

Circularity, a priority in the renovation of Usquare.brussels

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The police barracks are becoming a new open and multi-functional part of the city. The Usquare.brussels project aims to transform the Fritz Toussaint barracks in Ixelles into a dynamic site consisting of family homes, student accommodation, university buildings and commercial spaces. It will no longer be a closed military complex but a completely new urban space. The project will be coordinated by SAU (Société d'Aménagement Urbain), which has set very high standards in terms of sustainability, while also adopting a circular demolition strategy.

In 2018, the Brussels-Capital region bought back the 3.9 hectare site in Ixelles, previously owned by the federal state. The aim was to give a second life to these iconic buildings (covering approx. 56,000 m²), by creating a unique fusion between history and the future. At least, this was the challenge set by the SAU coordinator.

The project manager, Ann-Sophie Doesburg, and architect/urban planner Bruno Allardin explain their approach in the following terms: "We wanted to create a project that would integrate the history of the site, which dates back over 100 years, while laying foundations for the next 100 years."

SUSTAINABILITY AT THE CORE

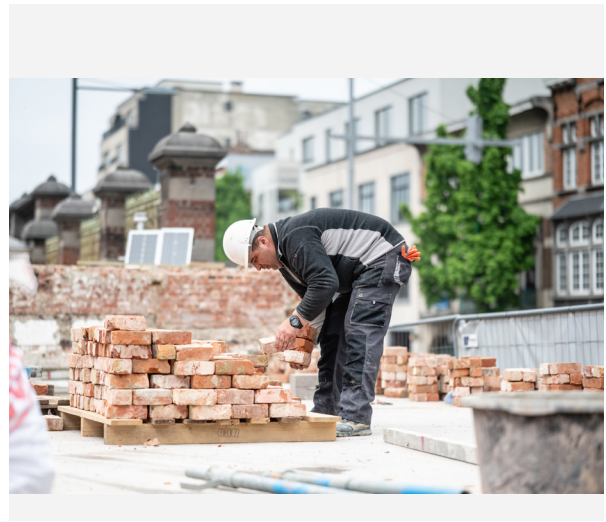
From the very beginning of the project, SAU prioritised the most sustainable possible procedures for the project. Wherever possi-

ble, the emphasis was placed on restoring the buildings in their original state, while taking account of their future use. The new



Using the BIM has made it possible to estimate quantities accurately, such as the quantity of bricks available for reuse in situ. As there were not enough of the latter for the entire construction project, reused bricks were purchased.

structures were designed to be flexible and adjustable in case of changing needs. Buildings which were not sufficiently stable had to be demolished, rather than renovated. “The principles of circular demolition and construction represent the key focus of this reconversion project. We aim at giving a second life to the recovered materials in situ. When this is not possible, we look for another location where they can be reused or examine opportunities for high quality recycling. If new materials are required, in spite of everything, we opt for products with the lowest possible impact. For example, we would consider using clay and hemp for insulation.”



Careful dismantling of bricks for reuse on-site.

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FINDING A PARTNER FOR THE CIRCULARITY PROJECT

To strengthen their strategy, the SAU launched a public call for tenders for a partner in the field of circularity. Rotor won the contract and was awarded a budget of EUR 170,000 to help define and implement a circular strategy over a four-year period. The aim was to develop a BIM (Building Information Modeling) combined with an inventory of reusable elements. Ann-Sophie Doesburg and Bruno Allardin explain: “By gathering information on available materials, our idea was to enable the architects, engi-

neers and contractors involved to easily give a second life to these existing elements. Recording and sharing this data allowed all stakeholders involved in the project to access data concerning dimensions, quantities, composition, location on site and physical properties of the materials. This information also served as a basis for evaluating the strategy in terms of economic, technical and environmental indicators.” On average, each element covered about twenty pages in the materials inventory.

USING THE BIM AS A BASIC TOOL FOR CIRCULAR DEMOLITION

It was decided to develop a BIM model solely for buildings intended for renovation. “The aim was that this model could also be used during the life of the building”, explain Ann-Sophie Doesburg and Bruno Allardin. Rotor provided in-depth training so that all the parties involved, including architects

and contractors, could work on this basis. Using the materials inventory and the BIM model, two end-of-life scenarios were modelled for each building. Lionel Billet from Rotor explains: “The question is: should we try to conserve as much as possible, or is it better to carry out a thorough renovation?

We study the impact of each scenario in terms of maintenance, we assess the quantities of materials available for reuse or recycling, we examine the needs in terms of reuse materials, etc.” In this particular case, the scenarios clearly demonstrated that the ‘circular demolition and reuse’ approach was feasible.

A COMPLEX EXERCISE

All we had to do was get down to work! But it would be no easy task. Although Rotor could boast of its pioneering role in the field of circularity, they did not yet have any BIM experts on their team. “So the process took longer. At the request of the BIM model designer, we regularly returned to the site to take additional measurements. And when the model contained too much detail, making the demolition process more complex, we had to realise that the level of detail was not sufficient for the ‘construction’ part. In the end, this result-



Dismantled tiles are cleaned then packaged for reuse at a later stage.

ed in several BIM models, when it would have been precisely beneficial to have a BIM model for re-use that could be just as useful to the architects as to the construction team. All those involved therefore need to be fully informed in advance of the details that they need to prepare effectively for their work. But the objective really is to integrate the developed BIM models into an as built BIM model that applies throughout the lifespan of each building”, explains Lionel Billet.

USING THE CENTRAL HALL AS A PROJECT STORAGE SPACE

Despite the existing challenges, the BIM model has been extremely valuable for the circular demolition of buildings in situ and reuse of recovered materials. “As we were working with a complex set of buildings, the BIM model was the perfect guide when it came to identifying materials that could be used in situ, as well as assessing the required storage volume.” Part of the M

building, located in the middle of the site, was up as a storage and ‘marketplace’ area. This was where bricks recovered from demolished buildings, amongst other elements, could be stored before being reused in new buildings. This information was easily accessible for the contractor and other interested parties.

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A RESULT THAT EXCEEDED EXPECTATIONS

“In addition, we used the BIM to estimate volumes of reused materials and waste

generated. We used this information to generate scenarios and also to establish

minimum requirements for reuse and recycling.” These requirements related not only to the minimum quantity of materials to be recovered for re-use or recycling, but also to the volume of re-used and recycled materials to be used as part of the renovation project. “These were lower limits”, add Ann-Sophie Doesburg and Bruno Allardin. It was then up to the bidders to

come up with creative solutions to comply with these criteria. Ann-Sophie Doesburg and Bruno Allardin also tell us that “thanks to the detailed preparations made possible by the BIM model, our expectations were greatly exceeded in this respect. We received tenders that were certainly ambitious, but in tune with the reality of the building.”

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The grand hall, converted into a vast covered storage space for new products and reused components.