI De Meyer (structural work phase 2), Prefadim (façade), Albitum (green roofs), Vanhout (finishing), Electro Entreprise (electrical services), Van Maele (sanitary services), Chauffage Declercq (heating and ventilation services), Heyer (medical gases), Coopman (elevators), Aercom (pneumatic post), Honeywell (security).

Project Cost: 82 million euro ($99.6 million) (phase 1), 202 million euro ($245.4 million) (phase 2)

Schedule
2000 Start of design
2005 Start of first construction phase
2010 Completion of first phase
2012 Start of second construction phase
2017 Completion of second phase

Land area 144,000 m²
Building footprint 31,460 m²
Volume 489 485 m³
Usable area 105,280 m²

Capacity 1,054 beds (in 2017)
Hospitalizations 35,022 patients (in 2016)
Admission 248,575 days (in 2016)

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